MSC MARC finite element analysis software usage course

Course lecturer: Kristóf Bobor, PhD
Presentation: Alexandra Kemény

Course data

- 5×3 h course
- 12 participants
- Online platform via MS Teams

- Finite element analysis basics
- MSC MARC basics
- Material properties
- Forming and welding processes

Part 1

Installing and licensing the software (Marc Mentat 2019 Feature Pack 1)

MSC Marc units

	N-mm-s-K	N-m-s-K (SI)
force	1 N	1 N
distance	1000 mm	1 m
time	1 s	1 s
mass	$1{\cdot}10^{-3}$ Mg	1 kg
stress	$1{\cdot}10^{-6}$ MPa	1 Pa
energy, work	$1{\cdot}10^{3}$ Nmm	1 J (Nm)
Young's modulus	$1{\cdot}10^{-6}$ MPa	1 Pa
density	$1{\cdot}10^{-12}$ Mg/mm^3	1 kg/m^3
conductivity (K)	1 Nmm/(mmK)	1 W/(mK)
specific heat	$1{\cdot}10^{6}$ mm^2/(s^2 K)	1 J/(kg K)
film coefficient (face film)	$1{\cdot}10^{-3}$ Nmm/(mm^2 K)	1 W/(m^2 K)
latent heat	$1{\cdot}10^{6}$ Nmm/Mg	1 J/kg
thermal expansion coefficient	1 1/K	1 1/K

MSC Marc stress-strain calculations

			Stress	Strain
Small strain	-		Engin.	Engin.
	Large rotation		Engin.	Engin.
Large Strain	Total Lagrange		II. Piola-Kirchhof	Green-Lagrange
	Updated Lagrange	Adaptive decomposition	True (Cauchy)	True
		Multiplicative decomposition	True (Cauchy)	True

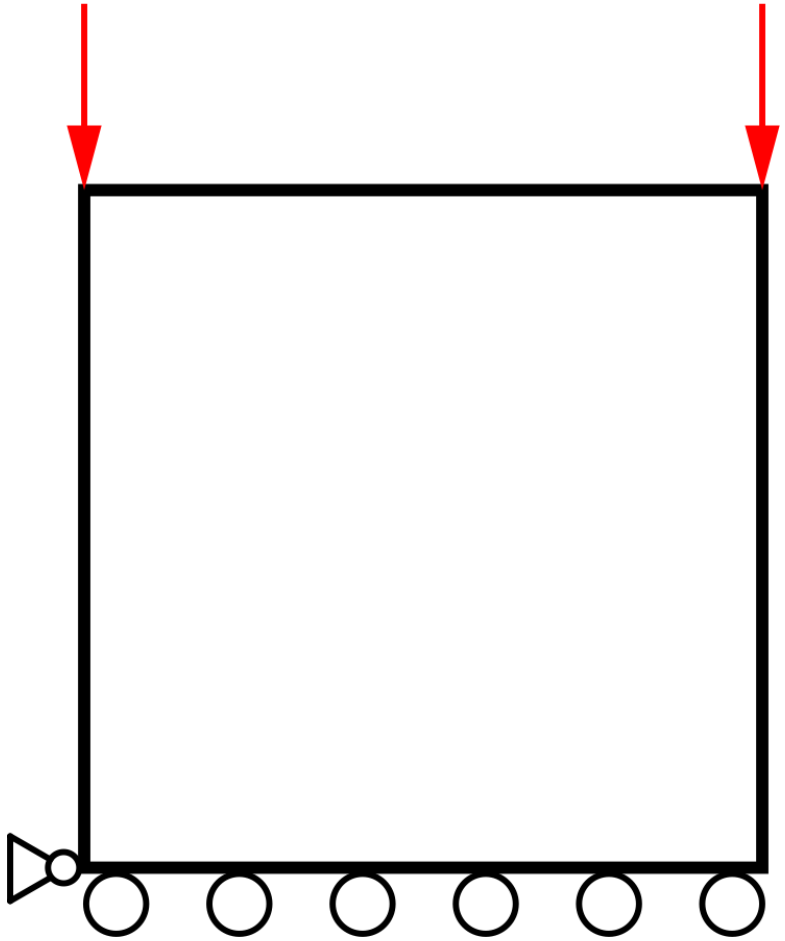
Basics

- Overview of the program
  - Plot control – visible controls settings
- Creating an element
  - First creating the nodes, then adding element
  - Import from 3D model
- Mesh refinement
  - Geometry and Mesh – operations – subdivide
- Platin strain – 2D geometry with thickness
- Job
  - Job results settings
  - Output file – error message decoding

Exercise 1&2
Deforming a simple object

Exercise 1

- Fixed x=0 displacement on bottom
- Fixed y=0 displacement from left bottom
- Fixed y=0.02 displacement on top sides



Marc Mentat 2019 Feature Pack 1 (64bit): sik_alakv_1_elem_job1.t16 - [Model (View 1)]

Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

sik_alakv_1_elem_job1.t16

Deformed Shape Settings

Style: Deformed

Deformation Scaling

Manual | Automatic

Uniform

Factor: 30 | Factor: 31.9648

Copy -> Manual

Show Factor | Header

Harmonic Analysis

Phase (Deg): 0 | Reset

Real Part | Imaginary Part

Edges: Full | Surface | Outline

Original: Full | Surface | Outline

Find Solid Outline

Outline Angle: 60

OK

Settings

Style: Off

Tensor: Total Strain

Beam Diagram

Settings

Style: Off

Unpost | Isolate | Delta

Track Plot | Flowlines

OK

Inc: 1
Time: 1.000e+00

MSC Software

4 16 22 28 34 3
39
38
37
36
2

Y
X

lcase1

1

Number of increments detected : 2
Command > *post_next
Command > *post_prev
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): sik_alakv_1_elem_job1.t16 - [Model (View 1)]

Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

- sik_alakv_1_elem_job1.t16
  - Mesh (61)
  - Geometric Properties (1)
  - Materials (1)
    - Standard (1)
  - Sets (3)

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: *Equivalent Von Mises Stress*

Vector Plot
Settings
Style: Off
Vector: *Displacement*

Tensor Plot
Settings
Style: Off
Tensor: *Total Strain*

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 1
Time: 1.000e+00

MSC Software

9.979e+02
9.057e+02
8.135e+02
7.213e+02
6.291e+02
5.369e+02
4.446e+02
3.524e+02
2.602e+02
1.680e+02
7.579e+01

Max: 9.979e+02 @Node 4
Min: 7.579e+01 @Node 19

lcase1
Equivalent Von Mises Stress
1

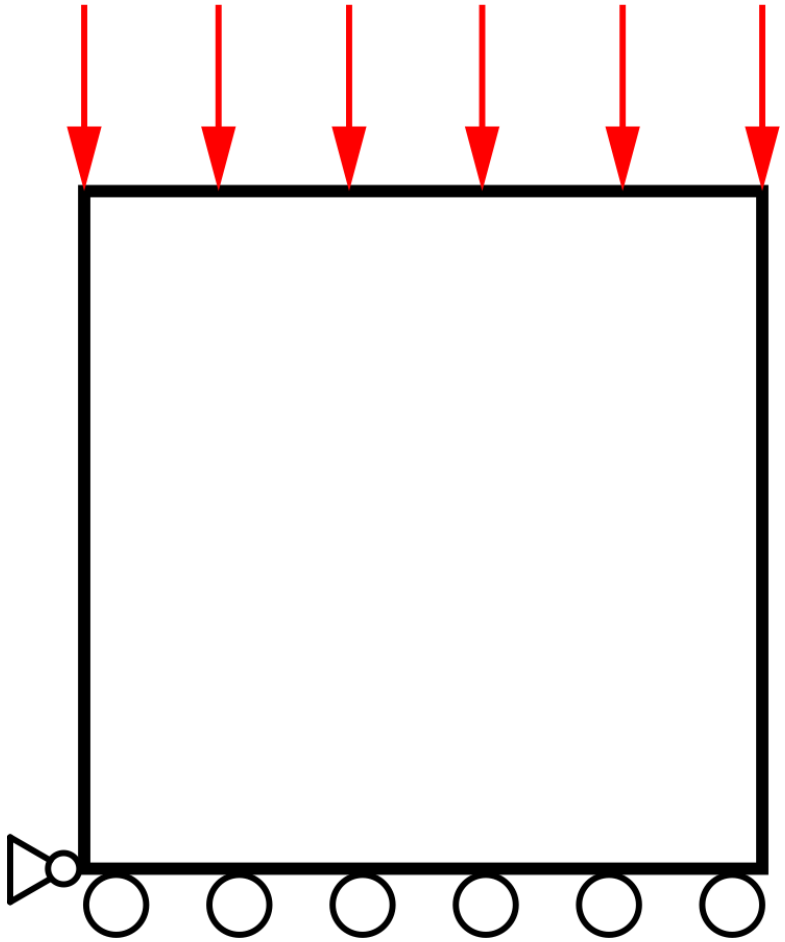
Command > *post_next
Command > *set_defmag 30
Enter uniform deformation scale factor : *post_contour_bands
Enter uniform deformation scale factor : *set_autorange on
Command >

Dynamic Menu | Model Navigator

Ready

Exercise 2

- Fixed x=0 displacement on bottom
- Fixed y=0 displacement from left bottom
- Fixed y=0.02 displacement on top line



Marc Mentat 2019 Feature Pack 1 (64bit): sik_alakv_1_elem.mud - [Model (View 1)]

Select View Tools Mode Window Help

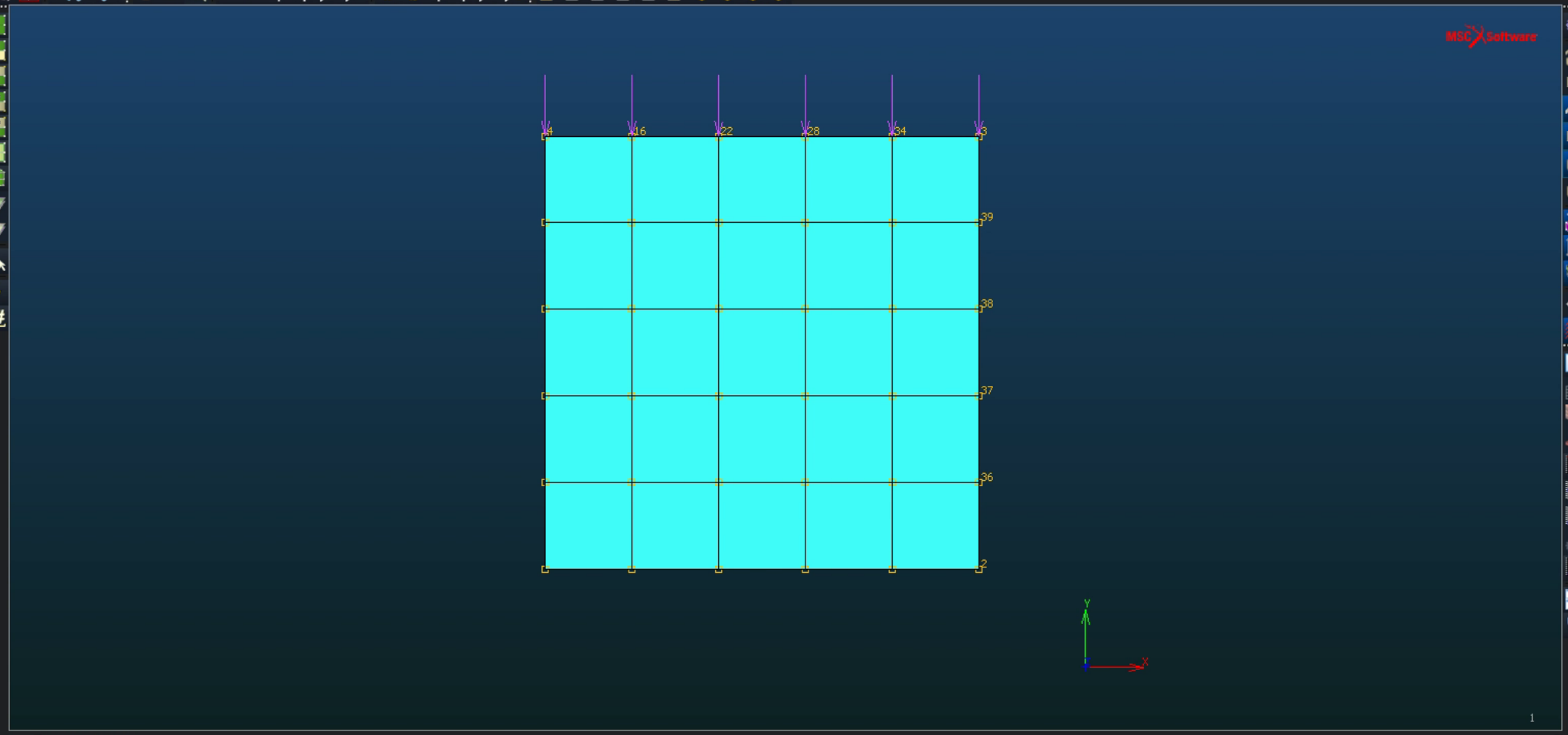
Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

New (Structural) | New (General) | Tools | Properties
Show Menu | Identify
New (State Variable) | Edit | Plot Settings
Boundary Conditions

Model | List

- sik_alakv_1_elem
  - Mesh (61)
  - Geometric Properties (1)
    - Structural Plane Strain (1)
      - sik_alakvaltozas
  - Materials (1)
    - Standard (1)
      - acel
  - Boundary Conditions (3)
    - Structural Fixed Displacement (3)
      - y_megtamasztas
      - x_megtamasztas
      - y_elmozdulas
  - Loadcases (1)
    - Structural Static (1)
      - lcase1
  - Jobs (1)
    - Structural (1)
      - job1
  - Sets (3)
    - Nodes (3)
      - y_megtamasztas_nodes
      - x_megtamasztas_nodes
      - y_elmozdulas_nodes



Enter apply name :
Command > *add_apply_nodes
Enter add apply node list : 16 22 28 34
Enter add apply node list : # | End of List

Dialog
Enter add apply node list :

Dynamic Menu | Model Navigator

Ready

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Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

sik_alakv_1_elem_job1.t16
- Mesh (61)
- Geometric Properties (1)
- Materials (1)
  - Standard (1)
- Sets (3)

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

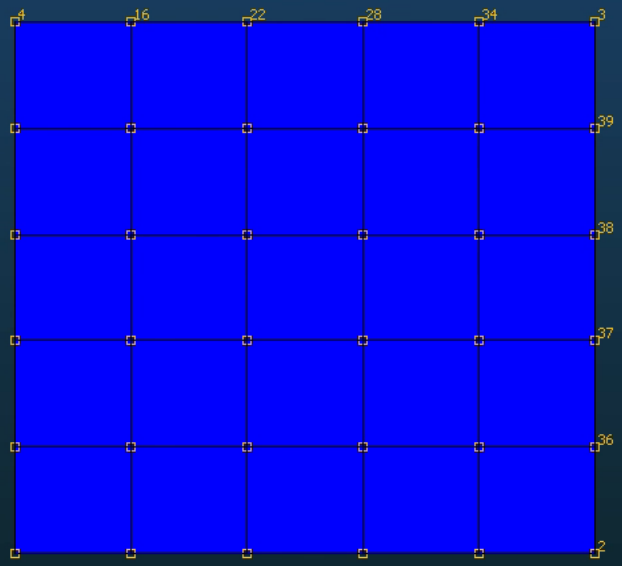
Tensor Plot
Settings
Style: Off
Tensor: Total Strain

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 1
Time: 1.000e+00

4.113e+02
4.109e+02
4.105e+02
4.101e+02
4.097e+02
4.092e+02
4.088e+02
4.084e+02
4.080e+02
4.076e+02
4.072e+02



Max: 4.072e+02 @Node 1
Min: 4.072e+02 @Node 1

lcase1
Equivalent Von Mises Stress
1

Command > *post_prev
Command > *post_next
Command > *post_prev
Command > *post_next
Command >

Dynamic Menu | Model Navigator

Ready

Exercise 3&4 - Beam Explained step-by-step

Exercise 3

- Fixed x=0, y=0 and z=0 displacement on left side
- Point load (y direction) on right end

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Rec

Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Basic Manipulation: Length Unit; Geometry & Mesh; Renumber

Pre-Automesh: Check/Repair Geometry; Curve Divisions; Solid Mesh Seeds

Automesh: Curves; Volumes; Planar; 2-D Rebars; Surfaces

Operations: Attach; Convert; Expand; Move; Solids; Sweep; Change Class; Defeature; Imprint; Relax; Stretch; Symmetry; Check; Duplicate; Intersect; Revolve; Subdivide

Coordinate System: Grid; Edit

Model Sections: New; Identify; Properties; Show Menu; Plot Settings; Edit; Template File

Model | List

- tarto_1
  - Mesh (62)

MSC Software

3 4 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 24

Y X

1

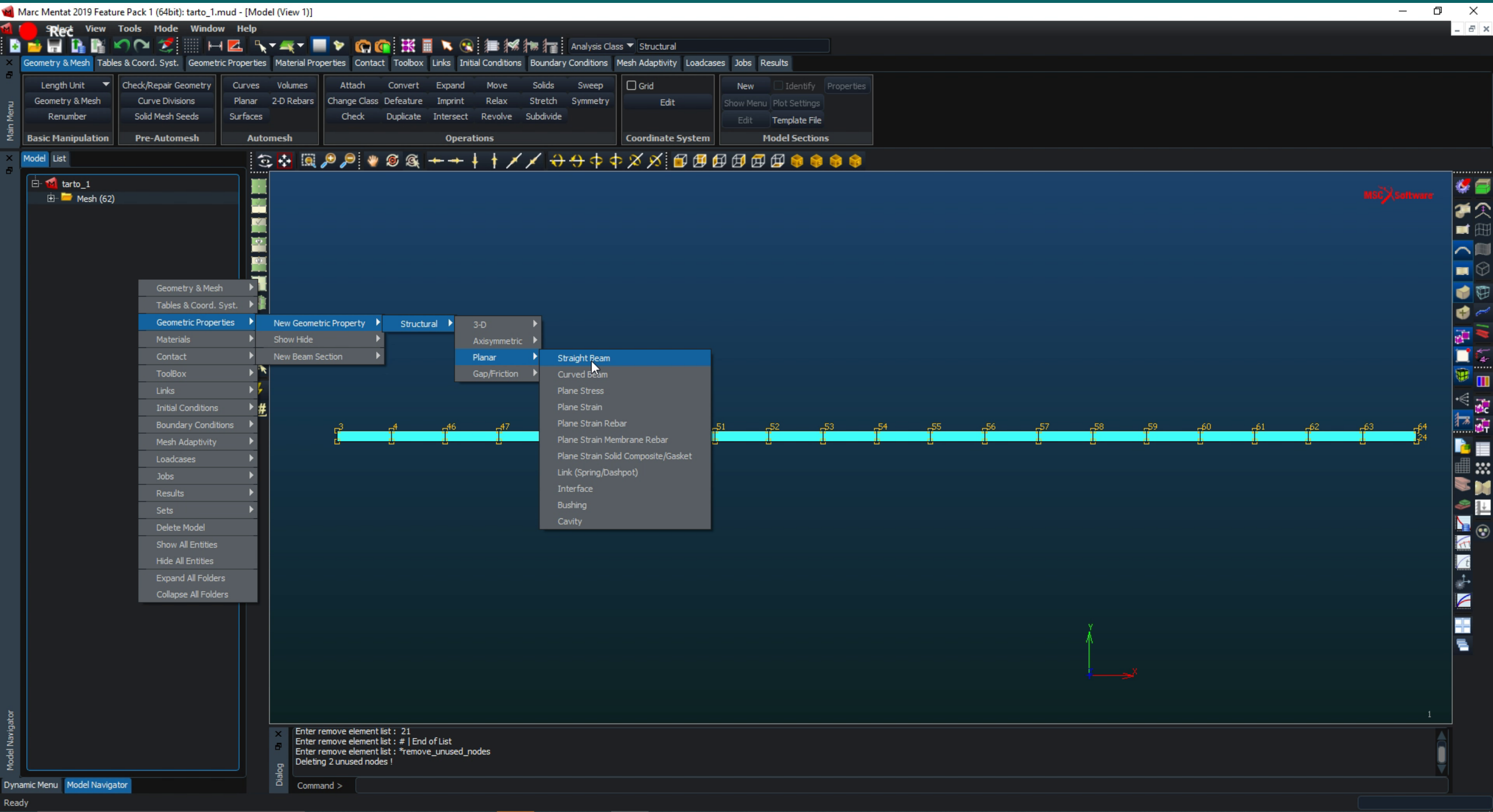
Enter remove element list : 21
Enter remove element list : # | End of List
Enter remove element list : *remove_unused_nodes
Deleting 2 unused nodes !

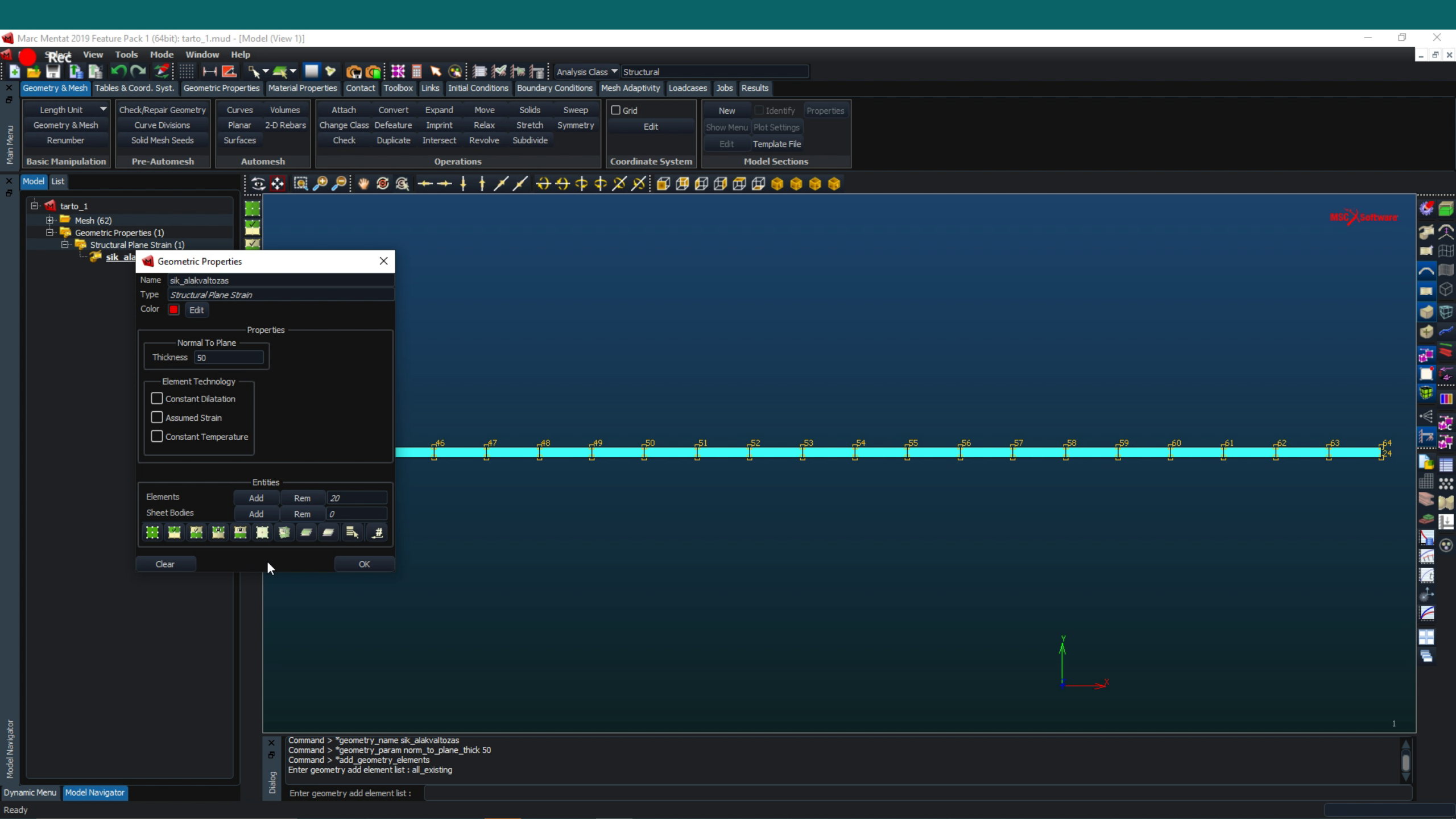
Command >

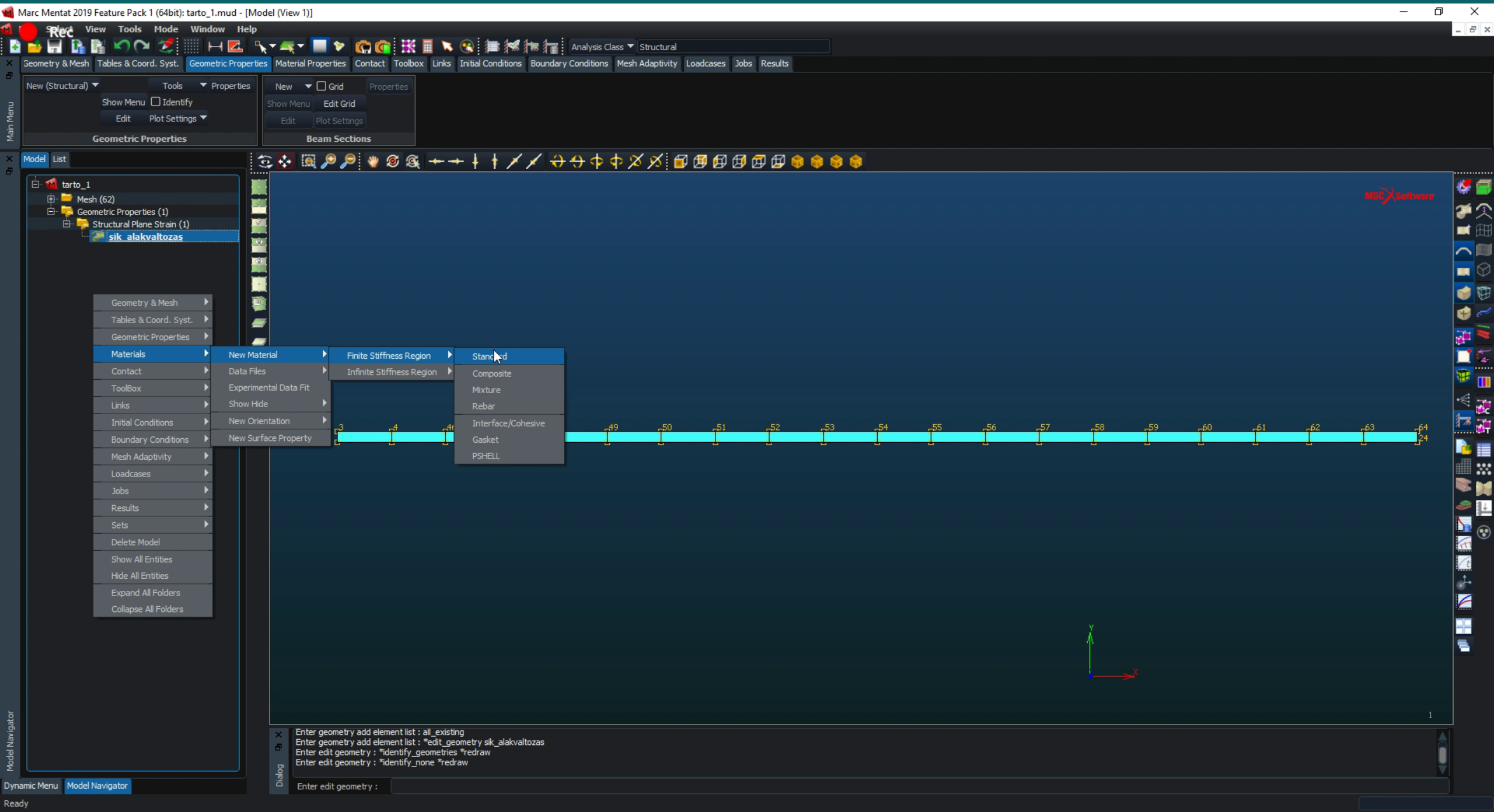
Dialog

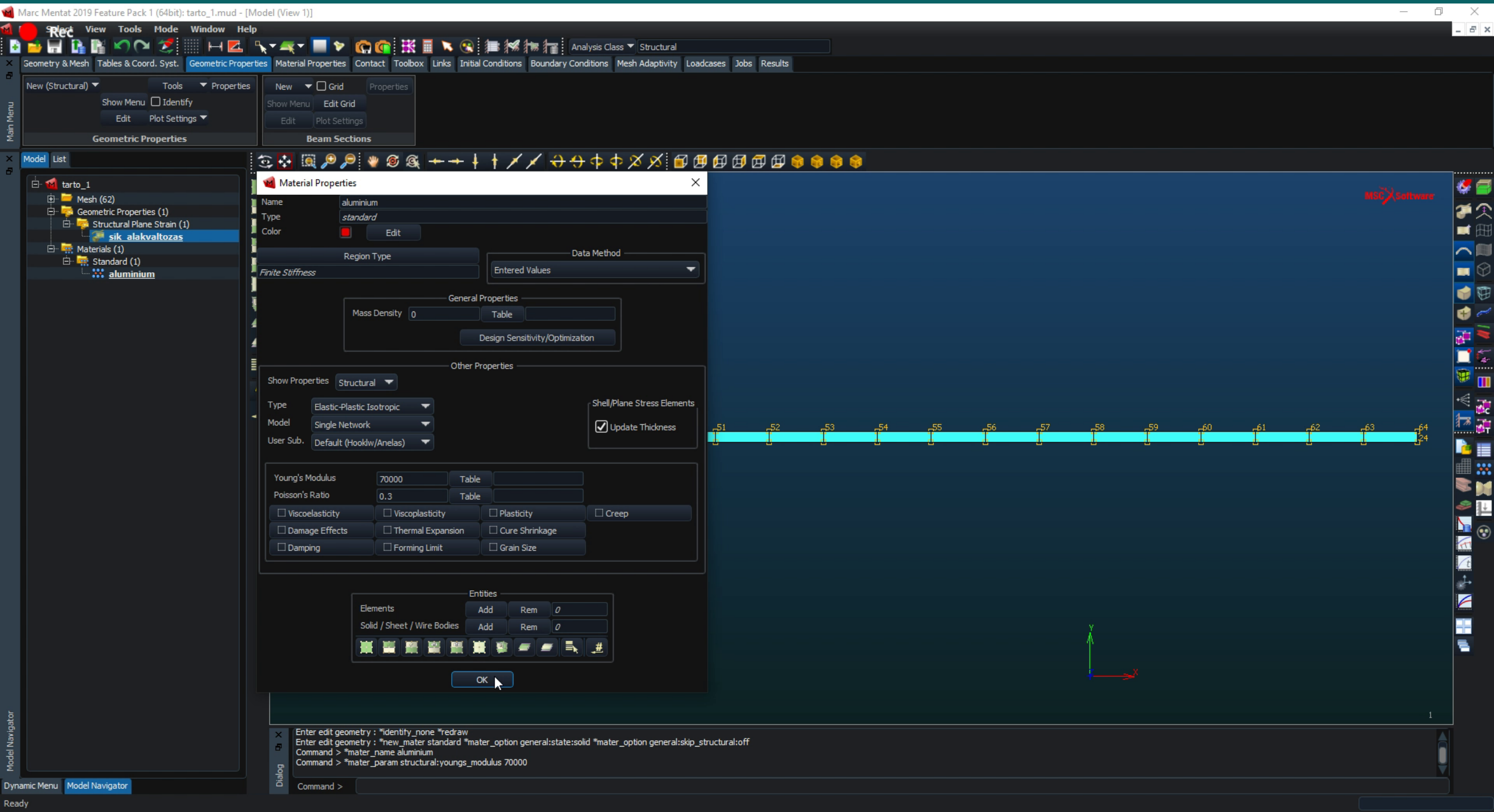
Main Menu | Model Navigator | Dynamic Menu | Model Navigator

Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
File View Tools Mode Window Help
Analysis Class
Structural
Geometry & Mesh
Tables & Coord. Syst.
Geometric Properties
Material Properties
Contact
Toolbox
Links
Initial Conditions
Boundary Conditions
Mesh Adaptivity
Loadcases
Jobs
Results
Length Unit
Geometry & Mesh
Renumber
Basic Manipulation
Check/Repair Geometry
Curve Divisions
Solid Mesh Seeds
Pre-Automesh
Curves
Volumes
Planar
2-D Rebars
Surfaces
Automesh
Attach
Convert
Expand
Move
Solids
Sweep
Change Class
Defeature
Imprint
Relax
Stretch
Symmetry
Check
Duplicate
Intersect
Revolve
Subdivide
Operations
Grid
Edit
Coordinate System
New
Identify
Properties
Show Menu
Plot Settings
Edit
Template File
Model Sections
Model
List
tarto_1
Mesh (62)
Geometry & Mesh
Tables & Coord. Syst.
Geometric Properties
Materials
Contact
ToolBox
Links
Initial Conditions
Boundary Conditions
Mesh Adaptivity
Loadcases
Jobs
Results
Sets
Delete Model
Show All Entities
Hide All Entities
Expand All Folders
Collapse All Folders
New Geometric Property
Show Hide
New Beam Section
Structural
3-D
Axisymmetric
Planar
Gap/Friction
Straight Beam
Curved Beam
Plane Stress
Plane Strain
Plane Strain Rebar
Plane Strain Membrane Rebar
Plane Strain Solid Composite/Gasket
Link (Spring/Dashpot)
Interface
Bushing
Cavity
MSC Software
Enter remove element list : 21
Enter remove element list : # | End of List
Enter remove element list : *remove_unused_nodes
Deleting 2 unused nodes !
Dialog
Command >
Dynamic Menu
Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Length Unit
Geometry & Mesh
Renumber
Basic Manipulation
Check/Repair Geometry
Curve Divisions
Solid Mesh Seeds
Pre-Automesh
Curves Volumes
Planar 2-D Rebars
Surfaces
Automesh
Attach Convert Expand Move Solids Sweep
Change Class Defeature Imprint Relax Stretch Symmetry
Check Duplicate Intersect Revolve Subdivide
Operations
Grid
Edit
Coordinate System
New Identify Properties
Show Menu Plot Settings
Edit Template File
Model Sections
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_ala
Geometric Properties
Name sik_alakvaltozas
Type Structural Plane Strain
Color Edit
Properties
Normal To Plane
Thickness 50
Element Technology
Constant Dilatation
Assumed Strain
Constant Temperature
Entities
Elements Add Rem 20
Sheet Bodies Add Rem 0
Clear
OK
MSC Software
46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
24
Command > *geometry_name sik_alakvaltozas
Command > *geometry_param norm_to_plane_thick 50
Command > *add_geometry_elements
Enter geometry add element list : all_existing
Dialog
Enter geometry add element list :
Dynamic Menu Model Navigator
Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
New (Structural) Tools Properties
Show Menu Identify
Edit Plot Settings
Geometric Properties
New Grid Properties
Show Menu Edit Grid
Edit Plot Settings
Beam Sections
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_alakvaltozas
Geometry & Mesh
Tables & Coord. Syst.
Geometric Properties
Materials
Contact
ToolBox
Links
Initial Conditions
Boundary Conditions
Mesh Adaptivity
Loadcases
Jobs
Results
Sets
Delete Model
Show All Entities
Hide All Entities
Expand All Folders
Collapse All Folders
New Material
Data Files
Experimental Data Fit
Show Hide
New Orientation
New Surface Property
Finite Stiffness Region
Infinite Stiffness Region
Standard
Composite
Mixture
Rebar
Interface/Cohesive
Gasket
PSHELL
MSC Software
Enter geometry add element list : all_existing
Enter geometry add element list : *edit_geometry sik_alakvaltozas
Enter edit geometry : *identify_geometries *redraw
Enter edit geometry : *identify_none *redraw
Enter edit geometry :
Dialog
Dynamic Menu
Model Navigator
Ready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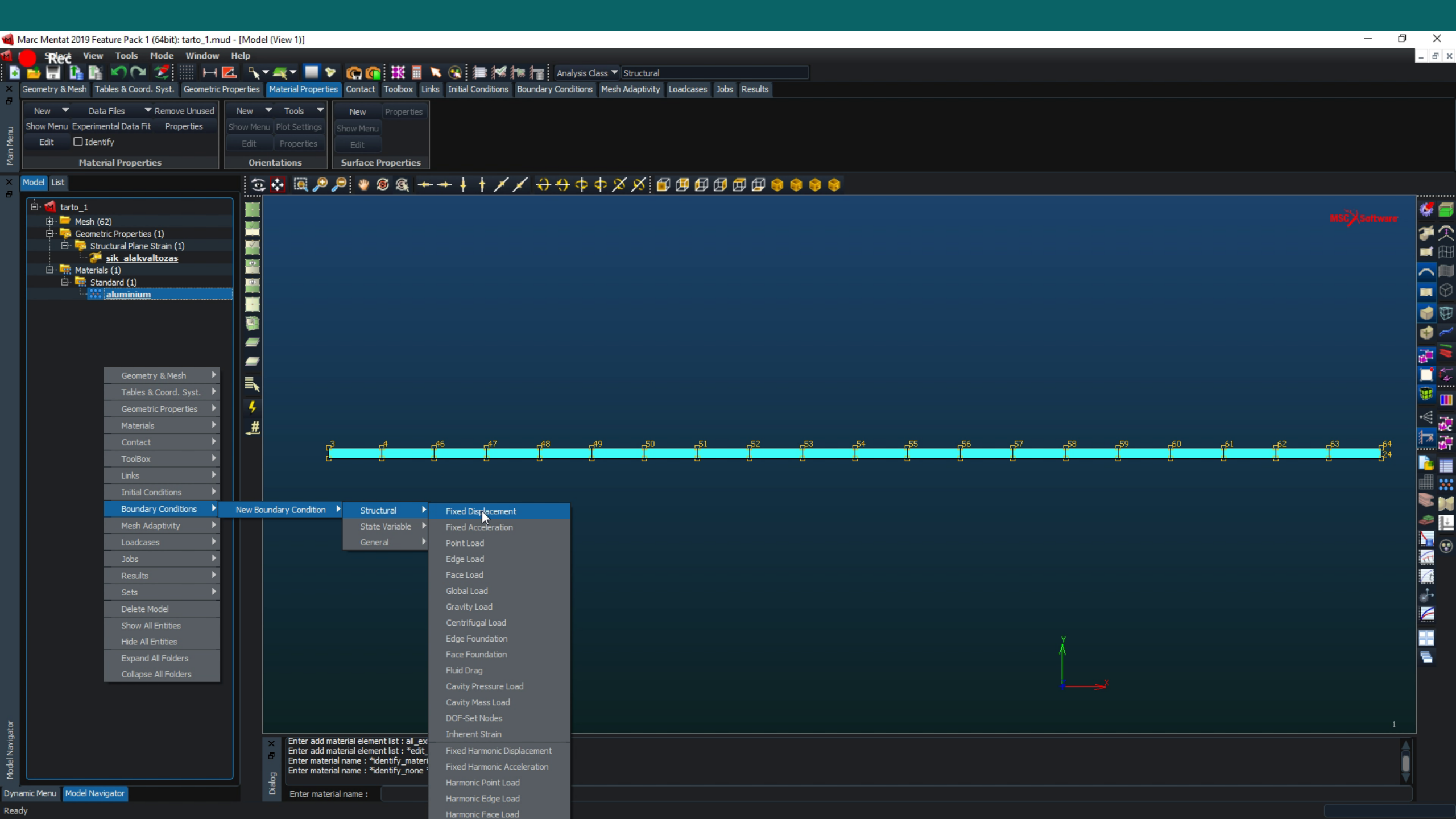
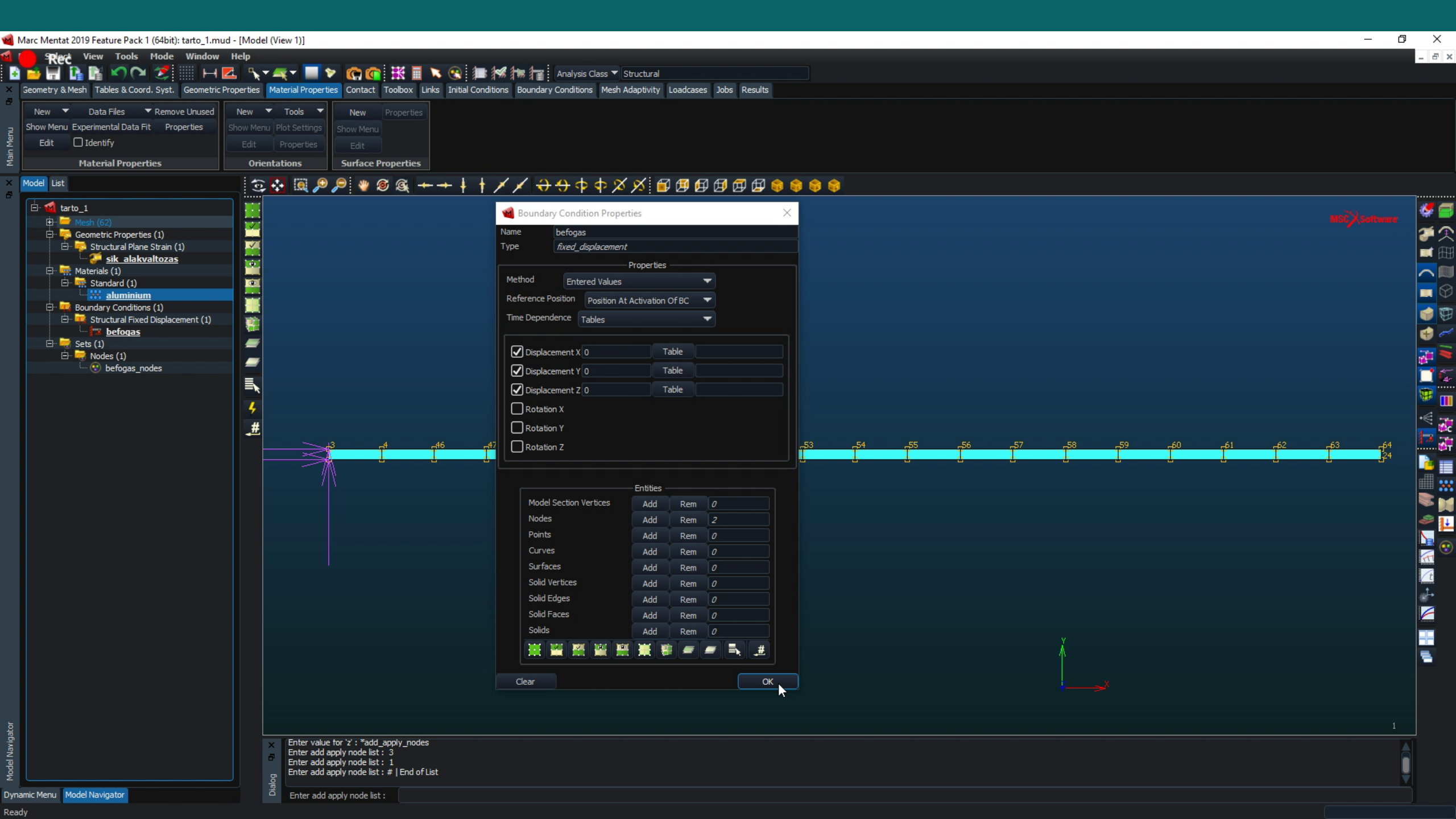
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
New (Structural) Tools Properties
Show Menu Identify
Edit Plot Settings
Geometric Properties
New Grid Properties
Show Menu Edit Grid
Edit Plot Settings
Beam Sections
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_alakvaltozas
Materials (1)
Standard (1)
aluminium
Material Properties
Name aluminium
Type standard
Color Edit
Region Type
Finite Stiffness
Data Method
Entered Values
General Properties
Mass Density 0 Table
Design Sensitivity/Optimization
Other Properties
Show Properties Structural
Type Elastic-Plastic Isotropic
Model Single Network
User Sub. Default (Hooklw/Anelas)
Shell/Plane Stress Elements
Update Thickness
Young's Modulus 70000 Table
Poisson's Ratio 0.3 Table
Viscoelasticity Viscoplasticity Plasticity Creep
Damage Effects Thermal Expansion Cure Shrinkage
Damping Forming Limit Grain Size
Entities
Elements Add Rem 0
Solid / Sheet / Wire Bodies Add Rem 0
OK
MSC Software
51 52 53 54 55 56 57 58 59 60 61 62 63 64
Enter edit geometry : *identify_none *redraw
Enter edit geometry : *new_mater standard *mater_option general:state:solid *mater_option general:skip_structural:off
Command > *mater_name aluminium
Command > *mater_param structural:youngs_modulus 70000
Command >
Dynamic Menu Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
New Data Files Remove Unused
Show Menu Experimental Data Fit Properties
Edit Identify
Material Properties
New Tools
Show Menu Plot Settings
Edit Properties
Orientations
New Properties
Show Menu
Edit
Surface Properties
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_alakvaltozas
Materials (1)
Standard (1)
aluminium
Geometry & Mesh
Tables & Coord. Syst.
Geometric Properties
Materials
Contact
ToolBox
Links
Initial Conditions
Boundary Conditions
Mesh Adaptivity
Loadcases
Jobs
Results
Sets
Delete Model
Show All Entities
Hide All Entities
Expand All Folders
Collapse All Folders
New Boundary Condition
Structural
State Variable
General
Fixed Displacement
Fixed Acceleration
Point Load
Edge Load
Face Load
Global Load
Gravity Load
Centrifugal Load
Edge Foundation
Face Foundation
Fluid Drag
Cavity Pressure Load
Cavity Mass Load
DOF-Set Nodes
Inherent Strain
Fixed Harmonic Displacement
Fixed Harmonic Acceleration
Harmonic Point Load
Harmonic Edge Load
Harmonic Face Load
MSC Software
Enter material name :
Dynamic Menu Model Navigator
Ready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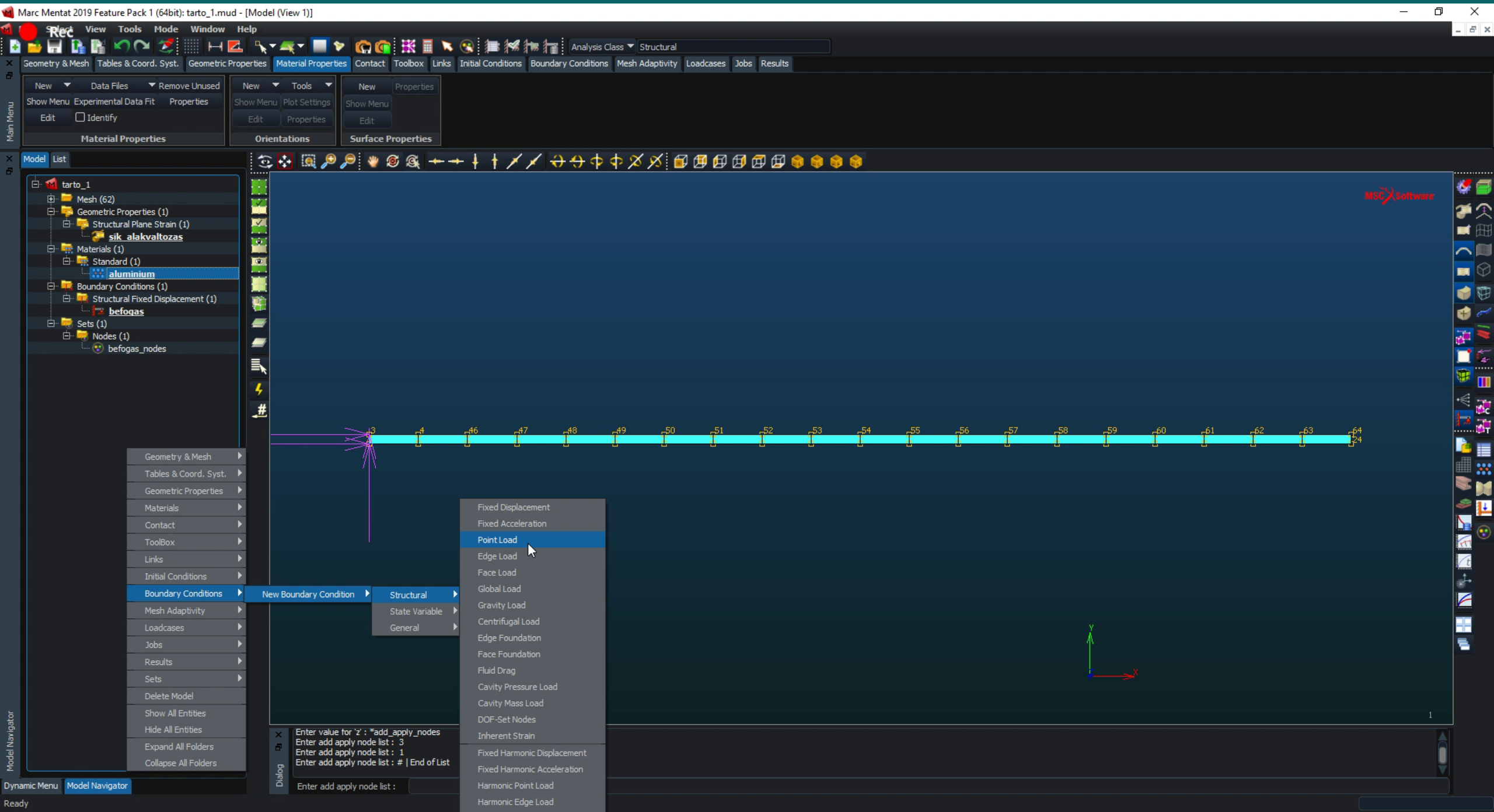
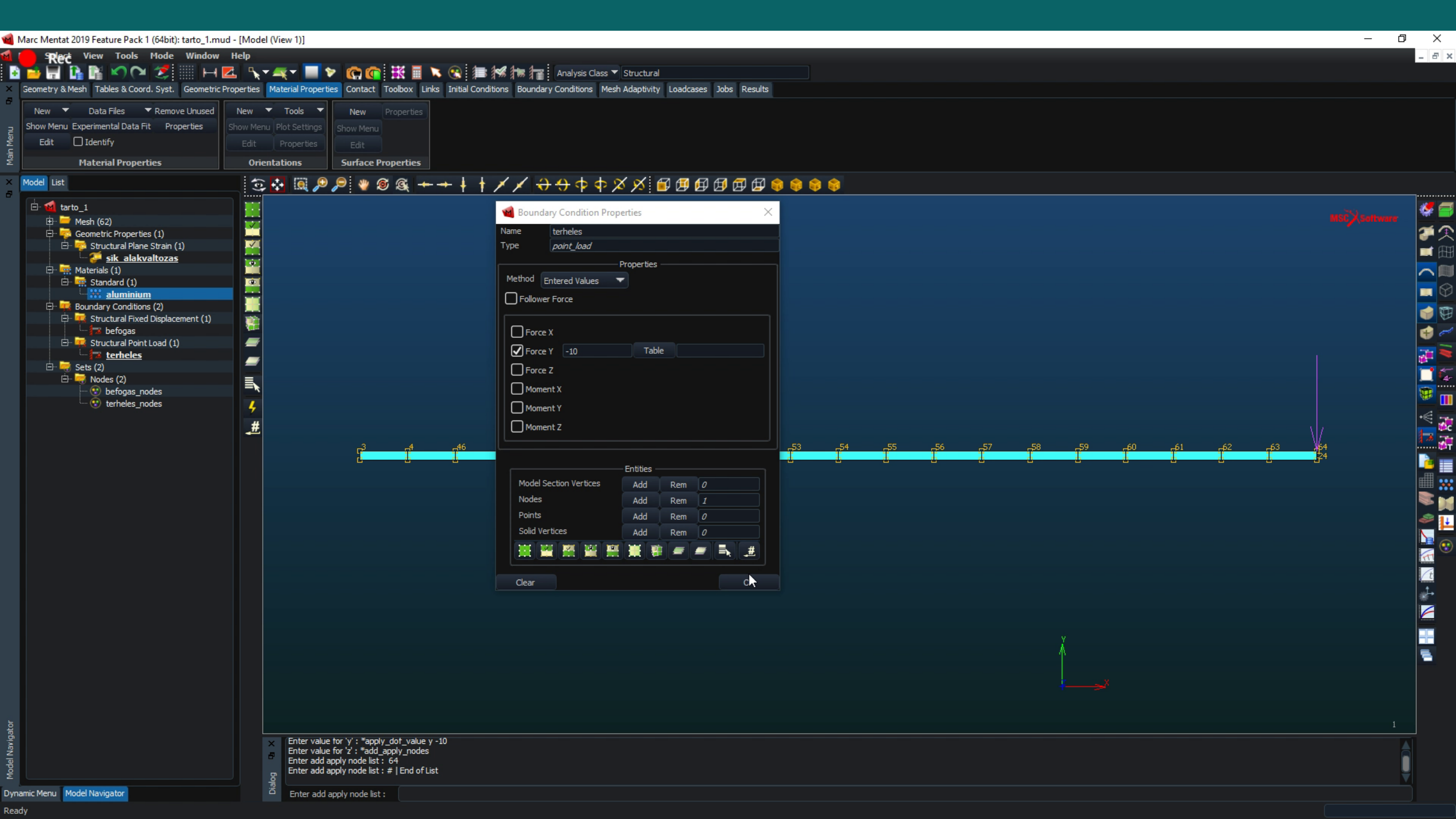
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
New Data Files Remove Unused
Show Menu Experimental Data Fit Properties
Edit Identify
Material Properties
New Tools
Show Menu Plot Settings
Edit Properties
Orientations
New Properties
Show Menu
Edit
Surface Properties
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_alakvaltozas
Materials (1)
Standard (1)
aluminium
Boundary Conditions (1)
Structural Fixed Displacement (1)
befogas
Sets (1)
Nodes (1)
befogas_nodes
Boundary Condition Properties
Name befogas
Type fixed_displacement
Properties
Method Entered Values
Reference Position Position At Activation Of BC
Time Dependence Tables
Displacement X 0 Table
Displacement Y 0 Table
Displacement Z 0 Table
Rotation X
Rotation Y
Rotation Z
Entities
Model Section Vertices Add Rem 0
Nodes Add Rem 2
Points Add Rem 0
Curves Add Rem 0
Surfaces Add Rem 0
Solid Vertices Add Rem 0
Solid Edges Add Rem 0
Solid Faces Add Rem 0
Solids Add Rem 0
Clear
OK
MSC Software
Enter value for 'z' : *add_apply_nodes
Enter add apply node list : 3
Enter add apply node list : 1
Enter add apply node list : # | End of List
Enter add apply node list :
Dynamic Menu Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
New Data Files Remove Unused
Show Menu Experimental Data Fit Properties
Edit Identify
Material Properties
New Tools
Show Menu Plot Settings
Edit Properties
Orientations
New Properties
Show Menu
Edit
Surface Properties
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_alakvaltozas
Materials (1)
Standard (1)
aluminium
Boundary Conditions (1)
Structural Fixed Displacement (1)
befogas
Sets (1)
Nodes (1)
befogas_nodes
Geometry & Mesh
Tables & Coord. Syst.
Geometric Properties
Materials
Contact
ToolBox
Links
Initial Conditions
Boundary Conditions
Mesh Adaptivity
Loadcases
Jobs
Results
Sets
Delete Model
Show All Entities
Hide All Entities
Expand All Folders
Collapse All Folders
New Boundary Condition
Structural
State Variable
General
Fixed Displacement
Fixed Acceleration
Point Load
Edge Load
Face Load
Global Load
Gravity Load
Centrifugal Load
Edge Foundation
Face Foundation
Fluid Drag
Cavity Pressure Load
Cavity Mass Load
DOF-Set Nodes
Inherent Strain
Fixed Harmonic Displacement
Fixed Harmonic Acceleration
Harmonic Point Load
Harmonic Edge Load
3 4 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 24
MSC Software
Enter value for 'z' : *add_apply_nodes
Enter add apply node list : 3
Enter add apply node list : 1
Enter add apply node list : # | End of List
Enter add apply node list :
Dialog
Dynamic Menu
Model Navigator
Ready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Analysis Class Structural
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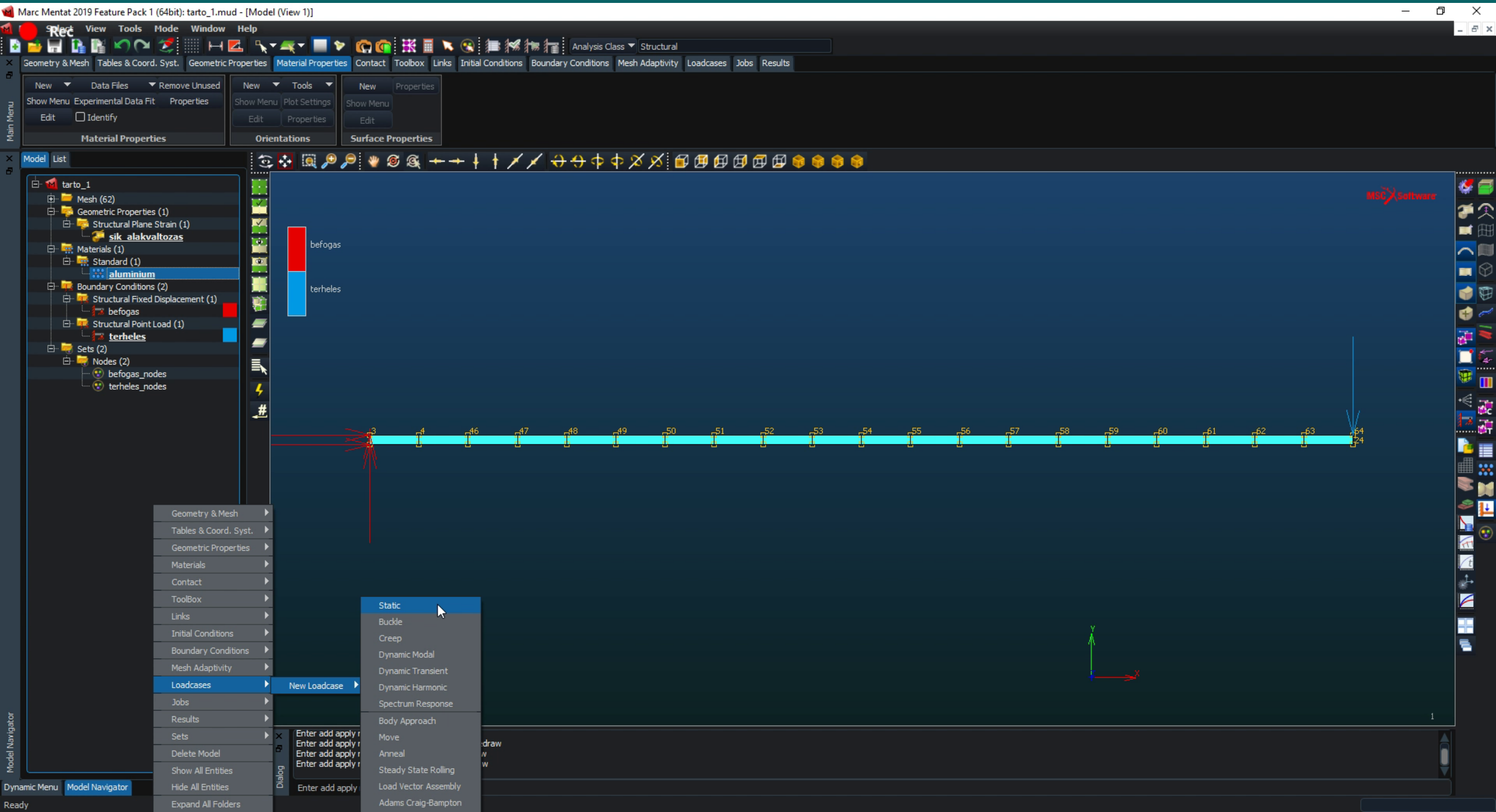
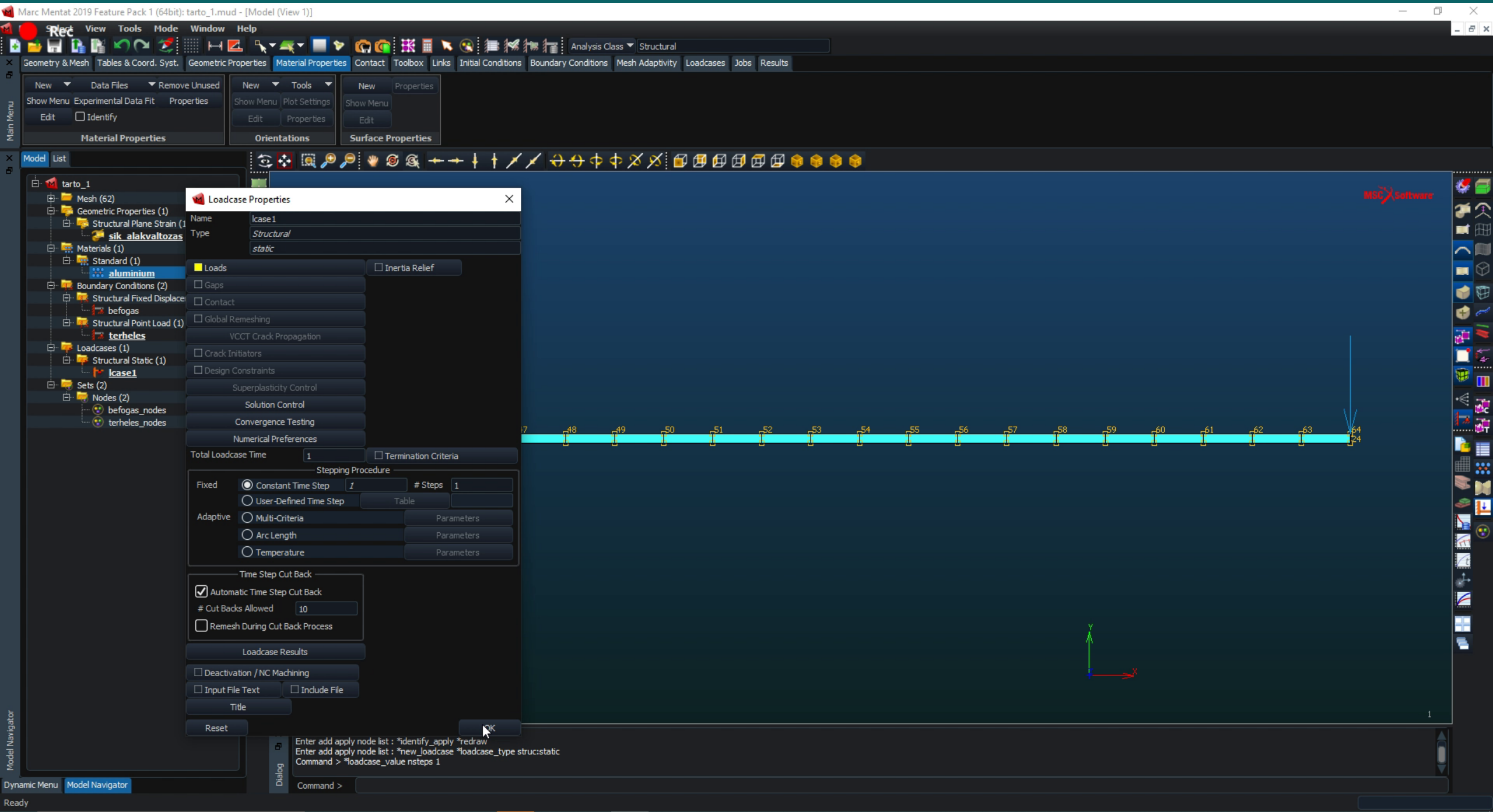
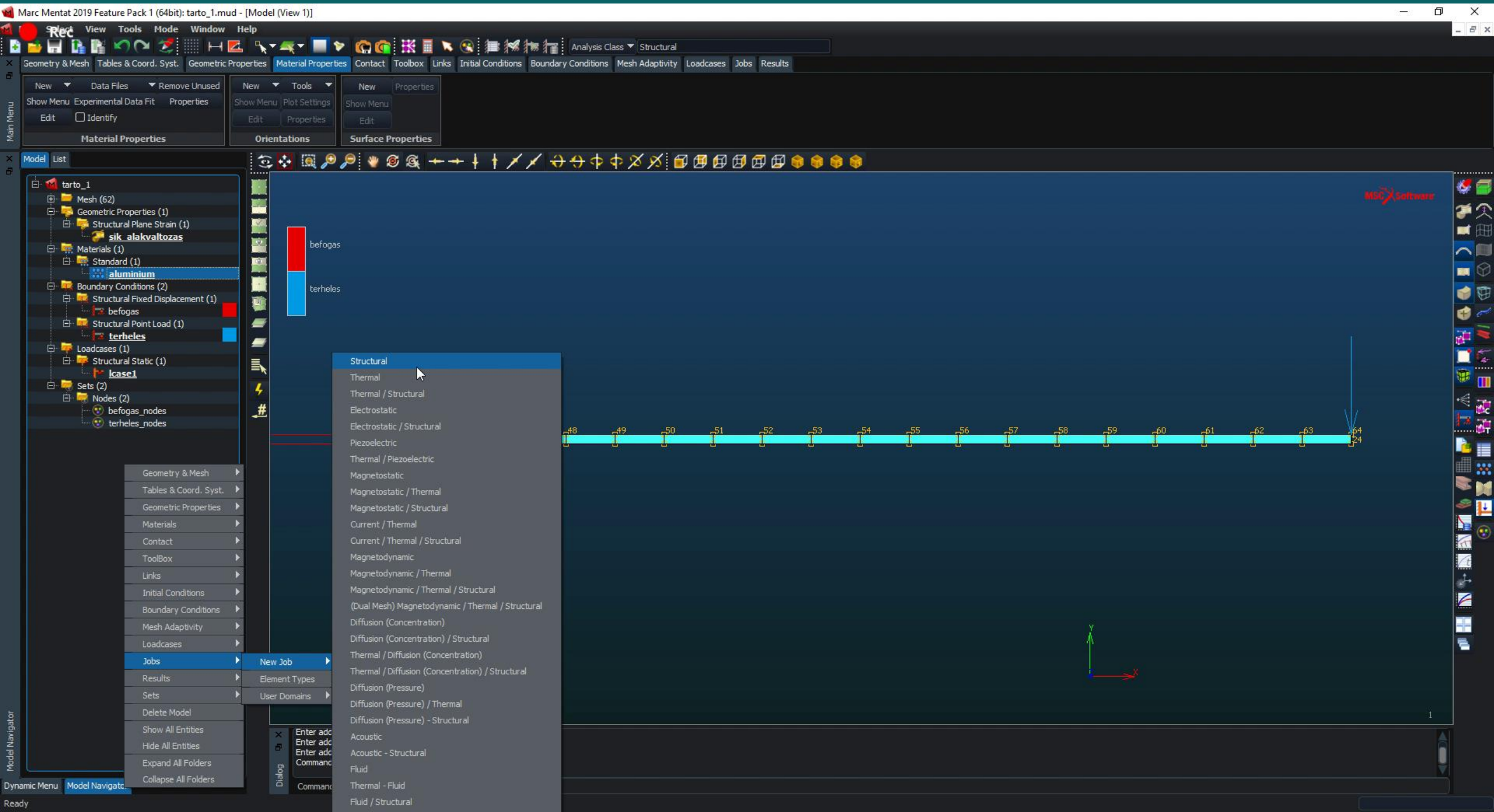
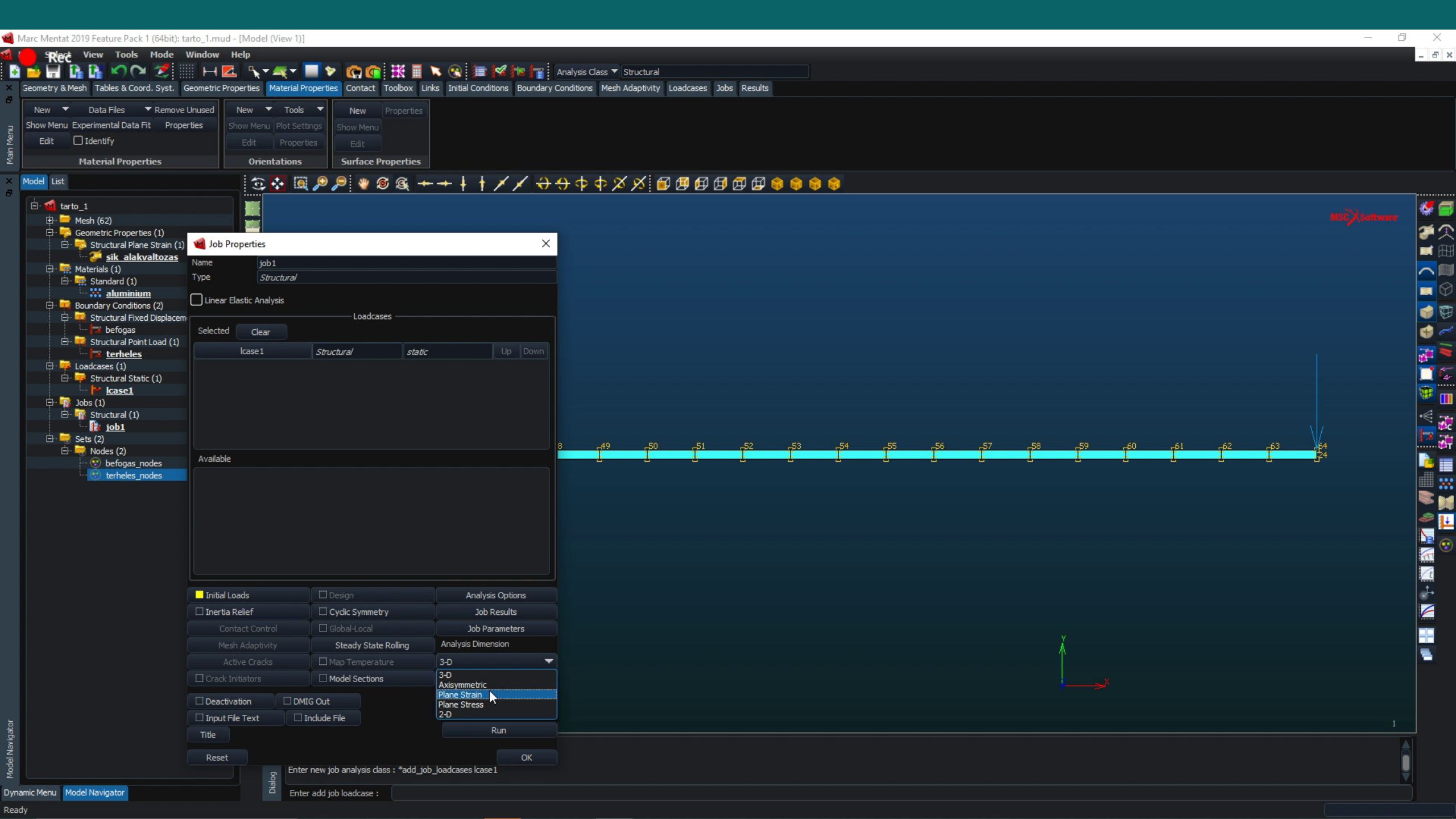
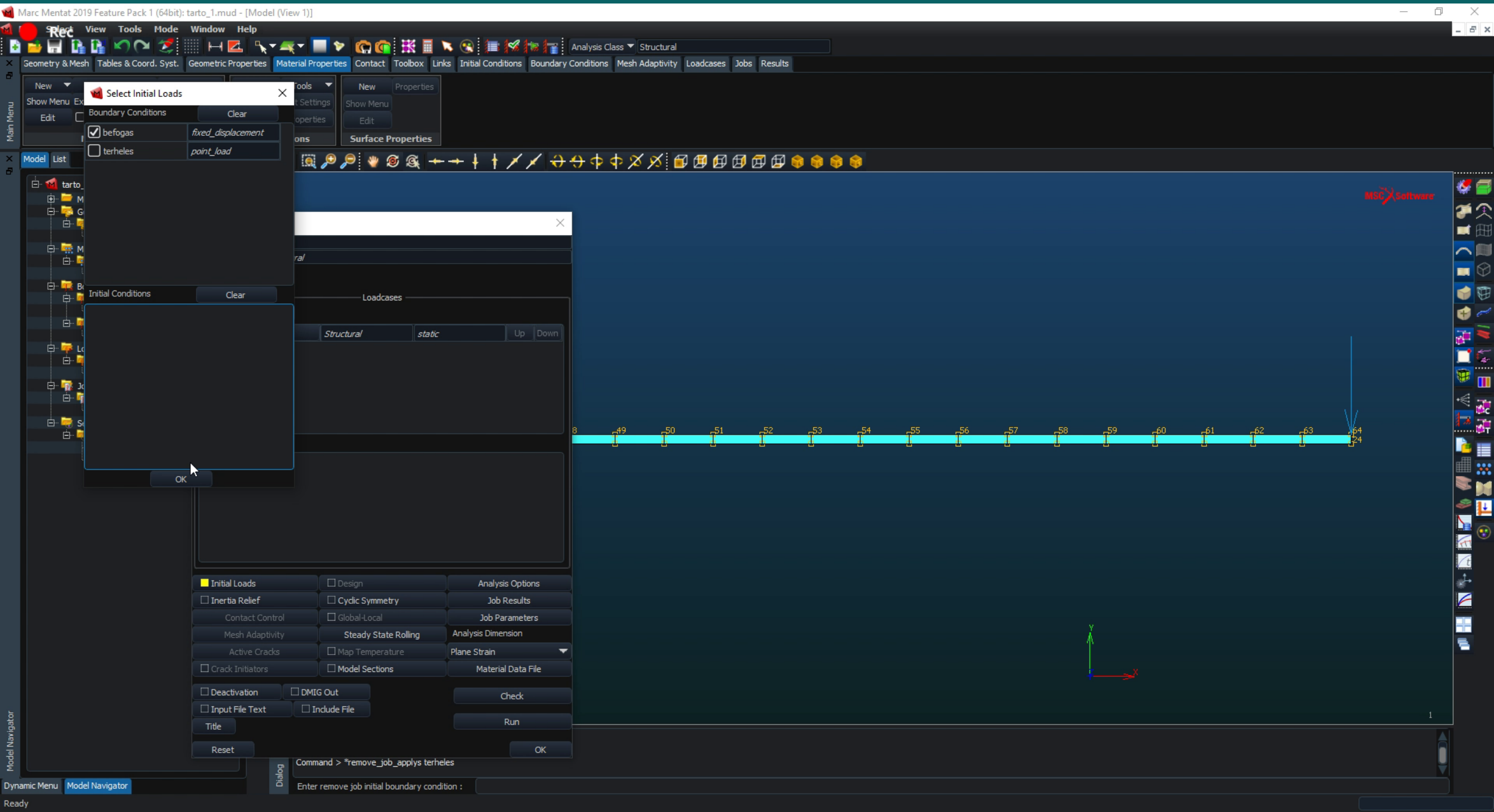
New Data Files Remove Unused
Show Menu Experimental Data Fit Properties
Edit Identify
Material Properties
New Tools
Show Menu Plot Settings
Edit Properties
Orientations
New Properties
Show Menu
Edit
Surface Properties
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_alakvaltozas
Materials (1)
Standard (1)
aluminium
Boundary Conditions (2)
Structural Fixed Displacement (1)
befogas
Structural Point Load (1)
terheles
Sets (2)
Nodes (2)
befogas_nodes
terheles_nodes
Boundary Condition Properties
Name terheles
Type point_load
Properties
Method Entered Values
Follower Force
Force X
Force Y -10 Table
Force Z
Moment X
Moment Y
Moment Z
Entities
Model Section Vertices Add Rem 0
Nodes Add Rem 1
Points Add Rem 0
Solid Vertices Add Rem 0
Clear
OK
MSC Software
Enter value for 'y' : *apply_dof_value y -10
Enter value for 'z' : *add_apply_nodes
Enter add apply node list : 64
Enter add apply node list : # | End of List
Enter add apply node list :
Dialog
Dynamic Menu Model Navigator
Ready

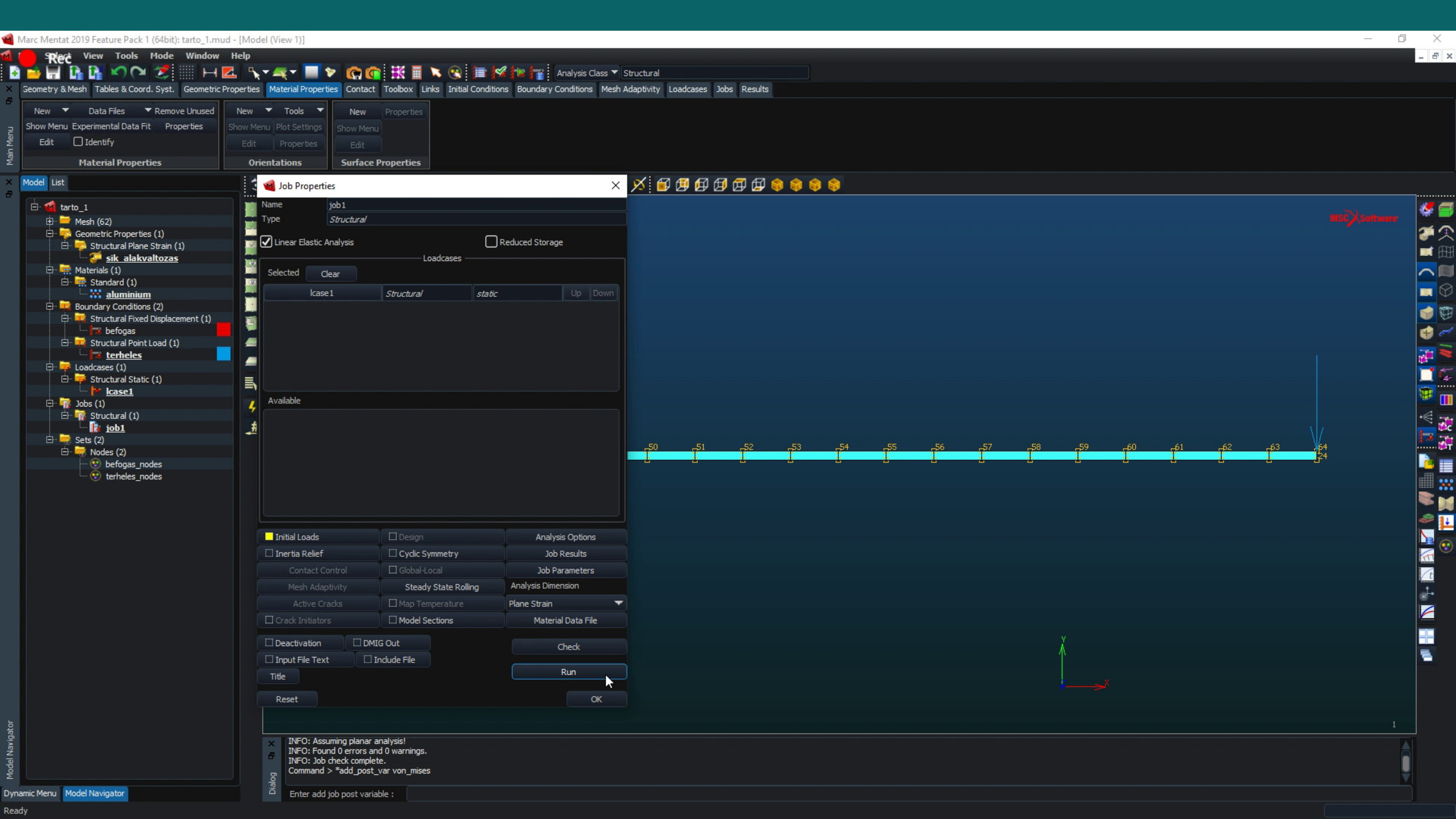

Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
New Data Files Remove Unused
Show Menu Experimental Data Fit Properties
Edit Identify
Material Properties
New Tools
Show Menu Plot Settings
Edit Properties
Orientations
New Properties
Show Menu
Edit
Surface Properties
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_alakvaltozas
Materials (1)
Standard (1)
aluminium
Boundary Conditions (2)
Structural Fixed Displacement (1)
befogas
Structural Point Load (1)
terheles
Sets (2)
Nodes (2)
befogas_nodes
terheles_nodes
befogas
terheles
MSC Software
Geometry & Mesh
Tables & Coord. Syst.
Geometric Properties
Materials
Contact
ToolBox
Links
Initial Conditions
Boundary Conditions
Mesh Adaptivity
Loadcases
Jobs
Results
Sets
Delete Model
Show All Entities
Hide All Entities
Expand All Folders
New Loadcase
Static
Buckle
Creep
Dynamic Modal
Dynamic Transient
Dynamic Harmonic
Spectrum Response
Body Approach
Move
Anneal
Steady State Rolling
Load Vector Assembly
Adams Craig-Bampton
Dialog
Dynamic Menu
Model Navigator
Ready

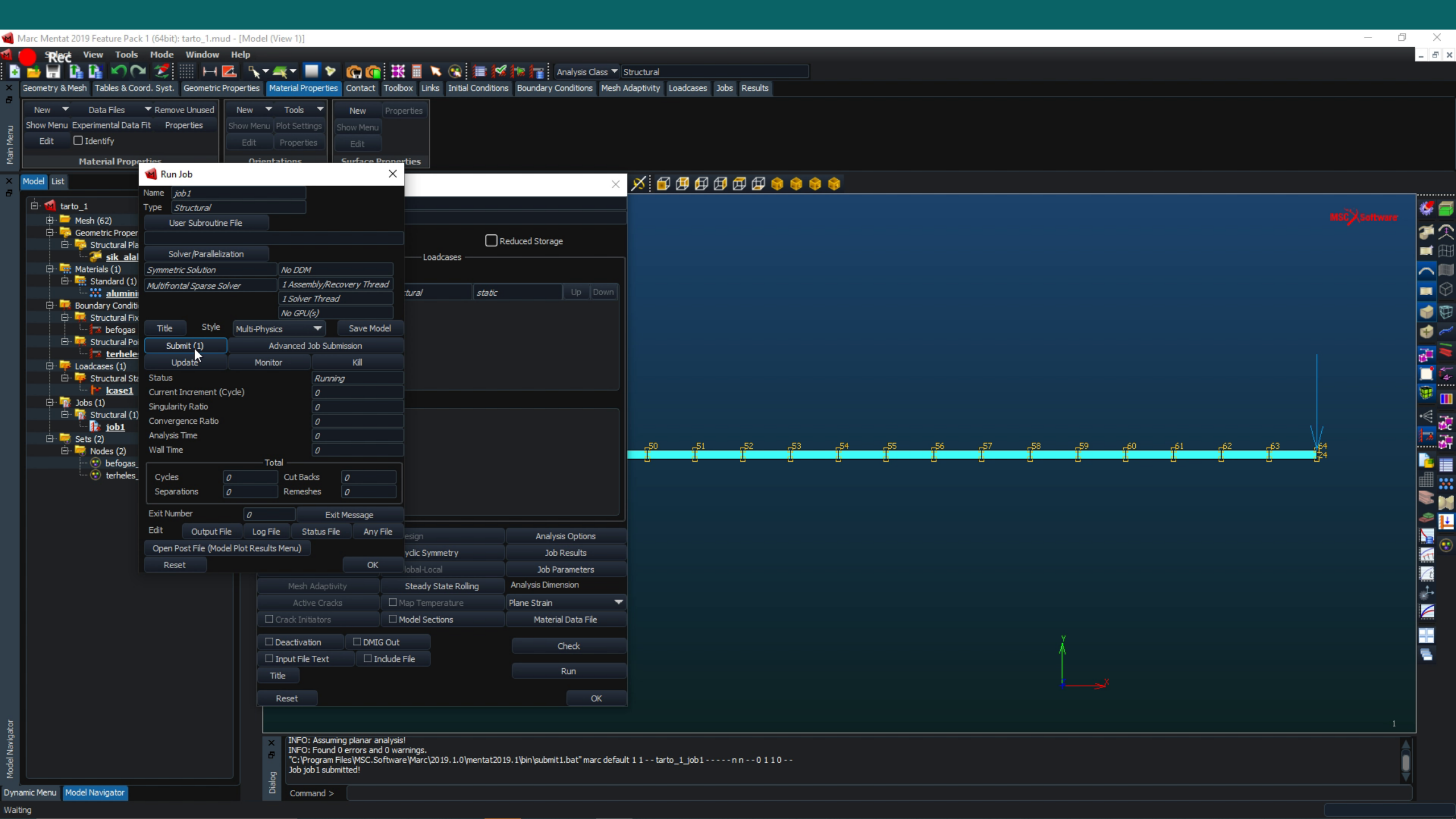

Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
New Data Files Remove Unused
Show Menu Experimental Data Fit Properties
Edit Identify
Material Properties
New Tools
Show Menu Plot Settings
Edit Properties
Orientations
New Properties
Show Menu
Edit
Surface Properties
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1
sik_alakvaltozas
Materials (1)
Standard (1)
aluminium
Boundary Conditions (2)
Structural Fixed Displace
befogas
Structural Point Load (1)
terheles
Loadcases (1)
Structural Static (1)
lcase1
Sets (2)
Nodes (2)
befogas_nodes
terheles_nodes
Loadcase Properties
Name lcase1
Type Structural
static
Loads
Inertia Relief
Gaps
Contact
Global Remeshing
VCCT Crack Propagation
Crack Initiators
Design Constraints
Superplasticity Control
Solution Control
Convergence Testing
Numerical Preferences
Total Loadcase Time 1
Termination Criteria
Stepping Procedure
Fixed
Constant Time Step 1 # Steps 1
User-Defined Time Step Table
Adaptive
Multi-Criteria Parameters
Arc Length Parameters
Temperature Parameters
Time Step Cut Back
Automatic Time Step Cut Back
Cut Backs Allowed 10
Remesh During Cut Back Process
Loadcase Results
Deactivation / NC Machining
Input File Text
Include File
Title
Reset
OK
MSC Software
47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
Enter add apply node list : *identify_apply *redraw
Enter add apply node list : *new_loadcase *loadcase_type struc:static
Command > *loadcase_value nsteps 1
Dialog
Command >
Dynamic Menu
Model Navigator
Ready

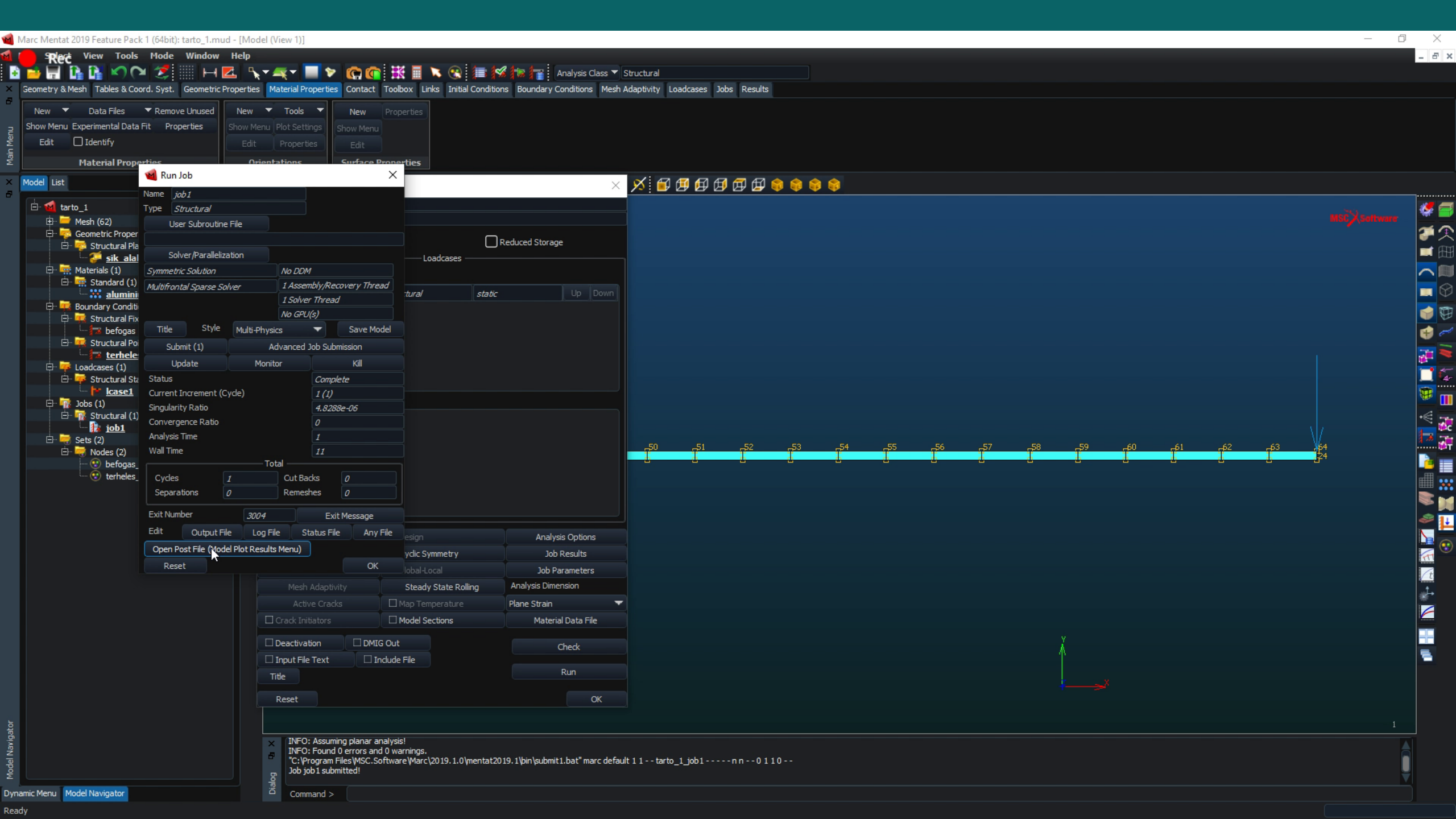

Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
File View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Material Properties
Orientations
Surface Properties
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_alakvaltozas
Materials (1)
Standard (1)
aluminium
Boundary Conditions (2)
Structural Fixed Displacement (1)
befogas
Structural Point Load (1)
terheles
Loadcases (1)
Structural Static (1)
lcase1
Sets (2)
Nodes (2)
befogas_nodes
terheles_nodes
befogas
terheles
MSC Software
Structural
Thermal
Thermal / Structural
Electrostatic
Electrostatic / Structural
Piezoelectric
Thermal / Piezoelectric
Magnetostatic
Magnetostatic / Thermal
Magnetostatic / Structural
Current / Thermal
Current / Thermal / Structural
Magnetodynamic
Magnetodynamic / Thermal
Magnetodynamic / Thermal / Structural
(Dual Mesh) Magnetodynamic / Thermal / Structural
Diffusion (Concentration)
Diffusion (Concentration) / Structural
Thermal / Diffusion (Concentration)
Thermal / Diffusion (Concentration) / Structural
Diffusion (Pressure)
Diffusion (Pressure) / Thermal
Diffusion (Pressure) - Structural
Acoustic
Acoustic - Structural
Fluid
Thermal - Fluid
Fluid / Structural
Geometry & Mesh
Tables & Coord. Syst.
Geometric Properties
Materials
Contact
ToolBox
Links
Initial Conditions
Boundary Conditions
Mesh Adaptivity
Loadcases
Jobs
Results
Sets
Delete Model
Show All Entities
Hide All Entities
Expand All Folders
Collapse All Folders
New Job
Element Types
User Domains
Dynamic Menu
Model Navigator
Ready

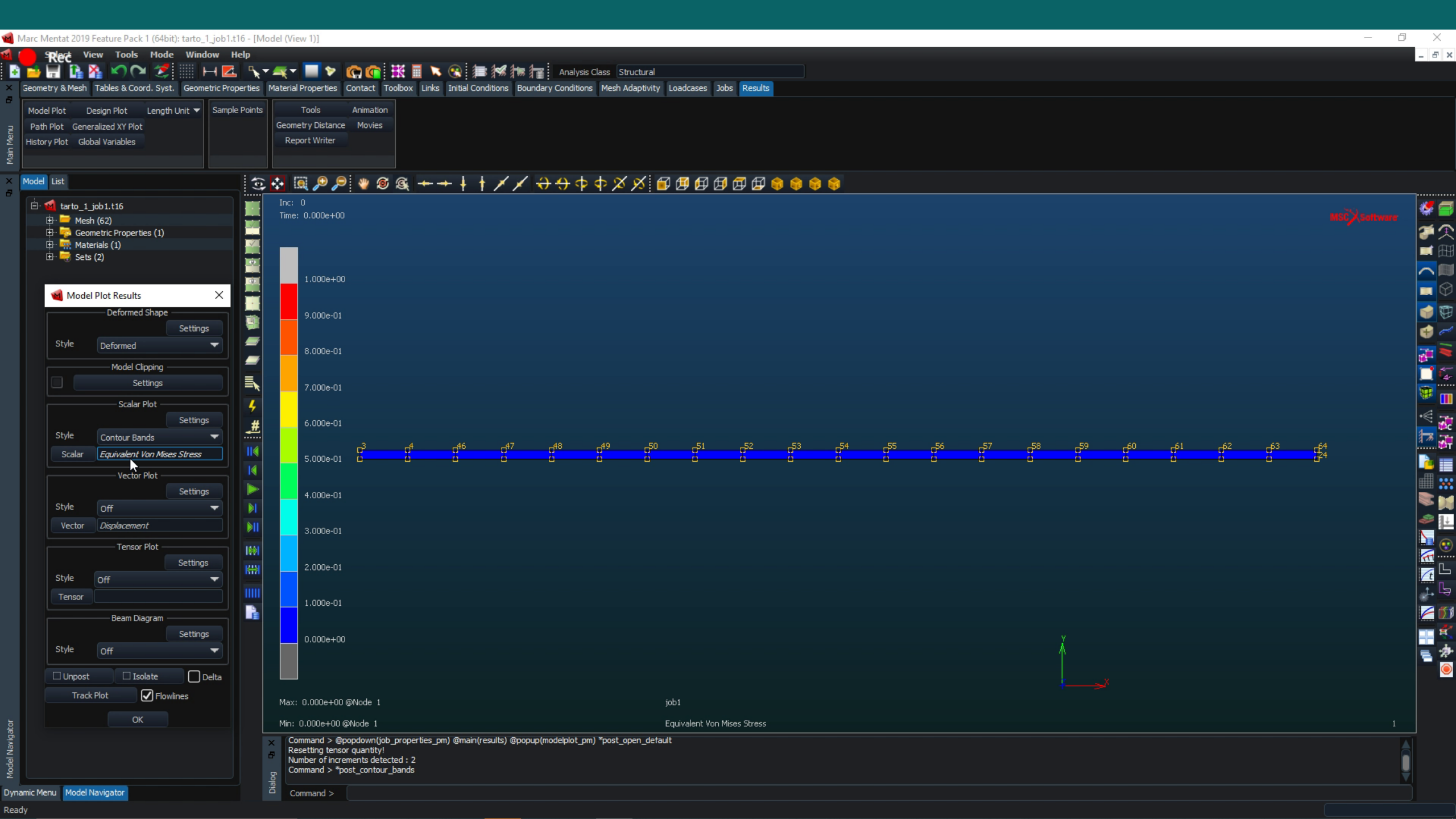

Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
New Data Files Remove Unused
Show Menu Experimental Data Fit Properties
Edit Identify
Material Properties
New Tools
Show Menu Plot Settings
Edit Properties
Orientations
New Properties
Show Menu
Edit
Surface Properties
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_alakvaltozas
Materials (1)
Standard (1)
aluminium
Boundary Conditions (2)
Structural Fixed Displacem
befogas
Structural Point Load (1)
terheles
Loadcases (1)
Structural Static (1)
lcase1
Jobs (1)
Structural (1)
job1
Sets (2)
Nodes (2)
befogas_nodes
terheles_nodes
Job Properties
Name job1
Type Structural
Linear Elastic Analysis
Loadcases
Selected Clear
lcase1 Structural static Up Down
Available
Initial Loads
Design
Analysis Options
Inertia Relief
Cyclic Symmetry
Job Results
Contact Control
Global-Local
Job Parameters
Mesh Adaptivity
Steady State Rolling
Analysis Dimension
Active Cracks
Map Temperature
3-D
Crack Initiators
Model Sections
3-D
Axisymmetric
Plane Strain
Plane Stress
2-D
Deactivation
DMIG Out
Input File Text
Include File
Title
Run
Reset
OK
MSC Software
Dialog
Enter new job analysis class : *add_job_loadcases lcase1
Enter add job loadcase :
Dynamic Menu
Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
Select
View
Tools
Mode
Window
Help
Analysis Class
Structural
Geometry & Mesh
Tables & Coord. Syst.
Geometric Properties
Material Properties
Contact
Toolbox
Links
Initial Conditions
Boundary Conditions
Mesh Adaptivity
Loadcases
Jobs
Results
Select Initial Loads
Boundary Conditions
Clear
befogas
fixed_displacement
terheles
point_load
Initial Conditions
Clear
OK
Loadcases
Structural
static
Up
Down
Initial Loads
Design
Analysis Options
Inertia Relief
Cyclic Symmetry
Job Results
Contact Control
Global-Local
Job Parameters
Mesh Adaptivity
Steady State Rolling
Analysis Dimension
Active Cracks
Map Temperature
Plane Strain
Crack Initiators
Model Sections
Material Data File
Deactivation
DMIG Out
Check
Input File Text
Include File
Run
Title
Reset
OK
Surface Properties
Model
List
Command > *remove_job_applys terheles
Enter remove job initial boundary condition :
Dynamic Menu
Model Navigator
Ready
MSC Software

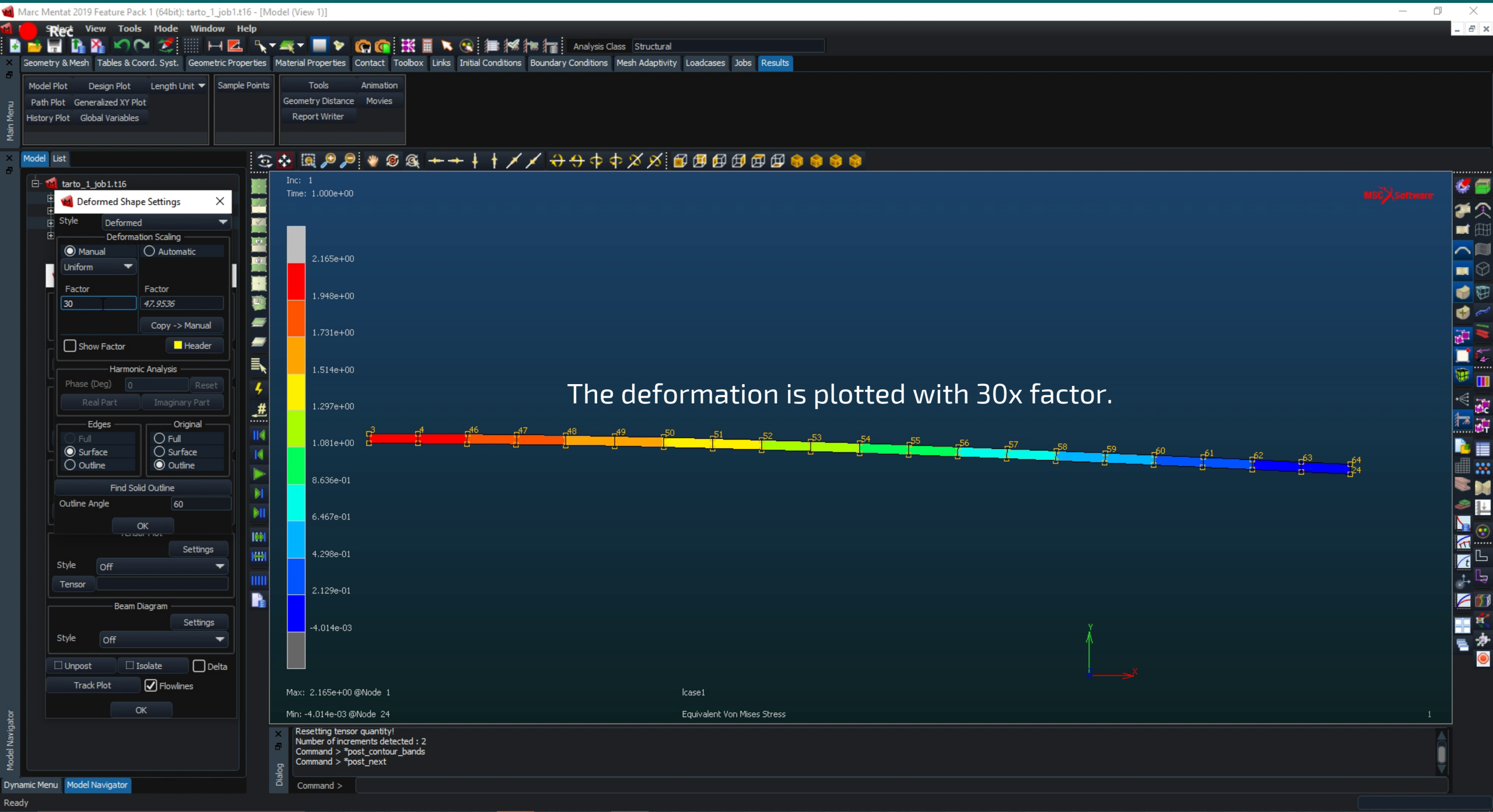

Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
New Data Files Remove Unused
Show Menu Experimental Data Fit Properties
Edit Identify
Material Properties
New Tools
Show Menu Plot Settings
Edit Properties
Orientations
New Properties
Show Menu
Edit
Surface Properties
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_alakvaltozas
Materials (1)
Standard (1)
aluminium
Boundary Conditions (2)
Structural Fixed Displacement (1)
befogas
Structural Point Load (1)
terheles
Loadcases (1)
Structural Static (1)
lcase1
Jobs (1)
Structural (1)
job1
Sets (2)
Nodes (2)
befogas_nodes
terheles_nodes
Job Properties
Name job1
Type Structural
Linear Elastic Analysis
Reduced Storage
Loadcases
Selected Clear
lcase1 Structural static Up Down
Available
Initial Loads
Design
Analysis Options
Inertia Relief
Cyclic Symmetry
Job Results
Contact Control
Global-Local
Job Parameters
Mesh Adaptivity
Steady State Rolling
Analysis Dimension
Active Cracks
Map Temperature
Plane Strain
Crack Initiators
Model Sections
Material Data File
Deactivation
DMIG Out
Check
Input File Text
Include File
Run
Title
Reset
OK
MSC Software
50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
INFO: Assuming planar analysis!
INFO: Found 0 errors and 0 warnings.
INFO: Job check complete.
Command > *add_post_var von_mises
Enter add job post variable :
Dynamic Menu
Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
File Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Run Job
Name job1
Type Structural
User Subroutine File
Solver/Parallelization
Symmetric Solution
No DDM
Multifrontal Sparse Solver
1 Assembly/Recovery Thread
1 Solver Thread
No GPU(s)
Title Style Multi-Physics Save Model
Submit (1) Advanced Job Submission
Update Monitor Kill
Status Running
Current Increment (Cycle) 0
Singularity Ratio 0
Convergence Ratio 0
Analysis Time 0
Wall Time 0
Total
Cycles 0 Cut Backs 0
Separations 0 Remeshes 0
Exit Number 0 Exit Message
Edit Output File Log File Status File Any File
Open Post File (Model Plot Results Menu)
Reset OK
Reduced Storage
Loadcases
static Up Down
Analysis Options
Job Results
Job Parameters
Analysis Dimension
Plane Strain
Material Data File
Mesh Adaptivity Steady State Rolling
Active Cracks Map Temperature
Crack Initiators Model Sections
Deactivation DMIG Out
Input File Text Include File
Title
Check
Run
Reset OK
tarto_1
Mesh (62)
Materials (1)
Standard (1)
Boundary Conditi
Loadcases (1)
Jobs (1)
Structural (1)
job1
Sets (2)
Nodes (2)
befogas_
terheles_
lcase1
INFO: Assuming planar analysis!
INFO: Found 0 errors and 0 warnings.
"C:\Program Files\MSC.Software\Marc\2019.1.0\mentat2019.1\bin\submit1.bat" marc default 1 1 - - tarto_1_job1 - - - - - n n - - 0 1 1 0 - -
Job job1 submitted!
Command >
Dynamic Menu Model Navigator
Waiting


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Run Job
Name job1
Type Structural
User Subroutine File
Solver/Parallelization
Symmetric Solution
No DDM
Multifrontal Sparse Solver
1 Assembly/Recovery Thread
1 Solver Thread
No GPU(s)
Title Style Multi-Physics Save Model
Submit (1) Advanced Job Submission
Update Monitor Kill
Status Complete
Current Increment (Cycle) 1 (1)
Singularity Ratio 4.8288e-06
Convergence Ratio 0
Analysis Time 1
Wall Time 11
Total
Cycles 1 Cut Backs 0
Separations 0 Remeshes 0
Exit Number 3004 Exit Message
Edit Output File Log File Status File Any File
Open Post File (Model Plot Results Menu)
Reset OK
Reduced Storage
Loadcases
static Up Down
Analysis Options
Job Results
Job Parameters
Analysis Dimension
Plane Strain
Material Data File
Mesh Adaptivity Steady State Rolling
Active Cracks Map Temperature
Crack Initiators Model Sections
Deactivation DMIG Out
Input File Text Include File
Title
Check
Run
Reset OK
tarto_1
Mesh (62)
Materials (1)
Standard (1)
Boundary Conditi
Loadcases (1)
lcase1
Jobs (1)
job1
Sets (2)
Nodes (2)
befogas_
terheles_
Model List
Dynamic Menu Model Navigator
Model Navigator
MSC Software
50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
INFO: Assuming planar analysis!
INFO: Found 0 errors and 0 warnings.
"C:\Program Files\MSC.Software\Marc\2019.1.0\mentat2019.1\bin\submit1.bat" marc default 1 1 - - tarto_1_job1 - - - - - n n - - 0 1 1 0 - -
Job job1 submitted!
Dialog
Command >
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1_job1.t16 - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
tarto_1_job1.t16
Mesh (62)
Geometric Properties (1)
Materials (1)
Sets (2)
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Equivalent Von Mises Stress
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 0
Time: 0.000e+00
MSC Software
1.000e+00
9.000e-01
8.000e-01
7.000e-01
6.000e-01
5.000e-01
4.000e-01
3.000e-01
2.000e-01
1.000e-01
0.000e+00
3 4 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
Max: 0.000e+00 @Node 1
Min: 0.000e+00 @Node 1
job1
Equivalent Von Mises Stress
1
Command > @popdown(job_properties_pm) @main(results) @popup(modelplot_pm) *post_open_default
Resetting tensor quantity!
Number of increments detected : 2
Command > *post_contour_bands
Command >
Dynamic Menu Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1_job1.t16 - [Model (View 1)]
File View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
tarto_1_job1.t16
Mesh (62)
Geometric Properties (1)
Materials (1)
Sets (2)
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Equivalent Von Mises Stress
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 1
Time: 1.000e+00
MSC Software
2.165e+00
1.948e+00
1.731e+00
1.514e+00
1.297e+00
1.081e+00
8.636e-01
6.467e-01
4.298e-01
2.129e-01
-4.014e-03
3 4 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 24
Max: 2.165e+00 @Node 1
Min: -4.014e-03 @Node 24
lcase1
Equivalent Von Mises Stress
1
Resetting tensor quantity!
Number of increments detected : 2
Command > *post_contour_bands
Command > *post_next
Command >
Dynamic Menu Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1_job1.t16 - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
tarto_1_job1.t16
Deformed Shape Settings
Style Deformed
Deformation Scaling
Manual Automatic
Uniform
Factor 30
Factor 47.9536
Copy -> Manual
Show Factor Header
Harmonic Analysis
Phase (Deg) 0 Reset
Real Part Imaginary Part
Edges
Full Surface Outline
Original
Full Surface Outline
Find Solid Outline
Outline Angle 60
OK
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 1
Time: 1.000e+00
MSC Software
2.165e+00
1.948e+00
1.731e+00
1.514e+00
1.297e+00
1.081e+00
8.636e-01
6.467e-01
4.298e-01
2.129e-01
-4.014e-03
The deformation is plotted with 30x factor.
Max: 2.165e+00 @Node 1
lcase1
Min: -4.014e-03 @Node 24
Equivalent Von Mises Stress
Resetting tensor quantity!
Number of increments detected : 2
Command > *post_contour_bands
Command > *post_next
Command >
Dynamic Menu Model Navigator
Ready

Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1_job1.t16 - [Model (View 1)]

Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

tarto_1_job1.t16
- Mesh (62)
- Geometric Properties (1)
- Materials (1)
- Sets (2)

Inc: 1
Time: 1.000e+00

MSC Software

2.165e+00
1.948e+00
1.731e+00
1.514e+00
1.297e+00
1.081e+00
8.636e-01
6.467e-01
4.298e-01
2.129e-01
-4.014e-03

3 4 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 24

Max: 2.165e+00 @Node 1
Min: -4.014e-03 @Node 24

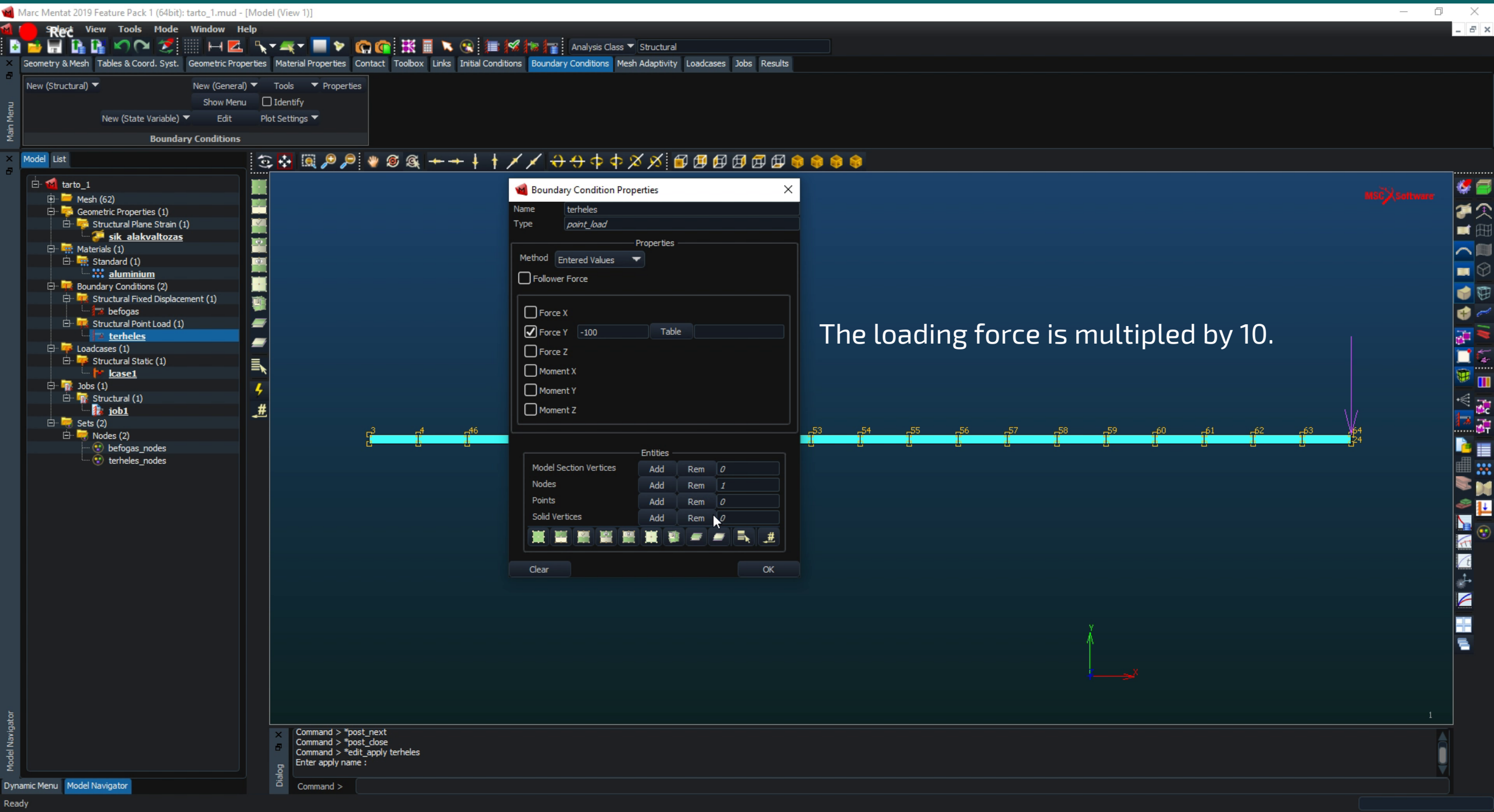
lcase1
Equivalent Von Mises Stress
1

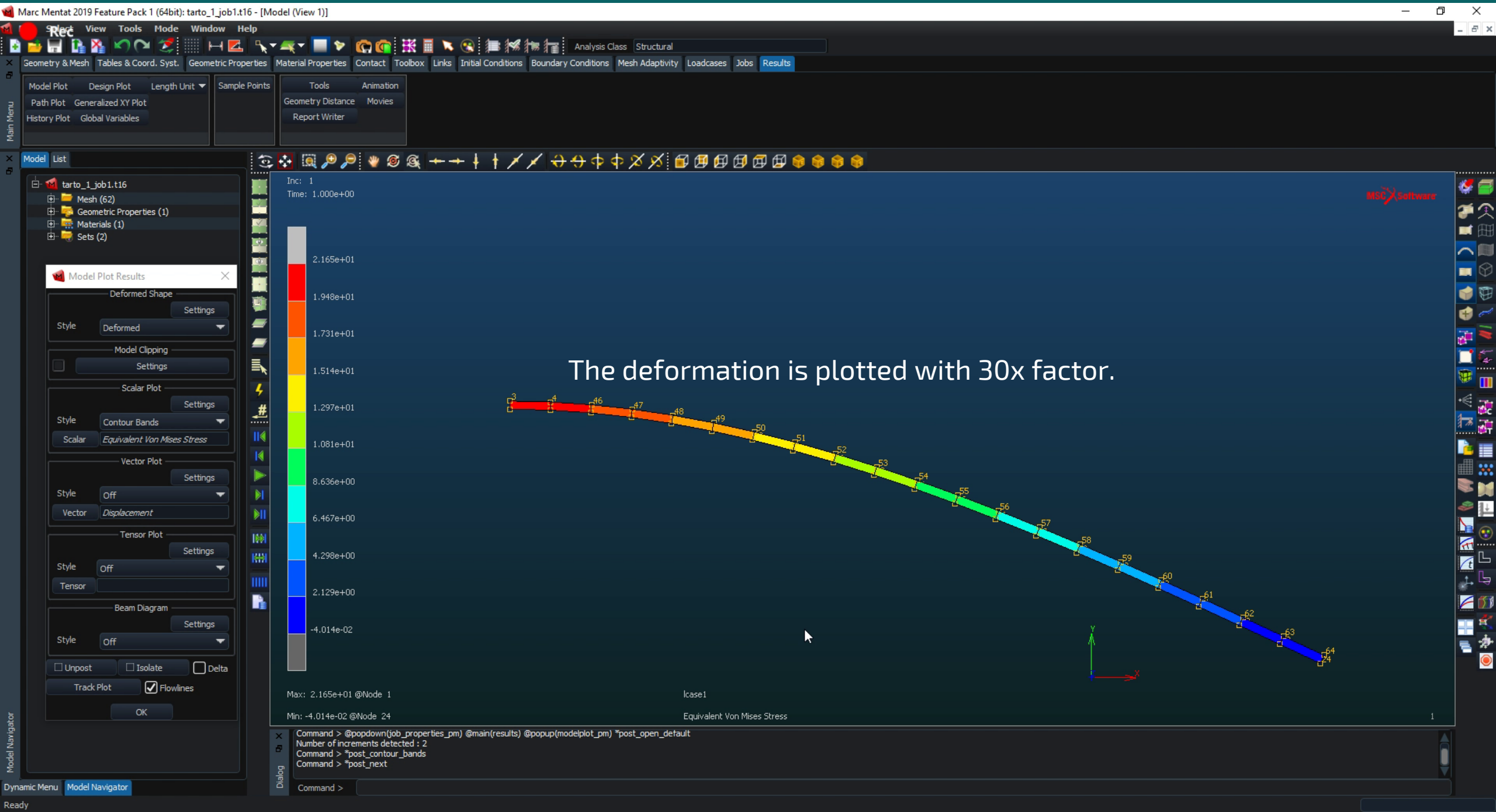
Resetting tensor quantity!
Number of increments detected : 2
Command > *post_contour_bands
Command > *post_next

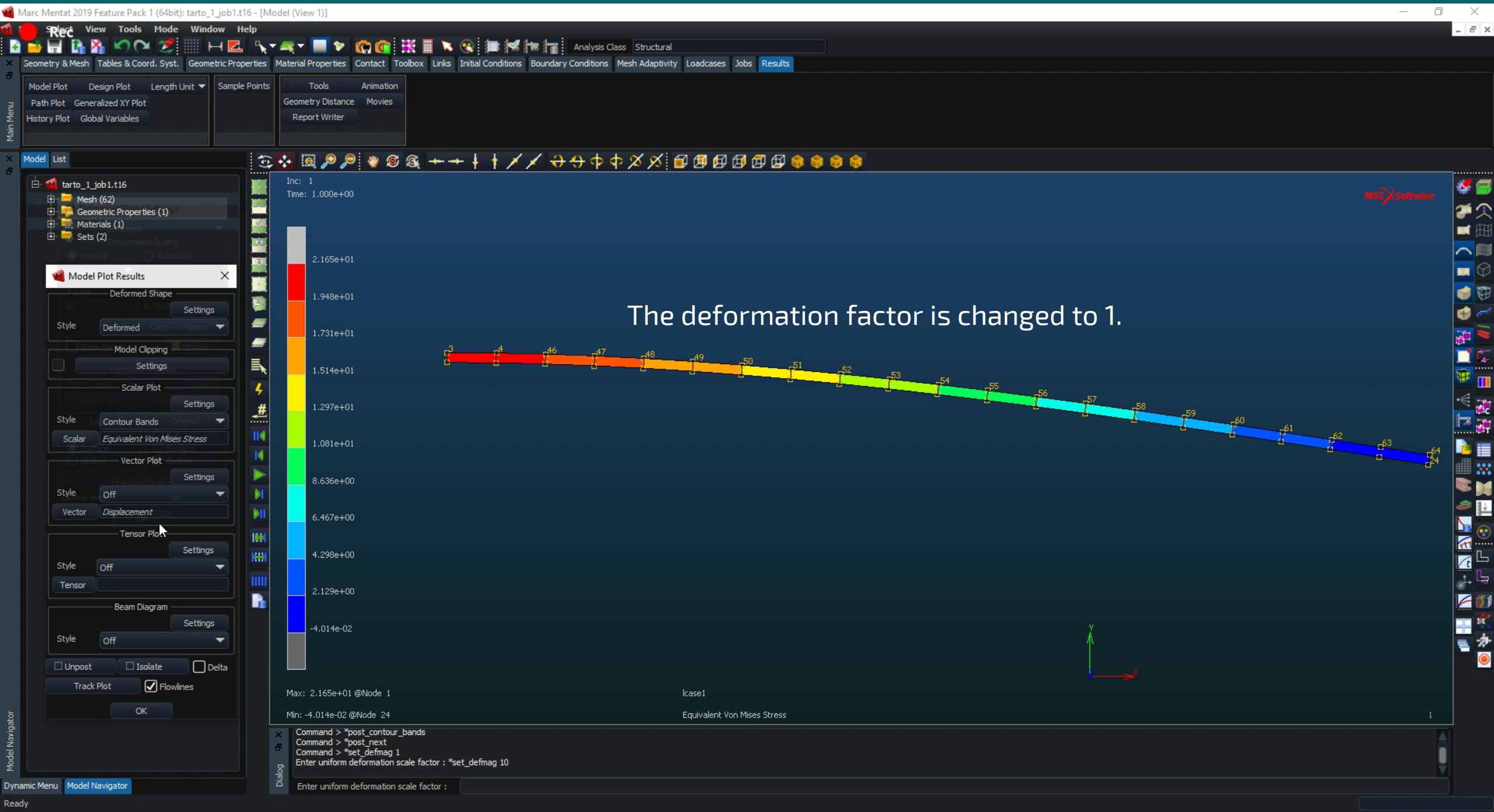
Command >

Dynamic Menu | Model Navigator

Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
New (Structural) New (General) Tools Properties
Show Menu Identify
New (State Variable) Edit Plot Settings
Boundary Conditions
Model List
tarto_1
Mesh (62)
Geometric Properties (1)
Structural Plane Strain (1)
sik_alakvaltozas
Materials (1)
Standard (1)
aluminium
Boundary Conditions (2)
Structural Fixed Displacement (1)
befogas
Structural Point Load (1)
terheles
Loadcases (1)
Structural Static (1)
lcase1
Jobs (1)
Structural (1)
job1
Sets (2)
Nodes (2)
befogas_nodes
terheles_nodes
Boundary Condition Properties
Name terheles
Type point_load
Properties
Method Entered Values
Follower Force
Force X
Force Y -100 Table
Force Z
Moment X
Moment Y
Moment Z
Entities
Model Section Vertices Add Rem 0
Nodes Add Rem 1
Points Add Rem 0
Solid Vertices Add Rem 0
Clear OK
The loading force is multipled by 10.
MSC Software
Command > *post_next
Command > *post_close
Command > *edit_apply terheles
Enter apply name :
Command >
Dynamic Menu Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1_job1.t16 - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
tarto_1_job1.t16
Mesh (62)
Geometric Properties (1)
Materials (1)
Sets (2)
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Equivalent Von Mises Stress
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 1
Time: 1.000e+00
2.165e+01
1.948e+01
1.731e+01
1.514e+01
1.297e+01
1.081e+01
8.636e+00
6.467e+00
4.298e+00
2.129e+00
-4.014e-02
The deformation is plotted with 30x factor.
Max: 2.165e+01 @Node 1
Min: -4.014e-02 @Node 24
lcase1
Equivalent Von Mises Stress
Command > @popdown(job_properties_pm) @main(results) @popup(modelplot_pm) *post_open_default
Number of increments detected : 2
Command > *post_contour_bands
Command > *post_next
Command >
Dynamic Menu Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): tarto_1_job1.t16 - [Model (View 1)]
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Tools Animation
Geometry Distance Movies
Report Writer
Model List
tarto_1_job1.t16
Mesh (62)
Geometric Properties (1)
Materials (1)
Sets (2)
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Equivalent Von Mises Stress
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 1
Time: 1.000e+00
2.165e+01
1.948e+01
1.731e+01
1.514e+01
1.297e+01
1.081e+01
8.636e+00
6.467e+00
4.298e+00
2.129e+00
-4.014e-02
The deformation factor is changed to 1.
Max: 2.165e+01 @Node 1
Min: -4.014e-02 @Node 24
lcase1
Equivalent Von Mises Stress
Command > *post_contour_bands
Command > *post_next
Command > *set_defmag 1
Enter uniform deformation scale factor : *set_defmag 10
Enter uniform deformation scale factor :
Dynamic Menu Model Navigator
Ready

Exercise 4

- Fixed x=0, y=0 and z=0 displacement on left side
- Point load (y direction) on right end
- Mesh refinement for better simulation results

Marc Mentat 2019 Feature Pack 1 (64bit): tarto_2.mud - [Model (View 1)]

Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Basic Manipulation: Length Unit; Geometry & Mesh; Renumber

Pre-Automesh: Check/Repair Geometry; Curve Divisions; Solid Mesh Seeds

Automesh: Curves; Volumes; Planar; 2-D Rebars; Surfaces

Operations: Attach; Convert; Expand; Move; Solids; Sweep; Change Class; Defeature; Imprint; Relax; Stretch; Symmetry; Check; Duplicate; Intersect; Revolve; Subdivide

Coordinate System: Grid; Edit

Model Sections: New; Identify; Properties; Show Menu; Plot Settings; Edit; Template File

Model | List

- tarto_2
  - Geometry (8)
  - Mesh (1106)
  - Geometric Properties (1)
  - Materials (1)
  - Boundary Conditions (2)
    - Structural Fixed Displacement (1)
      - befogas
    - Structural Point Load (1)
      - terheles
  - Loadcases (1)
  - Jobs (1)
  - Sets (2)

MSC Software

Deleting 0 duplicate points !
Deleting 0 collapsed curves !
Deleting 0 collapsed surfaces !
Deleting 0 duplicate curves!

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): tarto_2_job1.t16 - [Model (View 1)]

Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

- tarto_2_job1.t16
  - Geometry (8)
  - Mesh (1106)
  - Geometric Properties (1)
  - Materials (1)
  - Sets (2)

Inc: 1
Time: 1.000e+00

MSC Software

7.992e+01
7.194e+01
6.396e+01
5.599e+01
4.801e+01
4.003e+01
3.205e+01
2.407e+01
1.610e+01
8.118e+00
1.403e-01

Max: 7.992e+01 @Node 2
Min: 1.403e-01 @Node 102

lcase1
Equivalent Von Mises Stress
1

Enter uniform deformation scale factor : *redraw
Enter uniform deformation scale factor : *point_display_on
Enter uniform deformation scale factor : *node_display_off
Enter uniform deformation scale factor : *redraw

Enter uniform deformation scale factor :

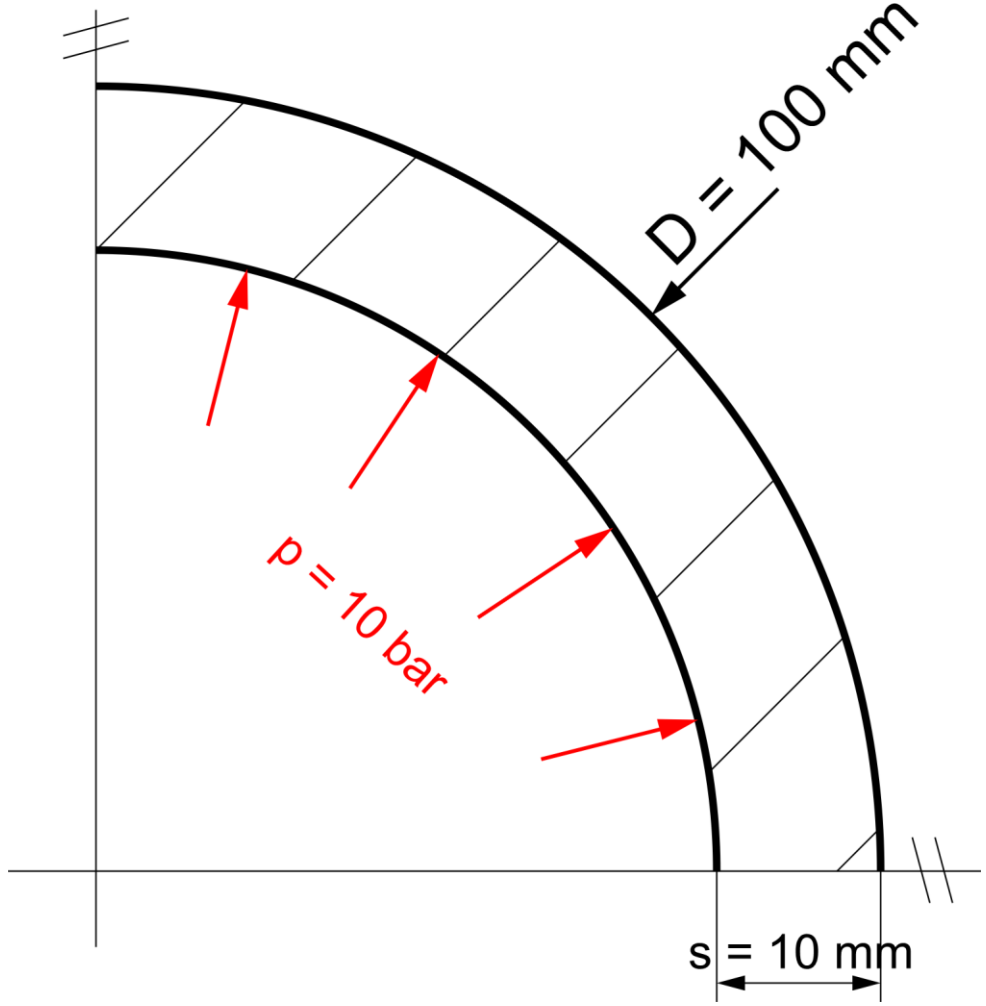
Dynamic Menu | Model Navigator

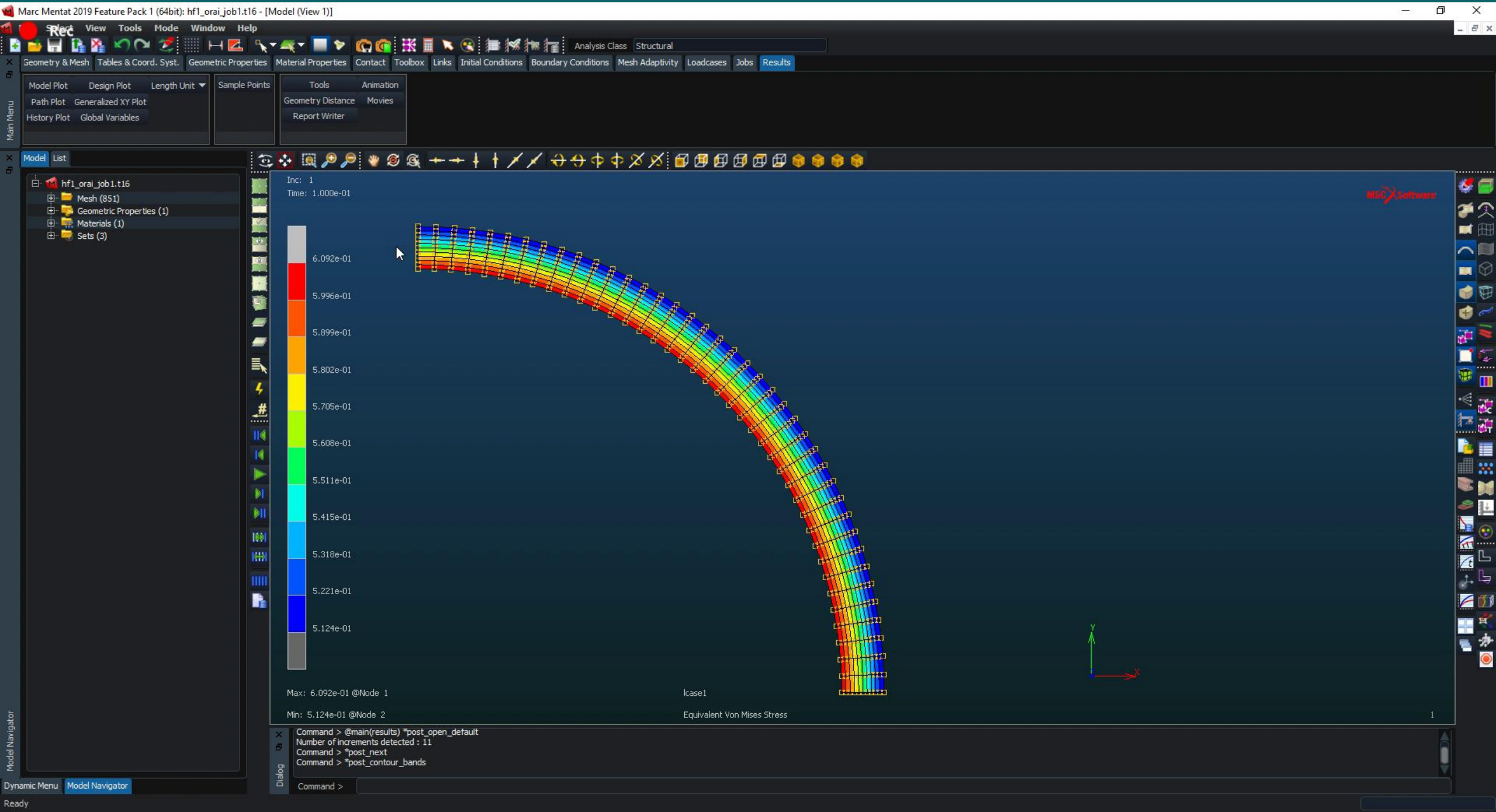
Ready

Homework 1

Homework 1

- Simulate the pressure effect on the tube.
- Use line element, expand and edge load commands.




Marc Mentat 2019 Feature Pack 1 (64bit): hf1_orai_job1.t16 - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
hf1_orai_job1.t16
Mesh (851)
Geometric Properties (1)
Materials (1)
Sets (3)
Inc: 1
Time: 1.000e-01
MSC Software
6.092e-01
5.996e-01
5.899e-01
5.802e-01
5.705e-01
5.608e-01
5.511e-01
5.415e-01
5.318e-01
5.221e-01
5.124e-01
Max: 6.092e-01 @Node 1
Min: 5.124e-01 @Node 2
lcase1
Equivalent Von Mises Stress
1
Command > @main(results) *post_open_default
Number of increments detected : 11
Command > *post_next
Command > *post_contour_bands
Command >
Dynamic Menu Model Navigator
Ready

Part 2

Tips and tricks for the exercises of Part 2

Tips and tricks

- Selection control: set edge flood to 60°. If the angle between 2 edges are smaller than the set value, when 1 is selected, both are.
- Multi-Criteria stepping: the software sets the time steps, if the change is fast, the steps become shorter, if the change is slow, the steps become longer.
- If anything goes wrong, hit Check.
- Automatic meshing: tri mesh and tetra mesh can mesh anything, but a little more inaccurately than quad mesh. However, quad mesh is not always applicable.

Tips and tricks

- For 3D models, it is recommended to use a different software, Hypermesh, but Marc can also mesh the models about fine.
- Plain stress mode: no stress in direction Z.
- Plain strain mode: no strain in direction Z.
- If near a stress concentration, a high stress is simulated, it is only prompt if more than one element has the same stress level.
- When importing an igs file, the 2 bottom boxes should be checked.

Tips and tricks

- Friction can be added in contacts – contact interactions.
- Separation: it is used when 2 surfaces are in contact, defines the needed stress value to separate them (glued surfaces).
- If displacement/speed is set in contacts, it is not needed to fix the geometric features with boundary conditions
- Job: Contact Control:
  - Node to segment – the values are only calculated in the nodes
  - Segment to segment – calulate the segments of the meshed body: needs more computing but the results are more accurate
  - Friction: Coulomb/ Shear (Kudo) → Bilinear/Arctangent (2nd better)

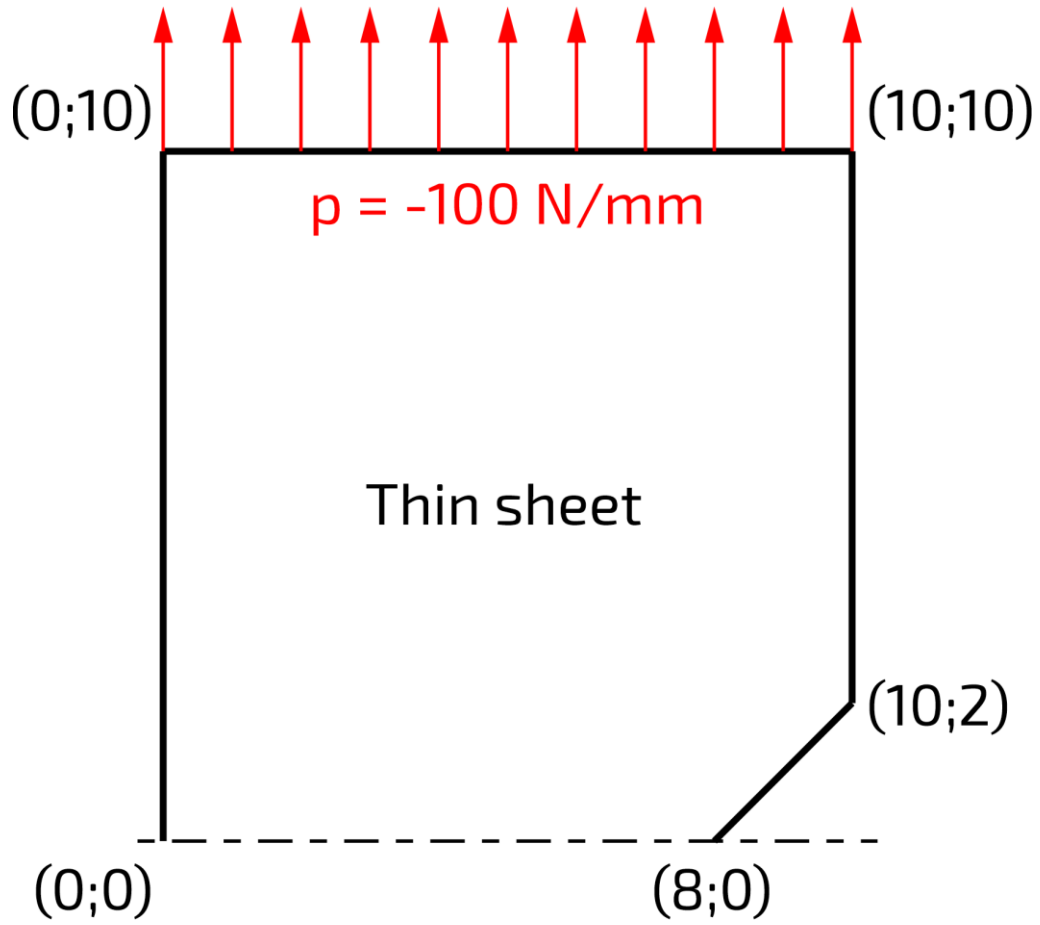
Tips and tricks

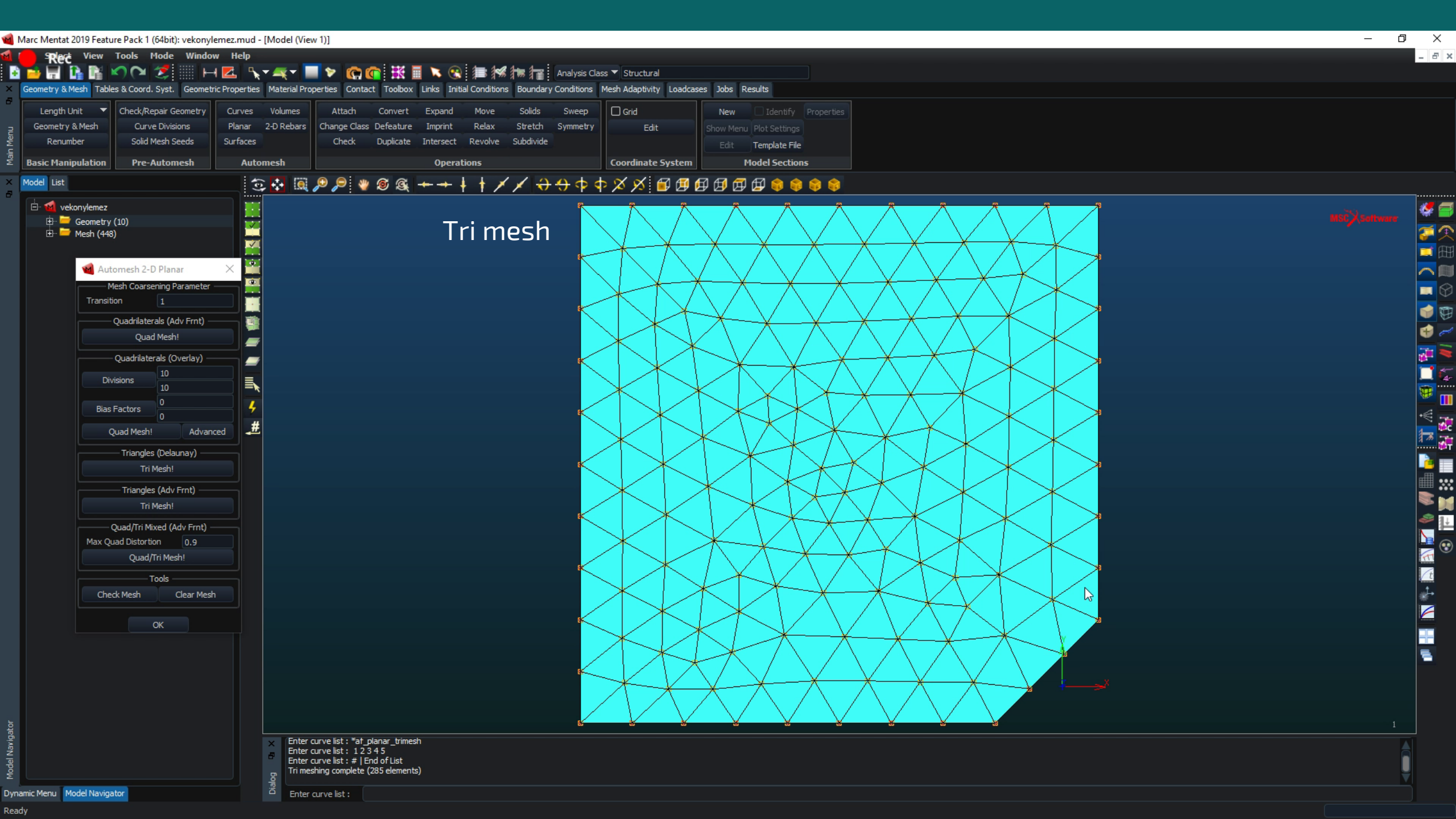
- Advanced Contact Control: Contact Tolerance Bias Factor can be set: Node can be iterated over the surface – if it falls in the width, the contact type is changed to touching. 0.95 means 5% on the outside of the surface and 95% on the inside. By this, nodes inside the surface (in the tool) can be avoided.
- Analysis Options: If large strain is needed, Updates Lagrange shoul be the computing mode.
- Inside Job: Element type: automatically set, but can be changed.
- If table is set for a material, yield stress should be 1, this is the multiplicator for the table.

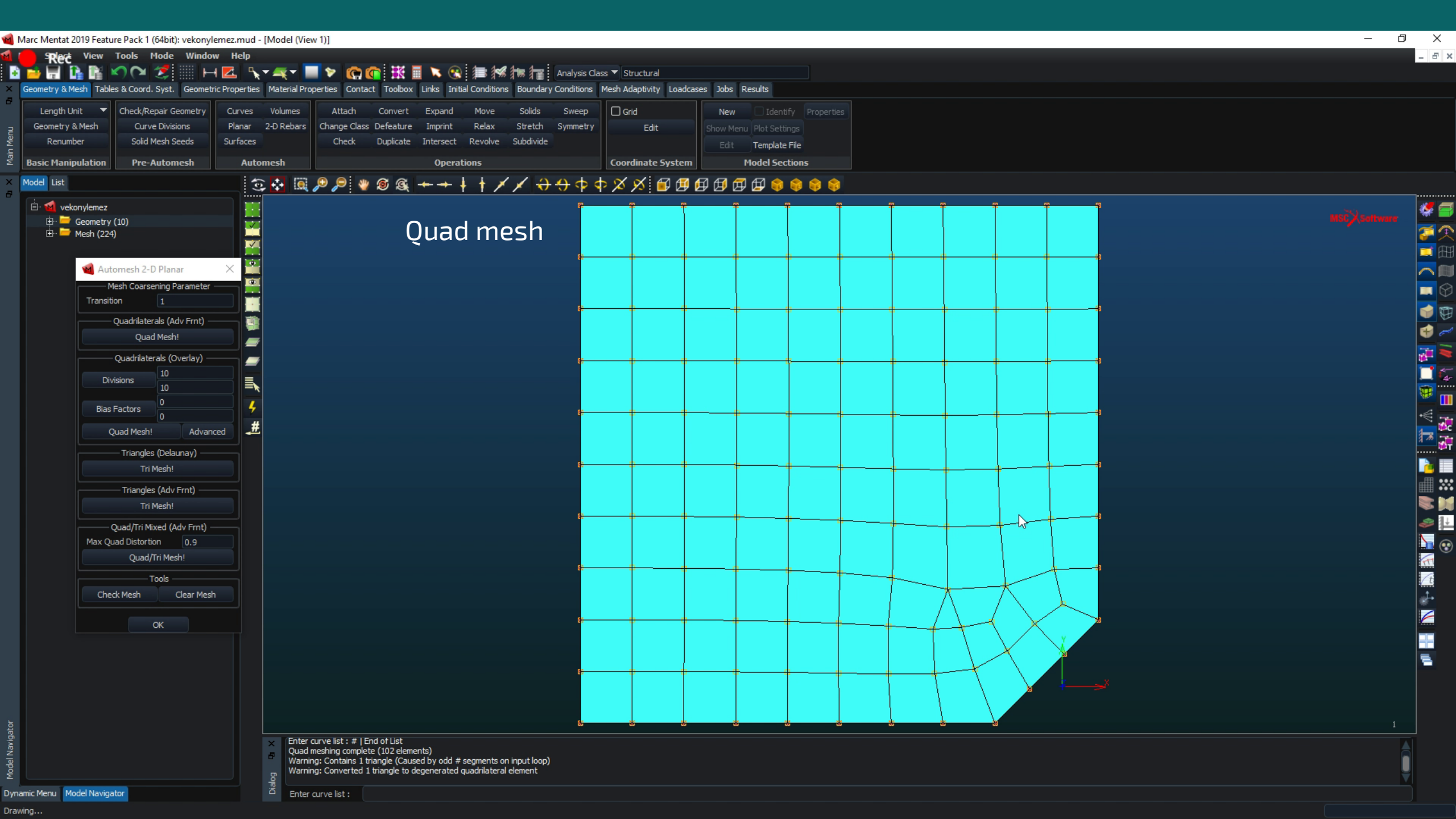
Exercise 5
Thin sheet

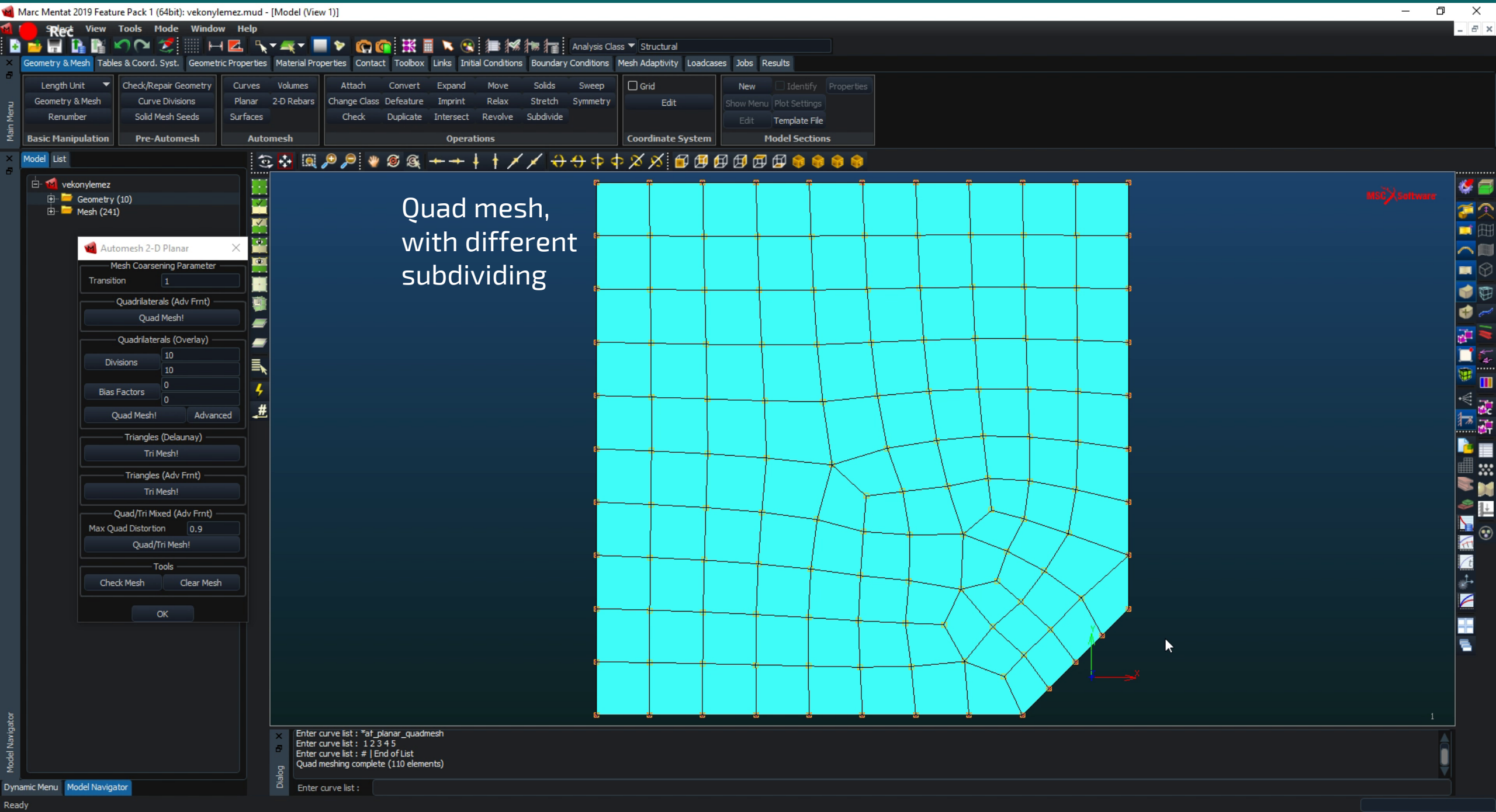
Exercise 5

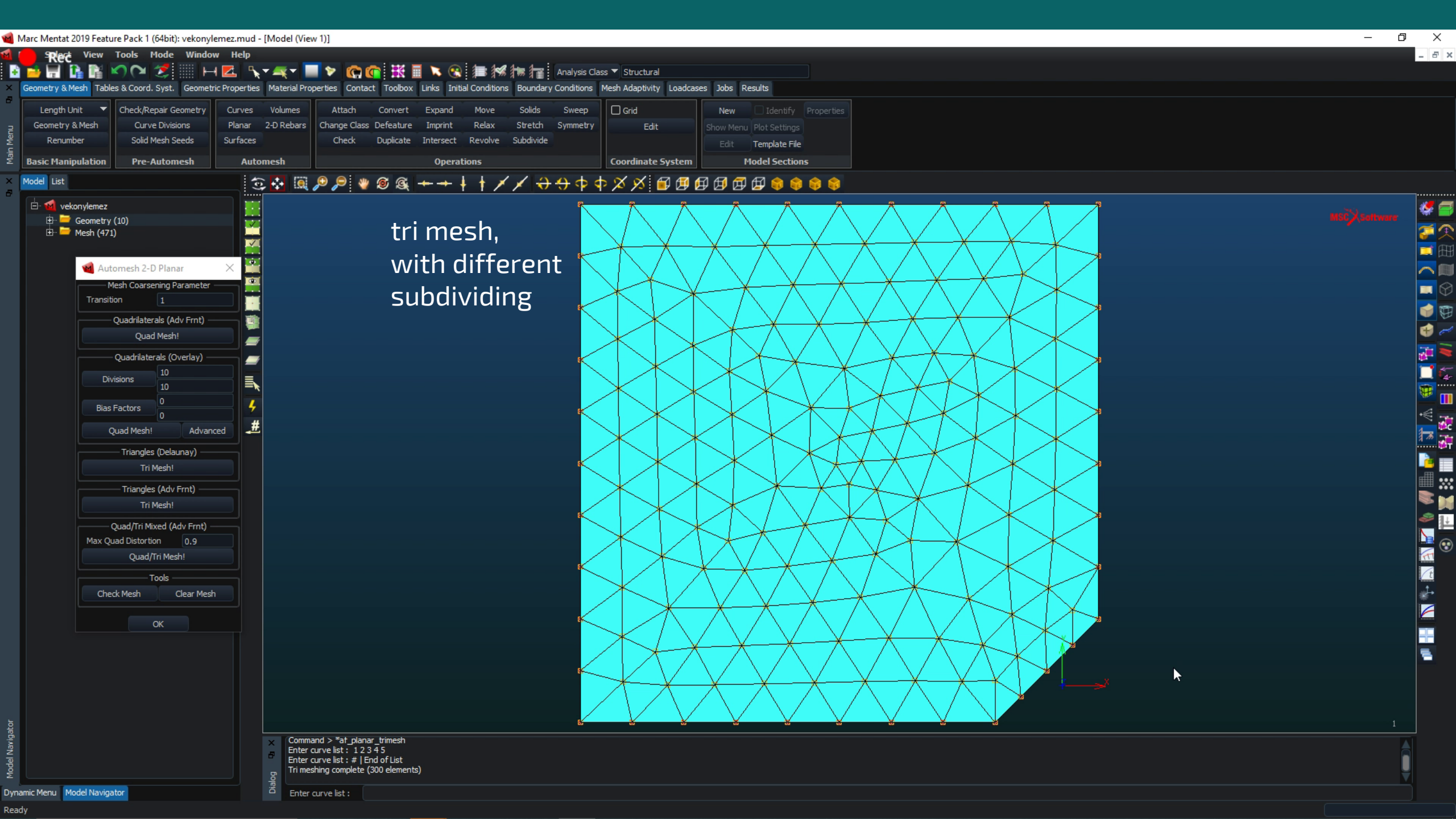
- Symmetry on lower edge
- Thickness = 1 mm
- Higher density mesh needed at the stress concentration.

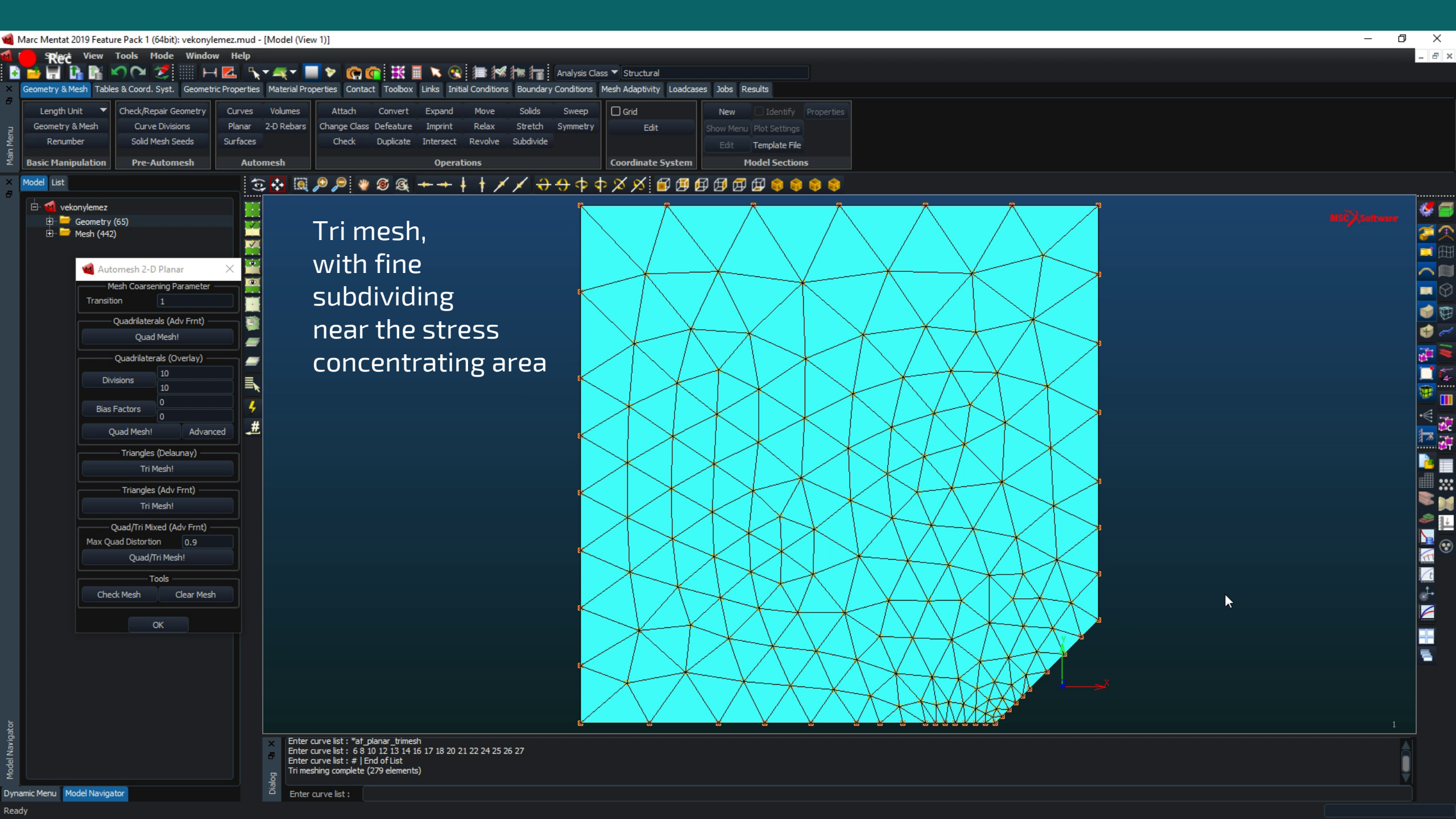



Marc Mentat 2019 Feature Pack 1 (64bit): vekonylemez.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Length Unit
Geometry & Mesh
Renumber
Basic Manipulation
Check/Repair Geometry
Curve Divisions
Solid Mesh Seeds
Pre-Automesh
Curves Volumes
Planar 2-D Rebars
Surfaces
Automesh
Attach Convert Expand Move Solids Sweep
Change Class Defeature Imprint Relax Stretch Symmetry
Check Duplicate Intersect Revolve Subdivide
Operations
Grid
Edit
Coordinate System
New Identify Properties
Show Menu Plot Settings
Edit Template File
Model Sections
Model List
vekonylemez
Geometry (10)
Mesh (448)
Automesh 2-D Planar
Mesh Coarsening Parameter
Transition 1
Quadrilaterals (Adv Frnt)
Quad Mesh!
Quadrilaterals (Overlay)
Divisions 10 10
Bias Factors 0 0
Quad Mesh! Advanced
Triangles (Delaunay)
Tri Mesh!
Triangles (Adv Frnt)
Tri Mesh!
Quad/Tri Mixed (Adv Frnt)
Max Quad Distortion 0.9
Quad/Tri Mesh!
Tools
Check Mesh Clear Mesh
OK
Tri mesh
MSC Software
Enter curve list : *at_planar_trimesh
Enter curve list : 1 2 3 4 5
Enter curve list : # | End of List
Tri meshing complete (285 elements)
Enter curve list :
Dialog
Model Navigator
Dynamic Menu Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): vekonylemez.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Length Unit
Geometry & Mesh
Renumber
Basic Manipulation
Check/Repair Geometry
Curve Divisions
Solid Mesh Seeds
Pre-Automesh
Curves Volumes
Planar 2-D Rebars
Surfaces
Automesh
Attach Convert Expand Move Solids Sweep
Change Class Defeature Imprint Relax Stretch Symmetry
Check Duplicate Intersect Revolve Subdivide
Operations
Grid
Edit
Coordinate System
New Identify Properties
Show Menu Plot Settings
Edit Template File
Model Sections
Model List
vekonylemez
Geometry (10)
Mesh (224)
Automesh 2-D Planar
Mesh Coarsening Parameter
Transition 1
Quadrilaterals (Adv Frnt)
Quad Mesh!
Quadrilaterals (Overlay)
Divisions 10 10
Bias Factors 0 0
Quad Mesh! Advanced
Triangles (Delaunay)
Tri Mesh!
Triangles (Adv Frnt)
Tri Mesh!
Quad/Tri Mixed (Adv Frnt)
Max Quad Distortion 0.9
Quad/Tri Mesh!
Tools
Check Mesh Clear Mesh
OK
Quad mesh
MSC Software
Enter curve list : # | End of List
Quad meshing complete (102 elements)
Warning: Contains 1 triangle (Caused by odd # segments on input loop)
Warning: Converted 1 triangle to degenerated quadrilateral element
Enter curve list :
Dialog
Main Menu
Model Navigator
Dynamic Menu
Model Navigator
Drawing...


Marc Mentat 2019 Feature Pack 1 (64bit): vekonylemez.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Length Unit Geometry & Mesh Renumber Basic Manipulation
Check/Repair Geometry Curve Divisions Solid Mesh Seeds Pre-Automesh
Curves Volumes Planar 2-D Rebars Surfaces Automesh
Attach Convert Expand Move Solids Sweep Change Class Defeature Imprint Relax Stretch Symmetry Check Duplicate Intersect Revolve Subdivide Operations
Grid Edit Coordinate System
New Identify Properties Show Menu Plot Settings Edit Template File Model Sections
Model List
vekonylemez
Geometry (10)
Mesh (241)
Automesh 2-D Planar
Mesh Coarsening Parameter
Transition 1
Quadrilaterals (Adv Frnt)
Quad Mesh!
Quadrilaterals (Overlay)
Divisions 10 10
Bias Factors 0 0
Quad Mesh! Advanced
Triangles (Delaunay)
Tri Mesh!
Triangles (Adv Frnt)
Tri Mesh!
Quad/Tri Mixed (Adv Frnt)
Max Quad Distortion 0.9
Quad/Tri Mesh!
Tools
Check Mesh Clear Mesh
OK
Quad mesh, with different subdividing
MSC Software
Enter curve list : *at_planar_quadmesh
Enter curve list : 1 2 3 4 5
Enter curve list : # | End of List
Quad meshing complete (110 elements)
Enter curve list :
Dialog
Model Navigator
Dynamic Menu Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): vekonylemez.mud - [Model (View 1)]
File View Tools Mode Window Help
Geometry & Mesh
Tables & Coord. Syst.
Geometric Properties
Material Properties
Contact
Toolbox
Links
Initial Conditions
Boundary Conditions
Mesh Adaptivity
Loadcases
Jobs
Results
Length Unit
Geometry & Mesh
Renumber
Basic Manipulation
Check/Repair Geometry
Curve Divisions
Solid Mesh Seeds
Pre-Automesh
Curves
Volumes
Planar
2-D Rebars
Surfaces
Automesh
Attach
Convert
Expand
Move
Solids
Sweep
Change Class
Defeature
Imprint
Relax
Stretch
Symmetry
Check
Duplicate
Intersect
Revolve
Subdivide
Operations
Grid
Edit
Coordinate System
New
Identify
Properties
Show Menu
Plot Settings
Edit
Template File
Model Sections
Model
List
vekonylemez
Geometry (10)
Mesh (471)
Automesh 2-D Planar
Mesh Coarsening Parameter
Transition
1
Quadrilaterals (Adv Frnt)
Quad Mesh!
Quadrilaterals (Overlay)
Divisions
10
10
Bias Factors
0
0
Quad Mesh!
Advanced
Triangles (Delaunay)
Tri Mesh!
Triangles (Adv Frnt)
Tri Mesh!
Quad/Tri Mixed (Adv Frnt)
Max Quad Distortion
0.9
Quad/Tri Mesh!
Tools
Check Mesh
Clear Mesh
OK
tri mesh,
with different
subdividing
MSC Software
Command > *at_planar_trimesh
Enter curve list : 1 2 3 4 5
Enter curve list : # | End of List
Tri meshing complete (300 elements)
Enter curve list :
Dialog
Dynamic Menu
Model Navigator
Ready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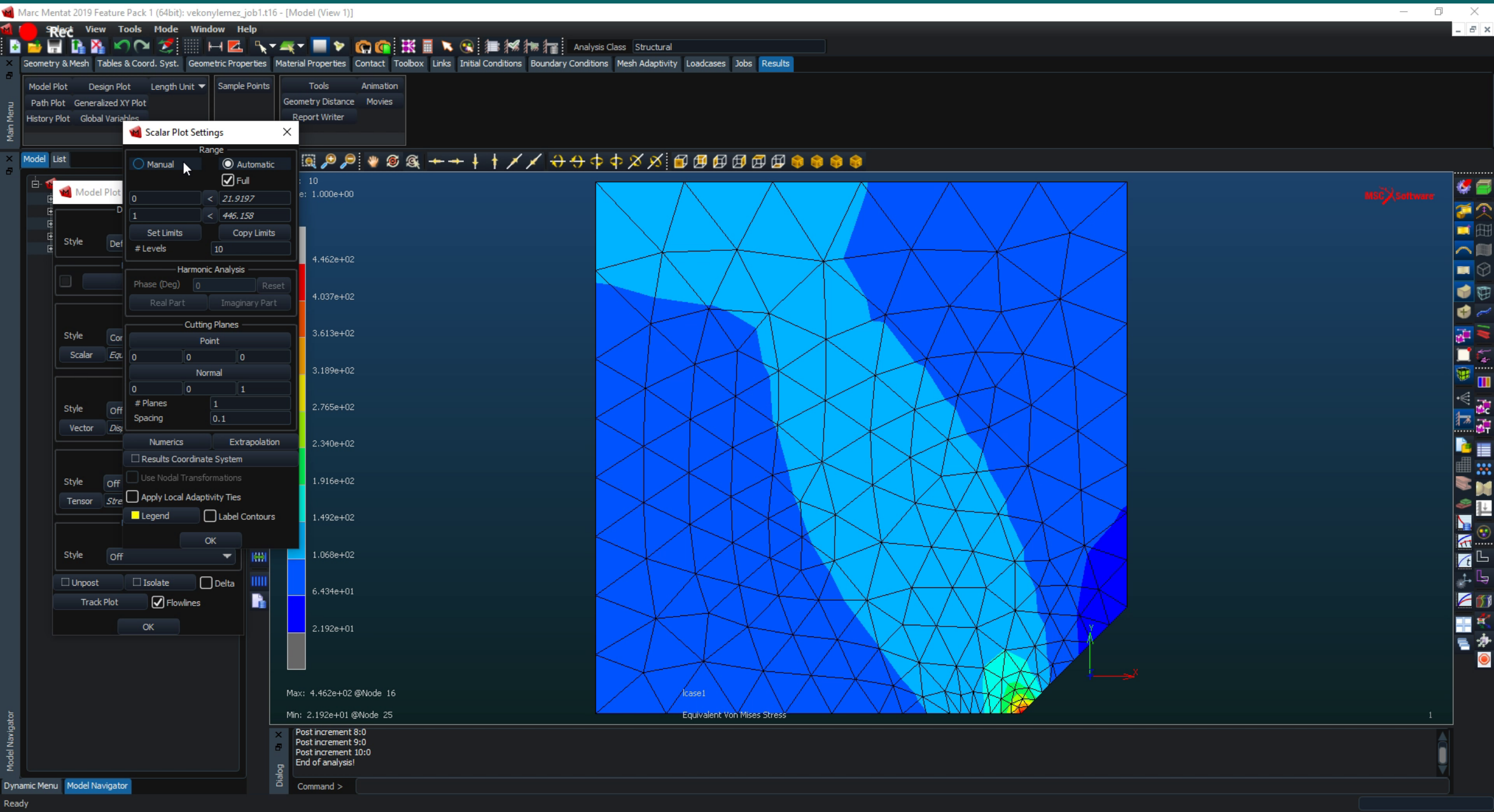
Surfaces
Automesh
Attach Convert Expand Move Solids Sweep
Change Class Defeature Imprint Relax Stretch Symmetry
Check Duplicate Intersect Revolve Subdivide
Operations
Grid
Edit
Coordinate System
New Identify Properties
Show Menu Plot Settings
Edit Template File
Model Sections
Model List
vekonylemez
Geometry (65)
Mesh (442)
Automesh 2-D Planar
Mesh Coarsening Parameter
Transition 1
Quadrilaterals (Adv Frnt)
Quad Mesh!
Quadrilaterals (Overlay)
Divisions 10 10
Bias Factors 0 0
Quad Mesh! Advanced
Triangles (Delaunay)
Tri Mesh!
Triangles (Adv Frnt)
Tri Mesh!
Quad/Tri Mixed (Adv Frnt)
Max Quad Distortion 0.9
Quad/Tri Mesh!
Tools
Check Mesh Clear Mesh
OK
Tri mesh, with fine subdividing near the stress concentrating area
MSC Software
Enter curve list : *at_planar_trimesh
Enter curve list : 6 8 10 12 13 14 16 17 18 20 21 22 24 25 26 27
Enter curve list : # | End of List
Tri meshing complete (279 elements)
Enter curve list :
Dialog
Dynamic Menu Model Navigator
Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): vekonylemez_job1.t16 - [Model (View 1)]
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Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Scalar Plot Settings
Range
Manual Automatic
Full
0 < 21.9197
1 < 446.158
Set Limits Copy Limits
Levels 10
Harmonic Analysis
Phase (Deg) 0 Reset
Real Part Imaginary Part
Cutting Planes
Point
0 0 0
Normal
0 0 1
Planes 1
Spacing 0.1
Numerics Extrapolation
Results Coordinate System
Use Nodal Transformations
Apply Local Adaptivity Ties
Legend Label Contours
OK
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
4.462e+02
4.037e+02
3.613e+02
3.189e+02
2.765e+02
2.340e+02
1.916e+02
1.492e+02
1.068e+02
6.434e+01
2.192e+01
Max: 4.462e+02 @Node 16
Min: 2.192e+01 @Node 25
lcase1
Equivalent Von Mises Stress
Post increment 8:0
Post increment 9:0
Post increment 10:0
End of analysis!
Command >
Dynamic Menu Model Navigator
Ready

Marc Mentat 2019 Feature Pack 1 (64bit): vekonylemez_job1.t16 - [Model (View 1)]

Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor: Stress

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 10
Time: 1.000e+00

4.000e+02
3.600e+02
3.200e+02
2.800e+02
2.400e+02
2.000e+02
1.600e+02
1.200e+02
8.000e+01
4.000e+01
0.000e+00

Stop monitor results file

Max: 4.462e+02 @Node 16
Min: 2.192e+01 @Node 25

lcase1
Equivalent Von Mises Stress
1

MSC Software

Post increment 8:0
Post increment 9:0
Post increment 10:0
End of analysis!

Dialog
Command >

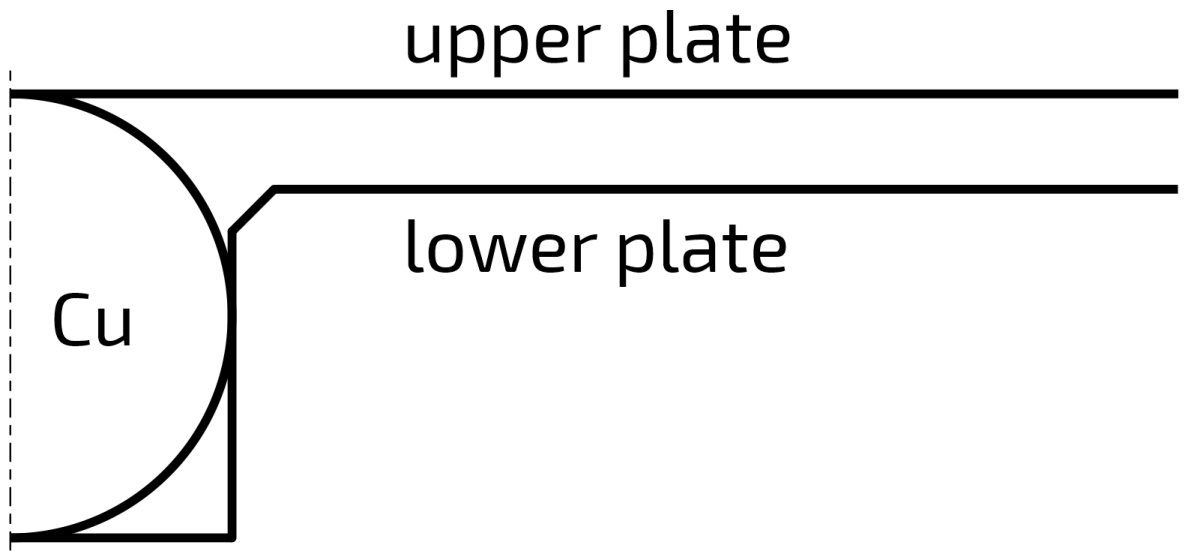
Dynamic Menu | Model Navigator

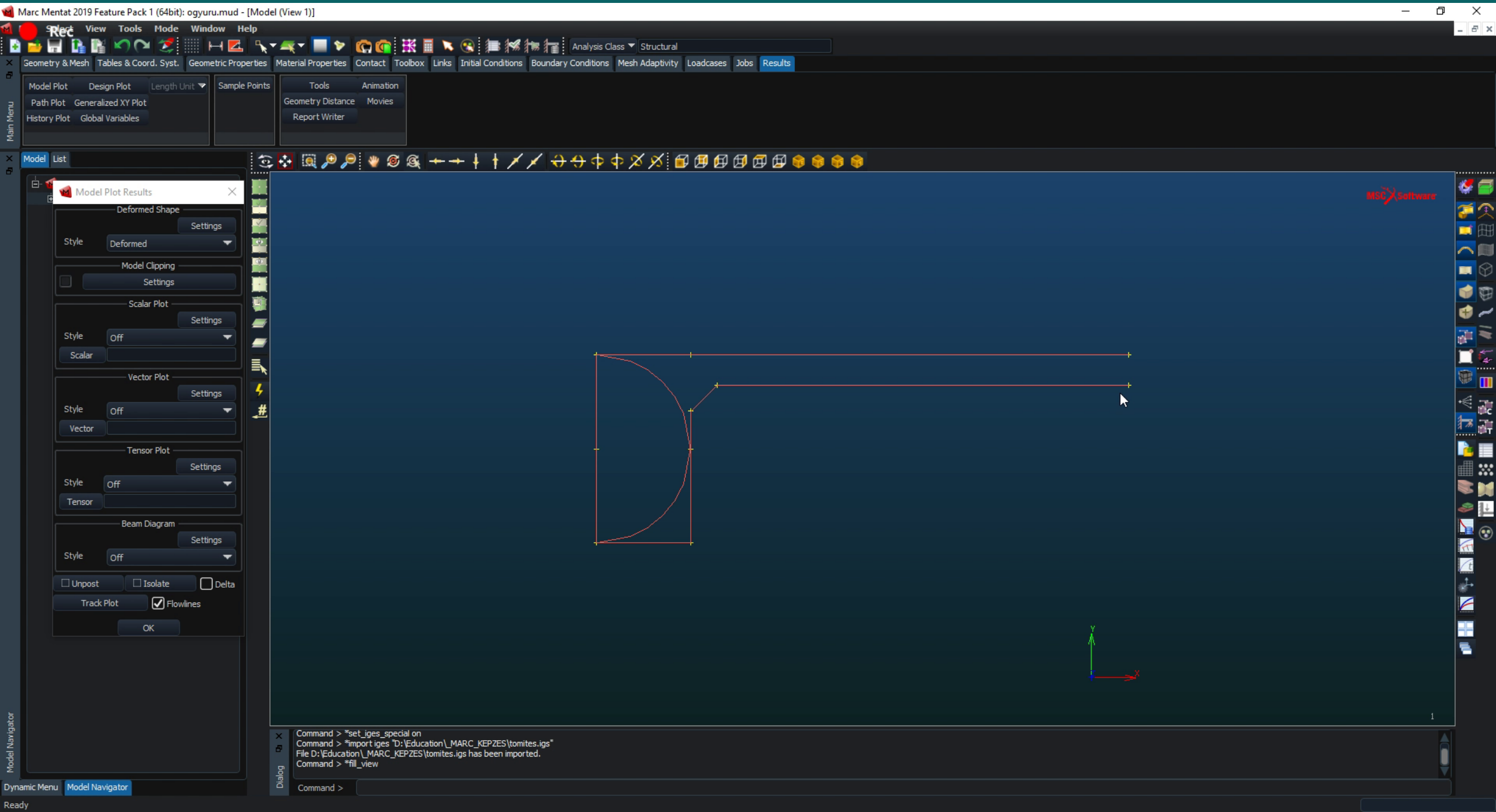
Waiting

Exercise 6
Sealing assembly

Exercise 6

- Axis symmetry
- Contact bodies, only the Cu sealing is meshed
- From IGS model




Marc Mentat 2019 Feature Pack 1 (64bit): ogyuru.mud - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Off
Scalar
Vector Plot
Settings
Style Off
Vector
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
MSC Software
Command > *set_iges_special on
Command > *import iges "D:\Education_MARC_KEPZES\tomites.igs"
File D:\Education_MARC_KEPZES\tomites.igs has been imported.
Command > *fill_view
Command >
Dialog
Dynamic Menu Model Navigator
Model Navigator
Ready

Marc Mentat 2019 Feature Pack 1 (64bit): ogyuru.mud - [Model (View 1)]

Rec

Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Contact Bodies: New, Detect Meshed Bodies, Identify Backfaces, Show Menu, Tools, Visibility, Edit, Identify, Properties

Contact Interactions: New, Tools, Show Menu, Properties, Edit

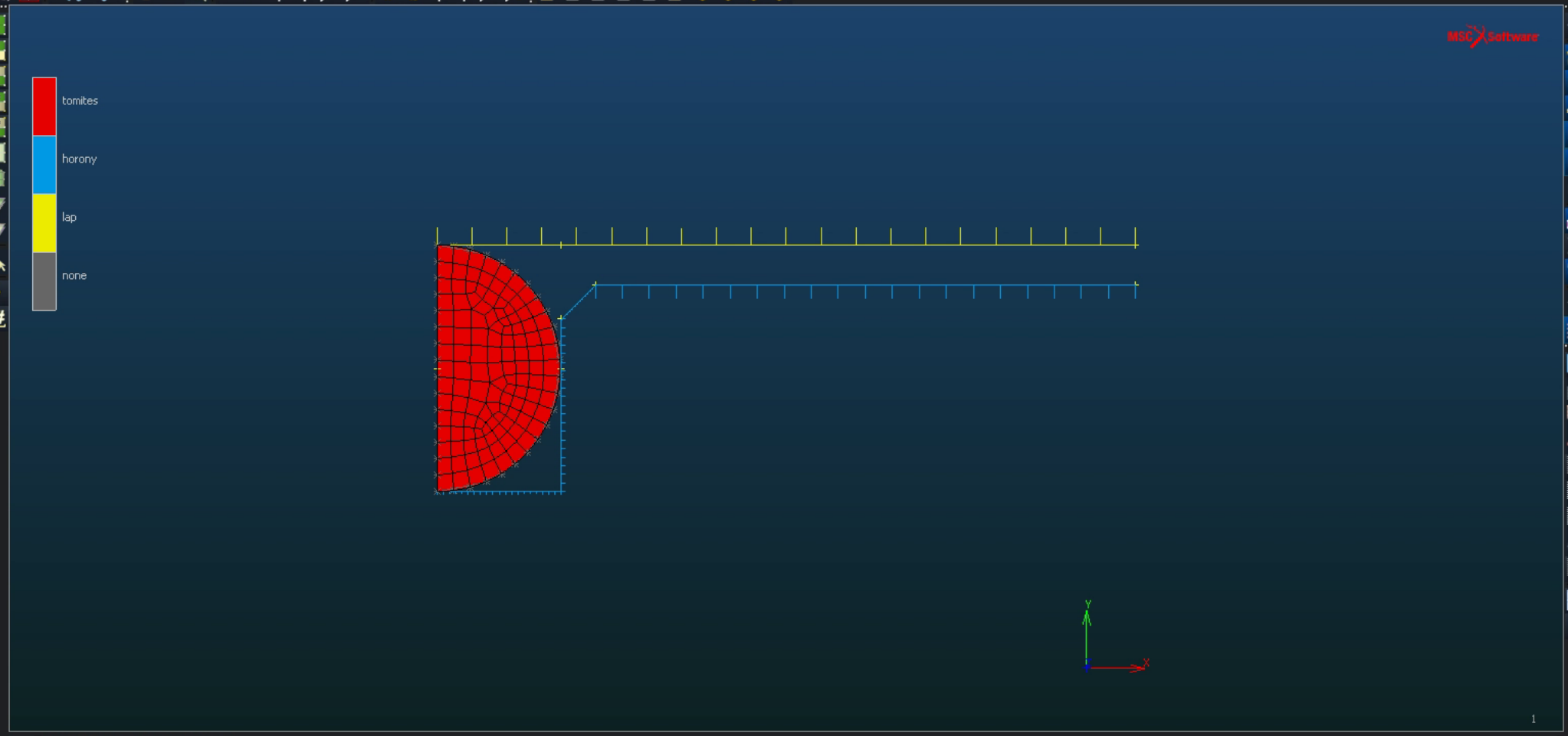
Contact Tables: New, Properties, Show Menu, Edit

Contact Areas: New, Properties, Show Menu, Edit

Exclude Segments: New, Properties, Show Menu, Edit

Model | List

- ogyuru
  - Geometry (18)
  - Mesh (262)
  - Geometric Properties (1)
    - Structural Plane Strain (1)
      - geom1
  - Materials (1)
    - Standard (1)
      - material1
  - Contact Bodies (3)
    - Meshed (Deformable) (1)
    - Geometric (2)
      - horony
      - lap



Command > *contact_body_name lap
Command > *add_contact_body_curves
Enter contact body add NURBS curve list : 5
Enter contact body add NURBS curve list : # | End of List

Dialog

Enter contact body add NURBS curve list :

Dynamic Menu | Model Navigator

Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): ogyuru.mud - [Model (View 1)]

Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

New | Detect Meshed Bodies | Identify Backfaces | Show Menu | Tools | Visibility | Edit | Identify | Properties — Contact Bodies

New | Tools | Show Menu | Properties | Edit — Contact Interactions

New | Properties | Show Menu | Edit — Contact Tables

New | Properties | Show Menu | Edit — Contact Areas

New | Properties | Show Menu | Edit — Exclude Segments

Model | List

- ogyuru
  - Geometry (18)
  - Mesh (262)
  - Geometric Properties (1)
    - Structural Plane Strain (1)
      - geom1
  - Materials (1)
    - Standard (1)
      - material1
  - Contact Bodies (3)
    - Meshed (Deformable) (1)
      - tomites
    - Geometric (2)
      - horony
      - lap
  - Contact Interactions (1)
    - Meshed (Deformable) vs. Geometric...
      - surlodas
  - Contact Tables (1)
    - ctable1

Contact Table Properties

Name: ctable1 | View Mode: Entry Matrix

Entries

Show Visible Bodies Only

First		Body Name	Body Type	Second 1	2	3
1	1	tomites	Meshed (Deformable)		T	T
2	2	horony	Geometric			
3	3	lap	Geometric			

Shown Entries: Activate | Deactivate | Remove | Detection | Remove Inactive

Populate / Manipulate | Full Default Contact: Touching | Glued

OK

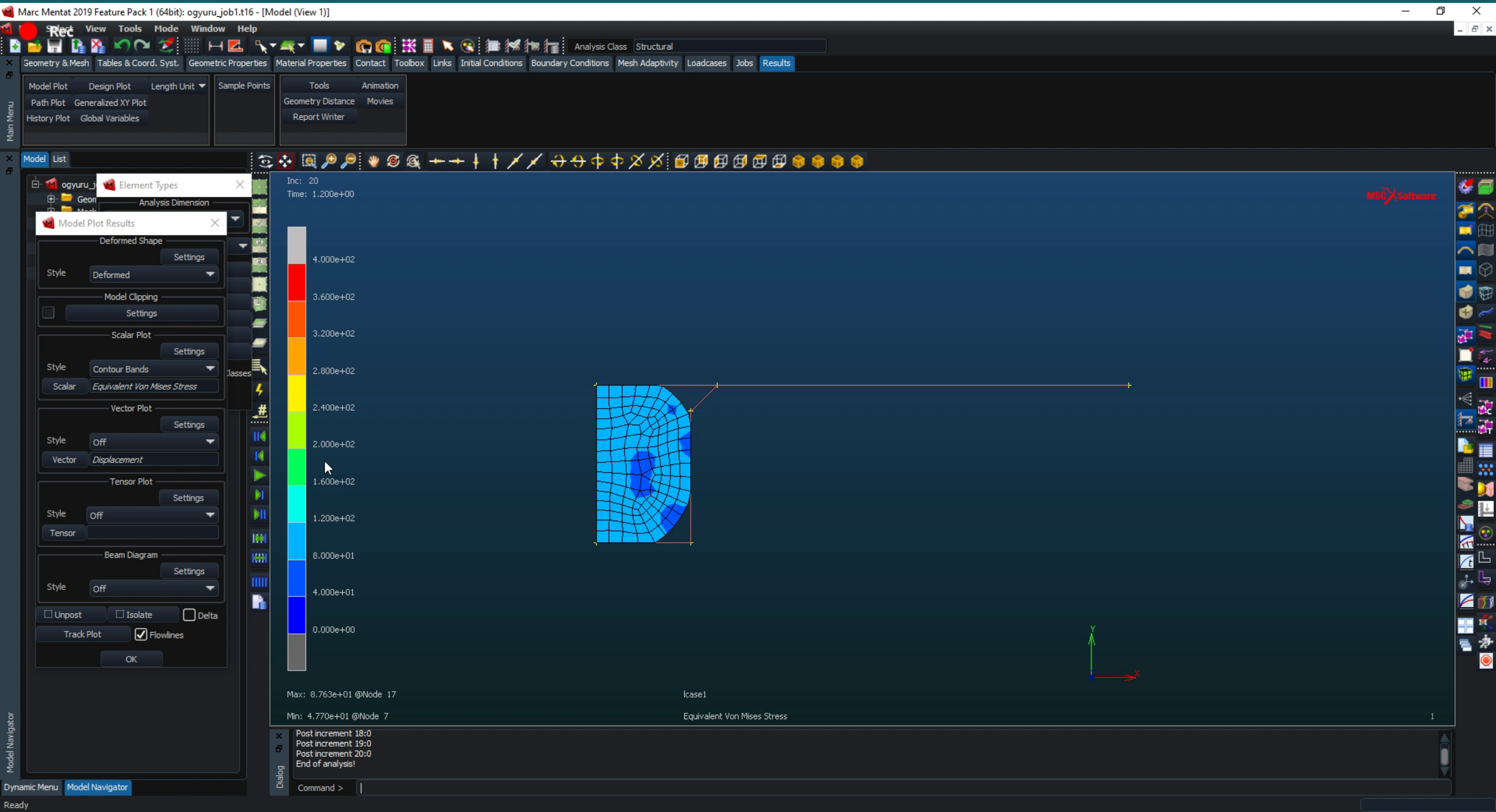
MSC Software

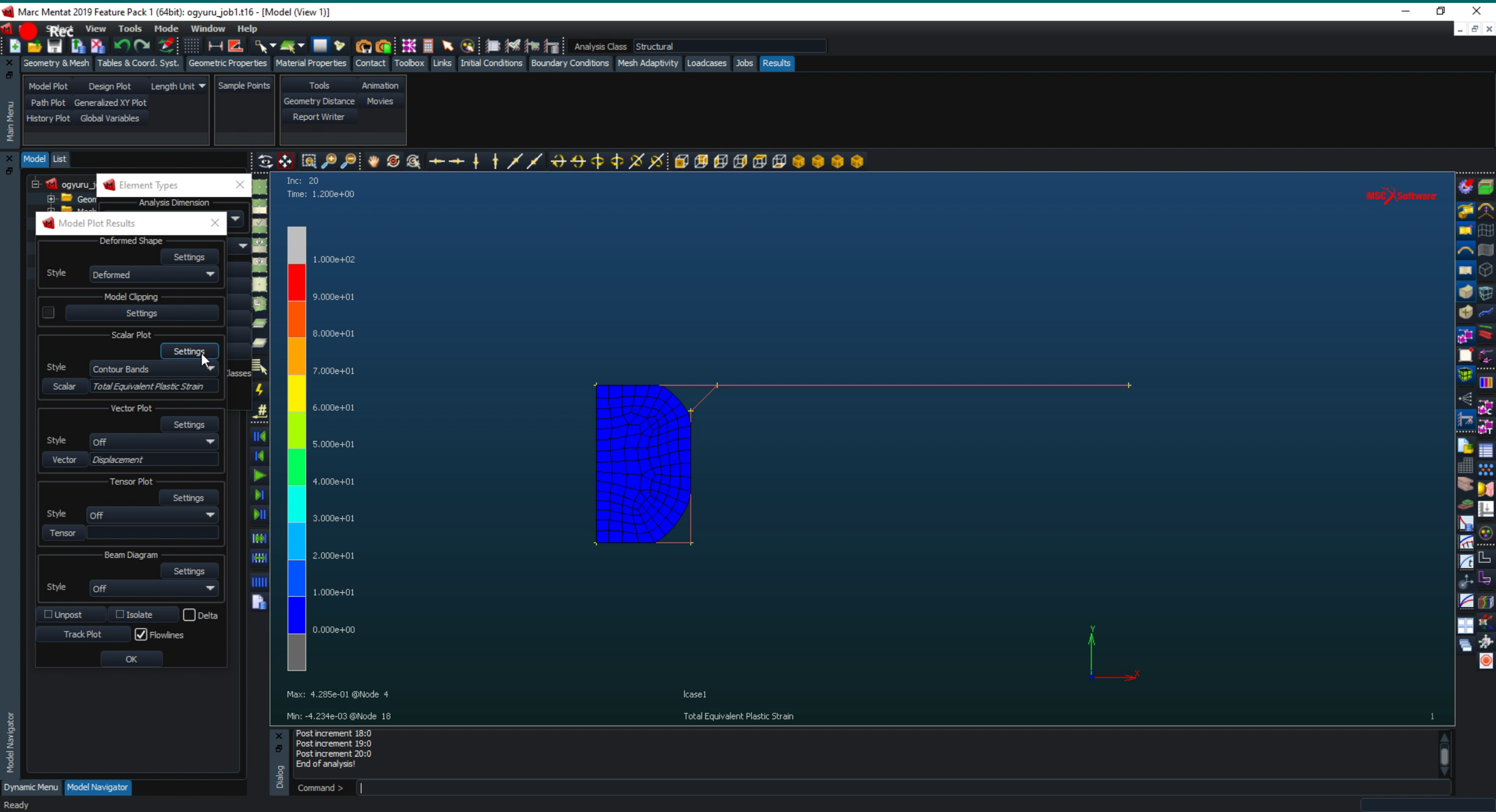
Command > *ctable_entry tomites lap
Enter contact table entry body A : *contact_table_option tomites lap contact:on
Command > *prog_string ctable:old_interact surlodas *ctable_entry_interact tomites lap
Command > *ctable_entry tomites lap

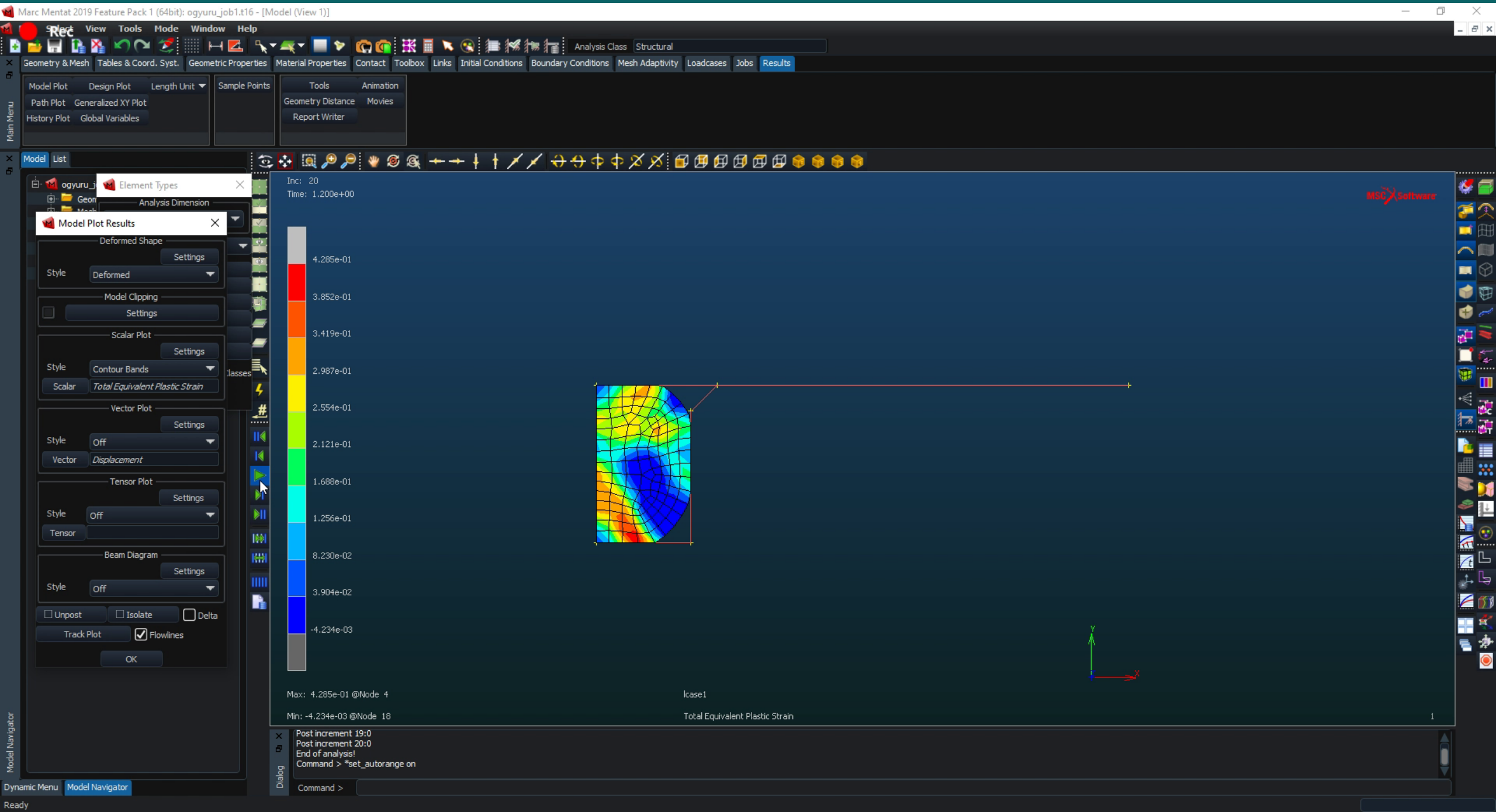
Enter contact table entry body A :

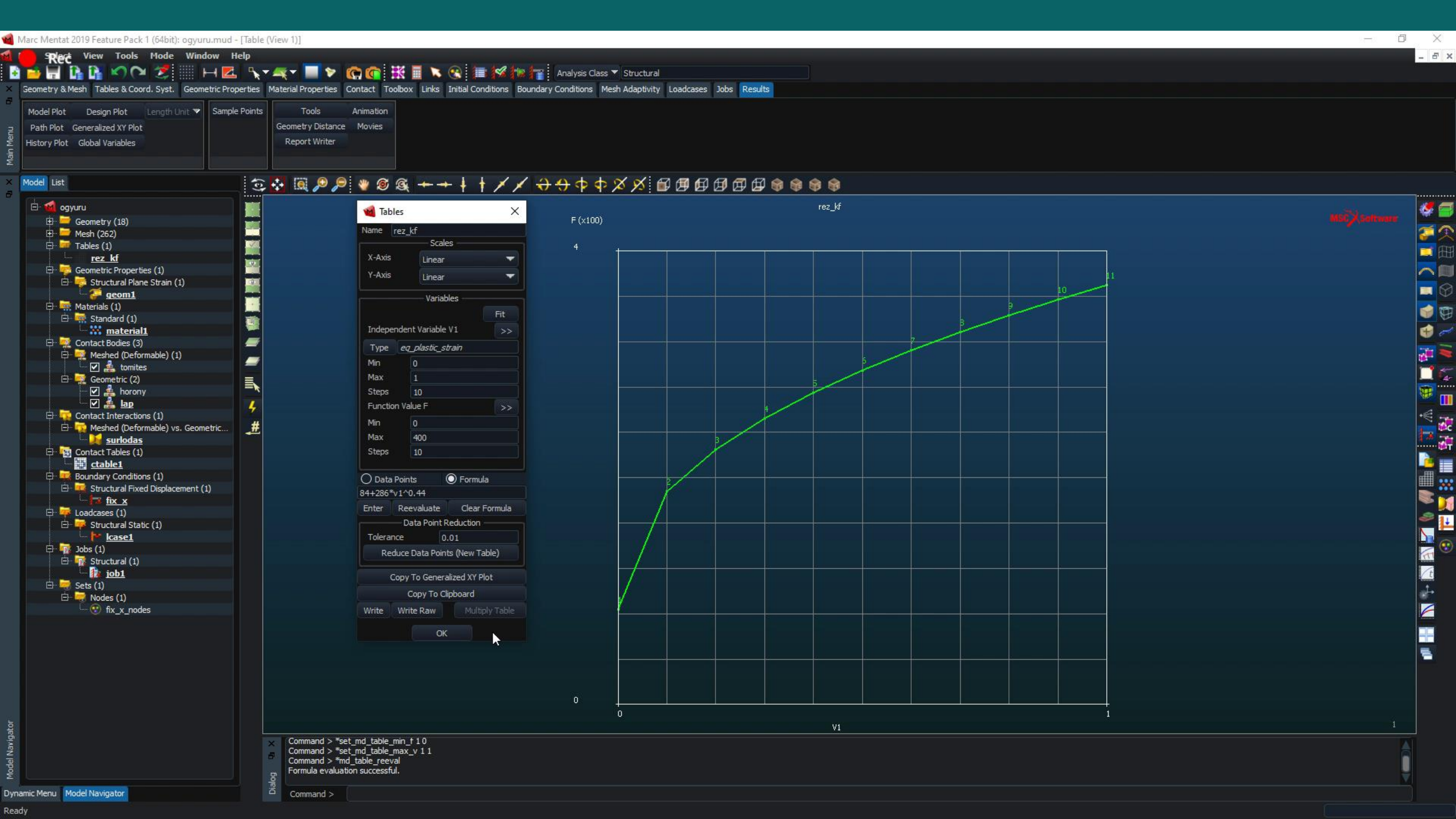
Dynamic Menu | Model Navigator

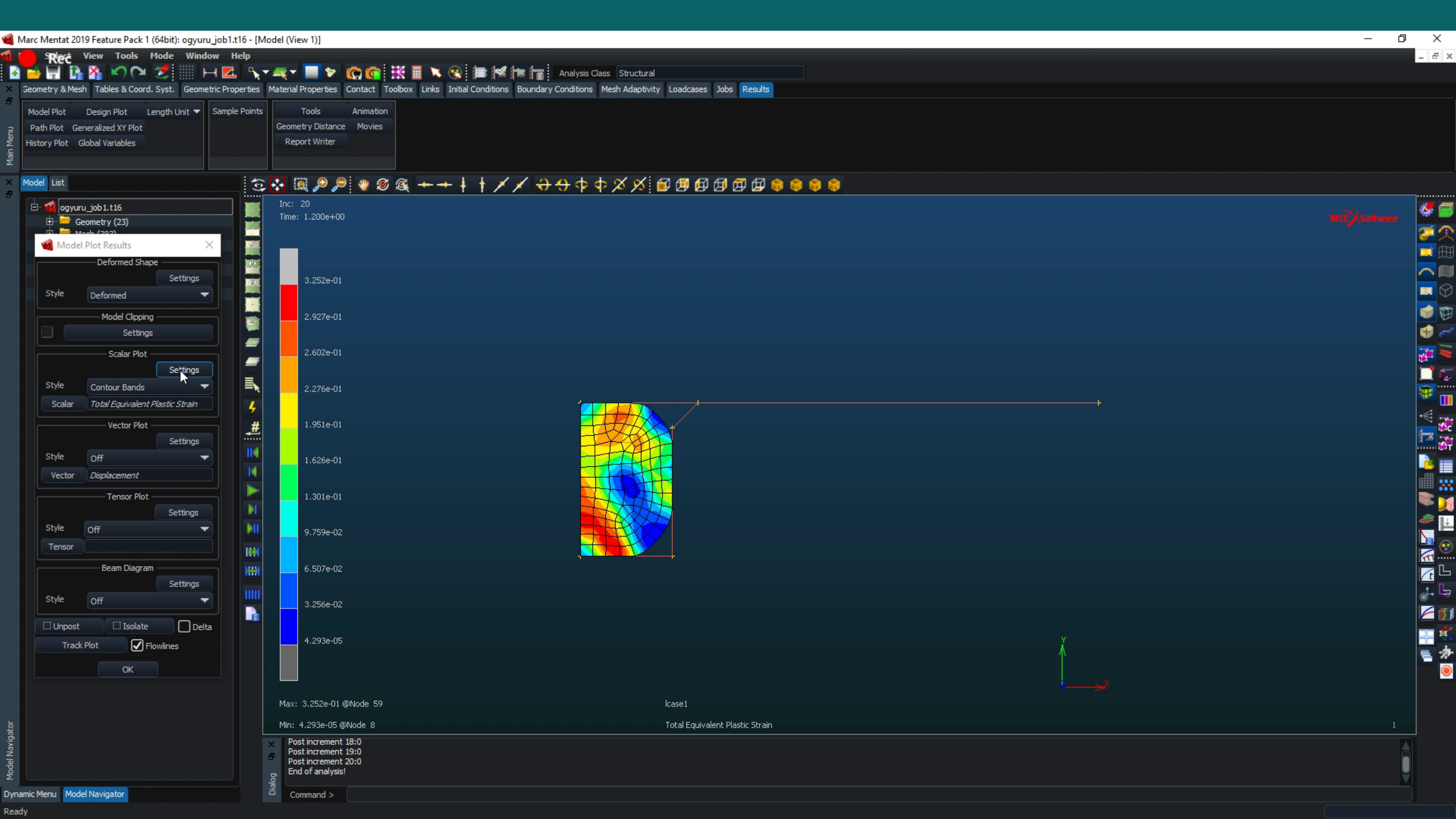
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): ogyuru_job1.t16 - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
Element Types
Analysis Dimension
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Equivalent Von Mises Stress
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 20
Time: 1.200e+00
4.000e+02
3.600e+02
3.200e+02
2.800e+02
2.400e+02
2.000e+02
1.600e+02
1.200e+02
8.000e+01
4.000e+01
0.000e+00
Max: 8.763e+01 @Node 17
Min: 4.770e+01 @Node 7
lcase1
Equivalent Von Mises Stress
1
Post increment 18:0
Post increment 19:0
Post increment 20:0
End of analysis!
Command >
Dynamic Menu Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): ogyuru_job1.t16 - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
Element Types
Analysis Dimension
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Total Equivalent Plastic Strain
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 20
Time: 1.200e+00
MSC Software
1.000e+02
9.000e+01
8.000e+01
7.000e+01
6.000e+01
5.000e+01
4.000e+01
3.000e+01
2.000e+01
1.000e+01
0.000e+00
Max: 4.285e-01 @Node 4
Min: -4.234e-03 @Node 18
lcase1
Total Equivalent Plastic Strain
1
Post increment 18:0
Post increment 19:0
Post increment 20:0
End of analysis!
Command >
Dynamic Menu Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): ogyuru_job1.t16 - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
Element Types
Analysis Dimension
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Total Equivalent Plastic Strain
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 20
Time: 1.200e+00
MSC Software
4.285e-01
3.852e-01
3.419e-01
2.987e-01
2.554e-01
2.121e-01
1.688e-01
1.256e-01
8.230e-02
3.904e-02
-4.234e-03
Max: 4.285e-01 @Node 4
Min: -4.234e-03 @Node 18
lcase1
Total Equivalent Plastic Strain
1
Post increment 19:0
Post increment 20:0
End of analysis!
Command > *set_autorange on
Command >
Dialog
Main Menu
Model Navigator
Dynamic Menu
Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): ogyuru.mud - [Table (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
ogyuru
Geometry (18)
Mesh (262)
Tables (1)
rez_kf
Geometric Properties (1)
Structural Plane Strain (1)
geom1
Materials (1)
Standard (1)
material1
Contact Bodies (3)
Meshed (Deformable) (1)
tomites
Geometric (2)
horony
lap
Contact Interactions (1)
Meshed (Deformable) vs. Geometric...
surlodas
Contact Tables (1)
ctable1
Boundary Conditions (1)
Structural Fixed Displacement (1)
fix_x
Loadcases (1)
Structural Static (1)
lcase1
Jobs (1)
Structural (1)
job1
Sets (1)
Nodes (1)
fix_x_nodes
Tables
Name rez_kf
Scales
X-Axis Linear
Y-Axis Linear
Variables
Fit
Independent Variable V1 >>
Type eq_plastic_strain
Min 0
Max 1
Steps 10
Function Value F >>
Min 0
Max 400
Steps 10
Data Points Formula
84+286*v1^0.44
Enter Reevaluate Clear Formula
Data Point Reduction
Tolerance 0.01
Reduce Data Points (New Table)
Copy To Generalized XY Plot
Copy To Clipboard
Write Write Raw Multiply Table
OK
rez_kf
F (x100)
4
0
0
1
V1
MSC Software
Command > *set_md_table_min_f 1 0
Command > *set_md_table_max_v 1 1
Command > *md_table_reeval
Formula evaluation successful.
Command >
Dialog
Dynamic Menu Model Navigator
Model Navigator
Ready


Marc Mentat 2019 Feature Pack 1 (64bit): ogyuru_job1.t16 - [Model (View 1)]
Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
ogyuru_job1.t16
Geometry (23)
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Total Equivalent Plastic Strain
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 20
Time: 1.200e+00
MSC Software
3.252e-01
2.927e-01
2.602e-01
2.276e-01
1.951e-01
1.626e-01
1.301e-01
9.759e-02
6.507e-02
3.256e-02
4.293e-05
Max: 3.252e-01 @Node 59
Min: 4.293e-05 @Node 8
lcase1
Total Equivalent Plastic Strain
1
Post increment 18:0
Post increment 19:0
Post increment 20:0
End of analysis!
Command >
Dynamic Menu Model Navigator
Ready

Marc Mentat 2019 Feature Pack 1 (64bit): ogyuru_job1.t16 - [Model (View 1)]

Rec

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

ogyuru_job1.t16
Geometry (23)

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Contact Normal Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 20
Time: 1.200e+00

MSC Software

5.240e+02
4.716e+02
4.192e+02
3.668e+02
3.144e+02
2.620e+02
2.096e+02
1.572e+02
1.048e+02
5.240e+01
0.000e+00

Max: 5.240e+02 @Node 23
Min: 0.000e+00 @Node 25

lcase1
Contact Normal Stress
1

Post increment 18:0
Post increment 19:0
Post increment 20:0
End of analysis!

Command >

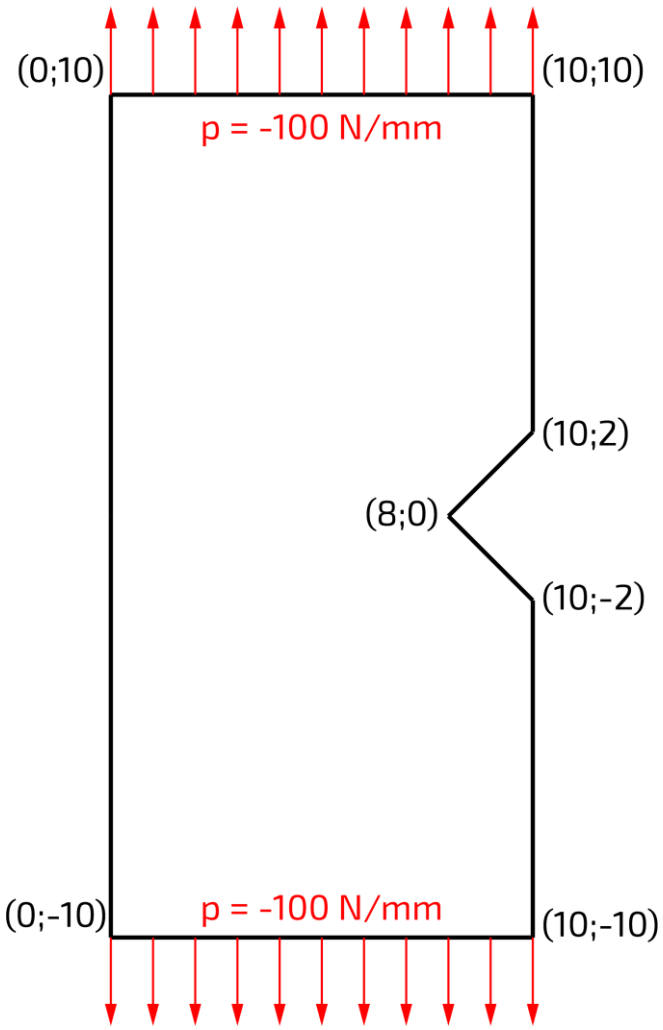
Dynamic Menu | Model Navigator

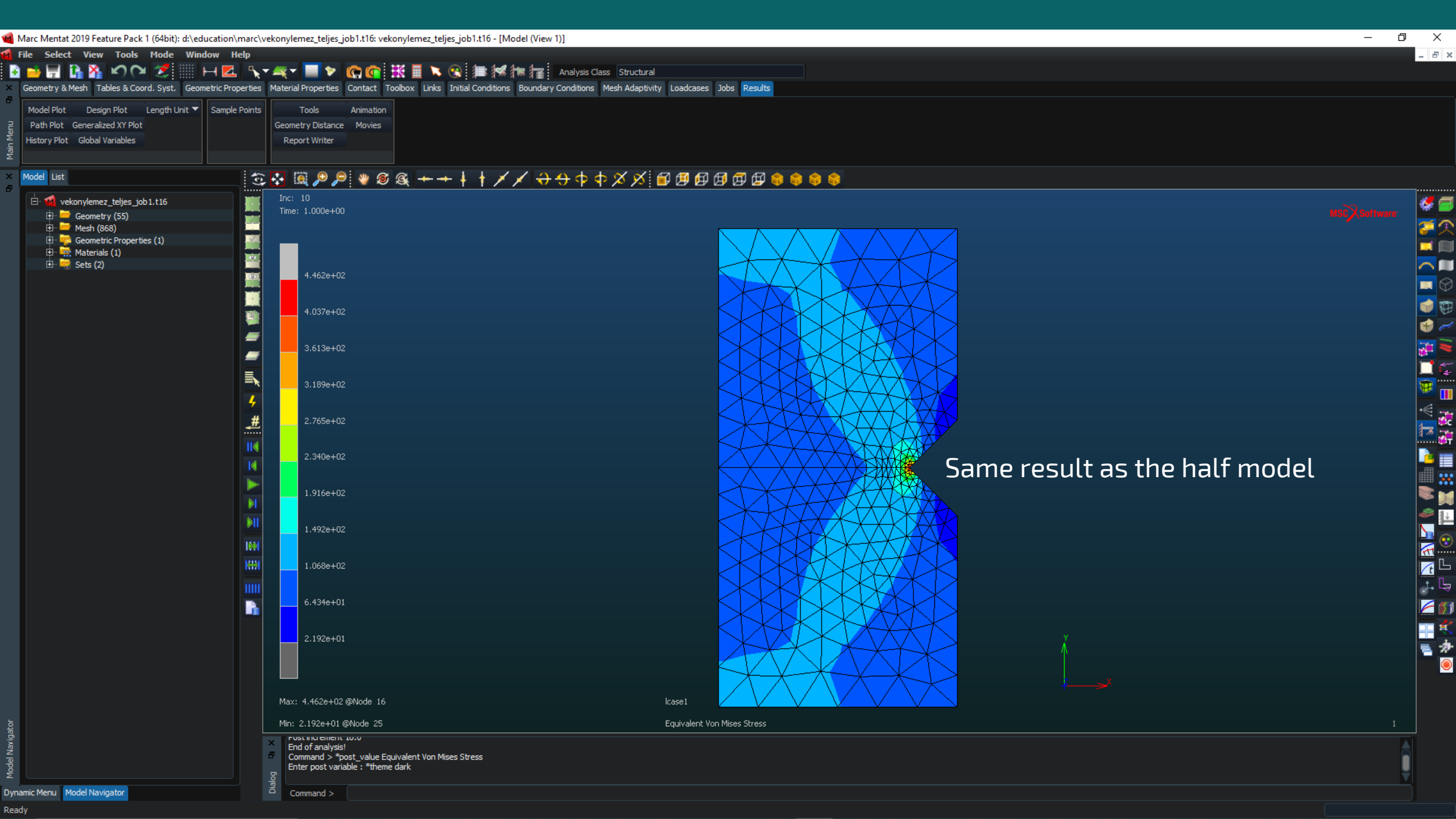
Ready

Homework 2&3

Homework 2

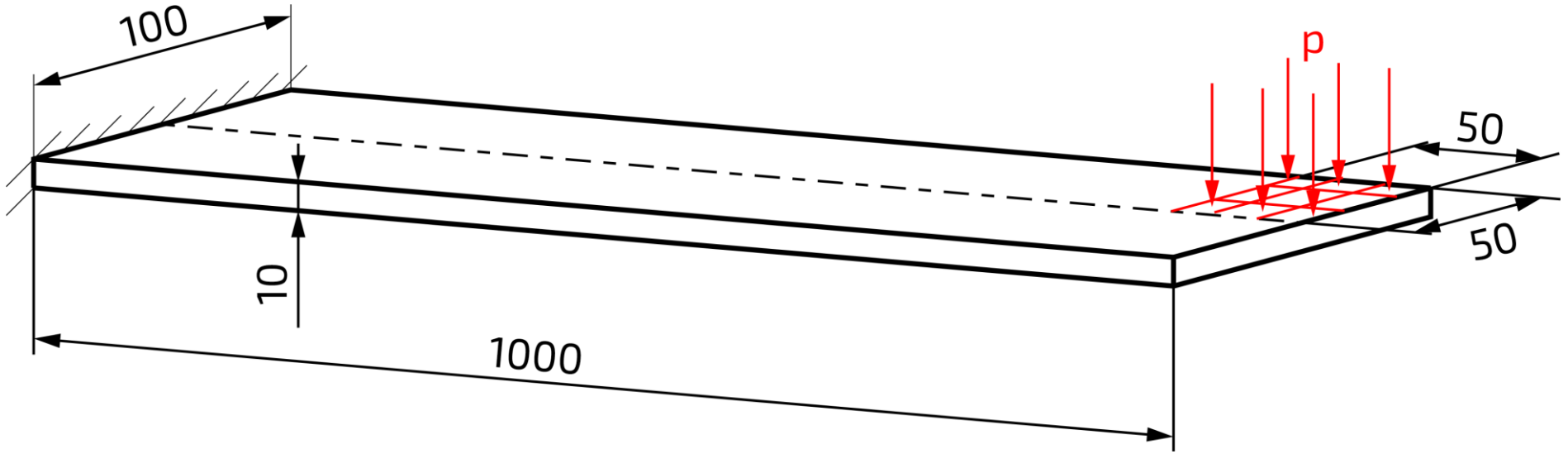
- Thickness = 1 mm
- Same as exercise 4, but simulating the whole sheet.
- Compare the results to the results of exercise 4.

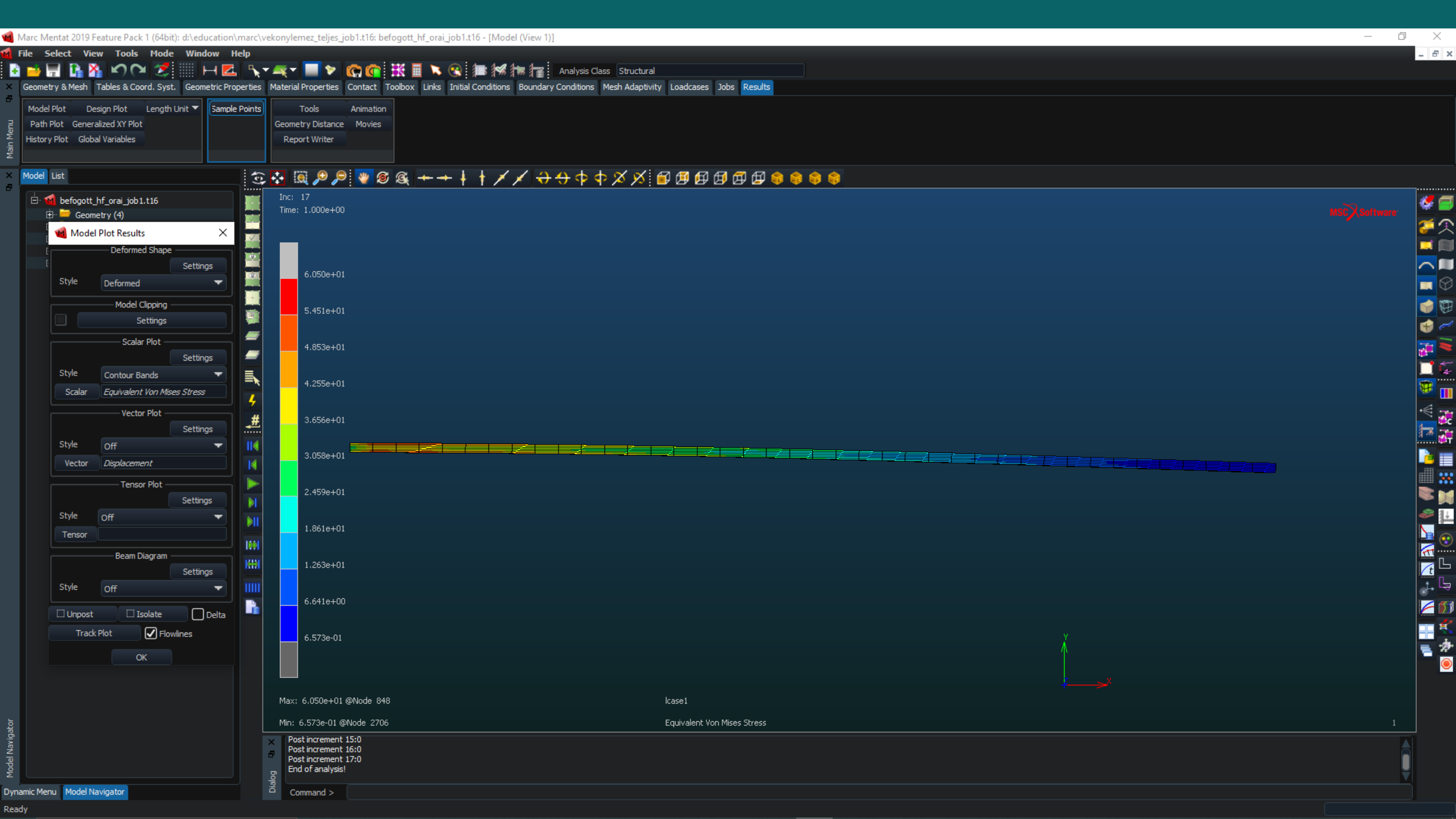



Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: vekonylemez_teljes_job1.t16 - [Model (View 1)]
File Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
vekonylemez_teljes_job1.t16
Geometry (55)
Mesh (868)
Geometric Properties (1)
Materials (1)
Sets (2)
Inc: 10
Time: 1.000e+00
4.462e+02
4.037e+02
3.613e+02
3.189e+02
2.765e+02
2.340e+02
1.916e+02
1.492e+02
1.068e+02
6.434e+01
2.192e+01
Max: 4.462e+02 @Node 16
Min: 2.192e+01 @Node 25
lcase1
Equivalent Von Mises Stress
1
MSC Software
Same result as the half model
End of analysis!
Command > *post_value Equivalent Von Mises Stress
Enter post variable : *theme dark
Command >
Dynamic Menu Model Navigator
Ready

Homework 3

- Material: Cu, elastic anf plastic strain
- Same as exercise 4, but simulating the whole sheet.
- Compare the results to the results of exercise 4.




Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: befogott_hf_orai_job1.t16 - [Model (View 1)]
File Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
befogott_hf_orai_job1.t16
Geometry (4)
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Equivalent Von Mises Stress
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 17
Time: 1.000e+00
MSC Software
6.050e+01
5.451e+01
4.853e+01
4.255e+01
3.656e+01
3.058e+01
2.459e+01
1.861e+01
1.263e+01
6.641e+00
6.573e-01
Max: 6.050e+01 @Node 848
Min: 6.573e-01 @Node 2706
lcase1
Equivalent Von Mises Stress
1
Post increment 15:0
Post increment 16:0
Post increment 17:0
End of analysis!
Command >
Dynamic Menu Model Navigator
Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: befogott_hf_orai_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

befogott_hf_orai_job1.t16

Geometry (4)

Model Plot Results

Deformed Shape
- Settings
- Style: Deformed

Model Clipping
- Settings

Scalar Plot
- Settings
- Style: Contour Bands
- Scalar: *Equivalent Elastic Strain*

Vector Plot
- Settings
- Style: Off
- Vector: *Displacement*

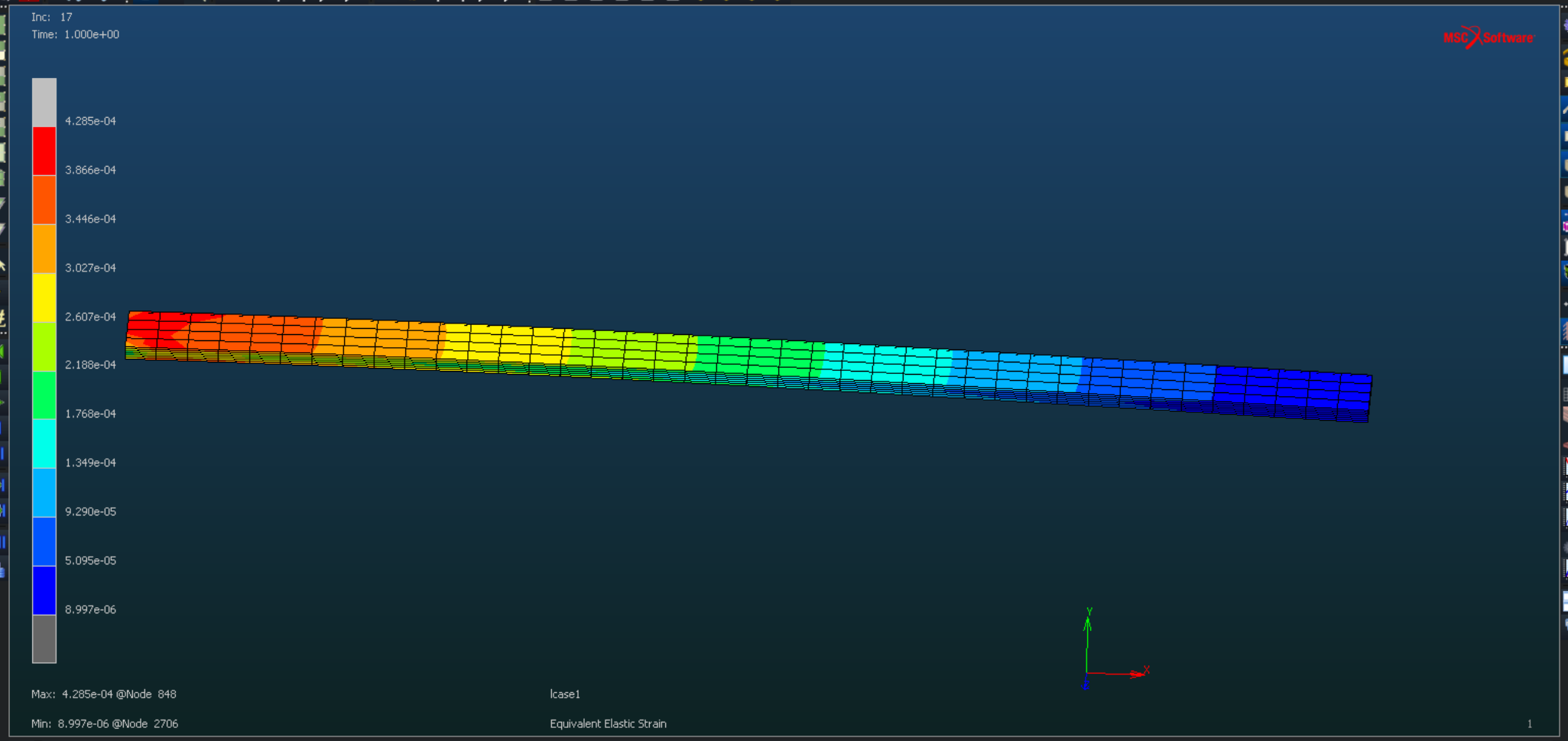
Tensor Plot
- Settings
- Style: Off
- Tensor

Beam Diagram
- Settings
- Style: Off

☐ Unpost ☐ Isolate ☐ Delta

Track Plot ☑ Flowlines

OK



Enter post variable : *post_value Total Equivalent Plastic Strain
Enter post variable : *post_value Equivalent Elastic Strain
Enter post variable : *post_value Displacement
Enter post variable : *post_value Equivalent Elastic Strain

Enter post variable :

Dialog

Main Menu | Model Navigator | Dynamic Menu | Model Navigator

Ready

Part 3

Tips and tricks for the exercises of Part 3

Tips and tricks

- If a highly elastic material is used (eg. rubber), type should be set to Mooney
- Expand command can be used in the results file – only to the current step – good for visualization
- For symmetry command: 1 point and a normal vector is needed – Sweep after!
- For calculating 2D crack: K1 – Toolbox – New Crack – 2D VCCT – set, select 1 node
  - In Job: select K1, VCCT
  - J-Integral can be also calculated

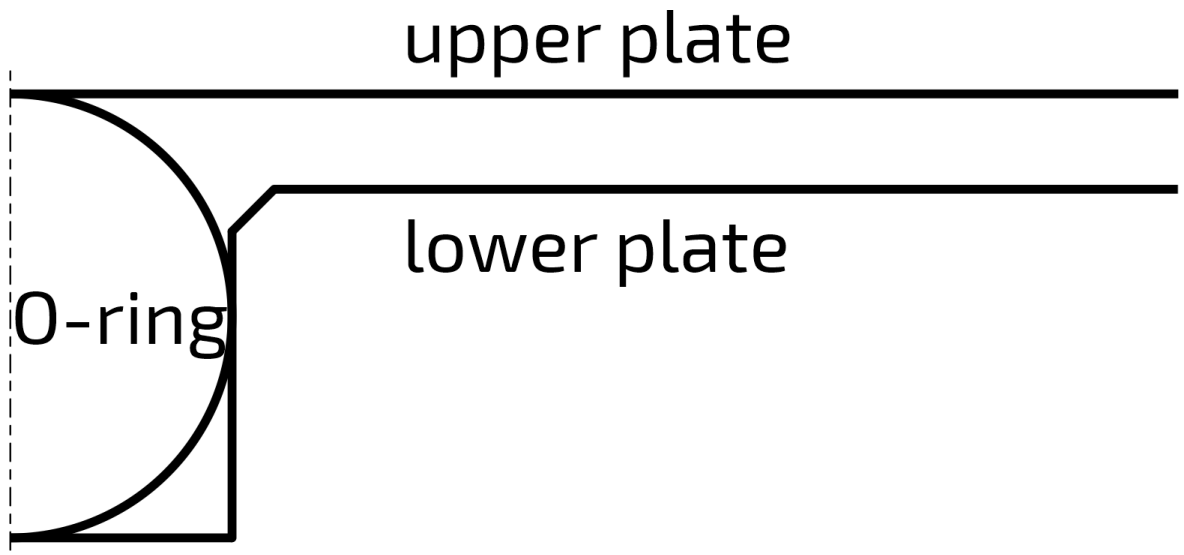
Tips and tricks

- Axis symmetric simulations: only x axis can be the symmetry axis, geometry can only be drawn in the positive y part of xy plane
- Remesh is better with tri mesh.
- Remeshing: Andvanced
  - Strain change: maximum strain of element before remeshing
  - Distortion: effective maximum strain
  - Penetration: if the elements would overlap, remeshing
  - Parameters: length of element can be set
- Overlapping on purpose: contact table - interference fit parameter (drawing to nominal dimensions)

Exercise 7
Sealing assembly (O-ring)

Exercise 7

- Axis symmetry
- Contact bodies, only the rubber O-ring is meshed
- From IGS model
- Only elastic deformation



Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tomites_03alkalom_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
- Settings
- Style: Deformed

Model Clipping
- Settings

Scalar Plot
- Settings
- Style: Contour Bands
- Scalar: *Equivalent Von Mises Stress*

Vector Plot
- Settings
- Style: Off
- Vector: *Displacement*

Tensor Plot
- Settings
- Style: Off
- Tensor

Beam Diagram
- Settings
- Style: Off

☐ Unpost ☐ Isolate ☐ Delta

Track Plot ☑ Flowlines

OK

Inc: 10
Time: 1.000e+00

MSC Software

3.267e+00
2.954e+00
2.641e+00
2.327e+00
2.014e+00
1.701e+00
1.388e+00
1.075e+00
7.617e-01
4.486e-01
1.354e-01

Max: 3.267e+00 @Node 36
Min: 1.354e-01 @Node 18

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tomites_03alkalom_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

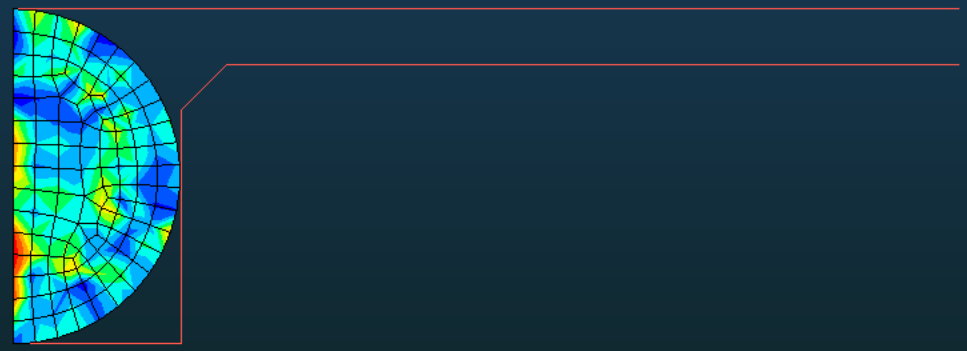
Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 20
Time: 2.000e+00

MSC Software

2.065e-15
1.835e-15
1.606e-15
1.377e-15
1.147e-15
9.177e-16
6.883e-16
4.590e-16
2.296e-16
1.647e-19
-2.292e-16

Some stress remains, but no plastic deformation



Max: 2.065e-15 @Node 35
Min: -2.292e-16 @Node 25

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_skip_to_last
Command >

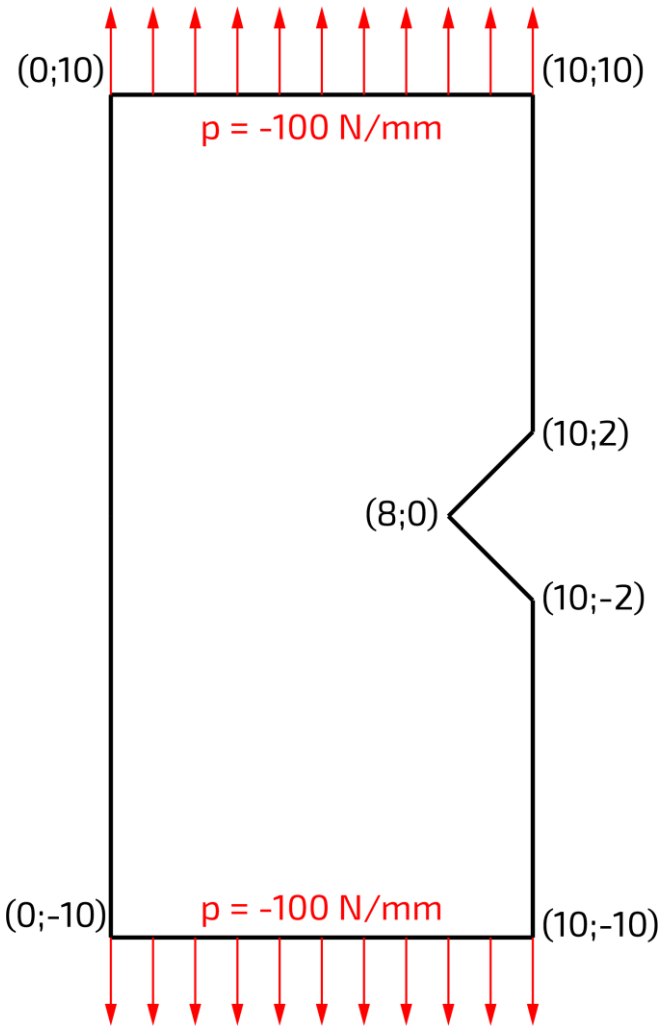
Dynamic Menu | Model Navigator

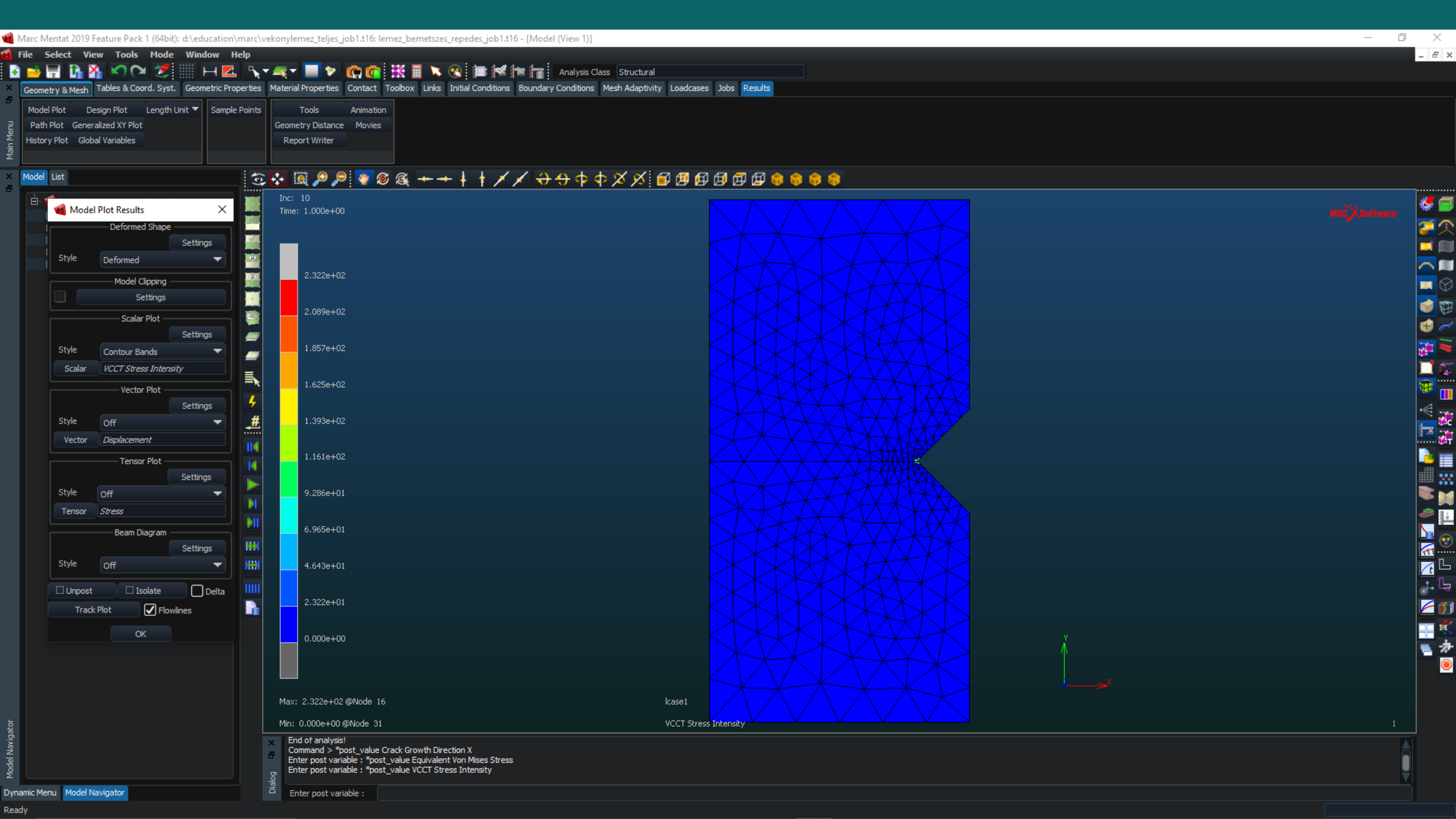
Ready

Exercise 8
Thin sheet with crack

Exercise 8

- Thickness = 1 mm
- Same as homework 2, but a crack is simulated to the notch.

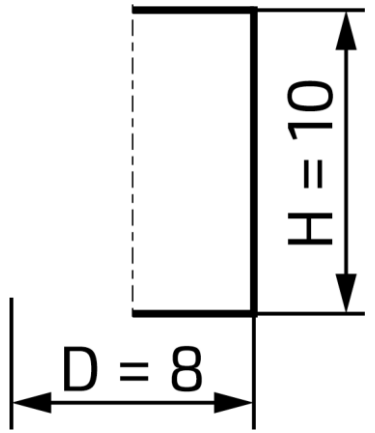



Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: lemez_bemetszes_repedes_job1.t16 - [Model (View 1)]
File Select View Tools Mode Window Help
Analysis Class Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar VCCT Stress Intensity
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor Stress
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 10
Time: 1.000e+00
2.322e+02
2.089e+02
1.857e+02
1.625e+02
1.393e+02
1.161e+02
9.286e+01
6.965e+01
4.643e+01
2.322e+01
0.000e+00
MSC Software
Max: 2.322e+02 @Node 16
Min: 0.000e+00 @Node 31
lcase1
VCCT Stress Intensity
1
End of analysis!
Command > *post_value Crack Growth Direction X
Enter post variable : *post_value Equivalent Von Mises Stress
Enter post variable : *post_value VCCT Stress Intensity
Enter post variable :
Dynamic Menu Model Navigator
Ready

Exercise 9
Compression

Exercise 9

- Compression between flat plates
- Al 2024 – AlCuMg2
- Room temperature: $k_f = 336 \cdot \varphi^{0.1547}$
- Remeshing



Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: zomites_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0
Time: 0.000e+00

1.000e+00
9.000e-01
8.000e-01
7.000e-01
6.000e-01
5.000e-01
4.000e-01
3.000e-01
2.000e-01
1.000e-01
0.000e+00

Max: 0.000e+00 @Node 15
Min: 0.000e+00 @Node 15

job1
Equivalent Von Mises Stress
1

Command > *rot_model_cspace_z_for
Command > *rot_model_cspace_z_for
Command > *rot_model_cspace_z_for
Command > *rot_model_cspace_z_rev

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: zomites_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 10
Time: 1.000e+00

MSC Software

2.392e+02
2.384e+02
2.376e+02
2.368e+02
2.359e+02
2.351e+02
2.343e+02
2.335e+02
2.327e+02
2.319e+02
2.311e+02

Max: 2.392e+02 @Node 41
Min: 2.311e+02 @Node 26

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: zomites_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 18
Time: 1.800e+00

MSC Software

2.652e+02
2.641e+02
2.631e+02
2.620e+02
2.610e+02
2.599e+02
2.589e+02
2.578e+02
2.568e+02
2.558e+02
2.547e+02

Max: 2.652e+02 @Node 10
Min: 2.547e+02 @Node 55

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_prev
Command > *post_prev
Command > *post_next
Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: zomites_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 25
Time: 2.500e+00

MSC Software

2.817e+02
2.805e+02
2.793e+02
2.781e+02
2.769e+02
2.757e+02
2.745e+02
2.733e+02
2.721e+02
2.709e+02
2.697e+02

Max: 2.817e+02 @Node 37
Min: 2.697e+02 @Node 25

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_prev
Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: zomites_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
- Settings
- Style: Deformed

Model Clipping
- Settings

Scalar Plot
- Settings
- Style: Contour Bands
- Scalar: *Equivalent Von Mises Stress*

Vector Plot
- Settings
- Style: Off
- Vector: *Displacement*

Tensor Plot
- Settings
- Style: Off
- Tensor

Beam Diagram
- Settings
- Style: Off

☐ Unpost ☐ Isolate ☐ Delta

Track Plot ☑ Flowlines

OK

Inc: 31
Time: 3.100e+00

MSC Software

2.937e+02
2.924e+02
2.911e+02
2.898e+02
2.885e+02
2.871e+02
2.858e+02
2.845e+02
2.832e+02
2.818e+02
2.805e+02

Max: 2.937e+02 @Node 28
Min: 2.805e+02 @Node 19

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_prev
Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: zomites_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 36
Time: 3.600e+00

MSC Software

3.035e+02
3.020e+02
3.006e+02
2.991e+02
2.976e+02
2.962e+02
2.947e+02
2.932e+02
2.918e+02
2.903e+02
2.888e+02

Max: 3.035e+02 @Node 2
Min: 2.888e+02 @Node 48

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Dialog
Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: zomites_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
- Settings
- Style: Deformed

Model Clipping
- Settings

Scalar Plot
- Settings
- Style: Contour Bands
- Scalar: *Equivalent Von Mises Stress*

Vector Plot
- Settings
- Style: Off
- Vector: *Displacement*

Tensor Plot
- Settings
- Style: Off
- Tensor

Beam Diagram
- Settings
- Style: Off

☐ Unpost ☐ Isolate ☐ Delta

Track Plot ☑ Flowlines

OK

Inc: 41
Time: 4.100e+00

MSC Software

3.124e+02
3.108e+02
3.092e+02
3.076e+02
3.061e+02
3.045e+02
3.029e+02
3.013e+02
2.997e+02
2.981e+02
2.966e+02

Max: 3.124e+02 @Node 2
Min: 2.966e+02 @Node 42

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Dialog

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: zomites_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
- Settings
- Style: Deformed

Model Clipping
- Settings

Scalar Plot
- Settings
- Style: Contour Bands
- Scalar: *Equivalent Von Mises Stress*

Vector Plot
- Settings
- Style: Off
- Vector: *Displacement*

Tensor Plot
- Settings
- Style: Off
- Tensor

Beam Diagram
- Settings
- Style: Off

☐ Unpost ☐ Isolate ☐ Delta

Track Plot ☑ Flowlines

OK

Inc: 45
Time: 4.500e+00

MSC Software

3.195e+02
3.178e+02
3.161e+02
3.144e+02
3.127e+02
3.110e+02
3.092e+02
3.075e+02
3.058e+02
3.041e+02
3.024e+02

Max: 3.195e+02 @Node 2
Min: 3.024e+02 @Node 43

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: zomites_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
- Settings
- Style: Deformed

Model Clipping
- Settings

Scalar Plot
- Settings
- Style: Contour Bands
- Scalar: *Equivalent Von Mises Stress*

Vector Plot
- Settings
- Style: Off
- Vector: *Displacement*

Tensor Plot
- Settings
- Style: Off
- Tensor

Beam Diagram
- Settings
- Style: Off

☐ Unpost ☐ Isolate ☐ Delta

Track Plot ☑ Flowlines

OK

Inc: 49
Time: 4.900e+00

MSC Software

3.249e+02
3.232e+02
3.215e+02
3.198e+02
3.181e+02
3.164e+02
3.147e+02
3.130e+02
3.113e+02
3.095e+02
3.078e+02

Max: 3.249e+02 @Node 1
Min: 3.078e+02 @Node 43

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Part 4

Tips and tricks for the exercises of Part 4

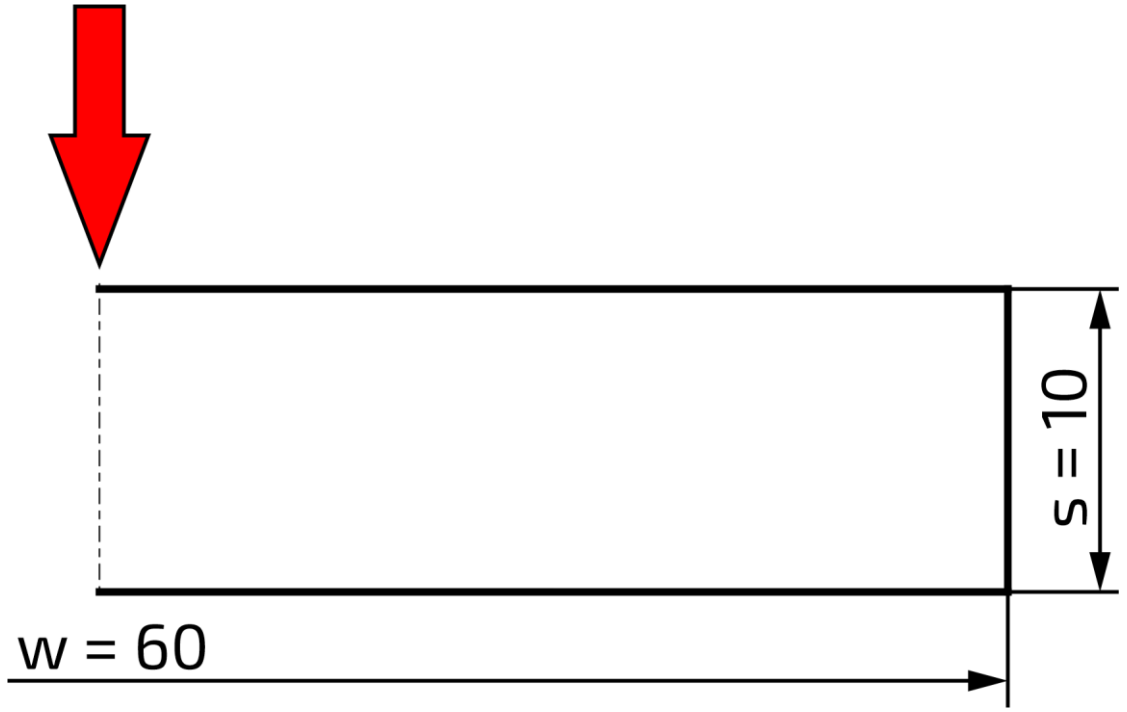
Tips and tricks

- Welding in 2D – 1 section
- ToolBox – Weld Path
- Loadcase – Solution control
  - Non positive definite – if the computing stops due to the DoF-s, this lets through
  - Pay attention to wrong result nodes – the computing can stop due to them
- Transform into 3D – expand – almost everything can be transformed

Exercise 10
Welding in 2D

Exercise 10

- 2D welding – 1 section
- Thermal+structural job
- Without welding filler metal



Marc Mentat 2019 Feature Pack 1 (64bit): heg2D_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Temperature

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 37
Time: 7.400e+00

MSC Software

4.000e+03
3.600e+03
3.200e+03
2.800e+03
2.400e+03
2.000e+03
1.600e+03
1.200e+03
8.000e+02
4.000e+02
0.000e+00

Max: 4.064e+03 @Node 9
Min: 2.924e+02 @Node 171

hegesztes
Temperature
1

Command > *post_prev
Command > *post_next
Command > *post_prev
Command > *post_next
Command >

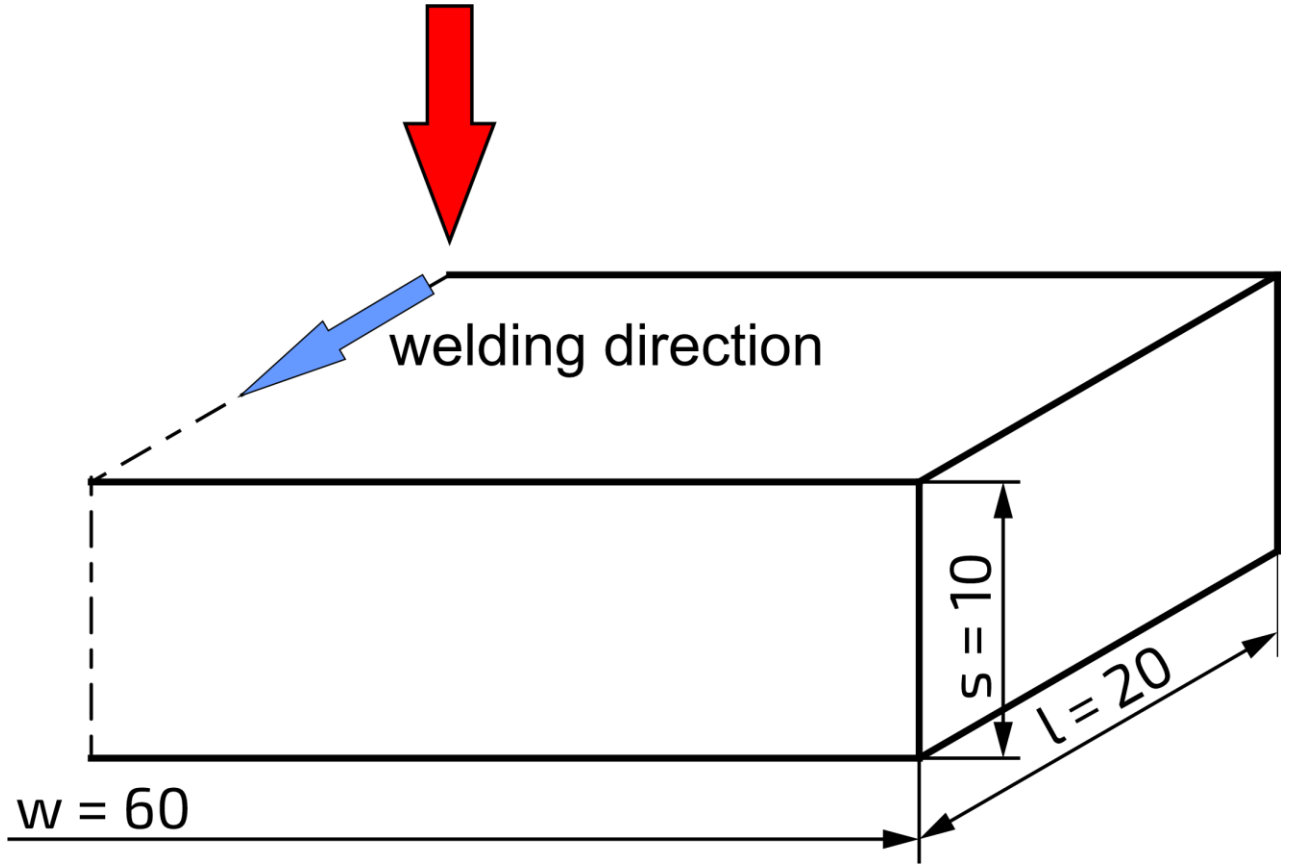
Dynamic Menu | Model Navigator

Ready

Exercise 11&12
Welding in 3D

Exercise 11

- 3D welding – whole process
- Thermal+structural job
- Without welding filler metal
- Temperature tracking during welding



Marc Mentat 2019 Feature Pack 1 (64bit): heg3D_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Temperature

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 2
Time: 4.000e-01

MSC Software

3.000e+03
2.700e+03
2.400e+03
2.100e+03
1.800e+03
1.500e+03
1.200e+03
9.000e+02
6.000e+02
3.000e+02
0.000e+00

Max: 2.348e+03 @Node 387
Min: 2.922e+02 @Node 2214

hegesztes
Temperature
1

Enter contour range : *post_prev
Enter contour range : *post_rewind
Enter contour range : *post_next
Enter contour range : *post_next

Dialog
Enter contour range :

Main Menu
Model Navigator
Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): heg3D_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Temperature

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 13
Time: 2.600e+00

3.000e+03
2.700e+03
2.400e+03
2.100e+03
1.800e+03
1.500e+03
1.200e+03
9.000e+02
6.000e+02
3.000e+02
0.000e+00

Max: 2.571e+03 @Node 385
Min: 2.929e+02 @Node 2277

hegesztes
Temperature
1

MSC Software

Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next

Enter contour range :

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): heg3D_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Temperature

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 22
Time: 4.400e+00

3.000e+03
2.700e+03
2.400e+03
2.100e+03
1.800e+03
1.500e+03
1.200e+03
9.000e+02
6.000e+02
3.000e+02
0.000e+00

MSC Software

Max: 2.480e+03 @Node 383
Min: 2.935e+02 @Node 30

hegesztes
Temperature
1

Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_prev
Enter contour range :

Dialog

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): heg3D_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Temperature

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 32
Time: 6.400e+00

3.000e+03
2.700e+03
2.400e+03
2.100e+03
1.800e+03
1.500e+03
1.200e+03
9.000e+02
6.000e+02
3.000e+02
0.000e+00

Max: 2.467e+03 @Node 381
Min: 2.974e+02 @Node 30

hegesztes
Temperature
1

MSC Software

Enter contour range : *post_prev
Enter contour range : *post_prev
Enter contour range : *post_prev
Enter contour range : *post_prev

Enter contour range :

Dialog

Main Menu | Model Navigator | Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): heg3D_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Temperature

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 46
Time: 9.200e+00

3.000e+03
2.700e+03
2.400e+03
2.100e+03
1.800e+03
1.500e+03
1.200e+03
9.000e+02
6.000e+02
3.000e+02
0.000e+00

Max: 2.317e+03 @Node 377
Min: 3.141e+02 @Node 30

hegesztes
Temperature
1

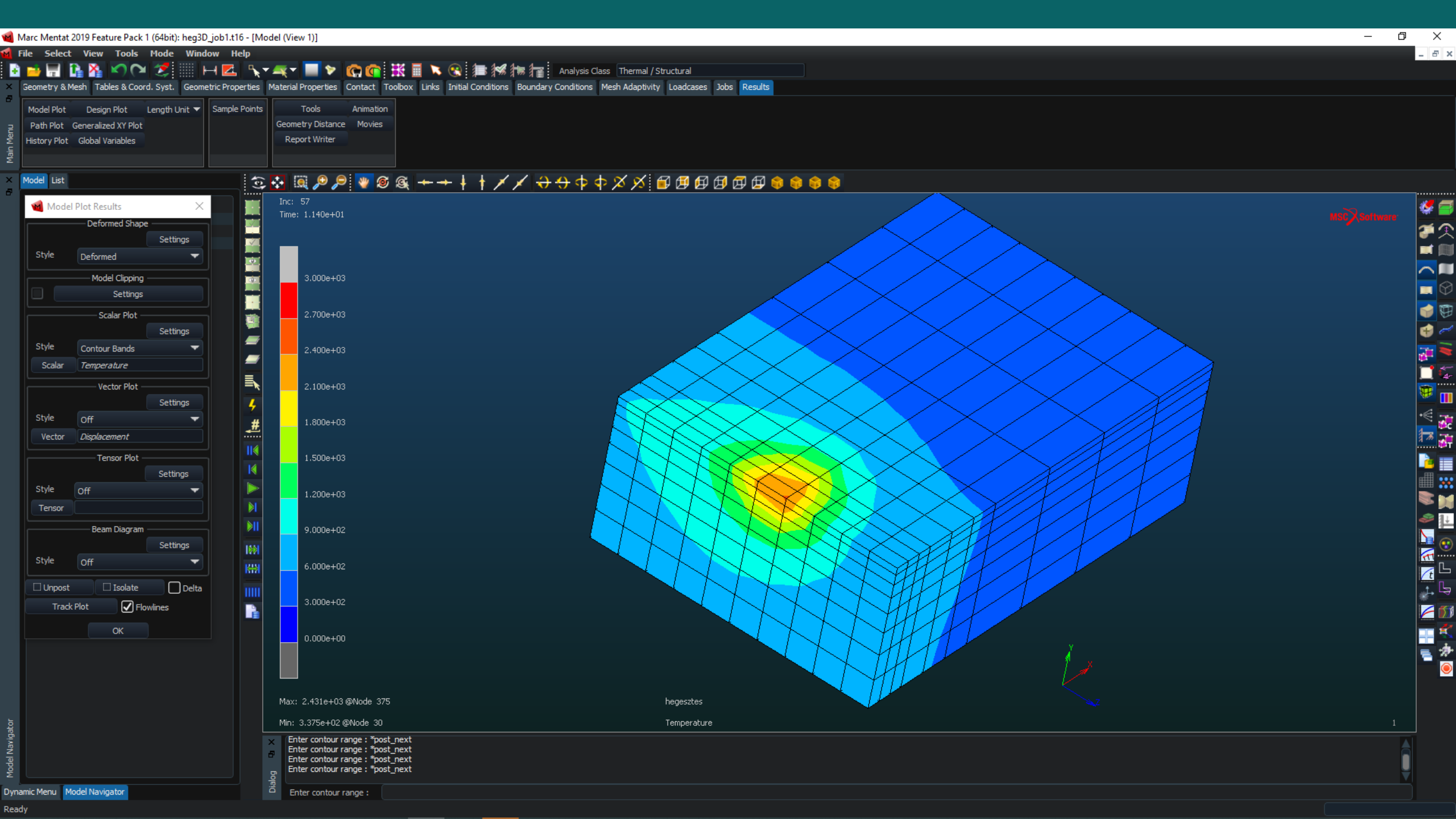
MSC Software

Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next

Enter contour range :

Dynamic Menu | Model Navigator

Ready


Marc Mentat 2019 Feature Pack 1 (64bit): heg3D_job1.t16 - [Model (View 1)]
File Select View Tools Mode Window Help
Analysis Class Thermal / Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Temperature
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 57
Time: 1.140e+01
3.000e+03
2.700e+03
2.400e+03
2.100e+03
1.800e+03
1.500e+03
1.200e+03
9.000e+02
6.000e+02
3.000e+02
0.000e+00
MSC Software
Max: 2.431e+03 @Node 375
Min: 3.375e+02 @Node 30
hegesztes
Temperature
1
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range :
Dialog
Model Navigator
Dynamic Menu
Model Navigator
Ready

Marc Mentat 2019 Feature Pack 1 (64bit): heg3D_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Temperature

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 68
Time: 1.360e+01

3.000e+03
2.700e+03
2.400e+03
2.100e+03
1.800e+03
1.500e+03
1.200e+03
9.000e+02
6.000e+02
3.000e+02
0.000e+00

Max: 2.564e+03 @Node 373
Min: 3.686e+02 @Node 30

hegesztes
Temperature
1

MSC Software

Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next

Enter contour range :

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): heg3D_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables

Sample Points

Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Temperature

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 79
Time: 1.580e+01

3.000e+03
2.700e+03
2.400e+03
2.100e+03
1.800e+03
1.500e+03
1.200e+03
9.000e+02
6.000e+02
3.000e+02
0.000e+00

Max: 2.740e+03 @Node 371
Min: 4.057e+02 @Node 30

hegesztes
Temperature
1

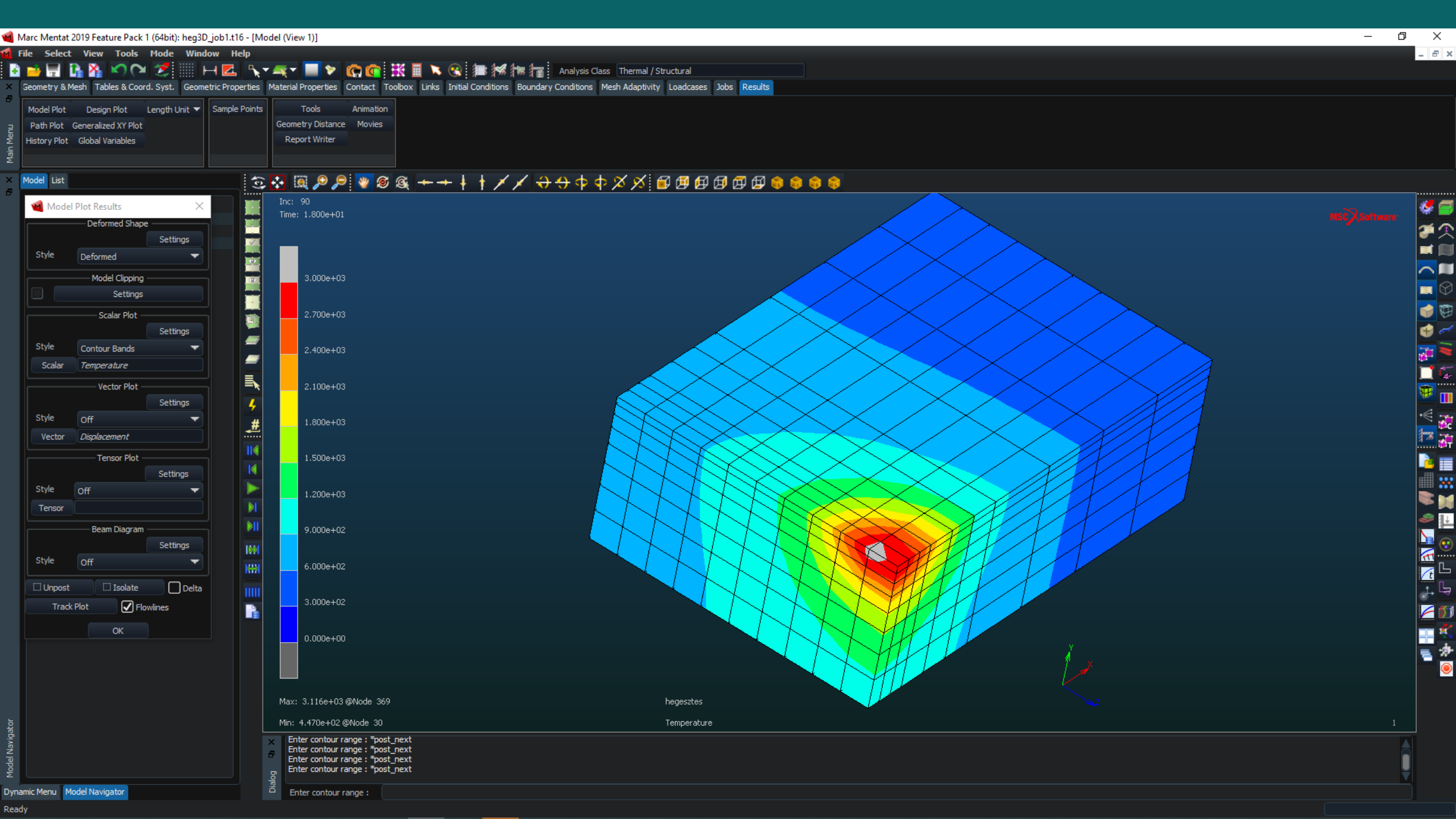
MSC Software

Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_prev

Enter contour range :

Dynamic Menu | Model Navigator

Ready


Marc Mentat 2019 Feature Pack 1 (64bit): heg3D_job1.t16 - [Model (View 1)]
File Select View Tools Mode Window Help
Analysis Class Thermal / Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Temperature
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 90
Time: 1.800e+01
3.000e+03
2.700e+03
2.400e+03
2.100e+03
1.800e+03
1.500e+03
1.200e+03
9.000e+02
6.000e+02
3.000e+02
0.000e+00
Max: 3.116e+03 @Node 369
Min: 4.470e+02 @Node 30
hegesztes
Temperature
1
MSC Software
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range :
Dialog
Main Menu
Model Navigator
Dynamic Menu
Model Navigator
Ready

Marc Mentat 2019 Feature Pack 1 (64bit): heg3D_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables

Sample Points

Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Temperature

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 100
Time: 2.000e+01

3.000e+03
2.700e+03
2.400e+03
2.100e+03
1.800e+03
1.500e+03
1.200e+03
9.000e+02
6.000e+02
3.000e+02
0.000e+00

Max: 4.041e+03 @Node 9
Min: 4.855e+02 @Node 597

hegesztes
Temperature
1

MSC Software

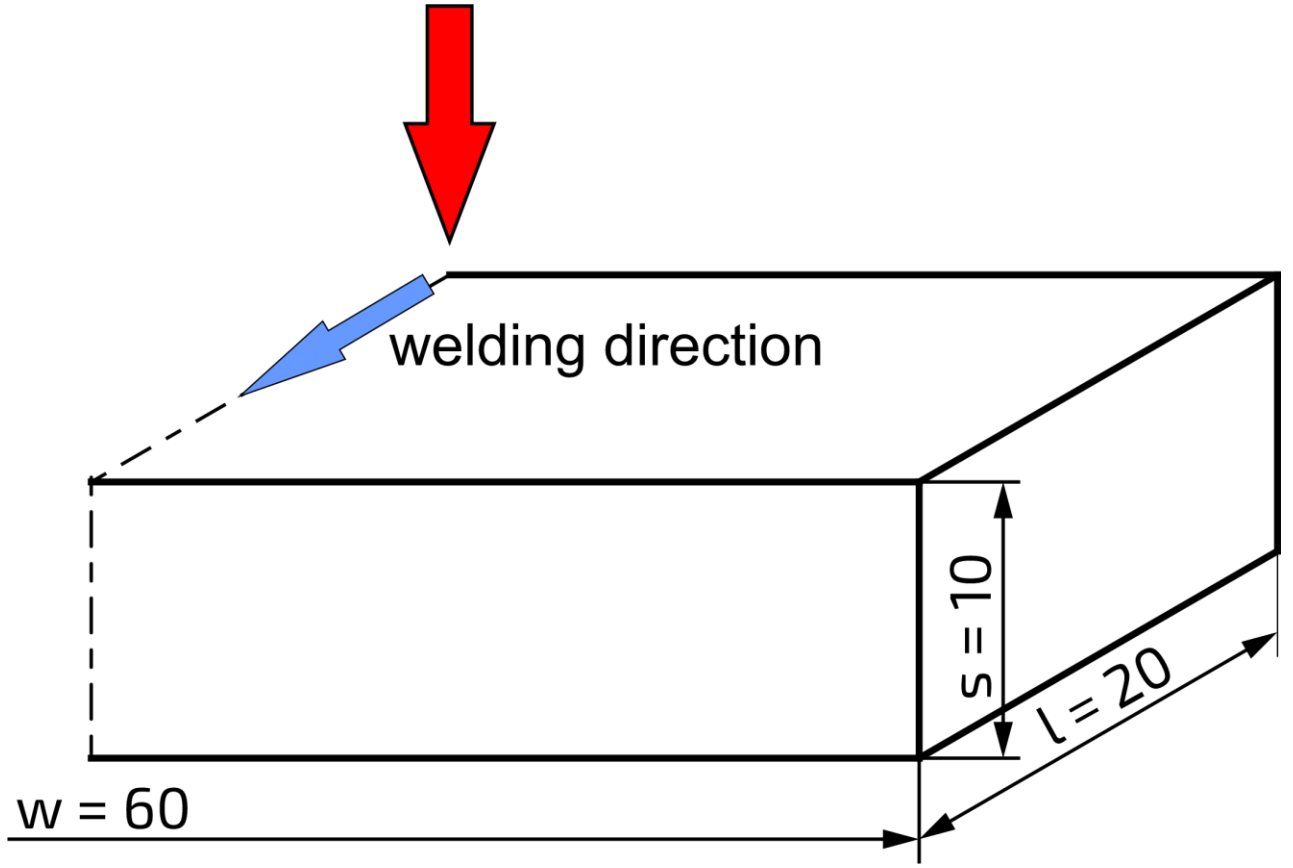
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_next
Enter contour range : *post_skip_to_last
Enter contour range :

Dynamic Menu | Model Navigator

Ready

Exercise 12

- 3D welding – whole process
- Thermal+structural job
- Without welding filler metal
- Plastic deformation tracking during and after welding



Marc Mentat 2019 Feature Pack 1 (64bit): heg_mat_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Total Equivalent Plastic Strain

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 1
Time: 2.000e-01

MSC Software

2.352e-03
2.108e-03
1.864e-03
1.620e-03
1.377e-03
1.133e-03
8.889e-04
6.451e-04
4.012e-04
1.574e-04
-8.645e-05

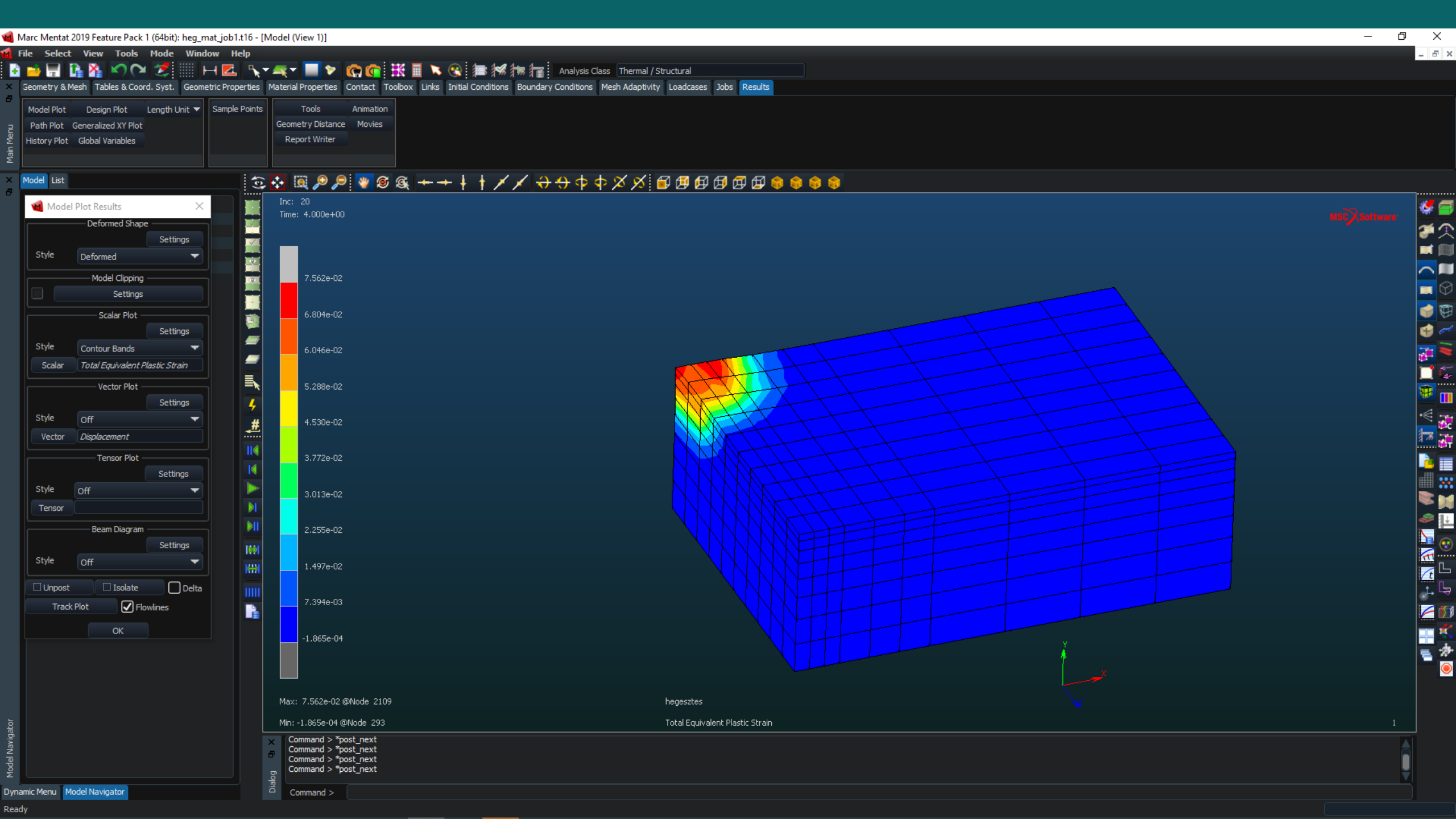
Max: 2.352e-03 @Node 366
Min: -8.645e-05 @Node 2149

hegesztes
Total Equivalent Plastic Strain
1

Command > *post_next
Command > *post_next
Command > *post_rewind
Command > *post_next
Command >

Dynamic Menu | Model Navigator

Ready


Marc Mentat 2019 Feature Pack 1 (64bit): heg_mat_job1.t16 - [Model (View 1)]
File Select View Tools Mode Window Help
Analysis Class Thermal / Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Total Equivalent Plastic Strain
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 20
Time: 4.000e+00
MSC Software
7.562e-02
6.804e-02
6.046e-02
5.288e-02
4.530e-02
3.772e-02
3.013e-02
2.255e-02
1.497e-02
7.394e-03
-1.865e-04
Max: 7.562e-02 @Node 2109
Min: -1.865e-04 @Node 293
hegesztes
Total Equivalent Plastic Strain
1
Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next
Command >
Dynamic Menu Model Navigator
Ready

Marc Mentat 2019 Feature Pack 1 (64bit): heg_mat_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Total Equivalent Plastic Strain

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 40
Time: 8.000e+00

MSC Software

9.811e-02
8.828e-02
7.845e-02
6.862e-02
5.879e-02
4.897e-02
3.914e-02
2.931e-02
1.948e-02
9.652e-03
-1.766e-04

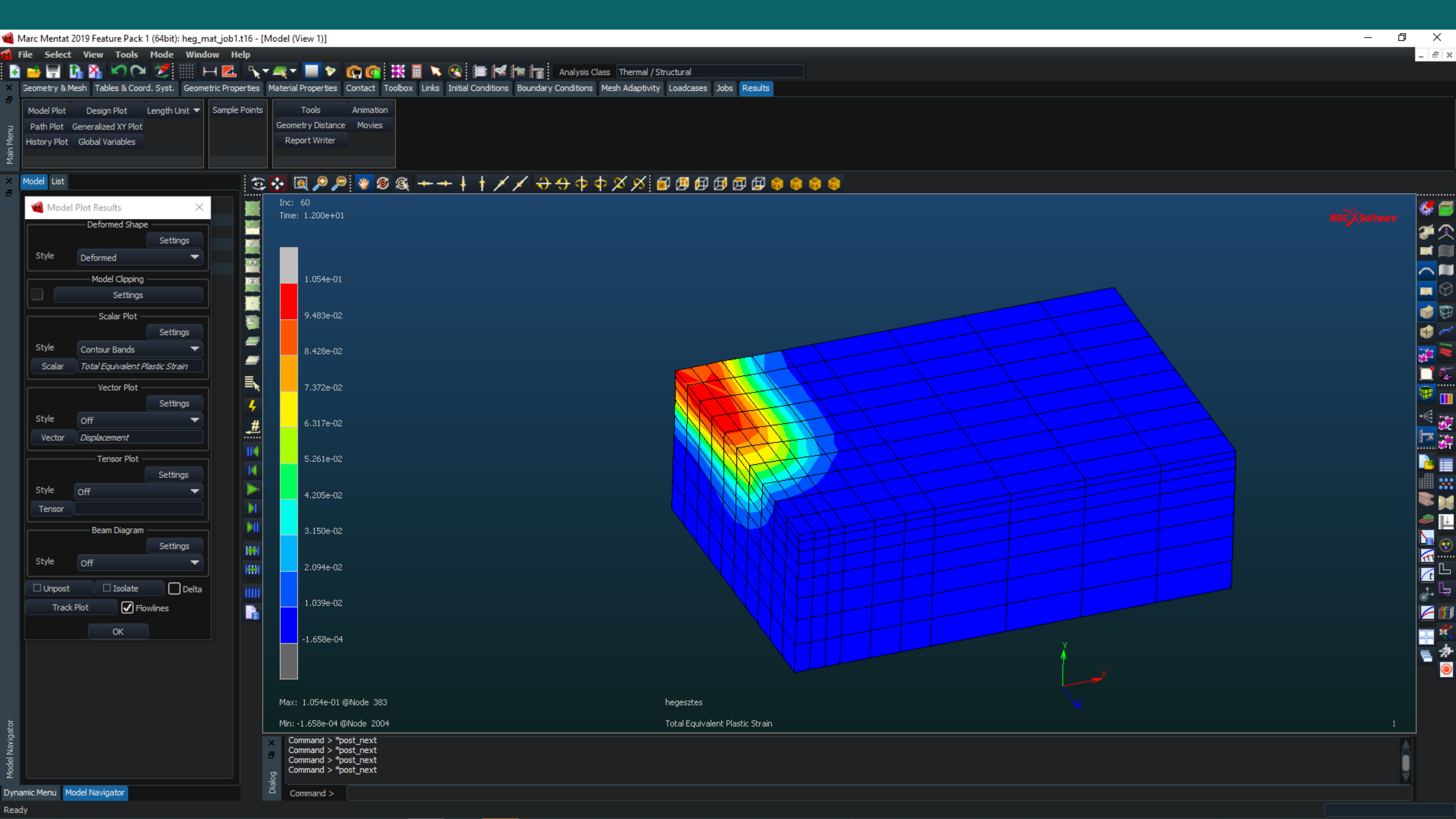
Max: 9.811e-02 @Node 383
Min: -1.766e-04 @Node 1234

hegesztes
Total Equivalent Plastic Strain
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_prev
Command >

Dynamic Menu | Model Navigator

Ready


Marc Mentat 2019 Feature Pack 1 (64bit): heg_mat_job1.t16 - [Model (View 1)]
File Select View Tools Mode Window Help
Analysis Class Thermal / Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Total Equivalent Plastic Strain
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 60
Time: 1.200e+01
MSC Software
1.054e-01
9.483e-02
8.428e-02
7.372e-02
6.317e-02
5.261e-02
4.205e-02
3.150e-02
2.094e-02
1.039e-02
-1.658e-04
Max: 1.054e-01 @Node 383
Min: -1.658e-04 @Node 2004
hegesztes
Total Equivalent Plastic Strain
1
Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next
Command >
Dialog
Main Menu
Model Navigator
Dynamic Menu
Model Navigator
Ready

Marc Mentat 2019 Feature Pack 1 (64bit): heg_mat_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Total Equivalent Plastic Strain

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 80
Time: 1.600e+01

1.053e-01
9.474e-02
8.420e-02
7.365e-02
6.310e-02
5.255e-02
4.201e-02
3.146e-02
2.091e-02
1.036e-02
-1.852e-04

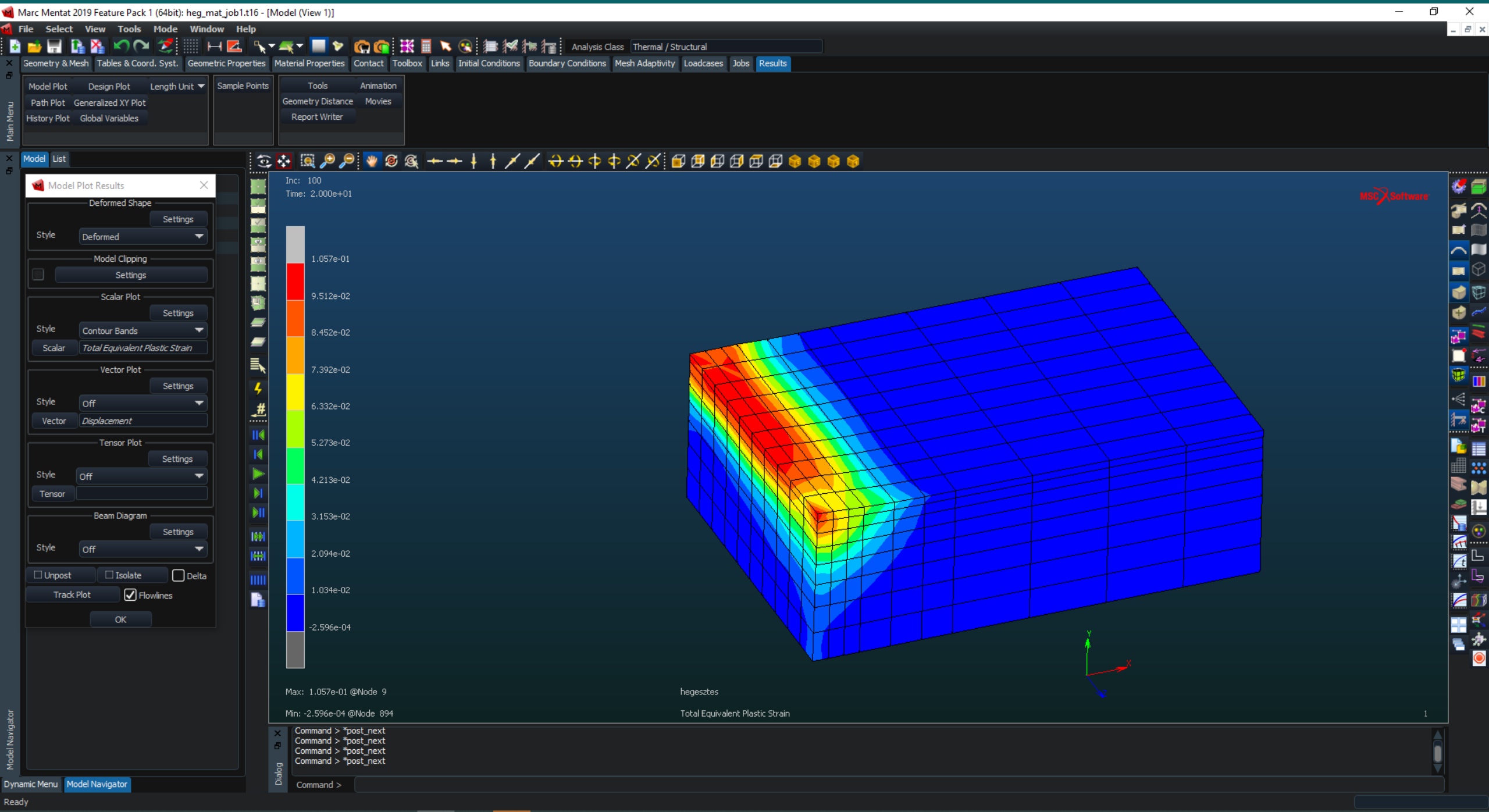
Max: 1.053e-01 @Node 383
Min: -1.852e-04 @Node 635

hegesztes
Total Equivalent Plastic Strain
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next
Command >

Dynamic Menu | Model Navigator

Ready


Marc Mentat 2019 Feature Pack 1 (64bit): heg_mat_job1.t16 - [Model (View 1)]
File Select View Tools Mode Window Help
Analysis Class Thermal / Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Total Equivalent Plastic Strain
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 100
Time: 2.000e+01
MSC Software
1.057e-01
9.512e-02
8.452e-02
7.392e-02
6.332e-02
5.273e-02
4.213e-02
3.153e-02
2.094e-02
1.034e-02
-2.596e-04
Max: 1.057e-01 @Node 9
Min: -2.596e-04 @Node 894
hegesztes
Total Equivalent Plastic Strain
1
Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next
Command >
Dialog
Main Menu
Model Navigator
Dynamic Menu
Model Navigator
Ready

Marc Mentat 2019 Feature Pack 1 (64bit): heg_mat_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Total Equivalent Plastic Strain

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 120
Time: 4.000e+01

MSC Software

1.749e-01
1.574e-01
1.398e-01
1.223e-01
1.047e-01
8.720e-02
6.966e-02
5.211e-02
3.457e-02
1.703e-02
-5.066e-04

Max: 1.749e-01 @Node 159
Min: -5.066e-04 @Node 894

lcase2
Total Equivalent Plastic Strain
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): heg_mat_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Thermal / Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Total Equivalent Plastic Strain

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 140
Time: 6.000e+01

MSC Software

1.749e-01
1.574e-01
1.398e-01
1.223e-01
1.047e-01
8.719e-02
6.965e-02
5.210e-02
3.456e-02
1.702e-02
-5.234e-04

Max: 1.749e-01 @Node 159
Min: -5.234e-04 @Node 894

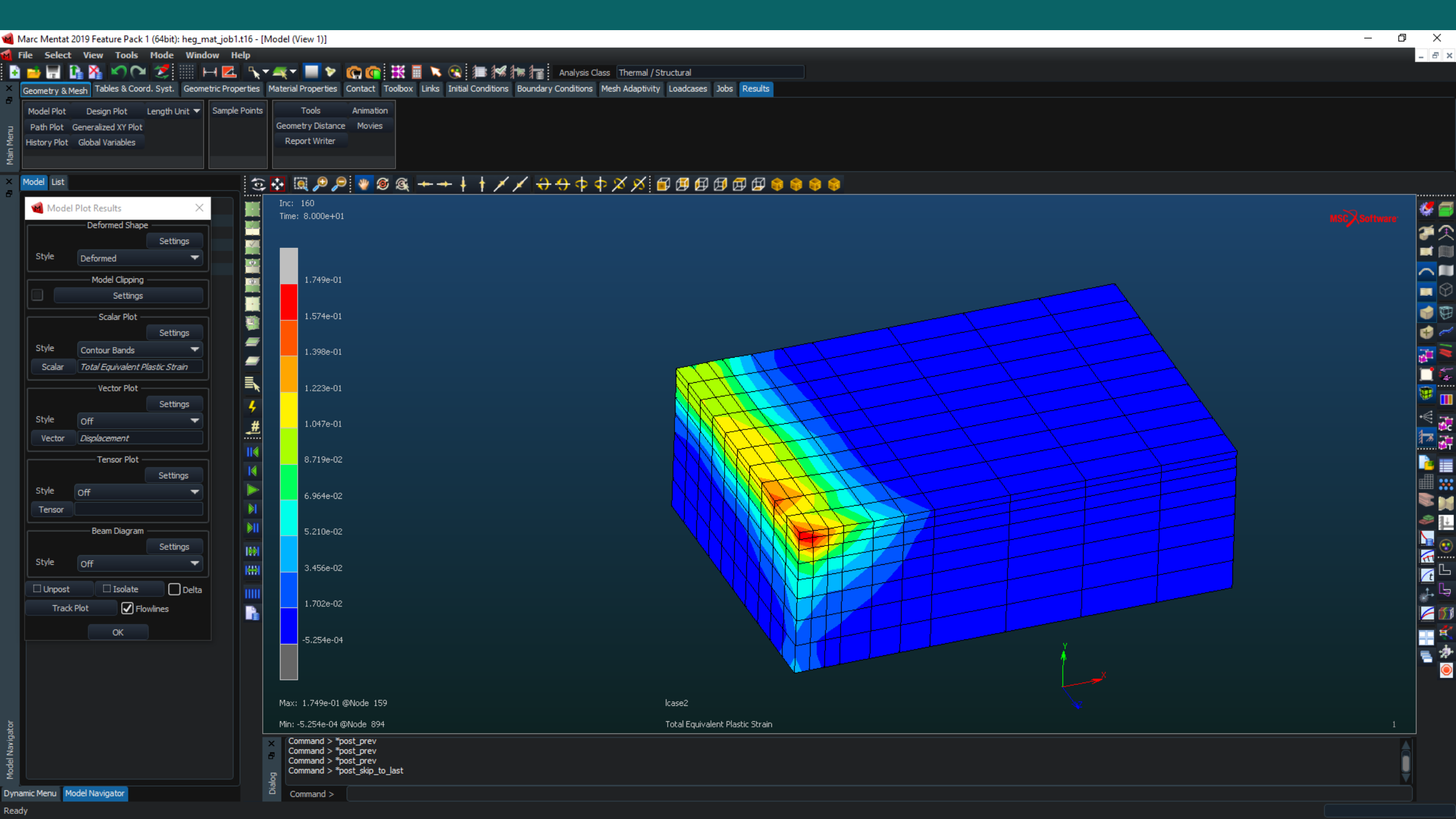
lcase2
Total Equivalent Plastic Strain
1

Command > *post_prev
Command > *post_prev
Command > *post_prev
Command > *post_prev
Command >

Dialog

Dynamic Menu | Model Navigator

Ready

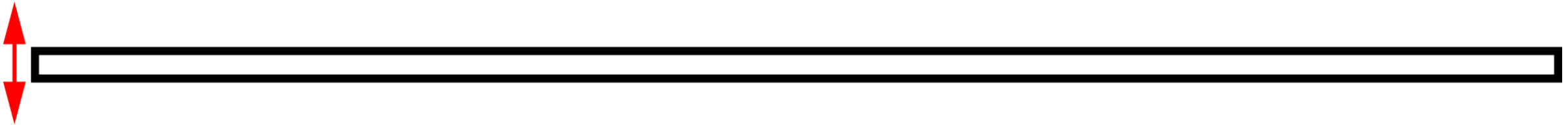

Marc Mentat 2019 Feature Pack 1 (64bit): heg_mat_job1.t16 - [Model (View 1)]
File Select View Tools Mode Window Help
Analysis Class Thermal / Structural
Geometry & Mesh Tables & Coord. Syst. Geometric Properties Material Properties Contact Toolbox Links Initial Conditions Boundary Conditions Mesh Adaptivity Loadcases Jobs Results
Model Plot Design Plot Length Unit
Path Plot Generalized XY Plot
History Plot Global Variables
Sample Points
Tools Animation
Geometry Distance Movies
Report Writer
Model List
Model Plot Results
Deformed Shape
Settings
Style Deformed
Model Clipping
Settings
Scalar Plot
Settings
Style Contour Bands
Scalar Total Equivalent Plastic Strain
Vector Plot
Settings
Style Off
Vector Displacement
Tensor Plot
Settings
Style Off
Tensor
Beam Diagram
Settings
Style Off
Unpost Isolate Delta
Track Plot Flowlines
OK
Inc: 160
Time: 8.000e+01
MSC Software
1.749e-01
1.574e-01
1.398e-01
1.223e-01
1.047e-01
8.719e-02
6.964e-02
5.210e-02
3.456e-02
1.702e-02
-5.254e-04
Max: 1.749e-01 @Node 159
Min: -5.254e-04 @Node 894
lcase2
Total Equivalent Plastic Strain
1
Command > *post_prev
Command > *post_prev
Command > *post_prev
Command > *post_skip_to_last
Command >
Dynamic Menu Model Navigator
Ready

Part 5

Exercise 13-16
Beam vibration

Exercise 13

- Fixed x=0 and z=0 displacement on left side
- y=10 amplitude on left side at 10 Hz frequency
- Dynamic transient loadcase
- Only elastic deformation, 2D plane strain



Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_2_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
- Settings
- Style: Deformed

Model Clipping
- Settings

Scalar Plot
- Settings
- Style: Contour Bands
- Scalar: *Equivalent Von Mises Stress*

Vector Plot
- Settings
- Style: Off
- Vector: *Displacement*

Tensor Plot
- Settings
- Style: Off
- Tensor

Beam Diagram
- Settings
- Style: Off

☐ Unpost ☐ Isolate ☐ Delta

Track Plot ☑ Flowlines

OK

Inc: 500
Time: 5.000e-01

MSC Software

2.982e+02
2.684e+02
2.386e+02
2.087e+02
1.789e+02
1.491e+02
1.193e+02
8.947e+01
5.965e+01
2.983e+01
1.060e-02

Max: 2.982e+02 @Node 2
Min: 1.060e-02 @Node 103

lcase1
Equivalent Von Mises Stress
1

Post increment 498:0
Post increment 499:0
Post increment 500:0
End of analysis!

Dialog

Command >

Dynamic Menu | Model Navigator

Ready

Exercise 14

- Fixed x=0, y=0 and z=0 displacement on left side
- Dynamic modal analysis, eigenfrequencies
- 2D plane strain

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: *Equivalent Von Mises Stress*

Vector Plot
Settings
Style: Off
Vector: *Displacement*

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:1
Time: 0.000e+00
Freq: 1.006e+01

MSC Software

6.647e+01
5.982e+01
5.318e+01
4.653e+01
3.988e+01
3.324e+01
2.659e+01
1.994e+01
1.330e+01
6.649e+00
2.350e-03

Max: 6.647e+01 @Node 2
Min: 2.350e-03 @Node 103

lcase1
Equivalent Von Mises Stress
1

Post increment 0:5
End of analysis!
Command > *post_rewind
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:2
Time: 0.000e+00
Freq: 6.302e+01

MSC Software

4.023e+02
3.621e+02
3.219e+02
2.817e+02
2.414e+02
2.012e+02
1.610e+02
1.208e+02
8.054e+01
4.031e+01
9.042e-02

Max: 4.023e+02 @Node 2
Min: 9.042e-02 @Node 103

lcase1
Equivalent Von Mises Stress
1

End of analysis!
Command > *post_rewind
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:3
Time: 0.000e+00
Freq: 1.764e+02

1.090e+03
9.811e+02
8.722e+02
7.633e+02
6.543e+02
5.454e+02
4.365e+02
3.275e+02
2.186e+02
1.096e+02
6.954e-01

Max: 1.090e+03 @Node 2
Min: 6.954e-01 @Node 103

lcase1
Equivalent Von Mises Stress
1

Command > *post_rewind
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:4
Time: 0.000e+00
Freq: 3.454e+02

2.062e+03
1.856e+03
1.650e+03
1.444e+03
1.238e+03
1.032e+03
8.263e+02
6.204e+02
4.145e+02
2.085e+02
2.616e+00

MSC Software

Max: 2.062e+03 @Node 2
Min: 2.616e+00 @Node 103

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Dialog
Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:5
Time: 0.000e+00
Freq: 5.705e+02

MSC Software

3.285e+03
2.957e+03
2.629e+03
2.301e+03
1.974e+03
1.646e+03
1.318e+03
9.903e+02
6.625e+02
3.348e+02
6.998e+00

Max: 3.285e+03 @Node 2
Min: 6.998e+00 @Node 103

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Dialog
Command >

Dynamic Menu | Model Navigator

Ready

Exercise 15

- Fixed x=0, y=0 and z=0 displacement on left side
- Dynamic modal analysis, eigenfrequencies
- 3D simulation

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_3d_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0
Time: 0.000e+00

MSC Software

1.000e+00
9.000e-01
8.000e-01
7.000e-01
6.000e-01
5.000e-01
4.000e-01
3.000e-01
2.000e-01
1.000e-01
0.000e+00

Max: 0.000e+00 @Node 1
Min: 0.000e+00 @Node 1
job1
Equivalent Von Mises Stress
1

Command > *post_prev
Command > *post_prev
Command > *post_prev
Command > *post_prev
Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_3d_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:1
Time: 0.000e+00
Freq: 9.809e+00

6.872e+01
6.185e+01
5.498e+01
4.811e+01
4.124e+01
3.436e+01
2.749e+01
2.062e+01
1.375e+01
6.875e+00
2.429e-03

MSC Software

Max: 6.872e+01 @Node 3
Min: 2.429e-03 @Node 1731

lcase1
Equivalent Von Mises Stress
1

Command > *post_prev
Command > *post_prev
Command > *post_prev
Command > *post_next
Command >

Dialog

Main Menu

Model Navigator

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_3d_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:2
Time: 0.000e+00
Freq: 4.154e+01

MSC Software

3.229e+02
2.906e+02
2.583e+02
2.260e+02
1.938e+02
1.615e+02
1.292e+02
9.691e+01
6.463e+01
3.234e+01
6.004e-02

Max: 3.229e+02 @Node 2
Min: 6.004e-02 @Node 101

lcase1
Equivalent Von Mises Stress
1

Command > *post_prev
Command > *post_prev
Command > *post_next
Command > *post_next
Command >

Dialog | Model Navigator | Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_3d_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:3
Time: 0.000e+00
Freq: 6.145e+01

4.060e+02
3.655e+02
3.249e+02
2.843e+02
2.437e+02
2.031e+02
1.625e+02
1.219e+02
8.128e+01
4.069e+01
9.043e-02

Max: 4.060e+02 @Node 2
Min: 9.043e-02 @Node 1731

lcase1
Equivalent Von Mises Stress
1

Command > *post_prev
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_3d_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:4
Time: 0.000e+00
Freq: 1.720e+02

1.104e+03
9.933e+02
8.830e+02
7.727e+02
6.624e+02
5.521e+02
4.419e+02
3.316e+02
2.213e+02
1.110e+02
6.745e-01

MSC Software

Max: 1.104e+03 @Node 2
Min: 6.745e-01 @Node 1731

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_3d_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:5
Time: 0.000e+00
Freq: 2.575e+02

1.941e+03
1.747e+03
1.553e+03
1.359e+03
1.166e+03
9.717e+02
7.778e+02
5.839e+02
3.901e+02
1.962e+02
2.331e+00

Max: 1.941e+03 @Node 2
Min: 2.331e+00 @Node 1717

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next
Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_3d_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:6
Time: 0.000e+00
Freq: 2.991e+02

1.949e+03
1.755e+03
1.561e+03
1.366e+03
1.172e+03
9.782e+02
7.841e+02
5.900e+02
3.959e+02
2.018e+02
7.690e+00

MSC Software

Max: 1.949e+03 @Node 699
Min: 7.690e+00 @Node 7244

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_3d_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:7
Time: 0.000e+00
Freq: 3.369e+02

2.095e+03
1.886e+03
1.676e+03
1.467e+03
1.258e+03
1.049e+03
8.395e+02
6.302e+02
4.210e+02
2.117e+02
2.458e+00

Max: 2.095e+03 @Node 2
Min: 2.458e+00 @Node 1731

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next
Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_3d_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:8
Time: 0.000e+00
Freq: 5.566e+02

3.350e+03
3.016e+03
2.681e+03
2.347e+03
2.013e+03
1.678e+03
1.344e+03
1.009e+03
6.751e+02
3.407e+02
6.368e+00

MSC Software

Max: 3.350e+03 @Node 2
Min: 6.368e+00 @Node 1731

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_3d_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit | Path Plot | Generalized XY Plot | History Plot | Global Variables | Sample Points | Tools | Animation | Geometry Distance | Movies | Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:9
Time: 0.000e+00
Freq: 7.086e+02

5.149e+03
4.636e+03
4.123e+03
3.610e+03
3.096e+03
2.583e+03
2.070e+03
1.557e+03
1.044e+03
5.309e+02
1.776e+01

Max: 5.149e+03 @Node 628
Min: 1.776e+01 @Node 105

lcase1
Equivalent Von Mises Stress
1

Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Ready

Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_3_3d_job1.t16 - [Model (View 1)]

File Select View Tools Mode Window Help

Analysis Class: Structural

Geometry & Mesh | Tables & Coord. Syst. | Geometric Properties | Material Properties | Contact | Toolbox | Links | Initial Conditions | Boundary Conditions | Mesh Adaptivity | Loadcases | Jobs | Results

Model Plot | Design Plot | Length Unit
Path Plot | Generalized XY Plot
History Plot | Global Variables
Sample Points
Tools | Animation
Geometry Distance | Movies
Report Writer

Model | List

Model Plot Results

Deformed Shape
Settings
Style: Deformed

Model Clipping
Settings

Scalar Plot
Settings
Style: Contour Bands
Scalar: Equivalent Von Mises Stress

Vector Plot
Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 0:10
Time: 0.000e+00
Freq: 8.310e+02

MSC Software

4.860e+03
4.375e+03
3.891e+03
3.406e+03
2.921e+03
2.437e+03
1.952e+03
1.467e+03
9.828e+02
4.981e+02
1.346e+01

Max: 4.860e+03 @Node 2866
Min: 1.346e+01 @Node 1737

lcase1
Equivalent Von Mises Stress
1

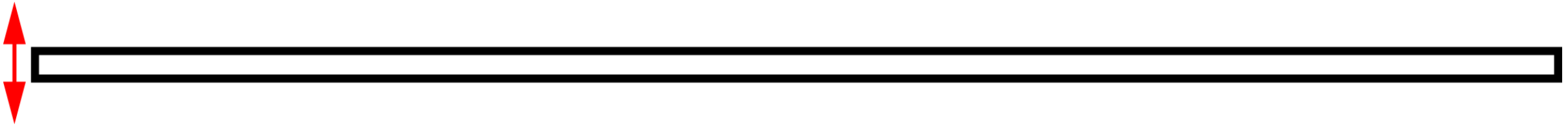
Command > *post_next
Command > *post_next
Command > *post_next
Command > *post_next

Command >

Dynamic Menu | Model Navigator

Exercise 16

- Fixed x=0 and z=0 displacement on left side
- y=10 amplitude on left side at 61 Hz frequency
- Dynamic transient loadcase
- Only elastic deformation, 2D plane strain



Marc Mentat 2019 Feature Pack 1 (64bit): d:\education\marc\vekonylemez_teljes_job1.t16: tartodin_4_job1.t16 - [Model (View 1)]

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Model | List

Model Plot Results

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Settings
Style: Off
Vector: Displacement

Tensor Plot
Settings
Style: Off
Tensor

Beam Diagram
Settings
Style: Off

Unpost | Isolate | Delta
Track Plot | Flowlines
OK

Inc: 500
Time: 8.197e-02

MSC Software

8.967e+02
8.071e+02
7.174e+02
6.278e+02
5.381e+02
4.485e+02
3.588e+02
2.691e+02
1.795e+02
8.983e+01
1.738e-01

Max: 8.967e+02 @Node 2
Min: 1.738e-01 @Node 103

lcase1
Equivalent Von Mises Stress
1

Post increment 498:0
Post increment 499:0
Post increment 500:0
End of analysis!

Dialog
Command >

Dynamic Menu | Model Navigator

Ready

Eigenfrequencies

- 2D vs 3D
- In 2D, some eigenfrequencies are missing

	2D (Hz)	3D (Hz)
1	10.0	9.8
2	-	41.5
3	63.0	61.5
4	176.4	172.0
5	-	257.5
6	-	299.1
7	345.4	336.9
8	570.5	556.6
9	-	708.6
10	not simulated	831.0

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