INTERNSHIP PROJECT

ELEATION ACADEMY

PROFILE

NAME :

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CONTACT NO. :

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COLLEGE :

PILLAI COLLEGE OF ENGINEERING

YEAR & SEMESTER :

BE. (4th YEAR)

8th SEMESTER

PROBLEM STATEMENT:

ENGINE BLOCK/CYLINDER BLOCK:

- A cylinder block is an integrated structure comprising the cylinder(s) of a reciprocating engine and often some or all of their associated surrounding structures. The term engine block is often used synonymously with "cylinder block".
- The analysis of the combustion chamber is done by using different materials.
- By conducting the above analysis on the combustion chamber combustion rate, pressure and temperature gradient conditions are found and the best material for the combustion chamber is suggested.

PROBLEM STATEMENT:

- Thermal analysis is conducted to find heat dissipation rate in engine block with the variation of materials .
- Structural and fatigue analysis(dynamic) is conduct on engine block at working load conditions to evaluate and compare stress, strain, deformation and fatigue life with the variation of materials.
- Frequency analysis is conducted on engine block with the variation of materials to evaluate frequency.
- Using these values material selection will be done, the value should be nearby previous one (cast iron) maximum accepted variation value 65HZ.

ANALYSIS OF ENGINE BLOCK USING HYPERWORKS:

- Mesh size(with reasoning why did you chose the particular size) : 8 .

  The particular size has been chosen as it results in better element quality for the model and gives consistent results.
- Mesh type : TETRA
- Element shape : TRIA
- Total number of nodes and elements :

  NODES : 76565

  ELEMENTS : 346678
- Quality Parameters

  TETRA COLLAPSE > 0.5

MATERIAL PROPERTIES:

MATERIAL 1 : AL 7475	MATERIAL 2 : Nickel Aluminium Bronze Alloy	MATERIAL 3 : Graphite Cast Iron	MATERIAL 4 : Sand Cast Magnesium Alloy
Density : 2.81g/cc	Density : 7.53g/cc	Density : 7.91g/cc	Density: 1.81g/cc
Young's Modulus: 70.3 GPa	Young's Modulus: 110 GPa	Young's Modulus: 99GPa	Young's Modulus: 45GPa
Poisson's Ratio: 0.33	Poisson's Ratio : 0.32	Poisson's Ratio: 0.21	Poisson's Ratio: 0.35
Thermal Conductivity : 163 W/m-K	Thermal Conductivity : 41.9 W/mK	Thermal Conductivity: 46 W/mK	Thermal Conductivity: 62 W/m.K
Specific Heat Capacity : 0.88 J/g-°C	Specific Heat Capacity : 419.0 J/kg	Specific Heat Capacity : 490.0 J/kg	Specific Heat Capacity : 1025.0 J/kg

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File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Search

Name ID Include

- Components (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/FULL ENGINE MESH MODEL.hm

Auto By Comp

nodes	lines	surfaces	solids	quick edit	Geom
node edit	line edit	surface edit	solid edit	edge edit	1D
temp nodes	length	defeature	ribs	point edit	2D
distance		midsurface		autocleanup	3D
points		dimensioning			Analysis
					Tool
					Post

Ready Engine FE

CASE 1

Analysis:

- **Case 1 : Static Analysis**
- Maximum Gas pressure: 11.6MPa
- Apply the given load on each cylinder and perform Static analysis with symmetric boundary conditions for:
- a) Full model.
- b) Half model.
- c) Quarter model.

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File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/FE_STAN_MAT1.hm

Auto By Comp

assemblies	find	translate	check elems	numbers	Geom
organize	mask	rotate	edges	renumber	1D
color	delete	scale	faces	count	2D
rename		reflect	features	mass calc	3D
reorder		project	normals	tags	Analysis
		position	dependency	HyperMorph	Tool
		permute	penetration		Post

Ready Engine FE PRESSURE

N_MAT1.mvw - HyperWorks 2021 - Student Edition

View Model Results Annotations Tools Preferences Applications Help

1 of 1

Results

e 1 (STAN)

nalysis

ID

sembly Hierarchy
mponents (1)
ad Cases
easures (2)
tes (1)
tstyles (3)
sults
ts (1)
stems (1)
ews (1)

Value

Analysis Results

Contour Plot
Displacement(Mag)
Analysis system

5.824E-02
5.177E-02
4.530E-02
3.883E-02
3.236E-02
2.589E-02
1.941E-02
1.294E-02
6.472E-03
0.000E+00
No Result

Max = 5.824E-02
Grids 16532
Min = 0.000E+00
Grids 1

1:1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type:
Displacement (v)
Mag
Layers:
Use corner data

Selection:
Components
Resolved in:
Analysis System
System
Use tracking system
Show midside node results

Averaging method:
None
Variation < 10 (%)
Averaging Options...
Envelope trace plot:
None

Value filter:
None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

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File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

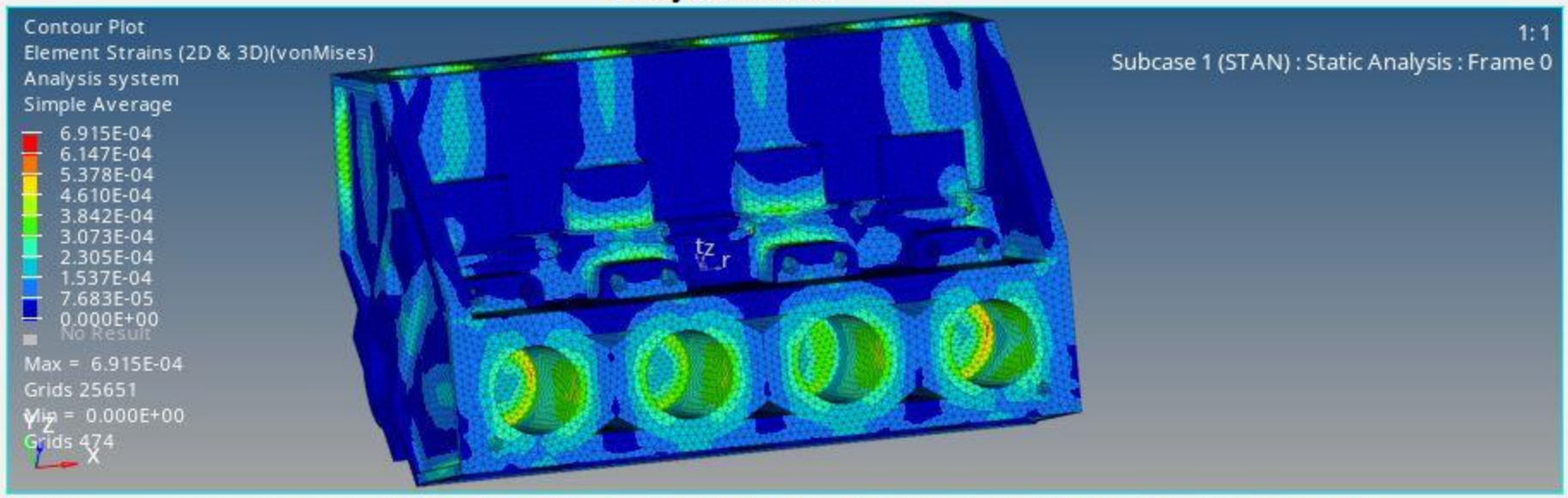
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Element Strains (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

Ready

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File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

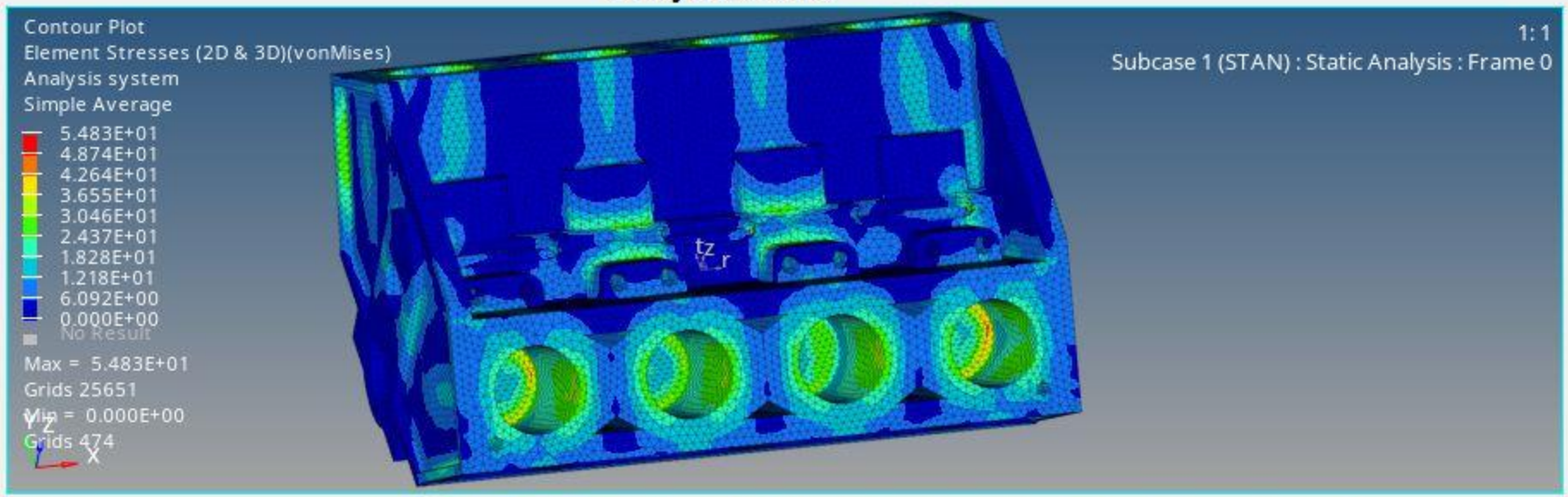
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

Ready

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File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/FE_STAN_MAT2.hm*

Auto By Comp

assemblies	find	translate	check elems	numbers	Geom
organize	mask	rotate	edges	renumber	1D
color	delete	scale	faces	count	2D
rename		reflect	features	mass calc	3D
reorder		project	normals	tags	Analysis
		position	dependency	HyperMorph	Tool
		permute	penetration		Post

Ready Engine FE PRESSURE

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File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

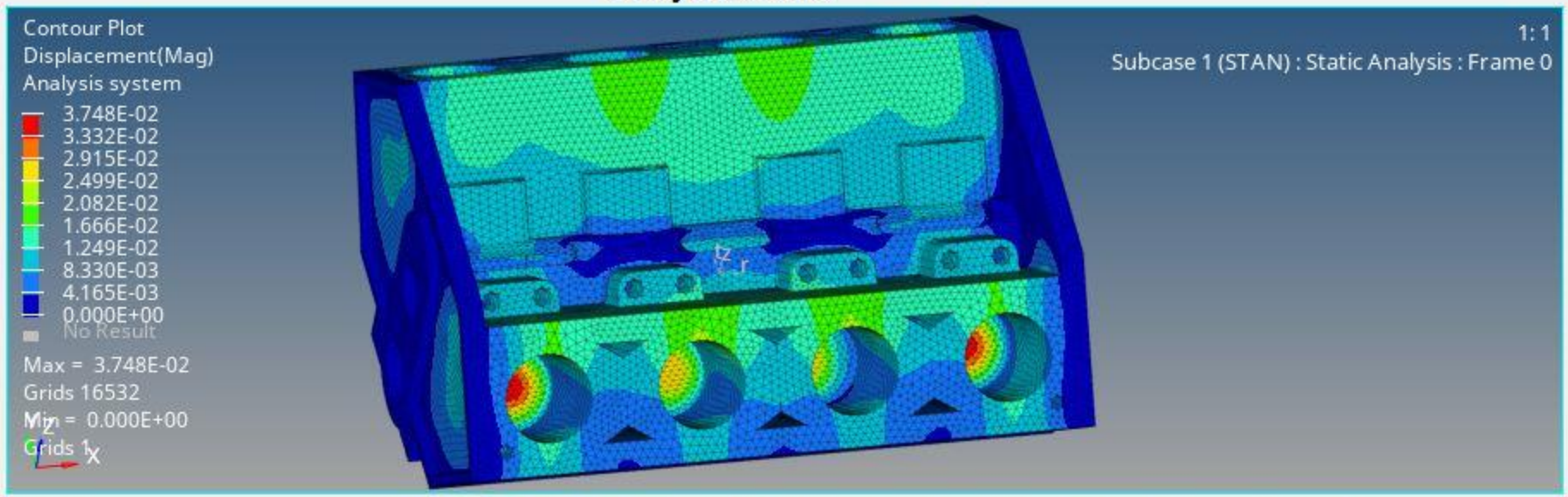
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FE_STAN_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

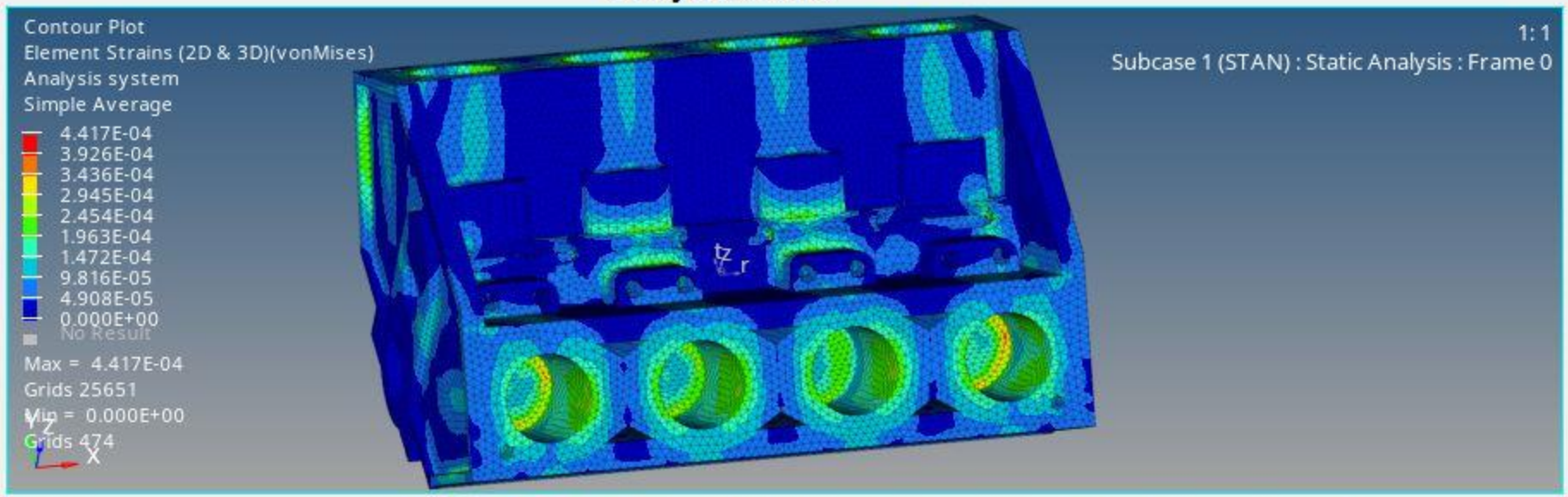
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Element Strains (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

0 entities selected

FE_STAN_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

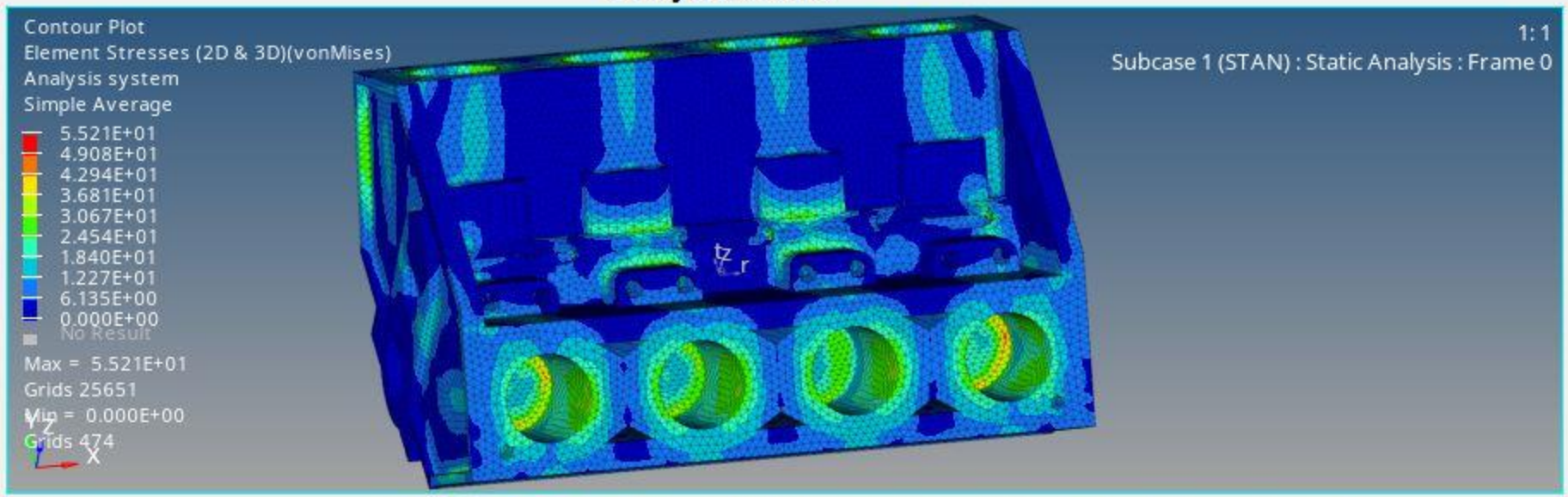
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

0 entities selected

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File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/FE_STAN_MAT3.hm

Auto By Comp

assemblies	find	translate	check elems	numbers	Geom
organize	mask	rotate	edges	renumber	1D
color	delete	scale	faces	count	2D
rename		reflect	features	mass calc	3D
reorder		project	normals	tags	Analysis
		position	dependency	HyperMorph	Tool
		permute	penetration		Post

Ready Engine FE PRESSURE

FE_STAN_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

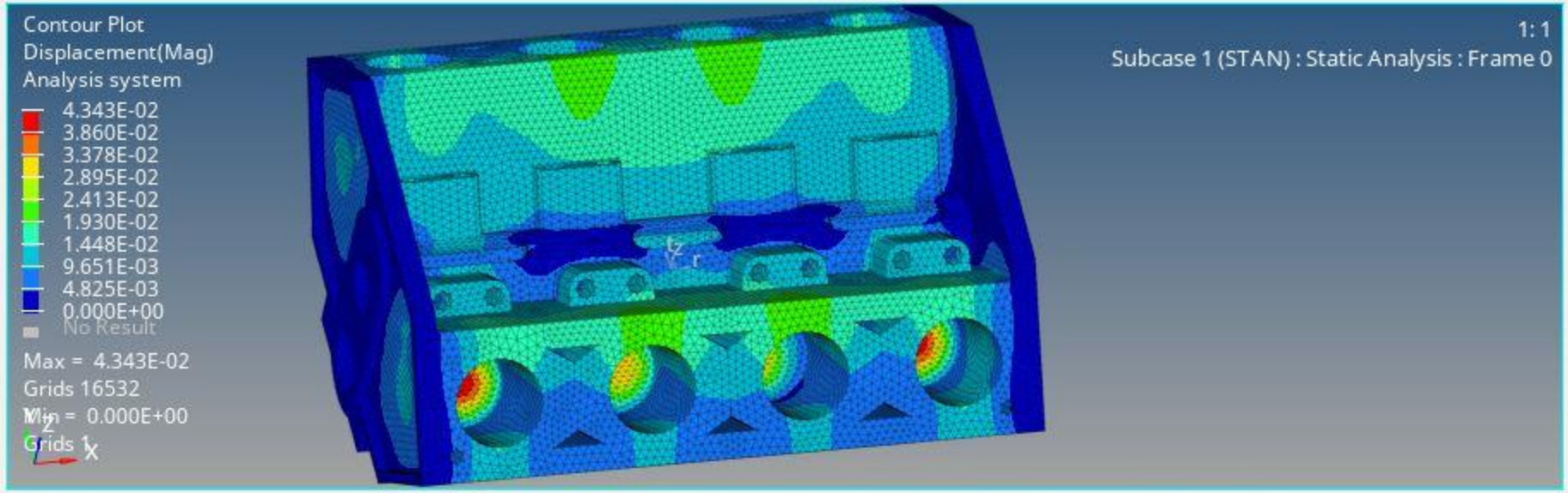
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FE_STAN_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

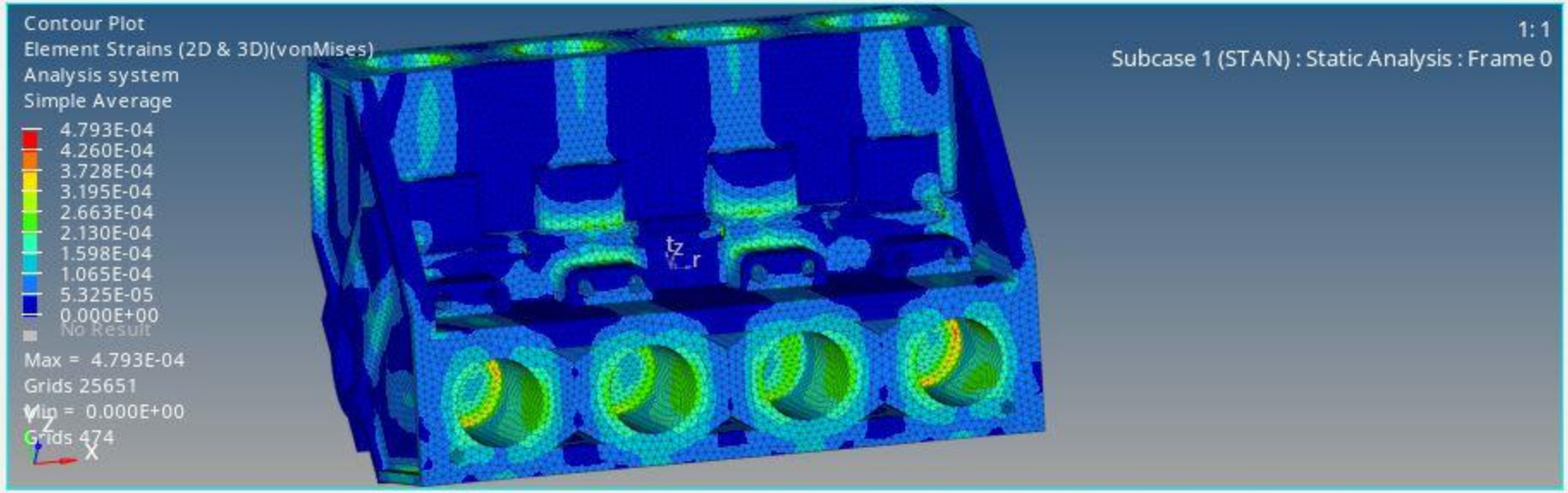
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Strains (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FE_STAN_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

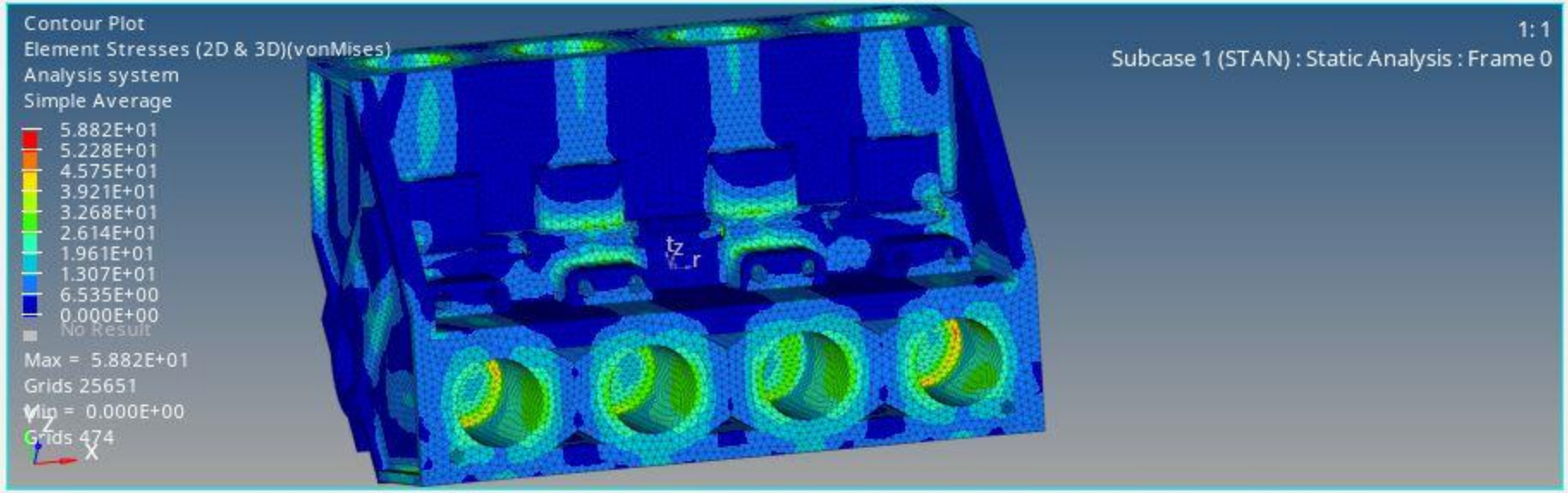
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

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File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/FE_STAN_MAT4.hm

Auto By Comp

assemblies	find	translate	check elems	numbers	Geom
organize	mask	rotate	edges	renumber	1D
color	delete	scale	faces	count	2D
rename		reflect	features	mass calc	3D
reorder		project	normals	tags	Analysis
		position	dependency	HyperMorph	Tool
		permute	penetration		Post

Ready Engine FE PRESSURE

FE_STAN_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

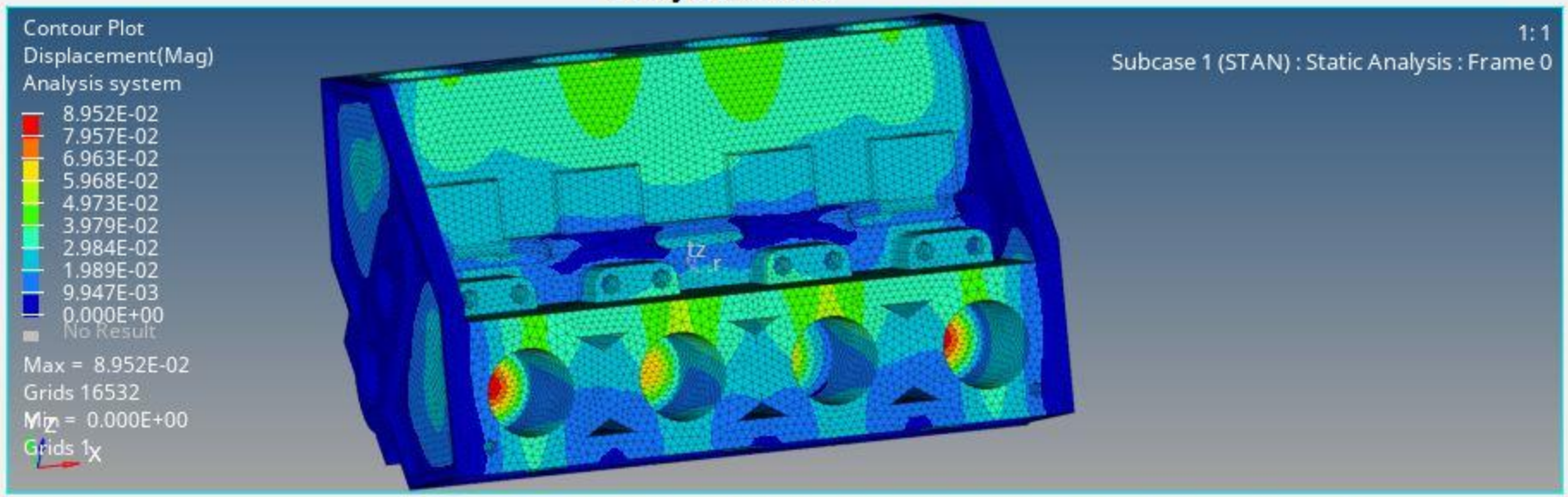
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FE_STAN_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

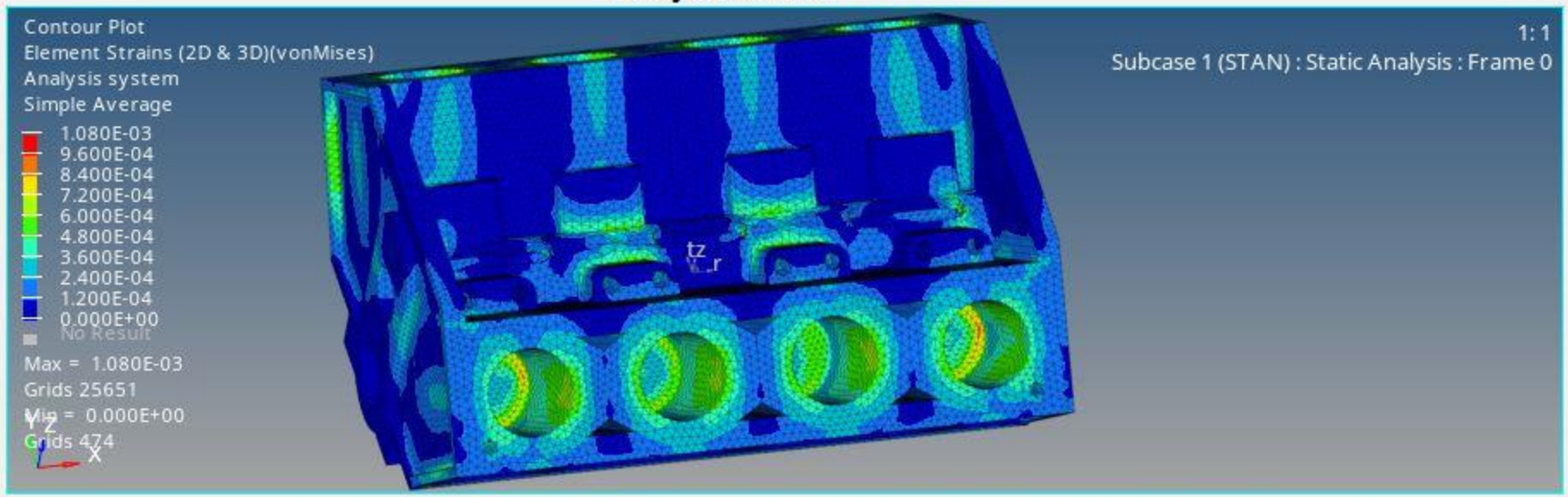
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Strains (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FE_STAN_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

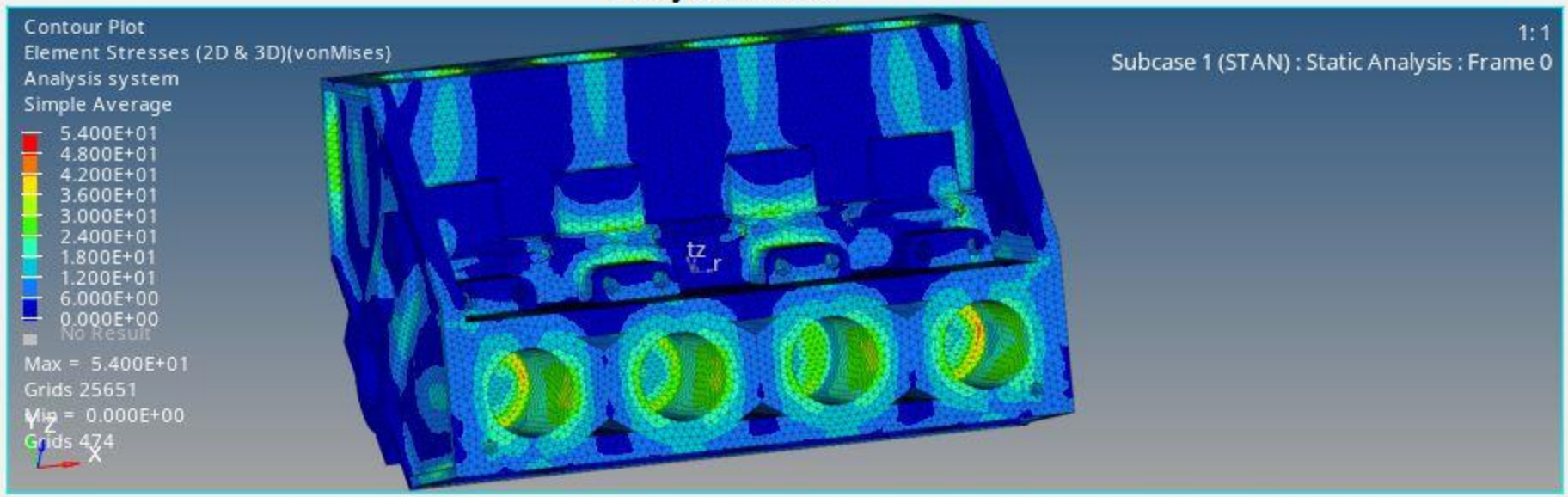
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/HE_STAN_MAT1.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine FE SPC

HE_STAN_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

Analysis Results

Contour Plot
Displacement(Mag)
Analysis system

5.825E-02
5.177E-02
4.530E-02
3.883E-02
3.236E-02
2.589E-02
1.942E-02
1.294E-02
6.472E-03
0.000E+00
No Result

Max = 5.825E-02
Grids 16532
Min = 0.000E+00
Grids 1

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Displacement (v)
Mag
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: None
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

0 entities selected

HE_STAN_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Strains (2D & 3D)(vonMises)
Analysis system
Simple Average

6.915E-04
6.147E-04
5.378E-04
4.610E-04
3.842E-04
3.073E-04
2.305E-04
1.537E-04
7.683E-05
0.000E+00
No Result

Max = 6.915E-04
Grids 25651
Min = 0.000E+00
Grids 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Strains (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

HE_STAN_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Stresses (2D & 3D)(vonMises)
Analysis system
Simple Average

5.483E+01
4.874E+01
4.264E+01
3.655E+01
3.046E+01
2.437E+01
1.828E+01
1.218E+01
6.092E+00
0.000E+00
No Result

Max = 5.483E+01
Grids 25651
Min = 0.000E+00
Grids 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Stresses (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/HE_STAN_MAT2.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

Ready Engine FE SPC

HE_STAN_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Displacement(Mag)
Analysis system

3.749E-02
3.332E-02
2.916E-02
2.499E-02
2.083E-02
1.666E-02
1.250E-02
8.330E-03
4.165E-03
0.000E+00
No Result

Max = 3.749E-02
Grids 16532
Min = 0.000E+00
Grids 1

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Displacement (v)
Mag
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: None
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

HE_STAN_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Strains (2D & 3D)(vonMises)
Analysis system
Simple Average

4.417E-04
3.926E-04
3.436E-04
2.945E-04
2.454E-04
1.963E-04
1.472E-04
9.816E-05
4.908E-05
0.000E+00
No Result

Max = 4.417E-04
Grids 25651
Min = 0.000E+00
Grids 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Strains (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

HE_STAN_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Stresses (2D & 3D)(vonMises)
Analysis system
Simple Average

5.521E+01
4.908E+01
4.294E+01
3.681E+01
3.067E+01
2.454E+01
1.840E+01
1.227E+01
6.135E+00
0.000E+00
No Result

Max = 5.521E+01
Grids 25651
Min = 0.000E+00
Grids 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Stresses (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/HE_STAN_MAT3.hm*

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

Boundary Conditions and Solvers

Engine FE SPC

HE_STAN_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Displacement(Mag)
Analysis system

4.343E-02
3.860E-02
3.378E-02
2.895E-02
2.413E-02
1.930E-02
1.448E-02
9.651E-03
4.826E-03
0.000E+00
No Result

Max = 4.343E-02
Grids 16532
Min = 0.000E+00
Grids 1

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Displacement (v)
Mag
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: None
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

HE_STAN_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Strains (2D & 3D)(vonMises)
Analysis system
Simple Average

4.793E-04
4.260E-04
3.728E-04
3.195E-04
2.663E-04
2.130E-04
1.598E-04
1.065E-04
5.325E-05
0.000E+00
No Result

Max = 4.793E-04
Grids 25651
Min = 0.000E+00
Grids 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Strains (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

HE_STAN_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Stresses (2D & 3D)(vonMises)
Analysis system
Simple Average

5.882E+01
5.228E+01
4.575E+01
3.921E+01
3.268E+01
2.614E+01
1.961E+01
1.307E+01
6.535E+00
0.000E+00
No Result

Max = 5.882E+01
Grids 25651
Min = 0.000E+00
Grids 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Stresses (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/HE_STAN_MAT4.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

Boundary Conditions and Solvers

Engine FE SPC

HE_STAN_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Displacement(Mag)
Analysis system

8.952E-02
7.957E-02
6.963E-02
5.968E-02
4.973E-02
3.979E-02
2.984E-02
1.989E-02
9.947E-03
0.000E+00
No Result

Max = 8.952E-02
Grids 16532
Min = 0.000E+00
Grids 1

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Displacement (v)
Mag
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: None
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

HE_STAN_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Strains (2D & 3D)(vonMises)
Analysis system
Simple Average

1.080E-03
9.600E-04
8.400E-04
7.200E-04
6.000E-04
4.800E-04
3.600E-04
2.400E-04
1.200E-04
0.000E+00
No Result

Max = 1.080E-03
Grids 25651
Min = 0.000E+00
Grids 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Strains (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

HE_STAN_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

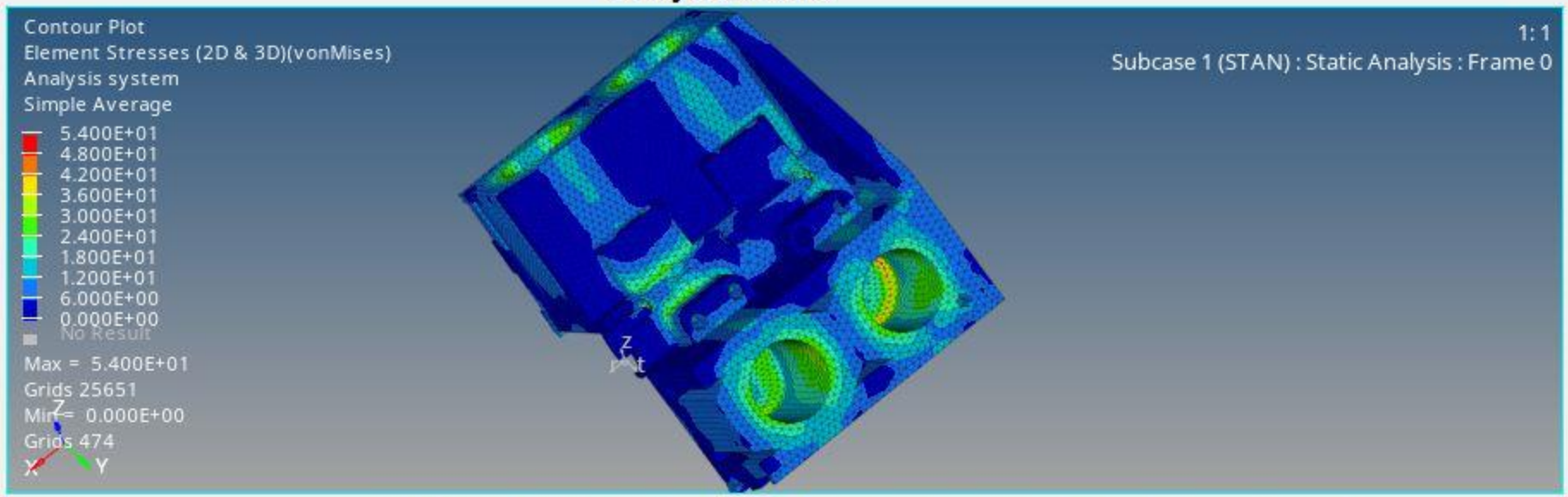
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/QE_STAN_MAT1.hm*

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

Boundary Conditions and Solvers

Engine QE SPC

QE_STAN_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Displacement(Mag)
Analysis system

5.701E-02
5.068E-02
4.434E-02
3.801E-02
3.167E-02
2.534E-02
1.900E-02
1.267E-02
6.334E-03
0.000E+00
No Result

Max = 5.701E-02
Grid 16532
Min = 0.000E+00
Grid 1

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type:
Displacement (v)
Mag
Layers:
Use corner data

Selection:
Components
Resolved in:
Analysis System
System
Use tracking system
Show midside node results

Averaging method:
None
Variation < 10 (%)
Averaging Options...
Envelope trace plot:
None

Value filter:
None

Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

QE_STAN_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Strains (2D & 3D)(vonMises)
Analysis system
Simple Average

6.163E-04
5.478E-04
4.794E-04
4.109E-04
3.424E-04
2.739E-04
2.054E-04
1.370E-04
6.848E-05
0.000E+00
No Result

Max = 6.163E-04
Grid 2929
Min = 0.000E+00
Grid 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Strains (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

QE_STAN_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Stresses (2D & 3D)(vonMises)
Analysis system
Simple Average

4.887E+01
4.344E+01
3.801E+01
3.258E+01
2.715E+01
2.172E+01
1.629E+01
1.086E+01
5.430E+00
0.000E+00
No Result

Max = 4.887E+01
Grid 2929
Min = 0.000E+00
Grid 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type:
Element Stresses (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection:
Components
Resolved in:
Analysis System
System
Use tracking system
Show midside node results

Averaging method:
Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot:
None

Value filter:
None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/QE_STAN_MAT2.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine QE SPC

QE_STAN_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

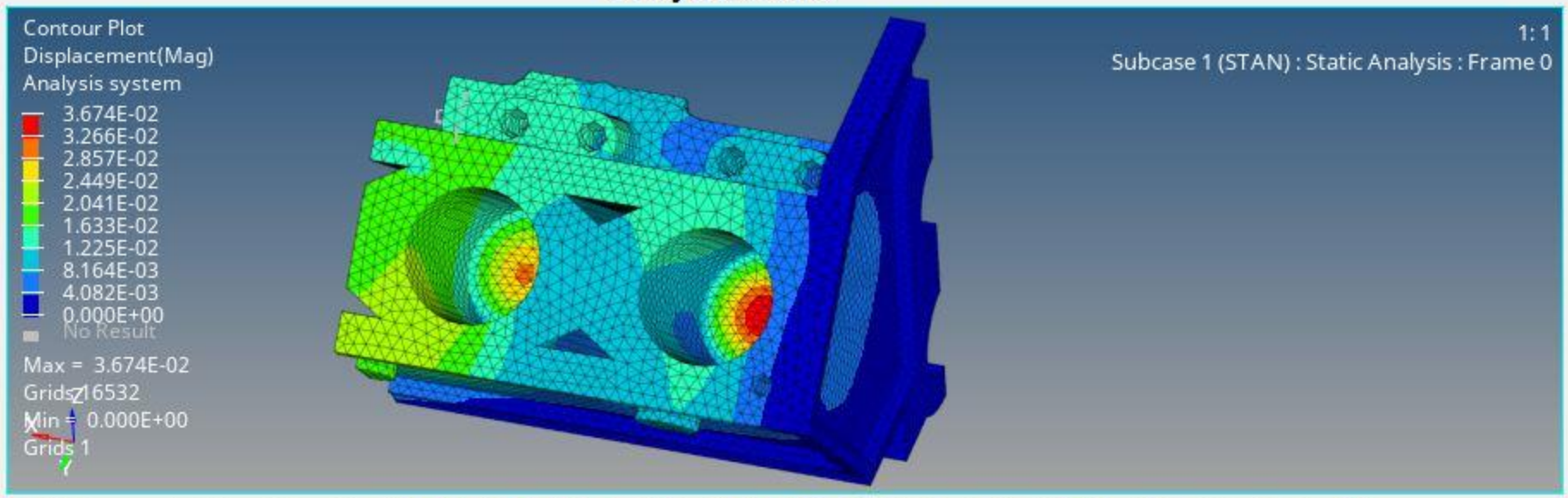
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

QE_STAN_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

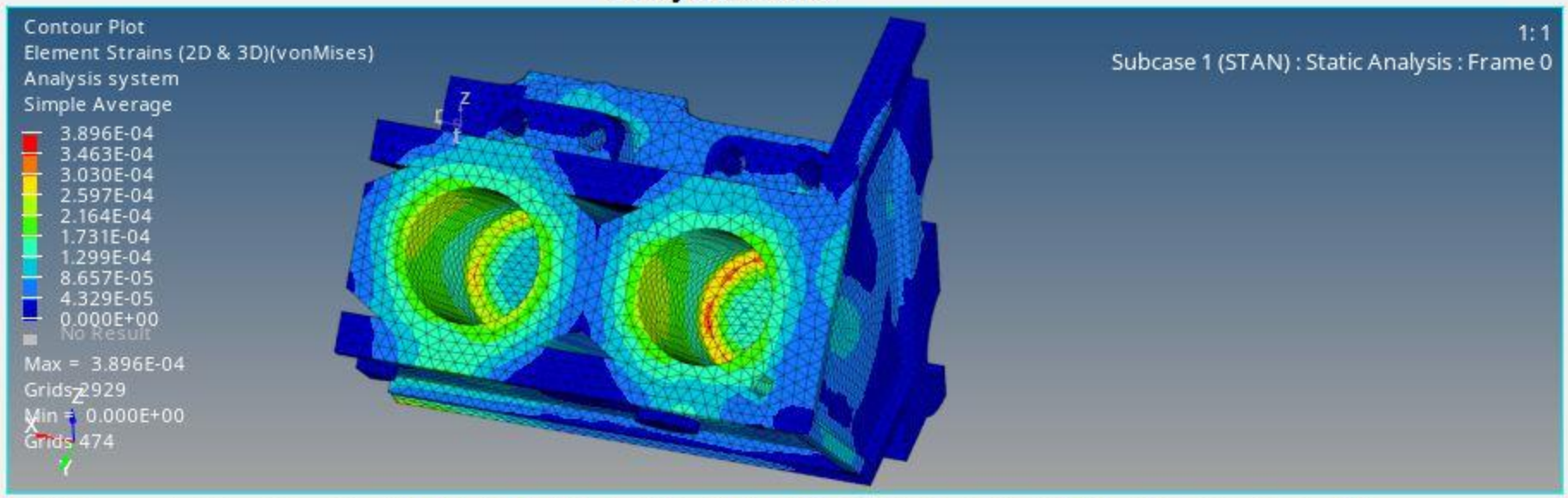
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Strains (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

QE_STAN_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Stresses (2D & 3D)(vonMises)
Analysis system
Simple Average

4.870E+01
4.329E+01
3.787E+01
3.246E+01
2.705E+01
2.164E+01
1.623E+01
1.082E+01
5.411E+00
0.000E+00
No Result

Max = 4.870E+01
Grids 2929
Min = 0.000E+00
Grids 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Stresses (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/QE_STAN_MAT3.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine QE SPC

QE_STAN_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

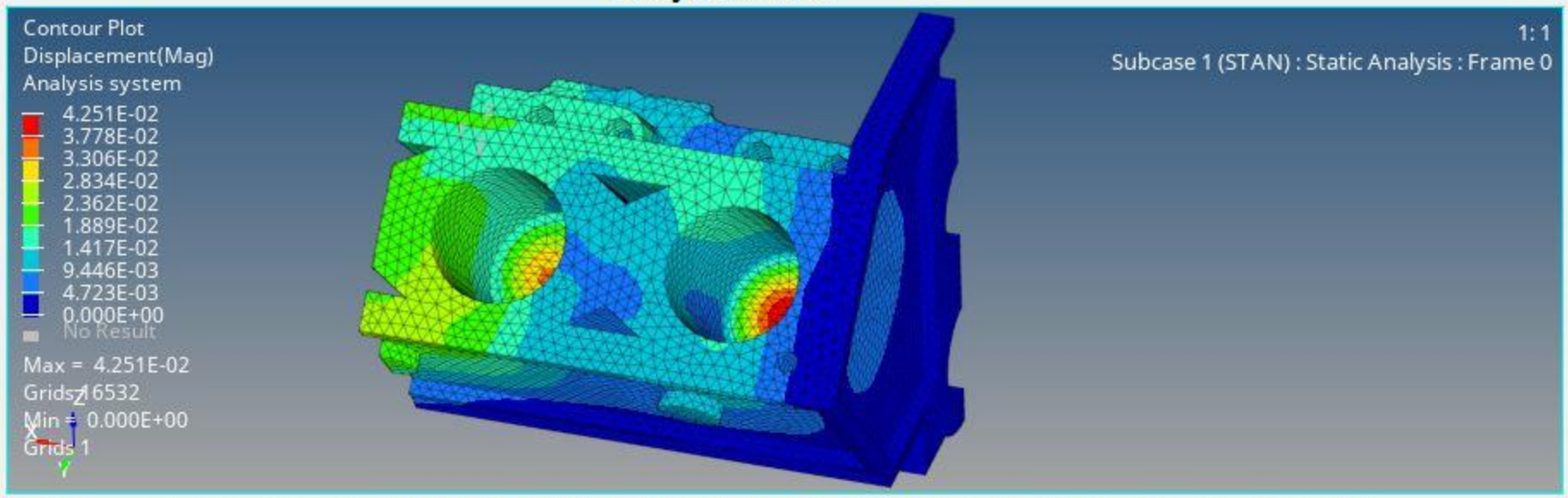
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

QE_STAN_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Strains (2D & 3D)(vonMises)
Analysis system
Simple Average

3.834E-04
3.408E-04
2.982E-04
2.556E-04
2.130E-04
1.704E-04
1.278E-04
8.520E-05
4.260E-05
0.000E+00
No Result

Max = 3.834E-04
Grids 6650
Min = 0.000E+00
Grids 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Strains (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

QE_STAN_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

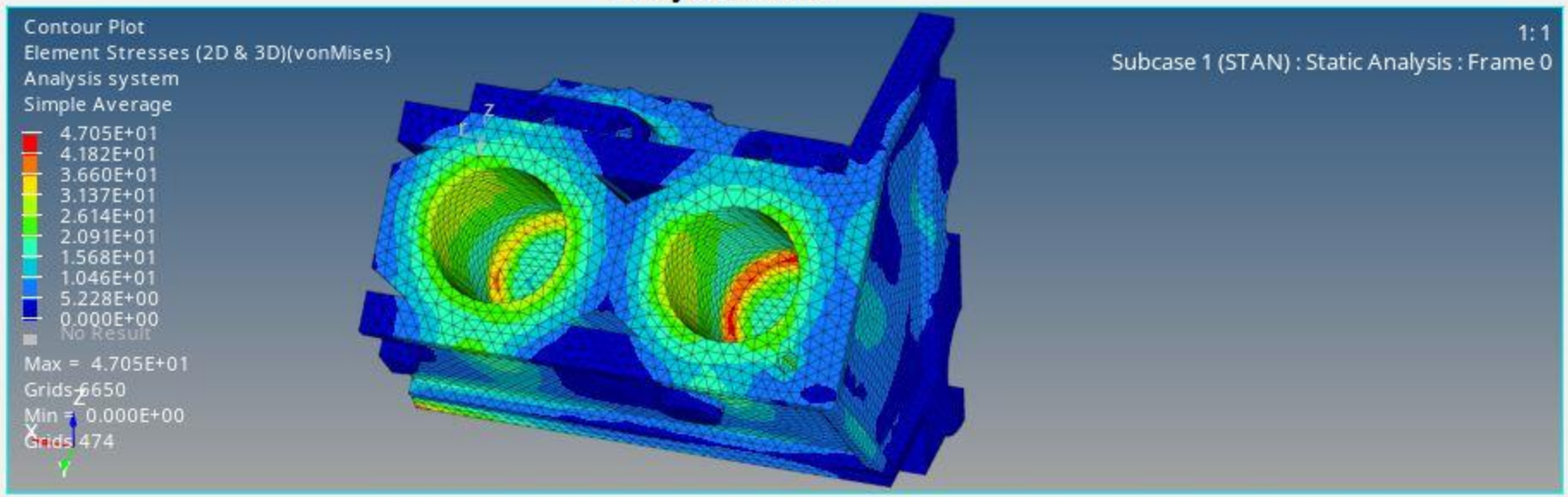
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

0 entities selected

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Load Collectors (2)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- System Collectors (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/STAN/QE_STAN_MAT4.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

Boundary Conditions and Solvers

Engine QE SPC

QE_STAN_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

Analysis Results

Contour Plot
Displacement(Mag)
Analysis system

8.762E-02
7.788E-02
6.815E-02
5.841E-02
4.868E-02
3.894E-02
2.921E-02
1.947E-02
9.735E-03
0.000E+00
No Result

Max = 8.762E-02
Grids 16532
Min = 0.000E+00
Grids 1

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Displacement (v)
Mag
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: None
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

0 entities selected

QE_STAN_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Strains (2D & 3D)(vonMises)
Analysis system
Simple Average

9.851E-04
8.757E-04
7.662E-04
6.567E-04
5.473E-04
4.378E-04
3.284E-04
2.189E-04
1.095E-04
0.000E+00
No Result

Max = 9.851E-04
Grids 2929
Min = 0.000E+00
Grids 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Strains (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

QE_STAN_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Systems (1)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Stresses (2D & 3D)(vonMises)
Analysis system
Simple Average

4.926E+01
4.378E+01
3.831E+01
3.284E+01
2.736E+01
2.189E+01
1.642E+01
1.095E+01
5.473E+00
0.000E+00
No Result

Max = 4.926E+01
Grids 2929
Min = 0.000E+00
Grids 474

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Stresses (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

CASE 2

Analysis:

- **Case 2 : Transient Thermal Analysis:**
- Maximum Temperature: 800°C
- Time: 250sec
- Convection Coefficient: 9.1e-5 W/mm2°C

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Curves (2)
- Groups (2)
- Load Collectors (9)
- Load Steps (2)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (2)
- Titles (1)

Name Value

Model Info: J:/P5/FH/TRaTA/TRaTA_MAT1.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine FE TSTEP

TRaTA_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

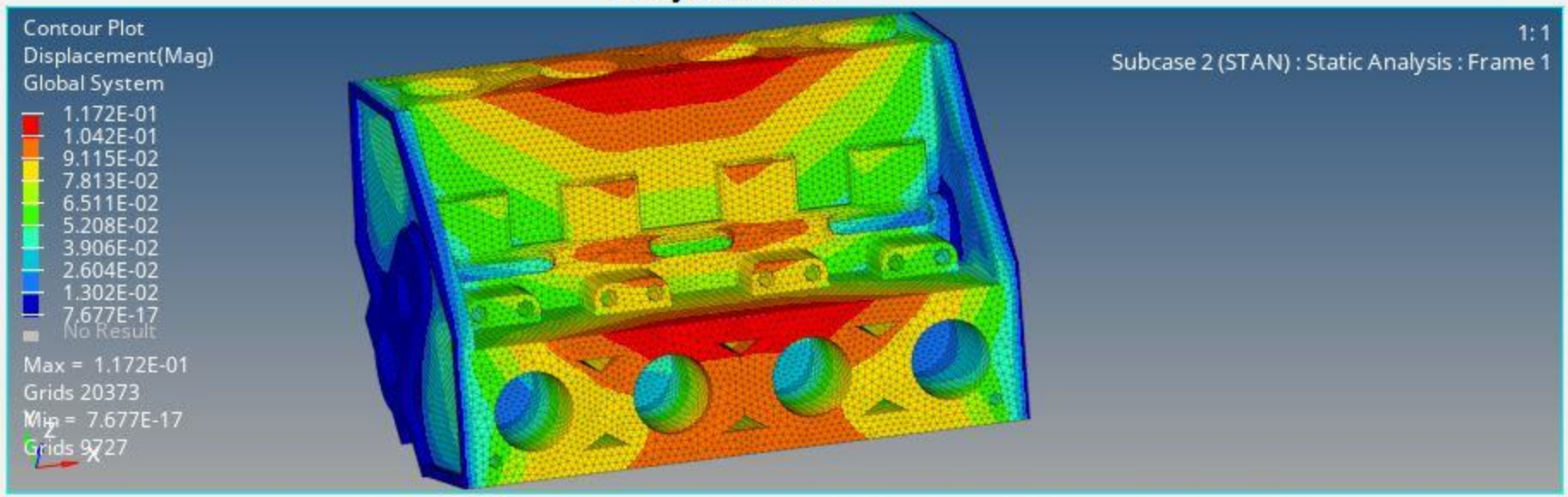
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Global System (proj: none)

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

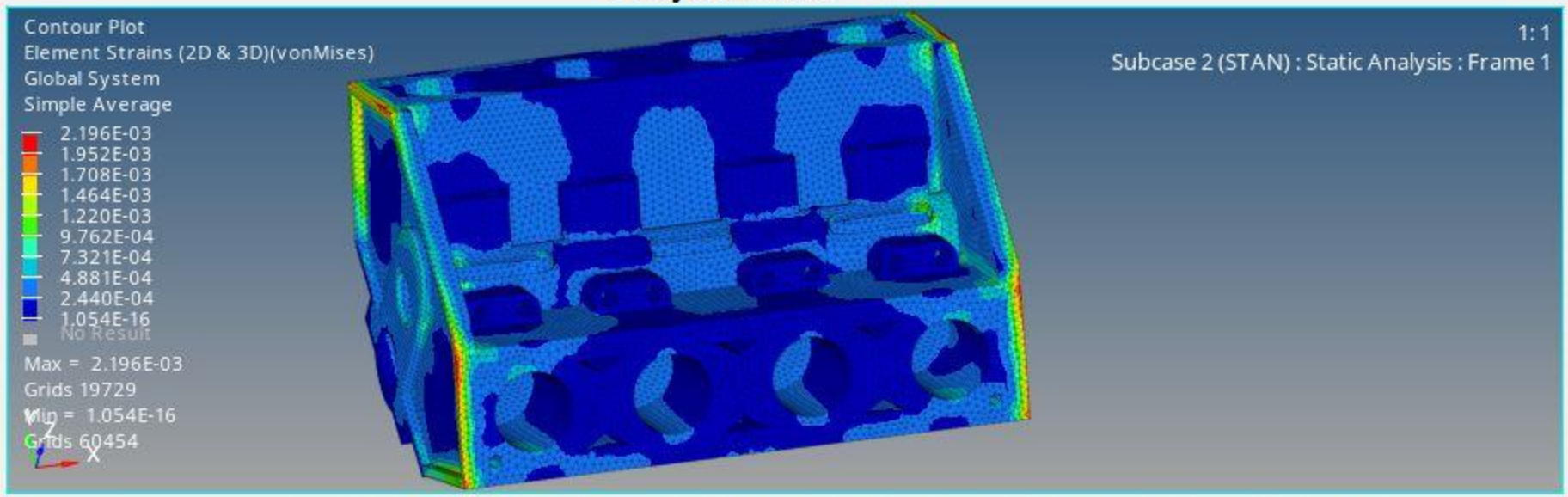
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Strains (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Global System (proj: none)

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

Analysis Results

Contour Plot
Element Stresses (2D & 3D)(vonMises)
Global System
Simple Average

1.741E+02
1.548E+02
1.354E+02
1.161E+02
9.675E+01
7.740E+01
5.805E+01
3.870E+01
1.935E+01
2.414E-12
No Result

Max = 1.741E+02
Grids 19729
Min = 2.414E-12
Grids 474

1: 1
Subcase 2 (STAN) : Static Analysis : Frame 1

By Comp

Result type:
Element Stresses (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection:
Components
Resolved in:
Global System (proj: none)
System
Use tracking system
Show midside node results

Averaging method:
Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot:
None

Value filter:
None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

0 entities selected

TRaTA_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

Search

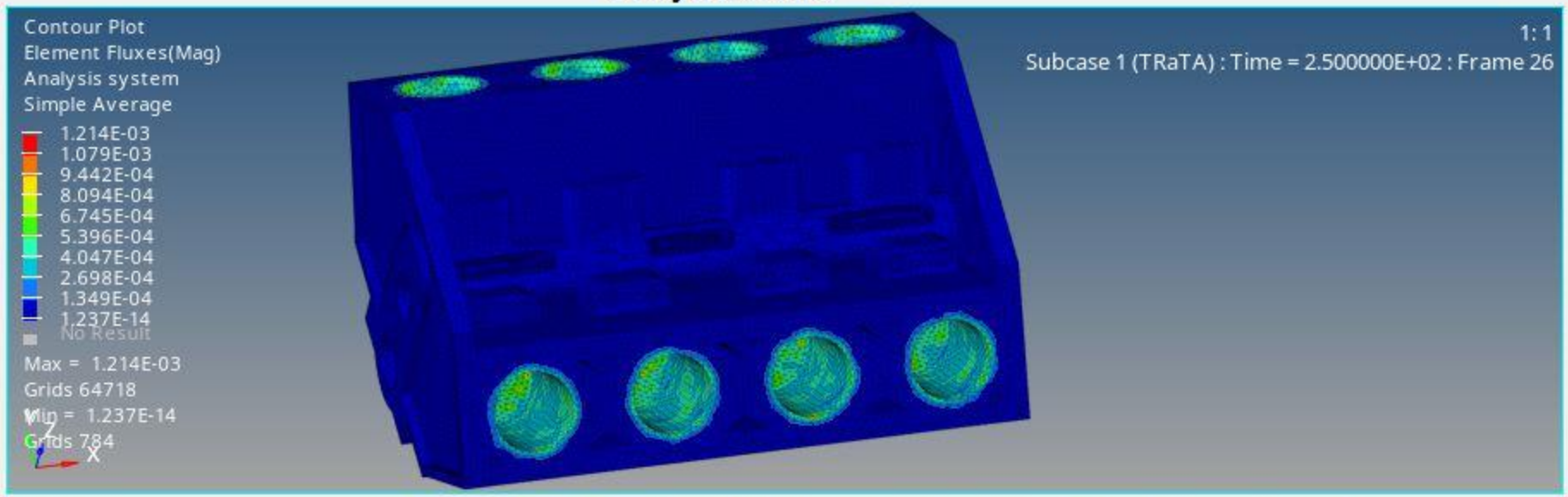
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Fluxes (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Grid Temperatures(Temperatures)

2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
No Result

Max = 2.500E+01
Grids 45246
Min = 2.500E+01
Grids X

1: 1
Subcase 1 (TRaTA) : Time = 2.500000E+02 : Frame 26

By Comp

Result type: Grid Temperatures (s)

Temperatures

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

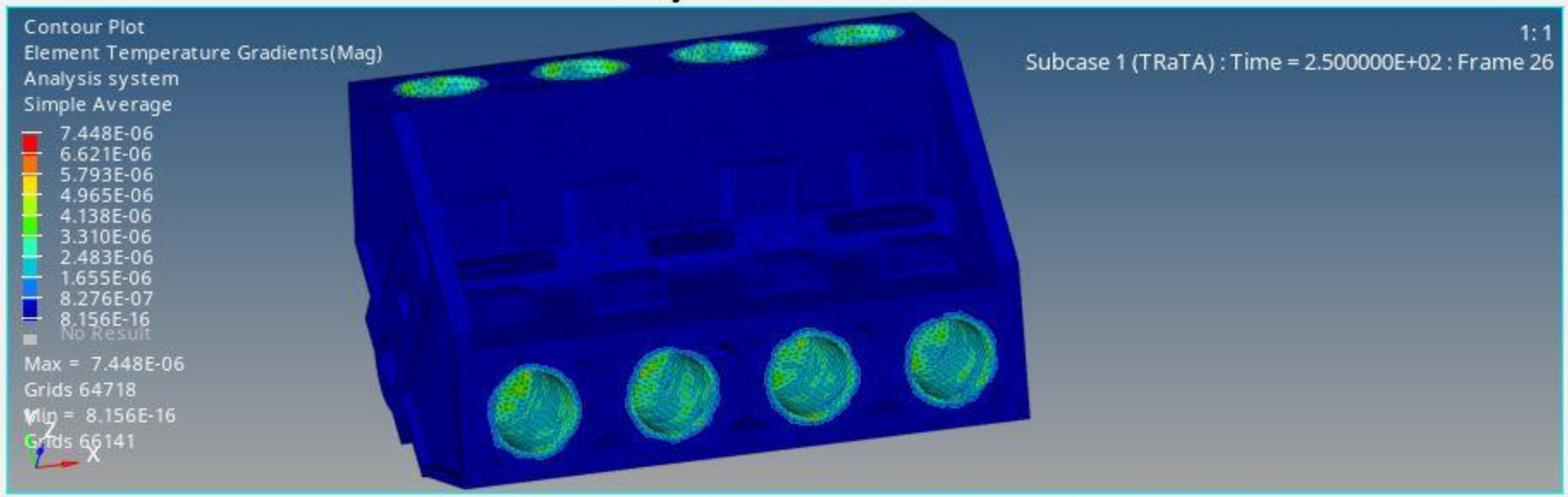
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Element Temperature Gradients

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

0 entities selected

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Components (1)
- Curves (2)
- Groups (2)
- Load Collectors (9)
- Load Steps (2)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (2)
- Titles (1)

Name Value

Model Info: J:/P5/FH/TRaTA/TRaTA_MAT2.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine FE TSTEP

TRaTA_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

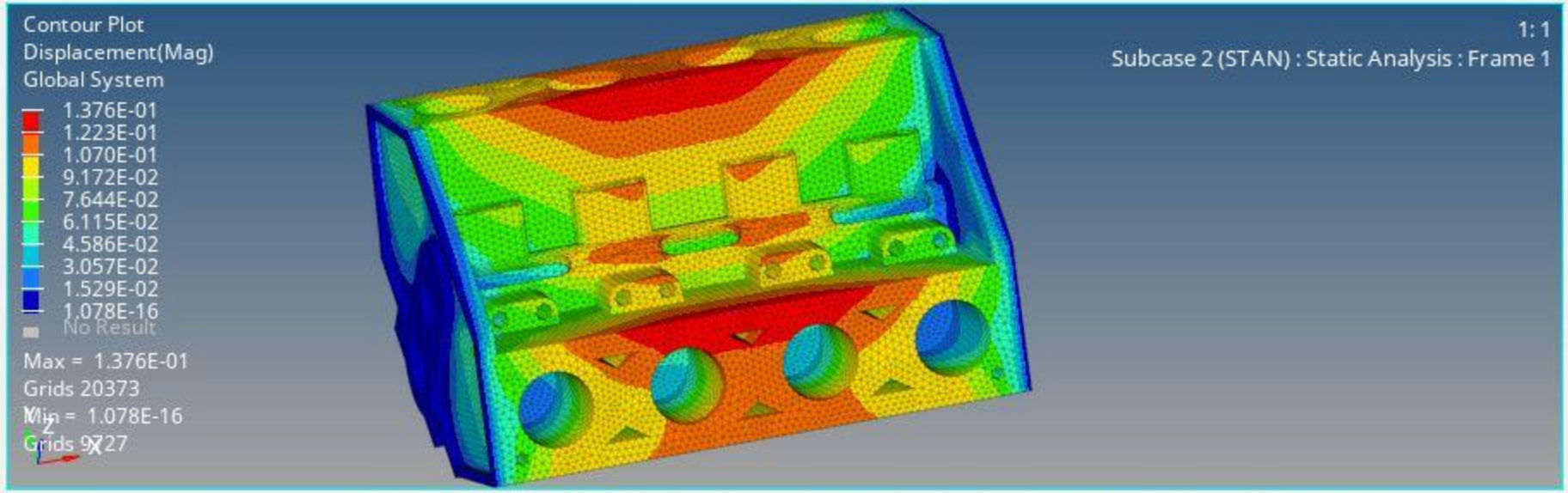
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Global System (proj: none)

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

Analysis Results

Contour Plot
Element Strains (2D & 3D)(vonMises)
Global System
Simple Average

2.574E-03
2.288E-03
2.002E-03
1.716E-03
1.430E-03
1.144E-03
8.580E-04
5.720E-04
2.860E-04
1.236E-16
No Result

Max = 2.574E-03
Grids 19729
Min = 1.236E-16
Grids 60454

1: 1
Subcase 2 (STAN) : Static Analysis : Frame 1

By Comp

Result type: Element Strains (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Global System (proj: none)
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

0 entities selected

TRaTA_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

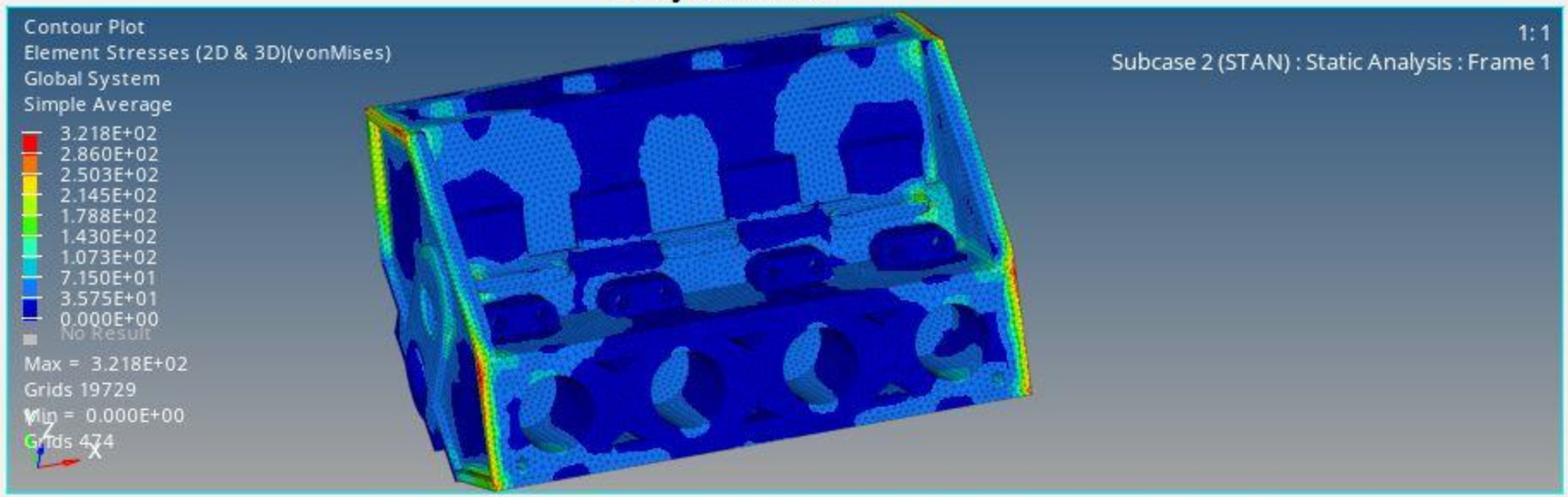
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Global System (proj: none)

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

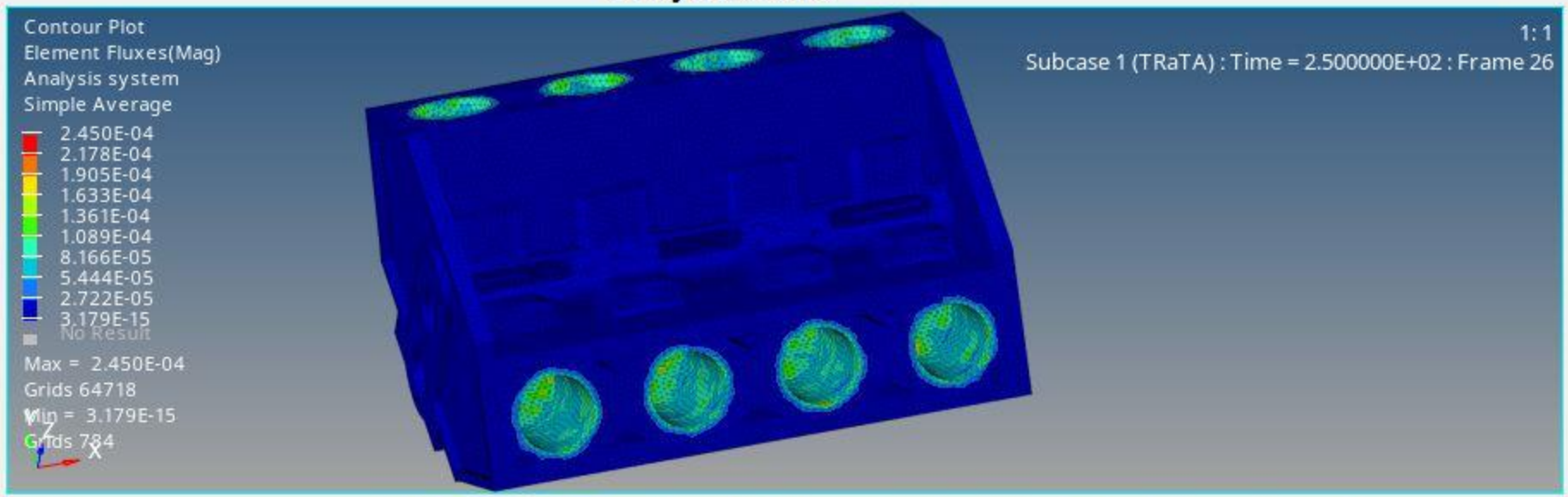
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Element Fluxes (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

Ready

TRaTA_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

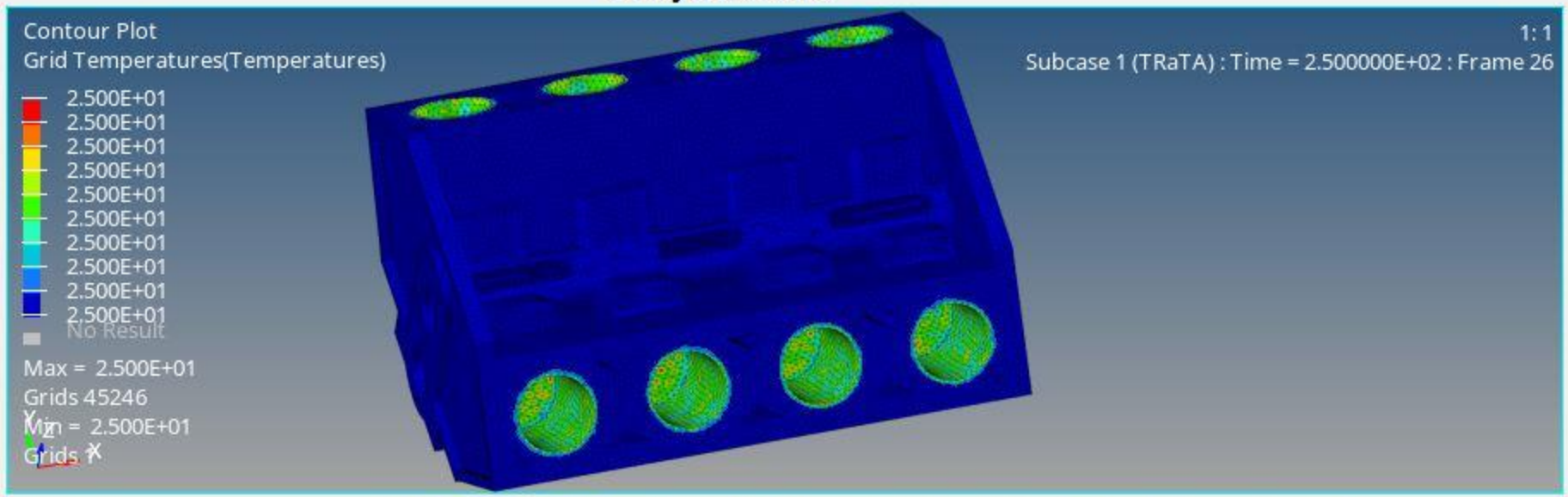
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Grid Temperatures (s)

Temperatures

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

Ready

TRaTA_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

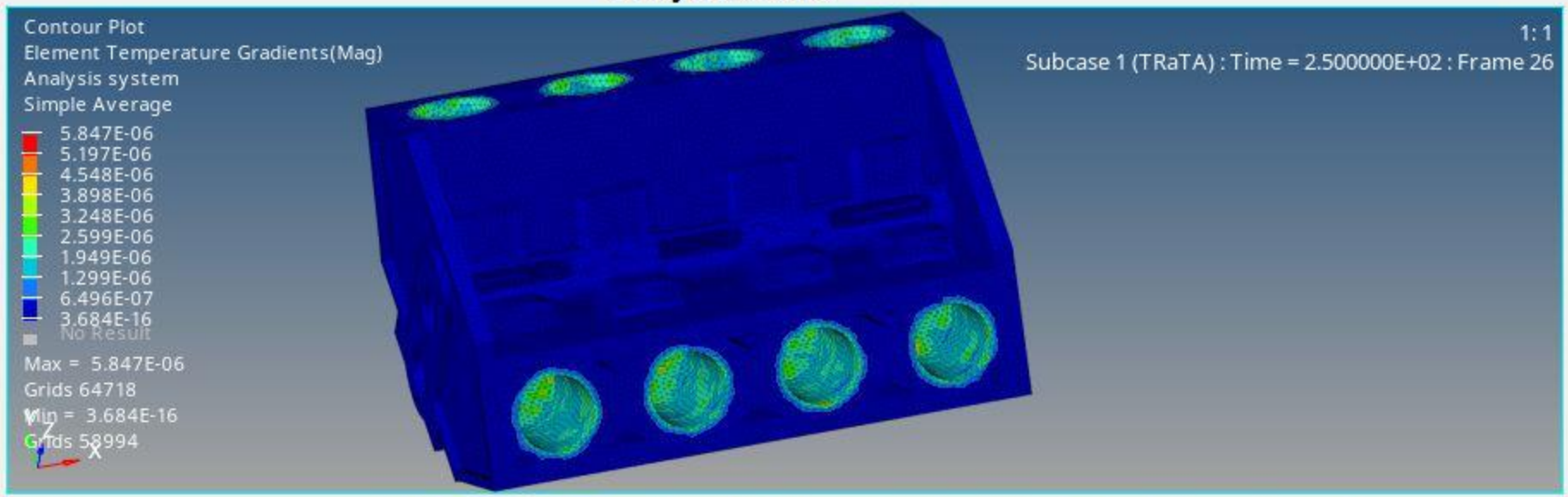
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Element Temperature Gradients

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

Ready

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Components (1)
- Curves (2)
- Groups (2)
- Load Collectors (9)
- Load Steps (2)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (2)
- Titles (1)

Name Value

Model Info: J:/P5/FH/TRaTA/TRaTA_MAT3.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine FE TSTEP

TRaTA_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

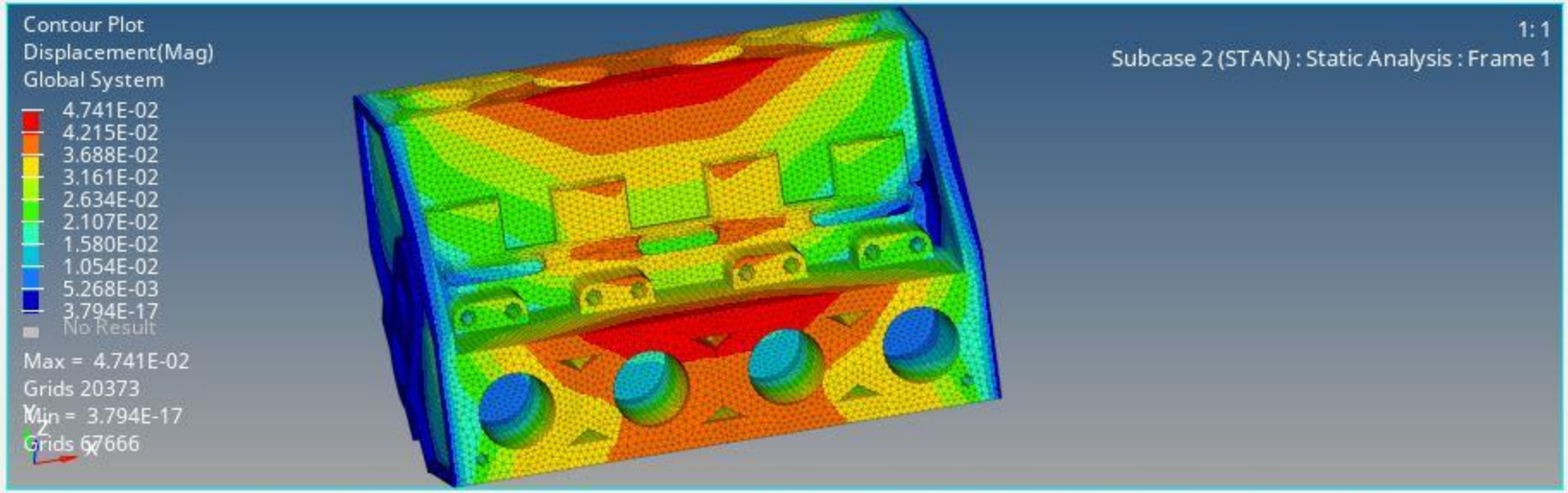
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Global System (proj: none)

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

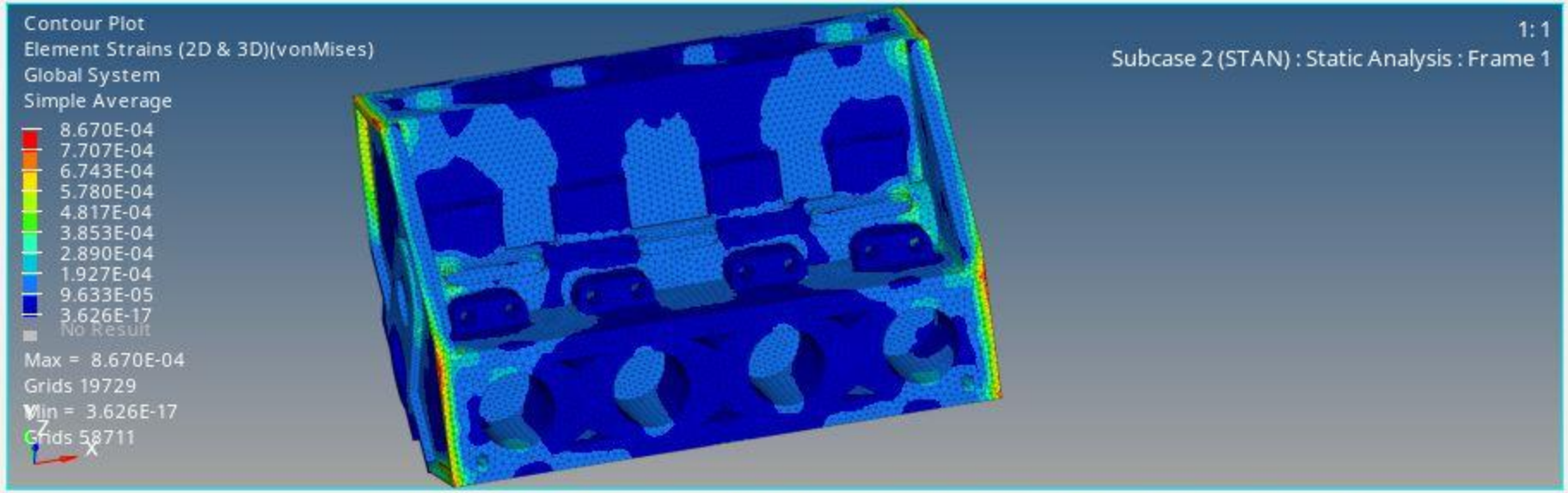
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Strains (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Global System (proj: none)

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

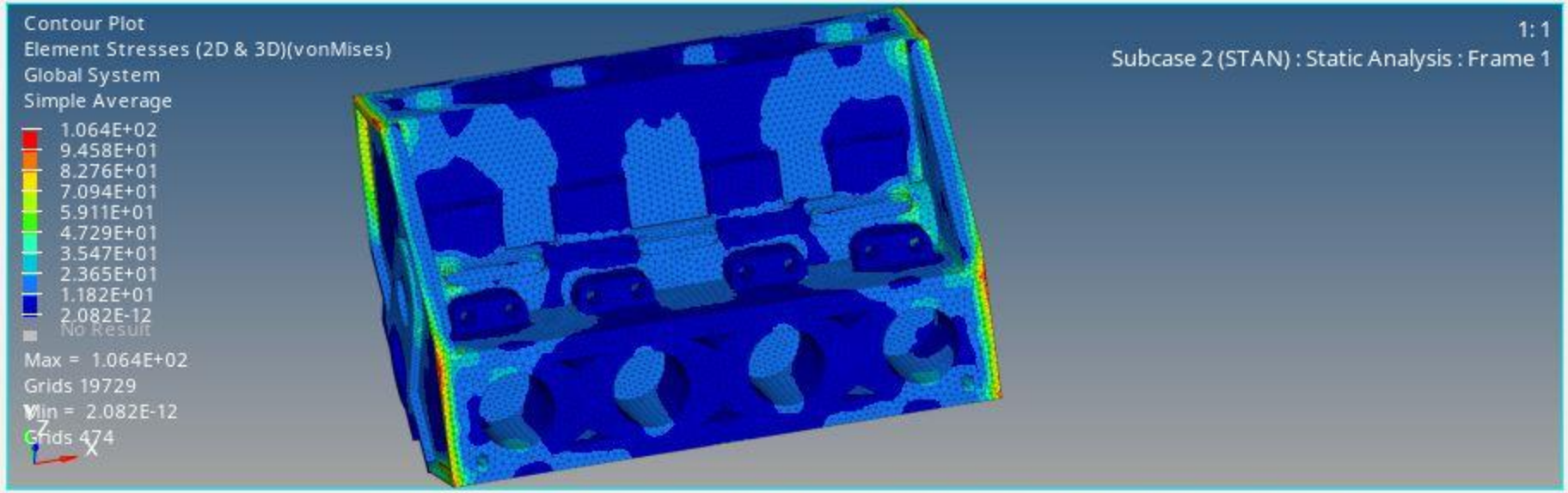
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Global System (proj: none)

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

Analysis Results

Contour Plot
Element Fluxes(Mag)
Analysis system
Simple Average

2.189E-04
1.946E-04
1.703E-04
1.460E-04
1.216E-04
9.731E-05
7.298E-05
4.865E-05
2.433E-05
4.350E-14
No Result

Max = 2.189E-04
Grids 64718
Min = 4.350E-14
Grids 46597

1: 1
Subcase 1 (TRaTA) : Time = 2.500000E+02 : Frame 26

By Comp

Result type: Element Fluxes (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

Ready

TRaTA_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

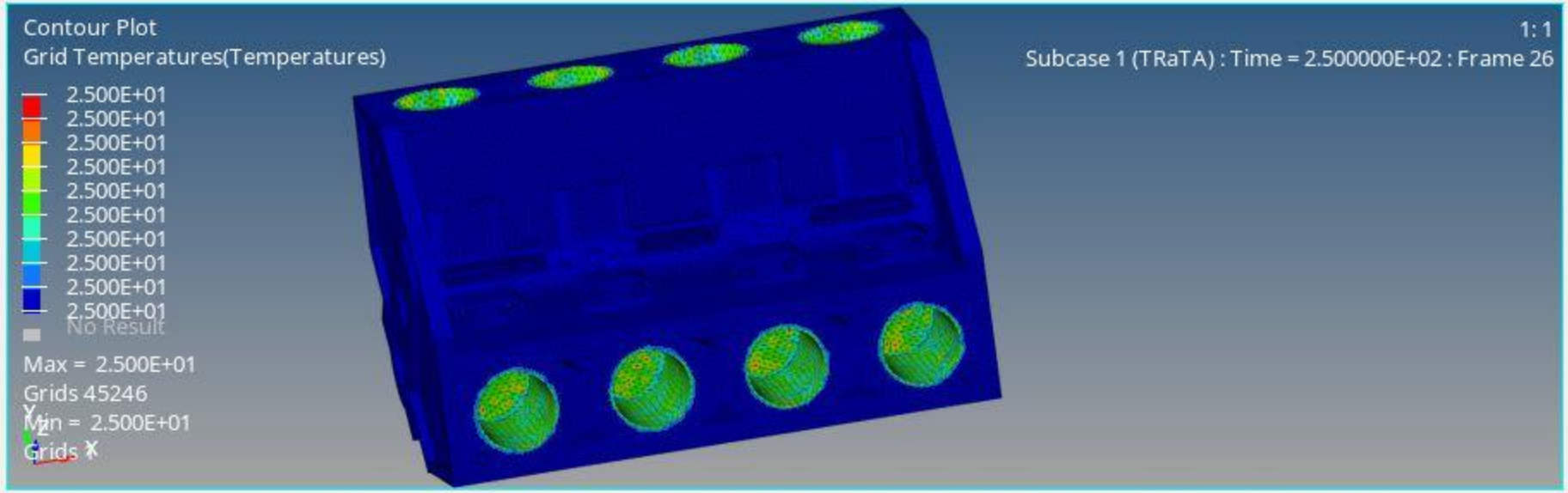
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Grid Temperatures (s)

Temperatures

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

Ready

TRaTA_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

Analysis Results

Contour Plot
Element Temperature Gradients(Mag)
Analysis system
Simple Average

4.760E-06
4.231E-06
3.702E-06
3.173E-06
2.644E-06
2.115E-06
1.587E-06
1.058E-06
5.288E-07
9.458E-16
No Result

Max = 4.760E-06
Grids 64718
Min = 9.458E-16
Grids 46597

1: 1
Subcase 1 (TRaTA) : Time = 2.500000E+02 : Frame 26

By Comp

Result type: Element Temperature Gradients
Mag
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

Ready

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Components (1)
- Curves (2)
- Groups (2)
- Load Collectors (9)
- Load Steps (2)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (2)
- Titles (1)

Name Value

Model Info: J:/P5/FH/TRaTA/TRaTA_MAT4.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine FE TSTEP

TRaTA_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

Analysis Results

Contour Plot
Displacement(Mag)
Global System

2.290E-01
2.036E-01
1.781E-01
1.527E-01
1.272E-01
1.018E-01
7.634E-02
5.090E-02
2.545E-02
9.884E-17
No Result

Max = 2.290E-01
Grids 20373
Min = 9.884E-17
Grids 9727

1: 1
Subcase 2 (STAN) : Static Analysis : Frame 1

By Comp

Result type: Displacement (v)
Mag
Layers:
Use corner data

Selection: Components
Resolved in: Global System (proj: none)
System
Use tracking system
Show midside node results

Averaging method: None
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

0 entities selected

TRaTA_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

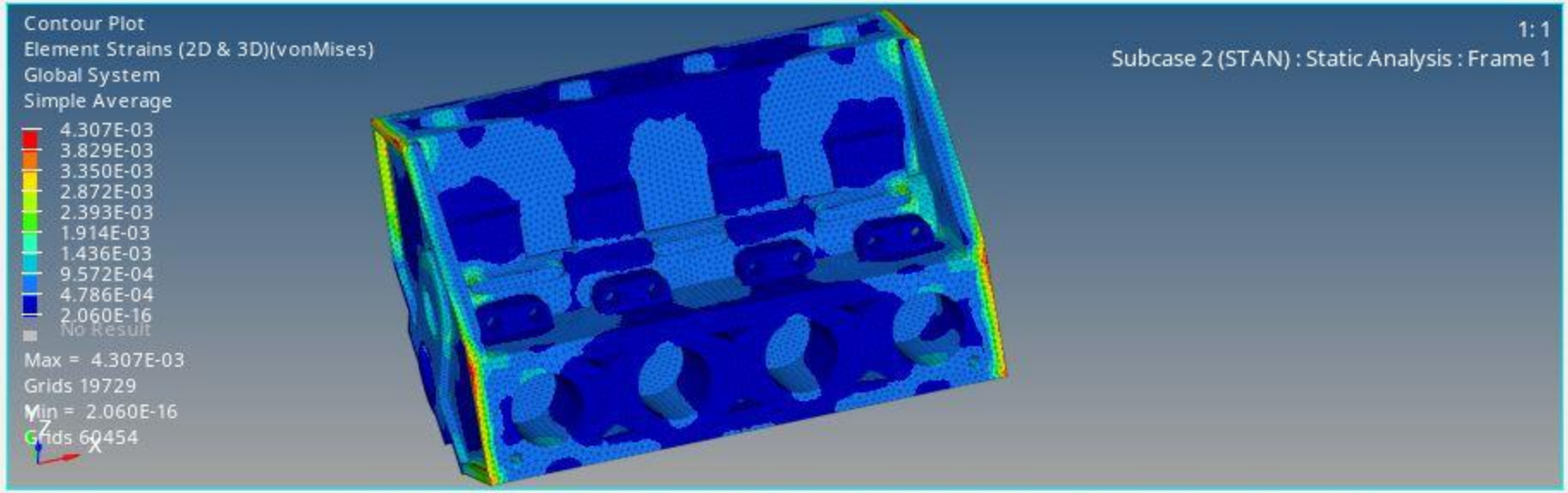
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Strains (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Global System (proj: none)

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (STAN)

Static Analysis

Search

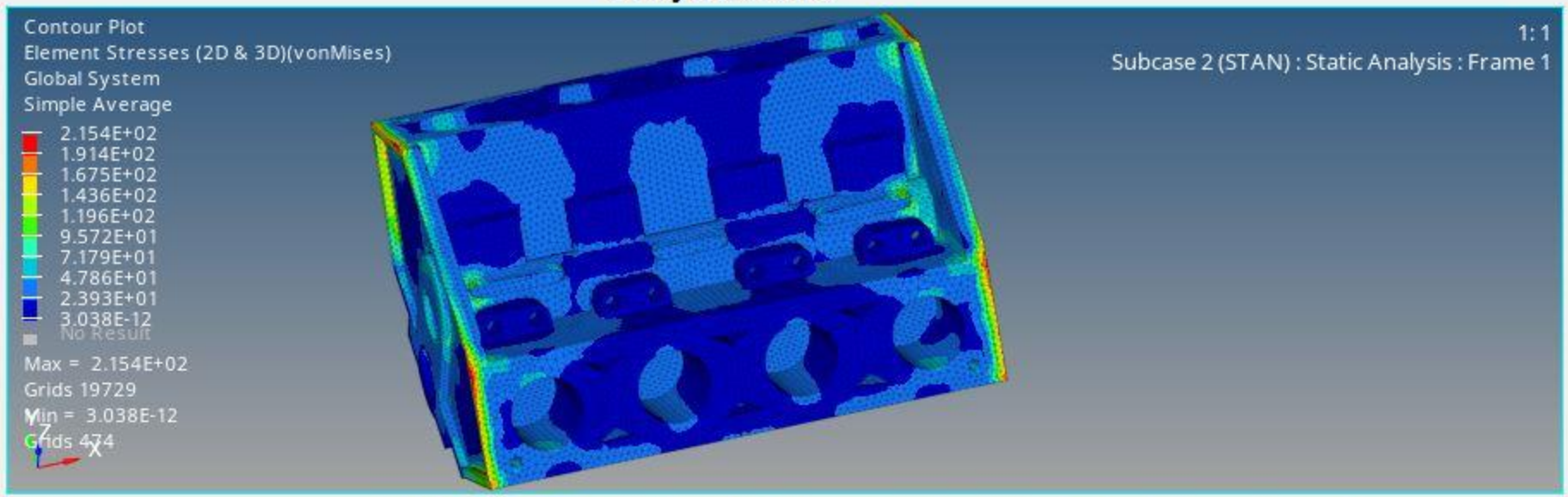
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Global System (proj: none)

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Fluxes(Mag)
Analysis system
Simple Average

6.161E-04
5.476E-04
4.792E-04
4.107E-04
3.423E-04
2.738E-04
2.054E-04
1.369E-04
6.846E-05
2.759E-14
No Result

Max = 6.161E-04
Grids 64718
Min = 2.759E-14
Grids 10590

1: 1
Subcase 1 (TRaTA) : Time = 2.500000E+02 : Frame 26

By Comp

Result type: Element Fluxes (v)
Mag
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

TRaTA_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Grid Temperatures(Temperatures)

2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
2.500E+01
No Result

Max = 2.500E+01
Grids 45246
Min = 2.500E+01
Grids 1

1: 1
Subcase 1 (TRaTA) : Time = 2.500000E+02 : Frame 26

By Comp

Result type: Grid Temperatures (s)

Temperatures

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

TRaTA_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (TRaTA)

Time = 2.500000E+02

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (3)
- Views (1)

Name Value

Analysis Results

Contour Plot
Element Temperature Gradients(Mag)
Analysis system
Simple Average

9.937E-06
8.833E-06
7.729E-06
6.625E-06
5.521E-06
4.416E-06
3.312E-06
2.208E-06
1.104E-06
4.451E-16
No Result

Max = 9.937E-06
Grids 64718
Min = 4.451E-16
Grids 10590

1: 1
Subcase 1 (TRaTA) : Time = 2.500000E+02 : Frame 26

By Comp

Result type: Element Temperature Gradients
Mag
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

0 entities selected

CASE 3

Analysis:

- **Case 3 : Modal Frequency Response Analysis**
- Maximum Rpm: 5000
- **Max Pressure: 11.6Mpa**

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (4)
- Components (1)
- Curves (1)
- Load Collectors (5)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/MFR/MFR_MAT1.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine FE PRESSURE

MFR_MAT1_freq.mvw - HyperWorks 2021 - Student Edition

File Edit View Curves Annotations Tools Preferences Applications Help

Session Plot

Entities

- Current Project
  - p1:Subcase 1 (MFR) - Displacement of grid 12
    - w1:Complex Plot
      - X Trans
        - x
        - ym
        - yp
      - Y Trans
      - Z Trans

Name Value

Subcase 1 (MFR) - Displacement of grid 1223

Curve: X Trans

X Trans
Y Trans
Z Trans

Cut Copy Paste Add P/M Ad

x = J:/P5/FH/MFR/MFR_MAT1_s1_d.frf:Block 1/column0

yp = J:/P5/FH/MFR/MFR_MAT1_s1_d.frf:Block 1/X Trans (P)

ym = J:/P5/FH/MFR/MFR_MAT1_s1_d.frf:Block 1/X Trans (M)

Source: File Math Values

File: J:/P5/FH/MFR/MFR_MAT1_s1_d.frf

Type: Unknown

Request: Block 1

Component: column0

Apply

Main console display active (Tcl8.5.9 / Tk8.5.9)

(MFR) 1 %

Ready

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (4)
- Components (1)
- Curves (1)
- Load Collectors (5)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/MFR/MFR_MAT2.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine FE PRESSURE

MFR_MAT2_freq.mvw - HyperWorks 2021 - Student Edition

File Edit View Curves Annotations Tools Preferences Applications Help

Session Plot

Entities

- Current Project
  - p1:Subcase 1 (MFR) - Displacement of grid 12
    - w1:Complex Plot
      - X Trans
        - x
        - ym
        - yp
      - Y Trans
      - Z Trans

Name Value

Subcase 1 (MFR) - Displacement of grid 1223

Curve: X Trans

X Trans
Y Trans
Z Trans

Cut Copy Paste Add P/M Ad

x = J:/P5/FH/MFR/MFR_MAT2_s1_d.frf:Block 1/column0

yp = J:/P5/FH/MFR/MFR_MAT2_s1_d.frf:Block 1/X Trans (P)

ym = J:/P5/FH/MFR/MFR_MAT2_s1_d.frf:Block 1/X Trans (M)

Source: File Math Values

File: J:/P5/FH/MFR/MFR_MAT2_s1_d.frf

Type: Unknown

Request: Block 1

Component: column0

Apply

Main console display active (Tcl8.5.9 / Tk8.5.9)

(MFR) 1 %

Ready

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (4)
- Components (1)
- Curves (1)
- Load Collectors (5)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/MFR/MFR_MAT3.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine FE PRESSURE

MFR_MAT3_freq.mvw - HyperWorks 2021 - Student Edition

File Edit View Curves Annotations Tools Preferences Applications Help

Session Plot

Entities

- Current Project
  - p1:Subcase 1 (MFR) - Displacement of grid 12
    - w1:Complex Plot
      - X Trans
        - x
        - ym
        - yp
      - Y Trans
      - Z Trans

Name Value

Subcase 1 (MFR) - Displacement of grid 1223

Curve: X Trans

X Trans
Y Trans
Z Trans

Cut Copy Paste Add P/M Ad

x = J:/P5/FH/MFR/MFR_MAT3_s1_d.frf:Block 1/column0

yp = J:/P5/FH/MFR/MFR_MAT3_s1_d.frf:Block 1/X Trans (P)

ym = J:/P5/FH/MFR/MFR_MAT3_s1_d.frf:Block 1/X Trans (M)

Source: File Math Values

File: J:/P5/FH/MFR/MFR_MAT3_s1_d.frf

Type: Unknown

Request: Block 1

Component: column0

Apply

Main console display active (Tcl8.5.9 / Tk8.5.9)

(MFR) 1 %

Ready

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (4)
- Components (1)
- Curves (1)
- Load Collectors (5)
- Load Steps (1)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/MFR/MFR_MAT4.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine FE PRESSURE

MFR_MAT4_freq.mvw - HyperWorks 2021 - Student Edition

File Edit View Curves Annotations Tools Preferences Applications Help

Session Plot

Entities

- Current Project
  - p1:Subcase 1 (MFR) - Displacement of grid 12
    - w1:Complex Plot
      - X Trans
        - x
        - ym
        - yp
      - Y Trans
      - Z Trans

Name Value

Subcase 1 (MFR) - Displacement of grid 1223

Curve: X Trans

X Trans
Y Trans
Z Trans

Cut Copy Paste Add P/M Ad

x = J:/P5/FH/MFR/MFR_MAT4_s1_d.frf:Block 1/column0

yp = J:/P5/FH/MFR/MFR_MAT4_s1_d.frf:Block 1/X Trans (P)

ym = J:/P5/FH/MFR/MFR_MAT4_s1_d.frf:Block 1/X Trans (M)

Source: File Math Values

File: J:/P5/FH/MFR/MFR_MAT4_s1_d.frf

Type: Unknown

Request Block 1

Component column0

Apply

Main console display active (Tcl8.5.9 / Tk8.5.9)

(MFR) 1 %

Ready

CASE 4

Analysis:

- **Case 4 :** Fatigue Analysis (using Static and Thermal Conditions).
- The required material and surface finish properties can be obtained online with reference to the given materials.

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (1)
- Components (1)
- Curves (1)
- Load Collectors (9)
- Load Steps (2)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/FATANAL/FATANAL_MAT1.hm*

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

Boundary Conditions and Solvers

Engine FE FATDEF

FATANAL_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

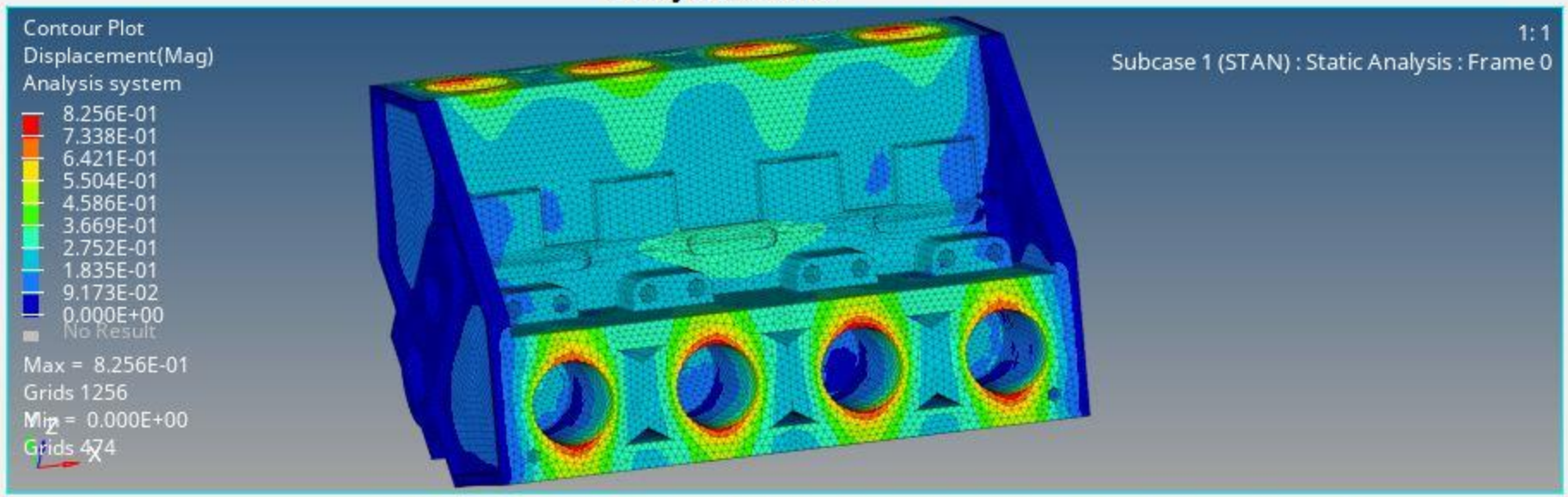
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

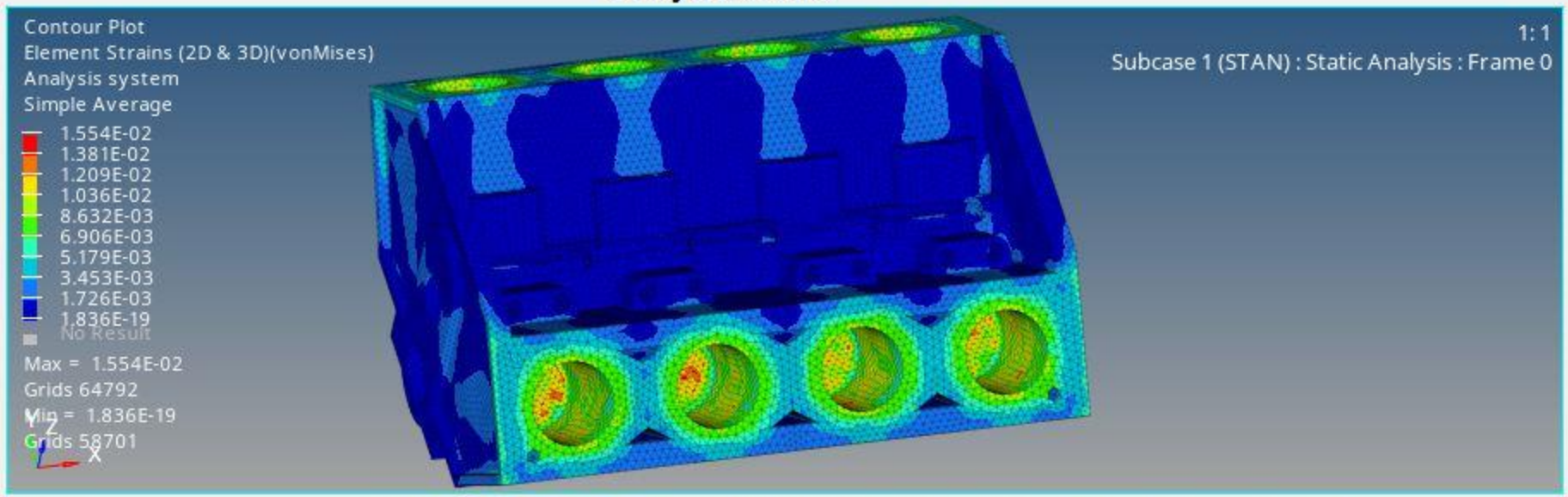
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Strains (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

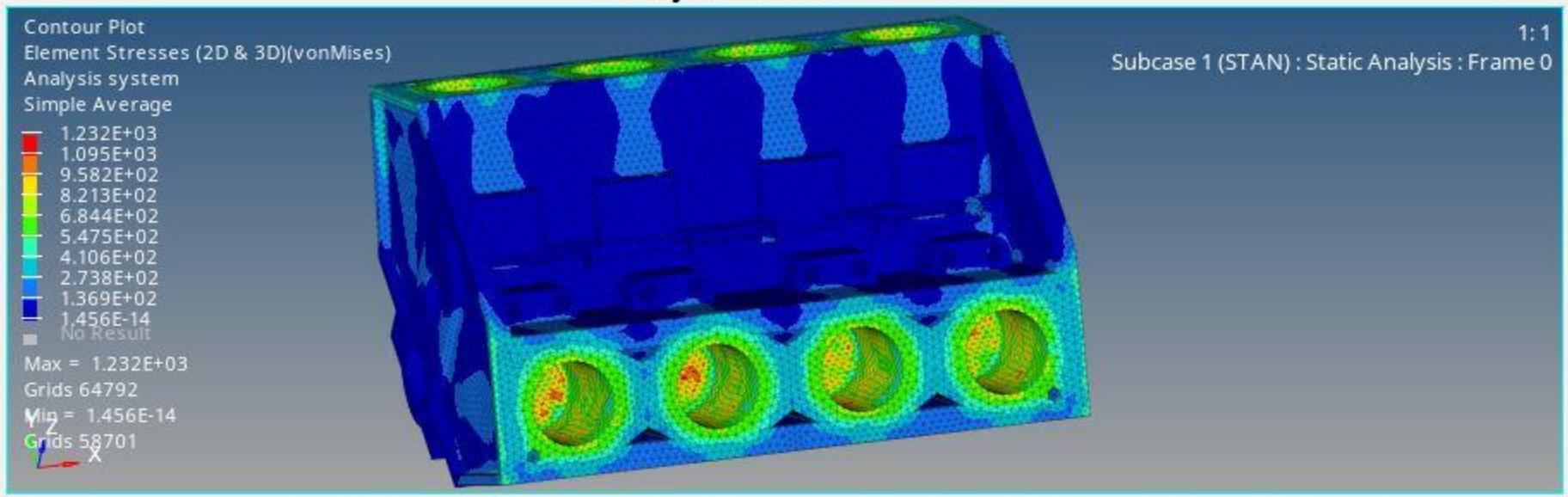
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (FATANAL)

Fatigue Analysis

Search

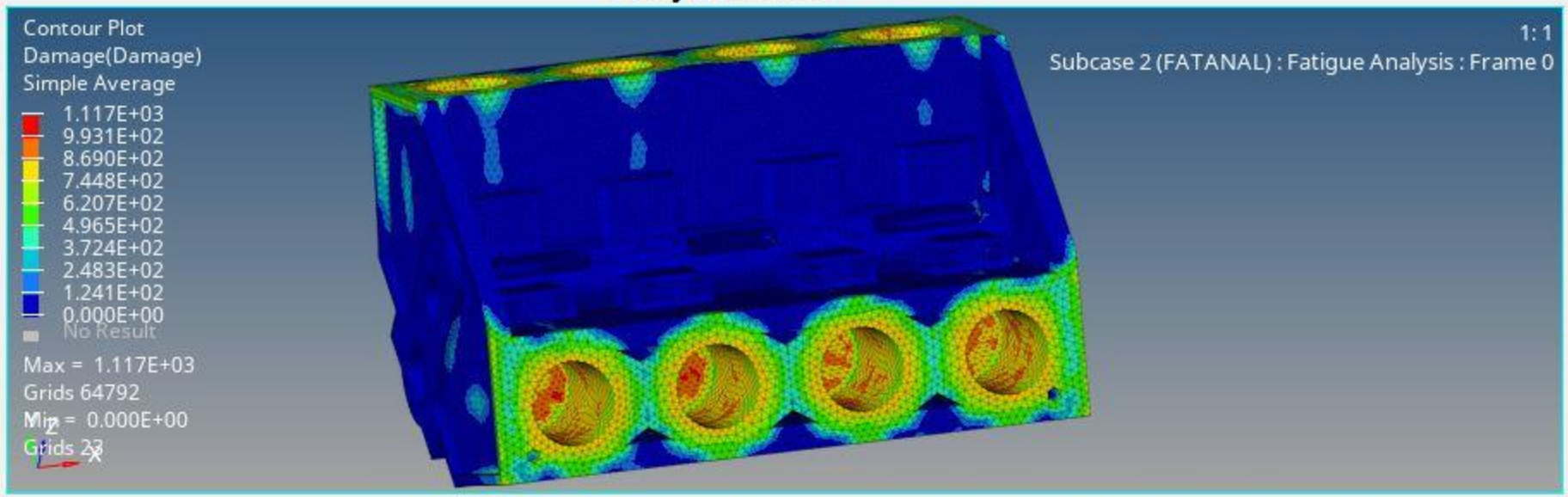
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Damage (s)

Damage

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT1.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (FATANAL)

Fatigue Analysis

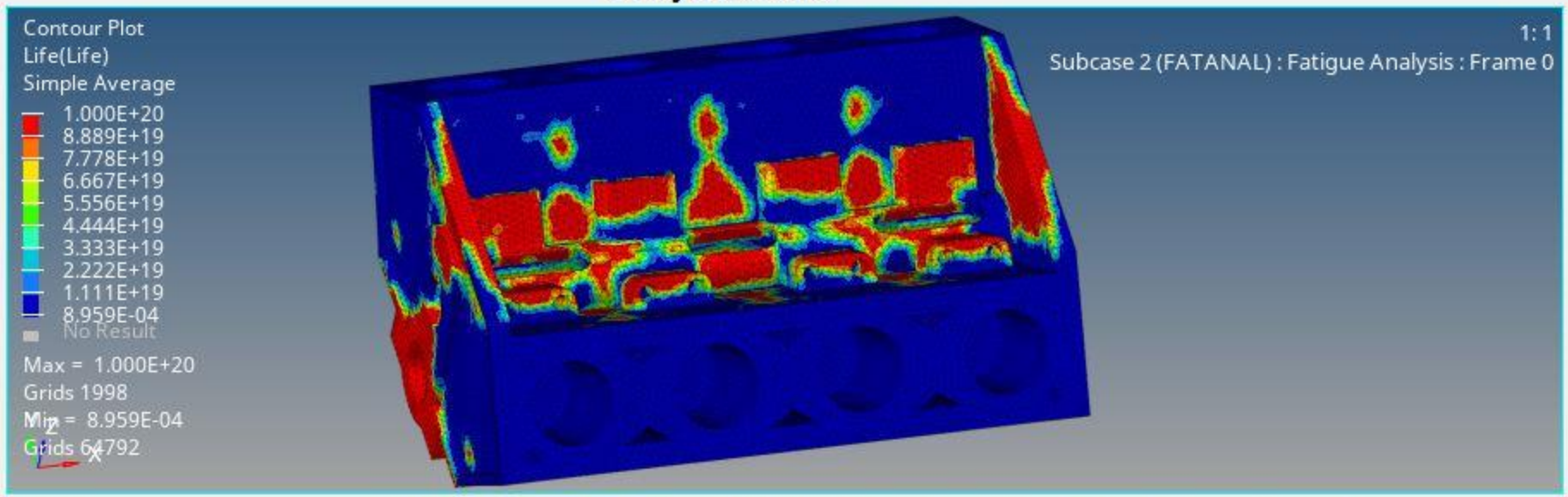
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Life (s)

Life

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

0 entities selected

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (2)
- Components (1)
- Curves (1)
- Load Collectors (9)
- Load Steps (2)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/FATANAL/FATANAL_MAT2.hm*

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

Boundary Conditions and Solvers

Engine FE FATDEF

FATANAL_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

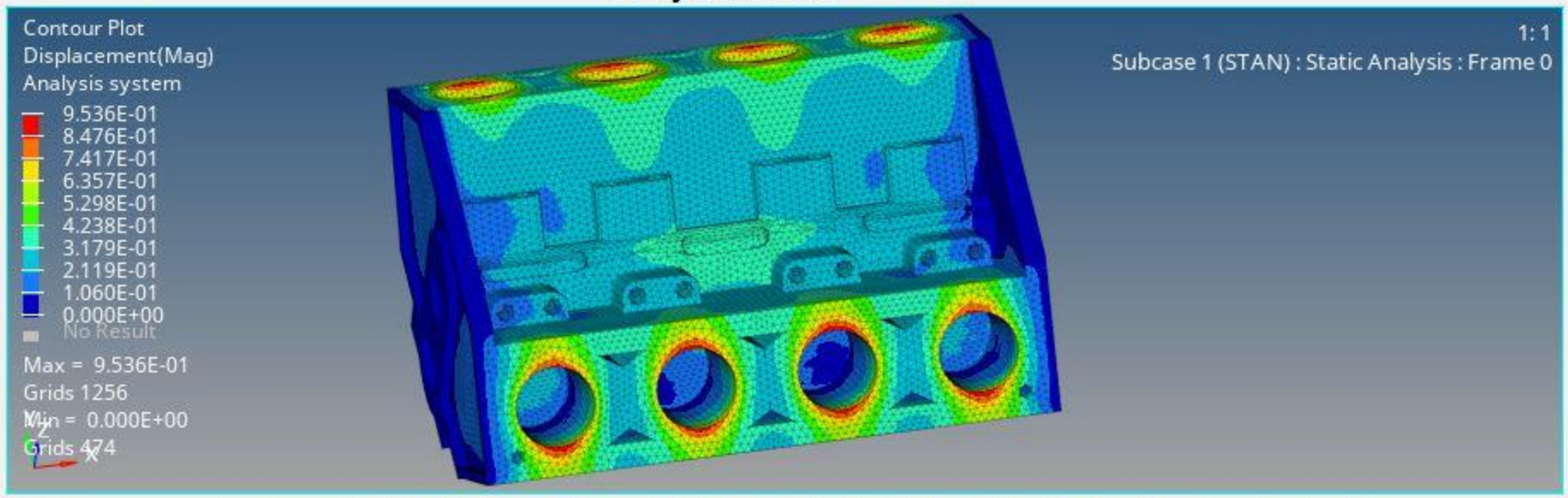
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Components (1)

Name Value

0 entities selected

Analysis Results

Contour Plot
Element Strains (2D & 3D)(vonMises)
Analysis system
Simple Average

1.778E-02
1.581E-02
1.383E-02
1.186E-02
9.880E-03
7.904E-03
5.928E-03
3.952E-03
1.976E-03
1.120E-19
No Result

Max = 1.778E-02
Grids 3827
Min = 1.120E-19
Grids 58701

1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0

By Comp

Result type: Element Strains (2D & 3D) (t)
vonMises
Layers:
Use corner data

Selection: Components
Resolved in: Analysis System
System
Use tracking system
Show midside node results

Averaging method: Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot: None

Value filter: None
Cache
Apply

Display Legend Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...

FATANAL_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

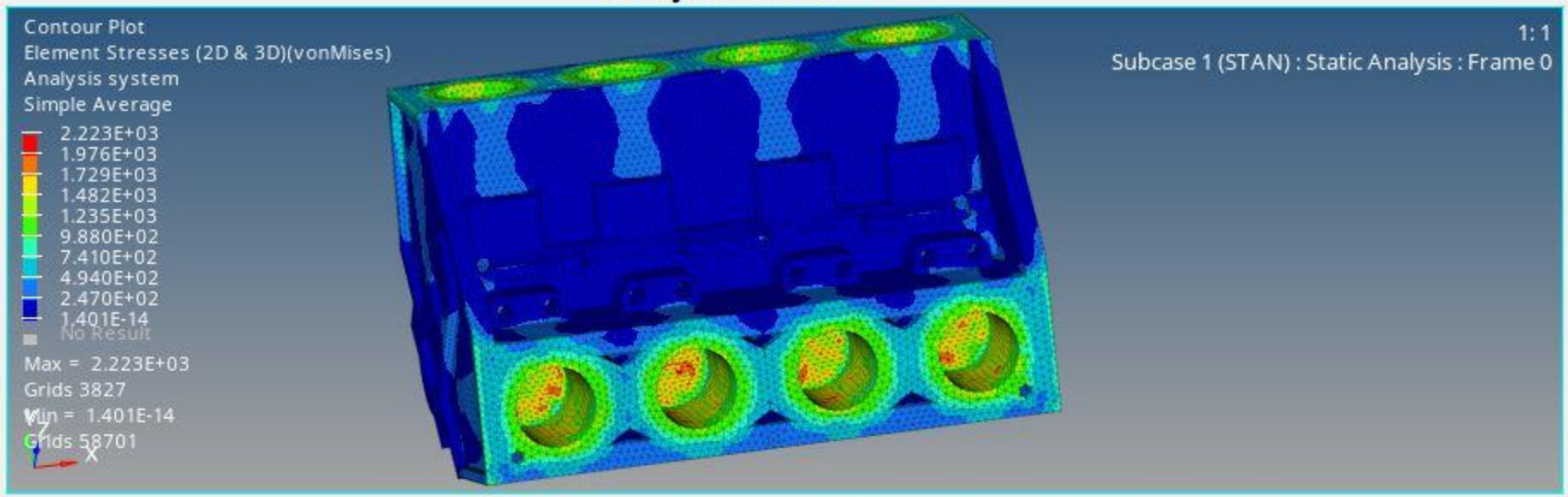
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (FATANAL)

Fatigue Analysis

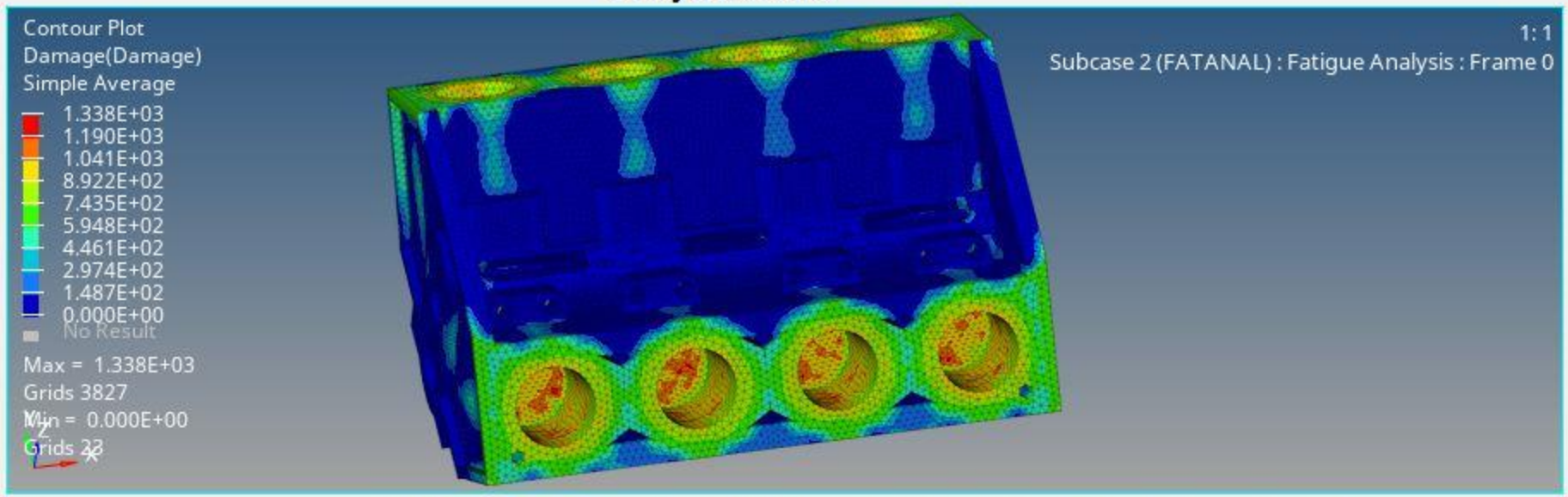
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Damage (s)

Damage

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

0 entities selected

FATANAL_MAT2.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (FATANAL)

Fatigue Analysis

Search

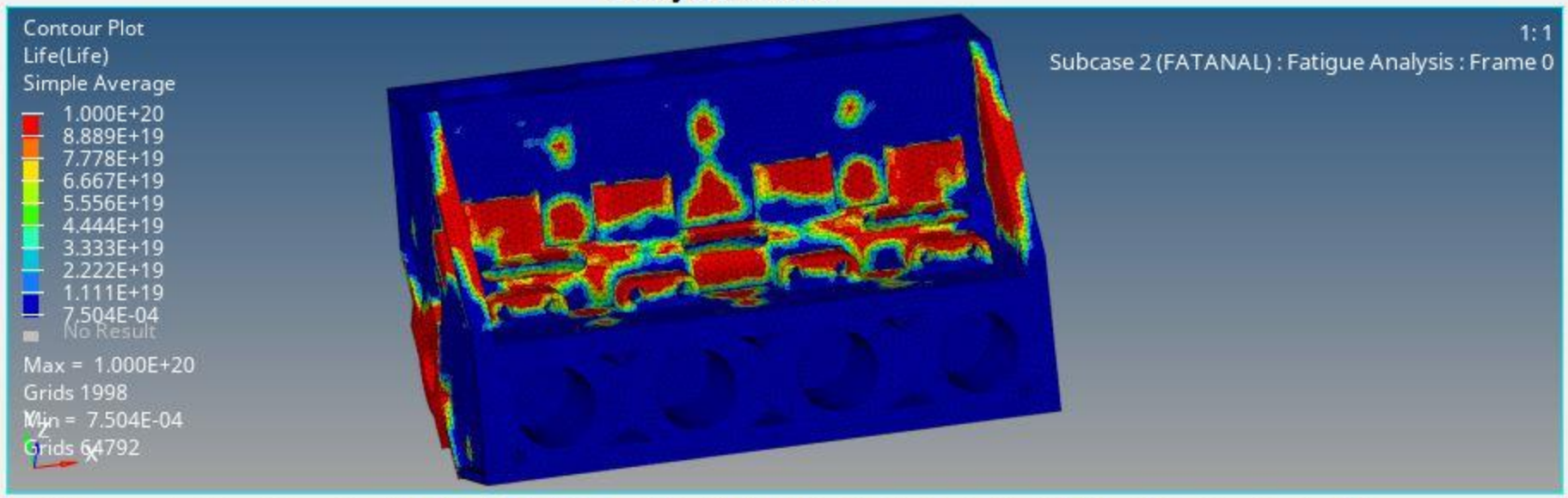
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Life (s)

Life

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (2)
- Components (1)
- Curves (1)
- Load Collectors (9)
- Load Steps (2)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/FATANAL/FATANAL_MAT3.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine FE FATDEF

FATANAL_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

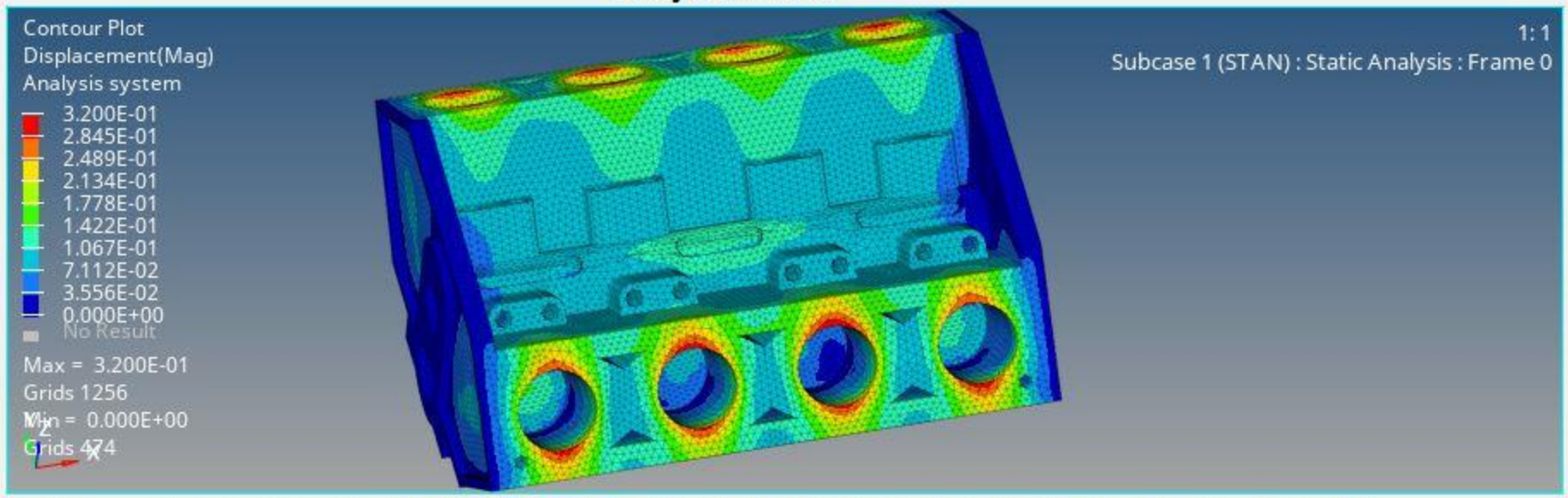
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

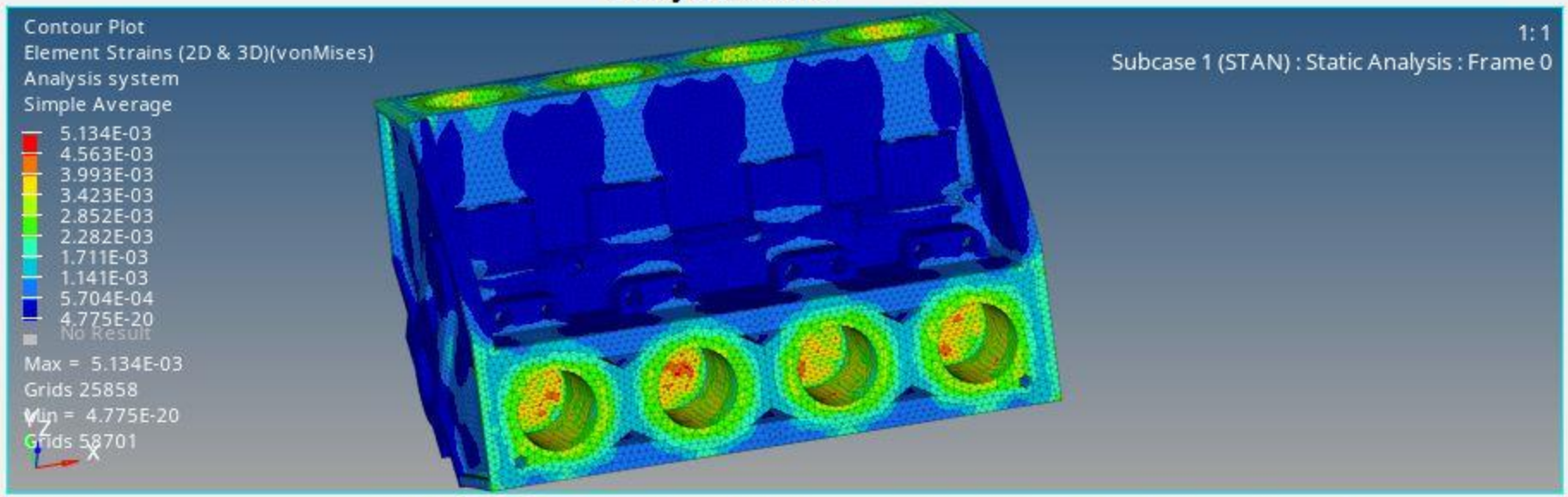
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Strains (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

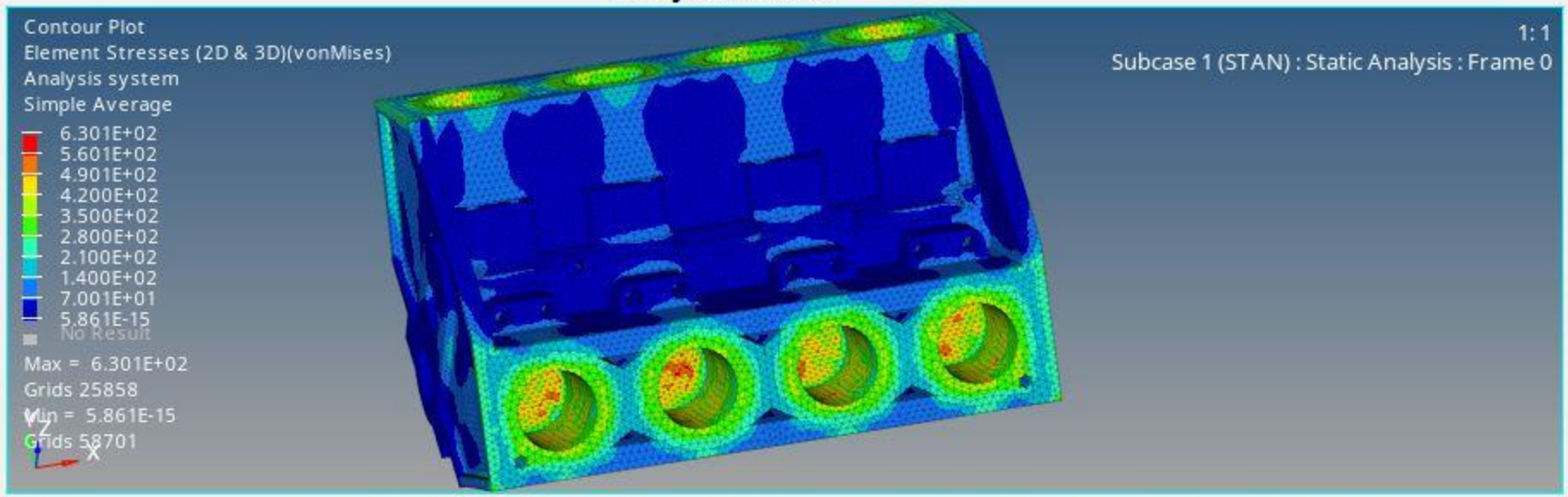
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Stresses (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (FATANAL)

Fatigue Analysis

Search

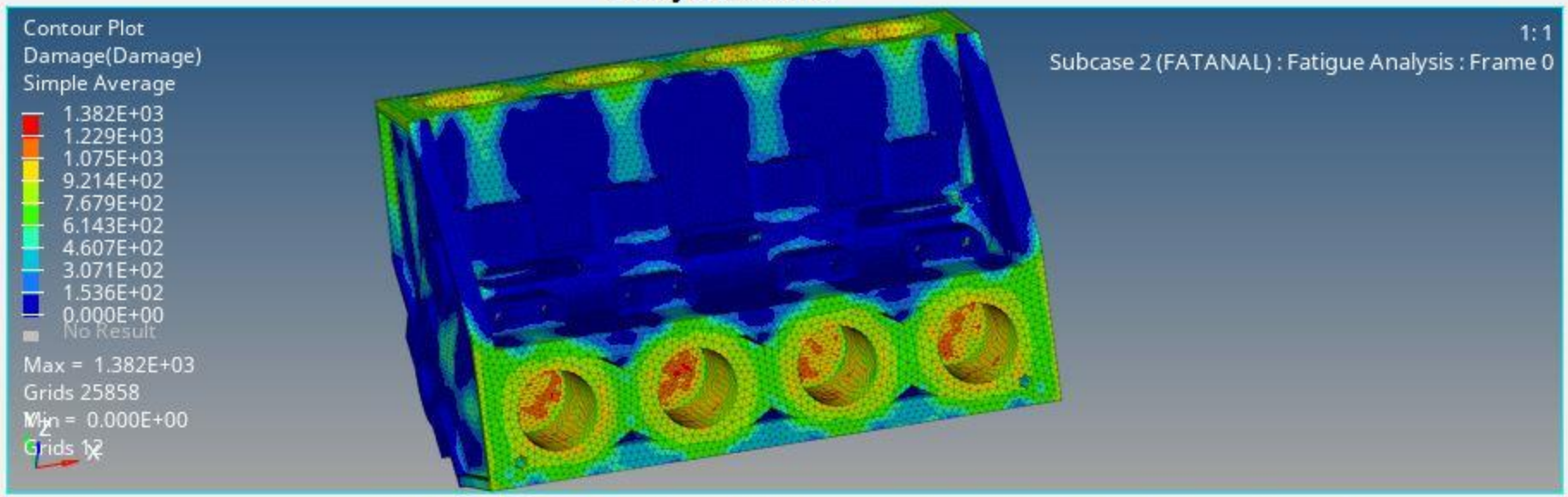
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Damage (s)

Damage

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT3.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (FATANAL)

Fatigue Analysis

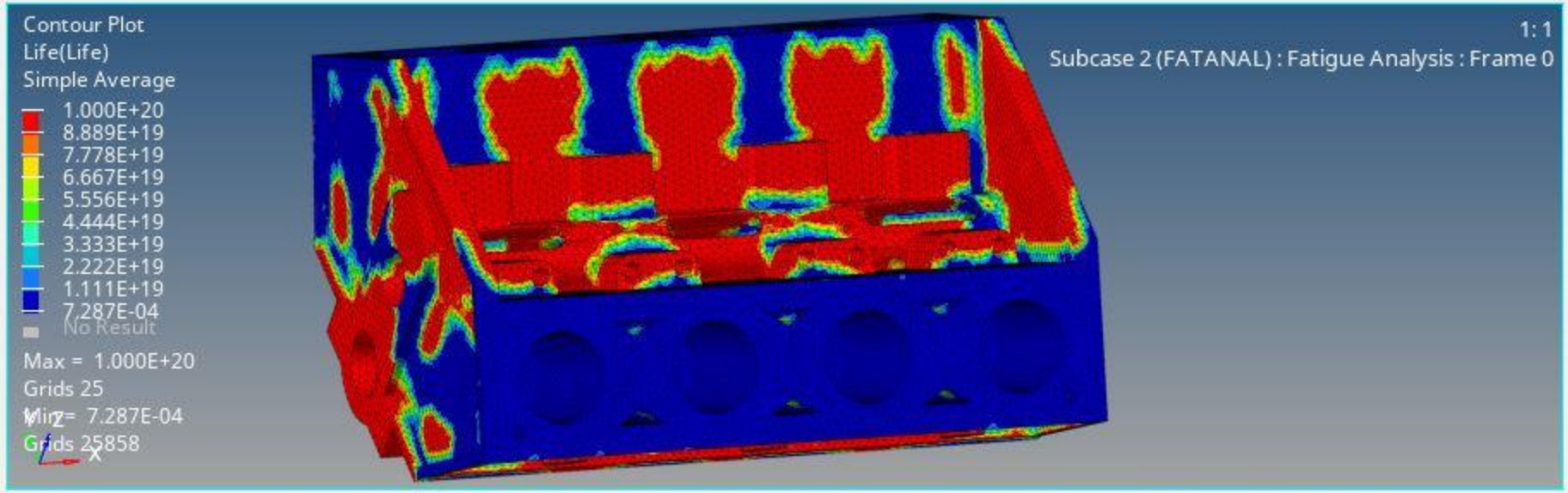
Search

Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

Analysis Results



By Comp

Result type: Life (s)

Life

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

0 entities selected

Untitled - HyperWorks 2021 - Student Edition - OptiStruct

File Edit View Collectors Geometry Mesh Connectors Materials Properties BCs Setup Tools Morphing Optimization Post XYPlots Preferences Applications Help

Session Mask Model Part Utility

Name ID Include

- Cards (2)
- Components (1)
- Curves (1)
- Load Collectors (9)
- Load Steps (2)
- Materials (1)
- Parts (1)
- Properties (1)
- Sets (1)
- Titles (1)

Name Value

Model Info: J:/P5/FH/FATANAL/FATANAL_MAT4.hm

Auto By Comp

vectors	load types		interfaces	control cards	Geom
systems	constraints	accels		output block	1D
preserve node	equations	temperatures	entity sets	loadsteps	2D
	forces	flux	blocks		3D
	moments	load on geom	set segments	optimization	Analysis
	pressures		bodies		Tool
			nsm	OptiStruct	Post

The file has been saved.

Engine FE FATDEF

FATANAL_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

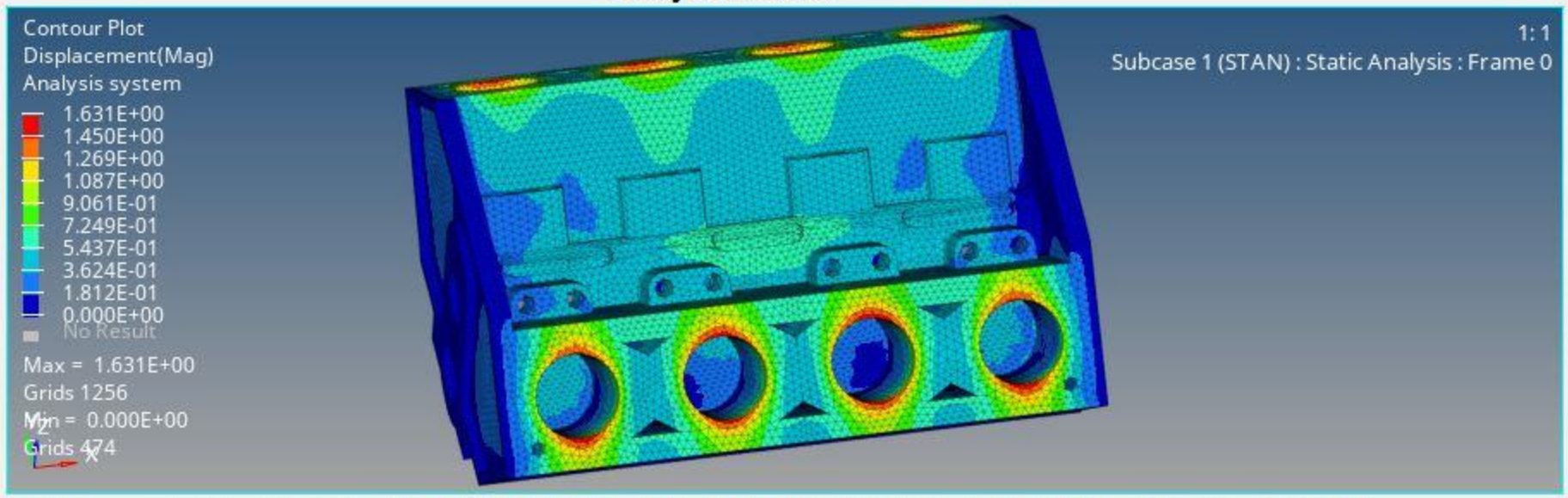
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Displacement (v)

Mag

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: None

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 1 (STAN)

Static Analysis

Search

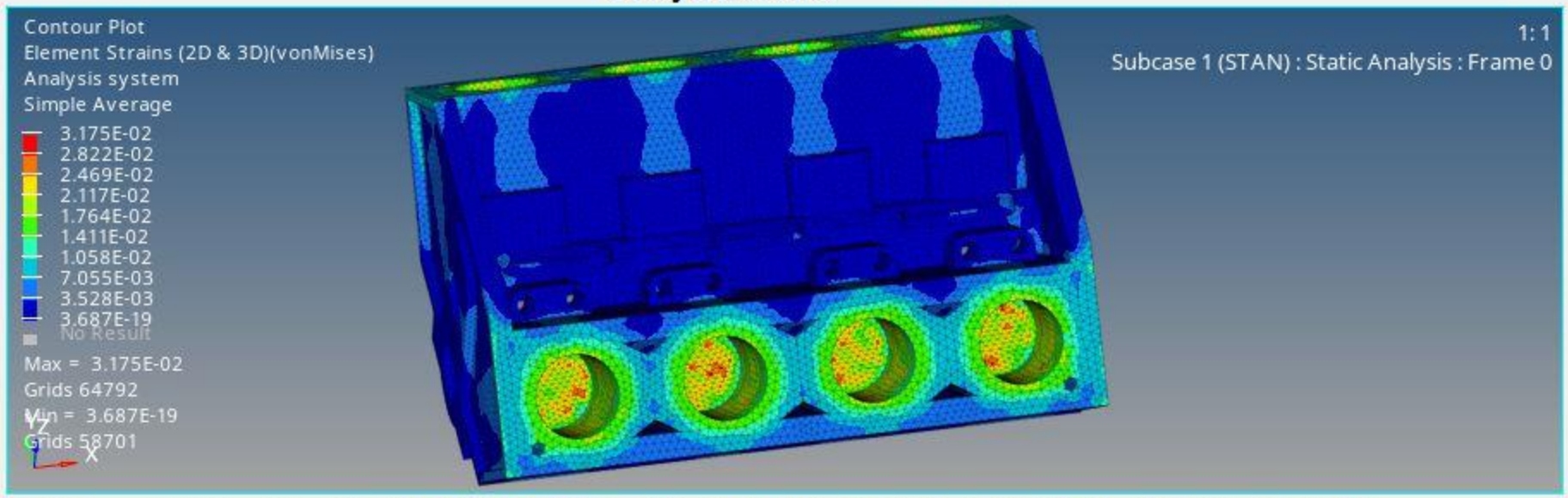
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Element Strains (2D & 3D) (t)

vonMises

Layers:

Use corner data

Selection: Components

Resolved in: Analysis System

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

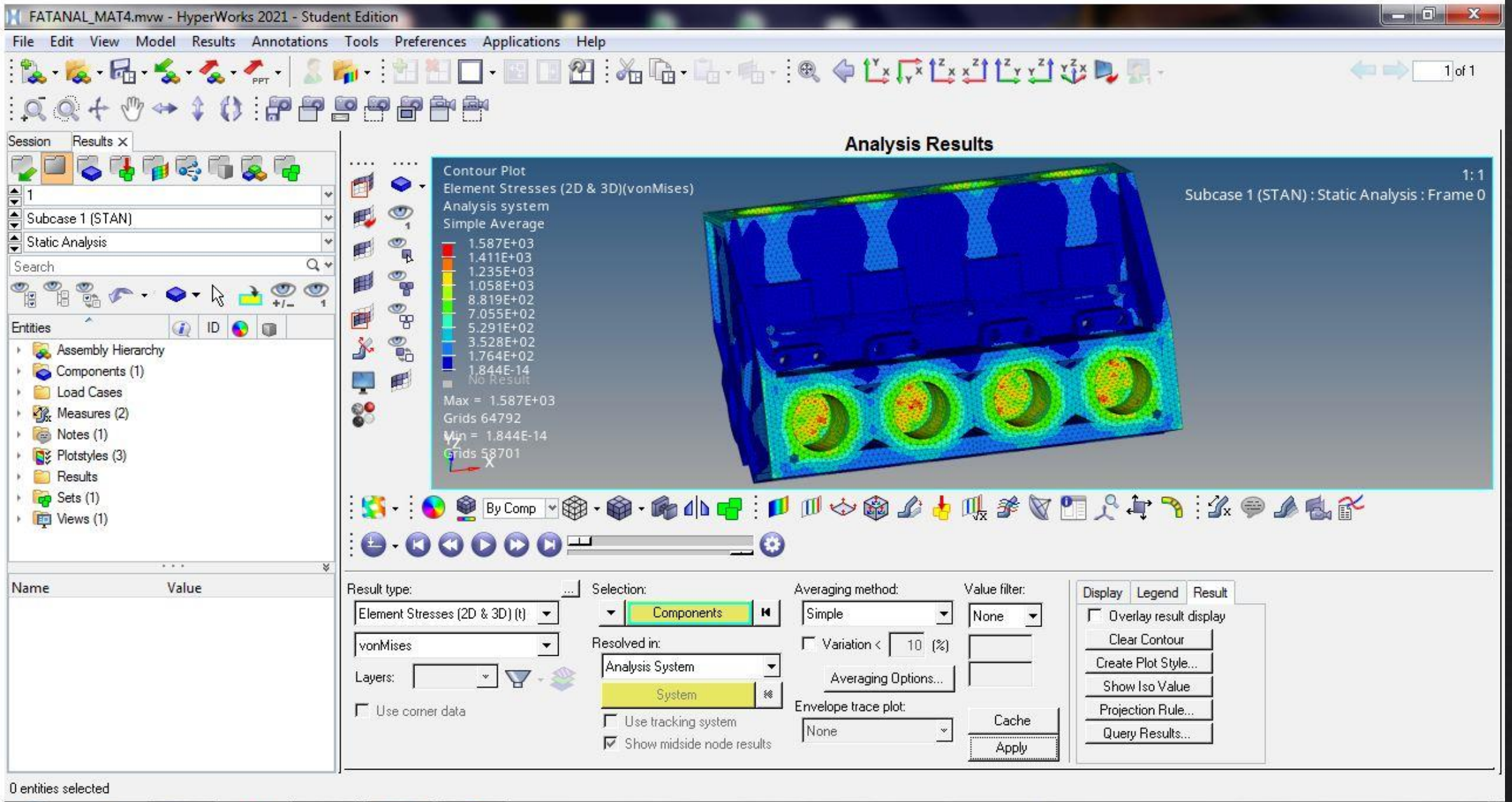
Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...


FATANAL_MAT4.mvw - HyperWorks 2021 - Student Edition
File Edit View Model Results Annotations Tools Preferences Applications Help
Analysis Results
Contour Plot
Element Stresses (2D & 3D)(vonMises)
Analysis system
Simple Average
1.587E+03
1.411E+03
1.235E+03
1.058E+03
8.819E+02
7.055E+02
5.291E+02
3.528E+02
1.764E+02
1.844E-14
No Result
Max = 1.587E+03
Grids 64792
Min = 1.844E-14
Grids 58701
1: 1
Subcase 1 (STAN) : Static Analysis : Frame 0
Session
Results
Subcase 1 (STAN)
Static Analysis
Entities
Assembly Hierarchy
Components (1)
Load Cases
Measures (2)
Notes (1)
Plotstyles (3)
Results
Sets (1)
Views (1)
Name
Value
Result type:
Element Stresses (2D & 3D) (t)
vonMises
Layers:
Use corner data
Selection:
Components
Resolved in:
Analysis System
System
Use tracking system
Show midside node results
Averaging method:
Simple
Variation < 10 (%)
Averaging Options...
Envelope trace plot:
None
Value filter:
None
Cache
Apply
Display
Legend
Result
Overlay result display
Clear Contour
Create Plot Style...
Show Iso Value
Projection Rule...
Query Results...
0 entities selected

FATANAL_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (FATANAL)

Fatigue Analysis

Search

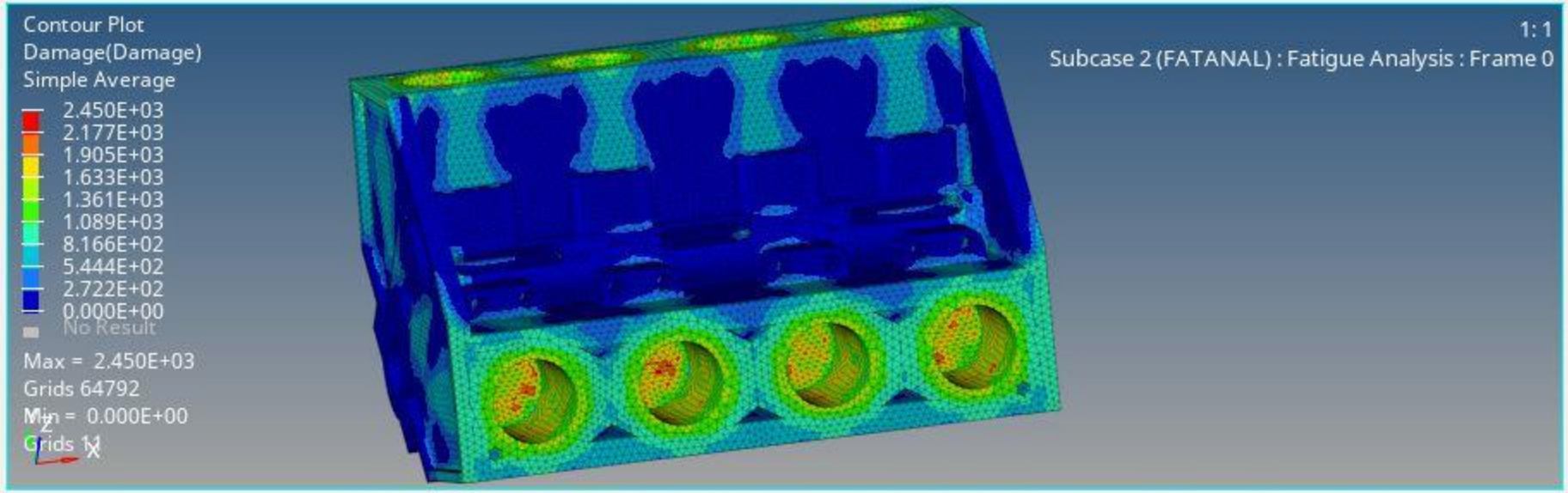
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Damage (s)

Damage

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

Create Plot Style...

Show Iso Value

Projection Rule...

Query Results...

FATANAL_MAT4.mvw - HyperWorks 2021 - Student Edition

File Edit View Model Results Annotations Tools Preferences Applications Help

Session Results

1

Subcase 2 (FATANAL)

Fatigue Analysis

Search

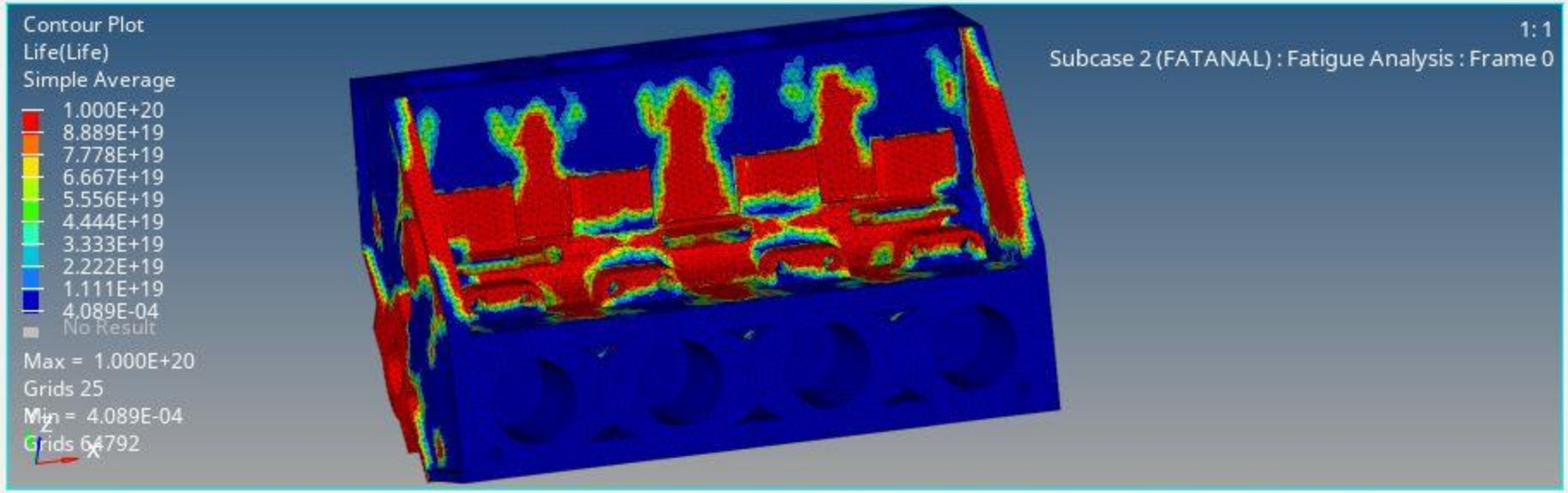
Entities ID

- Assembly Hierarchy
- Components (1)
- Load Cases
- Measures (2)
- Notes (1)
- Plotstyles (3)
- Results
- Sets (1)
- Views (1)

Name Value

0 entities selected

Analysis Results



By Comp

Result type: Life (s)

Life

Layers:

Use corner data

Selection: Components

Resolved in:

System

Use tracking system

Show midside node results

Averaging method: Simple

Variation < 10 (%)

Averaging Options...

Envelope trace plot: None

Value filter: None

Cache

Apply

Display Legend Result

Overlay result display

Clear Contour

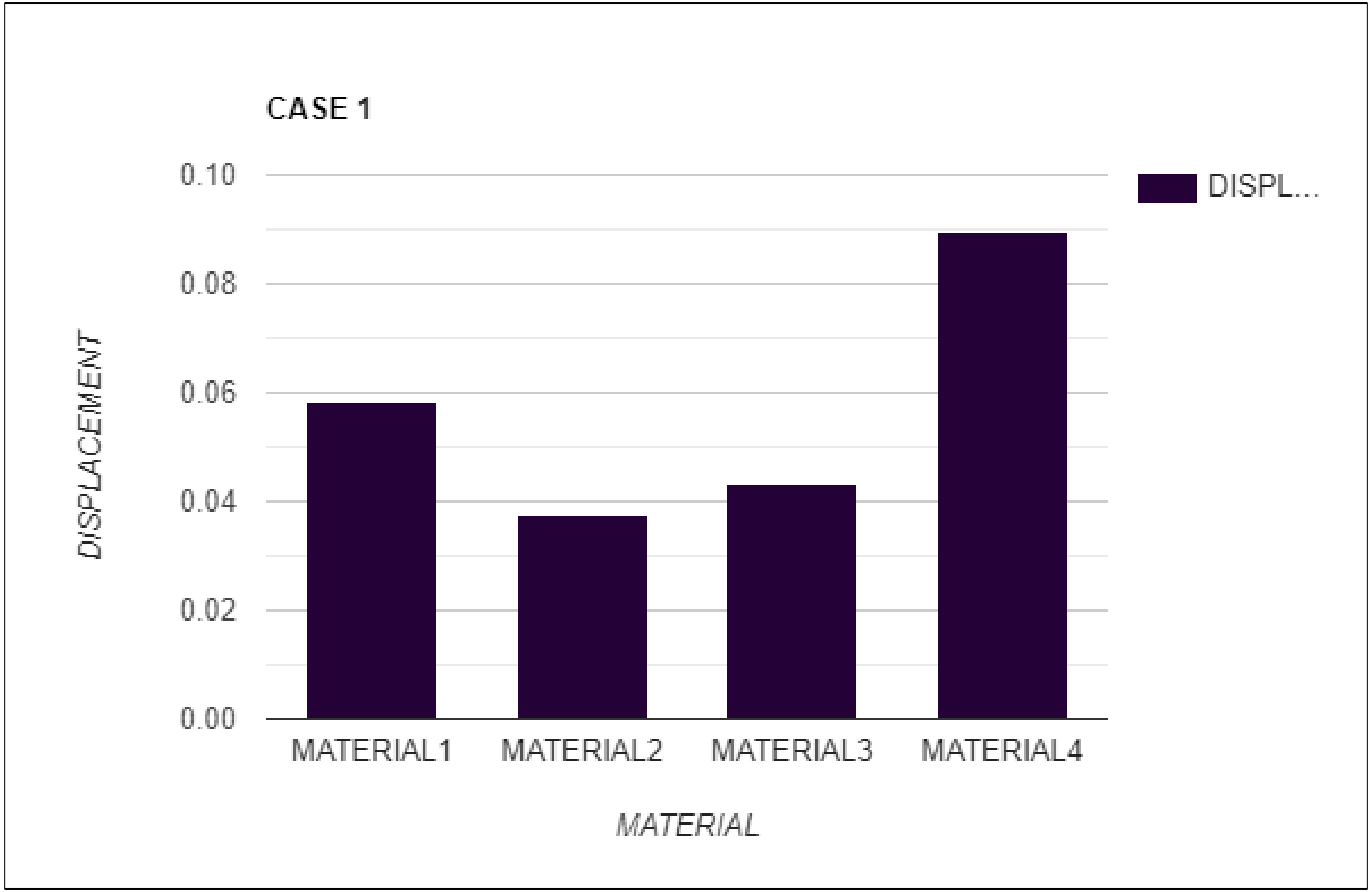
Create Plot Style...

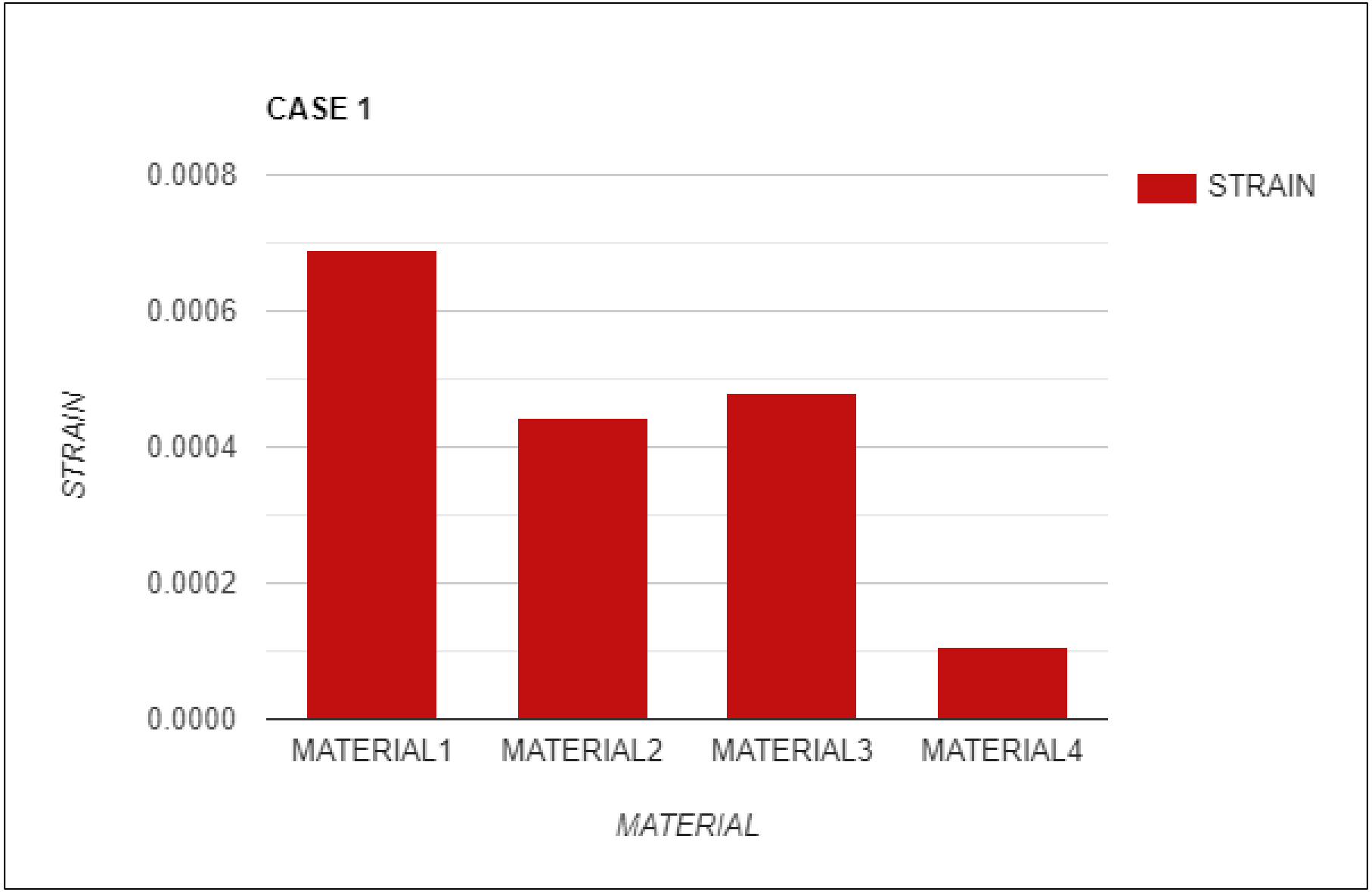
Show Iso Value

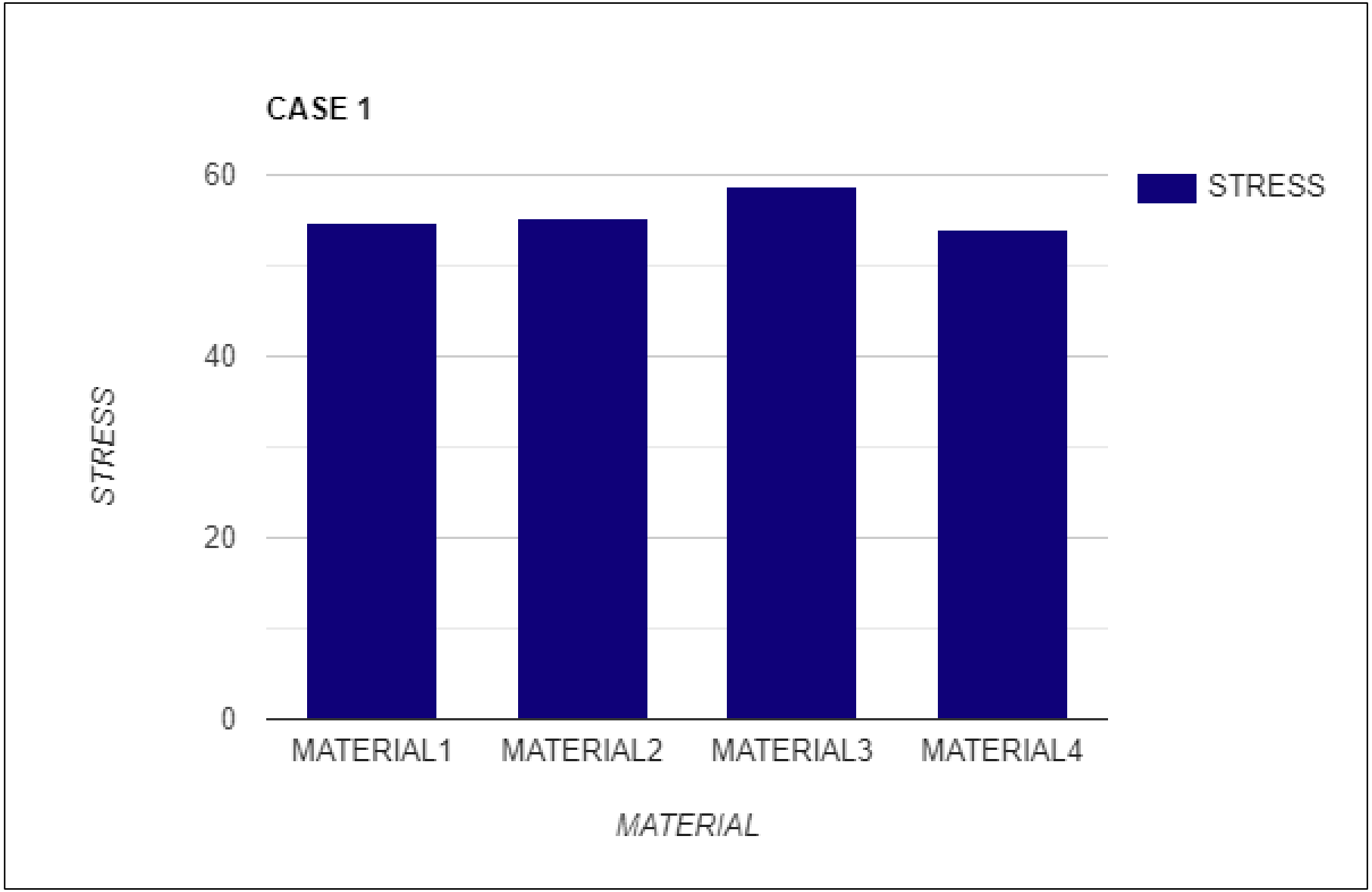
Projection Rule...

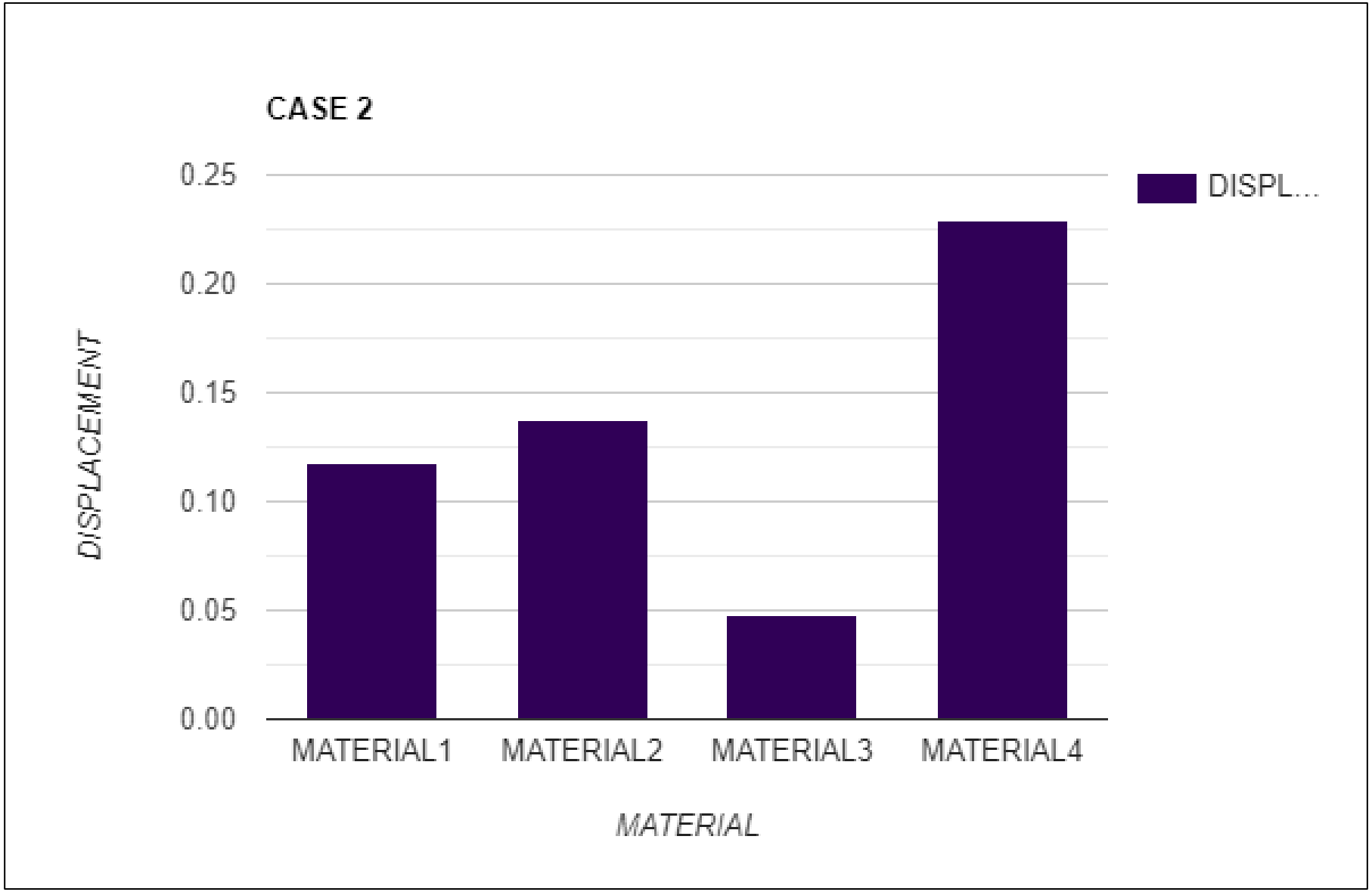
Query Results...

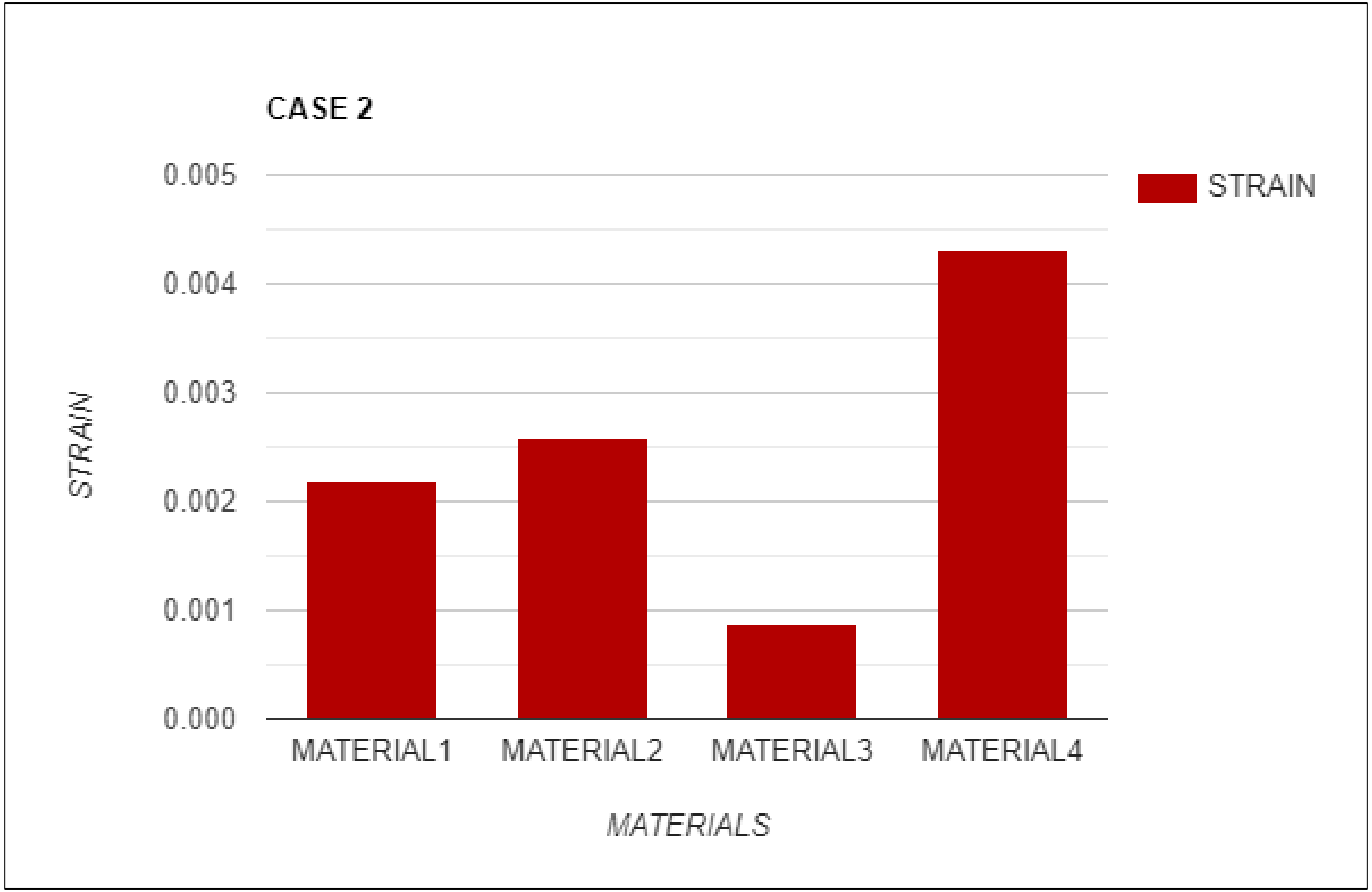
RESULTS

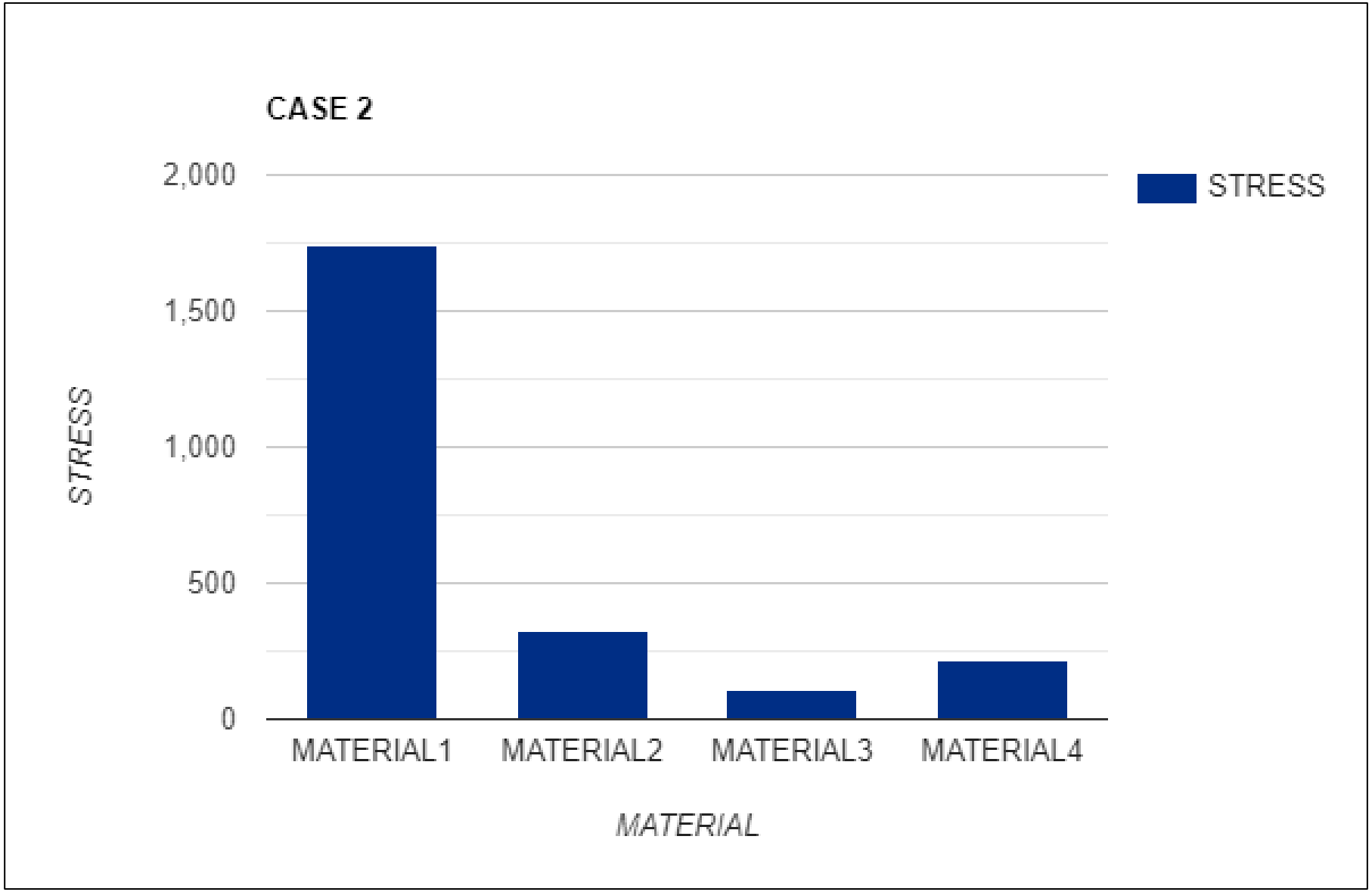

CASE 1
0.10
0.08
0.06
0.04
0.02
0.00
DISPLACEMENT
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIAL
DISPL...

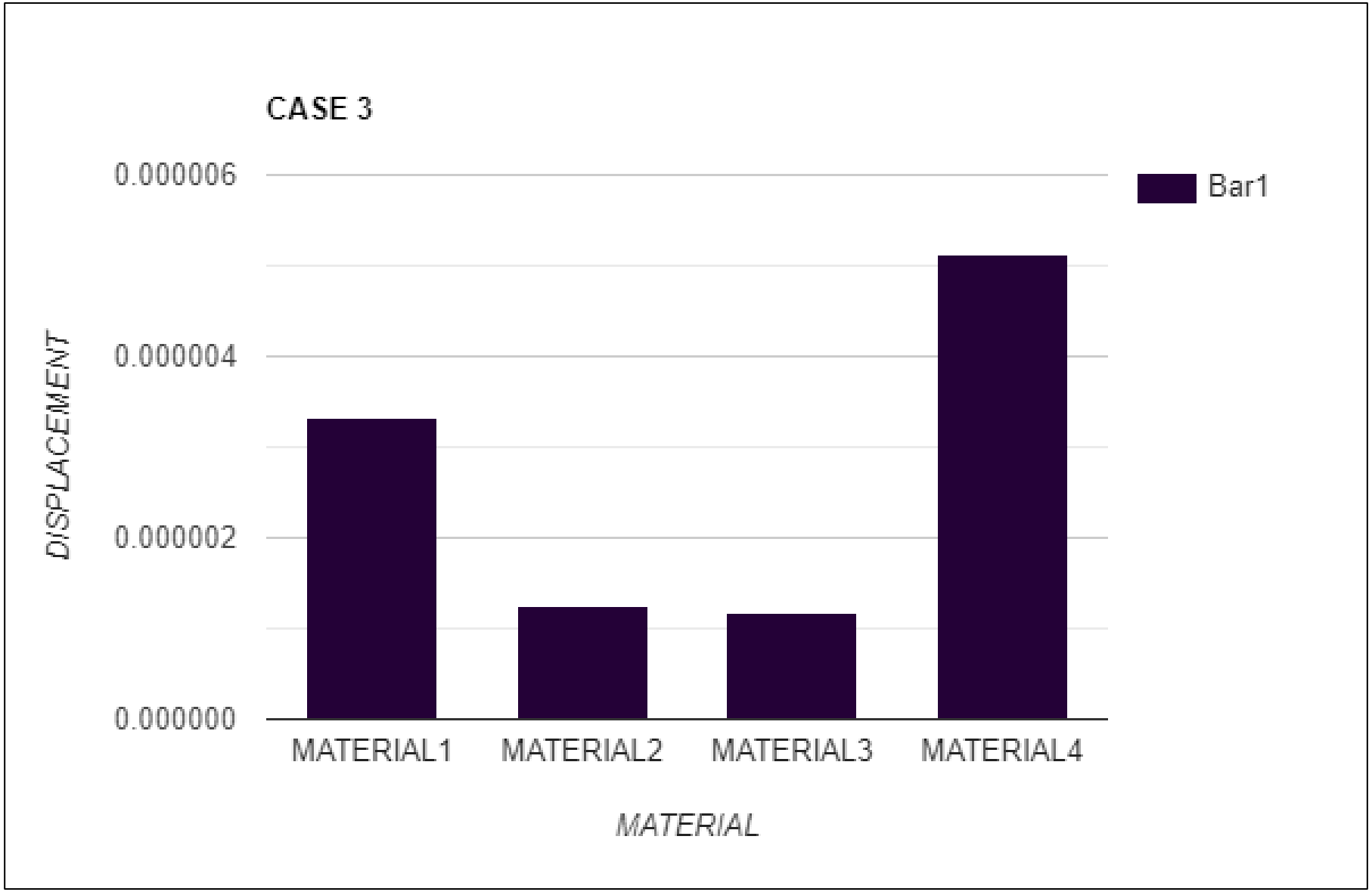

CASE 1
0.0008
0.0006
0.0004
0.0002
0.0000
STRAIN
STRAIN
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIAL

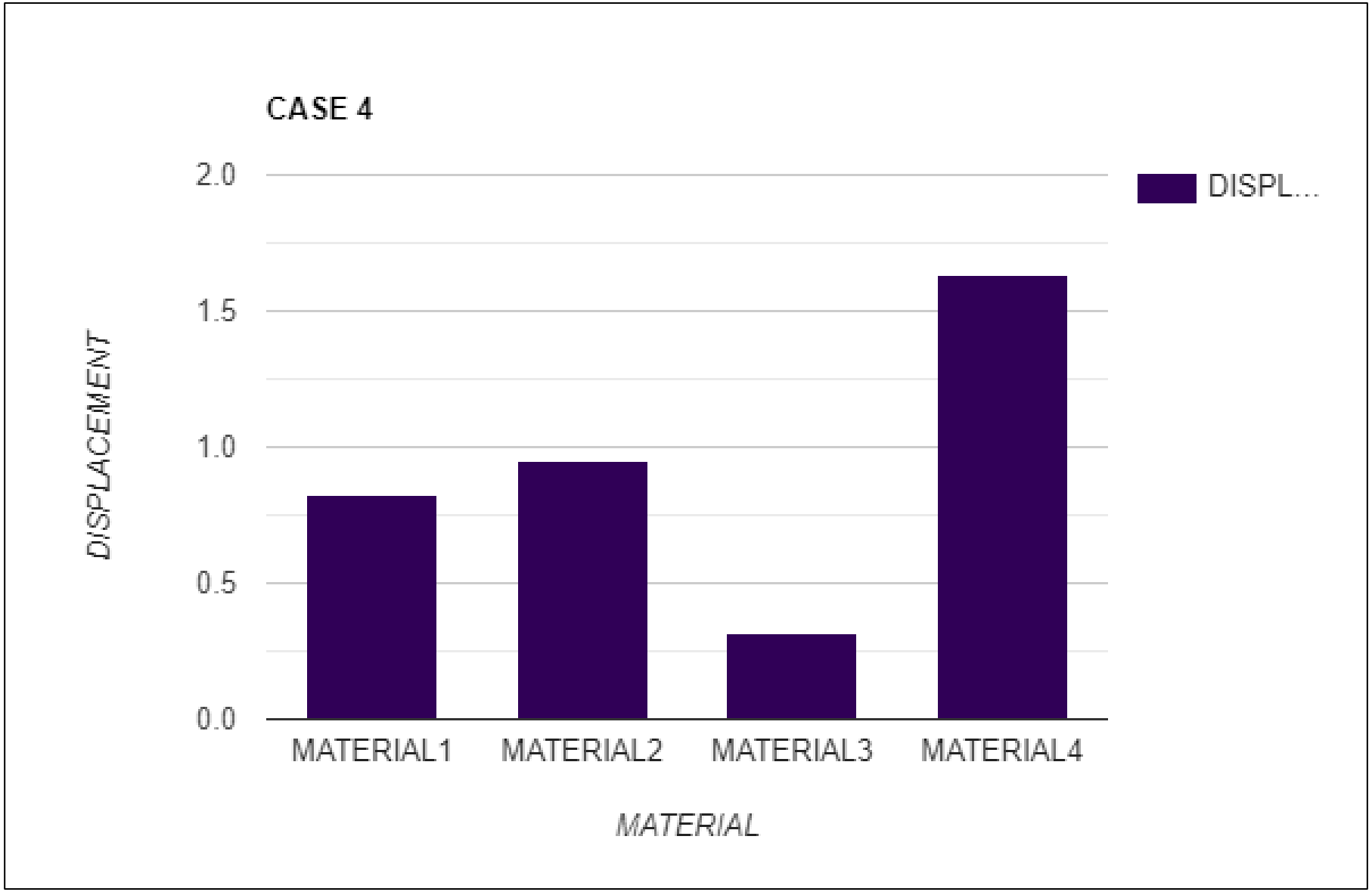

CASE 1
60
40
20
0
STRESS
STRESS
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIAL

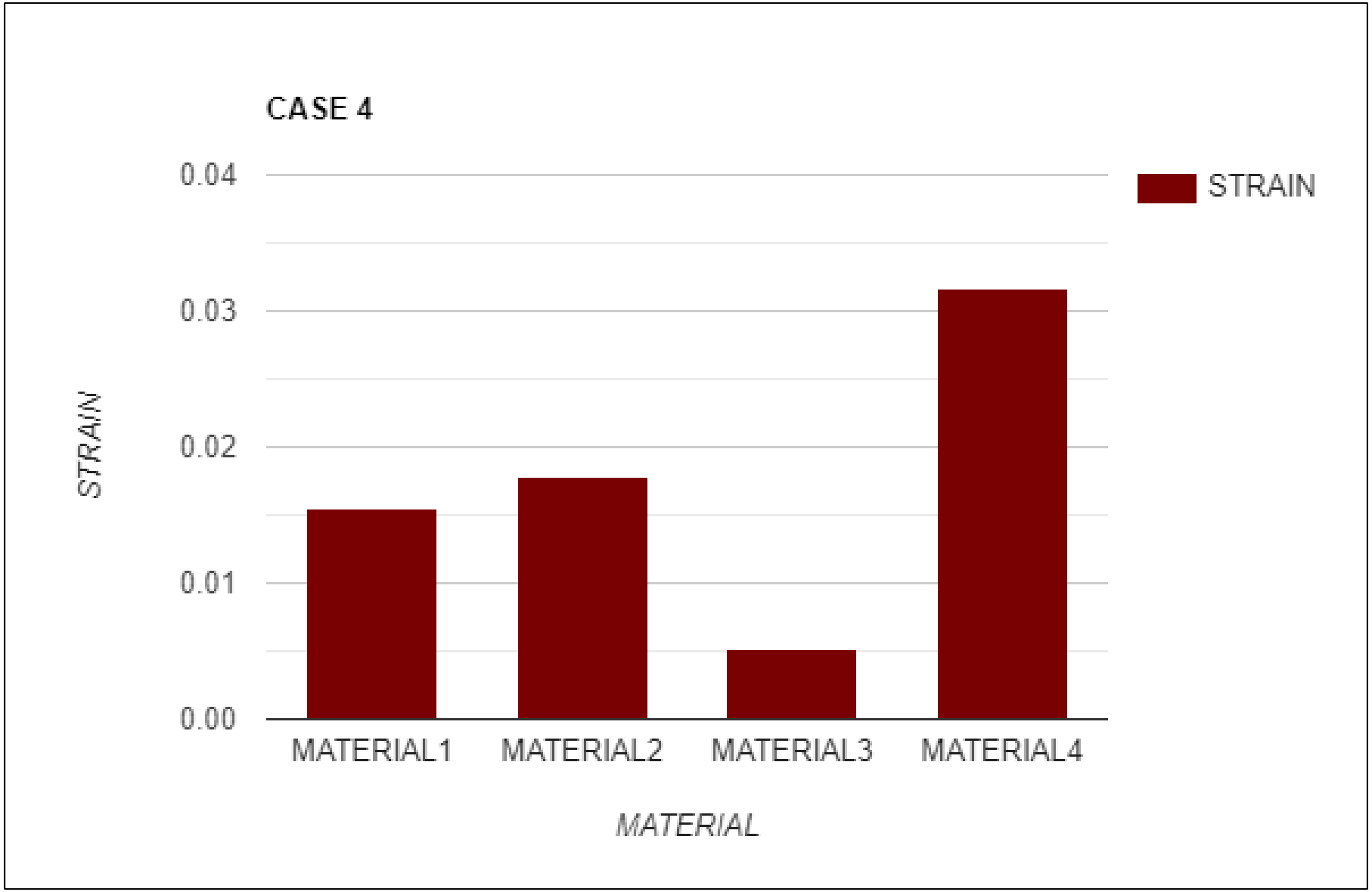

CASE 2
0.25
0.20
0.15
0.10
0.05
0.00
DISPLACEMENT
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIAL
DISPL...

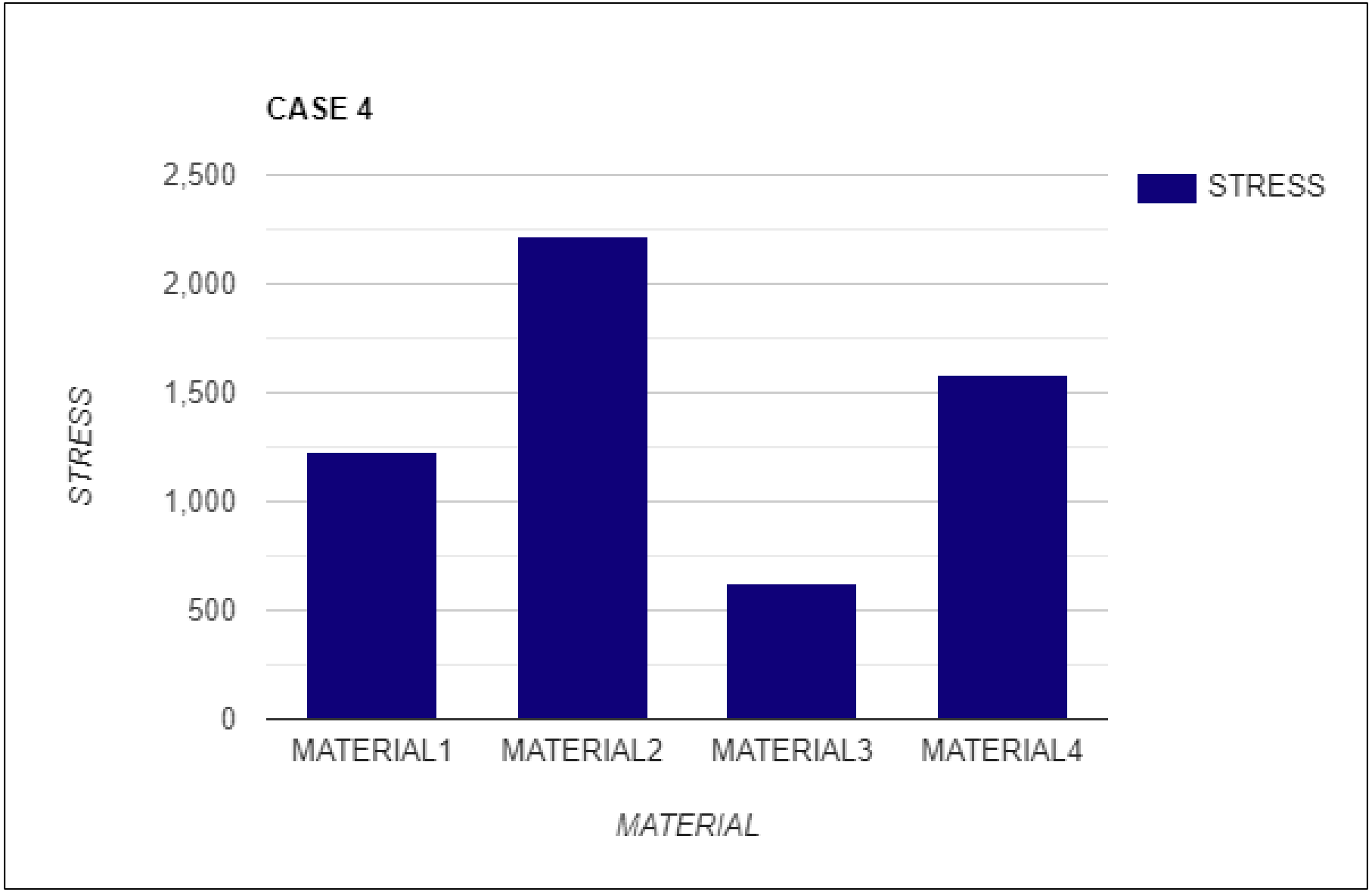

CASE 2
0.005
0.004
0.003
0.002
0.001
0.000
STRAIN
STRAIN
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIALS

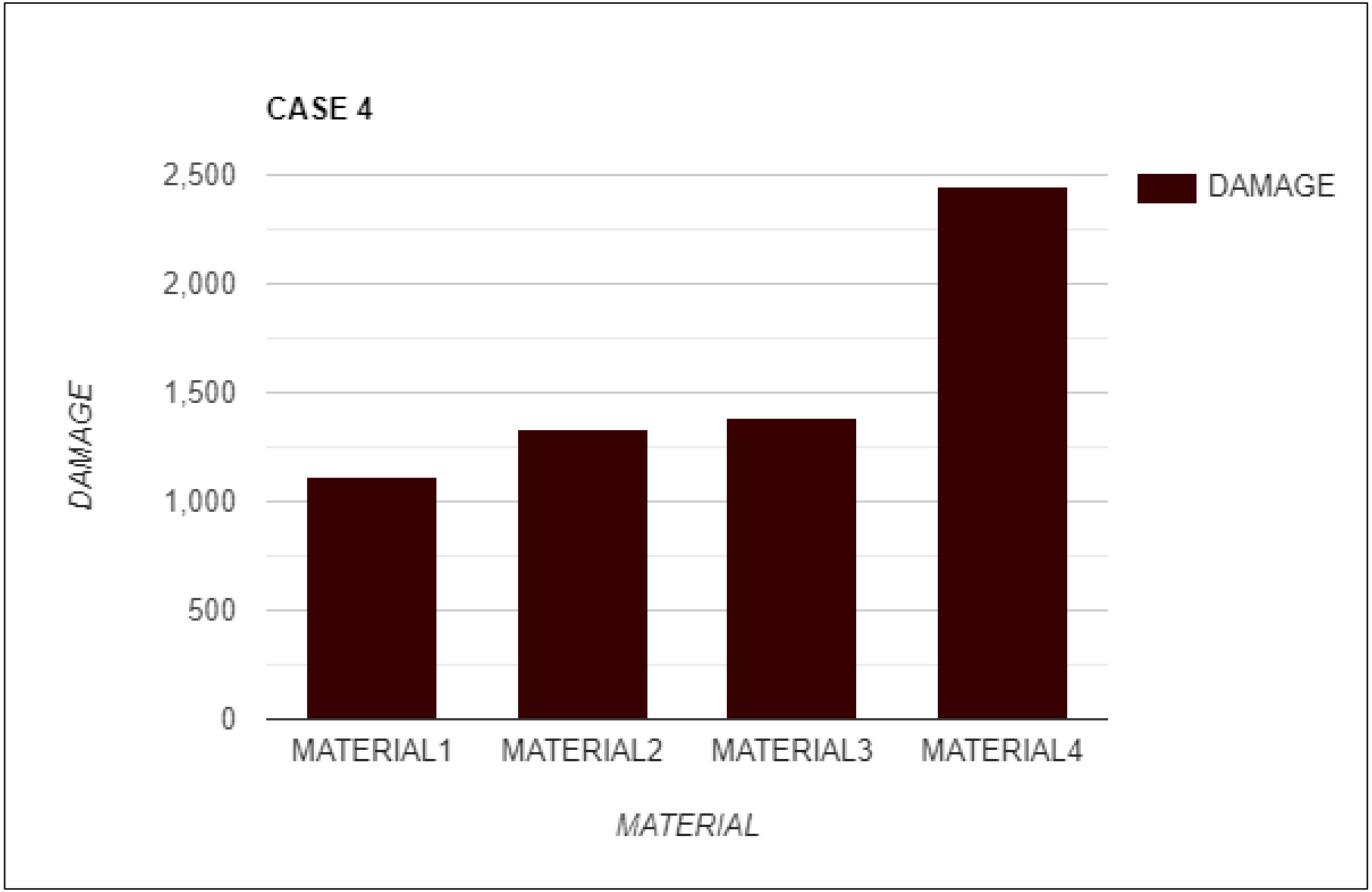

CASE 2
2,000
1,500
1,000
500
0
STRESS
STRESS
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIAL

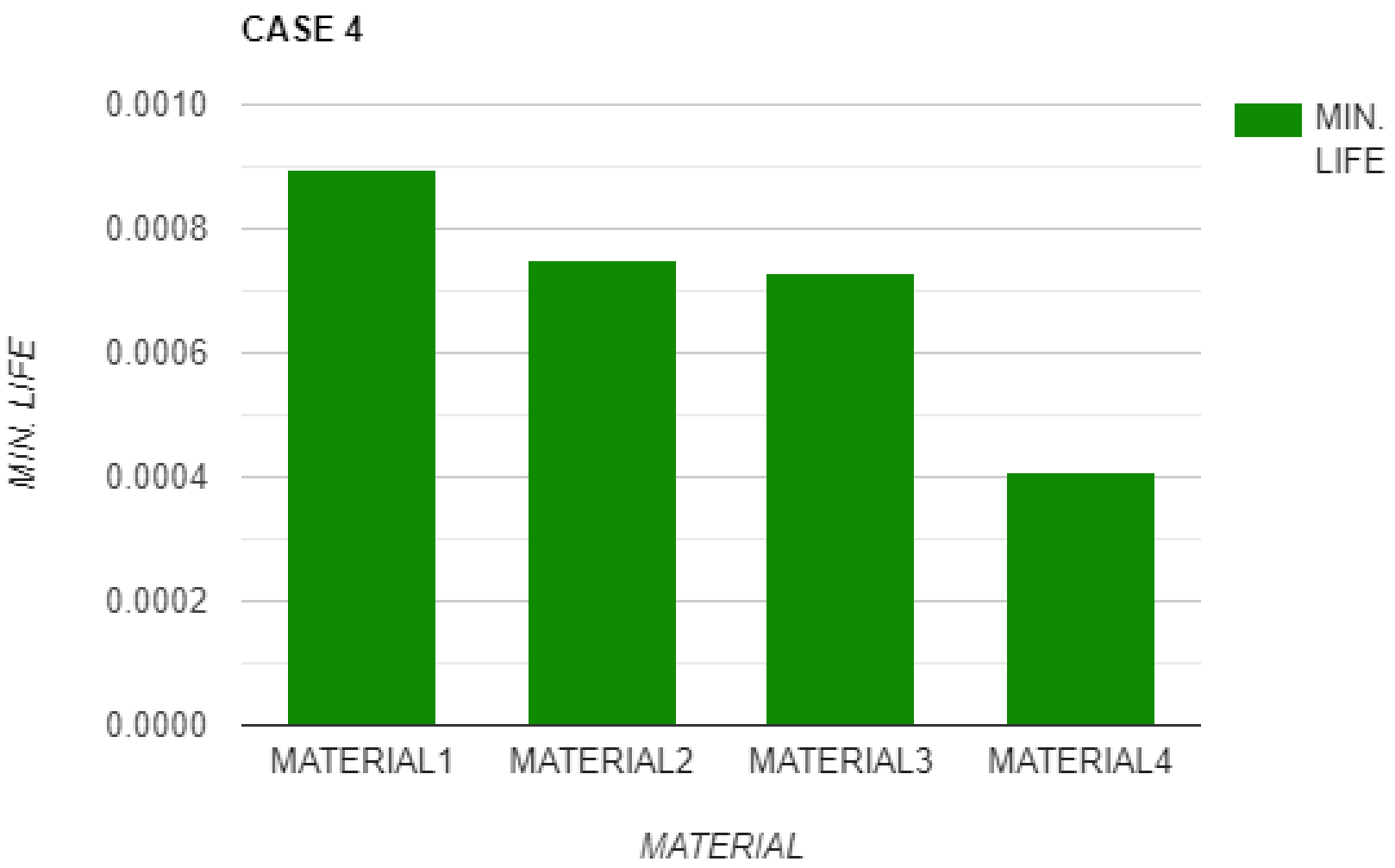

CASE 3
0.000006
0.000004
0.000002
0.000000
DISPLACEMENT
Bar1
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIAL


CASE 4
2.0
1.5
1.0
0.5
0.0
DISPLACEMENT
DISPL...
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIAL


CASE 4
0.04
0.03
0.02
0.01
0.00
STRAIN
STRAIN
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIAL


CASE 4
2,500
2,000
1,500
1,000
500
0
STRESS
STRESS
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIAL


CASE 4
2,500
2,000
1,500
1,000
500
0
DAMAGE
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIAL
DAMAGE


CASE 4
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
MIN. LIFE
MATERIAL1
MATERIAL2
MATERIAL3
MATERIAL4
MATERIAL
MIN. LIFE

CONCLUSION

- AFTER CONSIDERING THE RESULTS OF ALL THE MATERIALS IN DIFFERENT ASPECTS AND CONDITIONS, MATERIAL 3 (*Graphite Cast Iron*) IS SUITED BEST FOR THE WORKING OF THE GIVEN MODEL.

THANK YOU