

Design Analysis

Predni stojan

Created by

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Summary

Model Information

Analysis Type - Static Stress with Linear Material Models
Units - Custom - (N, mm, s, °C, K, V, ohm, A, J)
Model location - C:\School\Diplomka\inventor\ASM2014simulace\sestava_drzak_stred_nova_17.5..fem
Design scenario description - Design Scenario # 1

Analysis Parameters Information

Load Case Multipliers

Static Stress with Linear Material Models may have multiple load cases. This allows a model to be analyzed with multiple loads while solving the equations a single time. The following is a list of load case multipliers that were analyzed with this model.

Load Case	Description	Pressure/Surface Forces	Gravity/Acceleration	Angular Velocity (Omega)	Angular Acceleration (Alpha)	Displacement	Thermal	Electrical
1	<no description>	1	0	0	0	0	0	0

Centrifugal Information

Angular Velocity (Omega) Magnitude = 0 (RPM)

	X	Y	Z
Rotation Center Point (mm)	0	0	0
Rotation Axis	0	0	0

Angular Acceleration (Alpha) Magnitude = 0 (RPM/s)

	X	Y	Z
Rotation Center Point (mm)	0	0	0
Rotation Axis	0	0	0

Multiphysics Information

Default Nodal Temperature	0 °C
Source of Initial Nodal Temperatures	Loads from FEA Editor
Time step from Heat Transfer Analysis	Last
Default nodal voltage	0 V
Source of nodal voltages	Model file

Processor Information

Type of Solver	Automatic
Disable Calculation and Output of Strains	No
Calculate Reaction Forces	Yes
Invoke Banded Solver	Yes
Avoid Bandwidth Minimization	No
Stop After Stiffness Calculations	No
Displacement Data in Output File	No
Stress Data in Output File	No
Equation Numbers Data in Output File	No
Element Input Data in Output File	No
Nodal Input Data in Output File	No
Centrifugal Load Data in Output File	No

Part Information

Part I D	Part Name	Element Type	Material Name
1	stojna_stredni: 1	Brick	oCel

3	DIN 912 - nahrazený DIN EN ISO 4762 M12 x 30:1	Brick	Steel (AISI 1080) Annealed
4	DIN 912 - nahrazený DIN EN ISO 4762 M12 x 30:2	Brick	Steel (AISI 1080) Annealed
9	domecek_stred_silnejši_novy: 1	Brick	11 523.1

Element Information

Element Properties used for:

- stojna_stredni: 1
- DIN 912 - nahrazený DIN EN ISO 4762 M12 x 30:1
- DIN 912 - nahrazený DIN EN ISO 4762 M12 x 30:2
- domecek_stred_silnejši_novy: 1

Element Type	Brick
Compatibility	Not Enforced
Integration Order	2nd Order
Stress Free Reference Temperature	0 °C

Material Information

ocel -Brick

Material Model	Standard
Material Source	Not Applicable
Material Source File	
Date Last Updated	2014.02.05-15:06:38
Material Description	Customer defined material properties
Mass Density	0 N·s ² /mm/mm ³
Modulus of Elasticity	210000 N/mm ²
Poisson's Ratio	0.3
Thermal Coefficient of Expansion	0 1/°C
Yield Strength	207 N/mm ²
Ultimate Strength	345 N/mm ²

Steel (AISI 1080) Annealed -Brick

Material Model	Standard
Material Source	Autodesk Simulation Material Library
Material Source File	C:\Program Files\Autodesk\Simulation 2014\matlibs\alformat.mlb
Date Last Updated	2012/07/12-16:52:57
Material Description	None
Mass Density	7 N·s ² /mm/mm ³
Modulus of Elasticity	204774 N/mm ²
Poisson's Ratio	0.28
Thermal Coefficient of Expansion	1 1/°C

Yield Strength	375 N/mm²
Ultimate Strength	615 N/mm²

11 523.1 -Brick

Material Model	Standard
Material Source	Not Applicable
Material Source File	
Date Last Updated	2014.02.05-15:06:39
Material Description	Customer defined material properties
Mass Density	0 N·s²/mm³
Modulus of Elasticity	210000 N/mm²
Poisson's Ratio	0.3
Thermal Coefficient of Expansion	0 1/°C
Yield Strength	250 N/mm²
Ultimate Strength	550 N/mm²

Loads

FEA Object Group 3: Surface Forces

Surface Force

ID	Description	Part Number	Surface Number	Magnitude (N)	Vx	Vy	Vz
1	Unnamed	1	51	-10101,000000	0,000000	1,000000	0,000000

FEA Object Group 4: Surface Forces

Surface Force

ID	Description	Part Number	Surface Number	Magnitude (N)	Vx	Vy	Vz
2	Unnamed	1	54	-10101,000000	0,000000	1,000000	0,000000
3	Unnamed	1	48	-10101,000000	0,000000	1,000000	0,000000
4	Unnamed	1	45	-10101,000000	0,000000	1,000000	0,000000

FEA Object Group 5: Surface Forces

Surface Force

ID	Description	Part Number	Surface Number	Magnitude (N)	Vx	Vy	Vz
5	Unnamed	9	56	4050,000000	1,000000	0,000000	0,000000

Constraints

FEA Object Group 1: Surface General Constraints

Surface General Constraint

ID	Description	Part Number	Surface Number	Tx	Ty	Tz	Rx	Ry	Rz

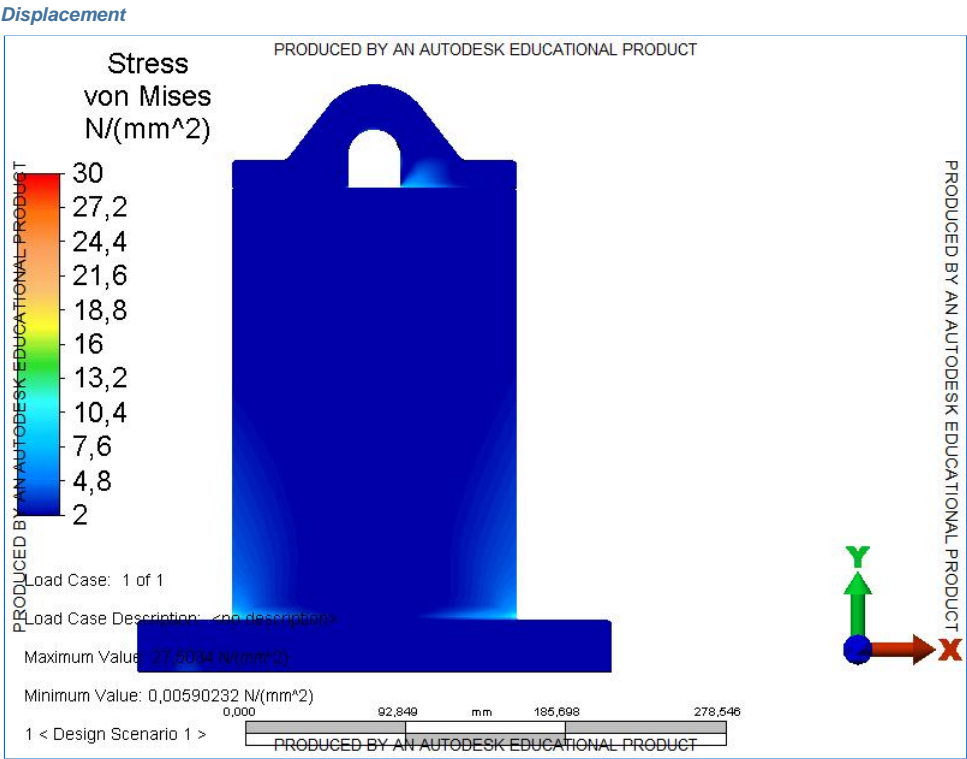
1	Unnamed	1	53	Yes	No	Yes	No	No	No
2	Unnamed	1	50	Yes	No	Yes	No	No	No
3	Unnamed	1	56	Yes	No	Yes	No	No	No
4	Unnamed	1	47	Yes	No	Yes	No	No	No

FEA Object Group 2: Surface General Constraints

Surface General Constraint

ID	Description	Part Number	Surface Number	Tx	Ty	Tz	Rx	Ry	Rz
5	Unnamed	1	31	No	Yes	No	No	No	No

Results Presentation Images



Processor Log Files

Meshing Log

Part 1 < stojna_stredni:1 >

Status: the part successfully meshed.

Surface Mesh Statistics

Mesh operation	Solid mesh
Final mesh size	3,25164 mm
Elements created	25044

Solid Mesh Statistics

Mesh type	Mix of bricks, wedges, pyramids and tetrahedra
Watertight	Yes
Mesh has microholes	No
Total nodes	152757
Volume	2979676,482894 mm³
Total elements	194404

	Tetrahedra	Pyramids	Wedges	Bricks
Elements	54359	26299	6770	106976
Volume %	2,48	3,16	1,93	92,43
Max. length ratio	3767,9	91,6	9,9	12,6
Avg. length ratio	6	3,8	2,3	1,7
Avg. aspect ratio	1,3	1,3	1,1	1
Unconstrained aspect ratio	10,7	3,8	1,6	1,3

Log file

Length units used in the log file are modeling units: mm

SOLID MESH GENERATION BEFORE ANALYSIS

PROGRAM WILL USE THE FOLLOWING FILES:

Input: C:\School\Diplomka\inventor\ASM2014simulace\sestava_drzak_stred_nova_17.5..FEM
Output: C:\School\Diplomka\inventor\ASM2014simulace\sestava_drzak_stred_nova_17.5..FEM

COMMAND LINE:

C:\Program Files\Autodesk\Simulation 2014\SOLIDX.exe -b=0 -o=1 -zw=2 C:\School\Diplomka\inventor\ASM2014simulace\sestava_drzak_stred_nova_17.5. -ds=1 -d=0 -u=13 -c=2 -t=1 -progress_pipe=4 -cancel_pipe=5 -za=-1 -zg=1,3:4,9 -m=1 -Td=1 -Tl=3.25164 -Tg=1.

TYPE OF OPERATION:

- Meshing only surface defined by part 1
- Generating bricks, wedges, pyramids and tetrahedra elements
- Automatically minimizing aspect ratio of solid elements

FINAL STATISTICS:

Elements built (4,5,6,8 noded): 194404 (54359, 26299, 6770, 106976)

Volume (4,5,6,8 noded %): 2979676.482894 (2.48, 3.16, 1.93, 92.43)

Number of nodes: 152757

Length ratios (avg) 6.0, 3.8, 2.3, 1.7

Length ratios (max) 3767.9, 91.6, 9.9, 12.6

Aspect ratio: unconstrained (10.7, 3.8, 1.6, 1.3)

Average aspect ratios: (1.3, 1.3, 1.1, 1.0)

Number of restarts: 0

Elapsed time: 8 minutes 0 seconds

Part 3 < DIN 912 - nahrazený DIN EN ISO 4762 M12 x 30:1 >

Status: the part successfully meshed.

Surface Mesh Statistics

Mesh operation	Solid mesh
Final mesh size	5,03013 mm
Elements created	292

Solid Mesh Statistics

Mesh type	Mix of bricks, wedges, pyramids and tetrahedra
Watertight	Yes
Mesh has microholes	No
Total nodes	481
Volume	5327,939866 mm³
Total elements	1337

	Tetrahedra	Pyramids	Wedges	Bricks
Elements	1067	217	27	26
Volume %	66,67	25,31	2,57	5,51
Max. length ratio	115,9	14,7	5,9	3,5
Avg. length ratio	6,6	4	3	1,9
Avg. aspect ratio	1,3	1,3	1,1	1
Unconstrained aspect ratio	3,5	2,8	1,3	1,1

Log file

Length units used in the log file are modeling units: mm

SOLID MESH GENERATION BEFORE ANALYSIS

PROGRAM WILL USE THE FOLLOWING FILES:

Input: C:\School\Diplomka\inventor\ASM2014simulace\sestava_drzak_stred_nova_17.5..FEM

Output: C:\School\Diplomka\inventor\ASM2014simulace\sestava_drzak_stred_nova_17.5..FEM

COMMAND LINE:

C:\Program Files\Autodesk\Simulation 2014\SOLIDX.exe -b=0 -o=1 -zw=2 C:\School\Diplomka\inventor\ASM2014simulace\sestava_drzak_stred_nova_17.5. -ds=1 -d=0 -u=13 -c=2 -t=1 -progress_pipe=16 -cancel_pipe=17 -za=-1 -zg=1,3:4,9 -m=3 -Td=1 -Tl=5.03013 -Tg=

TYPE OF OPERATION:

Meshing only surface defined by part 3

Generating bricks, wedges, pyramids and tetrahedra elements

Automatically minimizing aspect ratio of solid elements

FINAL STATISTICS:

Elements built (4,5,6,8 noded): 1337 (1067, 217, 27, 26)

Volume (4,5,6,8 noded %): 5327.939866 (66.67, 25.31, 2.57, 5.51)

Number of nodes: 481

Length ratios (avg) 6.6, 4.0, 3.0, 1.9

Length ratios (max) 115.9, 14.7, 5.9, 3.5

Aspect ratio: unconstrained (3.5, 2.8, 1.3, 1.1)

Average aspect ratios: (1.3, 1.3, 1.1, 1.0)

Number of restarts: 0

Elapsed time: 0 minutes 2 seconds

Part 4 < DIN 912 - nahrazeny DIN EN ISO 4762 M12 x 30:2 >

Status: the part successfully meshed.

Surface Mesh Statistics

Mesh operation	Solid mesh
Final mesh size	5,03013 mm
Elements created	294

Solid Mesh Statistics

Mesh type	Mix of bricks, wedges, pyramids and tetrahedra
Watertight	Yes
Mesh has microholes	No
Total nodes	483
Volume	5327,646714 mm³
Total elements	1342

	Tetrahedra	Pyramids	Wedges	Bricks
Elements	1069	221	27	25
Volume %	66,58	25,58	2,57	5,32
Max. length ratio	135,3	14,8	5,9	3,5
Avg. length ratio	6,8	4	3	1,9
Avg. aspect ratio	1,3	1,3	1,1	1
Unconstrained aspect ratio	4,1	2,8	1,3	1,1

Log file

Length units used in the log file are modeling units: mm

SOLID MESH GENERATION BEFORE ANALYSIS

PROGRAM WILL USE THE FOLLOWING FILES:

Input: C:\School\Diplomka\inventor\ASM2014simulace\sestava_drzak_stred_nova_17.5..FEM
Output: C:\School\Diplomka\inventor\ASM2014simulace\sestava_drzak_stred_nova_17.5..FEM

COMMAND LINE:

C:\Program Files\Autodesk\Simulation 2014\SOLIDX.exe -b=0 -o=1 -zw=2 C:\School\Diplomka\inventor\ASM2014simulace\sestava_drzak_stred_nova_17.5. -ds=1 -d=0 -u=13 -c=2 -t=1 -progress_pipe=12 -cancel_pipe=13 -za=-1 -zg=1,3:4,9 -m=4 -Td=1 -Tl=5.03013 -Tg=

TYPE OF OPERATION:

Meshing only surface defined by part 4
Generating bricks, wedges, pyramids and tetrahedra elements
Automatically minimizing aspect ratio of solid elements

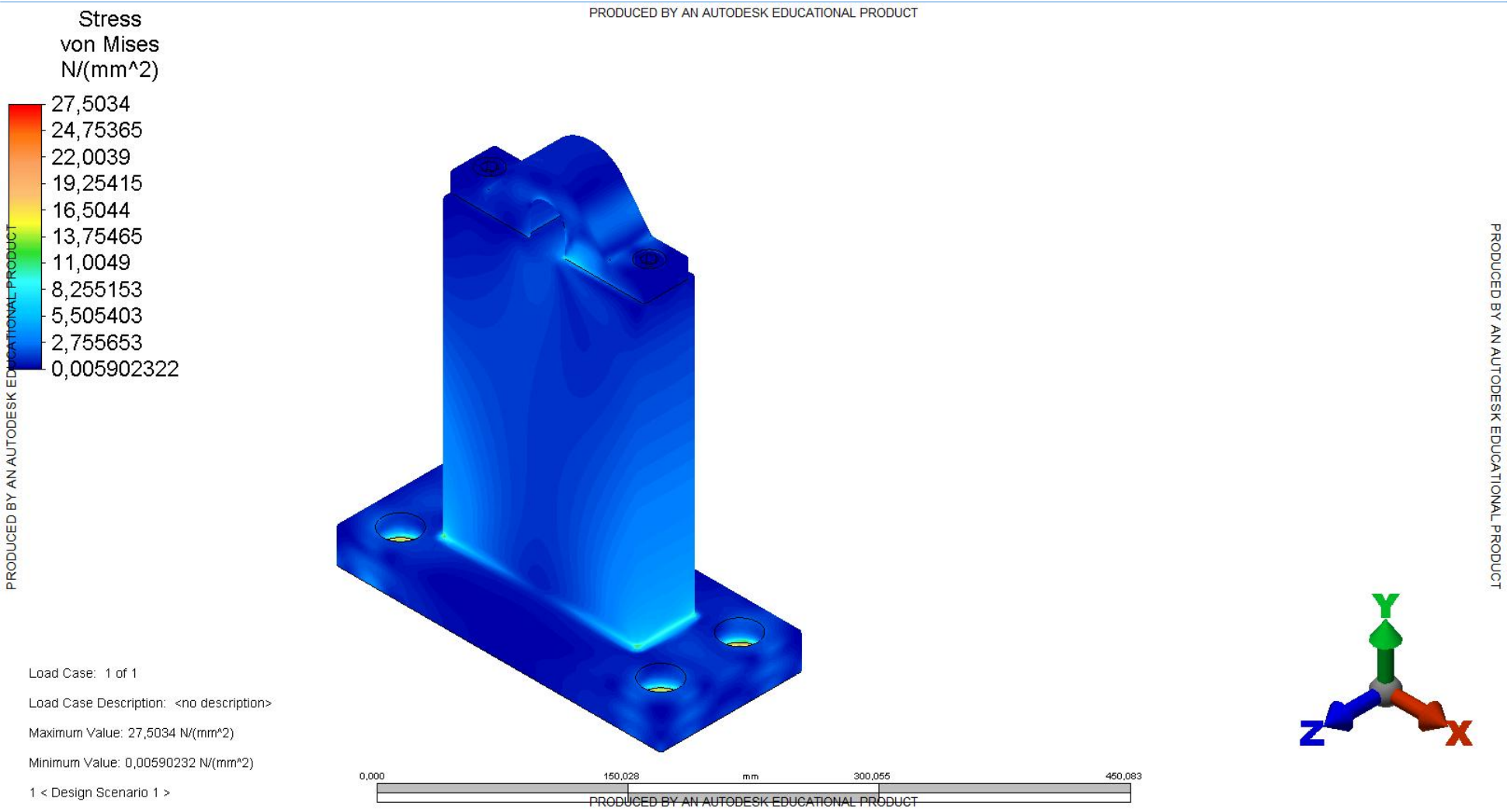
FINAL STATISTICS:

Elements built (4,5,6,8 noded): 1342 (1069, 221, 27, 25)

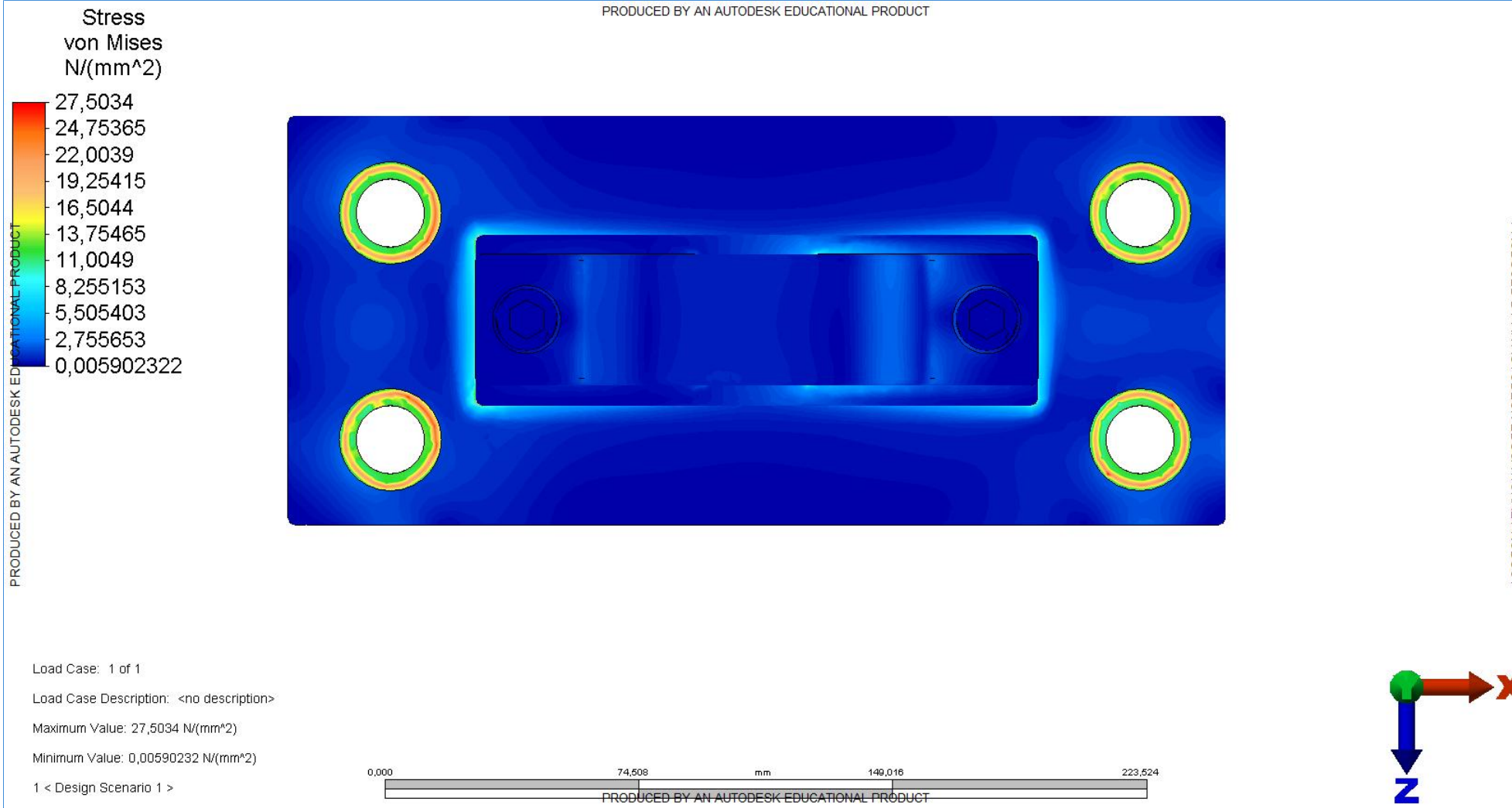
Volume (4,5,6,8 noded %): 5327.646714 (66.58, 25.58, 2.57, 5.32)
Number of nodes: 483
Length ratios (avg) 6.8, 4.0, 3.0, 1.9
Length ratios (max) 135.3, 14.8, 5.9, 3.5
Aspect ratio: unconstrained (4.1, 2.8, 1.3, 1.1)
Average aspect ratios: (1.3, 1.3, 1.1, 1.0)
Number of restarts: 0
Elapsed time: 0 minutes 1 seconds

Mesh Log - Error Retrieving mesh results for Part 9

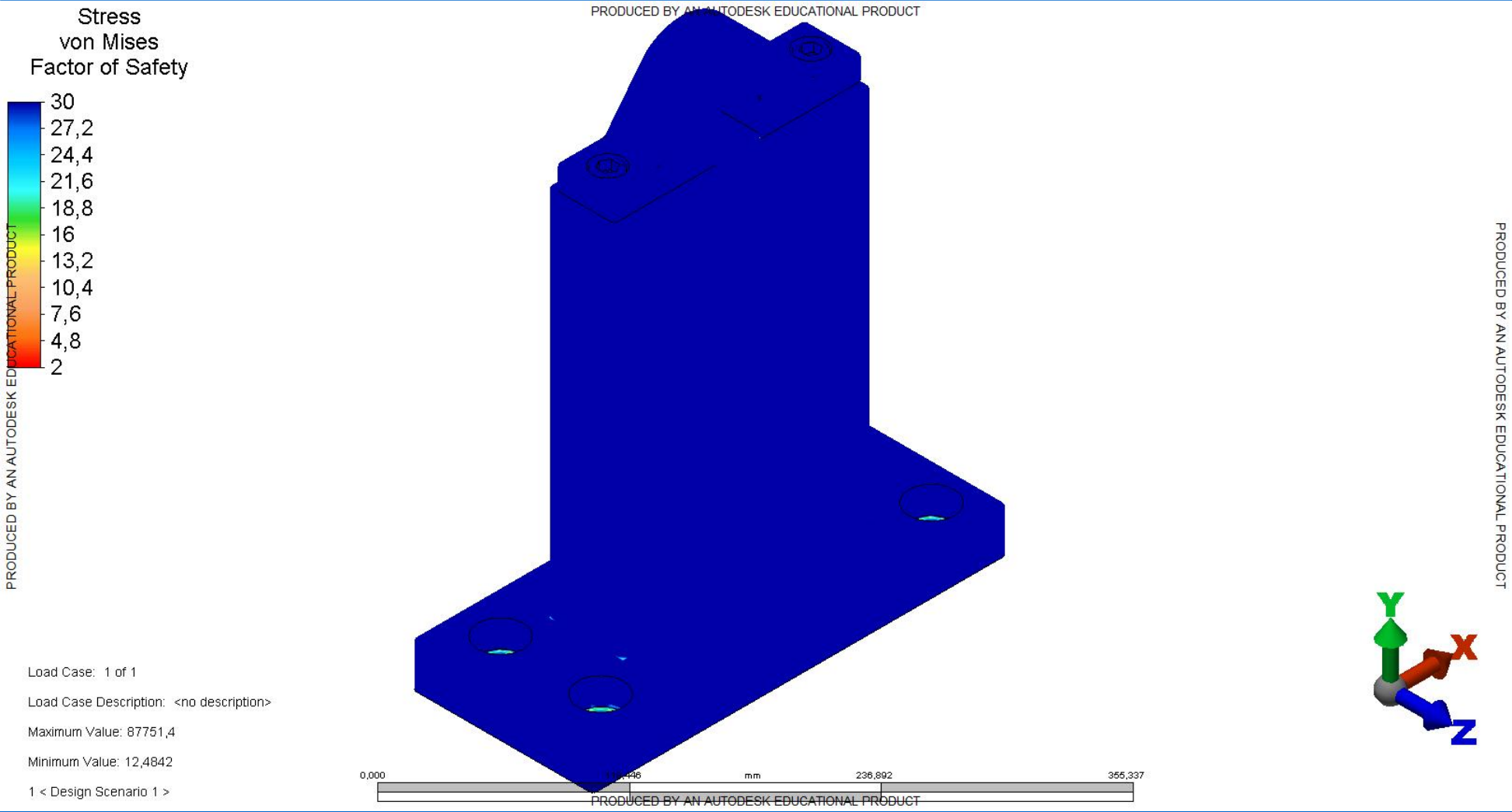
[predni_stojan1](#)

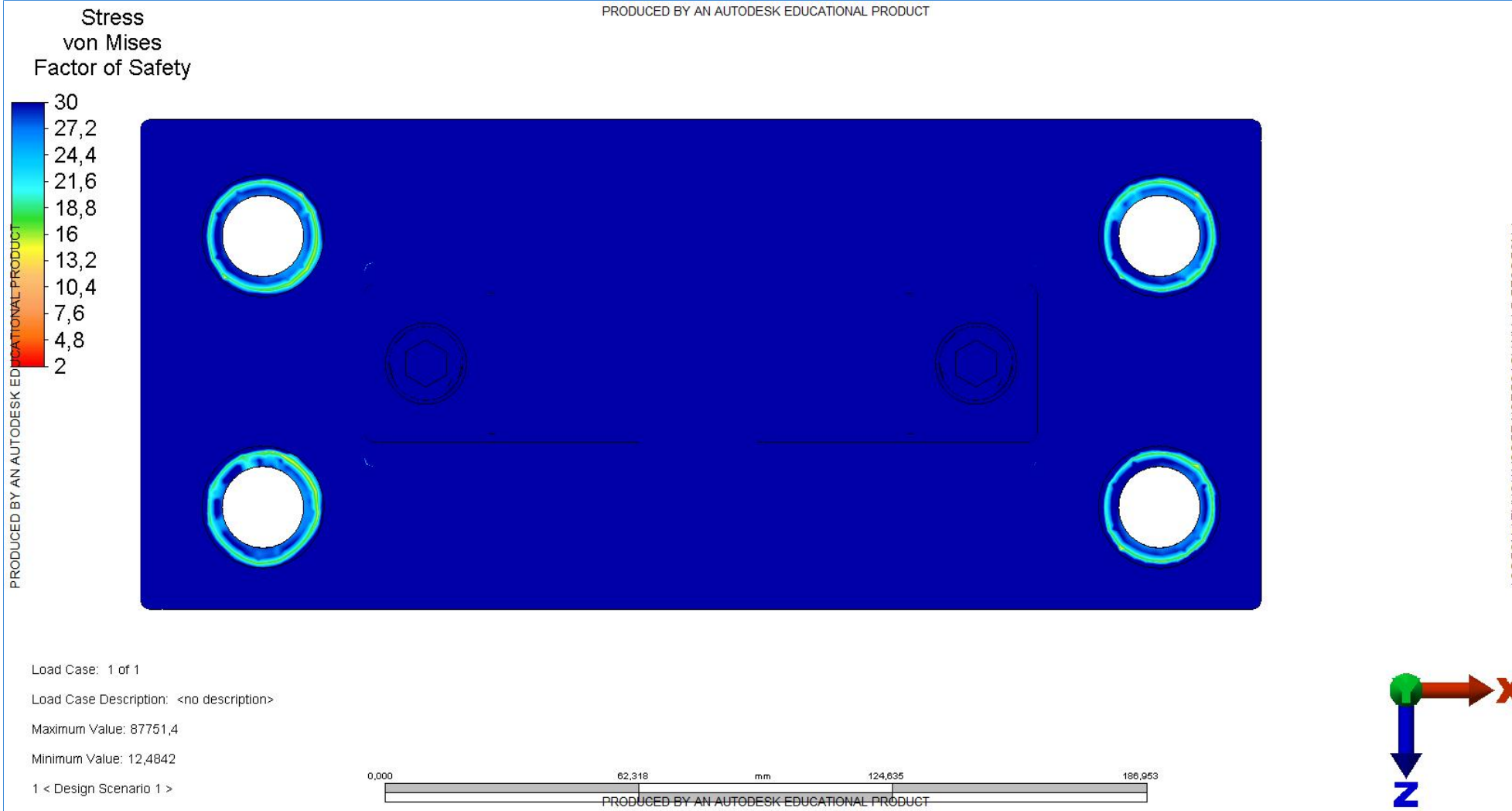


predni_stojan2

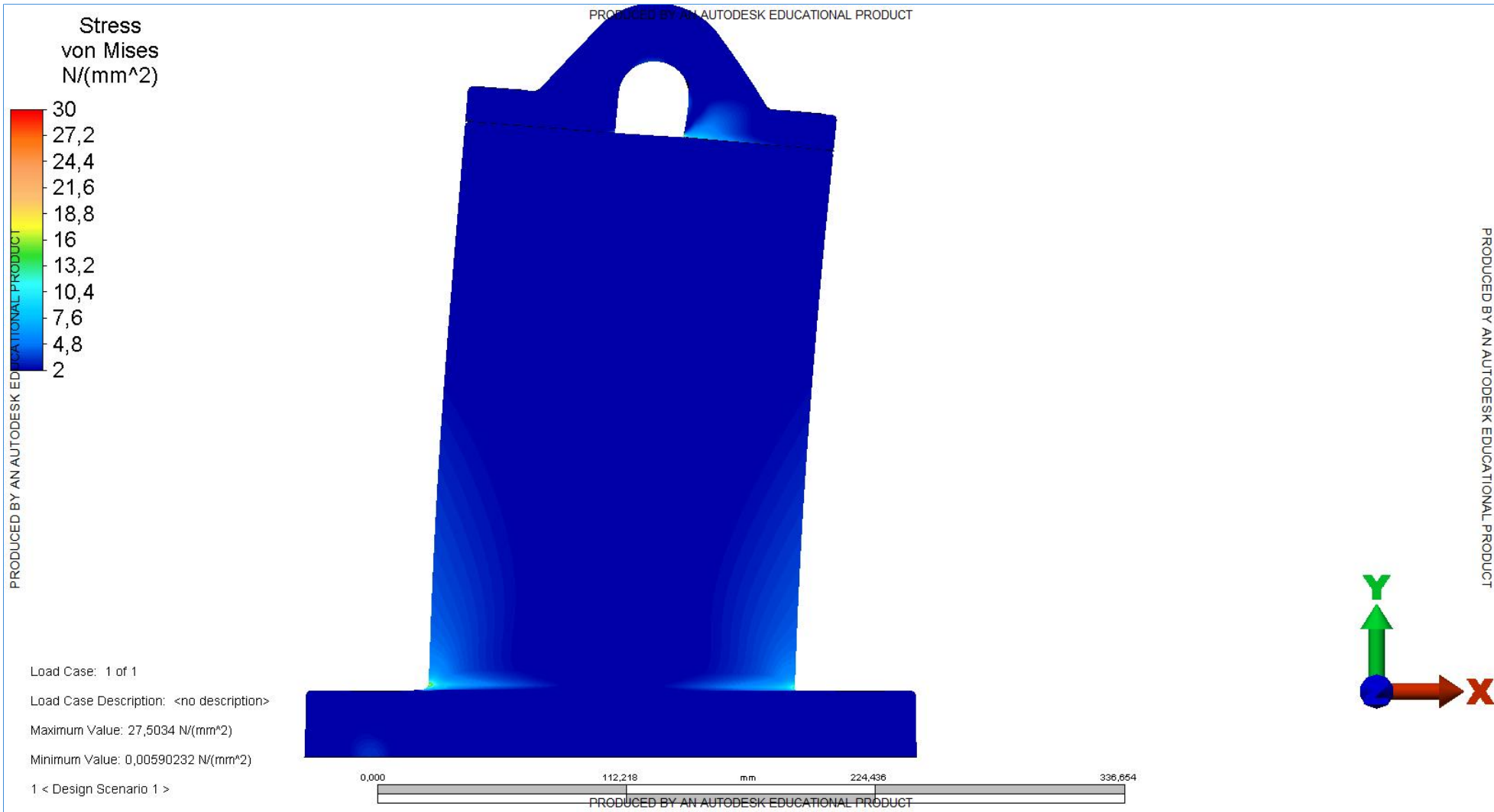


predni_stojan3





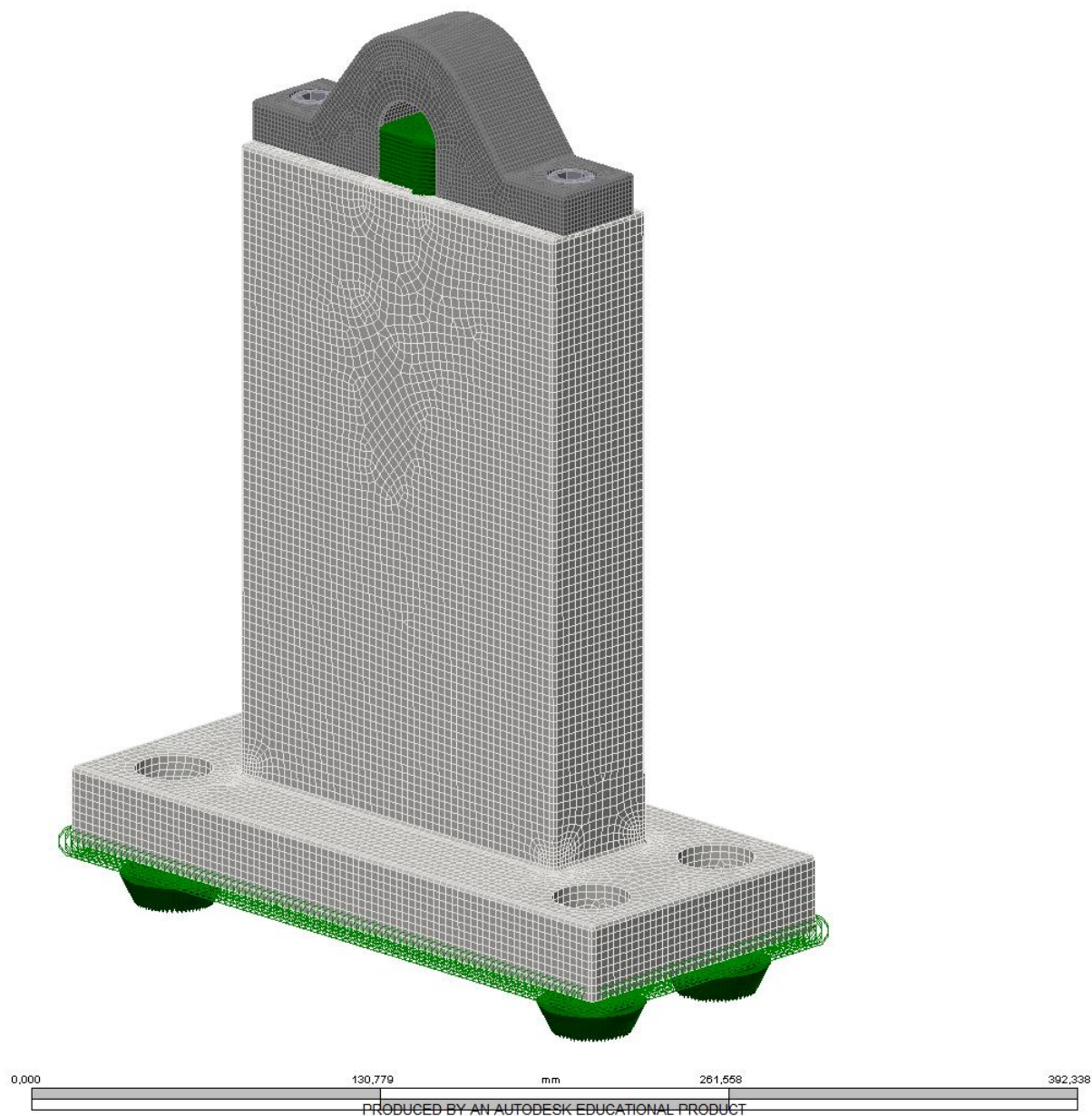
predni_stojan5



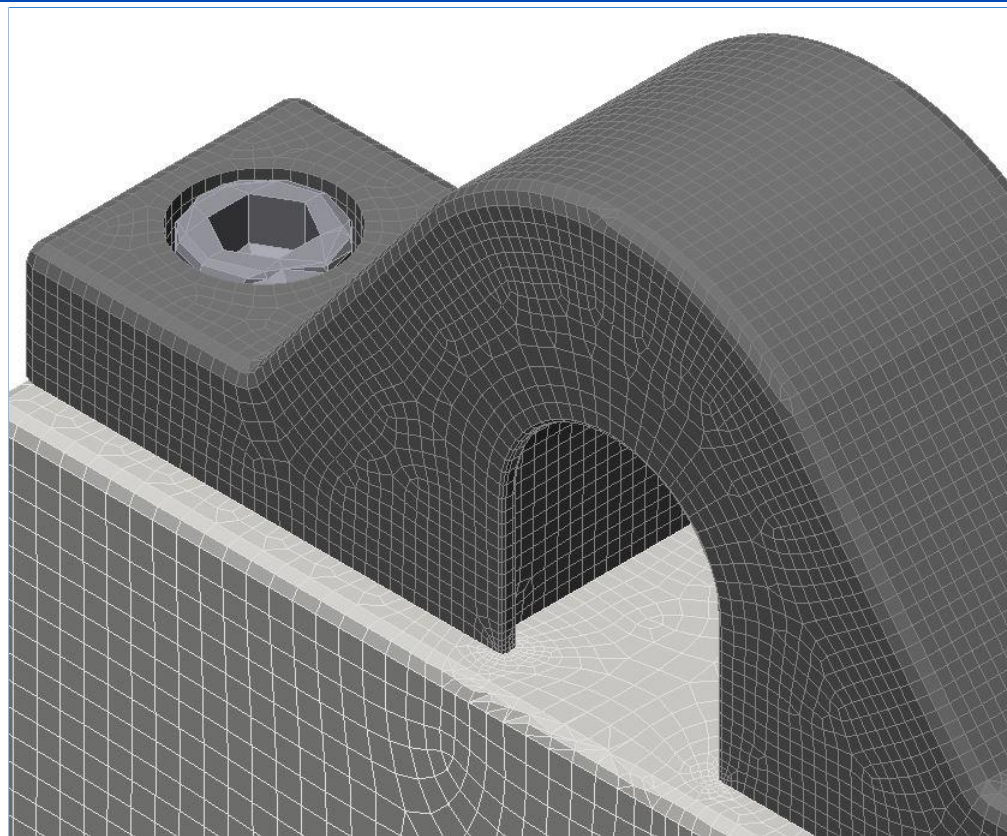
sestava_drzak_stred_26.5

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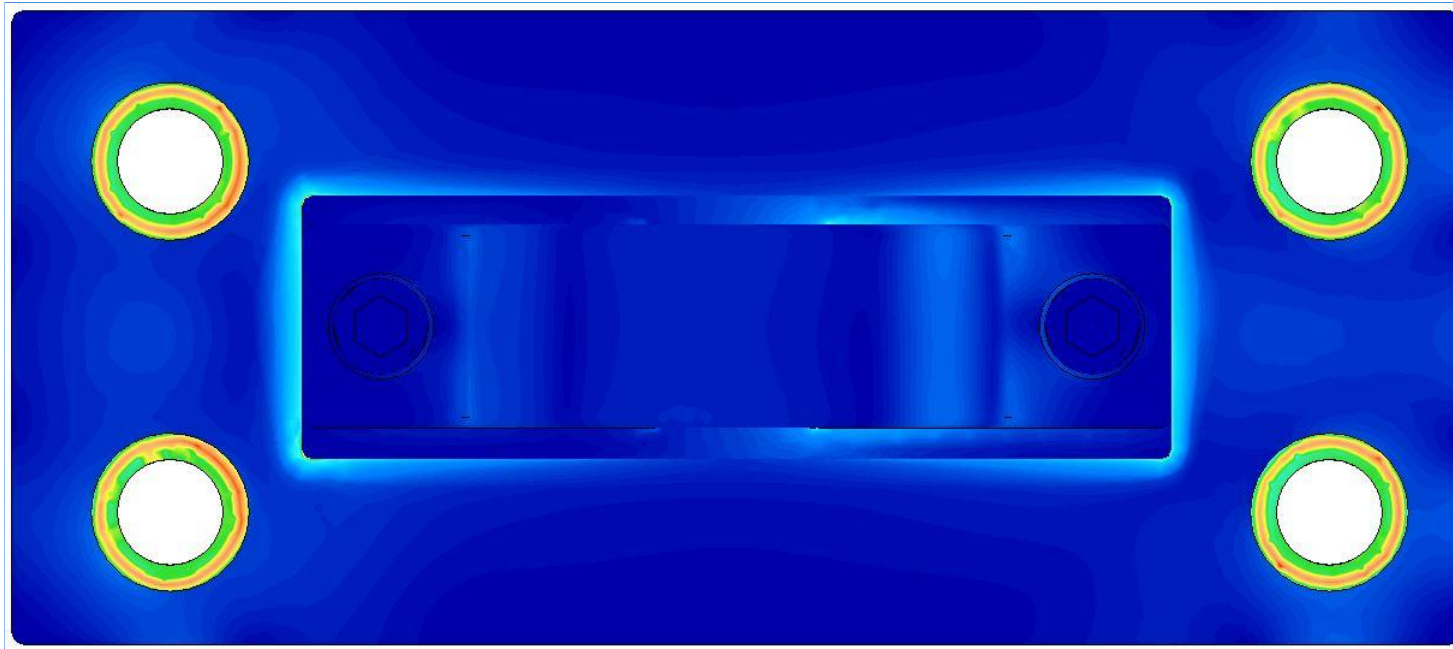
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



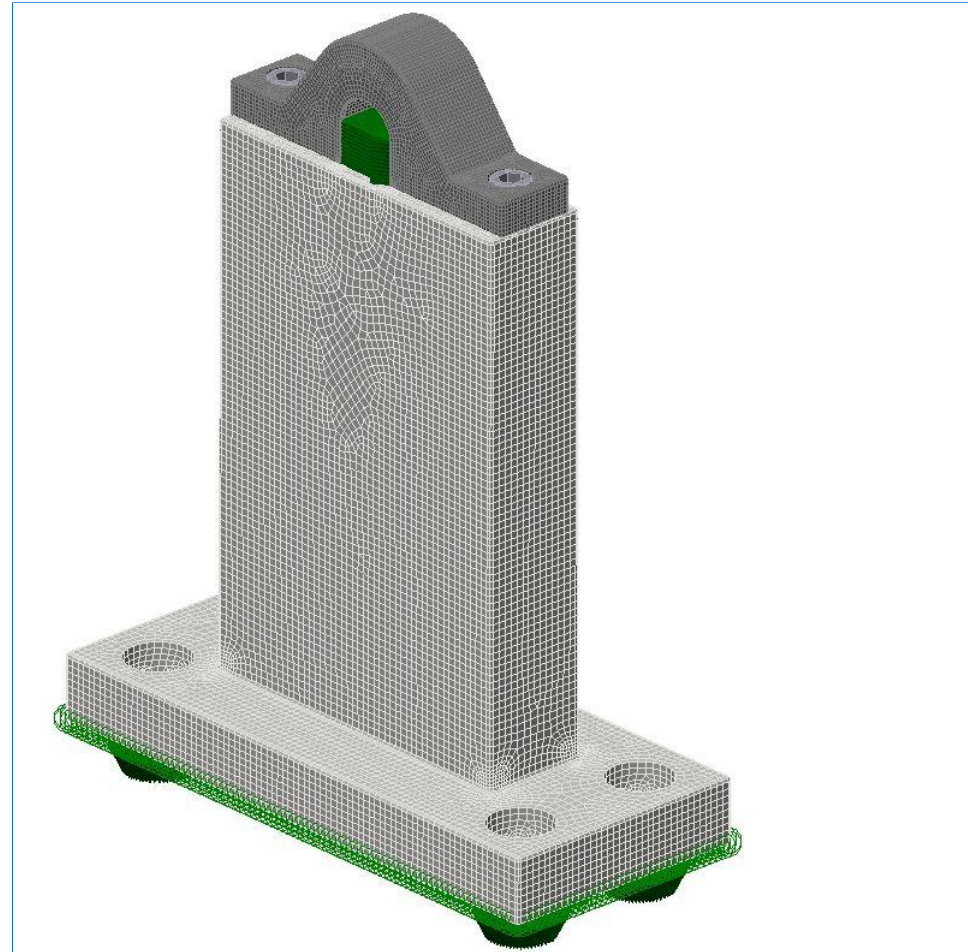
sestava_predni_final03



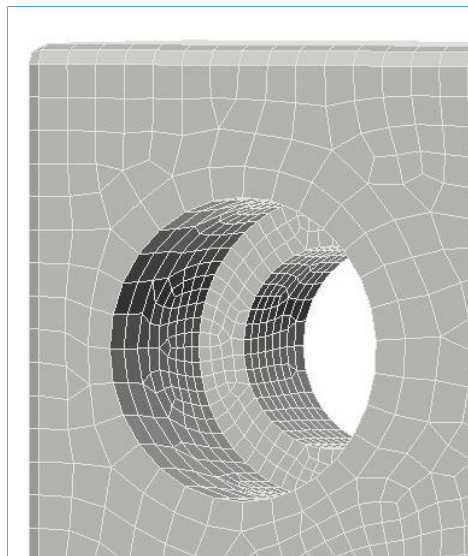
sestava_predni_final04



stojan_predni_fin01



stojan_predni_fin02



stojan_predni_fin012

