

Study Report



Analyzed File	Axis 2 v8
Version	Autodesk Fusion 360 (2.0.8609)
Creation Date	2020-07-02, 07:27:27
Author	Grędys Przemysław

Project Properties

Title	Studies
Author	jjjku

Simulation Model 1:1

Study 2 - Static Stress

Study Properties

Study Type	Static Stress
Last Modification Date	2020-07-01, 23:49:56

Settings

General

Contact Tolerance	0.1 mm
Remove Rigid Body Modes	No

☐ Damping

☐ Mesh

Average Element Size (% of model size)	
Solids	3
Scale Mesh Size Per Part	Yes
Average Element Size (absolute value)	-
Element Order	Parabolic
Create Curved Mesh Elements	No
Max. Turn Angle on Curves (Deg.)	60
Max. Adjacent Mesh Size Ratio	1.5
Max. Aspect Ratio	10
Minimum Element Size (% of average size)	20

☐ Adaptive Mesh Refinement

Number of Refinement Steps	6
Results Convergence Tolerance (%)	5
Portion of Elements to Refine (%)	40
Results for Baseline Accuracy	Von Mises Stress

☐ Materials

Component	Material	Safety Factor
LEGO_(axle connector) v2:1	PC/ABS Plastic	Yield Strength
LEGO_3706 v2:1	PC/ABS Plastic	Yield Strength
LEGO_4519 v2:1	PC/ABS Plastic	Yield Strength
LEGO_(axle triple pin) v2:1	PC/ABS Plastic	Yield Strength
LEGO_(axle triple pin) v2:2	PC/ABS Plastic	Yield Strength
LEGO_(axle triple pin) v2:3	PC/ABS Plastic	Yield Strength
LEGO_3648(gear 24) v2:1	PC/ABS Plastic	Yield Strength

☐ PC/ABS Plastic

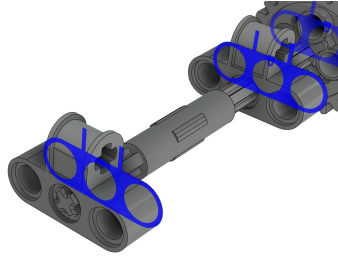
Density	1.1E-06 kg / mm ³
Young's Modulus	2780 MPa
Poisson's Ratio	0.4
Yield Strength	54.4 MPa
Ultimate Tensile Strength	54.4 MPa
Thermal Conductivity	2.4E-04 W / (mm C)
Thermal Expansion Coefficient	6.7E-05 / C
Specific Heat	2133 J / (kg C)

☐ Contacts

☐ Bonded

Name
[S] Bonded1 [LEGO_(axle triple pin) v2:2 LEGO_3648(gear 24) v2:1]
[S] Bonded2 [LEGO_(axle triple pin) v2:2 LEGO_3648(gear 24) v2:1]
[S] Bonded3 [LEGO_4519 v2:1 LEGO_(axle triple pin) v2:1]
[S] Bonded4 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:2]
[S] Bonded5 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:2]
[S] Bonded6 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:2]
[S] Bonded7 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:2]
[S] Bonded8 [LEGO_3706 v2:1 LEGO_3648(gear 24) v2:1]
[S] Bonded9 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:3]
[S] Bonded10 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:2]
[S] Bonded11 [LEGO_3706 v2:1 LEGO_3648(gear 24) v2:1]
[S] Bonded12 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:3]
[S] Bonded13 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:2]
[S] Bonded14 [LEGO_3706 v2:1 LEGO_3648(gear 24) v2:1]
[S] Bonded15 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:3]
[S] Bonded16 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:2]
[S] Bonded17 [LEGO_3706 v2:1 LEGO_3648(gear 24) v2:1]
[S] Bonded18 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:3]
[S] Bonded19 [LEGO_3706 v2:1 LEGO_(axle triple pin) v2:2]
[S] Bonded20 [LEGO_(axle connector) v2:1 LEGO_4519 v2:1]
[S] Bonded21 [LEGO_(axle connector) v2:1 LEGO_4519 v2:1]
[S] Bonded22 [LEGO_(axle connector) v2:1 LEGO_4519 v2:1]
[S] Bonded23 [LEGO_(axle connector) v2:1 LEGO_4519 v2:1]
[S] Bonded24 [LEGO_(axle connector) v2:1 LEGO_4519 v2:1]
[S] Bonded25 [LEGO_(axle connector) v2:1 LEGO_4519 v2:1]

☐ Selected Entities

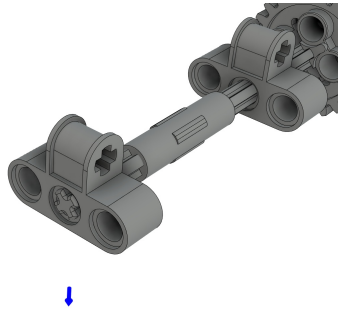


☐ Loads

☐ Gravity

Type	Gravity
Magnitude	9.807 m / s ²
X Value	0 m / s ²
Y Value	0 m / s ²
Z Value	-9.807 m / s ²

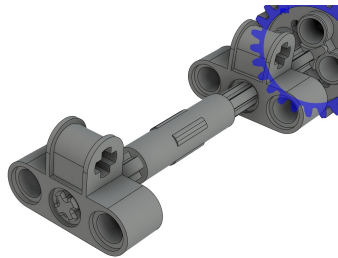
☐ Selected Entities



☐ Moment1

Type	Moment
Magnitude	199 N mm
X Value	-5.382E-13 N mm
Y Value	199 N mm
Z Value	-2.48E-13 N mm

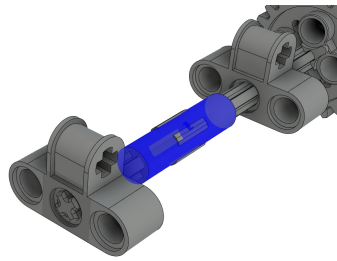
☐ Selected Entities



☐ Moment2

Type	Moment
Magnitude	-199 N mm
X Value	2.946E-13 N mm
Y Value	199 N mm
Z Value	-9.323E-13 N mm

☐ Selected Entities




☐ **Results**

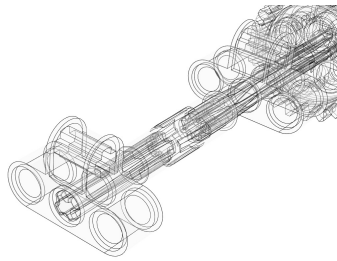
☐ **Result Summary**

Name	Minimum	Maximum
Safety Factor		
Safety Factor (Per Body)	0.941	15
Stress		
Von Mises	1.342E-04 MPa	57.81 MPa
1st Principal	-51.05 MPa	93.93 MPa
3rd Principal	-107.5 MPa	49.9 MPa
Normal XX	-90.73 MPa	65.4 MPa
Normal YY	-56.13 MPa	54.72 MPa
Normal ZZ	-69.62 MPa	82.69 MPa
Shear XY	-19.27 MPa	16.37 MPa
Shear YZ	-16.38 MPa	14.46 MPa
Shear ZX	-24.32 MPa	31.27 MPa
Displacement		
Total	0 mm	0.09792 mm
X	-0.09427 mm	0.09428 mm
Y	-0.01578 mm	0.0158 mm
Z	-0.09598 mm	0.09591 mm
Reaction Force		
Total	0 N	2.183 N
X	-1.068 N	1.168 N
Y	-2.06 N	1.678 N
Z	-1.093 N	1.526 N
Strain		
Equivalent	6.704E-08	0.03866
1st Principal	-1.002E-04	0.03591
3rd Principal	-0.03651	2.329E-04
Normal XX	-0.01566	0.007006
Normal YY	-0.006736	0.005333
Normal ZZ	-0.01236	0.01311
Shear XY	-0.01941	0.01649
Shear YZ	-0.0165	0.01456
Shear ZX	-0.0245	0.0315
Contact Pressure		
Total	0 MPa	65.39 MPa
X	-62.04 MPa	63.37 MPa
Y	-21.52 MPa	22.99 MPa
Z	-58.84 MPa	46.81 MPa

☐ **Safety Factor**

☐ **Safety Factor (Per Body)**

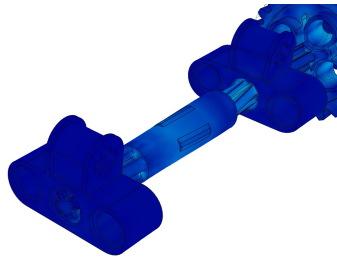
0  8, Threshold: 0.8 - 1.1



☐ **Stress**

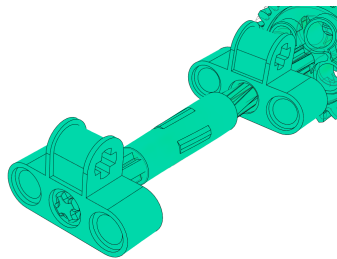
☐ **Von Mises**

[MPa] 0  57.81



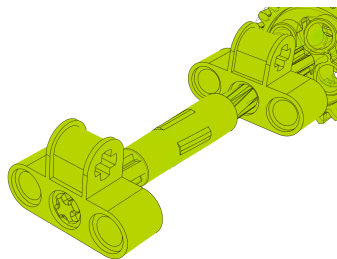
☐ **1st Principal**

[MPa] -51.05  93.93



☐ **3rd Principal**

[MPa] -107.5  49.9



☐ **Displacement**

☐ **Total**

[mm] 0  0.09792

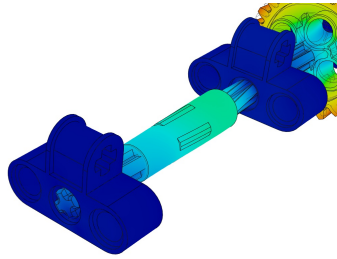


Image Width (pixels):