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# Study Report

AUTODESK

| | | | |
|---|---|---|---|
| Analyzed File | Landing stick v1 | Version | Autodesk Fusion (2604.0.316) |
| Creation Date | 2025-12-02, 17:21:31 | Author | saura |

## Report Properties

| Report Properties | |
|---|---|
| Title | Studies |
| Author | saura |

## Simulation Model 1

## Study 1 - Static Stress

### Study Properties

| Study Properties | |
|---|---|
| Study Type | Static Stress |
| Last Modification Date | 2025-12-02, 14:17:37 |

### Study Setup

| Settings | |
|---|---|
| **General** | |
| Contact Tolerance | 0.10 mm |
| Remove Rigid Body Modes | No |
| **Mesh** | |
| Average Element Size (% of model size) - Solids | 8 |
| Scale Mesh Size Per Part | No |
| Average Element Size (absolute value) | - |

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| | |
|---|---|
| Element Order | Parabolic |
| Create Curved Mesh Elements | Yes |
| Max. Turn Angle on Curves (Deg.) | 30 |
| Max. Adjacent Mesh Size Ratio | 1.5 |
| Max. Aspect Ratio | 10 |
| Minimum Element Size (% of average size) | 15 |
| **Adaptive Mesh Refinement** | |
| Number of Refinement Steps | 0 |
| Results Convergence Tolerance (%) | 20 |
| Portion of Elements to Refine (%) | 10 |
| Results for Baseline Accuracy | von Mises Stress |

| **Materials** | |
|---|---|
| **Aluminum 6061** | |
| **Components** | |
| Component | Strength |
| Body1 | Yield Strength |
| **Properties** | |
| Density | 2.700E-06 kg / mm^3 |
| Young's Modulus | 68900.00 MPa |
| Poisson's Ratio | 0.33 |
| Yield Strength | 275.00 MPa |
| Ultimate Tensile Strength | 310.00 MPa |
| Thermal Conductivity | 0.167 W / (mm C) |
| Thermal Expansion Coefficient | 2.360E-05 / C |
| Specific Heat | 897.00 J / (kg C) |

| **Contacts** | | | | |
|---|---|---|---|---|
| Contact Type | Contact Set | Penetration Type | Bodies | Entities |

| **Mesh** | |
|---|---|
| Type | Solids |
| Nodes | 5801 |
| Elements | 2924 |

## Load Case1

| **Constraints** |
|---|
| **Fixed1** |

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| | |
|---|---|
| Type | Fixed |
| Ux | Fixed |
| Uy | Fixed |
| Uz | Fixed |

| **Loads** | |
|---|---|
| **Gravity** | |

| | |
|---|---|
| Type | Gravity |
| Magnitude | 9.807 m / s^2 |
| X Value | 0.00 m / s^2 |
| Y Value | 0.00 m / s^2 |
| Z Value | -9.807 m / s^2 |
| **Force1** | |

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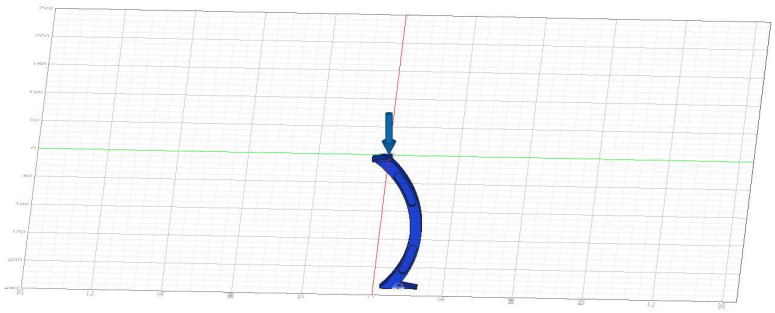
| | |
|---|---|
| Type | Force |
| Magnitude | 40.00 N |
| X Value | 0.00 N |
| Y Value | 0.00 N |
| Z Value | -40.00 N |
| Force Per Entity | No |

## Load Case1 - Guided Results

**Safety Factor**




With the analysis criteria in this study setup, there is opportunity to reduce the volume of material and cost of this design.

**Next Steps**

**Above Safety Factor Limit**

**Validate your study setup**

- Check the loads are not set too high
- Check the mesh refinement and consider increasing it in areas of high stress
- Confirm your Safety Factor requirement
- If the Displacement result shows high displacement, consider running a Nonlinear study to gain more insight

**Check other results**

- Examine the Below target Result visualization to see where the weakest areas are
- Check the stress result to see if, and where, the material might yield
- Check the displacement result to see how far from its original alignment the model has moved
- Look at other results, such as reaction forces to check your study set up, or strain to check your material performance

**Lightweight the design**

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- Set a Safety Factor upper limit to find where material can be removed
- Remove material from areas that exceed the Safety Factor upper limit

**Generate alternative designs**

- In the Generative Design workspace, create design modifications
- Remove unnecessary material using a Shape Optimization study

## Load Case1 - Results

| Result Summary | | | |
|---|---|---|---|
| Result type | Sub-result | Minimum | Maximum |
| **Safety Factor** | | | |
| | Safety Factor | 16.532 | 3.771E+07 |
| **Stress** | | | |
| | Von Mises | 7.292E-06 MPa | 16.634 MPa |
| | 1st Principal | -1.262 MPa | 12.117 MPa |
| | 3rd Principal | -17.371 MPa | 0.678 MPa |
| | Normal XX | -3.525 MPa | 2.892 MPa |
| | Normal YY | -3.195 MPa | 3.417 MPa |
| | Normal ZZ | -16.031 MPa | 11.476 MPa |
| | Shear XY | -1.217 MPa | 1.329 MPa |
| | Shear YZ | -5.133 MPa | 5.029 MPa |
| | Shear XZ | -1.707 MPa | 1.812 MPa |
| **Displacement** | | | |
| | Total | 0 mm | 0.183 mm |
| | X | -3.591E-04 mm | 3.562E-04 mm |
| | Y | -0.166 mm | 4.498E-05 mm |
| | Z | -0.077 mm | 0.013 mm |
| **Reaction Force** | | | |
| | Total | 0 N | 5.014 N |
| | X | -0.966 N | 0.926 N |
| | Y | -1.904 N | 1.925 N |
| | Z | -0.699 N | 5.013 N |
| **Strain** | | | |
| | Equivalent | 1.588E-10 | 2.819E-04 |
| | 1st Principal | -1.914E-07 | 2.067E-04 |
| | 3rd Principal | -3.052E-04 | -4.894E-11 |
| | Normal XX | -5.695E-05 | 1.009E-04 |
| | Normal YY | -5.553E-05 | 6.506E-05 |
| | Normal ZZ | -2.189E-04 | 1.63E-04 |
| | Shear XY | -4.698E-05 | 5.131E-05 |
| | Shear YZ | -1.982E-04 | 1.942E-04 |
| | Shear XZ | -6.591E-05 | 6.996E-05 |
| **Contact Force** | | | |
| | Total | 0 N | 0 N |
| | X | 0 N | 0 N |
| | Y | 0 N | 0 N |
| | Z | 0 N | 0 N |

| Safety Factor |
|---|

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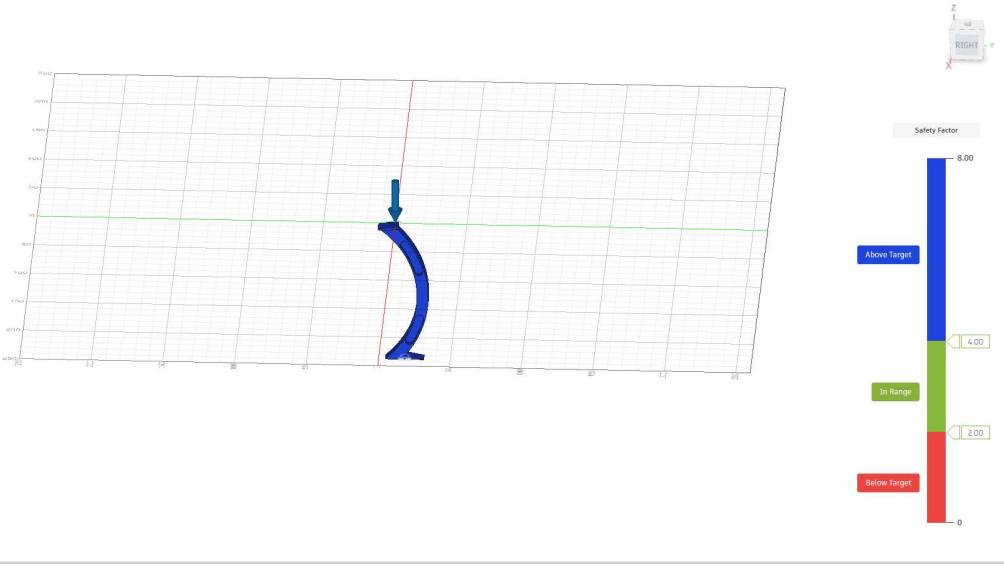
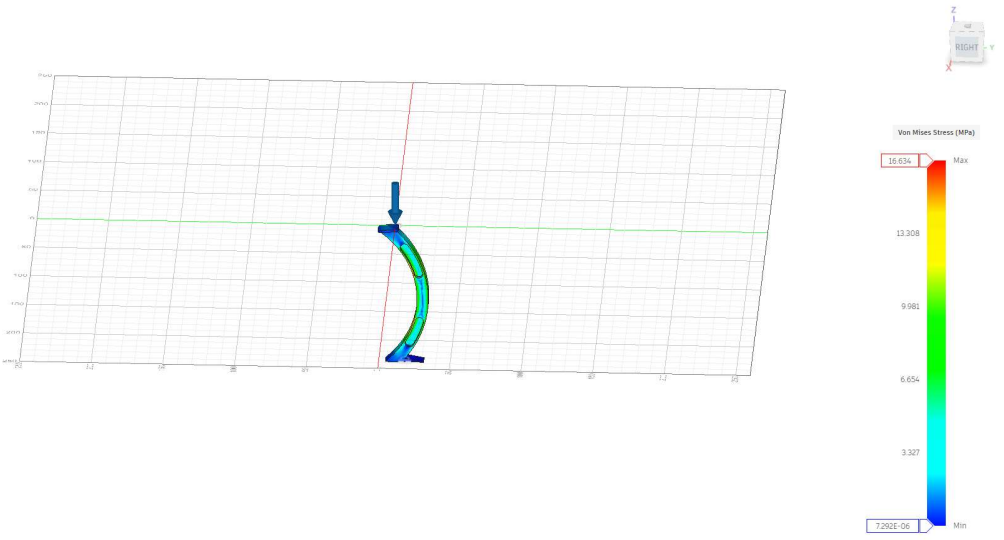
## Safety Factor

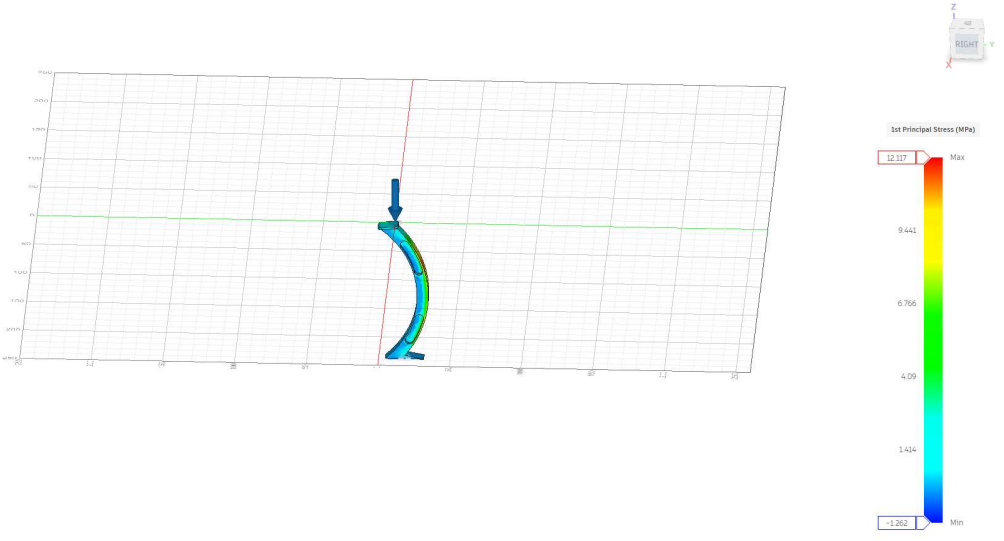



## Stress

### Von Mises




### 1st Principal




### 3rd Principal

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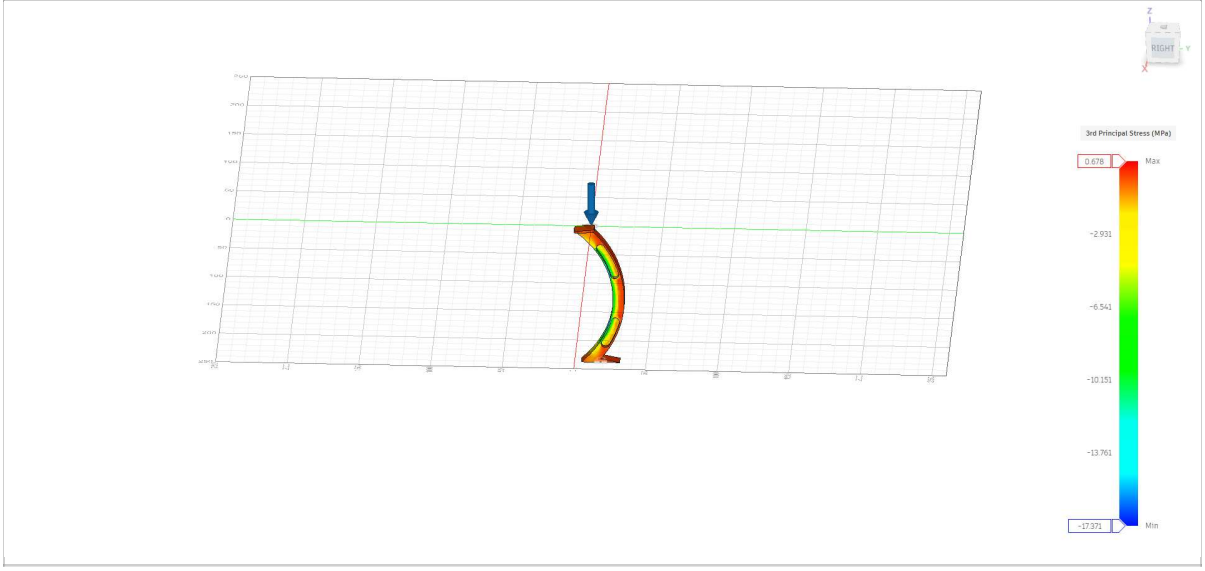
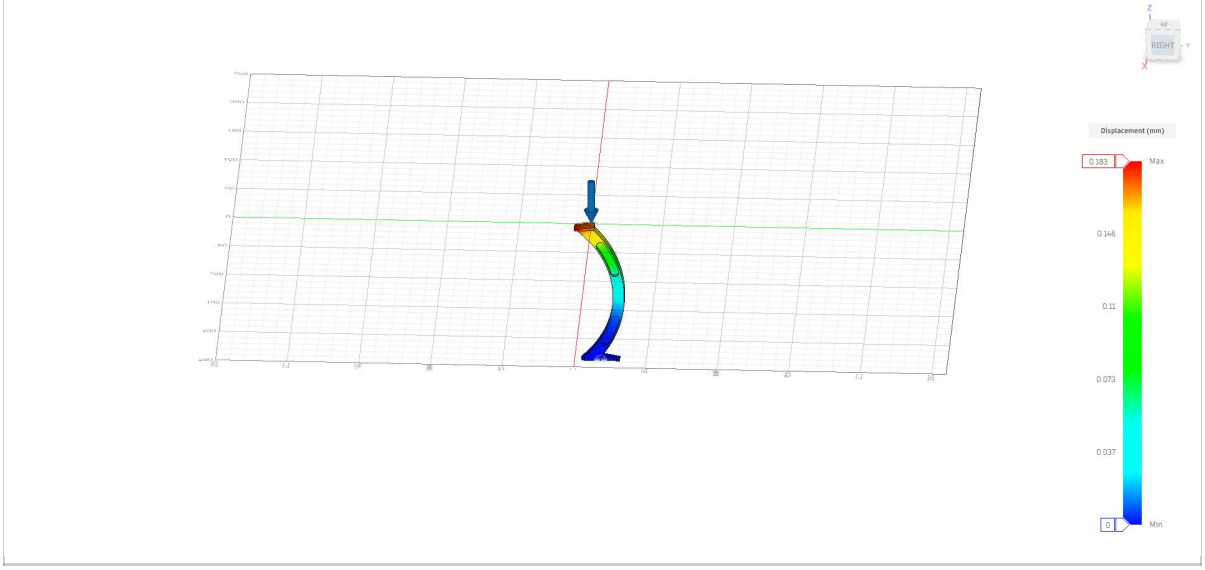



## Displacement

### Total