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|  | |  | | --- | | **Simulation of Cantilever Bracket 1-2**  **Date: Sunday, October 22, 2023 Designer: Solidworks**  **Study name: Static 1**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc148895328)  [Assumptions 2](#_Toc148895329)  [Model Information 2](#_Toc148895330)  [Study Properties 3](#_Toc148895331)  [Units 3](#_Toc148895332)  [Material Properties 4](#_Toc148895333)  [Loads and Fixtures 4](#_Toc148895334)  [Connector Definitions 5](#_Toc148895335)  [Interaction Information 5](#_Toc148895336)  [Mesh information 5](#_Toc148895337)  [Sensor Details 6](#_Toc148895338)  [Resultant Forces 6](#_Toc148895339)  [Beams 6](#_Toc148895340)  [Study Results 7](#_Toc148895341)  [Conclusion 10](#_Toc148895342) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** Cantilever Bracket 1-2**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Split Line3** | **Solid Body** | ****Mass:0.828668 kg****  ****Volume:0.000298082 m^3****  ****Density:2,780 kg/m^3****  ****Weight:8.12095 N**** | ****C:\Users\jakob\software\TU\23FL\CAD\HW5.1\Models and Drawings\Cantilever Bracket 1-2.SLDPRT****  **Oct 22 19:27:23 2023** | |

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| Study Properties  |  |  | | --- | --- | | Study name | Static 1 | | Analysis type | Static | | Mesh type | Solid Mesh | | Thermal Effect: | On | | Thermal option | Include temperature loads | | Zero strain temperature | 77 Fahrenheit | | Include fluid pressure effects from SOLIDWORKS Flow Simulation | Off | | Solver type | Automatic | | Inplane Effect: | Off | | Soft Spring: | Off | | Inertial Relief: | Off | | Incompatible bonding options | Automatic | | Large displacement | Off | | Compute free body forces | On | | Friction | Off | | Use Adaptive Method: | Off | | Result folder | SOLIDWORKS document (C:\Users\jakob\software\TU\23FL\CAD\HW5.1\Models and Drawings) | |

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| Units  |  |  | | --- | --- | | Unit system: | SI (MKS) | | Length/Displacement | m | | Temperature | Kelvin | | Angular velocity | Rad/sec | | Pressure/Stress | N/m^2 | |

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| Material Properties  |  |  |  | | --- | --- | --- | | ****Model Reference**** | ****Properties**** | ****Components**** | |  | |  |  | | --- | --- | | ****Name:**** | **2024-T4** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Unknown** | | ****Yield strength:**** | **3.25e+08 N/m^2** | | ****Tensile strength:**** | **4.7e+08 N/m^2** | | ****Elastic modulus:**** | **7.24e+10 N/m^2** | | ****Poisson's ratio:**** | **0.33** | | ****Mass density:**** | **2,780 kg/m^3** | | ****Shear modulus:**** | **2.8e+10 N/m^2** | | ****Thermal expansion coefficient:**** | **2.32e-05 /Kelvin** | | **SolidBody 1(Split Line3)(Cantilever Bracket 1-2)** | | **Curve Data:N/A** | | | |

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| **Loads and Fixtures**  | ****Fixture name**** | ****Fixture Image**** | ****Fixture Details**** | | --- | --- | --- | | **Fixed-1** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Fixed Geometry** | | | ****Resultant Forces****   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Components** | **X** | **Y** | **Z** | **Resultant** | | **Reaction force(N)** | **-6,500** | **8.39233e-05** | **6.10352e-05** | **6,500** | | **Reaction Moment(N.m)** | **0** | **0** | **0** | **0** | | | |  | ****Load name**** | ****Load Image**** | ****Load Details**** | | --- | --- | --- | | **Force-1** |  | |  |  | | --- | --- | | Entities: | **1 edge(s)** | | Reference: | **Edge< 1 >** | | Type: | **Apply force** | | Values: | **---, ---, -6,500 N** | | |

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| Connector Definitions No Data |

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| Interaction Information No Data |

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| Mesh information  |  |  | | --- | --- | | Mesh type | Solid Mesh | | Mesher Used: | Standard mesh | | Automatic Transition: | Off | | Include Mesh Auto Loops: | Off | | Jacobian points for High quality mesh | 16 Points | | Element Size | 6.68184 mm | | Tolerance | 0.334092 mm | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 10720 | | Total Elements | 6514 | | Maximum Aspect Ratio | 3.4521 | | % of elements with Aspect Ratio < 3 | 99.9 | | Percentage of elements with Aspect Ratio > 10 | 0 | | Percentage of distorted elements | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:01 | | Computer name: | JW-MACHINE | |

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| Sensor Details No Data |

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| Resultant ForcesReaction forces  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N | -6,500 | 8.39233e-05 | 6.10352e-05 | 6,500 |  Reaction Moments  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N.m | 0 | 0 | 0 | 0 | |
| Free body forces  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N | -0.00134284 | -1.39495e-05 | 0.000122687 | 0.00134851 |  Free body moments  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N.m | 0 | 0 | 0 | 1e-33 | |

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| Beams No Data |

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| Study Results  | Name | Type | Min | Max | | --- | --- | --- | --- | | Stress1 | SX: X Normal Stress | -57,498,496.000N/m^2  Node: 370 | 99,194,136.000N/m^2  Node: 34 | | **Cantilever Bracket 1-2-Static 1-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Copy[ 1 ] Stress1 | VON: von Mises Stress | 7,766.246N/m^2  Node: 2442 | 92,937,448.000N/m^2  Node: 34 | | **Cantilever Bracket 1-2-Static 1-Stress-Copy[ 1 ] Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0.000e+00m  Node: 77 | 2.040e-03m  Node: 130 | | **Cantilever Bracket 1-2-Static 1-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 5.016e-07  Element: 1837 | 9.861e-04  Element: 4066 | | **Cantilever Bracket 1-2-Static 1-Strain-Strain1** | | | | |

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| Conclusion |