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|  | |  | | --- | | **Simulation of Anchor Bracket 2-3**  **Date: Tuesday, October 24, 2023 Designer: Jakob Werle**  **Study name: Static 1**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc149050972)  [Assumptions 2](#_Toc149050973)  [Model Information 2](#_Toc149050974)  [Study Properties 3](#_Toc149050975)  [Units 3](#_Toc149050976)  [Material Properties 4](#_Toc149050977)  [Loads and Fixtures 5](#_Toc149050978)  [Connector Definitions 5](#_Toc149050979)  [Interaction Information 6](#_Toc149050980)  [Mesh information 6](#_Toc149050981)  [Sensor Details 6](#_Toc149050982)  [Resultant Forces 7](#_Toc149050983)  [Beams 7](#_Toc149050984)  [Study Results 8](#_Toc149050985)  [Conclusion 12](#_Toc149050986) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** Anchor Bracket 2-3**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Split Line1** | **Solid Body** | ****Mass:3.11566 kg****  ****Volume:0.00039589 m^3****  ****Density:7,870 kg/m^3****  ****Weight:30.5334 N**** | ****C:\Users\jakob\software\TU\23FL\CAD\Q5\Anchor Bracket 2-3.SLDPRT****  **Oct 24 14:38:40 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 | 298 Kelvin | | 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\Q5) | |

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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:**** | **AISI 1010 Steel, hot rolled bar** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Unknown** | | ****Yield strength:**** | **1.8e+08 N/m^2** | | ****Tensile strength:**** | **3.25e+08 N/m^2** | | ****Elastic modulus:**** | **2e+11 N/m^2** | | ****Poisson's ratio:**** | **0.29** | | ****Mass density:**** | **7,870 kg/m^3** | | ****Shear modulus:**** | **8e+10 N/m^2** | | ****Thermal expansion coefficient:**** | **1.22e-05 /Kelvin** | | **SolidBody 1(Split Line1)(Anchor Bracket 2-3)** | | **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)** | **-8,600** | **-0.00201416** | **-8.39233e-05** | **8,600** | | **Reaction Moment(N.m)** | **0** | **0** | **0** | **0** | | | |  | ****Load name**** | ****Load Image**** | ****Load Details**** | | --- | --- | --- | | **Force-1** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Reference: | **Face< 1 >** | | Type: | **Apply force** | | Values: | **---, ---, -8,600 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 | 7.34466 mm | | Tolerance | 0.367233 mm | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 12089 | | Total Elements | 7371 | | Maximum Aspect Ratio | 3.5476 | | % of elements with Aspect Ratio < 3 | 100 | | 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 | -8,600 | -0.00201416 | -8.39233e-05 | 8,600 |  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 | -0.000749309 | -0.00190061 | -8.40081e-05 | 0.00204471 |  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 | VON: von Mises Stress | 88,114.281N/m^2  Node: 5428 | 213,833,968.000N/m^2  Node: 11390 | | **Anchor Bracket 2-3-Static 1-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Copy[ 1 ] Stress1 | SX: X Normal Stress | -105,367,744.000N/m^2  Node: 590 | 214,168,976.000N/m^2  Node: 11383 | | **Anchor Bracket 2-3-Static 1-Stress-Copy[ 1 ] Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0.000e+00m  Node: 77 | 9.858e-04m  Node: 8378 | | **Anchor Bracket 2-3-Static 1-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 2.057e-07  Element: 1209 | 8.620e-04  Element: 7368 | | **Anchor Bracket 2-3-Static 1-Strain-Strain1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Factor of Safety1 | Automatic | 8.418e-01  Node: 11390 | 2.043e+03  Node: 5428 | | **Anchor Bracket 2-3-Static 1-Factor of Safety-Factor of Safety1** | | | | |

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| Conclusion |