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|  | |  | | --- | | **Simulation of shaft**  **Date: Tuesday, October 31, 2017 Designer: Solidworks**  **Study name: SimulationXpress Study**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc497234289)  [Assumptions 2](#_Toc497234290)  [Model Information 2](#_Toc497234291)  [Material Properties 3](#_Toc497234292)  [Loads and Fixtures 3](#_Toc497234293)  [Mesh information 4](#_Toc497234294)  [Study Results 6](#_Toc497234295)  [Conclusion 9](#_Toc497234296) | |
| Description Stress  https://www.solidworks.com/product/solidworks-simulation |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** shaft**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Boss-Extrude1** | **Solid Body** | ****Mass:0.239454 kg****  ****Volume:3.06992e-005 m^3****  ****Density:7800 kg/m^3****  ****Weight:2.34665 N**** | ****E:\Documents\MECH3550\EDU\_Simulation\_Model\_Files\_2015\Inital Files\EDU\_Simulation\_Initial\_Model\_Files\_2014\spider\shaft.SLDPRT****  **Oct 31 17:18:44 2017** | |

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| Material Properties  |  |  |  | | --- | --- | --- | | ****Model Reference**** | ****Properties**** | ****Components**** | |  | |  |  | | --- | --- | | ****Name:**** | **Plain Carbon Steel** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Unknown** | | ****Yield strength:**** | **2.20594e+008 N/m^2** | | ****Tensile strength:**** | **3.99826e+008 N/m^2** | | **SolidBody 1(Boss-Extrude1)(shaft)** | |

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| **Loads and Fixtures**  | ****Fixture name**** | ****Fixture Image**** | ****Fixture Details**** | | --- | --- | --- | | **Fixed-1** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Fixed Geometry** | |  | ****Load name**** | ****Load Image**** | ****Load Details**** | | --- | --- | --- | | **Force-1** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Apply normal force** | | Value: | **0.001 N** | | |

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| Mesh information  |  |  | | --- | --- | | Mesh type | Solid Mesh | | Mesher Used: | Standard mesh | | Automatic Transition: | Off | | Include Mesh Auto Loops: | Off | | Jacobian points | 4 Points | | Element Size | 0.123318 in | | Tolerance | 0.00616589 in | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 10012 | | Total Elements | 6392 | | Maximum Aspect Ratio | 3.1094 | | % of elements with Aspect Ratio < 3 | 100 | | % of elements with Aspect Ratio > 10 | 0 | | % of distorted elements(Jacobian) | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:01 | | Computer name: | V530SOZLEK | |  | | |

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| Study Results  | Name | Type | Min | Max | | --- | --- | --- | --- | | Stress | VON: von Mises Stress | 2.17053e-007 N/m^2  Node: 3645 | 1.47441 N/m^2  Node: 997 | | **shaft-SimulationXpress Study-Stress-Stress** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement | URES: Resultant Displacement | 0 mm  Node: 63 | 4.72346e-011 mm  Node: 9682 | | **shaft-SimulationXpress Study-Displacement-Displacement** | | | |  | Name | Type | | --- | --- | | Deformation | Deformed shape | | **shaft-SimulationXpress Study-Displacement-Deformation** | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Factor of Safety | Max von Mises Stress | 1.49615e+008  Node: 997 | 1.01631e+015  Node: 3645 | | **shaft-SimulationXpress Study-Factor of Safety-Factor of Safety** | | | | |

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| Conclusion |