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|  | |  | | --- | | **Simulation of shaft3**  **Date: 23 فبراير, 2016 Designer: Solidworks**  **Study name: Static 1**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc443994745)  [Assumptions 2](#_Toc443994746)  [Model Information 2](#_Toc443994747)  [Study Properties 3](#_Toc443994748)  [Units 3](#_Toc443994749)  [Material Properties 4](#_Toc443994750)  [Loads and Fixtures 5](#_Toc443994751)  [Connector Definitions 6](#_Toc443994752)  [Contact Information 6](#_Toc443994753)  [Mesh information 7](#_Toc443994754)  [Sensor Details 8](#_Toc443994755)  [Resultant Forces 8](#_Toc443994756)  [Beams 8](#_Toc443994757)  [Study Results 9](#_Toc443994758)  [Conclusion 11](#_Toc443994759) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** shaft3**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Cut-Extrude3** | **Solid Body** | ****Mass:2.26075 kg****  ****Volume:0.0002877 m^3****  ****Density:7858 kg/m^3****  ****Weight:22.1553 N**** | ****E:\SolidWork\Project\shaft3.SLDPRT****  **Feb 23 03:39:23 2016** | |

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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 | FFEPlus | | 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 (E:\SolidWork\Project) | |

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

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| Material Properties  |  |  |  | | --- | --- | --- | | ****Model Reference**** | ****Properties**** | ****Components**** | |  | |  |  | | --- | --- | | ****Name:**** | **1023 Carbon Steel Sheet (SS)** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Unknown** | | ****Yield strength:**** | **2.82685e+008 N/m^2** | | ****Tensile strength:**** | **4.25e+008 N/m^2** | | ****Elastic modulus:**** | **2.05e+011 N/m^2** | | ****Poisson's ratio:**** | **0.29** | | ****Mass density:**** | **7858 kg/m^3** | | ****Shear modulus:**** | **8e+010 N/m^2** | | ****Thermal expansion coefficient:**** | **1.2e-005 /Kelvin** | | **SolidBody 1(Cut-Extrude3)(shaft3)** | | **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)** | **-0.00851219** | **-0.96513** | **7.01189e-005** | **0.965168** | | **Reaction Moment(N.m)** | **0** | **0** | **0** | **0** | | | |  | ****Load name**** | ****Load Image**** | ****Load Details**** | | --- | --- | --- | | **Force-1** |  | |  |  | | --- | --- | | Entities: | **3 face(s)** | | Type: | **Apply normal force** | | Value: | **1 N** | | | **Force-2** |  | |  |  | | --- | --- | | Entities: | **3 face(s)** | | Type: | **Apply normal force** | | Value: | **1 N** | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Connector Definitions **Pin/Bolt/Bearing Connector**   |  |  |  | | --- | --- | --- | | ****Model Reference**** | ****Connector Details**** | ****Strength Details**** | | ****Bearing Support-2**** | |  |  | | --- | --- | | ****Entities:**** | **1 face(s)** | | ****Type:**** | **Bearing** | | **No Data** | | ****Connector Forces****   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Type** | **X-Component** | **Y-Component** | **Z-Component** | **Resultant** | | **Axial Force (N)** | **-0.053443** | **0** | **0** | **0.053443** | | **Shear Force (N)** | **0** | **2.3263** | **-5.6362e-005** | **2.3263** | | **Bending moment (N.m)** | **0** | **0** | **0** | **0** | | | | | ****Bearing Support-3**** | |  |  | | --- | --- | | ****Entities:**** | **1 face(s)** | | ****Type:**** | **Bearing** | | **No Data** | | ****Connector Forces****   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Type** | **X-Component** | **Y-Component** | **Z-Component** | **Resultant** | | **Axial Force (N)** | **0.061955** | **-0** | **-0** | **-0.061955** | | **Shear Force (N)** | **0** | **0.63878** | **-1.3716e-005** | **0.63878** | | **Bending moment (N.m)** | **0** | **0** | **0** | **0** | | | | |

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| Contact 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 | 4 Points | | Element Size | 6.60336 mm | | Tolerance | 0.330168 mm | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 14584 | | Total Elements | 9336 | | Maximum Aspect Ratio | 8.1126 | | % of elements with Aspect Ratio < 3 | 93.7 | | % of elements with Aspect Ratio > 10 | 0 | | % of distorted elements(Jacobian) | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:01 | | Computer name: | MONGOOSE-PC | |  | | |

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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 | -0.00851219 | -0.96513 | 7.01189e-005 | 0.965168 |  Reaction Moments  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N.m | 0 | 0 | 0 | 0 | |
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| Beams No Data |

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| Study Results  | Name | Type | Min | Max | | --- | --- | --- | --- | | Stress1 | VON: von Mises Stress | 6.16997 N/m^2  Node: 747 | 20544.3 N/m^2  Node: 11052 | | **shaft3-Static 1-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0 mm  Node: 34 | 1.14846e-005 mm  Node: 11225 | | **shaft3-Static 1-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 7.01292e-011  Element: 8735 | 8.16303e-008  Element: 4150 | | **shaft3-Static 1-Strain-Strain1** | | | | |

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| Conclusion |