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|  | |  | | --- | | **Simulation of shaft2**  **Date: 23 فبراير, 2016 Designer: Solidworks**  **Study name: Static 2**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc443994397)  [Assumptions 2](#_Toc443994398)  [Model Information 2](#_Toc443994399)  [Study Properties 3](#_Toc443994400)  [Units 3](#_Toc443994401)  [Material Properties 4](#_Toc443994402)  [Loads and Fixtures 5](#_Toc443994403)  [Connector Definitions 6](#_Toc443994404)  [Contact Information 6](#_Toc443994405)  [Mesh information 7](#_Toc443994406)  [Sensor Details 8](#_Toc443994407)  [Resultant Forces 8](#_Toc443994408)  [Beams 8](#_Toc443994409)  [Study Results 9](#_Toc443994410)  [Conclusion 12](#_Toc443994411) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** shaft2**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Cut-Extrude3** | **Solid Body** | ****Mass:1.39029 kg****  ****Volume:0.000176927 m^3****  ****Density:7858 kg/m^3****  ****Weight:13.6248 N**** | ****E:\SolidWork\Project\shaft2.SLDPRT****  **Feb 23 03:37:33 2016** | |

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| Study Properties  |  |  | | --- | --- | | Study name | Static 2 | | 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)(shaft2)** | | **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)** | **0.0197661** | **-1.23212** | **0.766886** | **1.45142** | | **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** | | | **Torque-1** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Reference: | **Axis1** | | Type: | **Apply torque** | | Value: | **1 N.m** | | |

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| Connector Definitions **Pin/Bolt/Bearing Connector**   |  |  |  | | --- | --- | --- | | ****Model Reference**** | ****Connector Details**** | ****Strength Details**** | | ****Bearing Support-1**** | |  |  | | --- | --- | | ****Entities:**** | **1 face(s)** | | ****Type:**** | **Bearing** | | **No Data** | | ****Connector Forces****   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Type** | **X-Component** | **Y-Component** | **Z-Component** | **Resultant** | | **Axial Force (N)** | **-0.074818** | **-3.1462e-018** | **0** | **0.074818** | | **Shear Force (N)** | **-8.3267e-017** | **1.9742** | **-0.87241** | **2.1584** | | **Bending moment (N.m)** | **-1.#IND** | **-1.#IND** | **-1.#IND** | **-1.#IND** | | | | | ****Bearing Support-2**** | |  |  | | --- | --- | | ****Entities:**** | **1 face(s)** | | ****Type:**** | **Bearing** | | **No Data** | | ****Connector Forces****   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Type** | **X-Component** | **Y-Component** | **Z-Component** | **Resultant** | | **Axial Force (N)** | **0.055054** | **2.3151e-018** | **-0** | **-0.055054** | | **Shear Force (N)** | **-1.3878e-017** | **0.26379** | **0.10841** | **0.28519** | | **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 | 5.61553 mm | | Tolerance | 0.280777 mm | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 14731 | | Total Elements | 9396 | | Maximum Aspect Ratio | 7.846 | | % of elements with Aspect Ratio < 3 | 96.2 | | % of elements with Aspect Ratio > 10 | 0 | | % of distorted elements(Jacobian) | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:02 | | 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 | 0.0197661 | -1.23212 | 0.766886 | 1.45142 |  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 | 759.699 N/m^2  Node: 9656 | 1.28251e+006 N/m^2  Node: 14250 | | **shaft2-Static 2-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0 mm  Node: 50 | 0.000366607 mm  Node: 659 | | **shaft2-Static 2-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 5.58685e-009  Element: 7561 | 3.59695e-006  Element: 2942 | | **shaft2-Static 2-Strain-Strain1** | | | |  | Name | Type | | --- | --- | | Displacement1{1} | Deformed shape | | **shaft2-Static 2-Displacement-Displacement1{1}** | | |

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| Conclusion |