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|  | |  | | --- | | **Simulation of rectangular hollow plate**  **Date: Wednesday, August 19, 2020 Designer: Solidworks**  **Study name: fine analysis**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc48740121)  [Assumptions 2](#_Toc48740122)  [Model Information 2](#_Toc48740123)  [Study Properties 3](#_Toc48740124)  [Units 3](#_Toc48740125)  [Material Properties 4](#_Toc48740126)  [Loads and Fixtures 5](#_Toc48740127)  [Connector Definitions 5](#_Toc48740128)  [Contact Information 6](#_Toc48740129)  [Mesh information 6](#_Toc48740130)  [Sensor Details 6](#_Toc48740131)  [Resultant Forces 7](#_Toc48740132)  [Beams 7](#_Toc48740133)  [Study Results 8](#_Toc48740134)  [Conclusion 12](#_Toc48740135) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** rectangular hollow plate**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Cut-Extrude1** | **Solid Body** | ****Mass:1.49947 kg****  ****Volume:0.000187434 m^3****  ****Density:8,000 kg/m^3****  ****Weight:14.6948 N**** | ****C:\Users\nlr1\Desktop\SW Simulation 2021\Training Files\SOLIDWORKS Simulation - With Results\Lesson01\Case Studies\rectangular hollow plate.SLDPRT****  **Aug 18 16:51:07 2020** | |

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| Study Properties  |  |  | | --- | --- | | Study name | fine analysis | | 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\nlr1\Desktop\SW Simulation 2021\Training Files\SOLIDWORKS Simulation - With Results\Lesson01\Case Studies\Results) | |

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

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| Material Properties  |  |  |  | | --- | --- | --- | | ****Model Reference**** | ****Properties**** | ****Components**** | |  | |  |  | | --- | --- | | ****Name:**** | **AISI 304** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Max von Mises Stress** | | ****Yield strength:**** | **206.807 N/mm^2** | | ****Tensile strength:**** | **517.017 N/mm^2** | | ****Elastic modulus:**** | **190,000 N/mm^2** | | ****Poisson's ratio:**** | **0.29** | | ****Mass density:**** | **8 g/cm^3** | | ****Shear modulus:**** | **75,000 N/mm^2** | | ****Thermal expansion coefficient:**** | **1.8e-05 /Kelvin** | | **SolidBody 1(Cut-Extrude1)(rectangular hollow plate)** | | **Curve Data:N/A** | | | |

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| **Loads and Fixtures**  | ****Fixture name**** | ****Fixture Image**** | ****Fixture Details**** | | --- | --- | --- | | **Fixed side** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Fixed Geometry** | | | ****Resultant Forces****   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Components** | **X** | **Y** | **Z** | **Resultant** | | **Reaction force(N)** | **-109,999** | **0.980767** | **0.118603** | **109,999** | | **Reaction Moment(N.m)** | **0** | **0** | **0** | **0** | | | |  | ****Load name**** | ****Load Image**** | ****Load Details**** | | --- | --- | --- | | **Tensile force** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Apply normal force** | | Value: | **-110,000 N** | | |

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| Connector Definitions No Data |

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| Contact Information No Data |

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| Mesh information  |  |  | | --- | --- | | Mesh type | Solid Mesh | | Mesher Used: | Curvature-based mesh | | Jacobian points for High quality mesh | 16 Points | | Maximum element size | 2.86227 mm | | Minimum element size | 2.86227 mm | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 104248 | | Total Elements | 68511 | | Maximum Aspect Ratio | 4.2889 | | % of elements with Aspect Ratio < 3 | 99.8 | | Percentage of elements with Aspect Ratio > 10 | 0 | | Percentage of distorted elements | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:04 | | Computer name: | LP5-NLR1\_DSA | |

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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 | -109,999 | 0.980767 | 0.118603 | 109,999 |  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 | 14.6517 | 15.4283 | -10.8562 | 23.8864 |  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 | 4.213394e+00N/mm^2 (MPa)  Node: 33785 | 4.156976e+02N/mm^2 (MPa)  Node: 6281 | | **rectangular hollow plate-fine analysis-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0.000000e+00mm  Node: 1 | 1.435144e-01mm  Node: 303 | | **rectangular hollow plate-fine analysis-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 1.907115e-05  Node: 33785 | 1.881579e-03  Node: 6281 | | **rectangular hollow plate-fine analysis-Strain-Strain1** | | | |  | Name | Type | | --- | --- | | Fatigue Check1 | Fatigue Check Plot | | **rectangular hollow plate-fine analysis-Fatigue Check-Fatigue Check1** | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Stress2 | P1: 1st Principal Stress | -3.071084e+00N/mm^2 (MPa)  Node: 33686 | 4.193761e+02N/mm^2 (MPa)  Node: 6281 | | **rectangular hollow plate-fine analysis-Stress-Stress2** | | | | |

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| Conclusion |