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|  | |  | | --- | | **Simulation of shell\_small\_material**  **Date: 27 May 2024 Designer: Solidworks**  **Study name: Static 1**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc167736937)  [Assumptions 2](#_Toc167736938)  [Model Information 3](#_Toc167736939)  [Study Properties 4](#_Toc167736940)  [Units 4](#_Toc167736941)  [Material Properties 5](#_Toc167736942)  [Loads and Fixtures 5](#_Toc167736943)  [Connector Definitions 6](#_Toc167736944)  [Interaction Information 6](#_Toc167736945)  [Mesh information 7](#_Toc167736946)  [Sensor Details 7](#_Toc167736947)  [Resultant Forces 8](#_Toc167736948)  [Beams 8](#_Toc167736949)  [Study Results 9](#_Toc167736950)  [Conclusion 11](#_Toc167736951) | |
| Description No Data |

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| Assumptions  |  |  | | --- | --- | | Original Model | Model Analyzed | |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** shell\_small\_material**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **shell\_small.step<1>[4]** | **Solid Body** | ****Mass:0.0138369 kg****  ****Volume:1.02598e-05 m^3****  ****Density:1,348.65 kg/m^3****  ****Weight:0.135601 N**** | ****C:\Users\cinta\Downloads\IER\_Shell\Small Shell\shell\_small\_material.SLDPRT****  **May 27 21:14:43 2024** | | **shell\_small.step<1>[3]** | **Solid Body** | ****Mass:0.0115786 kg****  ****Volume:8.5767e-06 m^3****  ****Density:1,350 kg/m^3****  ****Weight:0.11347 N**** | ****C:\Users\cinta\Downloads\IER\_Shell\Small Shell\shell\_small\_material.SLDPRT****  **May 27 21:14:43 2024** | |

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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 | On | | Compute free body forces | On | | Friction | Off | | Use Adaptive Method: | Off | | Result folder | SOLIDWORKS document (C:\Users\cinta\Downloads) | |

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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:**** | **Custom Plastic** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Max von Mises Stress** | | ****Yield strength:**** | **5.3e+07 N/m^2** | | ****Tensile strength:**** | **5.8e+07 N/m^2** | | ****Elastic modulus:**** | **4.3e+09 N/m^2** | | ****Poisson's ratio:**** | **0.394** | | ****Mass density:**** | **1,350 kg/m^3** | | ****Shear modulus:**** | **3.189e+08 N/m^2** | | **SolidBody 1(shell\_small.step<1>[4])(shell\_small),**  **SolidBody 2(shell\_small.step<1>[3])(shell\_small)** | | **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)** | **-8.94892** | **-0.00148447** | **0.616156** | **8.9701** | | **Reaction Moment(N.m)** | **0** | **0** | **0** | **0** | | | |  | ****Load name**** | ****Load Image**** | ****Load Details**** | | --- | --- | --- | | **Force-1** |  | |  |  | | --- | --- | | Entities: | **2 face(s)** | | Type: | **Apply normal force** | | Value: | **15 N** | | |

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| Connector Definitions No Data |

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| Interaction Information  | Interaction | Interaction Image | Interaction Properties | | --- | --- | --- | | Global Interaction |  | |  |  | | --- | --- | | Type: | **Bonded** | | Components: | **1 component(s)** | | Options: | **Independent mesh** | | |

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| Mesh information  |  |  | | --- | --- | | Mesh type | Solid Mesh | | Mesher Used: | Blended curvature-based mesh | | Jacobian points for High quality mesh | 16 Points | | Maximum element size | 8.14427 mm | | Minimum element size | 0.407214 mm | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 16402 | | Total Elements | 8522 | | Maximum Aspect Ratio | 50.2 | | % of elements with Aspect Ratio < 3 | 61.2 | | Percentage of elements with Aspect Ratio > 10 | 17.5 | | Percentage of distorted elements | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:04 | | Computer name: |  | |

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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 | -8.94892 | -0.00148447 | 0.616156 | 8.9701 |  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 | 0 | 0 | 0 |  Free body 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 | 6.835e+01N/m^2  Node: 13395 | 4.320e+07N/m^2  Node: 14791 | | **shell\_small\_material-Static 1-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0.000e+00mm  Node: 5 | 4.026e+01mm  Node: 4 | | **shell\_small\_material-Static 1-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 2.511e-08  Element: 4602 | 4.867e-03  Element: 595 | | **shell\_small\_material-Static 1-Strain-Strain1** | | | | |

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| Conclusion |