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|  | |  | | --- | | **Simulation of nut-rail\_trasintion**  **Date: Friday, May 6, 2022 Designer: Isaac Wax**  **Study name: Static 1**  **Analysis type: Static** | | Table of Contents  [Description 2](#_Toc102738457)  [Assumptions 3](#_Toc102738458)  [Model Information 4](#_Toc102738459)  [Study Properties 5](#_Toc102738460)  [Units 6](#_Toc102738461)  [Material Properties 6](#_Toc102738462)  [Loads and Fixtures 7](#_Toc102738463)  [Connector Definitions 7](#_Toc102738464)  [Contact Information 8](#_Toc102738465)  [Mesh information 9](#_Toc102738466)  [Sensor Details 10](#_Toc102738467)  [Resultant Forces 11](#_Toc102738468)  [Beams 11](#_Toc102738469)  [Study Results 12](#_Toc102738470)  [Conclusion 15](#_Toc102738471)  [Appendix 15](#_Toc102738472) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** nut-rail\_trasintion**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Chamfer6** | **Solid Body** | ****Mass:0.106453 kg****  ****Volume:0.000104365 m^3****  ****Density:1,020 kg/m^3****  ****Weight:1.04324 N**** | ****G:\.shortcut-targets-by-id\1GMoSA8JadHg7ZC1-OKURvM-MxZ\_KA2B-\ROV-2022\MECHAICAL\Bouancey Module Submodule\nut-rail\_trasintion.SLDPRT****  **May 6 13:54:48 2022** | |

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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 | Off | | Compute free body forces | On | | Friction | Off | | Use Adaptive Method: | Off | | Result folder | SOLIDWORKS document (G:\.shortcut-targets-by-id\1GMoSA8JadHg7ZC1-OKURvM-MxZ\_KA2B-\ROV-2022\MECHAICAL\Bouancey Module Submodule) | |

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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:**** | **ABS** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Unknown** | | ****Tensile strength:**** | **3e+07 N/m^2** | | ****Elastic modulus:**** | **2e+09 N/m^2** | | ****Poisson's ratio:**** | **0.394** | | ****Mass density:**** | **1,020 kg/m^3** | | ****Shear modulus:**** | **3.189e+08 N/m^2** | | **SolidBody 1(Chamfer6)(nut-rail\_trasintion)** | | **Curve Data:N/A** | | | |

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| **Loads and Fixtures**  | ****Fixture name**** | ****Fixture Image**** | ****Fixture Details**** | | --- | --- | --- | | **Fixed-1** |  | |  |  | | --- | --- | | Entities: | **2 face(s)** | | Type: | **Fixed Geometry** | | | ****Resultant Forces****   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Components** | **X** | **Y** | **Z** | **Resultant** | | **Reaction force(N)** | **-0.065531** | **-0.00371353** | **-33.6004** | **33.6004** | | **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: | **40 lbf** | | |

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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: | Standard mesh | | Automatic Transition: | Off | | Include Mesh Auto Loops: | Off | | Jacobian points for High quality mesh | 16 Points | | Element Size | 4.70967 mm | | Tolerance | 0.235483 mm | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 31494 | | Total Elements | 19814 | | Maximum Aspect Ratio | 6.8815 | | % of elements with Aspect Ratio < 3 | 96.7 | | Percentage of elements with Aspect Ratio > 10 | 0 | | Percentage of distorted elements | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:05 | | Computer name: |  |  Mesh Control Information:  | **Mesh Control Name** | **Mesh Control Image** | **Mesh Control Details** | | --- | --- | --- | | **Control-1** |  | |  |  | | --- | --- | | Entities: | **54 edge(s)** | | Units: | **mm** | | Size: | **2.82576** | | Ratio: | **2.82576** | | |

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| Sensor Details  | Sensor name | Location | Sensor Details | | --- | --- | --- | | Mass1 |  | Value : 106.45 g  Entities :  Result :Stress  Component :VON: von Mises Stress  Criterion :Model Max  Step Criterion : Across all Steps  Step No.:1  Alert Value: NA | | Displacement1 |  | Value :  Entities :1 plane(s)  Result :Displacement  Component :UX: X Displacement  Criterion :Model Min  Step Criterion : Across all Steps  Step No.:1  Alert Value: NA | |

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| Resultant ForcesReaction forces  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N | -0.065531 | -0.00371353 | -33.6004 | 33.6004 |  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 | -0.00230744 | -0.00250959 | 0.00534451 | 0.00633925 |  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 | 3.002e+02N/m^2  Node: 24617 | 2.798e+06N/m^2  Node: 31340 | | **nut-rail\_trasintion-Static 1-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0.000e+00mm  Node: 51 | 2.209e-02mm  Node: 2168 | | **nut-rail\_trasintion-Static 1-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 1.268e-07  Element: 4465 | 8.086e-04  Element: 11025 | | **nut-rail\_trasintion-Static 1-Strain-Strain1** | | | |  | Name | Type | | --- | --- | | Displacement1{1} | Deformed shape | | **nut-rail\_trasintion-Static 1-Displacement-Displacement1{1}** | | |

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| Conclusion |

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| Appendix |