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|  | |  | | --- | | **Simulation of prt\_motor\_mount\_plate**  **Date: Tuesday, April 22, 2014 Designer: Solidworks**  **Study name: Normal**  **Analysis type: Frequency** | | Table of Contents  [Description 1](#_Toc385926989)  [Assumptions 2](#_Toc385926990)  [Model Information 2](#_Toc385926991)  [Study Properties 3](#_Toc385926992)  [Units 3](#_Toc385926993)  [Material Properties 4](#_Toc385926994)  [Loads and Fixtures 4](#_Toc385926995)  [Connector Definitions 5](#_Toc385926996)  [Contact Information 5](#_Toc385926997)  [Mesh Information 6](#_Toc385926998)  [Sensor Details 7](#_Toc385926999)  [Study Results 8](#_Toc385927000)  [Conclusion 13](#_Toc385927001) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** prt\_motor\_mount\_plate**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Split Line2** | **Solid Body** | ****Mass:0.103146 lb****  ****Volume:1.05744 in^3****  ****Density:0.0975437 lb/in^3****  ****Weight:0.103076 lbf**** | ****C:\Users\cuervo\Documents\OpenROV\test\_stand\_CAD\prt\_motor\_mount\_plate.SLDPRT****  **Apr 22 10:17:40 2014** | |

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| Study Properties  |  |  | | --- | --- | | Study name | Normal | | Analysis type | Frequency | | Mesh type | Solid Mesh | | Number of frequencies | 7 | | Solver type | Automatic | | Soft Spring: | On | | Incompatible bonding options | More accurate (slower) | | Thermal option | Include temperature loads | | Zero strain temperature | 298 Kelvin | | Include fluid pressure effects from SolidWorks Flow Simulation | Off | | Result folder | SolidWorks document (C:\Users\cuervo\Documents\OpenROV\test\_stand\_CAD) | |

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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:**** | **6061-T6 (SS)** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Unknown** | | ****Yield strength:**** | **2.75e+008 N/m^2** | | ****Tensile strength:**** | **3.1e+008 N/m^2** | | ****Mass density:**** | **2700 kg/m^3** | | ****Elastic modulus:**** | **6.9e+010 N/m^2** | | ****Poisson's ratio:**** | **0.33** | | ****Thermal expansion coefficient:**** | **2.4e-005 /Kelvin** | | **SolidBody 1(Split Line2)(prt\_motor\_mount\_plate)** | | **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** | |  | ****Load name**** | ****Load Image**** | ****Load Details**** | | --- | --- | --- | | **Force-2** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Apply normal force** | | Value: | **11 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 | 4 Points | | Maximum element size | 0.142683 in | | Minimum element size | 0.0475604 in | | Mesh Quality | High |  Mesh Information - Details  |  |  | | --- | --- | | Total Nodes | 21047 | | Total Elements | 12690 | | Maximum Aspect Ratio | 7.1728 | | % of elements with Aspect Ratio < 3 | 97.3 | | % of elements with Aspect Ratio > 10 | 0 | | % of distorted elements(Jacobian) | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:02 | | Computer name: | CUERVO-PC | |  | | |

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| Sensor Details No Data |

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| Study Results  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement Plot for Mode Shape: 1(Value = 344.83 Hz) | 0 mm  Node: 15 | 9526.13 mm  Node: 368 | | **prt\_motor\_mount\_plate-Normal-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement2 | URES: Resultant Displacement Plot for Mode Shape: 2(Value = 509.436 Hz) | 0 mm  Node: 15 | 9671.07 mm  Node: 253 | | **prt\_motor\_mount\_plate-Normal-Displacement-Displacement2** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement3 | URES: Resultant Displacement Plot for Mode Shape: 3(Value = 1917.7 Hz) | 0 mm  Node: 15 | 14321 mm  Node: 3424 | | **prt\_motor\_mount\_plate-Normal-Displacement-Displacement3** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement4 | URES: Resultant Displacement Plot for Mode Shape: 4(Value = 2546.21 Hz) | 0 mm  Node: 15 | 9376 mm  Node: 844 | | **prt\_motor\_mount\_plate-Normal-Displacement-Displacement4** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement5 | URES: Resultant Displacement Plot for Mode Shape: 5(Value = 3749.35 Hz) | 0 mm  Node: 15 | 11935.1 mm  Node: 368 | | **prt\_motor\_mount\_plate-Normal-Displacement-Displacement5** | | | |   **Mode List**   | ****Frequency Number**** | ****Rad/sec**** | ****Hertz**** | ****Seconds**** | | --- | --- | --- | --- | | **1** | **2166.6** | **344.83** | **0.0029** | | **2** | **3200.9** | **509.44** | **0.001963** | | **3** | **12049** | **1917.7** | **0.00052146** | | **4** | **15998** | **2546.2** | **0.00039274** | | **5** | **23558** | **3749.4** | **0.00026671** | | **6** | **33387** | **5313.8** | **0.00018819** | | **7** | **46734** | **7438** | **0.00013445** |   **Mass Participation (Normalized)**   | ****Mode Number**** | ****Frequency(Hertz)**** | ****X direction**** | ****Y direction**** | ****Z direction**** | | --- | --- | --- | --- | --- | | **1** | **344.83** | **0.42976** | **2.1125e-010** | **9.0263e-012** | | **2** | **509.44** | **2.0926e-010** | **0.44071** | **1.1044e-005** | | **3** | **1917.7** | **2.7616e-006** | **7.6364e-008** | **1.8053e-010** | | **4** | **2546.2** | **0.069866** | **1.3062e-009** | **2.611e-009** | | **5** | **3749.4** | **4.7017e-009** | **0.059132** | **0.00064317** | | **6** | **5313.8** | **0.013605** | **1.5694e-008** | **1.1808e-007** | | **7** | **7438** | **4.0157e-009** | **0.00031037** | **0.47586** | |  |  | **Sum X = 0.51323** | **Sum Y = 0.50016** | **Sum Z = 0.47652** | |

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| Conclusion |