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|  | |  | | --- | | **Simulation of MotorCage**  **Date: Monday, July 4, 2022 Designer: Solidworks**  **Study name: Static 1**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc107860064)  [Assumptions 2](#_Toc107860065)  [Model Information 2](#_Toc107860066)  [Study Properties 3](#_Toc107860067)  [Units 3](#_Toc107860068)  [Material Properties 4](#_Toc107860069)  [Loads and Fixtures 4](#_Toc107860070)  [Connector Definitions 5](#_Toc107860071)  [Interaction Information 5](#_Toc107860072)  [Mesh information 5](#_Toc107860073)  [Sensor Details 5](#_Toc107860074)  [Resultant Forces 6](#_Toc107860075)  [Beams 6](#_Toc107860076)  [Study Results 7](#_Toc107860077)  [Conclusion 9](#_Toc107860078)  [Appendix 9](#_Toc107860079) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** MotorCage**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **CirPattern1** | **Solid Body** | ****Mass:0.0562956 kg****  ****Volume:4.43433e-05 m^3****  ****Density:1,269.54 kg/m^3****  ****Weight:0.551697 N**** | ****B:\5.1\PROJECT\progress\Synthetic-HdyroExperimental-Machine-Project\designs\DischargeFlowControl\MotorCage.SLDPRT****  **Jun 29 16:59:50 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 (B:\5.1\PROJECT\progress\Synthetic-HdyroExperimental-Machine-Project\designs\DischargeFlowControl) | |

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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:**** | **PEI** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Unknown** | | ****Tensile strength:**** | **8.5e+07 N/m^2** | | ****Compressive strength:**** | **1.4e+08 N/m^2** | | ****Elastic modulus:**** | **3.1e+09 N/m^2** | | ****Poisson's ratio:**** | **0.44** | | ****Mass density:**** | **1,270 kg/m^3** | | **SolidBody 1(CirPattern1)(MotorCage)** | | **Curve Data:N/A** | | | |

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| **Loads and Fixtures**  | ****Fixture name**** | ****Fixture Image**** | ****Fixture Details**** | | --- | --- | --- | | **Fixed-1** |  | |  |  | | --- | --- | | Entities: | **4 face(s)** | | Type: | **Fixed Geometry** | | | ****Resultant Forces****   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Components** | **X** | **Y** | **Z** | **Resultant** | | **Reaction force(N)** | **0.0130131** | **0.000182867** | **0.0268909** | **0.0298747** | | **Reaction Moment(N.m)** | **0** | **0** | **0** | **0** | | | |  | ****Load name**** | ****Load Image**** | ****Load Details**** | | --- | --- | --- | | **Torque-1** |  | |  |  | | --- | --- | | Reference: | **Face< 1 >** | | Type: | **Apply torque** | | Value: | **1.1768 N.m** | | |

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| Connector Definitions No Data |

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| Interaction Information No Data |

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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 | 0.708231 cm | | Minimum element size | 0.0384384 cm | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 205590 | | Total Elements | 126324 | | Maximum Aspect Ratio | 43.898 | | % of elements with Aspect Ratio < 3 | 77.8 | | Percentage of elements with Aspect Ratio > 10 | 4.67 | | Percentage of distorted elements | 0 | | Time to complete mesh(hh;mm;ss): | 00:01:14 | | Computer name: | PROMETHEUS | |

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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 | 0.0130131 | 0.000182867 | 0.0268909 | 0.0298747 |  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 | -0.0104091 | 0.0103248 | -0.0118516 | 0.0188524 |  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 | 1.004e+04N/m^2  Node: 200764 | 8.732e+06N/m^2  Node: 150889 | | **MotorCage-Static 1-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0.000e+00mm  Node: 129 | 8.167e-01mm  Node: 223 | | **MotorCage-Static 1-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 5.771e-06  Element: 117752 | 2.099e-03  Element: 62553 | | **MotorCage-Static 1-Strain-Strain1** | | | |  | Name | Type | | --- | --- | | Displacement1{1} | Deformed shape | | **MotorCage-Static 1-Displacement-Displacement1{1}** | | |

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| Conclusion |

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| Appendix |