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|  | |  | | --- | | **Simulation of ARM\_12**  **Date: Friday, March 28, 2025 Designer: Solidworks**  **Study name: Static 1**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc194073256)  [Assumptions 2](#_Toc194073257)  [Model Information 2](#_Toc194073258)  [Study Properties 3](#_Toc194073259)  [Units 3](#_Toc194073260)  [Material Properties 4](#_Toc194073261)  [Loads and Fixtures 4](#_Toc194073262)  [Connector Definitions 5](#_Toc194073263)  [Contact Information 5](#_Toc194073264)  [Mesh information 5](#_Toc194073265)  [Sensor Details 6](#_Toc194073266)  [Resultant Forces 6](#_Toc194073267)  [Beams 6](#_Toc194073268)  [Study Results 7](#_Toc194073269)  [Conclusion 9](#_Toc194073270) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** ARM\_12**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Fillet1** | **Solid Body** | ****Mass:0.000392964 kg****  ****Volume:2.45618e-06 m^3****  ****Density:159.99 kg/m^3****  ****Weight:0.00385105 N**** | ****D:\Mustafa\Solid work\Robot V2\Arm\ARM\_12.SLDPRT****  **Mar 27 03:17:02 2025** | |

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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 (D:\Mustafa\Solid work\Robot V2\Arm) | |

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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:**** | **Balsa** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Unknown** | | ****Yield strength:**** | **2e+07 N/m^2** | | ****Elastic modulus:**** | **3e+09 N/m^2** | | ****Poisson's ratio:**** | **0.29** | | ****Mass density:**** | **159.99 kg/m^3** | | ****Shear modulus:**** | **3e+08 N/m^2** | | **SolidBody 1(Fillet1)(ARM\_12)** | | **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)** | **2.95043e-06** | **5** | **1.86265e-08** | **5** | | **Reaction Moment(N.m)** | **0** | **0** | **0** | **0** | | | |  | ****Load name**** | ****Load Image**** | ****Load Details**** | | --- | --- | --- | | **Force-1** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Reference: | **Edge< 1 >** | | Type: | **Apply force** | | Values: | **---, ---, 5 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: | Blended curvature-based mesh | | Jacobian points for High quality mesh | 16 Points | | Maximum element size | 1.34981 mm | | Minimum element size | 0.449933 mm | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 15493 | | Total Elements | 9295 | | Maximum Aspect Ratio | 4.1594 | | % of elements with Aspect Ratio < 3 | 99.7 | | Percentage of elements with Aspect Ratio > 10 | 0 | | Percentage of distorted elements | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:01 | | Computer name: | MOSTAFA\_LABIB | |

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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 | 2.95043e-06 | 5 | 1.86265e-08 | 5 |  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 | 3.90317e-06 | 1.3411e-06 | -4.09861e-08 | 4.12735e-06 |  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 | 1.200e+04N/m^2  Node: 9349 | 1.556e+07N/m^2  Node: 592 | | **ARM\_12-Static 1-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0.000e+00mm  Node: 29 | 1.353e+00mm  Node: 7371 | | **ARM\_12-Static 1-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 9.727e-06  Element: 1382 | 3.798e-03  Element: 8315 | | **ARM\_12-Static 1-Strain-Strain1** | | | | |

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| Conclusion |