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|  | |  | | --- | | **Simulation of prosthetic fin**  **Date: Monday, December 16, 2024 Designer: Solidworks**  **Study name: Static study**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc185284904)  [Assumptions 2](#_Toc185284905)  [Model Information 2](#_Toc185284906)  [Study Properties 3](#_Toc185284907)  [Units 3](#_Toc185284908)  [Material Properties 4](#_Toc185284909)  [Loads and Fixtures 5](#_Toc185284910)  [Connector Definitions 5](#_Toc185284911)  [Interaction Information 6](#_Toc185284912)  [Mesh information 6](#_Toc185284913)  [Sensor Details 6](#_Toc185284914)  [Resultant Forces 7](#_Toc185284915)  [Beams 7](#_Toc185284916)  [Study Results 8](#_Toc185284917)  [Conclusion 10](#_Toc185284918) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** prosthetic fin**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Fillet2** | **Solid Body** | ****Mass:0.320238 kg****  ****Volume:0.000313959 m^3****  ****Density:1,020 kg/m^3****  ****Weight:3.13834 N**** | ****C:\caed\PROJECT FINAL PUNITH\Prosthetic swim leg(step)\prosthetic fin.SLDPRT****  **Dec 16 23:39:42 2024** | |

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| Study Properties  |  |  | | --- | --- | | Study name | Static study | | 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 (C:\caed\PROJECT FINAL PUNITH\Prosthetic swim leg(step)) | |

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| Units  |  |  | | --- | --- | | Unit system: | SI (MKS) | | Length/Displacement | mm | | Temperature | Kelvin | | Angular velocity | Rad/sec | | Pressure/Stress | N/mm^2 (MPa) | |

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| Material Properties  |  |  |  | | --- | --- | --- | | ****Model Reference**** | ****Properties**** | ****Components**** | |  | |  |  | | --- | --- | | ****Name:**** | **TPU** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Unknown** | | ****Tensile strength:**** | **30 N/mm^2** | | ****Elastic modulus:**** | **2,000 N/mm^2** | | ****Poisson's ratio:**** | **0.394** | | ****Mass density:**** | **1.02 g/cm^3** | | ****Shear modulus:**** | **318.9 N/mm^2** | | **SolidBody 1(Fillet2)(prosthetic fin)** | | **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)** | **8.22033** | **94.3197** | **4.47035e-08** | **94.6772** | | **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: | **50 N** | | | **Force-2** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Apply normal force** | | Value: | **5 N** | | |

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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: | Standard mesh | | Automatic Transition: | Off | | Include Mesh Auto Loops: | Off | | Jacobian points for High quality mesh | 4 Points | | Element Size | 0.267654 in | | Tolerance | 0.0133827 in | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 14523 | | Total Elements | 8613 | | Maximum Aspect Ratio | 19.448 | | % of elements with Aspect Ratio < 3 | 95 | | Percentage of elements with Aspect Ratio > 10 | 0.0813 | | Percentage of distorted elements | 0.139 | | Time to complete mesh(hh;mm;ss): | 00:00:03 | | 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 | 8.22033 | 94.3197 | 4.47035e-08 | 94.6772 |  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 | -6.68865e-05 | -4.03253e-05 | -4.20958e-06 | 7.82154e-05 |  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 | 5.473e-03N/mm^2 (MPa)  Node: 12569 | 5.658e+00N/mm^2 (MPa)  Node: 14037 | | **prosthetic fin-Static study-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0.000e+00mm  Node: 6 | 1.149e+00mm  Node: 13003 | | **prosthetic fin-Static study-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 1.691e-06  Element: 3121 | 2.050e-03  Element: 3420 | | **prosthetic fin-Static study-Strain-Strain1** | | | | |

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| Conclusion |