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|  | |  | | --- | | **Simulation of Waxo\_C2**  **Date: Wednesday, May 10, 2017 Designer: Solidworks**  **Study name: Design Study 1**  **Analysis type: Design Study** | | Table of Contents  [Description 1](#_Toc482182097)  [Assumptions 2](#_Toc482182098)  [Model Information 2](#_Toc482182099)  [Study Properties 3](#_Toc482182100)  [Units 4](#_Toc482182101)  [Design Study Setup 4](#_Toc482182102)  [Study Results 5](#_Toc482182103)  [Conclusion 5](#_Toc482182104) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  | | --- | --- | --- | --- | | Document Name | Configuration | Document Path | Date Modified | | Waxo\_C2 | Default | Z:\Research project\myWork\Design\WaxoDesign\Waxo\_C2.SLDASM | May 09 19:59:02 2017 | | LoadCellLZCG-1 | Default | Z:\Research project\myWork\Design\WaxoDesign\LoadCellLZCG.SLDPRT | May 05 13:10:30 2017 | | TransmissionBoxAssem-1/VbrakeNoodle-1 | Default | Z:\Research project\myWork\Design\WaxoDesign\VbrakeNoodle.SLDPRT | Apr 13 16:18:32 2017 | | TransmissionBoxAssem-1/VbrakeNoodle-2 | Default | Z:\Research project\myWork\Design\WaxoDesign\VbrakeNoodle.SLDPRT | Apr 13 16:18:32 2017 | | TransmissionBoxAssem-1/cableRoutingBox-1 | Default | Z:\Research project\myWork\Design\WaxoDesign\cableRoutingBox.SLDPRT | Apr 13 17:49:58 2017 | | curvedBarLeft-1 | Default | Z:\Research project\myWork\Design\WaxoDesign\curvedBarLeft.SLDPRT | May 01 12:48:11 2017 | | curvedBarRight-1 | Default | Z:\Research project\myWork\Design\WaxoDesign\curvedBarRight.SLDPRT | May 09 19:51:40 2017 | | curvedBarRight-2 | Default | Z:\Research project\myWork\Design\WaxoDesign\curvedBarRight.SLDPRT | May 09 19:51:40 2017 | | loadCell mount-1 | Default | Z:\Research project\myWork\Design\WaxoDesign\loadCell mount.SLDPRT | May 04 19:52:04 2017 | | loadCellCableMount-1 | Default | Z:\Research project\myWork\Design\WaxoDesign\loadCellCableMount.SLDPRT | May 05 13:08:12 2017 | | myBootCAT\_Corrected-1 | Default | Z:\Research project\myWork\Design\WaxoDesign\myBootCAT\_Corrected.SLDPRT | May 01 12:35:47 2017 | | shank-1 | Default | Z:\Research project\myWork\Design\WaxoDesign\shank.SLDPRT | Apr 04 15:40:19 2017 | | torqueBar-1 | Default | Z:\Research project\myWork\Design\WaxoDesign\torqueBar.SLDPRT | May 09 19:53:09 2017 | | torqueBar-2 | Default | Z:\Research project\myWork\Design\WaxoDesign\torqueBar.SLDPRT | May 09 19:53:09 2017 | |

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| Study Properties  |  |  | | --- | --- | | Study name | Design Study 1 | | Analysis type | Design Study(Optimization) | | Design Study Quality | High quality (slower) | | Result folder | SOLIDWORKS document(Z:\Research project\myWork\Design\WaxoDesign) | |

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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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| **Design Study Setup** **Design Variables**   | ****Name**** | ****Type**** | ****Value**** | ****Units**** | | --- | --- | --- | --- | | **bar\_thickness** | **Range with Step** | Min:2 Max:3 Step:1 | mm | | **bar\_width** | **Range with Step** | Min:10 Max:20 Step:1 | mm |   **Constraints**   | ****Sensor name**** | ****Condition**** | ****Bounds**** | ****Units**** | ****Study name**** | | --- | --- | --- | --- | --- | | **Minimum Factor of Safety1** | **is greater than** | Min:1.500000 | <ConstrUnits/> | Static 2 |   **Goals**   | ****Name**** | ****Goal**** | ****Properties**** | ****Weight**** | ****Study name**** | | --- | --- | --- | --- | --- | | **Mass2** | Minimize | Mass | 10 | - | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Study Results 21 of 24 scenarios ran successfully.   | Component name | Units | Current | Initial | Optimal | Scenario1 | Scenario2 | | --- | --- | --- | --- | --- | --- | --- | | bar\_thickness | mm | 3 | 3 | - | 2 | 3 | | bar\_width | mm | 10 | 10 | - | 10 | 10 | | Minimum Factor of Safety1 |  | 0.323038 | 0.323038 | - | 0.226231 | 0.323038 | | Mass2 | g | 34.0816 | 34.0816 | - | 25.2584 | 34.0816 |  | Component name | Units | Scenario3 | Scenario4 | Scenario5 | Scenario6 | Scenario7 | | --- | --- | --- | --- | --- | --- | --- | | bar\_thickness | mm | 2 | 3 | 2 | 3 | 2 | | bar\_width | mm | 11 | 11 | 12 | 12 | 13 | | Minimum Factor of Safety1 |  | - | - | 0.317000 | 0.452029 | 0.364900 | | Mass2 | g | - | - | 29.009 | 39.7075 | 30.897 |  | Component name | Units | Scenario8 | Scenario9 | Scenario10 | Scenario11 | Scenario12 | | --- | --- | --- | --- | --- | --- | --- | | bar\_thickness | mm | 3 | 2 | 3 | 2 | 3 | | bar\_width | mm | 13 | 14 | 14 | 15 | 15 | | Minimum Factor of Safety1 |  | 0.529512 | 0.426550 | 0.619792 | 0.482066 | 0.656948 | | Mass2 | g | 42.5395 | 32.7936 | 45.3843 | 34.6986 | 48.2418 |  | Component name | Units | Scenario13 | Scenario14 | Scenario15 | Scenario16 | Scenario17 | | --- | --- | --- | --- | --- | --- | --- | | bar\_thickness | mm | 2 | 3 | 2 | 3 | 2 | | bar\_width | mm | 16 | 16 | 17 | 17 | 18 | | Minimum Factor of Safety1 |  | 0.458435 | 0.695207 | 0.477830 | 0.741675 | 0.589673 | | Mass2 | g | 36.612 | 51.112 | 38.534 | 53.9949 | 40.4644 |  | Component name | Units | Scenario18 | Scenario19 | Scenario20 | Scenario21 | Scenario22 | | --- | --- | --- | --- | --- | --- | --- | | bar\_thickness | mm | 3 | 2 | 3 | 2 | 3 | | bar\_width | mm | 18 | 19 | 19 | 20 | 20 | | Minimum Factor of Safety1 |  | 0.765499 | 0.578868 | 0.746426 | 0.587327 | 0.861705 | | Mass2 | g | 56.8906 | 42.4033 | 59.799 | 44.3508 | 62.7201 | |

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| Conclusion |