

Bearing calculation test plan

Propulsion system simulation

Fangzhou chen Jiacong li Marco Hoogesteger Martijn Crombeen

*Organisation: Solar Boat Sealander*

*Client: Mr. R. Eijlers*

*Tutor: Mr. W. Haak*

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# Aim & Hypothesis

## Aim

The aim of this test is to verify the simulated mathematical model of the bearing calculations.

## Hypothesis

The bearing simulation has the same desired output values, compared to the calculations.

# Variables

These are the constants and variables that will be used during the test.

|  |  |
| --- | --- |
| Constants simulation | Keep constant at... |
| Battery level computer | Constant power source. |
| All input variables | Real positive numbers & ISO-notation. |

## Inputs

The limits stated are the limits of the real world. If values out of this range are entered, the outputs will be unreliable.

|  |  |
| --- | --- |
| Inputs | Value |
| Friction coefficient | 0,0015 – 0,0050 |
| Radius shaft [m] | 0 – 0,05 |
| Load [N] | 0 - 1000 |

## Outputs

These are the outputs that will be monitored and will be used to see variations or changes in the system.

|  |  |
| --- | --- |
| Outputs | Value |
| Thrust [N] | 0 - 500 |
| Power output [W] | 0 - 8400 |
| Power loss [% of P\_in] | 0 – 1 |

# Tools

|  |  |
| --- | --- |
| Testing tools | Demand |
| Computer | Windows 10 compatible |
| Excel | Newest version |
| Keyboard | No limit |
| Mouse | No limit |
| Calculator | Basic calculator |
| Pen & Paper | Basic pen & paper |

# Method

The simulation will be compared to the actual calculations to see if they are the same.

## 4.1 Steps

1. Put the different values in the simulation
2. Note the outputs
3. Calculate the outputs based on the formulas using pen, paper and calculator
4. Note the answers.

# 5.Expect result

The expected outputs are stated in the table 2.2

# 6.Conclusion

If the outputs have the same values as their calculated counterparts, the test is considered as passed.  
If not, the test is considered as failed.

# Appendix

**Friction force**

=loss due to friction [N]

=load from axis on bearing [N]

µ=friction coefficient

**Powerloss due to friction**

= output power (W).

= input power (W).

=loss due to friction [N]

=radius driving shaft [m]

ω=angular velocity [rad/s]