Hi there,

This section of the file repository is dedicated to the resonance simulation results for different NCal prototype designs, generated using Fusion360 to confirming the best implementation of a lid mechanism to the wheel. The client (Bram) noted that he wanted to add lids to the device to assist in reducing modes in the wheel’s structure as it rotates. This was a great design idea and required the simulating of several lid implementations to confirm which was best for reducing the modal frequency. Fusion360 was used to simulate these mechanics, where the top and bottom of the axel were fixed in place and the only forces applied to the wheel were those of gravity and a rotational velocity of 360 deg/s (1 total rotation every second). The simulation process took some time as research and practice behind the simulation mechanics were required.

Five different lid implementation designs were analysed and the results are reflected in the following table. Note that lids were also added above the masses when the center filling versions of the wheel underwent were simulation, as these lids would be implemented to assist in holding the masses in place.

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| **Lid/Infill Application** | **Lid Thickness (mm)** | **Lowest Rotational Mode Frequency (Hz)** | **Fusion 360 Model** |
| None | 0 | 162.1 |  |
| Center | 10 | 132.0 |  |
| Filled in Center | 45 | 117.6 |  |
| Top and Bottom | 5 | 61.1 |  |