

The background is a light blue gradient. In the top left, there are three small white cubes with blue outlines, connected by thin white lines. In the bottom left, there is a large, dark blue geometric shape resembling a stylized arrow or a corner. On the right side, there is a network of white dots connected by thin white lines, forming a complex, interconnected pattern.

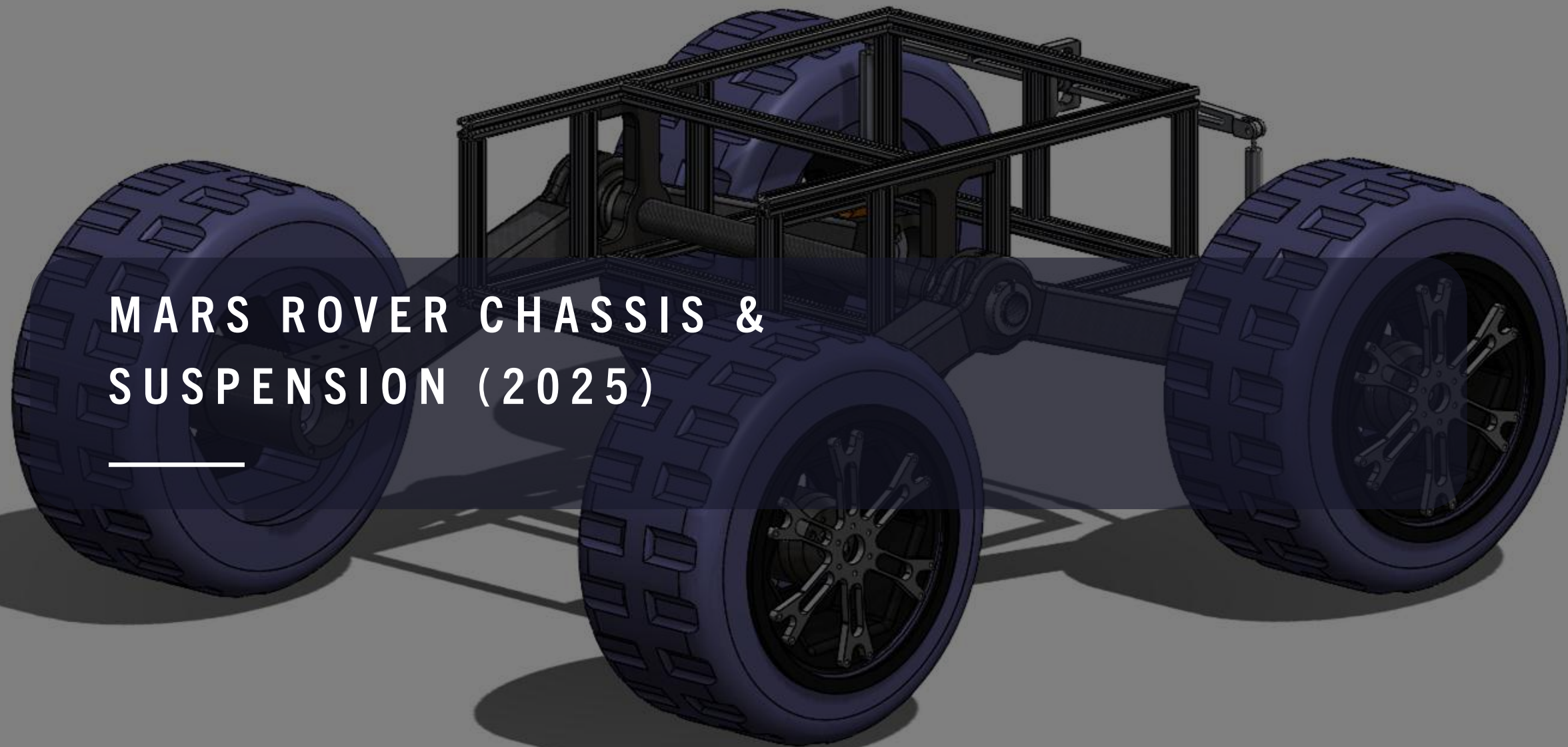
# PROJECT PORTFOLIO

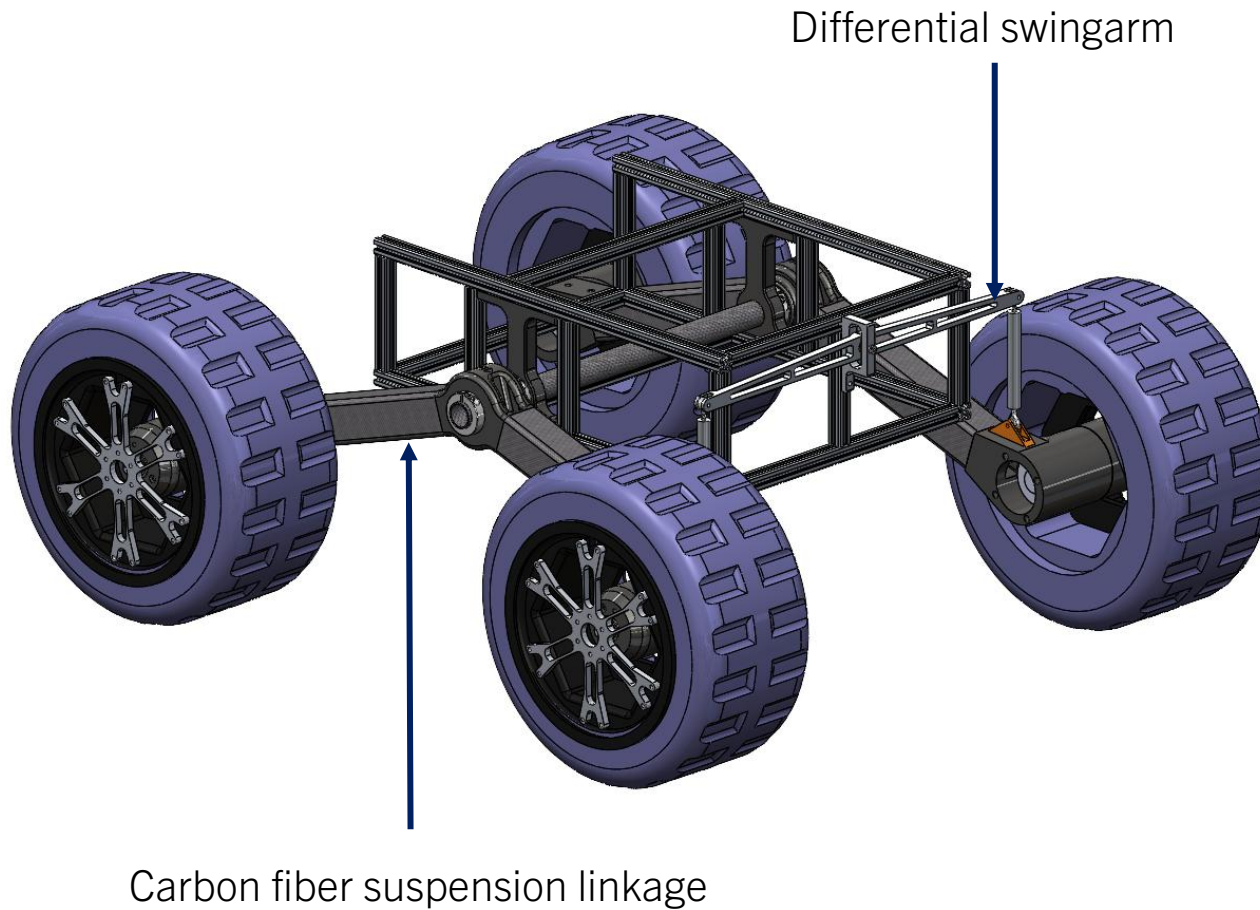
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Samuel Lavictoire

# MARS ROVER CHASSIS & SUSPENSION (2025)

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### Project tasks:

- Fixed previous tolerance issues in old Suspension linkage
- 3D printed pivot (Markforged nylon & carbon fiber)
- Researched and applied proper surface preparation epoxy surface carbon fiber
- Ran Ansys validation on Swingarm design

# PIVOT-DESIGN AND ASSEMBLY

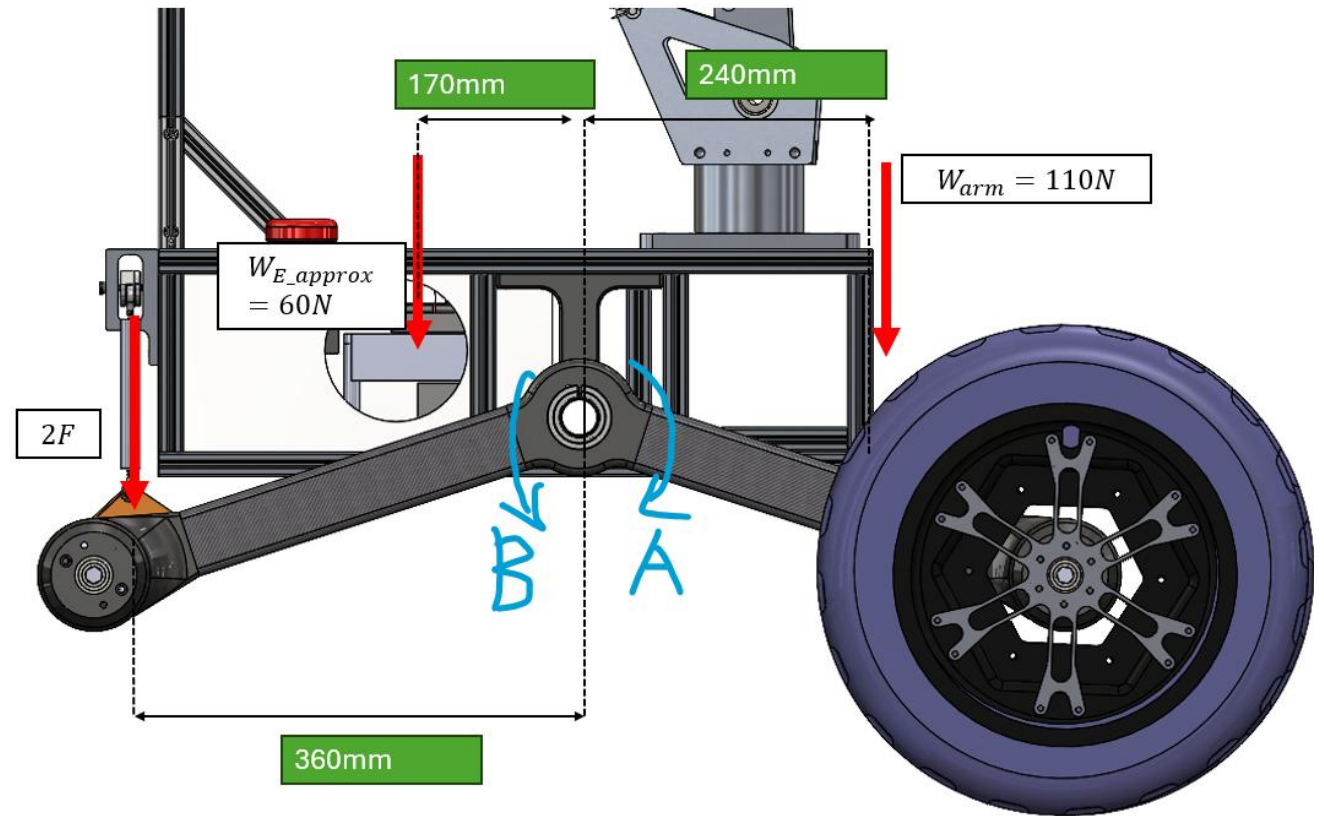


Bonding pivot to carbon fiber  
tubes



# SWINGARM-DESIGN

- Used Free body diagram
- Calculated forces for FEA simulation on Ansys





# SWINGARM-DESIGN

## A: Static Structural

Equivalent Stress

Type: Equivalent (von-Mises) Stress

Unit: MPa

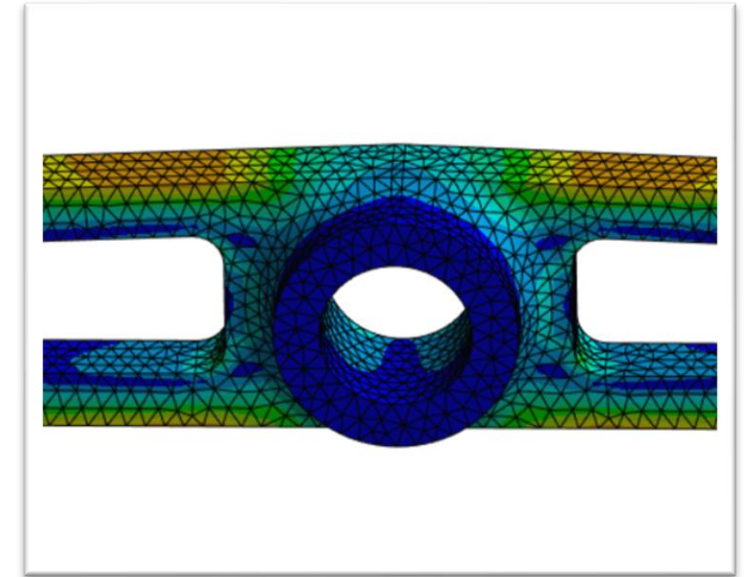
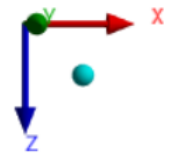
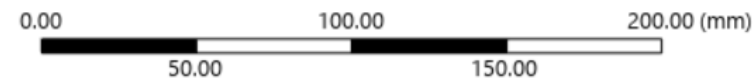
Time: 1 s

Custom

Max: 17.359

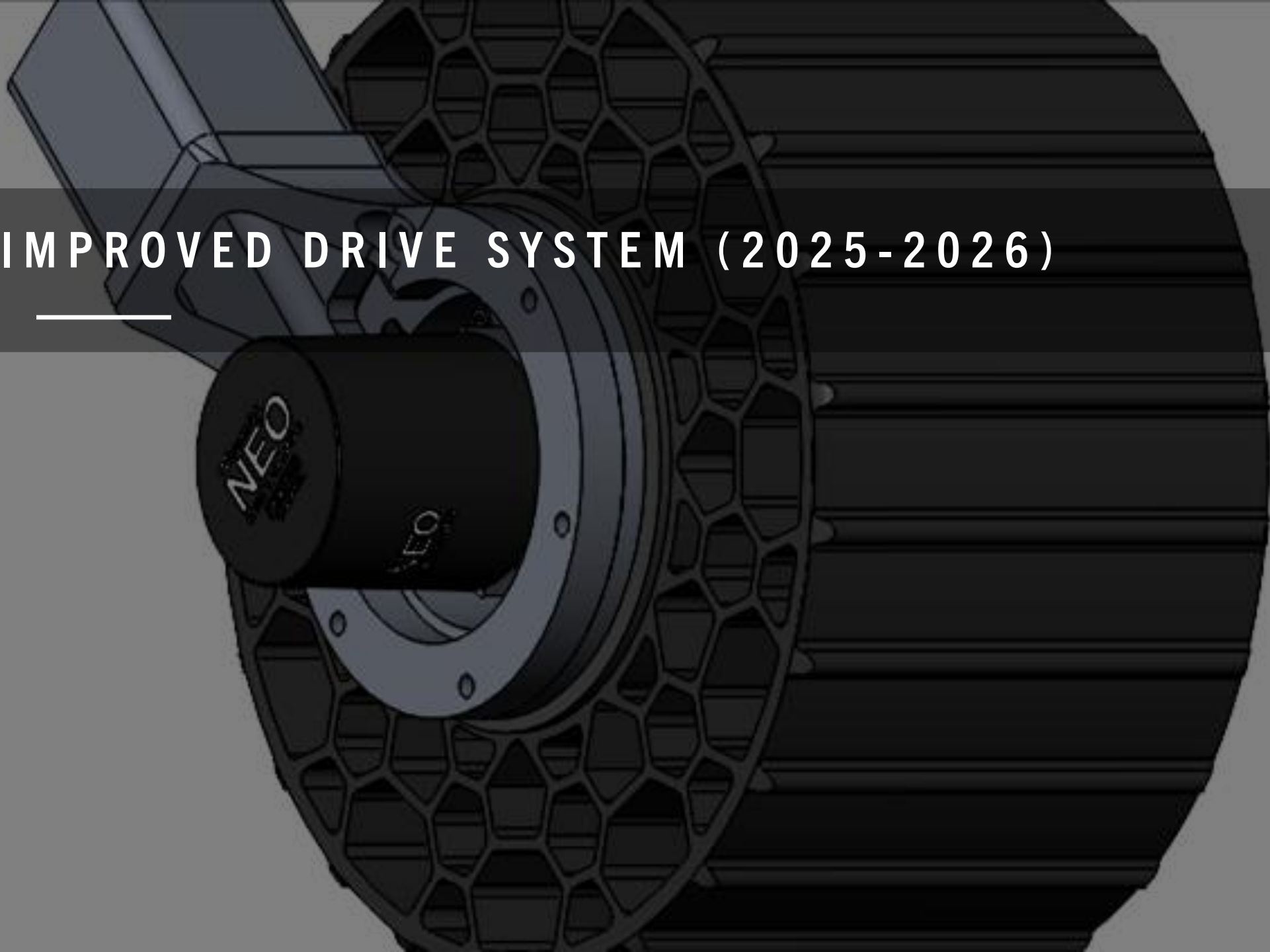
Min: 0.001973

2/6/2025 4:38 PM



# IMPROVED DRIVE SYSTEM (2025-2026)

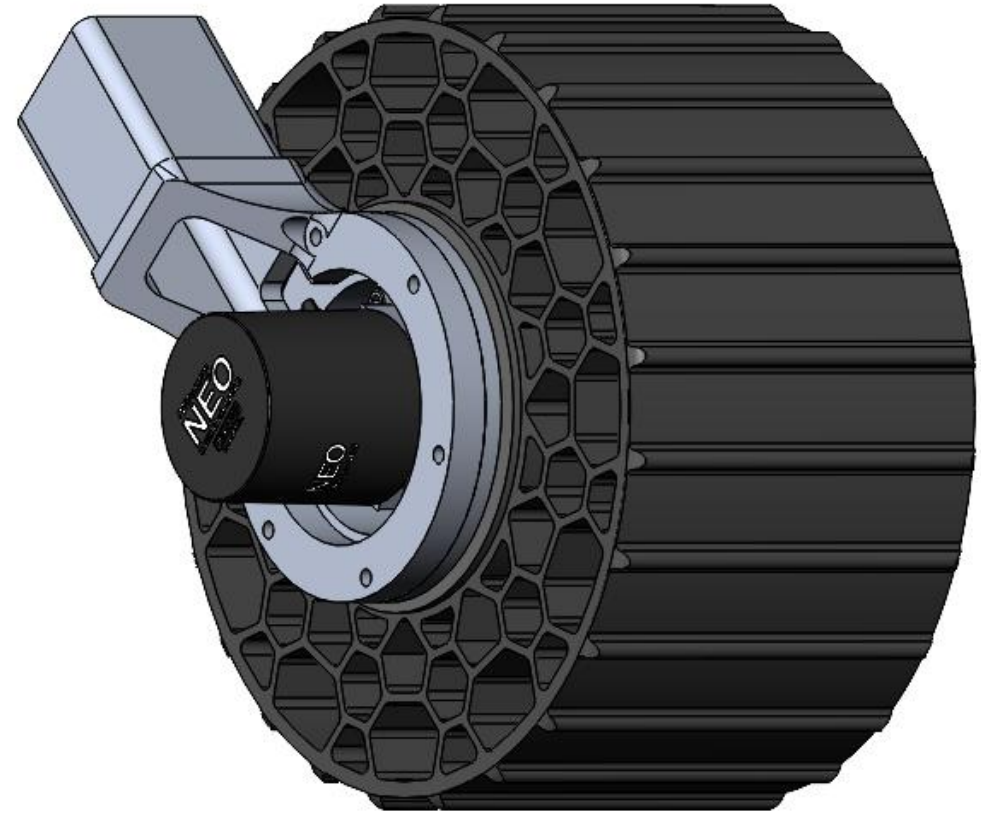
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# IMPROVED DRIVE SYSTEM

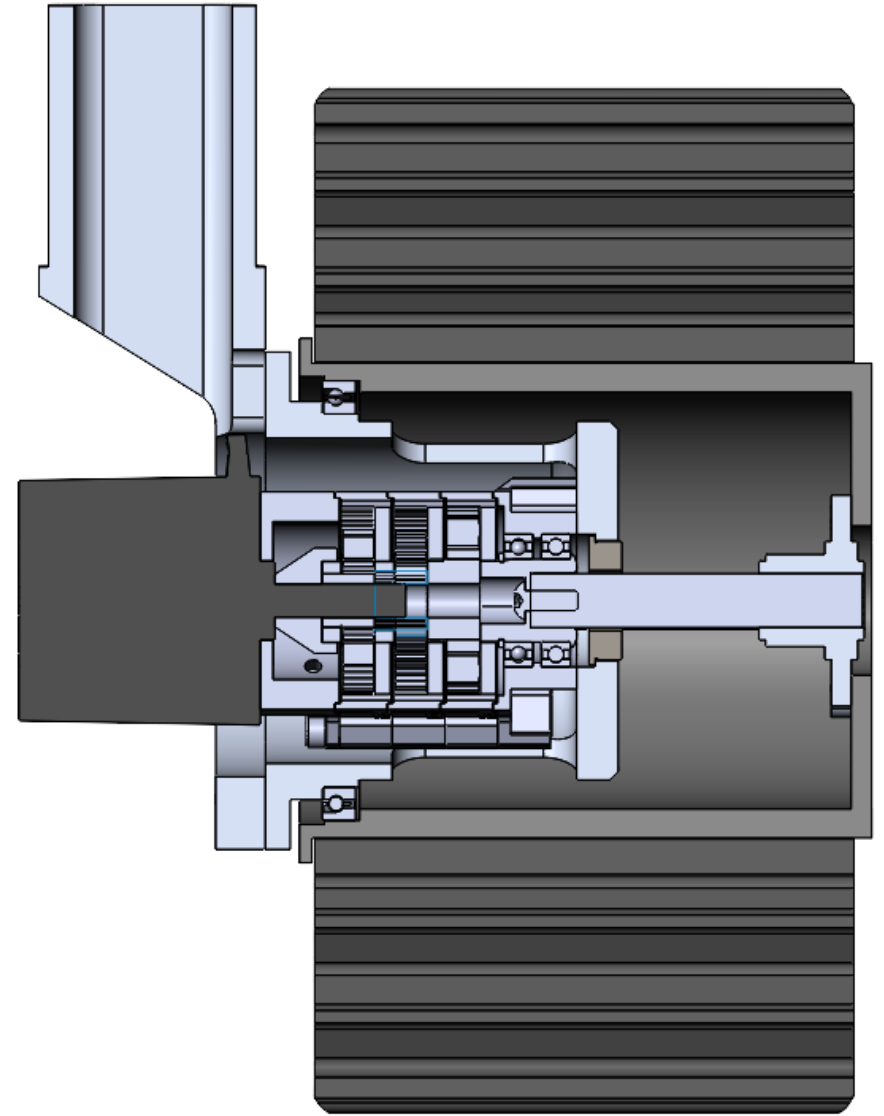
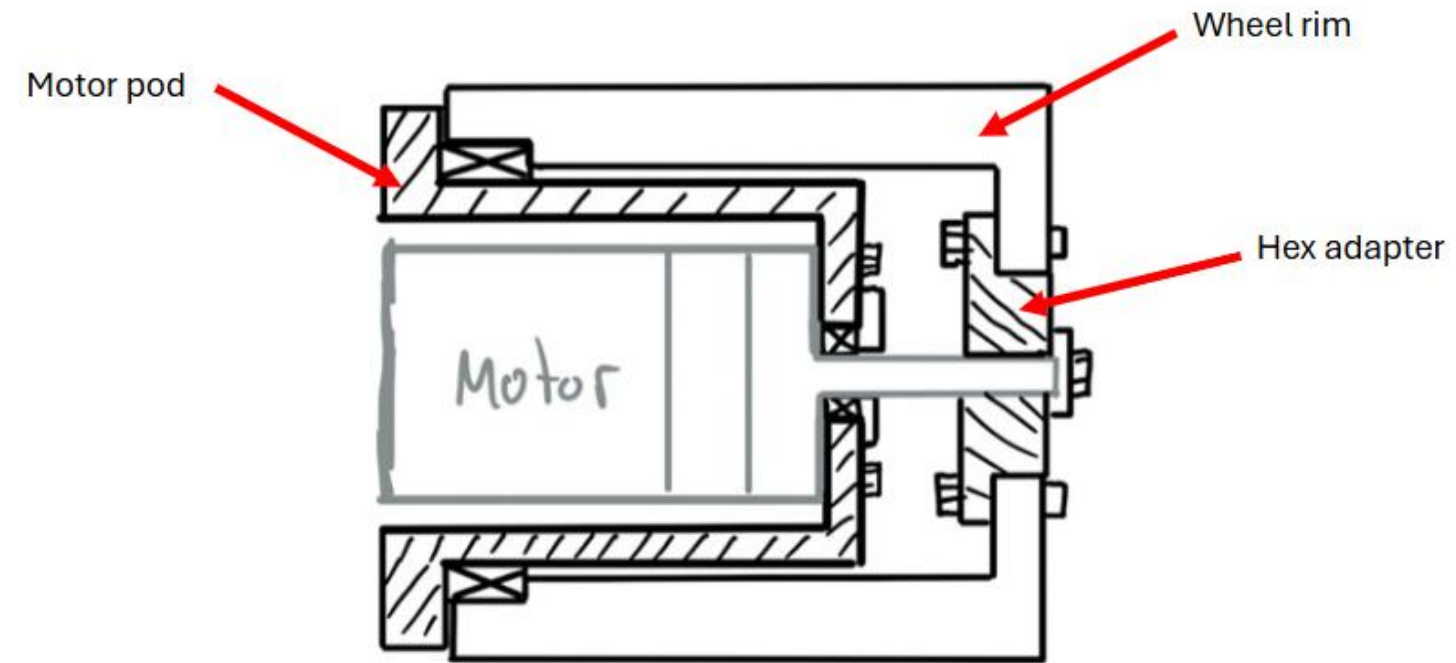
## Project Goals:

- Improve wheel and drive stability
  - By adding bearing to distribute load from wheel into the motor pod
- Integrate new brushless motor
- Reduce weight from drive assembly

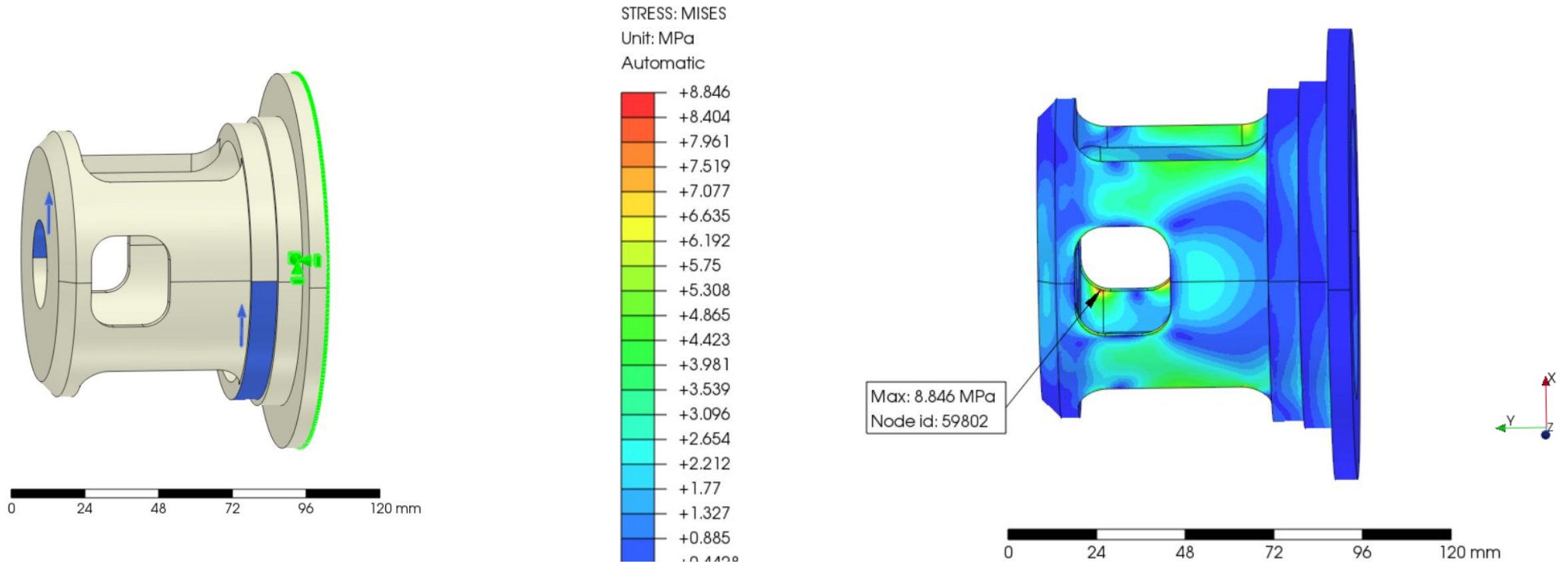




# CONCEPT TO DESIGN



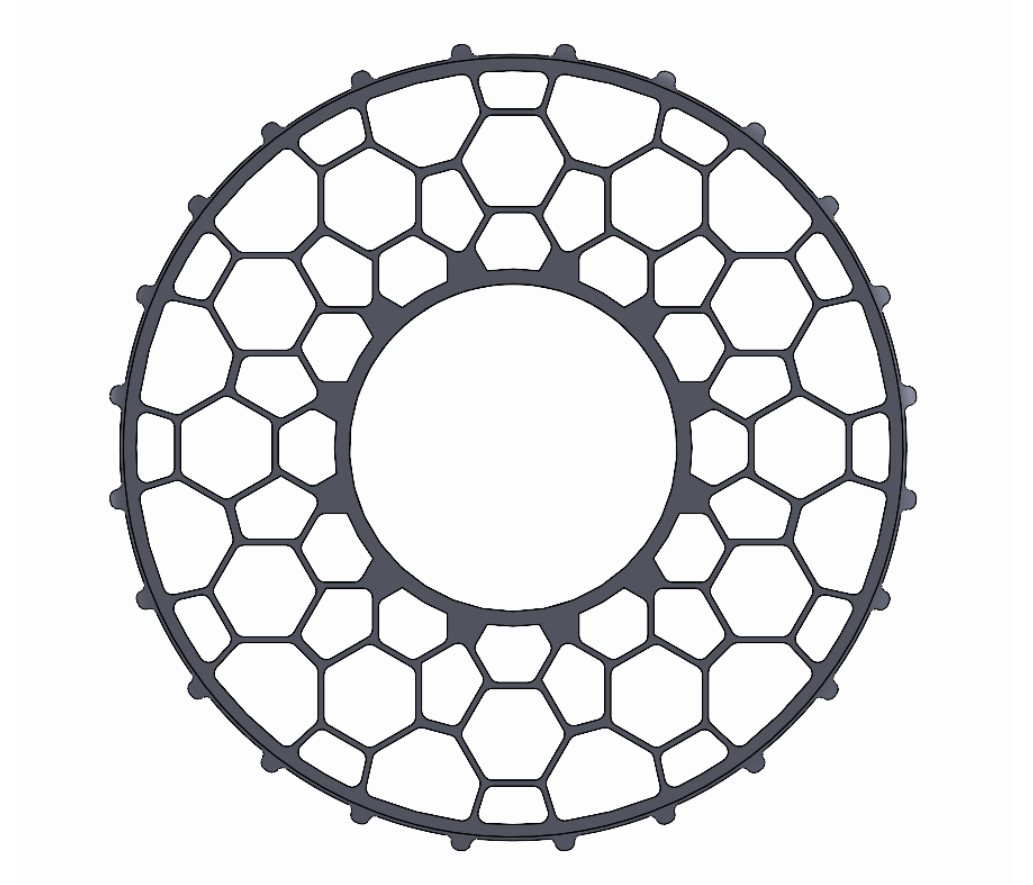
# FEA - MASS OPTIMIZATION (MOTOR POD)



# NON-PNEUMATIC TIRE

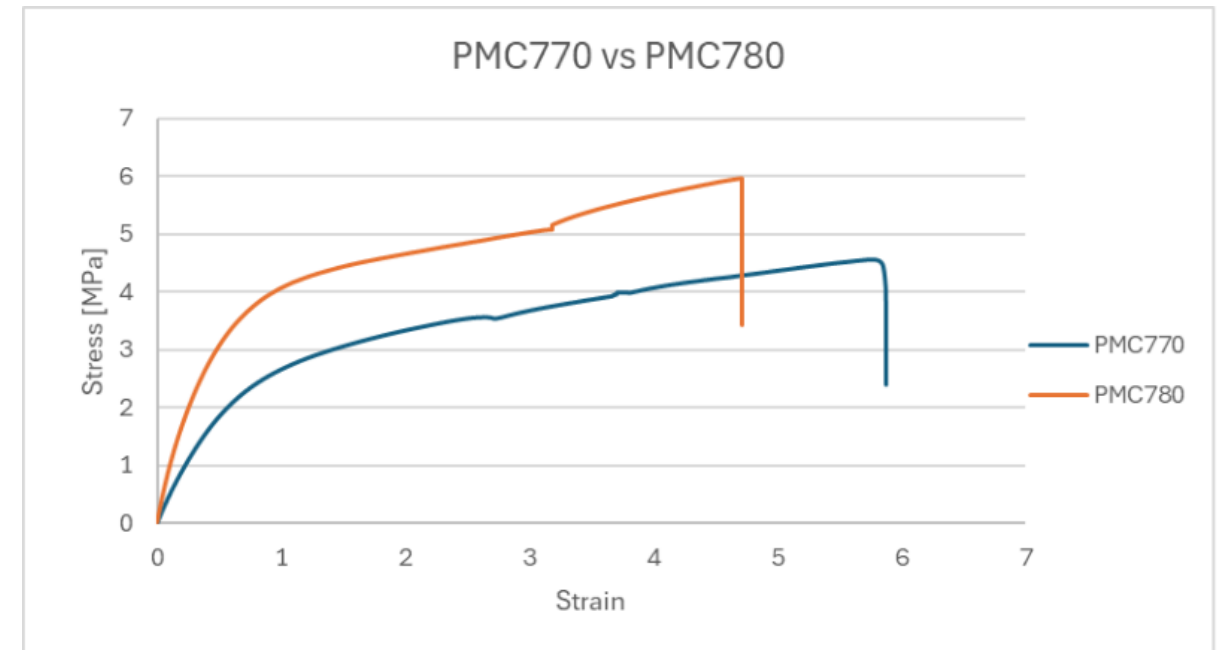
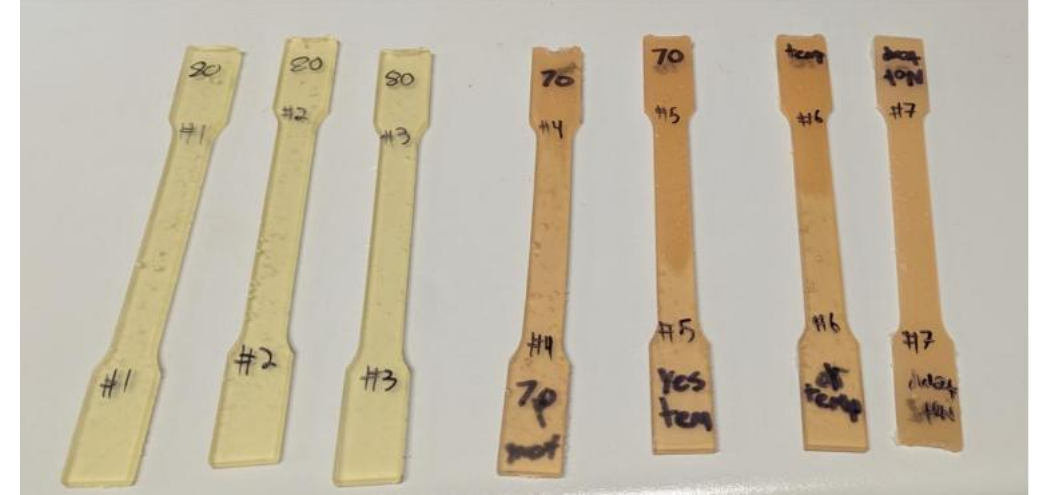
## Project Goals:

- Reduce mass in wheel assembly
- Perform material tests
- Validate simulation results
- Improve impact damping



# MATERIAL TESTING

- Tensile tests performed on Instron for polyurethane materials
- Obtain experimental data to fit Neo-Hookean hyper-elastic model in Ansys
- Compare two potential materials



# HYPER-ELASTIC MODEL

- Incorporated experimental data into Neo-Hookean model on Ansys
- Simulated prototype wheel design

## Next steps:

- Manufacture a scaled model of wheel
- Validate accuracy of simulation by comparing deflection to physical load test

**A: Static Structural**  
Total Deformation  
Type: Total Deformation  
Unit: mm  
Time: 1 s  
Max: 2.1594  
Min: 0  
1/16/2026 9:56:33 PM

