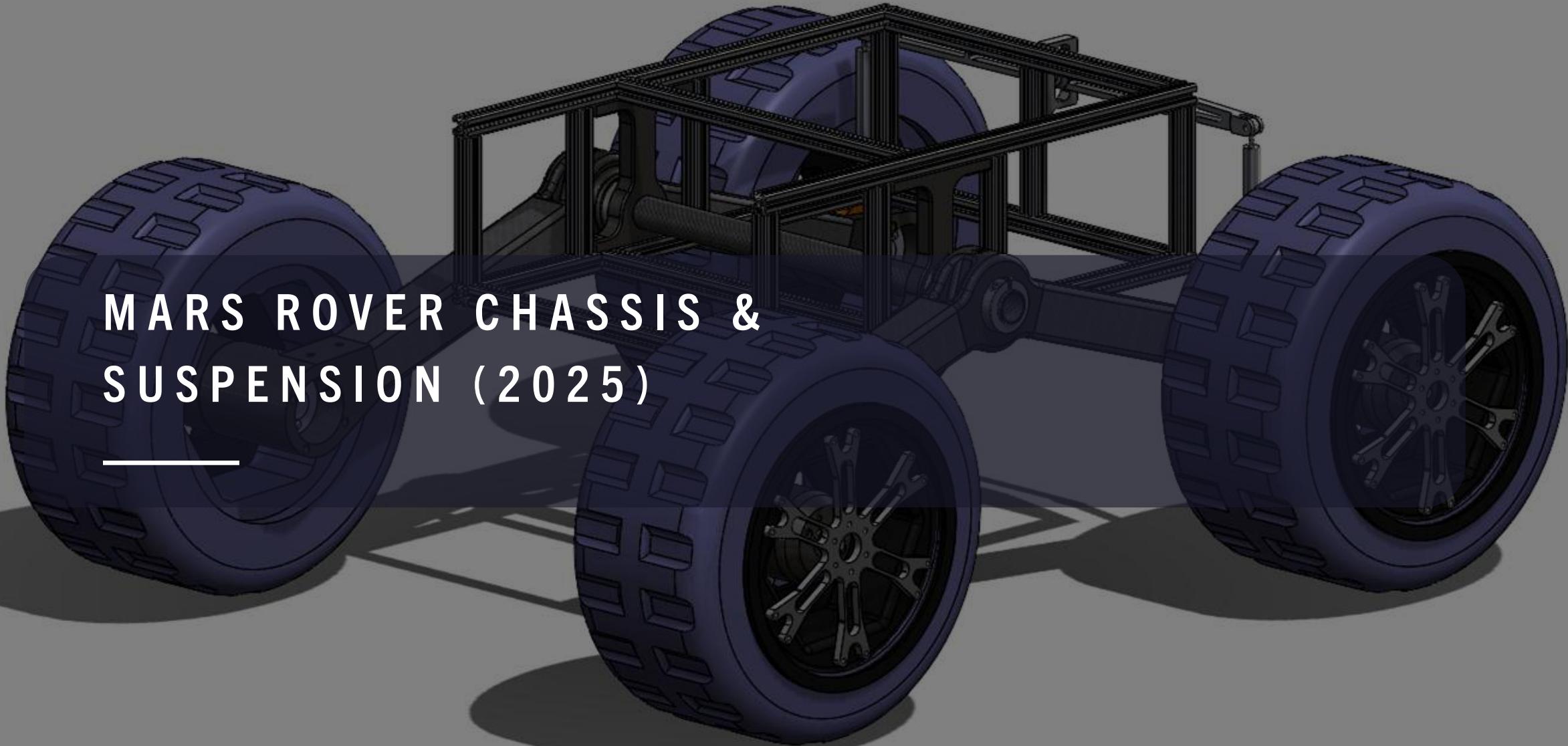
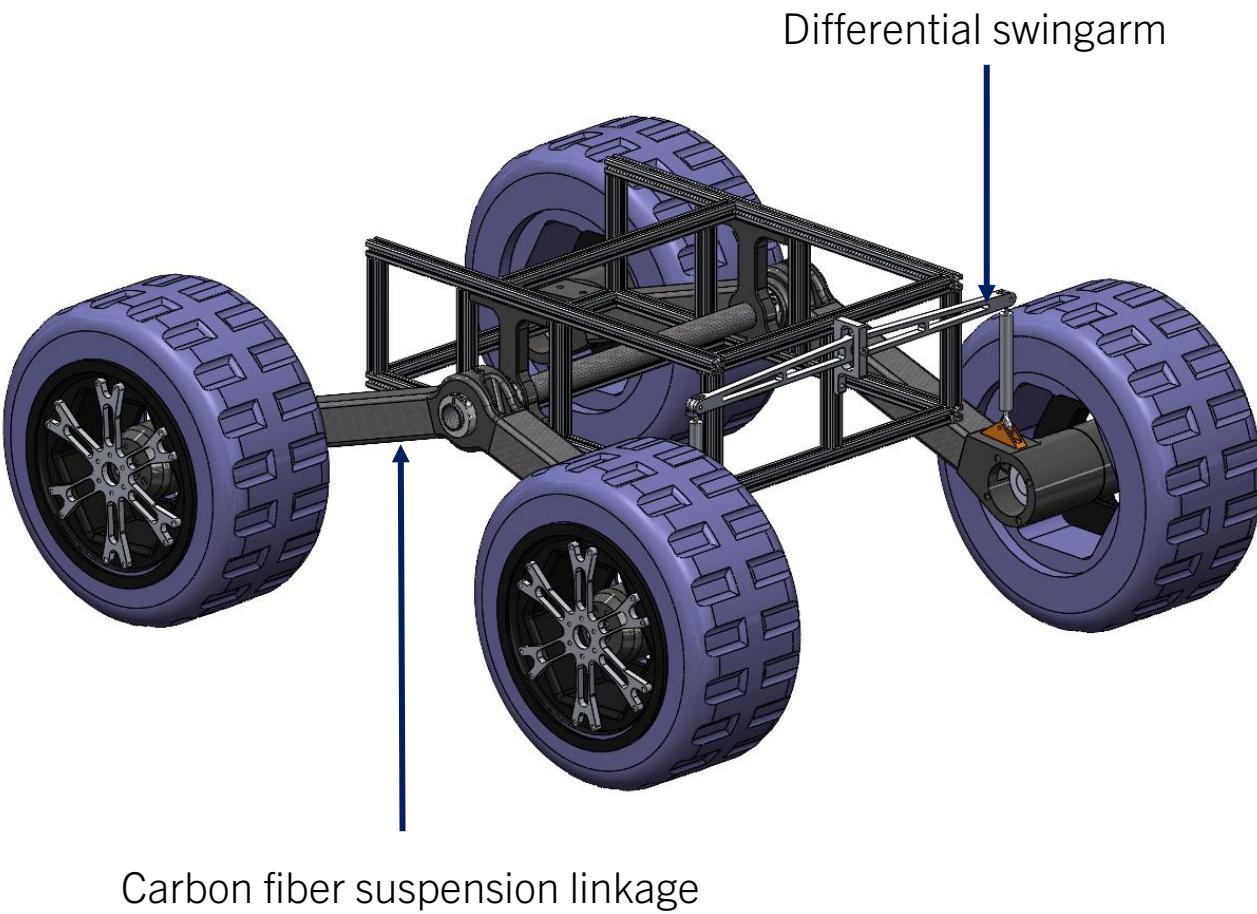


PROJECT PORTFOLIO

Samuel Lavictoire

MARS ROVER CHASSIS & SUSPENSION (2025)





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

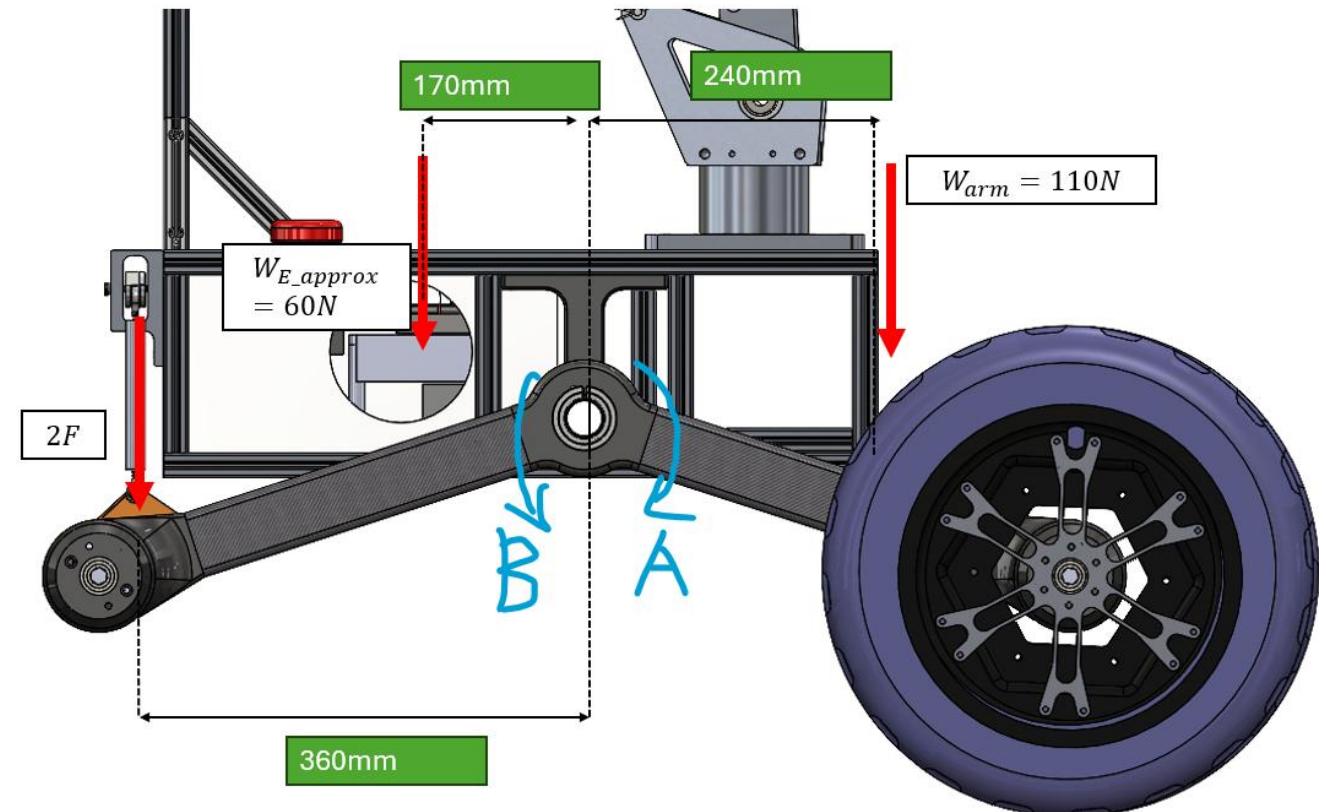


Bonding pivot to carbon fiber tubes



SWINGARM - DESIGN

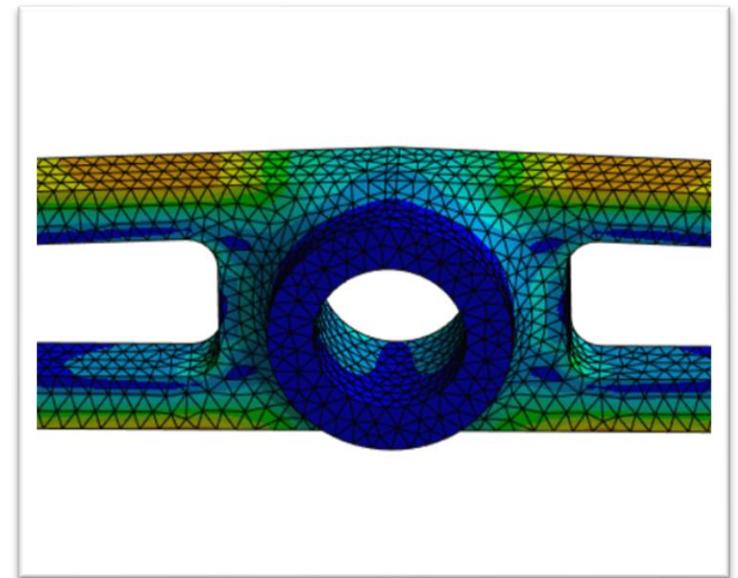
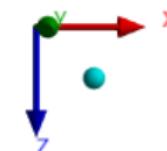
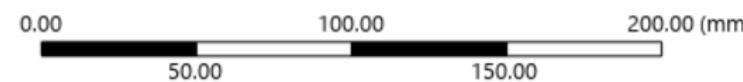
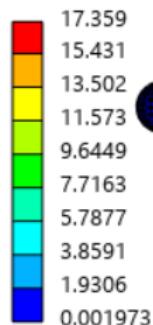
- Used Free body diagram
- Calculated forces for FEA simulation on Ansys

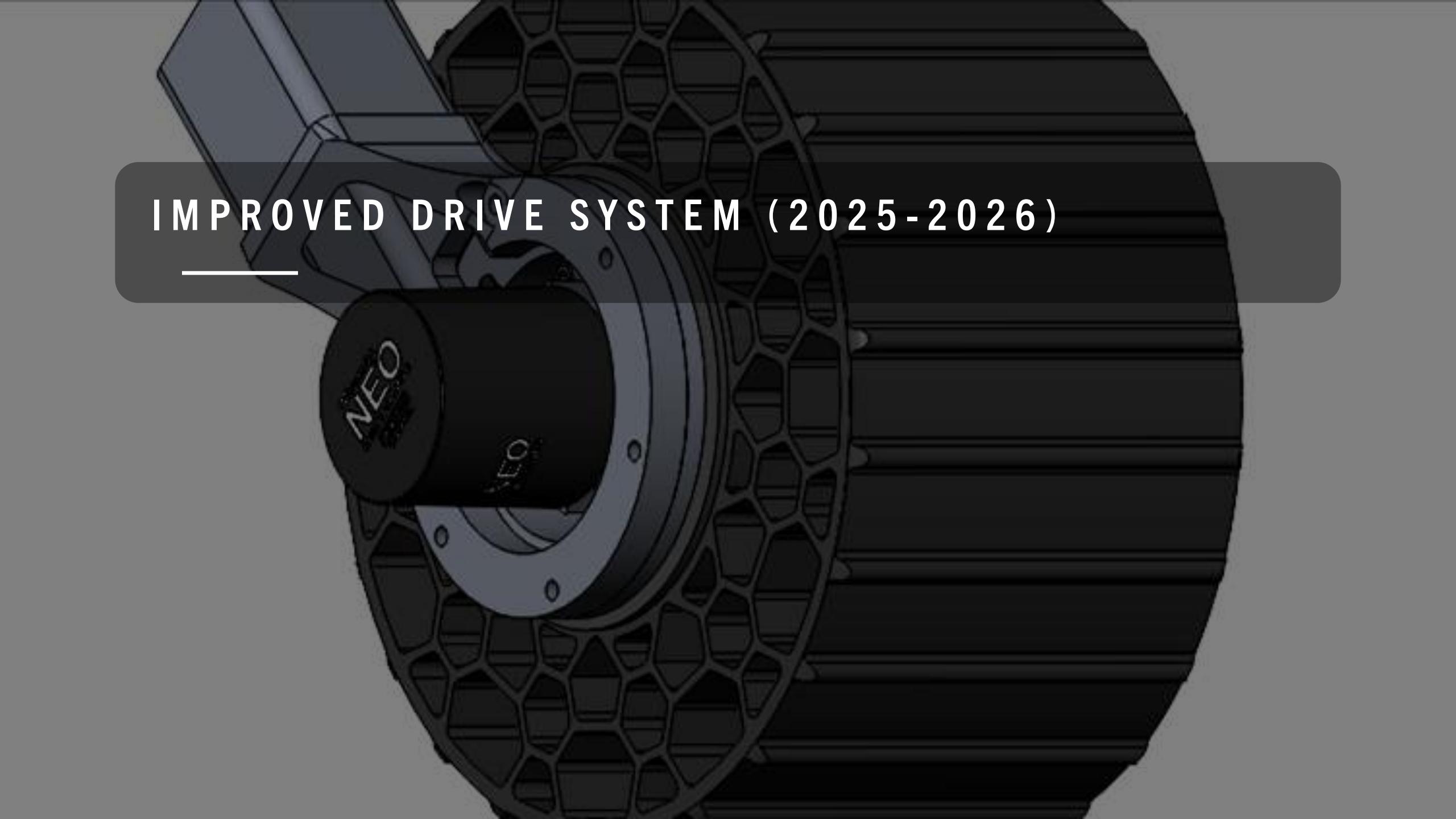


SWINGARM - DESIGN

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



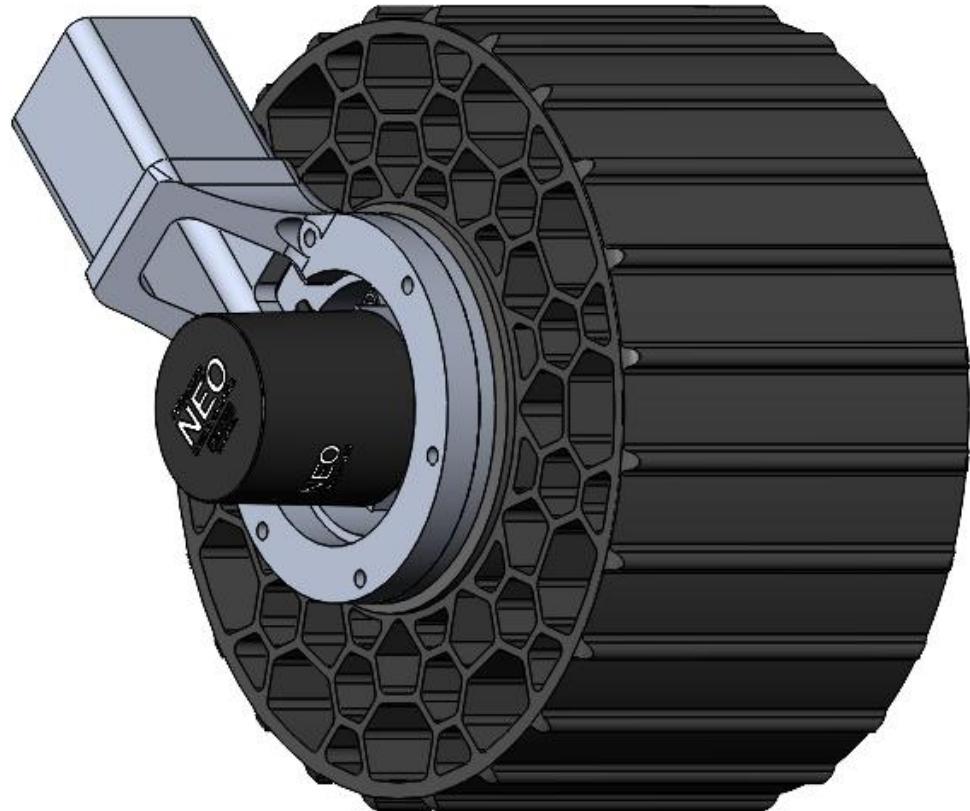


IMPROVED DRIVE SYSTEM (2025-2026)

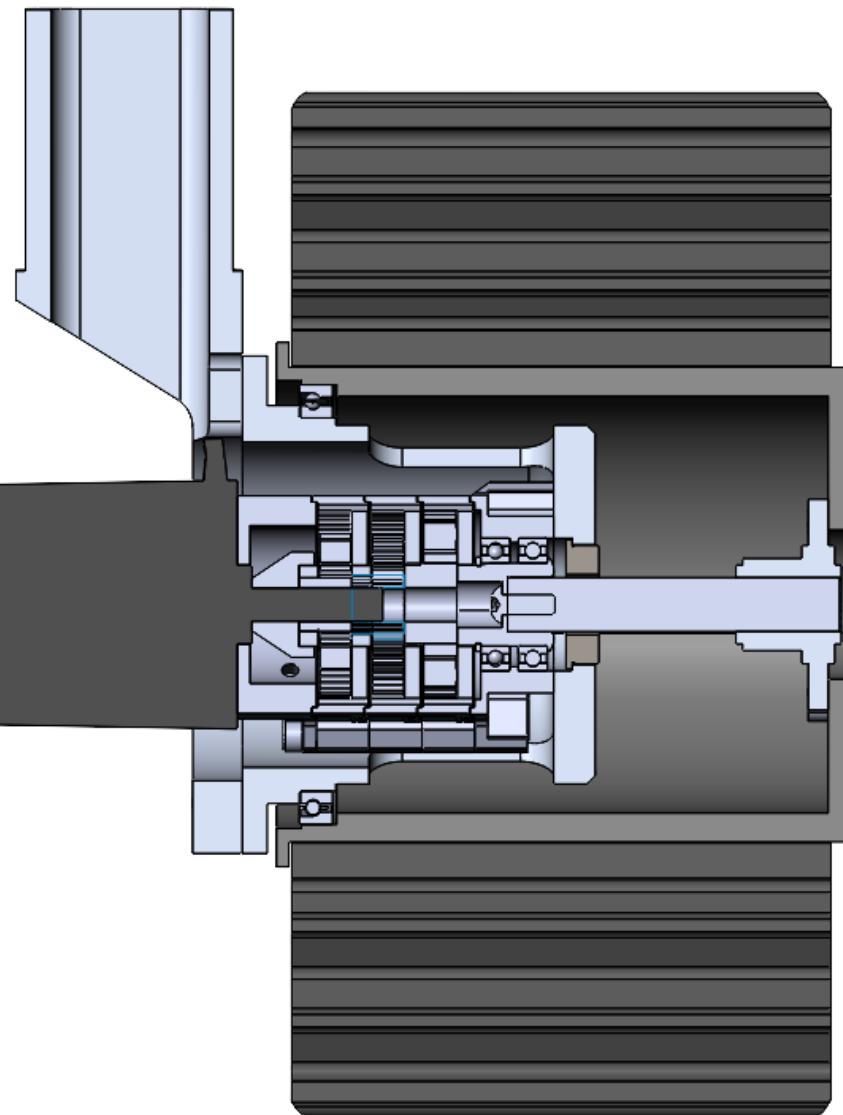
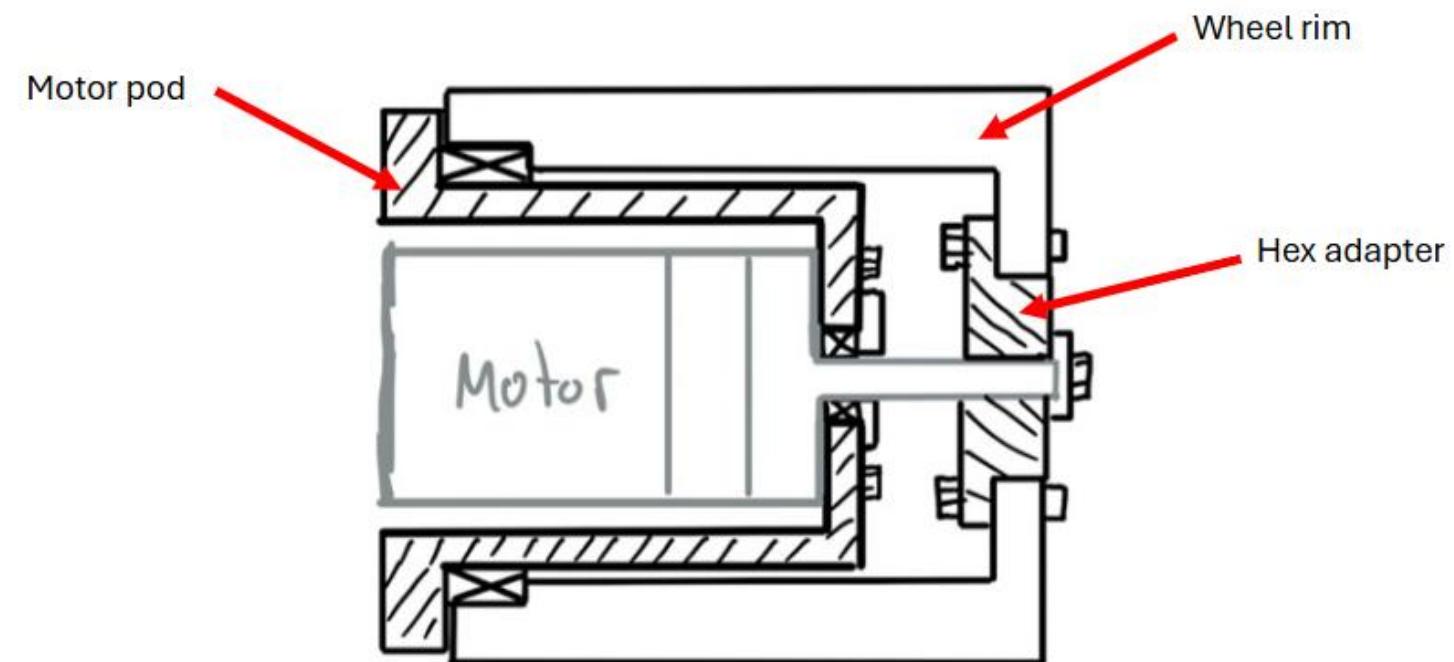
IMPROVED DRIVE SYSTEM

Project Goals:

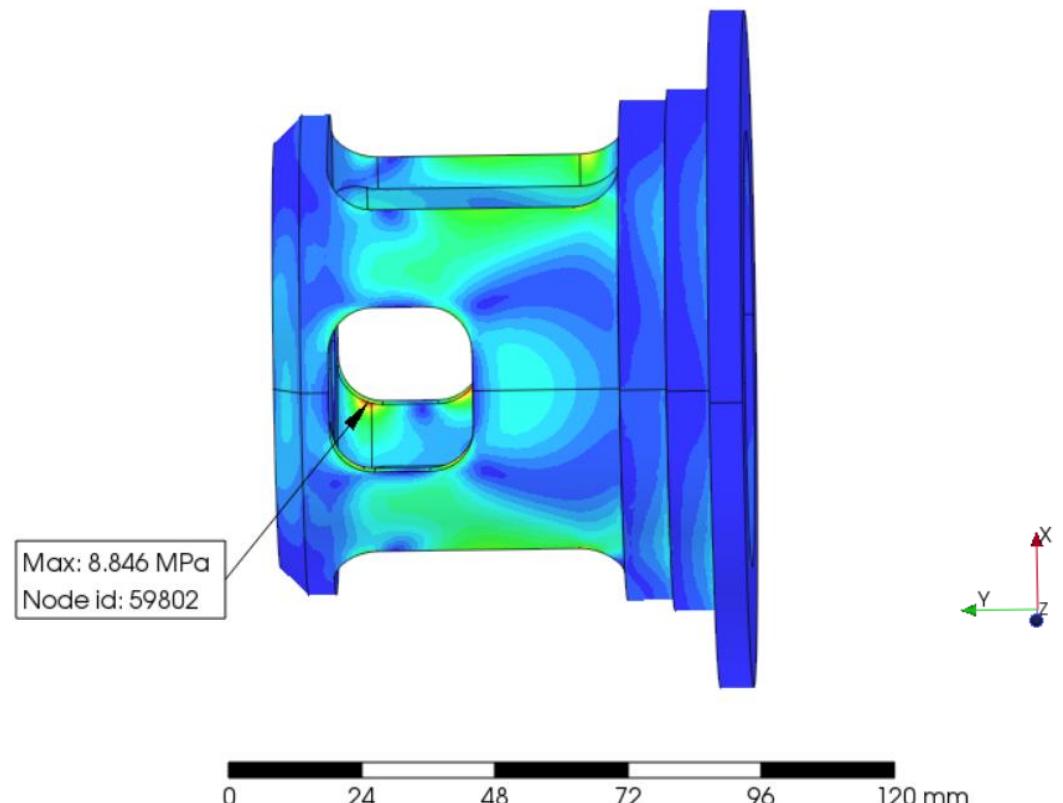
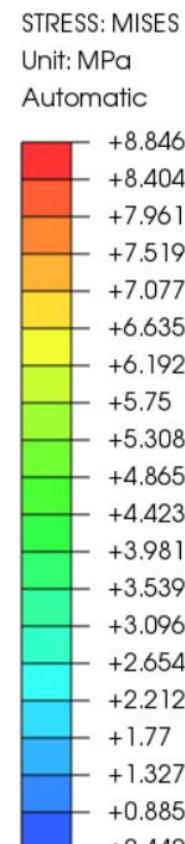
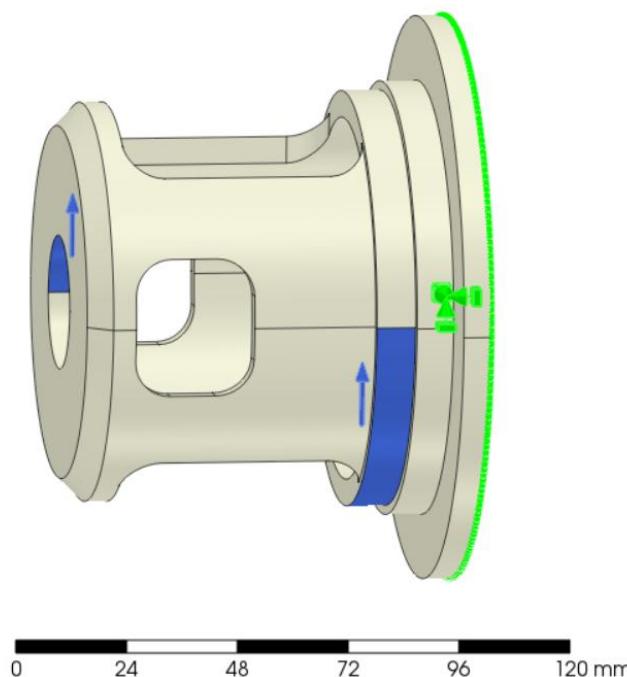
- Improve wheel and drive stability
 - By adding bearing to distribute load from wheel into the motor pod
- Integrate new brushless motor
- Reduce weight from drive assembly



CONCEPT TO DESIGN



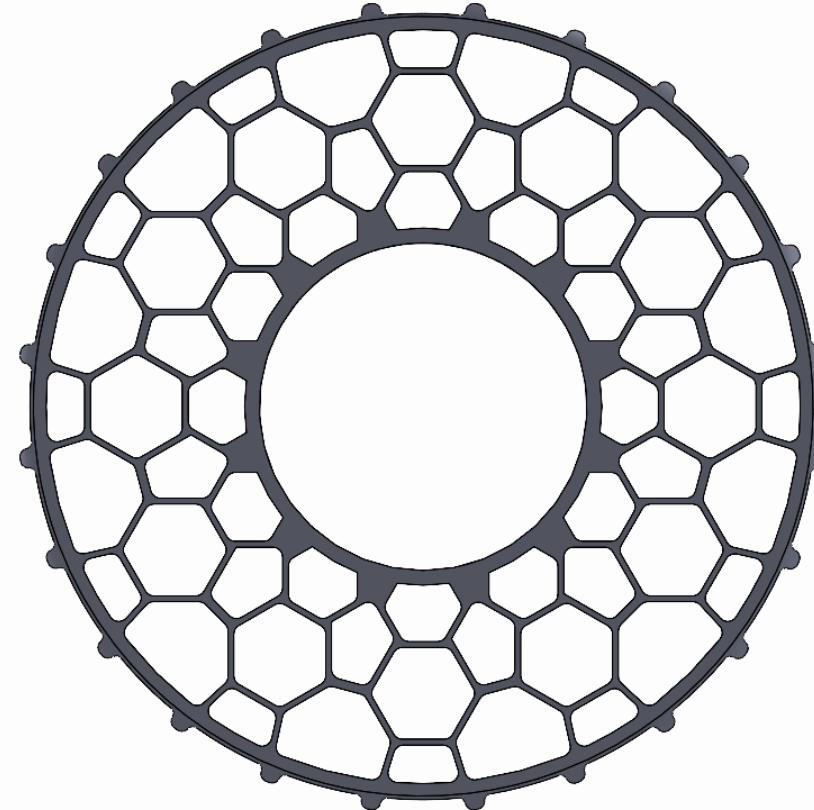
FEA - MASS OPTIMIZATION (MOTOR POD)



NON-PNEUMATIC TIRE

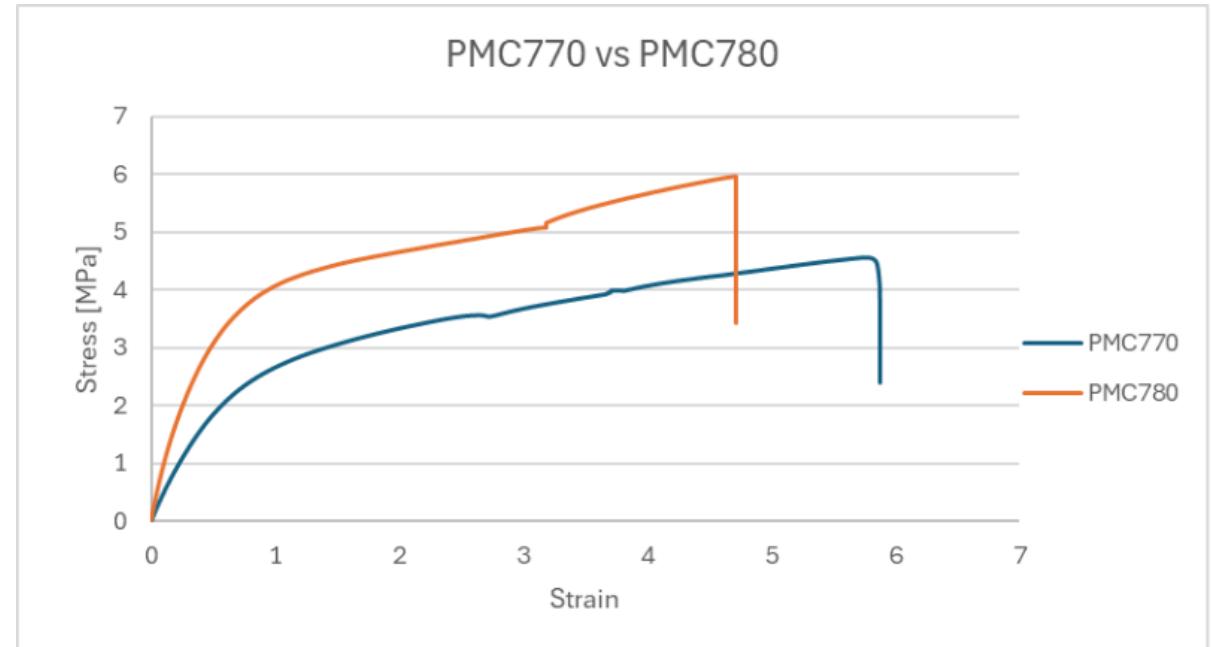
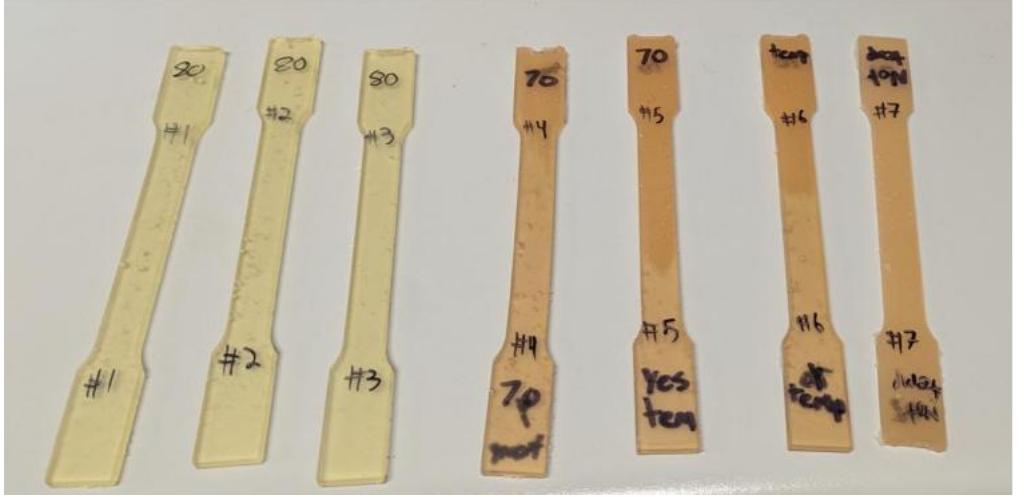
Project Goals:

- 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



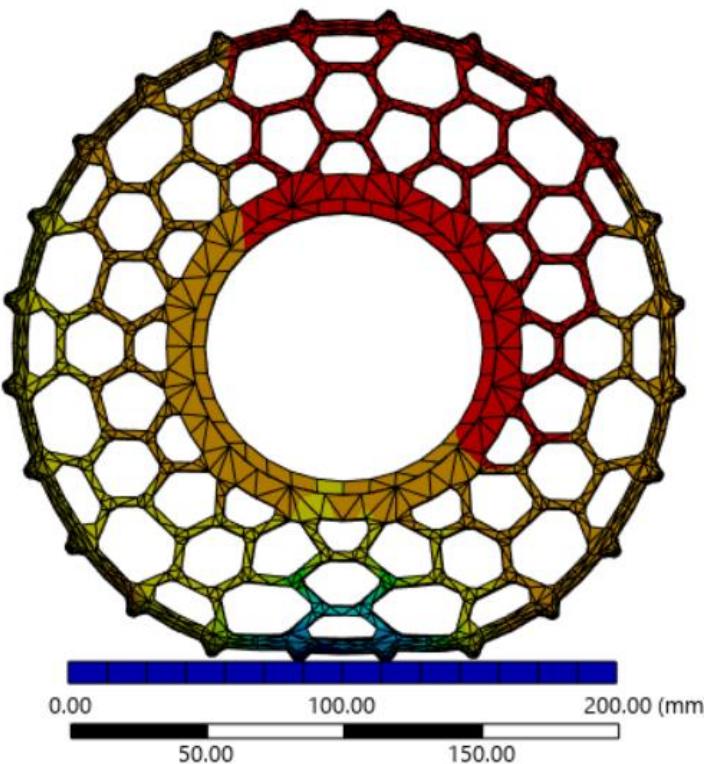
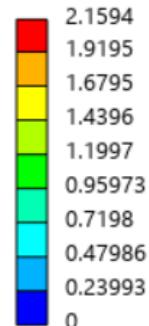
HYPER-ELASTIC MODEL

- 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



Ansys
2025 R2
STUDENT