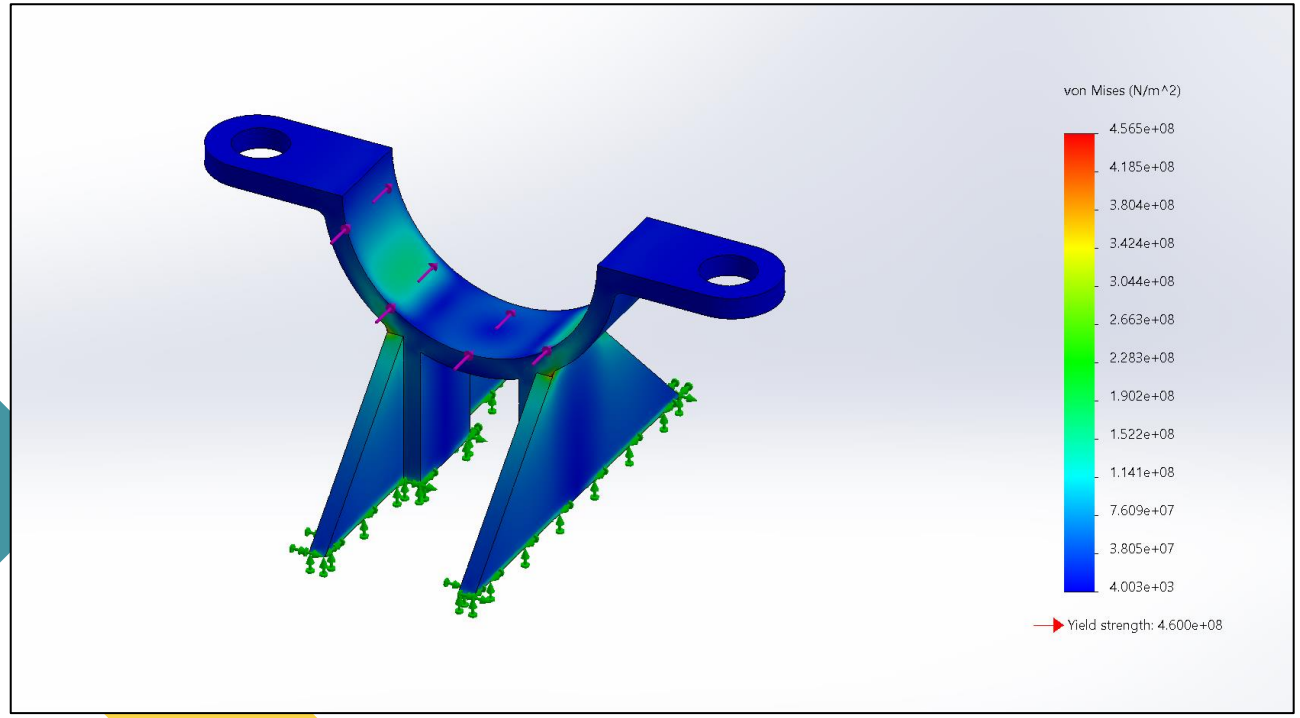
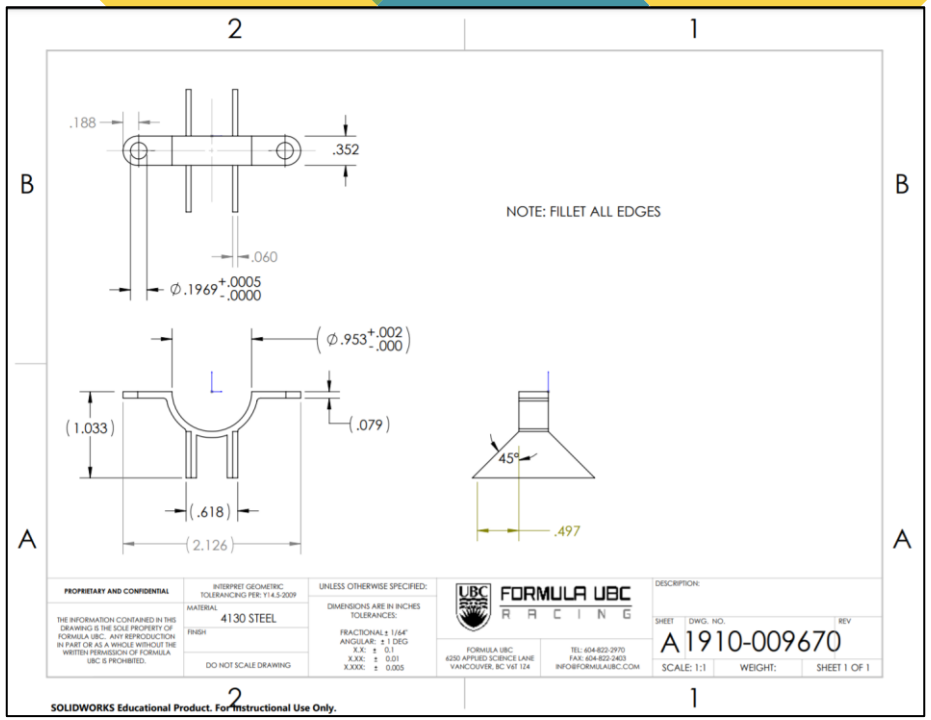
Design Portfolio

Daniel Youm

Steering Rack Mount

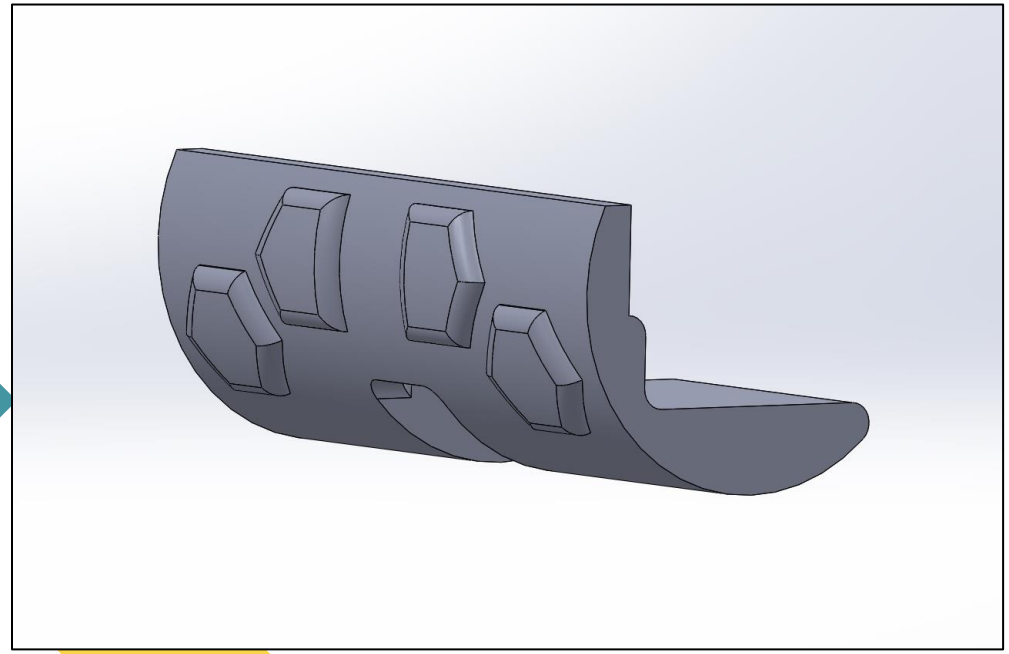
- The first part I designed and manufactured for Formula UBC.
- I chose steel as the material so that the mounts could be welded onto the chassis.
- Carried out FEA and created engineering drawings for it.

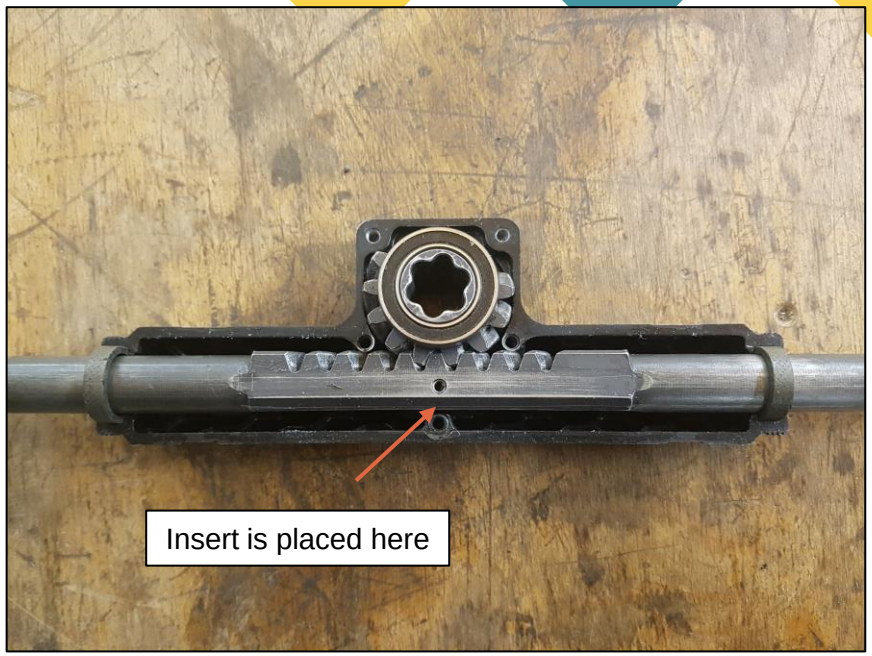




Steering Rack Pre-load Insert

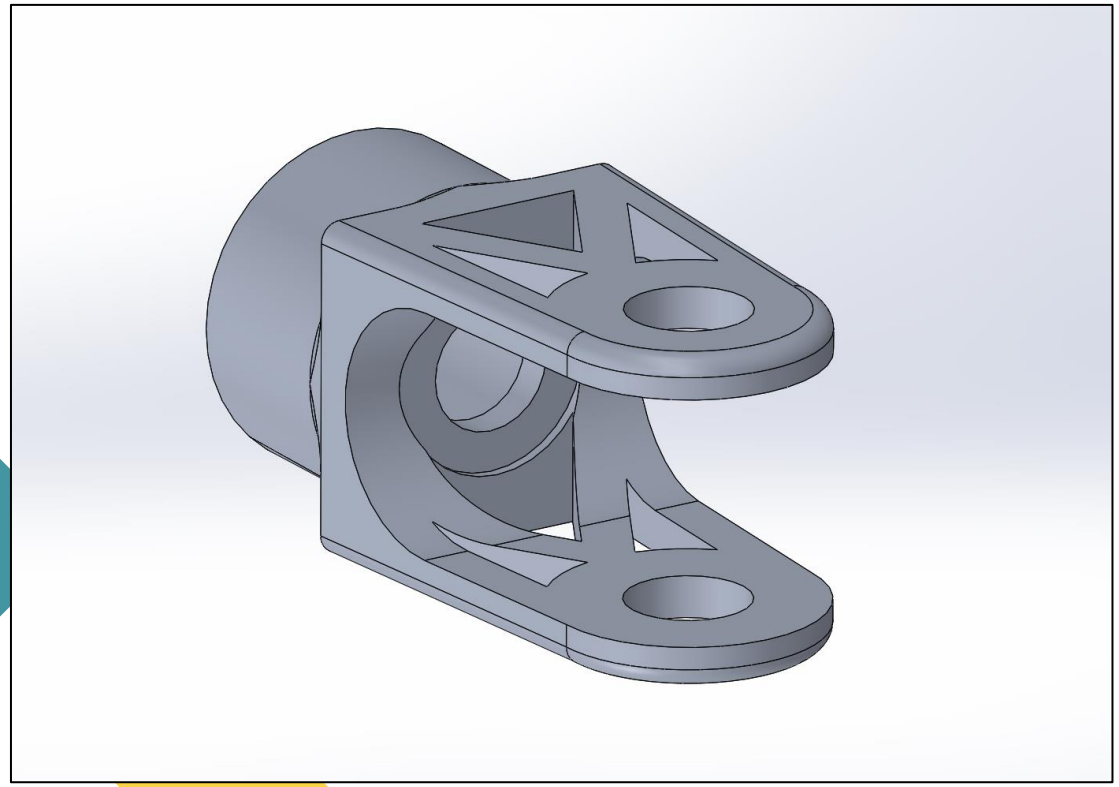
- The octagon extrusions fit into the honeycombed inside of the steering rack housing.
- The insert provides an upward force that improves the meshing between the rack and pinion.
- Resin-printed.

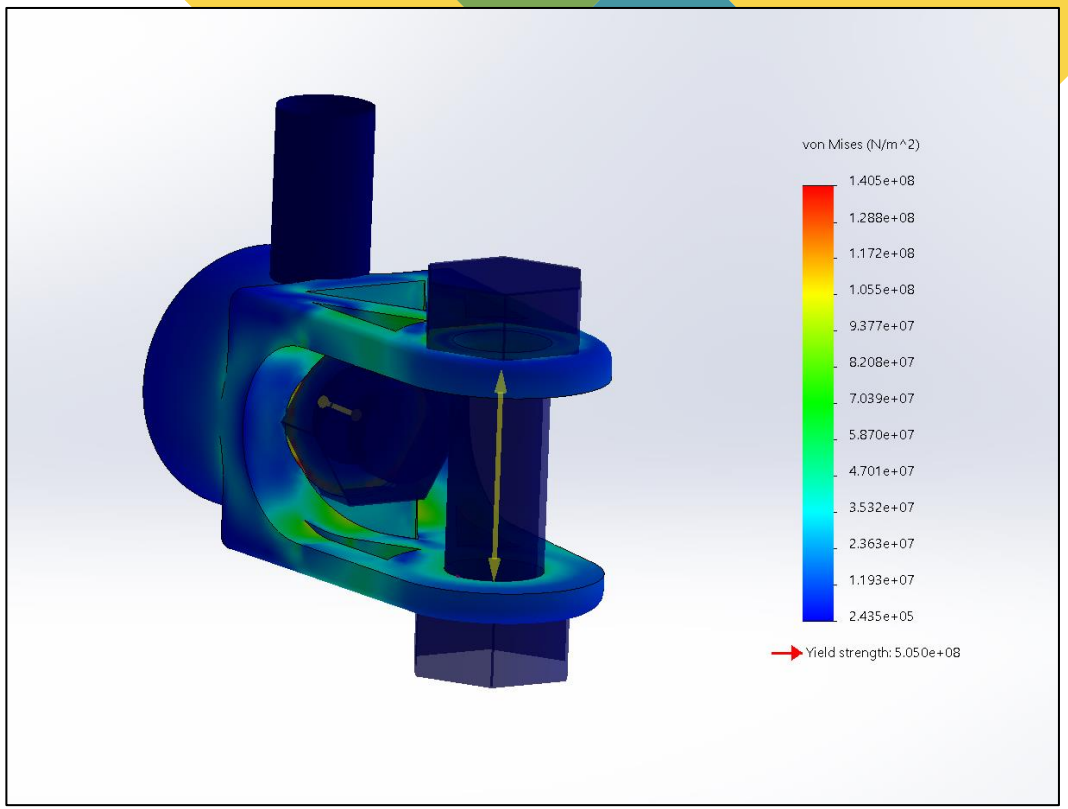




Steering Rack Clevis

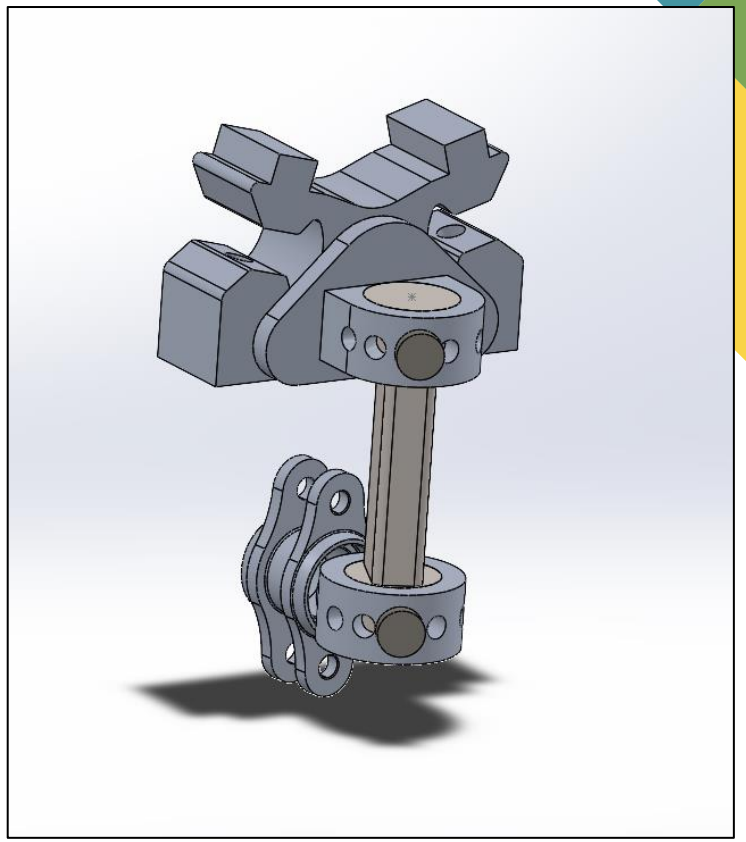
- Replacement aluminum clevis for the pre-existing OEM steel ones.
- Designed for 51% reduced mass.

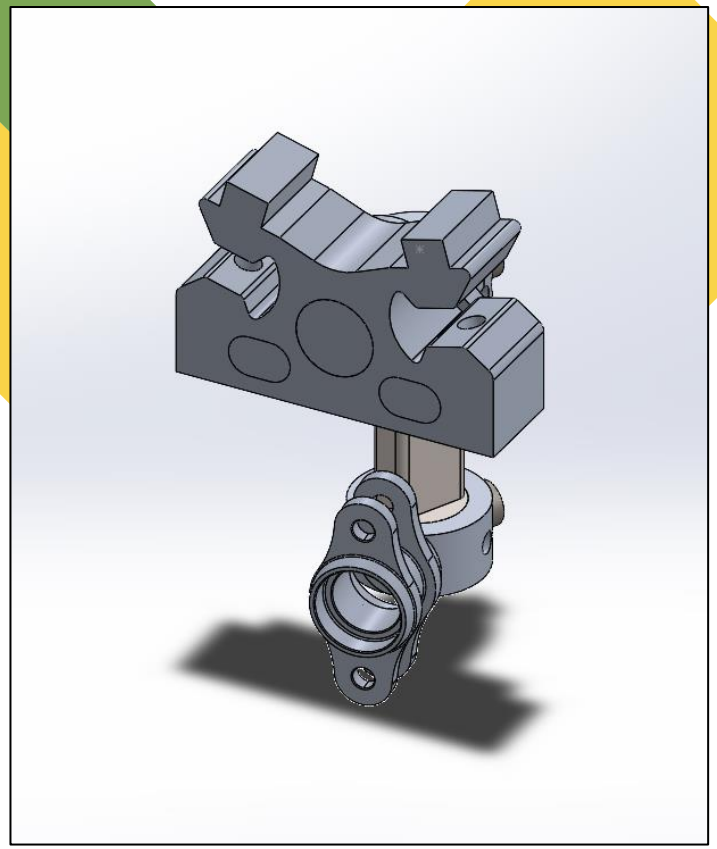


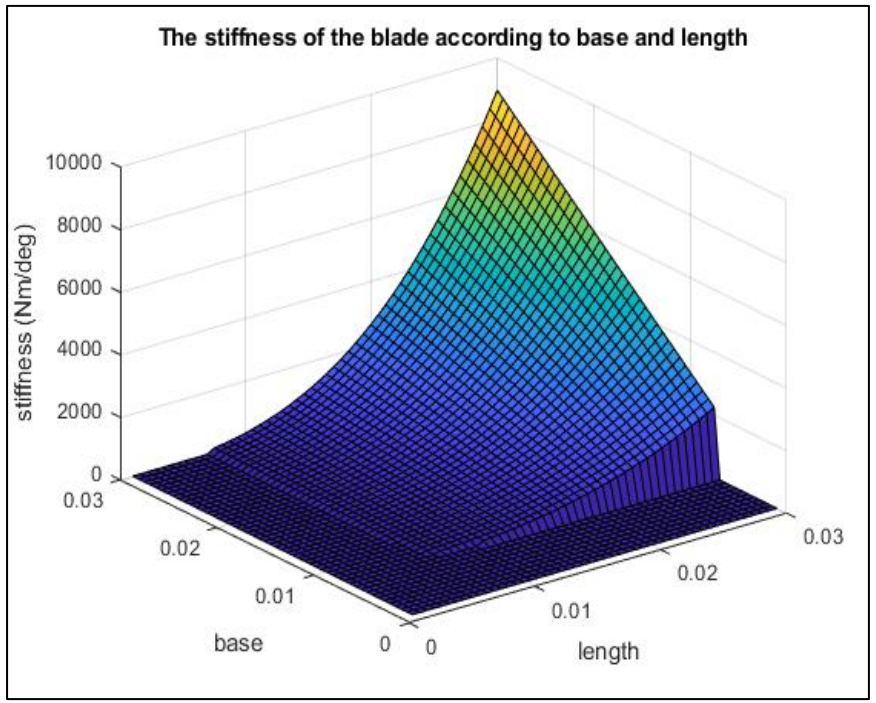


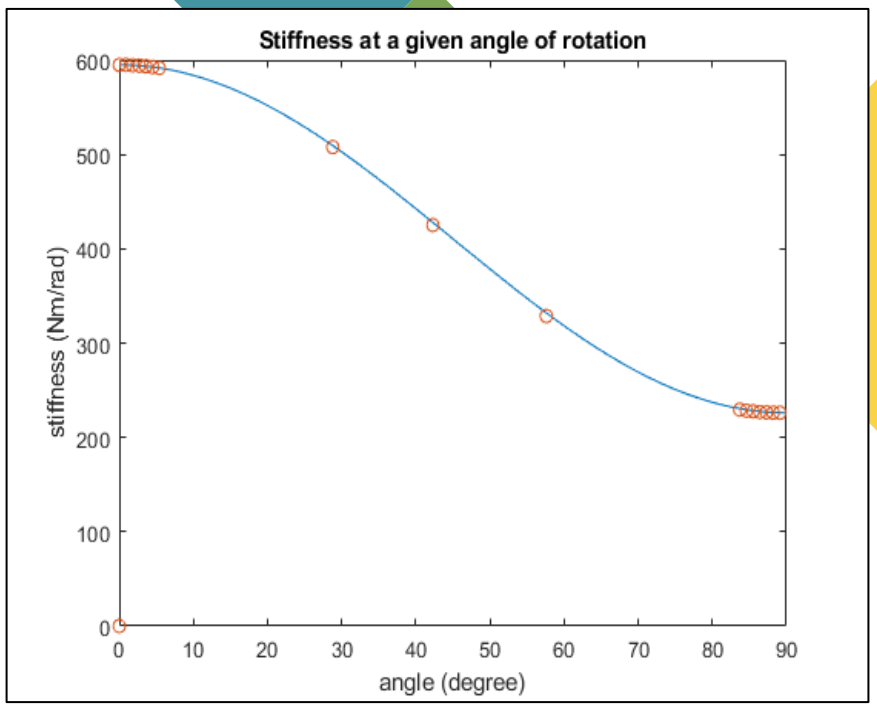
Front Anti-Roll Bar

- Designed a new anti-roll system for the front of the vehicle.
- Consists of a keying system, ARB blade, and toggle - to decouple roll and heave.

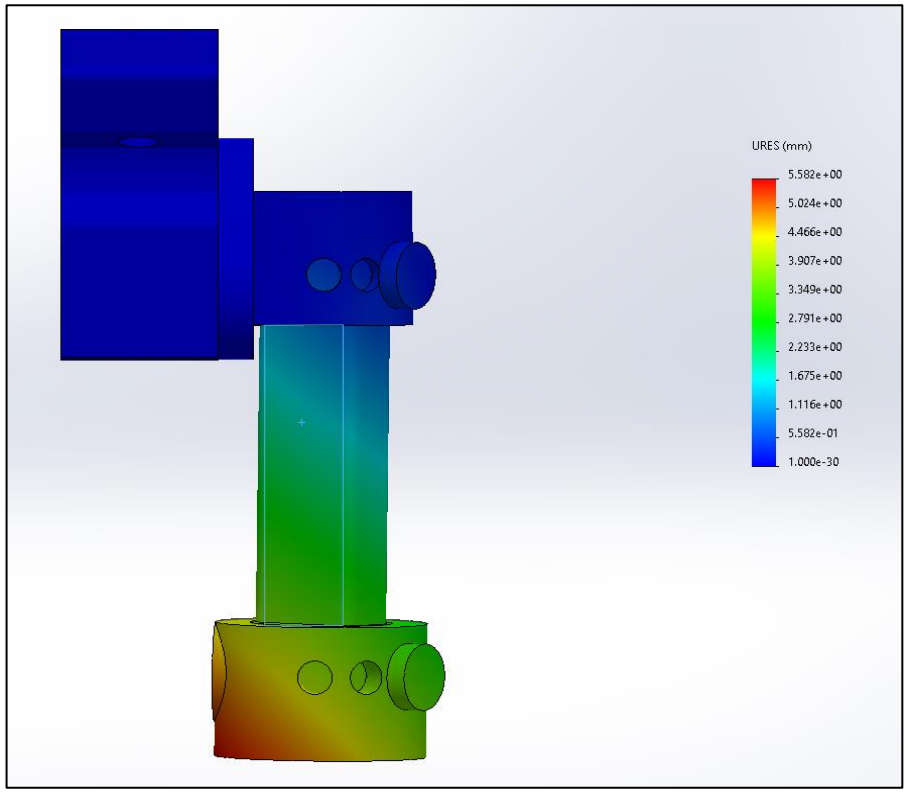


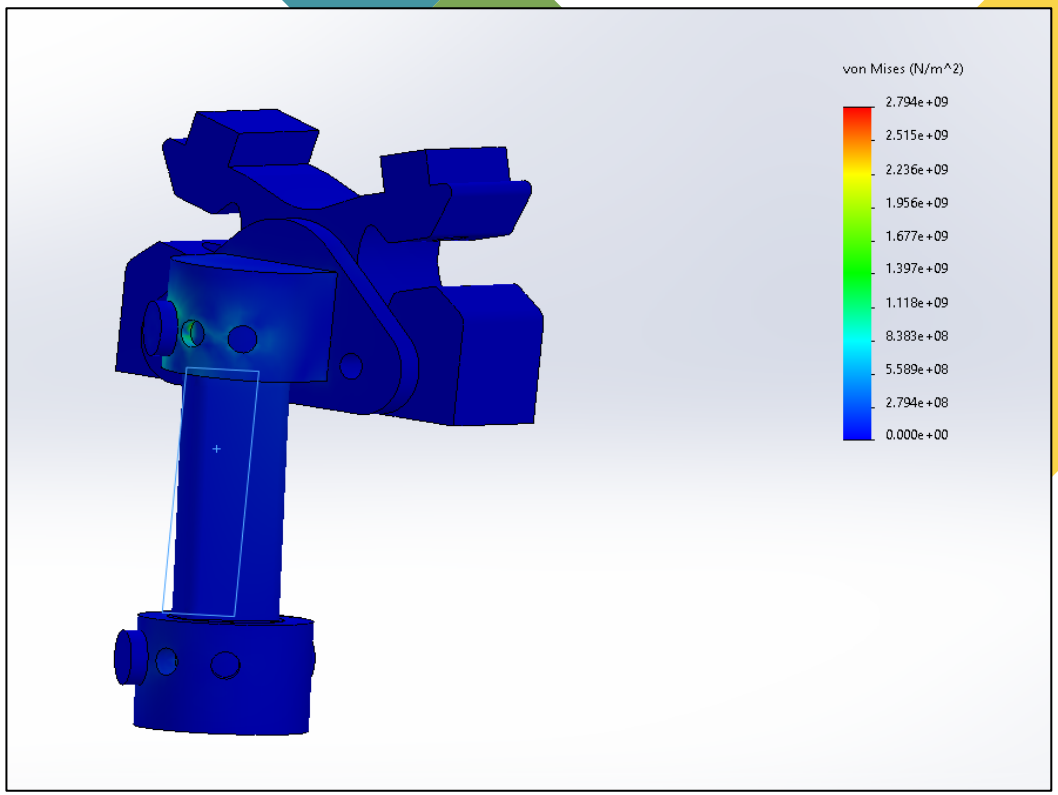






- Created a matlab script to determine stiffness according to the base and length of the cross-section of the ARB blade.
- The left graph shows the stiffness of a given dimension.
- The graph on the right shows the angle of the cross-section that correspond with the target stiffnesses

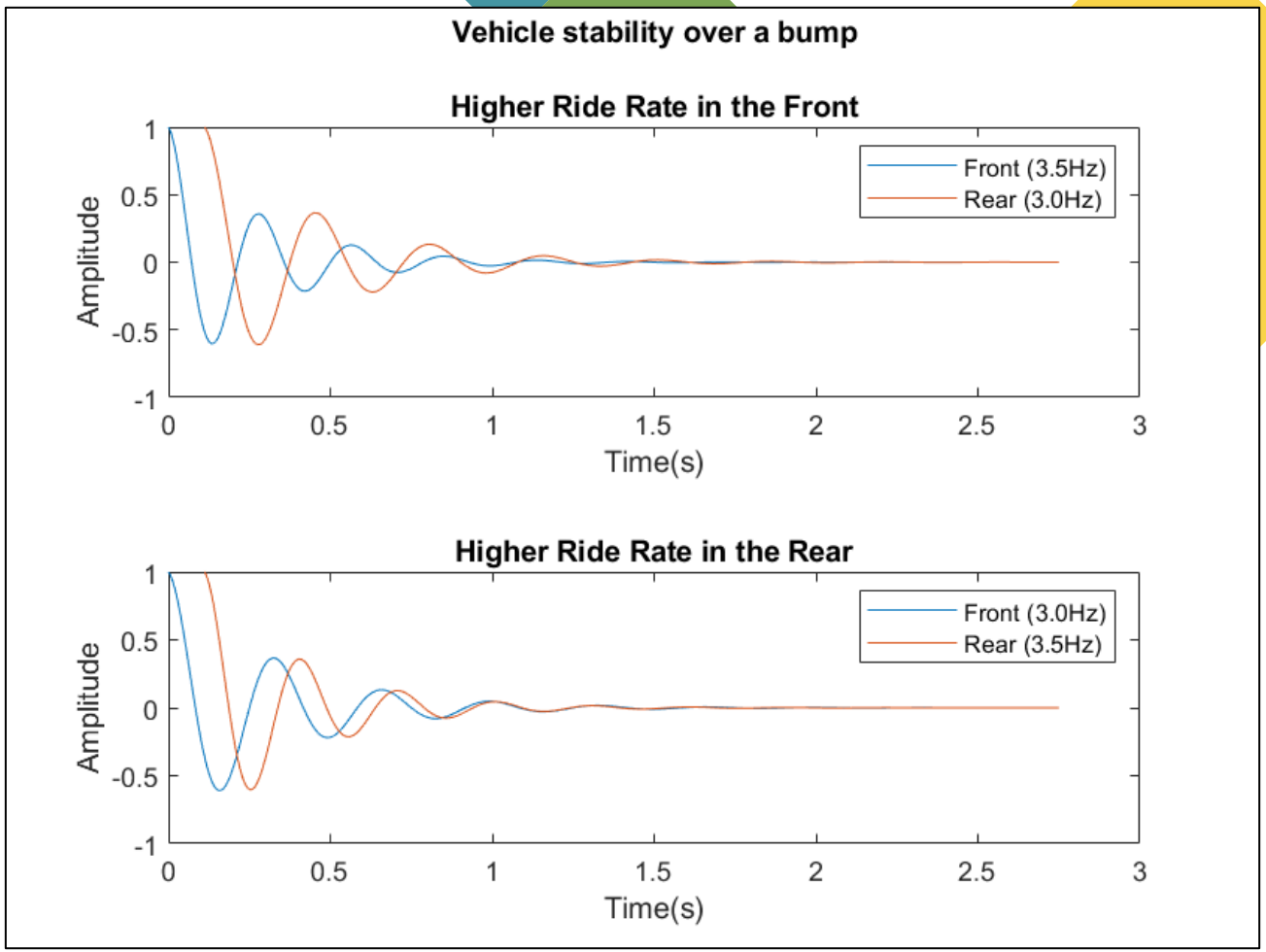




- Utilized FEA to determine safety factor and deflection.
- Studies showed flaws in the system, so it was discontinued.

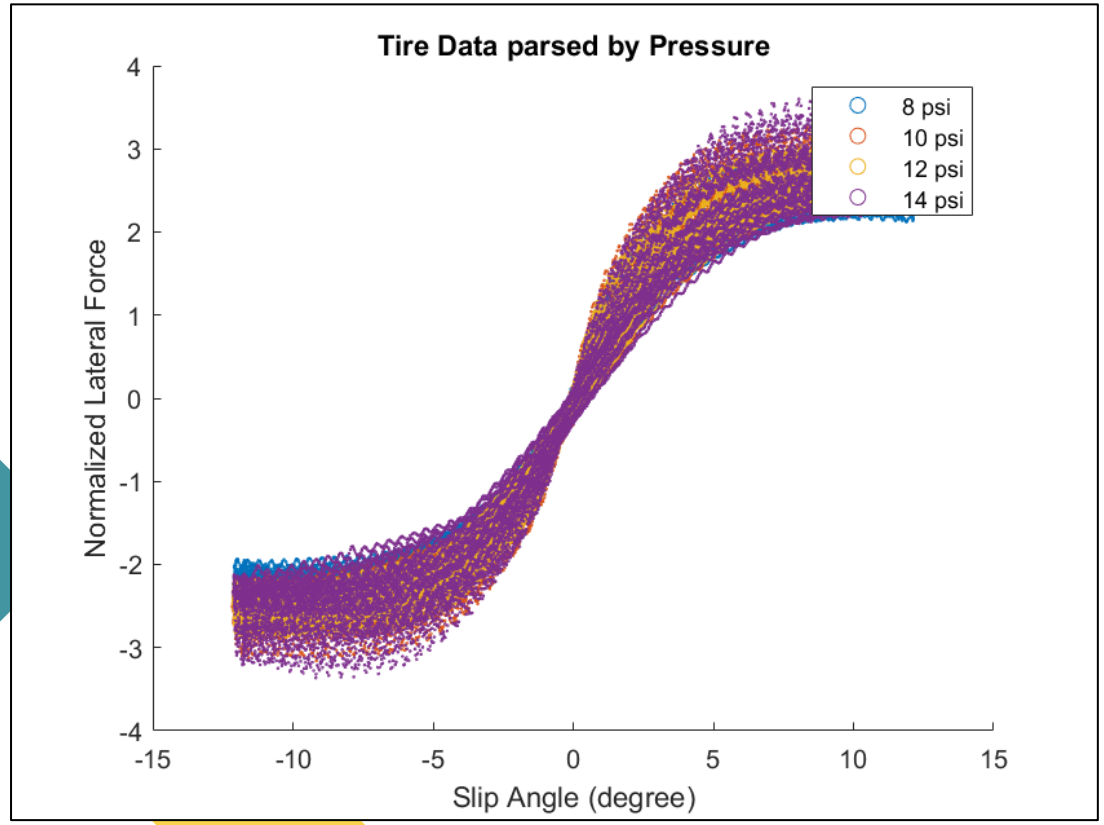
Vehicle Ride Rate Analysis

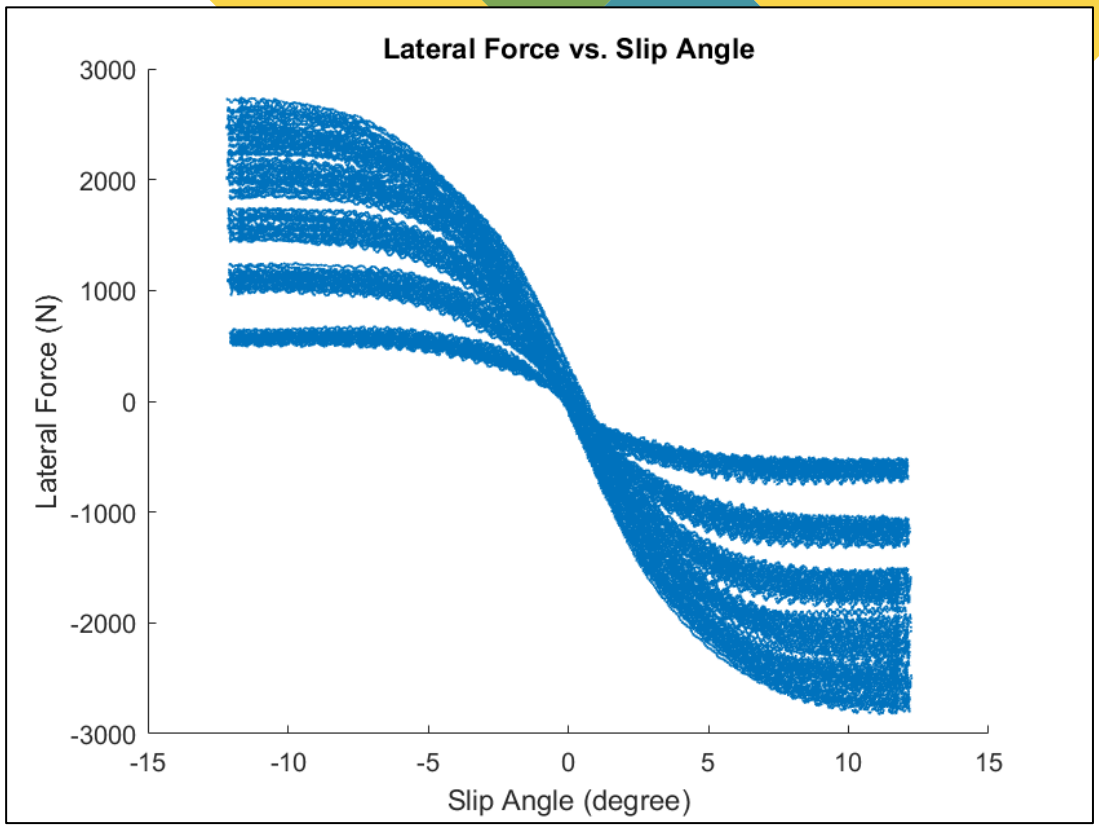
- Noticed that the current vehicle has a higher front ride rate than the rear.
- I created a MATLAB script to simulation the front and rear of the vehicle as it travels over a bump.
- Discovered that higher rear ride rates decreases desynchronization.



Tire Test Data Analysis

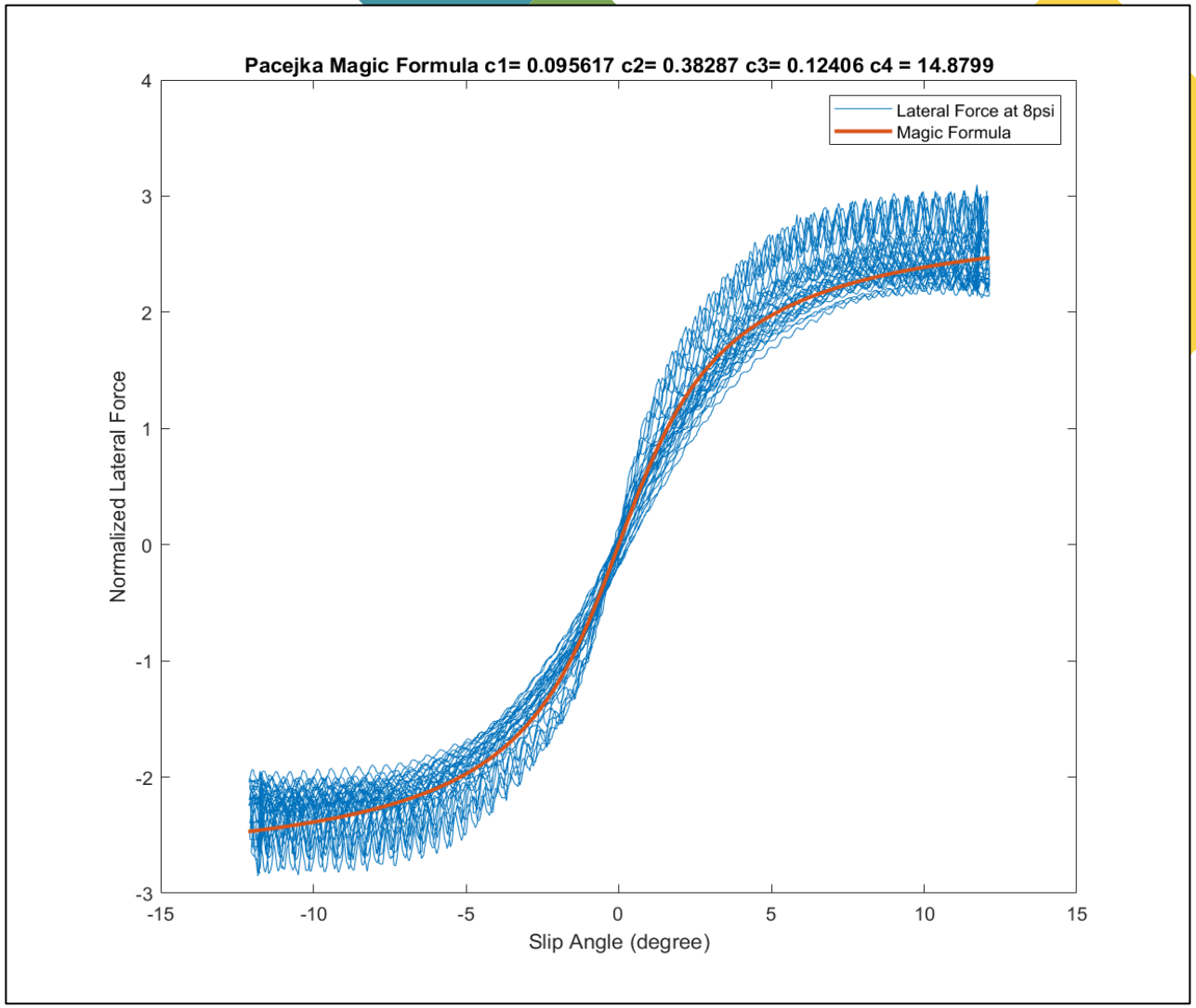
- Parsed and graphed tire test data.
- Separated by pressure and determined that pressure has little effect on lateral grip.





Vehicle Ride Rate Analysis

- Fit the tire test data to a Pacejka tire model.
- Will be continuing work to create a full tire model.



Thank you

for your time!

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