

Ramadan Haider – Portfolio

rhaidar@uwaterloo.ca | linkedin.com/in/ramadan-haider

CVT casing – BAJA SAE (2025)

What?

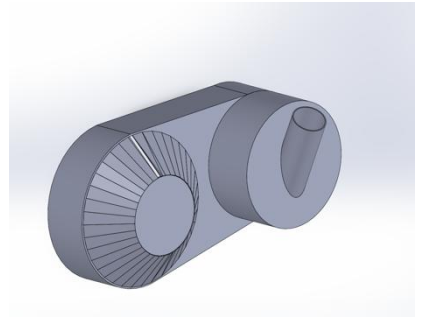
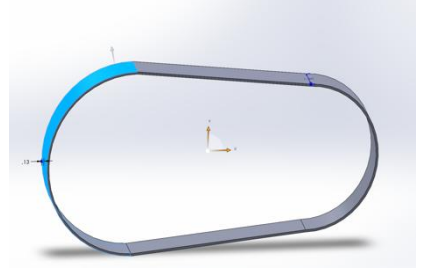
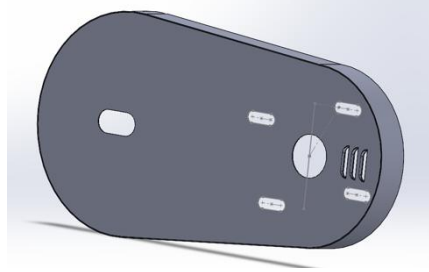
- Design and manufacture a rules compliant CVT casing to external objects (i.e: dirt, water, sediments) from entering the CVT.

How?

- Used Solid works sheet metal feature to create a CVT case.
- Integrated structures like louver using tool formation as well as an air intake for enhanced cooling performance during operation

Results

- Fabricated a Functional CVT casing with air intake and exhaust which resulted in 17% better cooling compared to previous versions.



Skid plate – Baja SAE (2025)

What?

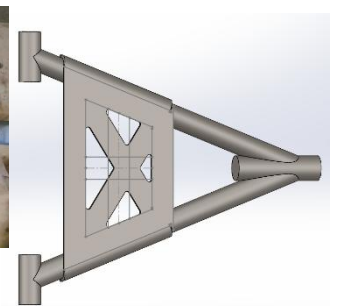
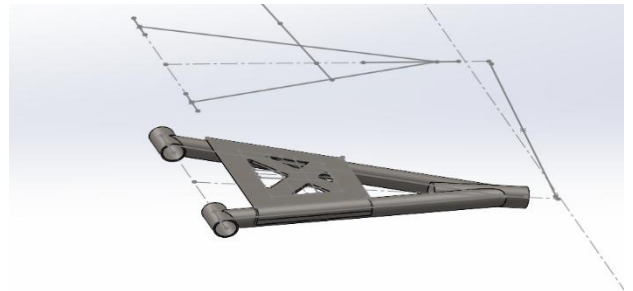
- Designed and manufactured an 0.125" thick steel skid plate for front control arms. Added lightening holes for reduced weight

How?

- Used SolidWorks sheet metal feature to design skid plates.
- Integrated design into whole assembly to ensure fit and design.
- Water jet cut sheet metal and TIG welded onto control arms to manufacture.

Results

- Stronger control arms able to withstand greater shear stress and normal stress when driving.



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Automotive dissection lab – *University of Waterloo (2024)*

What?

- Disassembled a 2003 Toyota corolla under the guidance of automotive experts, examining each part closely to understand its role and significance.

How?

- Systematically, dismantled the car, carefully documenting and examining each part and its function.
- Instructors provided insight into design principle and engineering concept, fostering deeper understanding

Results

- Emergded with a comprehensive understanding automotive engineering principles and practical skills applicable to vehicle analysis, repair, and maintenance.



Electric scooter – *Electrium mobility (2024)*

What?

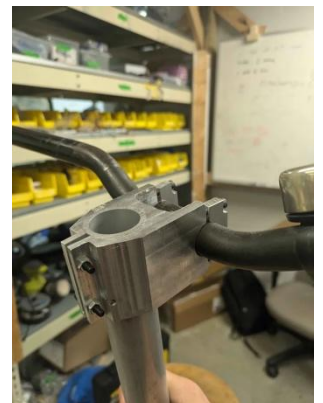
- Built an electric scooter by integrating a VESC (Vedder Electronic Speed Controller), brushless DC motors, and a custom aluminum frame.

How?

- Designed aluminum frame using weldments as well as sheet metal feature in solid works to produce chassis
- Configured the VESC for precise motor control, including torque and speed tuning, using custom firmware settings.

Results

- Achieved a smooth, reliable ride with efficient energy consumption and enhanced rider safety through robust mechanical and electrical design.



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CVT Model– *Baja SAE (2024)*

What?

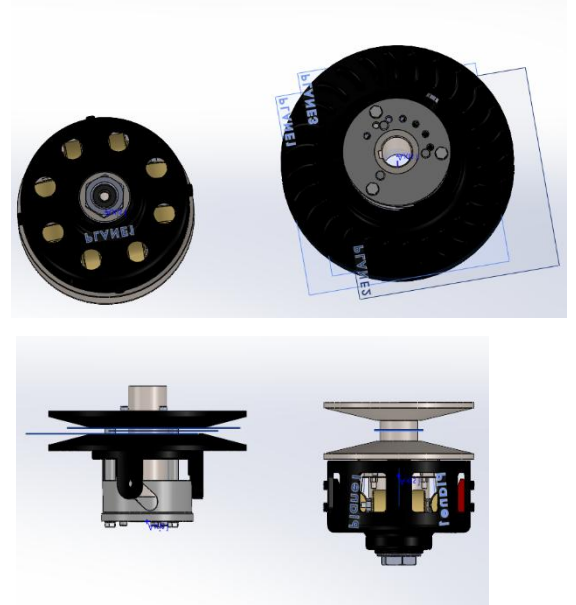
- Modelled the continuously variable transmission (CVT) used in the Baja car in SolidWorks, to be used in future assemblies.

How?

- Modeled primary and secondary sheaves with variable-width geometry for smooth belt engagement.
- Created mounting brackets and housing to integrate with the Baja drivetrain.
- Used SolidWorks Motion to simulate the CVT's pulley movement and belt behavior under load.

Results

- Resulted in an accurate CVT model which was implemented in overall assembly.



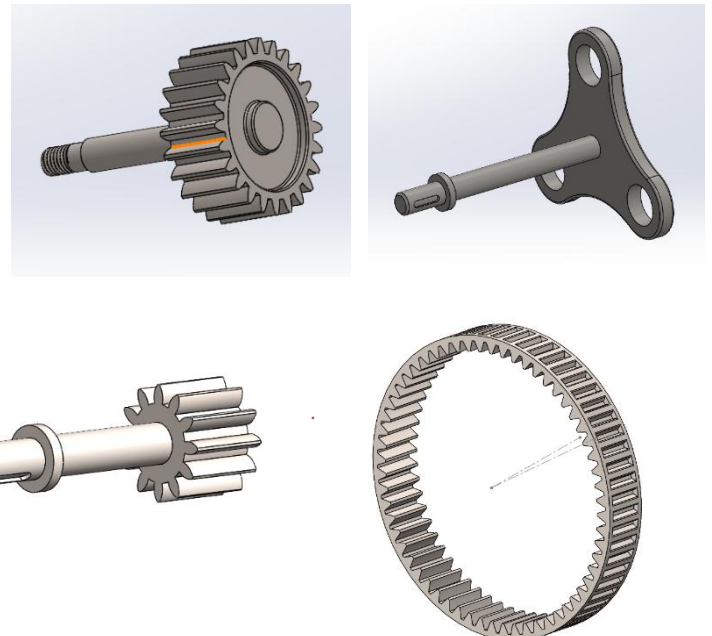
Planetary Gearbox– *Personal Project (2024)*

What?

- Designed components of a planetary gearbox to get a better understanding of how a gearbox worked.

How?

- Used Toolbox feature in SolidWorks to make a Sun-gear and Planet gears. Feature allowed for accurate design of gear teeth profile and pitch.
- Designed a ring gear to house the sun-gear and planetary gears. Added grooves on the outside face for gear teeth using a sin wave function



Results

- Performed motion analysis on whole assembly to ensure proper fit and smooth gear engagement