

SNOWMOBILE REAR DRIVE TEAM: SKIDADDLE



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Objective:

Design a powertrain and suspension to test a rear drive snowmobile, against conventional forward drive, for the UICSC team

Background and Value Proposition:

Snowmobiles have always had plastic drivers that mesh into a rubber track to move the vehicle. These drivers are located towards the front of the vehicle, just behind the engine. This pushes the track, which can lead to bunching up. This is due to a track being a flexible element. This possibly leads to both drivetrain and handling inefficiency. A solution is to pull the track, by having the drivers in the rear. Currently, there are no rear driven snowmobiles on the market as an OEM or Aftermarket platform.

Key Requirements:

- I Be configurable in both front and rear drive to provide data that is an “apples to apples” comparison
- I Handle up to 165 horsepower and 100 Ft-Lbs of Torque at over 100mph
- I Retain OEM-level suspension quality

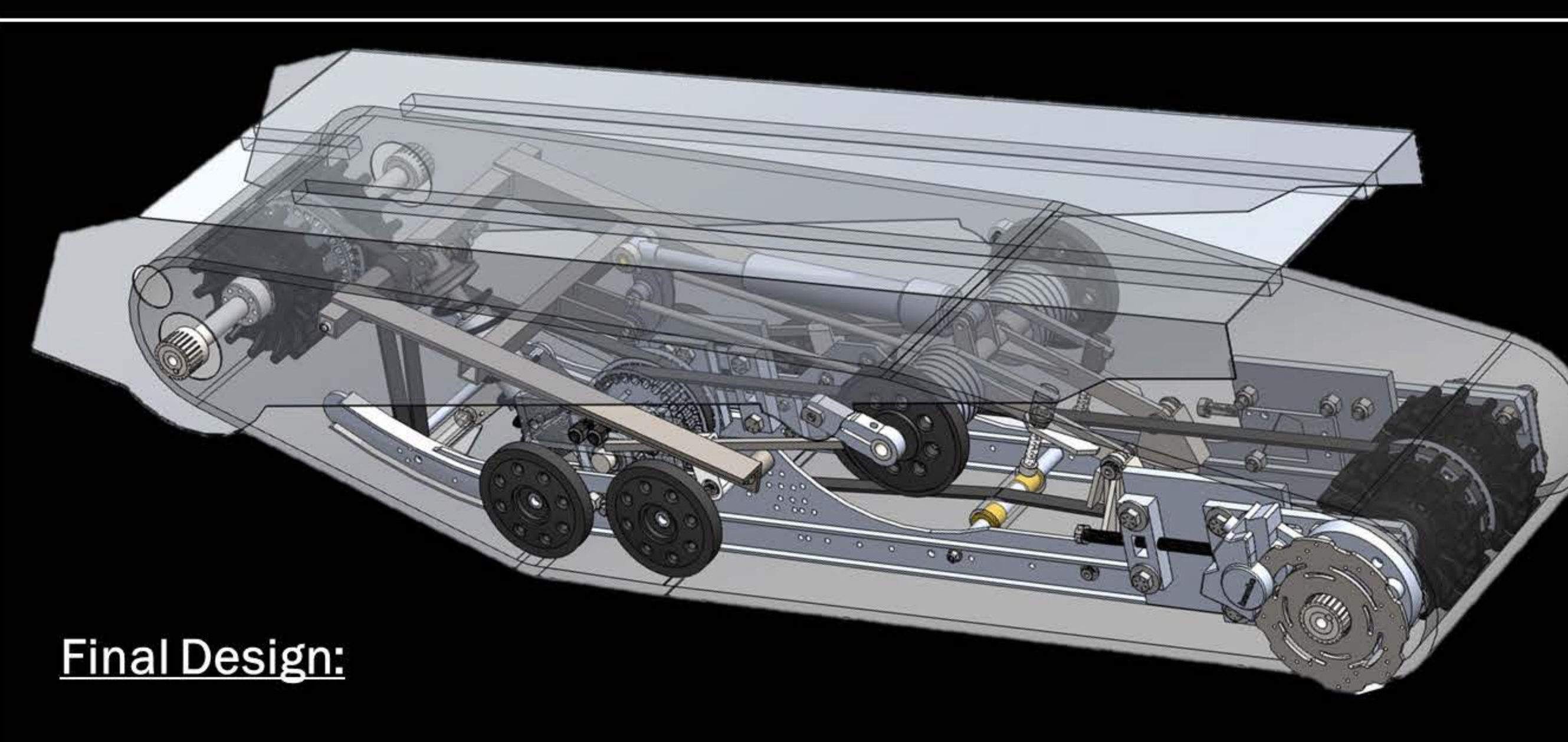
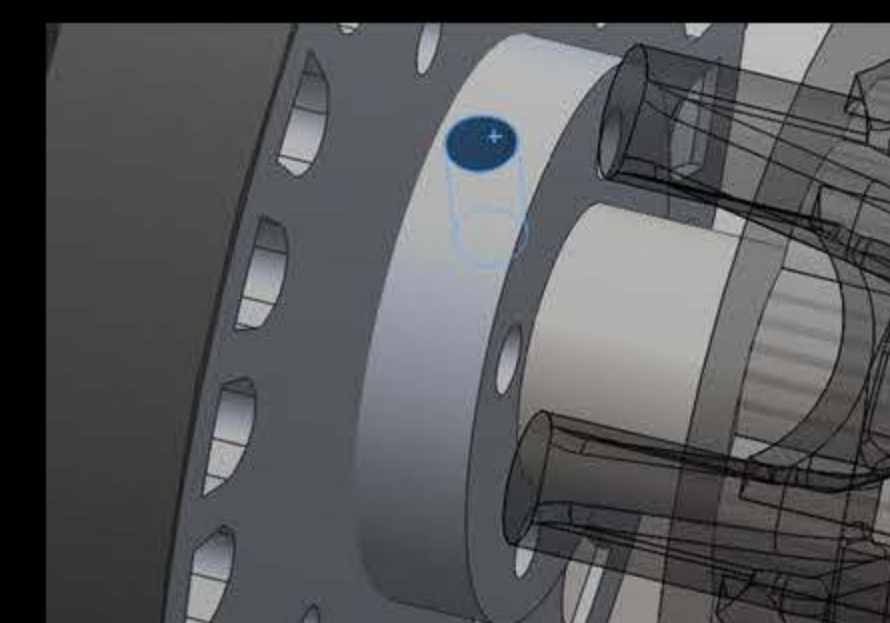
Development and Design Features:

- I Belt driven with 2 Gates Polychain GT2 Carbon 14mm Pitch 29mm width belts



- I Select drive hubs on front and rear axles that are easy to engage-disengage

- I Keyways able to withstand 520 Ft-Lbs of torque, and a safety shear pin limiting rear axle torque to 190 Ft-Lbs



Final Design:

Future Data Collection and Validation Plan:

Comparison tests between front and rear drive modes:

- I Braking
- I Acceleration
- I Instantaneous and ride-average fuel economy
- I SAE Standard test 2263 coast down

Summary, Conclusions, and Recommendations:

The design incorporates an Inverted-Triple Link version of Ski-Doo R-Motion suspension, can sustain in excess of the design criteria, and the ability to quickly change from front to rear drive. Manufacturing is unfinished as of Spring 2020 due to availability constraints but is nearly complete. In the future, all that is needed is to finish fabrication and testing to generate data to discover if rear drive is more efficient than forward drive.



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