

UICSC: Emissions Tow-Behind

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Current Participating Members: McKenzie Reid and William Thielman

Background/History:



Figure 1: Emissions Tow-Behind at SAE Clean Snowmobile Competition taken by UICSC during 2022 competition.

The University of Idaho Clean Snowmobile Challenge club (UICSC) are a group of U of I students who design, manufacture, and test snowmobiles based on their emissions, sound levels, and fuel efficiency. The club competes with other colleges across the nation in Eagle River, WI once a year, and the group has competed for over 20 years consecutively. As part of the emissions testing, each team's snowmobile tows an emissions-tow-behind sled containing sensitive equipment to test the chemicals resulting at the end of the exhaust pipe, as seen in the photo above. This data assists in distinguishing the carbon footprint exiting the snowmobile and how it affects the environment. Not only does this technology apply to snowmobiles, but also cars, tractors, and other motorized vehicles use similar technology to withdraw accurate emissions data under load. In order for this to be accomplished, the testing chassis is going to be changed into a robust small-trailer design, so as to hold more equipment as needed. We also anticipated building a small box for the equipment to be carried in so that future users can place the box in the back end of a car and drive with the equipment instead of using the trailer.

Objective(s):

The purpose of the project is to design, manufacture, and test an emissions cart that can be towed behind multiple vehicle types to test for emissions out of the exhaust.

Product/Data Collection:

- Talk to current sled team sponsors
- Wiring diagrams and component layout
- Shock and rebound analysis
 - Shock calibration
- Design, manufacture, and test trailer using FEA analysis
- Computer spec analysis
- Design, manufacture, and test axles and tires using FEA
- Working on snow first, then apply similar strategies for dirt and road analysis

Budget:

The budget can range anywhere from \$500-3,000 depending on sponsorship.

Potential engineering disciplines: ECE or ME.