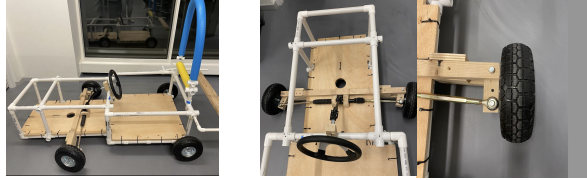


Roadkill...Design and Structure of an Electric Race Car

Introduction

This year, senior engineers have worked on the design and structure of an electric race car for the 2022 SAE Formula SAE Competition. The goal of this capstone is to not only build a drivable car, but to challenge students within the topics of engineering and exploring what it takes to perform in complex projects. Each team member was assigned a role, these roles include, 3D designer, welder, electronics assembler, and team manager, as well as being joined by Junior Directed Research students.

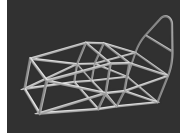
Early Designs & Builds



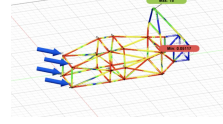
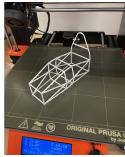
Our design started with sketches and using various easily accessible materials. Pictured is the first prototype which included tires, steering, and braking.

Achieved basic steering with a makeshift pivot wheel block that connected to our steering shaft. Brake design using wooden block and lever.

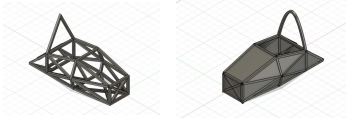
Car Frame & Chassis Design



First chassis design in Fusion 360 and printed mini version.



Chassis stress testing to see weak points.



Final chassis design to be welded, and car shell modeling plan.



3D printed implementation of car shelling. Future plans to scale up and laser cut wood.

Electronics, Motor, Power Train & More!



Thorough research led to motor decision. Pictured is 3D replica of motor housing that includes brake and chain drive, controller, and batteries.



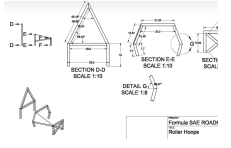
Instead of buying a differential, our team decided to make a fixed differential. Pictured is the rear axle assembly. Future plans to connect to steering wheel.



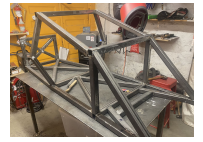
Welding



Welding the chassis has been a work in progress since the very first design. Lead welder and junior welders have been utilizing the New Haven Maker Space to weld.



Welding has been achieved by a lot of planning, cutting materials, and referring to the mechanical drawings which include measurements and angles. The material used for the chassis is steel.



Future Plans

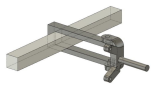
As graduating seniors, our work here is nearly done! Our team has only a few more things to take care of before passing off this capstone to future engineering seniors.



1 After the chassis is welded, our lead chassis designer will close up the car frame by using the laser cutter to cut wood panels and drill the holes for the chassis. They proceed with piecing together all the different parts into the chassis.



2 Search for a chair is still in progress. Pictured is model chair that could work.



3 Junior Directed Research students continue assigned tasks. Pictured is a juniors work for an initial steering design.



4 The tire decision was based off specifications of the wheel hubs and axle that were bought prior. Now they need to be put on.

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