SENIOR DESIGN PROJECT: EV 1 ABSTRACT

The goal of this group project was to build a single-occupant, electric vehicle with a modular frame design. One-person vehicles such as go-karts can be used for a variety of purposes, the main two being for recreation or for transportation purposes. Most one-occupant vehicles are assembled by welding a steel piping together to form the frame. However, this will lock the shape of the chassis in place once all the frame's pieces are welded together. This electric vehicle design was intentionally more modular in nature, and therefore more adaptable to design changes as needed. Another goal with this design was to utilize an electric motor to help minimize the weight of the vehicle, which should help to maximize the distance that can be traveled on a single battery charge.

The design process began by deciding what material will be used for the frame. After some research, aluminum extrusions seemed to be the best fit for this design, as the bars can be fitted together in several different ways due the slots which allow any of the pieces to be bolted together in whatever form is needed. The material of aluminum is also critical as it is a more lightweight material than using steel as the chassis material. Once the chassis was designed, the steering system and the drive system were researched and designed. The drive train for this vehicle aims to convert an electric bike conversion kit motor into a motor which will use a sprocket and chain system to power a one-wheel drive.

The fabrication phase of this project took considerably longer than what was previously thought by the team. Most of the team had little fabrication experience, and this proved a learning curve to overcome. Due to this, some features were not able to be implemented into the final build, including the braking system, the motor controller mount, etc. The chassis, drive system, and the steering were implemented though, which allowed the team to run basic drive tests with the motor. Our main goal of constructing the vehicle with modular components was still achieved, as our frame and motor mounts were able to be constructed in this manner.