Shell Eco-marathon Urban New Design

Overview
At the time of writing, the current Penn State Eco-marathon Urban car will not conform to the 2019 competition rules that require the vehicle to have two passenger doors. The New Design team was tasked at completely redesigning the PSU Urban car, to conform to the 2019 rules as well as to yield a more competitive and visually appealing car.

Objectives
The New Design team objectives were to create a 3D car model that would not only conform to the rules, but also match the PSU Eco-car Camaro. To meet this objective, the team used advanced SolidWorks modelling techniques to yield a car that looks like a mini Camaro and is visually appealing.

Approach
- Gathered a list of customer needs by referring to the rules and our sponsor
- Generated different concepts for the body, frame and powertrain
- Selected a concept for the body, frame, and powertrain based on our customer needs
- Created the frame design using SolidWorks weldments and structural members feature
- Designed the body using SolidWorks advanced surfacing techniques
- Tested the frame using SolidWorks FEA
- Designed the powertrain featuring a Honda GX160 engine
- Created an assembly of the models
- Designed details such as door hinges, fuel system, linkages, etc.
- Ordered cut, profiled, and bent tubing from VR3 Engineering based off of our frame design

Outcomes
- The new design of the Urban car meets 2019 Shell Eco-marathon rules
- The car is more visually appealing than the previous Penn State Urban car
- The powertrain is more compact and lighter weight than the previous car
- The frame design has a factor of safety of 3 and weighs only 36 pounds
- The frame tubes are in the Learning Factory, ready to be welded together by the team next semester