Shell Eco-Marathon Prototype Mechanical

Overview
The Shell Eco-Marathon is an annual competition that challenges students all across the world to design and build ultra-efficient vehicles for the purpose of advancing the automobile industry towards a more sustainable energy future. Students from Penn State have been constructing and continually improving upon the designs of two battery powered vehicles to enter into the competition.

Objectives
The main goal of the Prototype Mechanical team was to ensure that the car was mechanically sound and complied with all rules for competition. This includes designing and building mechanical components to guarantee the safety of the driver and optimize the fuel efficiency of the vehicle.

Approach
- The team had 20 people and a $3000 budget
- Four Sub-teams were created, each with a specific mechanical or electrical focus
- The customer needs were established based off of the 2015 Shell Eco-Marathon Americas Rules
- The rules include mechanical and electrical specifications that all cars must adhere to
- The car was then thoroughly inspected to identify discrepancies between the rules and the current state of the car
- The discrepancies formed the basis for the tasks that needed to be completed prior to competition
- Twice per week, the team communicated with the sponsor to update progress and ask questions
- Progress was tracked and tasks were scheduled using a Gantt Chart
- The competition took place from April 9-12 in Detroit, Michigan
- Each vehicle underwent a 10 station technical inspection prior to being allowed to compete

Outcomes
- Of the $3000 budget given to the 4 sub-teams, the prototype mechanical team spent only $56
- The prototype vehicle passed 10/10 inspection stations
- The prototype vehicle completed 1 successful run with a fuel efficiency of 83 miles/kWh
- The gasoline equivalent is 2717 mpg
- All tasks were completed on time and within budget