Shell Eco-Marathon, Urban Concept Vehicle

Overview
The team’s sponsor, Ryan Moyer, is an employee of Shell Oil Company, which holds an annual competition known as the Shell Eco-Marathon. The competition is held to find the most fuel-efficient vehicle designed and built by students worldwide. Last year, the Urban Concept Vehicle was unable to complete the entire course due to inadequate fuel efficiency. The Urban Concept team was tasked to optimize the existing engine to maximize efficiency for next year’s competition.

Objectives
1. Optimize the existing drivetrain.
2. Find a stable fuel source supplier.
3. Create an intuitive electrical setup for future teams.

Approach
- A list of customer needs was compiled based off of the official competition rules in addition to the past teams’ recommendations.
- The team generated new concepts for the intake, exhaust, transmission, and fuel source.
- Existing transmission systems were explored and compressed natural gas distributors were considered.
- Optimizing the engine tune requires a large amount of fuel; therefore, the team acquired a sponsorship from Praxair.
- Weekly meetings were held with Ryan Moyer and Professor Gary Neal to determine new courses of action and gain automotive and engineering advice.
- Raw materials were cut, bent, and welded in the Learning Factory for the exhaust and intake systems.
- SolidWorks software was utilized to model new intake and exhaust systems on the vehicle model.
- EcoCAL software was used to tune the engine during idle and driving test periods.
- The data gathered was compared to last year’s results and team finances were analysed to monitor cost saving techniques implemented.

Outcomes
- The sponsor will save $400 as a result of this project.
- Future teams will have no fuel source costs due to donations made by Praxair.
- The electrical wiring was organized in an intuitive configuration for future teams to follow.
- The new transmission, exhaust, and intake systems will ensure smoother power generation.