

Senior Design Team# 1 – Shell Eco-marathon Project Synopsis

For our Ethics & Design Project Organization, our group built a fuel-efficient prototype car to compete in the 2013 Eco Shell Marathon, which took place in Houston, Texas in between the dates of April 4th-7th. The main objective of this competition was to build a car that was as fuel efficient as possible. Some of the factors which played an important role in this project were the engine selected, the design of the frame and body, weight of the prototype and wheels selected.

Envisioning the competition being April of 2013, our group broke down our time line, which started back in September of 2012, in 3 major sections: Research and Design, Manufacturing and Testing and competition. The research and design, has been broken down into several different categories itself. Our goal was to study the Rules and Regulations and Previous Designs throughout the month of September. From then on, we set several different deadlines to ourselves in order to have the project delivered on time in April. The Research and Design part was successfully completed by December, time where we had set in stone most of the concepts we wanted to utilize in the car. Once spring started, we immediately started ordering materials and parts in order to manufacture the car. The first step was building the frame, which was the most time consuming task during the whole project. Due to the several layers of carbon fiber tow reinforcements, our group spent a month just building the frame. Subsequently, our team successfully attached the front wheels and developed the steering system. At this time we were able to incorporate the engine, which gave a solid shape to the vehicle. Finally, we started manufacturing the body, which had to be delivered in less than a week to allow for the shipping time constraints. After several days of work, we finished the car right on time to ship it to the competition, leaving only a few details to be worked on in Houston.

Perhaps the biggest setback our group faced throughout the three stages of the project was the lack of financial support. Competing against teams throughout the continent that are fully supported by their schools and university was a big disadvantage but our goal since the beginning had been to perform our best within those constraints. After all was said and done, the total cost of the project was almost \$10,000, nearly \$6,000 coming out of our pockets.

Once again, our goal was to perform as well as we could within our budget constraints. It is almost unrealistic to set bars as high as other teams that go to Houston with budgets twice as high as ours. To have a good idea, the winner of the 2012 Marathon in the Gasoline Energy prototype car, designed a car that ran 2,188.6 mpg (it is important to remember cars must run at an average of 15 mph throughout the competition). On the ethanol prototype energy for example, the winner designed a prototype that ran an impressive 1,441.5-mpg. Most teams that currently successfully race at SEM have been doing the competition for years, therefore, simply improving on their previous designs rather than starting a brand new one.

Our group consisted of three members that are officially enrolled in Senior Design project. Unfortunately, the competition requires a lot more than only 3 members working on it, as every team taking part in the competition can be made up of 8 people. Having only 4 people fully engaged on the car was a big disadvantage but we did not let that stop us from reaching our goals. We did not win the race, our driver got in an accident that took away our chances of contention. Nonetheless, producing a working vehicle that passed the inspections and got the chance to compete was a huge accomplishment to our team and adding to the global learning aspect of the project, we could not have asked for a better overall experience.