SUPERMILEAGE: Ultra-Fuel Efficient Vehicles

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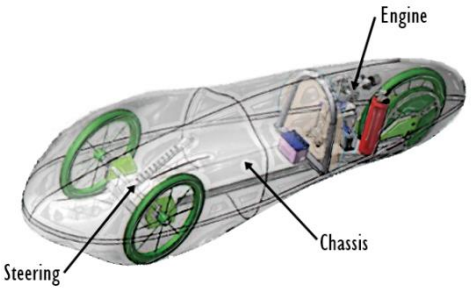
INTRODUCTION

No problem has ever rounded global leaders together quite like the global energy crisis. Oil geologists and analysts have forecasted impending global Peak Oil, a point at which the maximum rate of petroleum extraction is reached. A 2010 Oxford study states that by the year 2015, global oil demand will surpass oil supply, of which a global average of 61.7% is owing to transportation sector. Action can still be taken and one of the most commercially viable ways to do so is by transforming the world's consumption of transport fuels.

PROJECT

With this goal in mind, a group of UBC students have designed a series of ultra-energy efficient vehicle from the ground up: The Supermileage Mark prototypes.

Fuel efficiency in the vehicle is owing to the following four focal points of design:
(1) Aerodynamic optimization
(2) Weight minimization
(3) Engine customization
(4) Design for simplicity



The first notable feature of the Mark VIII Prototype is its sleek and streamlined shell form. The team conducted extensive yarn tuft wind tunnel testing on scale foam models to visualize flow fields on the body contours. Computational Fluid Dynamic (CFD) analysis coupled with modeling software, allowed the team to manipulate the body shape and curvature for highest performing profiles. Driver configuration is designed in a feet first, semi prone position allowing for a small frontal area and further eliminating drag. The bulk of the chassis base is constructed from 2" aircraft-grade aluminum honeycomb; selected for its high strength to weight ratio in bending. The 3-ply carbon fiber shell offers the same advantages in durability while being extremely lightweight.

Augmenting engine efficiency involved the sealing of air leaks in the manifold and insulation to assist with the internal combustion reaction. The engine is also retrofitted with a custom fuel injection system that mitigates fuel waste on intake walls by injecting directly at the intake valve for immediate vaporization.

CONCLUSION

Although, the Mark Prototype Series is not ready to hit the main street, it is a tangible look into the future of sustainable transportation. Technologies developed on the Mark Prototypes can also be extrapolated in industry practice. Above all else, the Mark Prototype Series serves to unlock fresh possibilities by defining new limits for what can be achieved with our earth's treasured resources.