

Project Description

Project Name: Body Shell design and optimization of the Shell Eco-Marathon car

Team Size: 3 MEE Students

Project Overview

The project consists of designing and optimizing the body shell of the car intended to participate in the Shell Eco-Marathon competition. Students are inquired to present several body shell designs of the car according to the SEM rules, and optimize these designs through aerodynamics tools in order to minimize the drag force. ANSYS solver with mesh morphing technique will be utilized in the optimization process. Besides the body shape, ground clearance, shape and elevation of wheel faring will be accounted for in the optimization process. After arriving at the final shape, a Fluid Structure Interaction (FSI) analysis will be carried out to determine the forces acting on the shell and followed by material selection, as well as shell maximum thickness.

The Shell Eco-Marathon is a car design competition that consists in designing a vehicle that travels the **farthest distance** using the **least amount of energy**. Two vehicle categories are considered: Prototype and Urban. Under each category, there are two engine classes: Electric Mobility (hydrogen battery or solar cells or plug-in electricity) and Internal Combustion (Gasoline or Diesel or Biofuels or Gas-To-Liquid fuel). Depending on the selected car type / category a set of design specs is specified by the Shell Eco-Marathon organizing committee: volume, height, width, weight, number of wheels, safety standards...

Project Deliverables

- Report including design parameters, aerodynamic study, FEM analysis...

Design Constraints

For details about the design specifications, competition regulations and procedures, refer to: <http://www.shell.com/home/content/ecomarathon>