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Rear Passenger Side Impact Safety Using Structural Design

Undergraduate final year research project

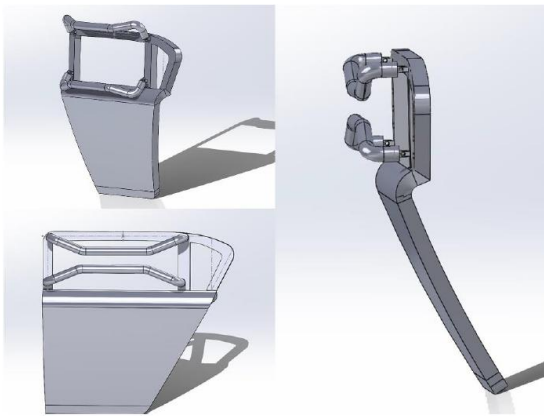


Figure 1 External 'H' Bar Crash Structure Around Rear Passenger Door

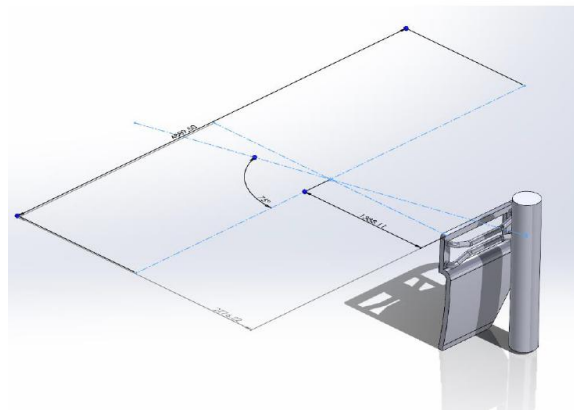


Figure 2

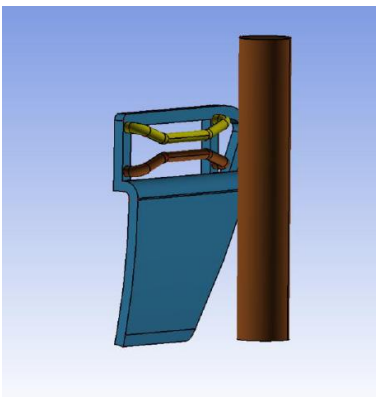


Figure 3 Ansys LS-DYNA Pre Post Setup.

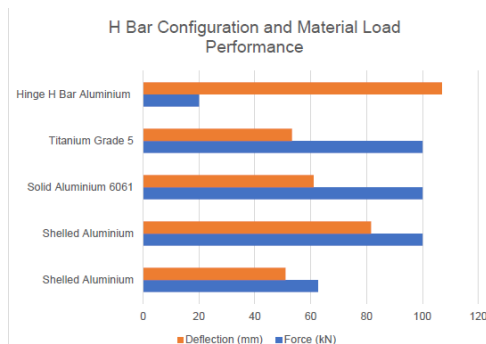


Figure 4 Performance Results of Different H-Bar Configurations.

A novel structural reinforcement designed to improve vehicle safety in side-impact crashes called the 'H-Bar'.

Side impacts cause severe injuries due to limited crumple zones. Rear passengers are especially vulnerable. Existing safety measures aren't effective enough—this aims to fix /address that.

Used **SolidWorks & ANSYS LS-DYNA** for crash simulations. Tested different materials (**Aluminium 6061, Titanium Ti-6AL-4V**).

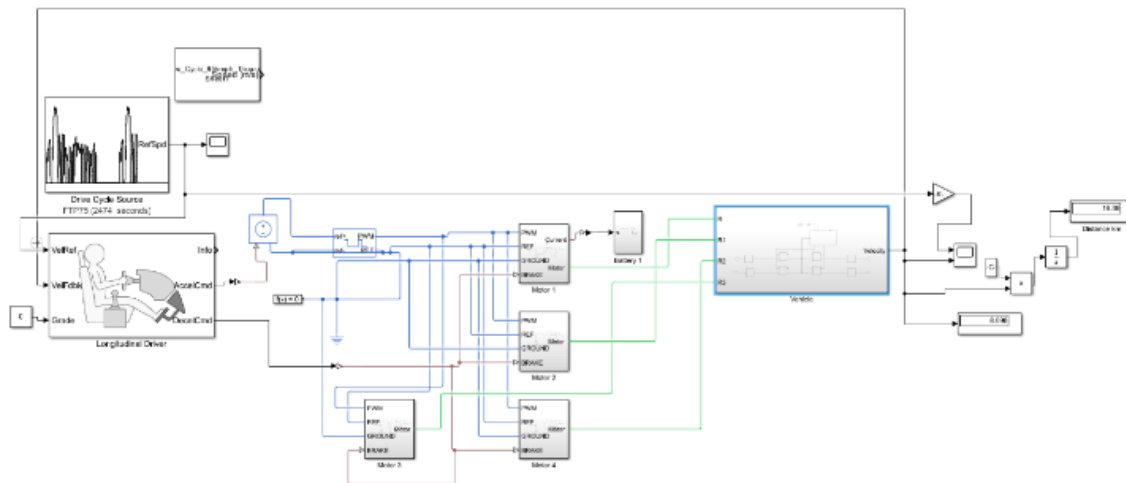
Designed both **static** and **actuated (deployable)** versions.

Static H Bar improved impact resistance significantly.

Actuated version failed due to hinge stress and slow deployment.

MATLAB and ANSYS Based Simulation of an Electric Powertrain & Aerodynamics

MSc Group Project



Developed an optimised **aerodynamic and powertrain model** for an electric vehicle, using **ANSYS Fluent** and **MATLAB Simulink** respectively to gain insight into vehicle behaviour and performance.

Used **ANSYS Fluent** for CFD simulations to analyse airflow and optimise aerodynamics.

Implemented a **MATLAB Simulink powertrain model** to assess energy efficiency under varying aerodynamic loads.

Modified **frontal profile, roof taper, and diffuser angle** to reduce drag.

