

Welcome , and thank you for taking the time to view my portfolio. The goal of this portfolio is to give you a deeper insight into my experiences and skills i have gained over my recent history

Project: Baja Roll Cage Design and Fabrication

Role: Chassis Subsystem Head

Objective: Design and manufacture a robust rollcage for the Baja competition, focusing on achieving a low weight-to-stiffness ratio, maintaining a low center of gravity, improving ergonomics, and ensuring safety. The rollcage needed to accommodate drivers up to the 95th percentile male while being prepared for various impact scenarios, including crashes and rollovers.

Design and Analysis

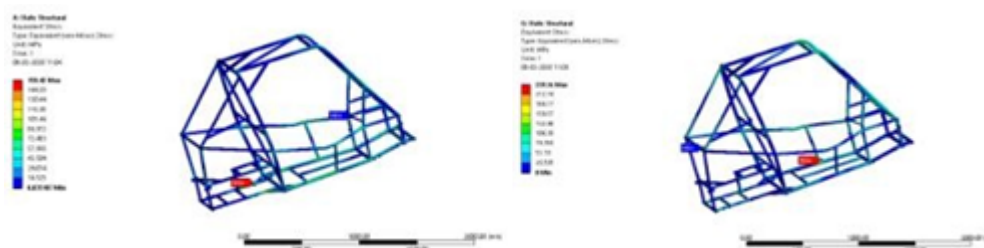
Solidworks Design: The design was meticulously crafted using Solidworks, taking into account the specified objectives and desired factors. This step was crucial to ensuring that the rollcage met the competition's stringent requirements.

Virtual Testing: The rollcage's performance was rigorously assessed through virtual tests conducted using Ansys software. These tests included static impacts from multiple directions, such as front, side, rear, and rollovers. This comprehensive analysis allowed us to fine-tune the design for optimal safety.

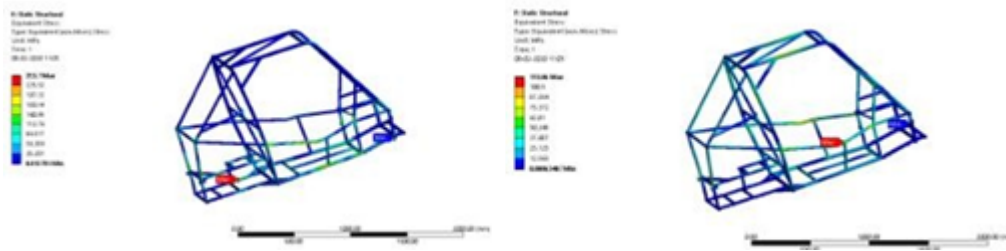
Ergonomics Evaluation: CATIA software was employed to evaluate and enhance the ergonomics of the cockpit. Ensuring driver comfort and usability was a priority to optimize team performance.

Integration in Solidworks: The final assembly of the rollcage was completed in Solidworks, incorporating critical points from other subsystems. This ensured seamless integration with the overall vehicle design.

CAE and Analysis



Strength Analysis: Extensive finite element analysis (FEA) was performed to determine the rollcage's strength under dynamic conditions, including impact loads, torsional loads, and rollover scenarios. The analysis yielded a factor of safety ranging from 1.6 to 2.3, demonstrating the robustness of the design.



This project exemplifies my leadership and technical skills as the Chassis Subsystem Head, overseeing the successful design, analysis, and fabrication of a rollcage that met the stringent requirements of the Baja competition. The rollcage not only prioritized safety and ergonomics but also showcased our commitment to excellence in engineering design and manufacturing.

Material Selection and Manufacturing

Material Choice: AISI 4130 was selected as the primary material for rollcage fabrication due to its exceptional strength and cost-effectiveness. This choice aligned with our dual objectives of strength and affordability.

Welding Process: TIG welding was employed for assembly, using ER70S-2 and ER80S-D2 as filler rods and WT20 2% Thoriated Tungsten electrodes with DCEN polarity. This welding process ensured the structural integrity and durability of the rollcage.