Baja SAE

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Purpose:

The team was tasked with designing and manufacturing a new chassis for the UVU Baja vehicle.

Design Requirements:

The Baja SAE competition has a strict rulebook that holds the bare minimum design requirements .

Additionally, the previous vehicle had issues to be fixed, such as:

- The old vehicle was heavy
- Front roll-over tendency
- Small cockpit

Finally, there were two requirements added due to the resources of the team:

- The team had a budget, so the less material used, the better
- The design should be as simple as possible, to be built by amateurs

Design Selection

The team produced about 100 design ideas, with inspiration from other Baja vehicles, Scierra Cars, CAN AM, and other similar vehicles

The team eliminated rulebook non-compliant designs, leaving slight variances in each of the three subsystems: Cockpit, Roll Hoop, and Rear Bracing.

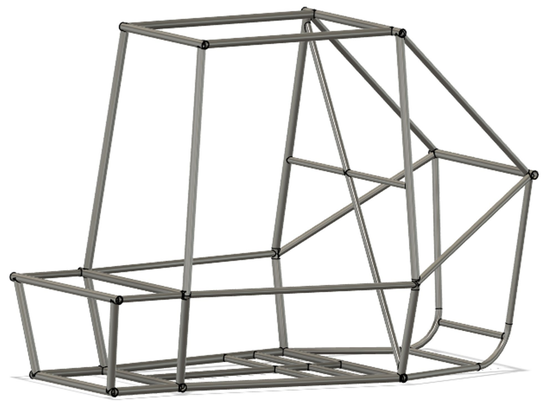
Cockpit: Straight member design chosen for:

- Simplicity
- Bent member restrictions (B.3.2.1)

Roll Hoop: 3-piece Hexagonal design chosen for:

- Simplicity
- Required less material
- More ergonomic

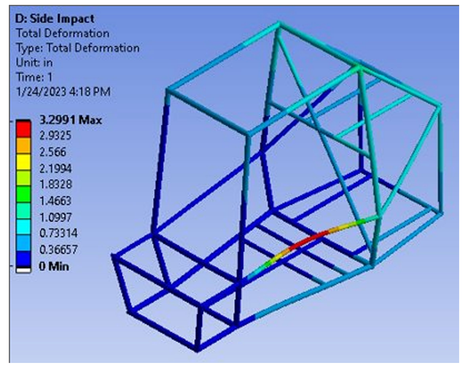
Rear Bracing: An upper triangle design was chosen because it created an intuitive mounting point for the engine and fuel tank.

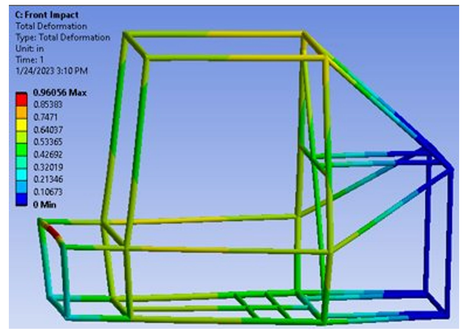


Analysis

FEA analysis was used to analyze the strength of the frame in the case of collision.

The analysis predicts that both the driver and the fuel system will be protected from any foreseeable crash.





Manufacture

The frame was manufactured during the spring semester.

The frame is made of 4130 alloy steel.

The team was able to manufacture the frame, and attach the suspension, steering, driver restraint, and fuel systems.