

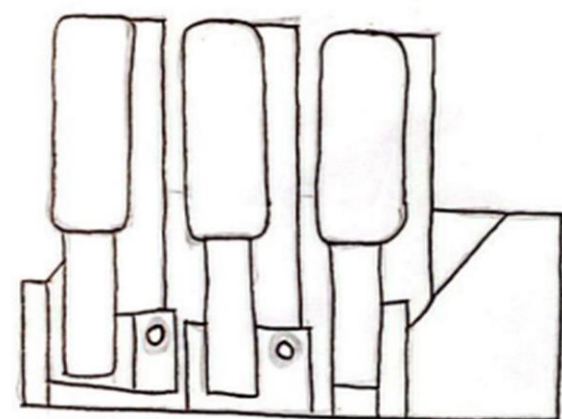
Aim of Project

The Aim of the project is to design and manufacture a pedal box suitable for a formula student car.

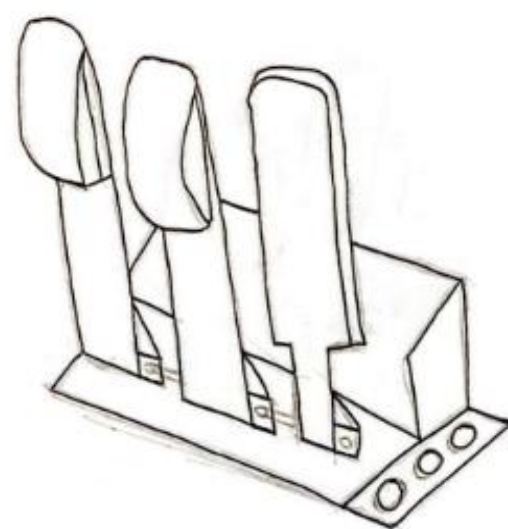
Background

- The Formula Student competition is an international competition that challenges universities to design and build a single seater race car to compete in Silverstone UK.
- The pedal box is key component that sits between the driver and the braking/accelerating systems of a formula student car.
- A pedal box must be precise, lightweight, and meet the ergonomics requirements to fit any driver.
- The pedal box must comply with the Formula Student Regulations 2024
- Must be reliable under high forces
- Must meet the adjustability requirements for different drivers
- Material Selected was 304 Stainless Steel for the base. Pedals to be made from Aluminium.

Design Concepts



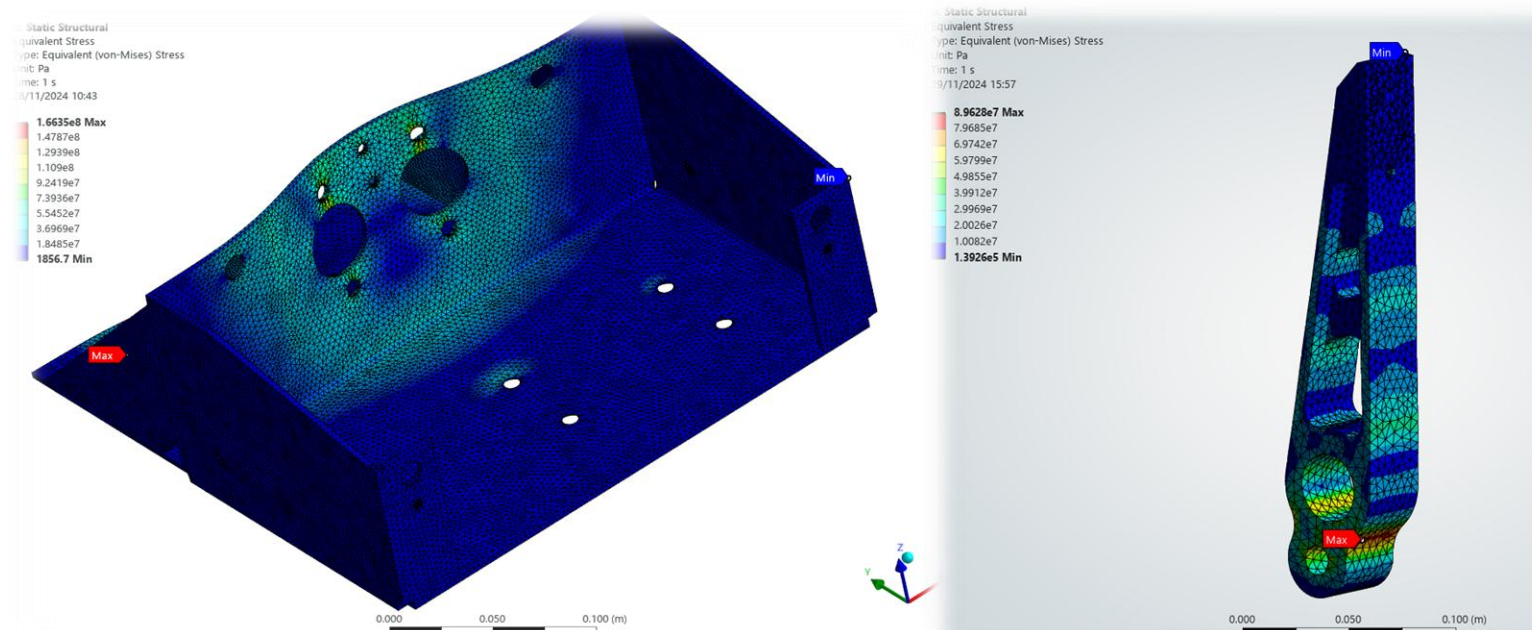
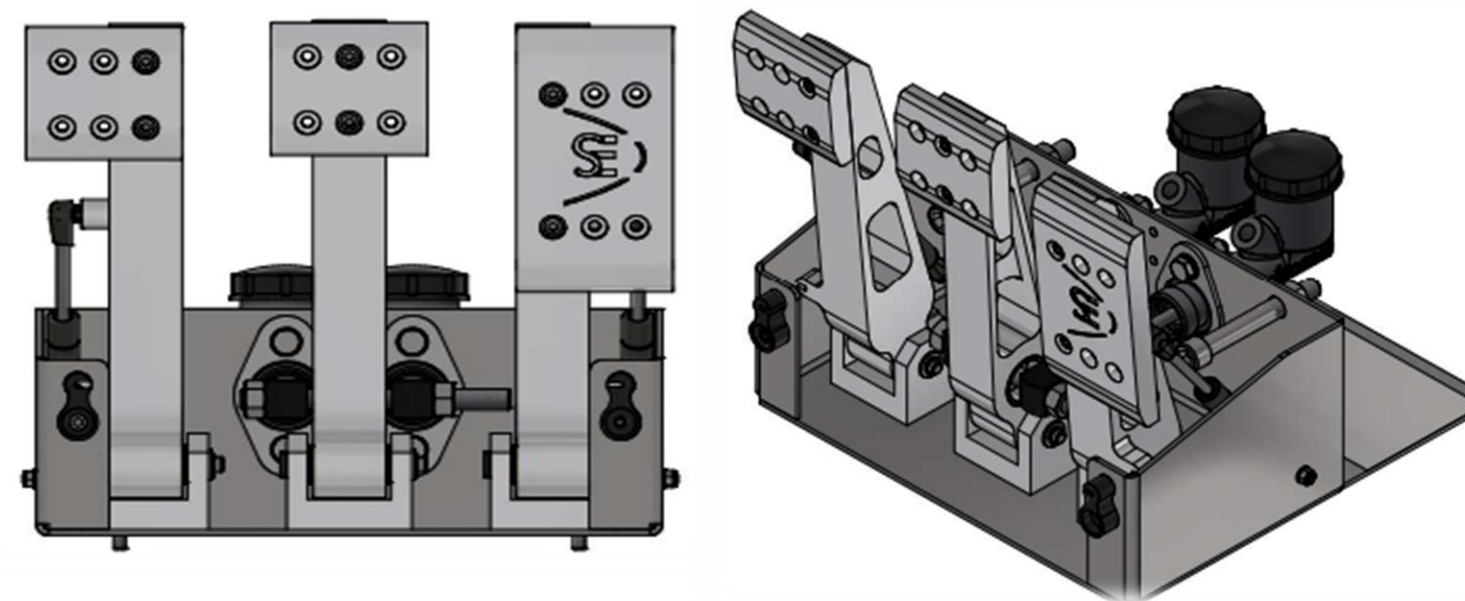
Concept 1



Concept 2

- From the 2 concept designs, you can see the progression to our final design.
- When we got sponsorship from Senator Engineering, it allowed us to get more creative with the designs of the pedals.
- The base was to be made of sheet metal, and the Pedals and brackets were made in a CNC machine.
- With a final design we were able to simulate forces on the pedals and base to ensure it would fail.

Final Design



Von Mises Stress

- Base
- Minimum factor of safety was 4.1069.
- The Maximum Von Mises Stress appears to be 166.3 MPa.
- Max Von Mises stress is 97.7 MPa lower than the material's yield strength.
- Pedals
- Factor of Safety for fatigue was 0.964. FOS for stress was 2.89 which is above 1, meaning its safe under the applied loading conditions.
- Max Von mises stress was 89.62 MPa which is 169.38 MPa lower than the materials yield strength

Conclusion

- The aim of the project was to design and manufacture a pedal box suitable for a Formula student race car
- All designs were within the rules and regulations of formula student
- Concept designs were drawn to give a visualization of a full assembly
- CAD parts were created using SolidWorks
- The pedal box was fully manufactured by Senator Engineering
- Team worked very well together, the work was split between each member and completed.

Acknowledgments

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References

<https://www.imeche.org/events/formula-student>