

M2.05 Bobcat Racing Pedal Assembly

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Sponsor: Abhimanyu Sharotry – Bobcat Racing

CURRENT STATUS

BACKGROUND

Formula SAE is an international collegiate engineering design competition that challenges universities to design, manufacture, and race formula cars.

GOAL

The goal for this project is to design, manufacture and assemble a pedal assembly that complies with the FSAE 2023 rules and regulations. It should pass technical inspection and operate effectively in the dynamic events during the 2023 Formula SAE competition.

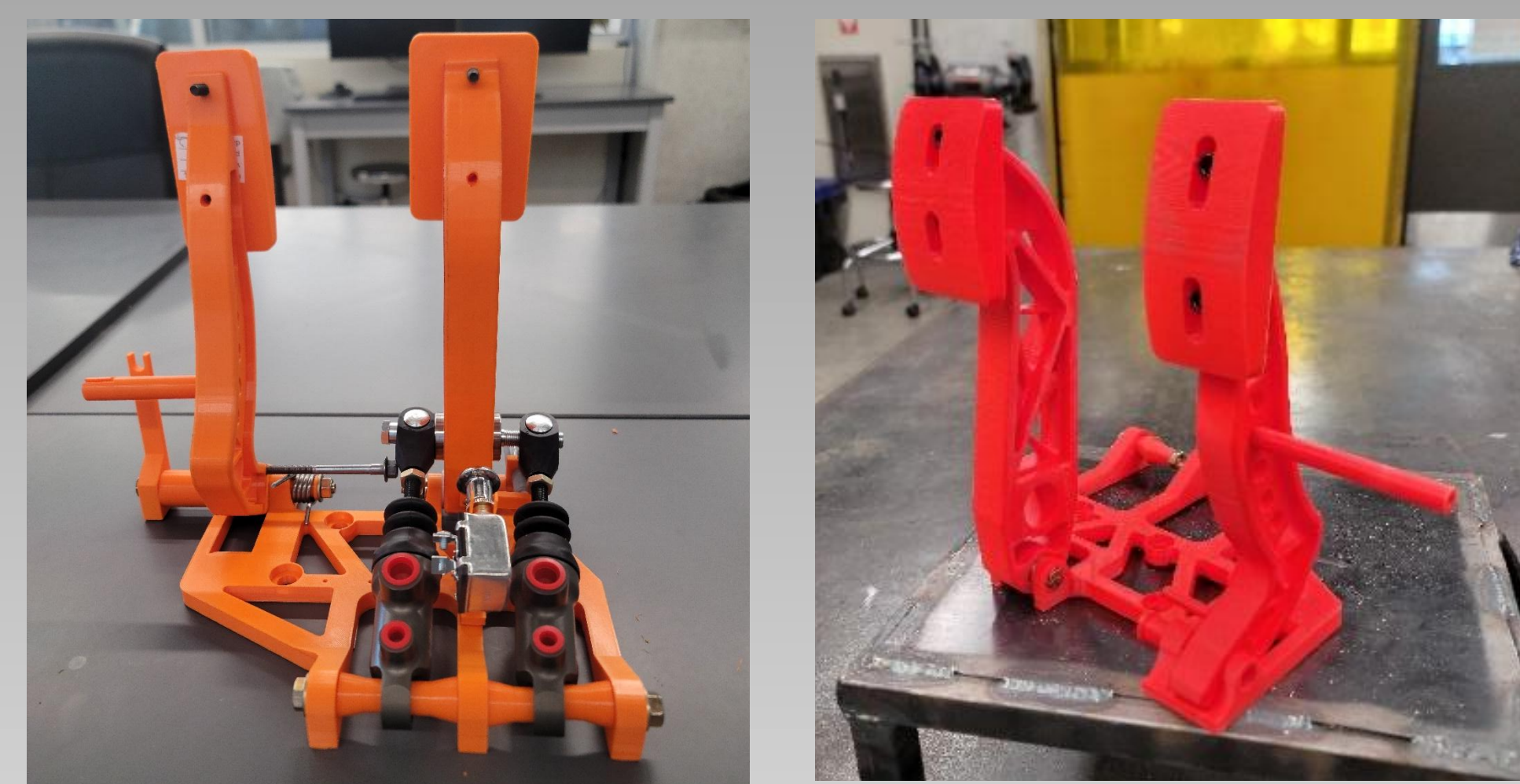
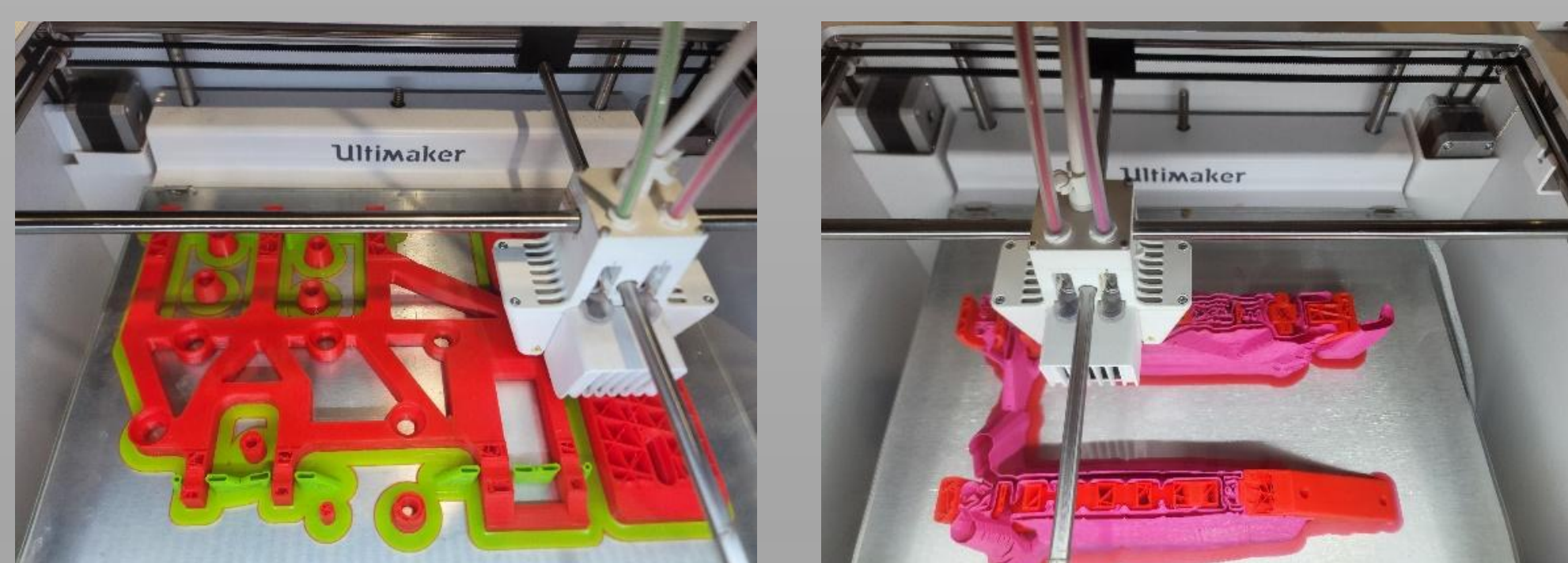
OBJECTIVES

- High Strength to Weight Ratio
- Optimized Factor of safety
- High Reliability

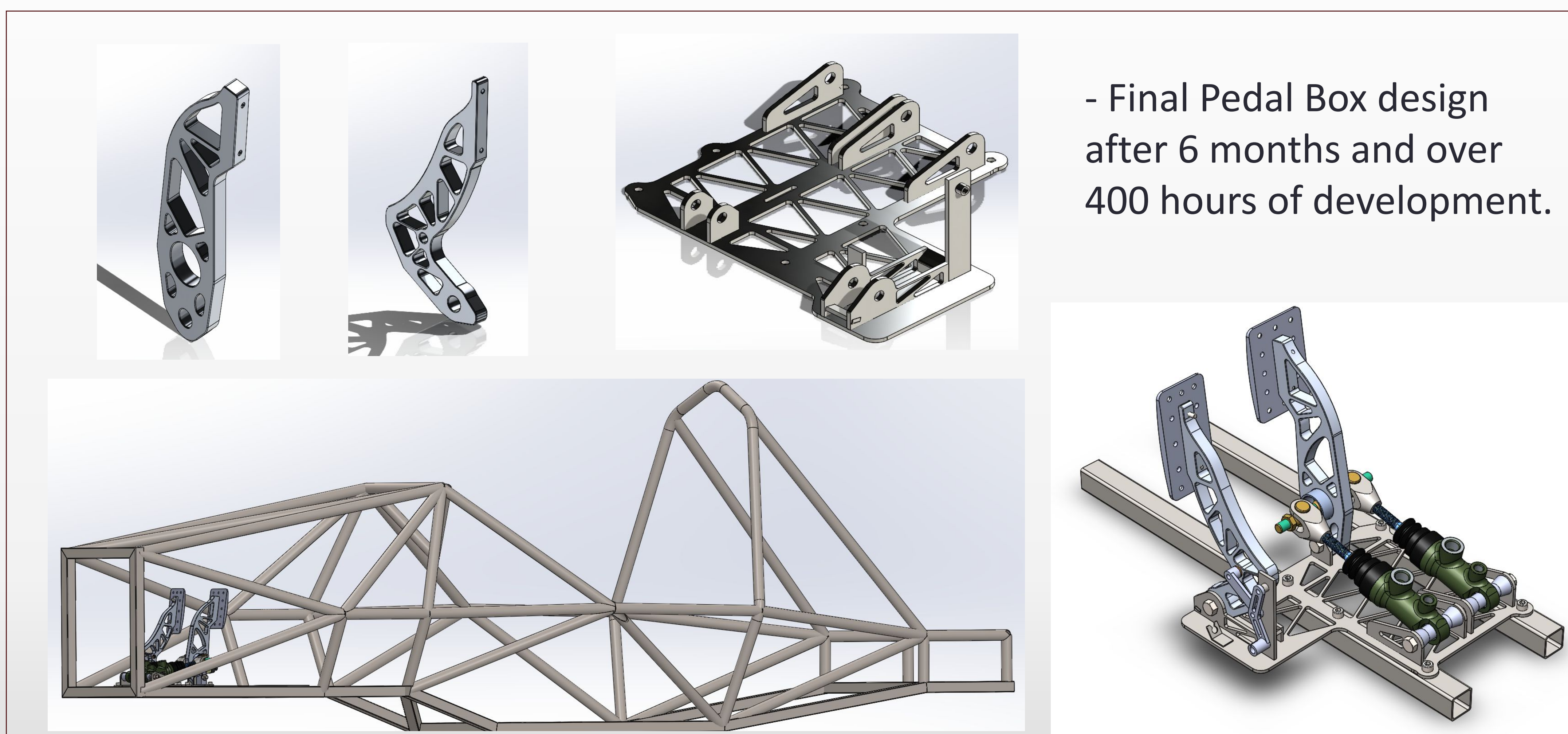
SPECIFICATIONS

- Withstand at least 2000 N applied to brake pedal and associated components.
- SAE Grade 5/ Metric grade 8.8 or better hardware
- Two independent master cylinders
- Constructed from steel or aluminum
- Brake light switch accommodation
- Brake Over travel switch accommodation
- Smooth operation of throttle

PROTOTYPING



INNOVATION



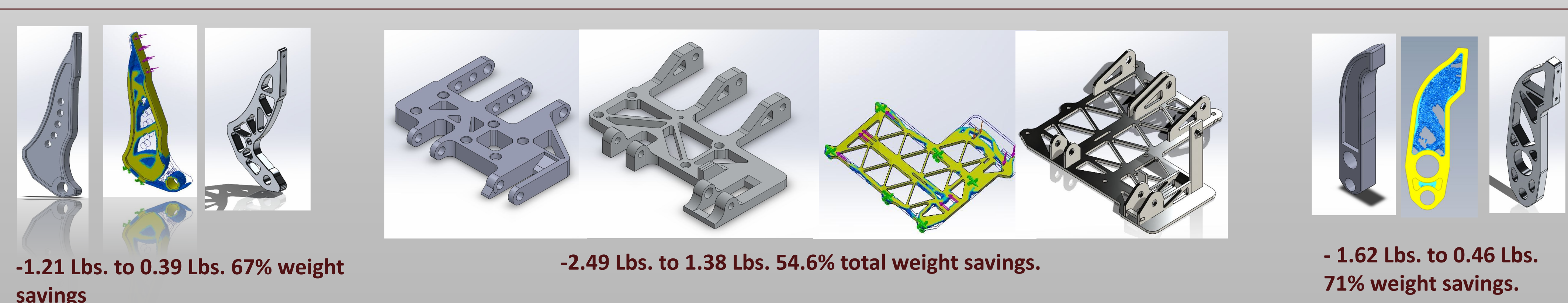
- Final Pedal Box design after 6 months and over 400 hours of development.

All Manufacturing processes are complete, the pedals are assembled and ready to deliver to the client. The final components have been powder coated.



TOPOLOGY OPTIMIZATION

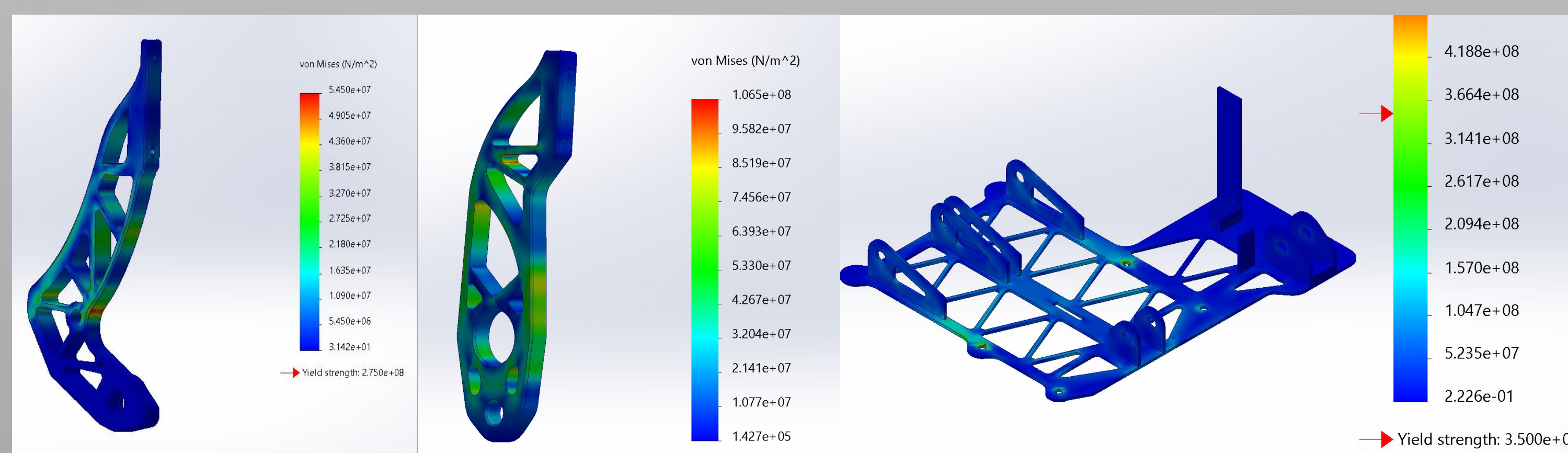
Throughout the evolution of the design, the components were refined to be lighter while maintaining its structural rigidity.



-1.21 Lbs. to 0.39 Lbs. 67% weight savings

-2.49 Lbs. to 1.38 Lbs. 54.6% total weight savings.

- 1.62 Lbs. to 0.46 Lbs. 71% weight savings.



- Finite Element Analysis (FEA) shows where the focus of stress lies within our components

MANUFACTURING



- The processes utilized to manufacture our pedal assembly include CNC milling, plasma and waterjet Cutting, lathe turning and TIG welding.

ACKNOWLEDGEMENTS

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Abhimanyu Sharotry – Bobcat Racing Team Principal/ Point of Contact/Project Advisor
Harrison Thramann – Bobcat Racing Lead/ Manufacturing support
Austin Talley – Course Instructor
Bobcat Racing Team - Sponsor

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