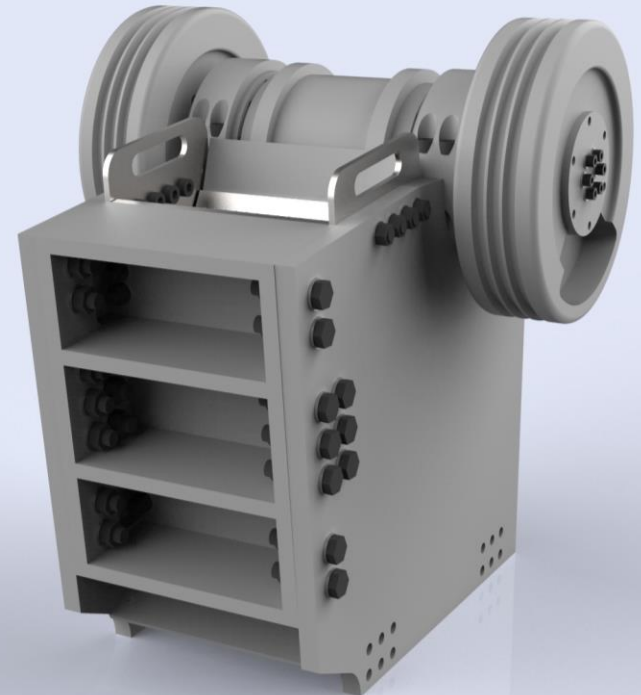


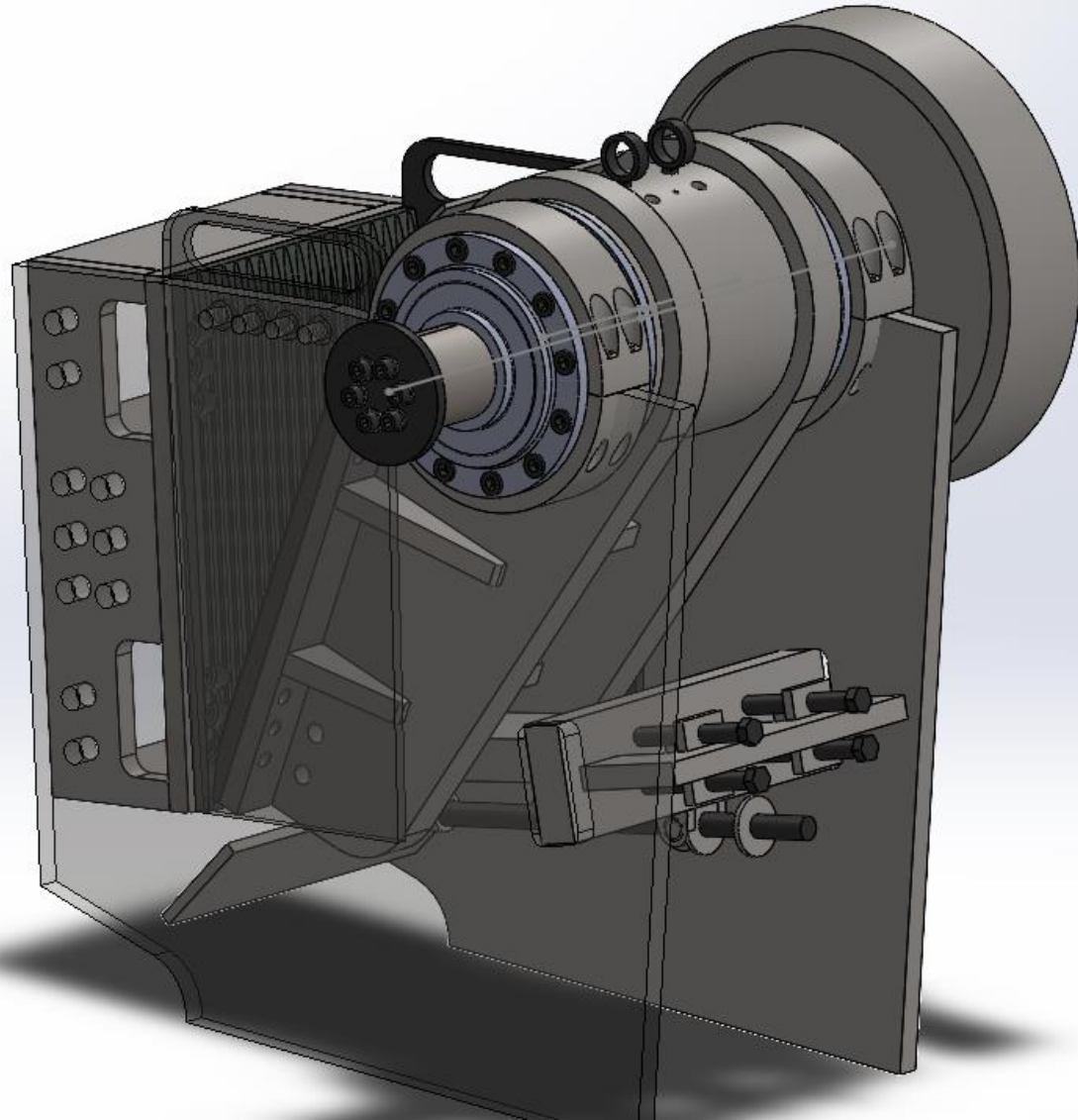
PRIMARY ROCK CRUSHER DESIGN



Alexander Buckeridge



Project Overview



- **Problem Definition**
- **Design Ideation**
- **Engineering Design & Simulation**
- **Manufacturing**
- **Testing**



Initial Concept and Design



Problem:

- The client lives in a rural area with no sealed roads and each year the wet season washes away and leaves a clay-based roadbase which is difficult to drive on in the wet and hard to maintain
- Road base would solve this problem however, it is expensive to transport to the area.

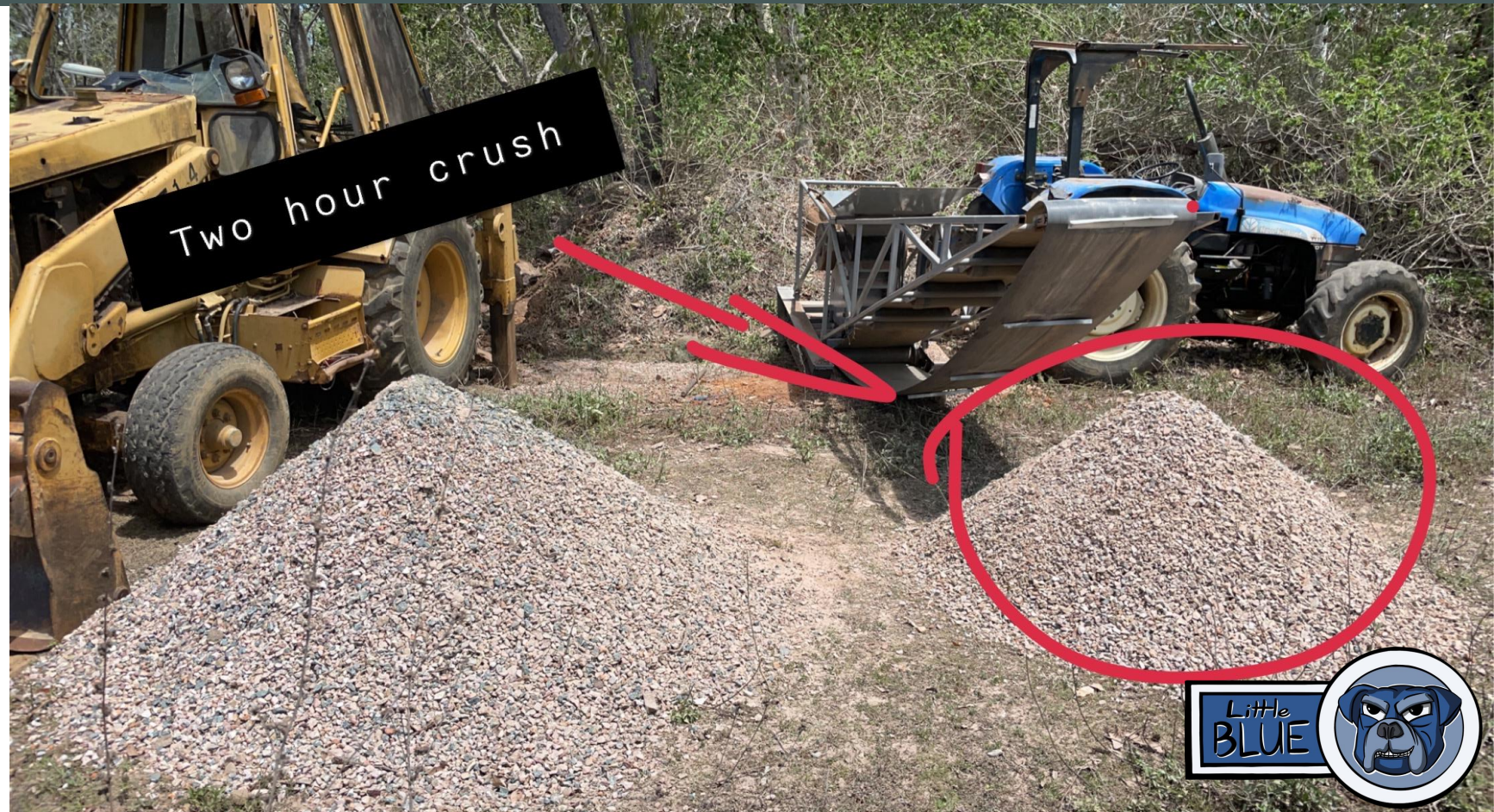
Solution:

- Develop Rock Crusher to process 'Blue Metal' deposits that are already on site to make roadbase for
- This crusher would be inexpensive and run off of a tractor PTO.



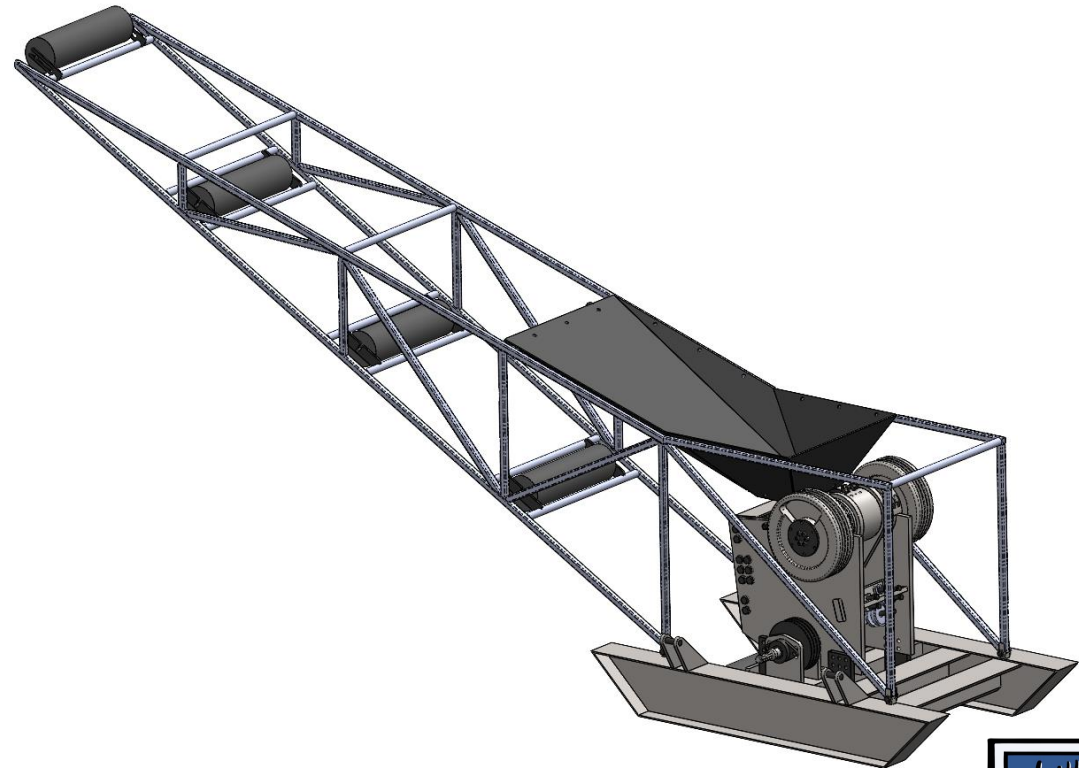
Crusher Concept

- Powered by tractor PTO
- Fed Rocks through the top
- The Crusher Breaks down the material Into Roadbase



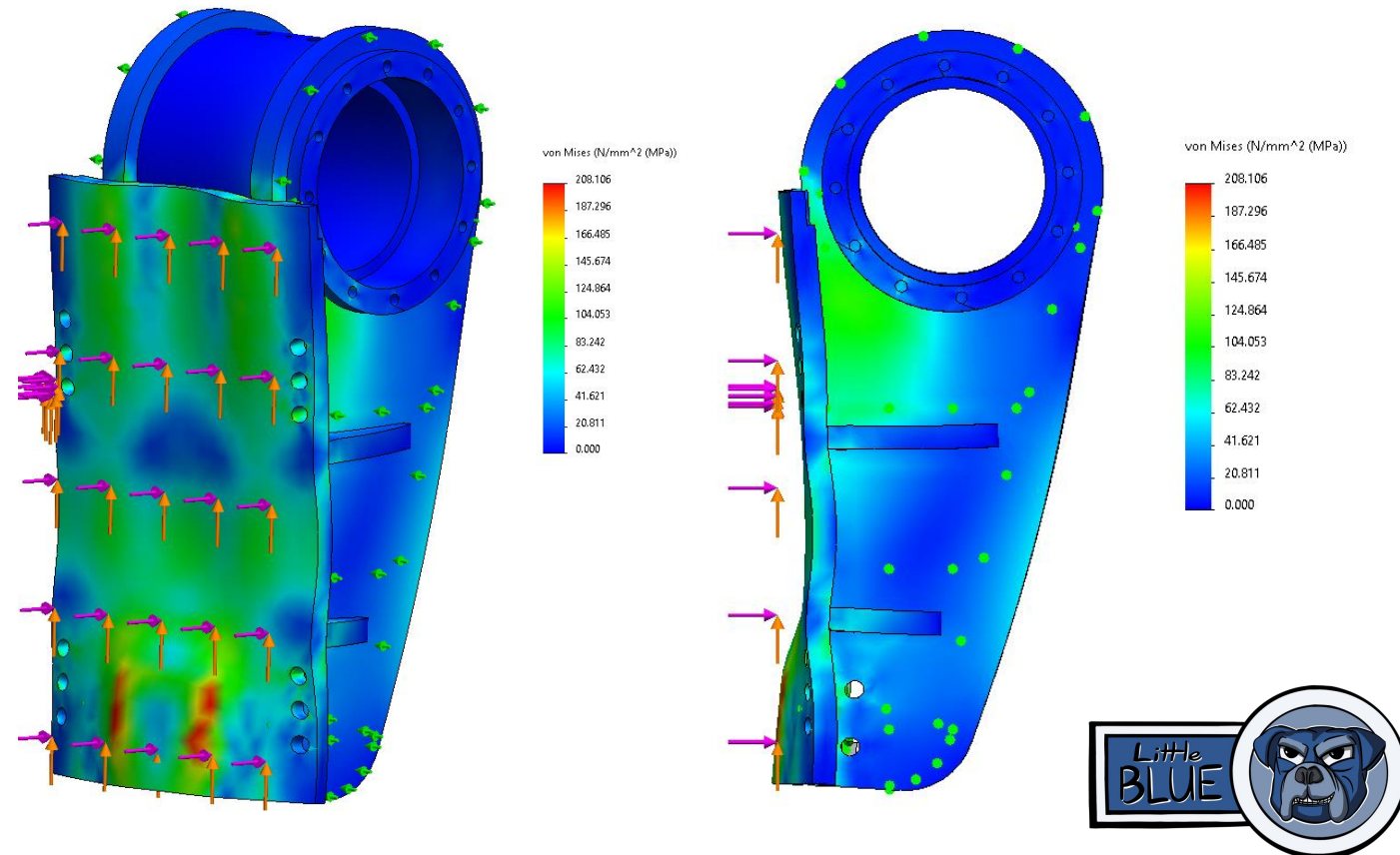
Working Principle

Crushing Rocks to form roadbase
in an agricultural setting.

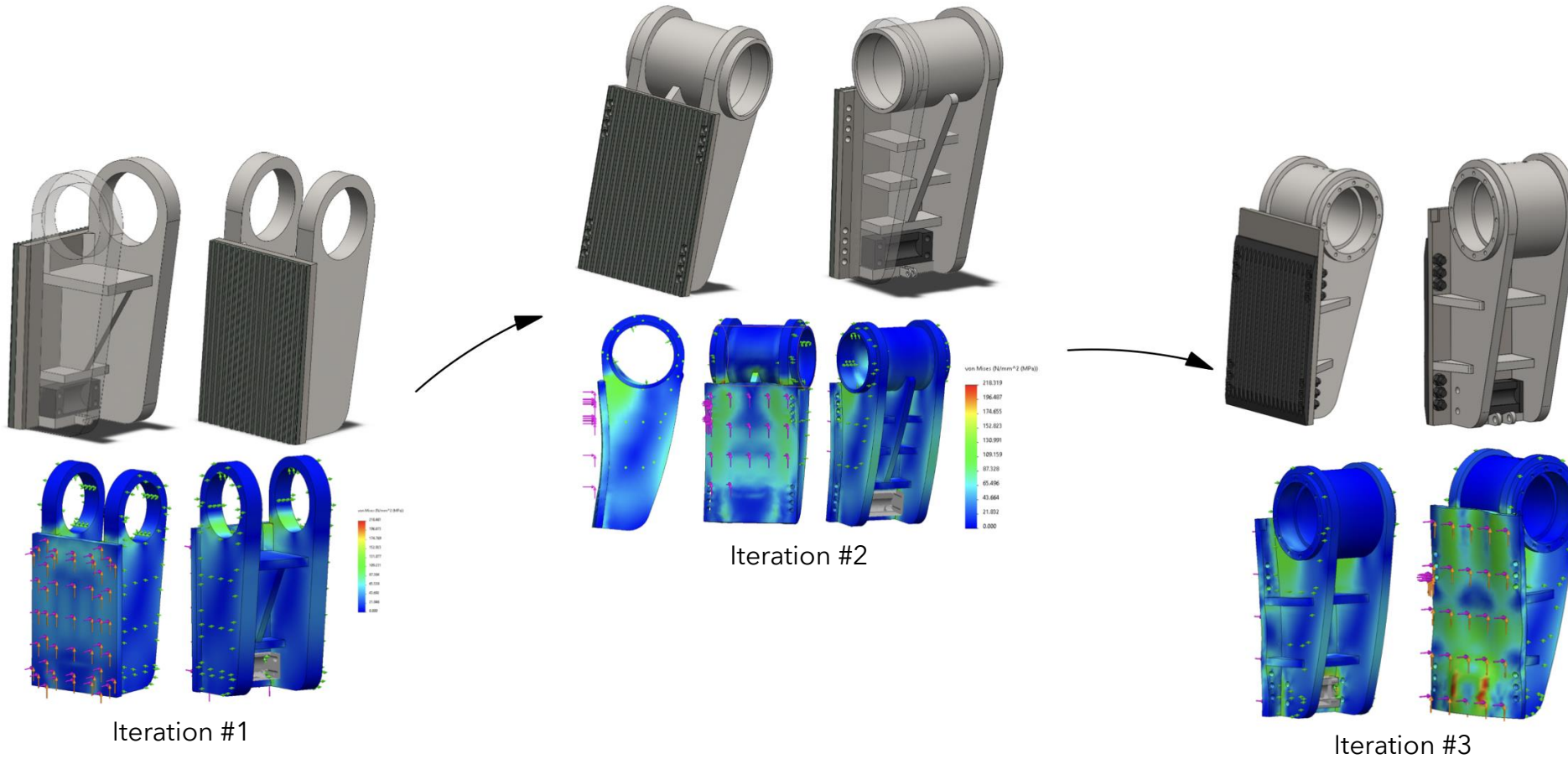


Stress Analysis and Design

- The rocks were taken from the site and the compressive strength of these rocks were tested, which then informed the loadcases for the design.
- The geometry was designed to have a stress less than the fatigue limit of the material



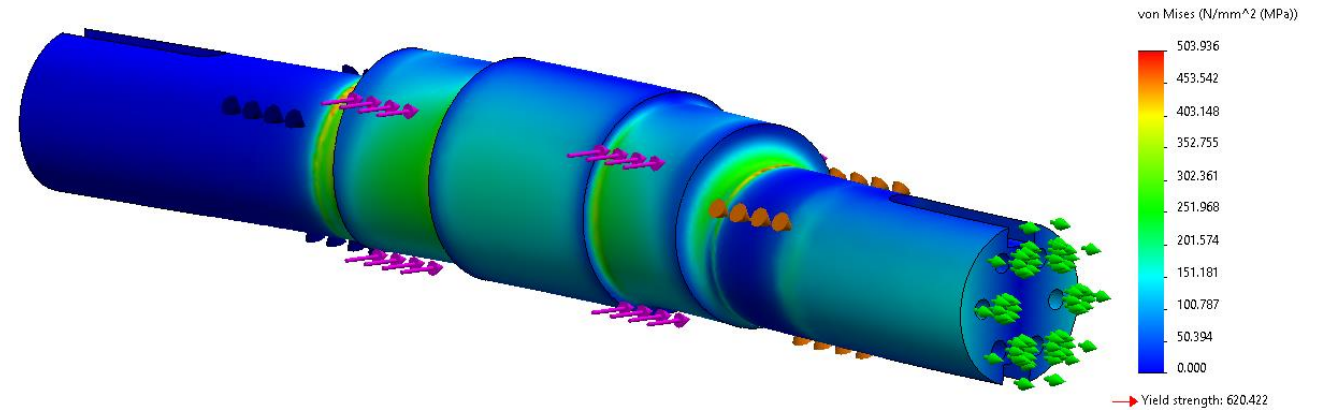
Design Iterations



Shaft Design

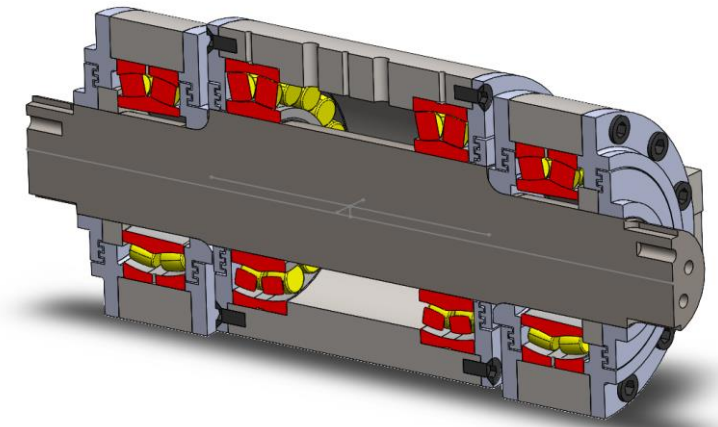
Shaft Design

Designed under bending and torsional loadcase, Wanted the max realistic stress to be less than the fatigue limit.



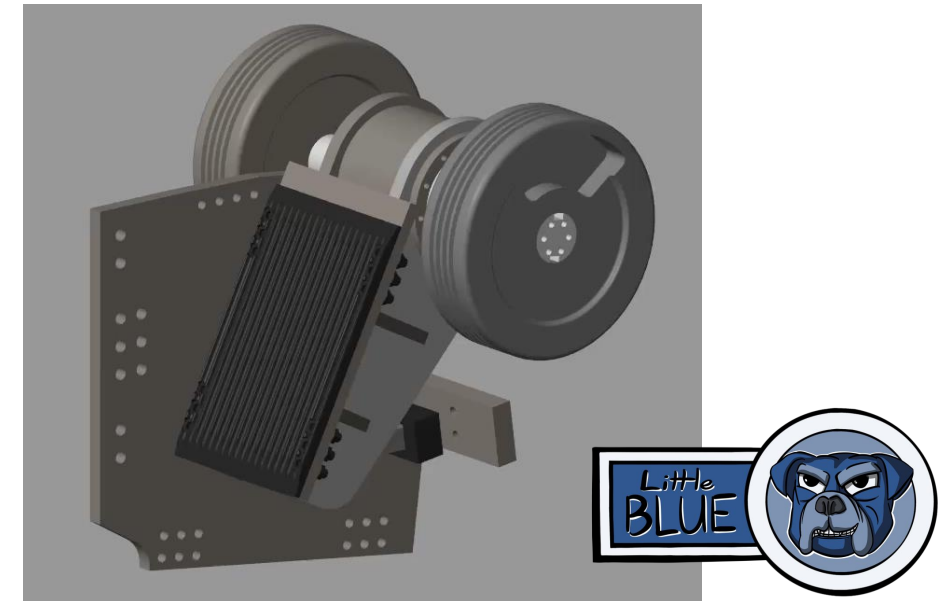
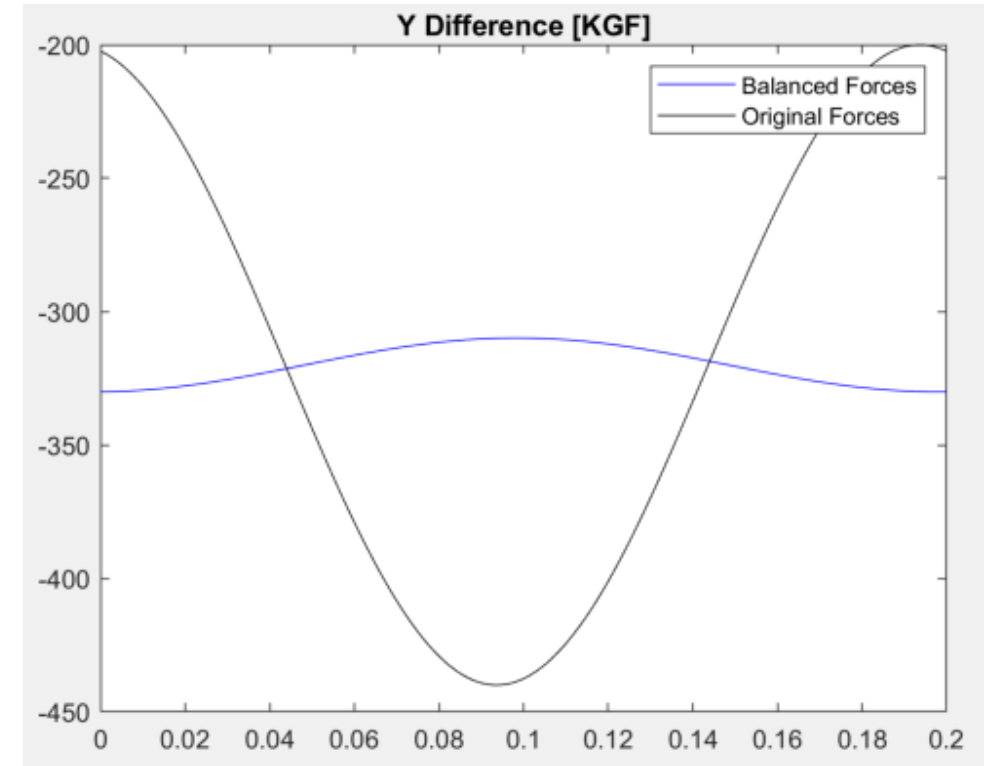
Labyrinth Sealing Method

- The labyrinth Sealing Method was used to intrusion seal the shafts
- Grease is fed into the internal space using grease nipples to 'bleed' the system

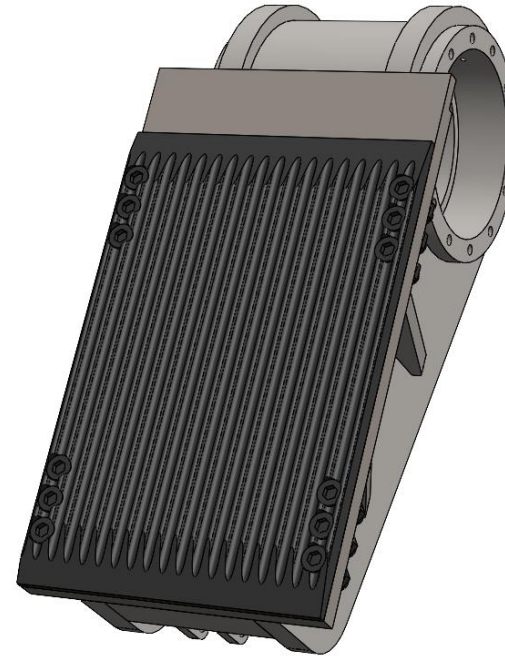


Counterweight Analysis

- Dynamic Analysis was done on the system to minimize the unbalanced forces from the shaft onto the bearings
- This was a problem as we did not want to put unnecessary loading on the bearings
- The weight on the flywheel was changed to optimize the net cyclic loading on the shaft.



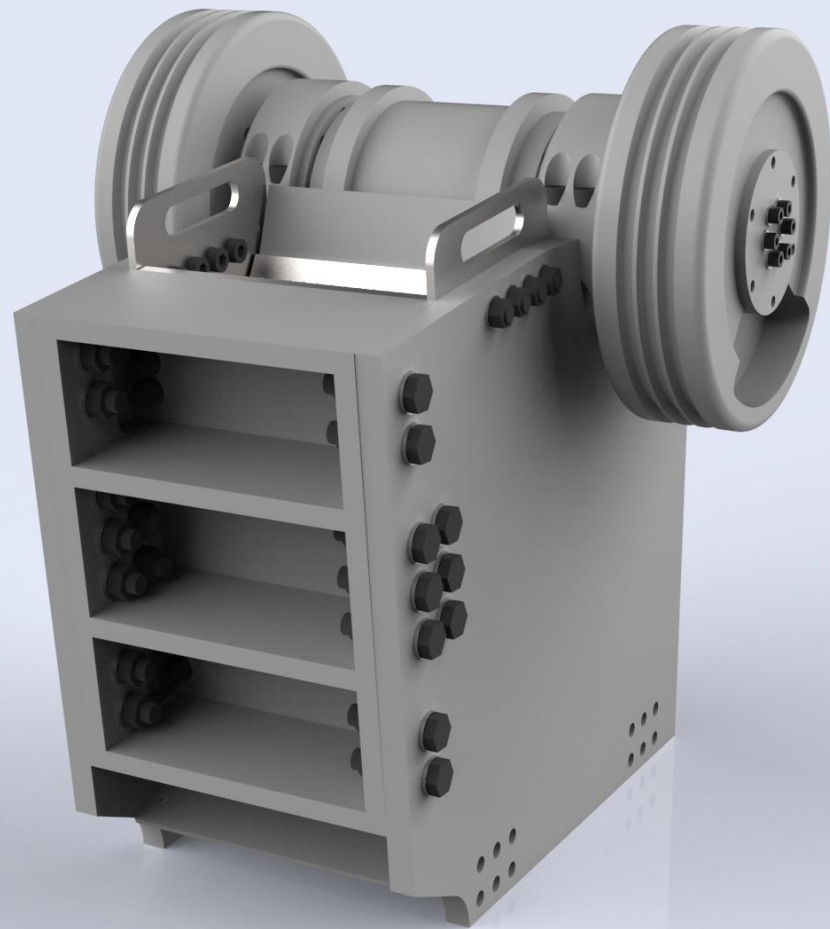
Manufacturing And Testing



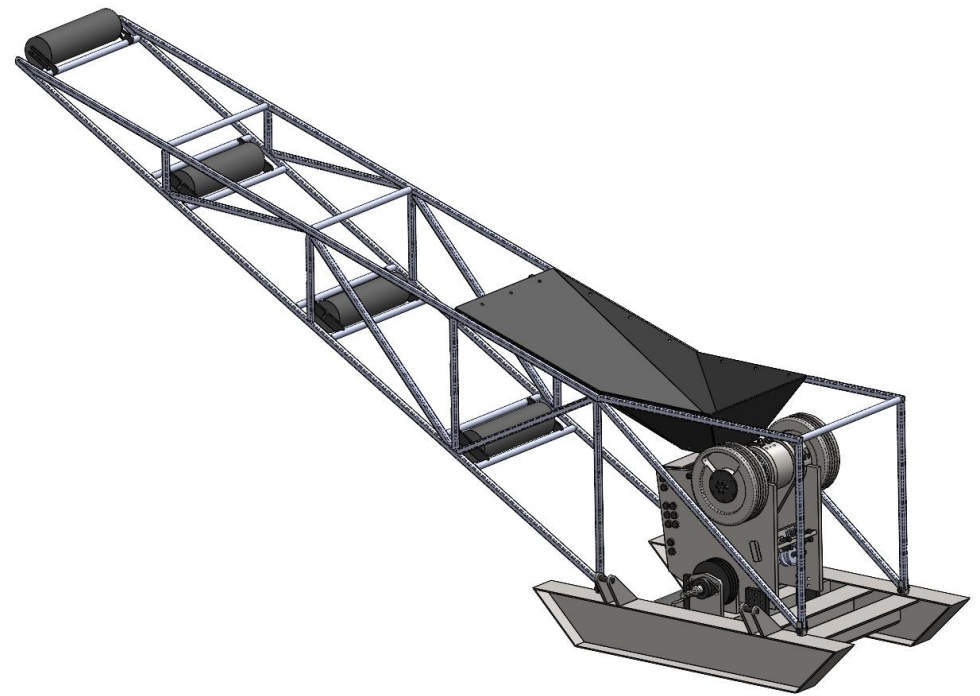
Manufacturing And Testing



CAD Vs. Reality



CAD Vs. Reality



Prototype Testing





Send a Chat

