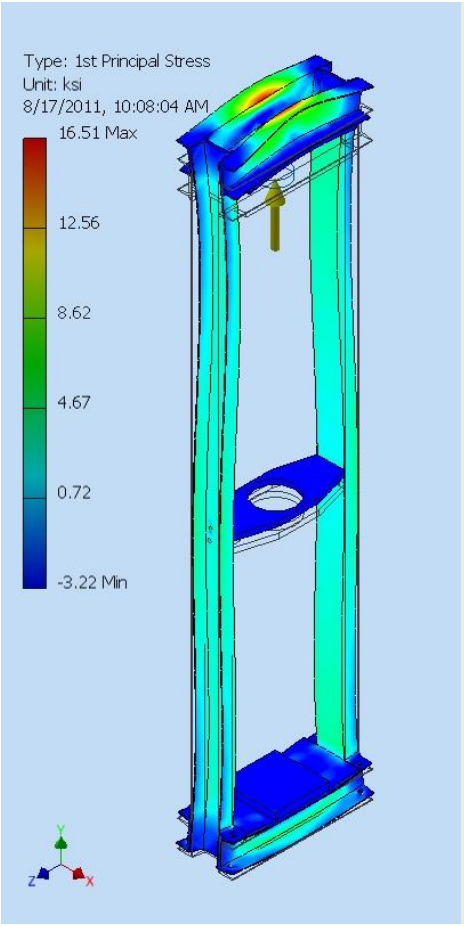
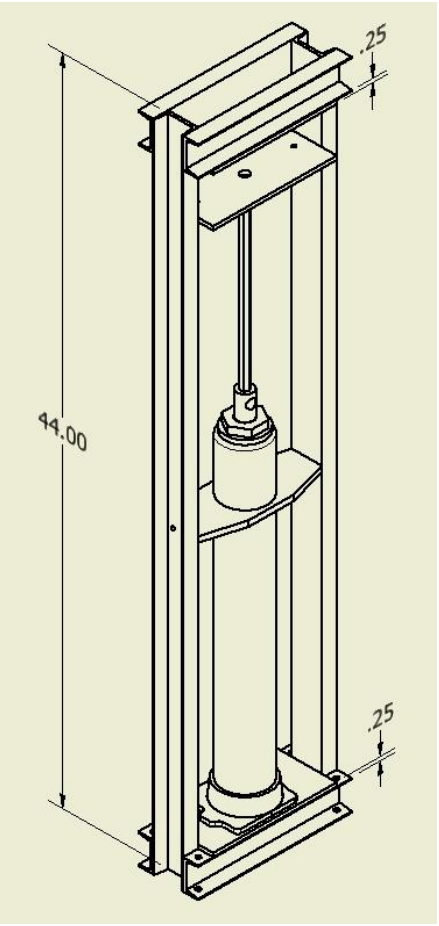
Broach Press: Offseason 2011 - 2012





Right - Stress analysis in Inventor displays force in kilo pounds per square inch.
Left - A drawing of the actual design, complete with Harbor Freight 3 ton hydraulic jack. The broach is attached to the top of the jack through a custom adapter.

How:

- Autodesk Inventor CAD Simulation shows us where the assembly is under the most stress.
- Used information from simulation to redesign methods of efficiently dealing with the forces.
- Welds placed in shear to prevent weld failure.
- Began machining work during the fall semester.
- New students used this pre-season opportunity to train in the use of the team's new mill and mini lathe.

Problem:

- Our team historically uses keyed shafts to drive mechanisms on rotating shafts.
- Single contact point (key) causes wear of the key slot and slop in system.

Solution:

- Hexagonal shafts have six contact points to distribute heavy load.
- This requires broaching a hexagon shaped hole in driven part.
- Arbor presses can deliver requisite pressure – but are not portable.
- We wanted to create a more portable hydraulic press to perform broach work.

A broach for a ½ in. hexagonal hole requires 1.5 tons of force to perform the job.