Cylinder Assembly Rotation Rig

Overview
The task was to design and model a portable, robust, and precise system to ensure the cylinders can be rotated accurately, reliably, and safely for long term use. The design must have precise positioning, because it will aid in the attachment of external parts and the pressure testing of the cylinder.

Objectives
The objectives of this project are as follows:
- Provide a rig to improve the current assembly process
- Achieve this in a way that increases safety and efficiency
- Provide analysis and documentation for feasibility of design

Approach
The team took a systematic approach to this project. A site visit to Dresser Rand’s facility started our project process. At this time much information was gathered including a description of the equipment that we were working with and a concise list of customer needs.

With a list of customer needs, the concept generation phase began. These concepts then went through a selection and combining process to optimize the design.

To assist with the analysis of the final concept, a CAD model was produced. Finite element analysis was done on the model to ensure its viability. A load of 11,000 lbs was applied to one side of the design resulting in a safety factor of 3 and a maximum deformation of 0.06 in.

A prototype was constructed to illustrate the concept of the final model. The team built a ½ scale model for approximately $700.00.

Outcomes
The final concept fulfilled the necessary objectives.
- The rig can be operated by a single worker leading to a reduction in man hours needed.
- The ability to lift and rotate the cylinders precisely eliminates damage to the cylinder.
- Portability of the rig reduces dependency on other equipment.