Pressure Lubricator Test Stand

Overview
Well Master Corporation enlists Team BASKS to assist in improving the company’s current method of lubricator pressure testing. Currently, the company has a fully manual testing process that can take upwards of an hour to complete depending on the lubricator model and no test stand to encase the lubricator to provide shielding during pressure testing in case of failure. In solving this issue, Team BASKS is challenged to develop a test stand prototype that will encase the lubricator, reduce test cycle test time, pressurize automatically and record and export data.

Objectives
The objective for Team BASKS is to improve the pressure testing process of lubricators Well Master manufactures for use in natural gas mining. The three ways this is achieved are designing a method to automate the pressure testing procedure as well as record and export data assigned to a specific lubricator’s serial number, designing a test stand to encase the PLC and lubricator to provide safety, and designing a screw clamp similar to a gear puller to seal an eight-bolt flange to reduce cycle time.

Approach
• Well Master provides Team BASKS with images and the steps of the current testing process, as well as a list of attributes and concerns and ranked by importance.
• The team searches for similar patents but doesn’t find exactly what is wanted by Well Master.
• The team does a concept generation for a screw clamp with plunger and sealing ring, horizontal versus vertical test stand designs, and PLC versus microcontroller for automation and data export.
• The team creates CAD models of the screw clamp with sealing ring and plunger, and horizontal and vertical test stands for consultation with Well Master to decide on final design.
• Well Master runs Finite Element Analysis on the screw clamp and the team makes design edits before more FEA will be run.

Outcomes
The team provided Well Master with CAD designs of the screw clamp with sealing ring and horizontal test stand for their own manufacture, as well as the PLC with code to record and export test data as well as a Pass/Fail designation specific to a certain lubricator’s serial number.

As a result of this project, Well Master has
• the ability to provide customers with proof of pressure testing and specific results
• added safety during pressure testing
• greatly reduced testing cycle time