High Steels Structures
Companion Plate Fixture

Overview:
High Steel Structures is a leading steel girder manufacturer in the United States. For this project the group was tasked to create a companion plate fixture that replaces the current destructive, time consuming pull test process to reduce the cost of labor and metalizing and blasting.

Objectives:
- Create prototype fixture to orient companion plates while also demonstrating the use of ergonomics, safety, and reduced waste in our design.
- Collect pull test data and perform statistical analysis on profile and pull test data to ensure process is in control and has constant repeatability.
- Draft auditing standards with key process control requirements to keep a tight correlation between the product pull tests and companion plate pull tests during the metal blasting, metalizing, and pull testing processes.
- Develop cost analysis that documents the savings that the companion plate offers from the elimination of rework and destructive process.

Approach:
Some of the group had previously worked with High Steel Structures so there was initial understanding of the process. Three times throughout the semester the group was able to visit onsite to monitor the metalizing and blasting processes, see our prototype in the process, then sit with other employees and talk about the ease of use as well as editing the objective reports based on operator feedback. When the group was not at the Williamsport location, the team held weekly meetings with our two points of contact Jamie Stock and Rick Dickerson to talk about the team’s process updates and to help answer any questions that came up. Through brainstorming the group created prototypes that were cut and welded together to test. The group split up the responsibilities of standard operating procedures, audit, statistical analysis, and cost analysis.

Outcomes:
All of the objectives were met and/or exceeded. Through statistical analysis, although limited data points, there was not a significant difference between the companion plate fixture and the girder pull test results. This means that with confidence, there was a direct correlation between the two processes. With the implementation of our companion plate fixture the team estimated ~$7,000 annual savings for using the non-destructive process.