Automated Butt Splicing Machine

Overview
The current splicing process performed by High Steel requires manual labor for each step in the process. In order to keep up with competition and product demand, the accuracy and speed of the splicing process must be improved. By designing a machine that can automate the process, it could yield better accuracy between welds, higher production speed, and a safer working environment.

Objectives
The objective of the project was to develop a conceptual design of a machine that can automate the operations of the splicing process and meet or exceed the required output for the downstream operations. After a design was made the team had to examine the feasibility of the machine and the potential savings that could come from it.

Approach
- Familiarized ourselves with the entire splicing process
- Performed a time study was of High Steel's current splicing process
- Designed three unique concepts to automate the splicing process
- Performed a pros and cons analysis of the three designs
- Chose a design to be expanded upon based on the pros and cons analysis
- Evaluated and improved the chosen design by using parts from the other concepts to form the final design
- Developed the final design in SolidWorks
- Performed a time study of the final design by evaluating every step it must perform and was compared with the current process
- Performed a financial analysis of the final design to examine the potential savings that can come by implementing it into the system

Outcomes
- Based on the financial analysis the final design is expected to save High Steel $1.2 million over two years
- By using three machines the final concept is estimated to double High Steel’s efficiency by producing enough splices to complete six girders per day
- The final design used a unique approach toward welding that can significantly reduce the total weld time and could be used in High Steel’s current process without the need of a machine