Laser Non-Contact Measurement of Moving Product

Overview
ArcelorMittal produces steel rails for railroads, cranes, transit agencies, and distributors at the factory in Steelton, PA. The inspection line does not have a non-contact measurement system, which is required by some of ArcelorMittal’s customers. In order to keep their customer base strong, a laser system must be implemented for head and base width measurement as part of the inspection process.

Objectives
The objective of this project was to create a prototype displaying the lasers being recommended. The lasers need to measure ten of the fourteen active rail sizes within a tolerance of ±0.004 inches or better. The laser system also must cost less than $10,000 to implement. Also, a system was to be modeled in CAD to show the changes in the current system that would need to be implemented for successful laser measurement.

Approach
- The Penn State Team visited the ArcelorMittal steel factory in Steelton, PA
- The team/sponsor determined the main goals for the project
- Blueprints of the current system and rail measurements were requested from the sponsor
- Research was done on different non-contact measurement systems given the constraints
- The different technologies examined were systems that are available to purchase from different companies
- The team visited the factory again to conduct more measurements for the prototype and CAD models
- The different technologies were compared looking at price, tolerance, capability, and constraints
- A CAD model was created to show the system at ArcelorMittal with the lasers in place
- A prototype was built to test the lasers being recommended
- Testing of the lasers was done using the software given to the group by MTI Instruments
- The software shows the width measurement of the sample being measured

Outcomes
The outcome of this project is to allow for ArcelorMittal to choose a laser system that works best for their inspection area.
- By adding a non-contact measurement system into the inspection area, ArcelorMittal will not lose one of their largest customers
- With this system in place ArcelorMittal may also be able to acquire new customers
- With a non-contact measurement system improvements can be made in the inspection area ultimately eliminating the final inspection stage