Automation of Test Sample Burning

Overview
ArcelorMittal Steelton produces multiple grades of steel rail. Their operators perform testing of various rail samples for mechanical properties. There is a separate workstation at the plant established for the procurement of the test samples, where the operator cuts 18-inch pieces of rail with a torch. ArcelorMittal Steelton faces the problem of various safety hazards at the sample test procurement station. Safety risks for the operator include contact with hot steel (800-1000 degrees F), uneven walking surfaces leading up to the station, steep steps, body strain of the operator while performing tasks, and inadequate lighting during the night.

Objectives
- To eliminate the risk of injury at ArcelorMittal Steelton’s burning station by creating a safer process for cutting test-sample premium rails
- To design a system to procure the test so that the controlled cooling utility operator does not need to be in close proximity to the hot steel
- To allow ArcelorMittal Steelton to maintain their cycle time of under 3 minutes to procure the test
- To implement a solution that will cost less than $40,000 and can be maintained for less than $2,000 per month

Approach
1. Traveled to ArcelorMittal Steelton to evaluate existing workstation
2. Investigated various cutting technologies based on ArcelorMittal’s criteria of safety, efficiency, cost, ease of implementation, and labor intensity
3. Contacted several rail-cutting technology vendors for demonstrations and other information about their products
4. Performed cost analysis on each type of technology
5. Designed a decision matrix to select product for station redesign
6. Redesigned workstation on SolidWorks 3D modelling software
7. Provided final recommendations and cost estimates

Outcomes
- Total implementation cost of redesign is $20,385
- Operational costs of redesign are $1,080 per month
- Fully automated solution with Meadoweld RS-100 Abrasive Rail Saw
- In-house fabricated aluminium workstation ramp with industrial matting
- Motion-Sensor LED Battery Powered Spotlights