Test Procurement of Standard Rail

Overview
Test samples for tensile and Brinell hardness testing were originally cut by an in-line hot saw and placed in a bin outside to cool. Recently it has been found that the test samples were displaying different material properties than the manufactured rails due to the different cooling processes. Currently, samples are cut after cooling in the yard with an acetylene torch. ArcelorMittal requests a sustainable way to procure the test sample after the rail has gone through all manufacturing processes and has cooled.

Objectives
- Derive potential solutions, with components under the $40,000 budget limit, which can acquire rail test specimens for the Brinell and tensile testing
- Use a weighted analysis on feasible solutions, using the following criteria: safety, cycle time, maintenance needs, robustness, labor, and cost, in order to recommend the highest ranked solution
- Present the recommended solution and the best method for implementation

Approach
- The team learned about the overall manufacturing process and the current procedure to procure test samples
- The group analyzed six different potential solutions: In-line Brinell Testers, Portable Brinell Testers, Partial Cutting, Plasma Cutting, Water Jet Cutting, and Rail Saws
- Rail Saws were determined a feasible solution since they were under $40,000 and could be implemented in the current setup at ArcelorMittal
- The group rated four hydraulic and two gas rail saws from 1 (low) to 10 (high) for each of the following weighted criteria: Safety (10), Cycle Time (9), Maintenance (8), Robustness (7), Labor (6), Cost (5), and Overall (8)
- The saw with the highest rank was found to be the Stanley Black & Decker RS25103 hydraulic rail saw
- In order to implement the saw, the team proposed the saw be used in the rail yard, transported in separate pieces, and stored in a weather-proof storage bin in the rail yard

Outcomes
- The test sample will display the properties as the manufactured rail
- The hydraulic saw has a decreased risk of back injury during use and when carried in separate pieces
- Storing the saw in the rail yard will decrease the amount of walking with the saw