Mechanical Cold Expansion of Drilled Bolt Holes

Overview
ArcelorMittal, the world’s largest steel producer, was requested by New York City Transit Authority to cold expand bolt holes in steel rails. The team had to make a recommendation for the most ideal equipment to use for the process that would not inhibit the plant’s productivity.

Objectives
The team presented an investigation for hole expansion options and complete implementation and cost analyses for the new process. Additionally, a management of change document was produced.

Approach
• Conducted research on the cold expansion process as well as the companies that provide equipment to implement the process
• Went on site visit to ArcelorMittal in Steelton, PA to gain an understanding of the facilities and process
• Contacted the two companies that manufactured expansion units, Fatigue Technology Inc and West Coast Industries
• Analysed sizes of holes drilled in rails to determine how many mandrels are necessary for expansion while staying within tolerances
• Prototyped a go-no-go gauge to test which of the two mandrel sizes will be needed for expansion
• Proceeded to recommend West Coast because they offered custom expansion equipment while providing a significant cost savings
• Recommended to place expansion process off-line to keep up with current efficiency
• Created a management of change document to assess potential risks associated with implementing a new process to rail production

Outcomes
• Recommended for ArcelorMittal to use West Coast Industries to purchase 2 expansion units, with 2 different size mandrels for sleeveless hole expansion
• This recommendation can save ArcelorMittal up to 80% from their initial quote from Fatigue Technology Inc
• With the suggestion to move the process off-line, ArcelorMittal can keep up with their current production rate of production
• Completed a management of change to show that the expansion process will be a low risk implementation