Corle Building Systems – Submerged Arc Welding Machine

Overview
Due to the location of the two weld heads with respect to the ground shoes, the machine is unable to weld approximately the first 16 inches and final 12 inches of the I-beam. These sections must be hand welded later in the fabrication process. This hand welding process is inefficient and costly to the overall production of I-beams.

Objectives
To develop a solution that will reduce the length of the un-welded portion of the I-beam during a single pass through the submerged arc-welding process. The weld must be of sufficient quality and comply with Corle’s IAS AC 472 and CSA-A660 industry standards.

Approach
Design Changes:
- Welding Parameters Adjusted
  - Increased voltage during welding of leading and trailing edges allowing for increased weld penetration and better fusion of the flanges to the web.
- Ground Shoe Relocation
  - An additional ground shoe was placed below the weld head to complete the welding circuit closer to the electrode in order to accommodate the first 16 inches and final 12 inches of the I-beam.

Outcomes
- Decreased manual welding length by 83.5% (i.e. Currently welding 33 feet of beam per day as compared to 200 feet of beam per day before process improvements) *Note: Based on 50 beams per day.
- Reduced manual welding time required after the submerged arc-welding process by 15%.
- Improved welding penetration and quality.
- Consistent fillet weld radius along the length of the beam.
- Cost Savings:
  - Approximate time saved per beam: 10 minutes.
  - Approximate cost saved per beam: $2.33.
  - Estimated annual cost savings based on production forecast of 50 beams per day: $30,333.33.
  - Unexplored cost savings of increased quality.