Advanced Development and Implementation of the High Mobility Manufacturing Robot

Bring man-portable robot robotic welding mechanization to challenging shipyard conditions

Team: Robotic Technologies of TN | Edison Welding Institute | Vigor Shipyards | Cahill Consulting

Problem Statement

Much of ship welding requires manual operations due to location and complexity of welds

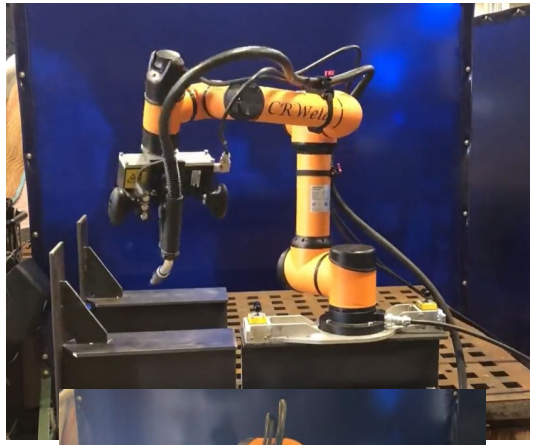
Traditional robotic/mechanized weld tools lack: 1) portability or 2) dexterity

Solution/ Approach

Man-portable Collaborative robot (Cobot) with magnetic base. Clamps to stiffeners to reach gusset/transition between stiffener and bulkhead. Automates weld process at this joint.

Major tasks include:

- Man Portable System
- Automated welding process
- Intuitive Operator interface
- Weld Qualified for 2F, 3F, 4F positions, single pass



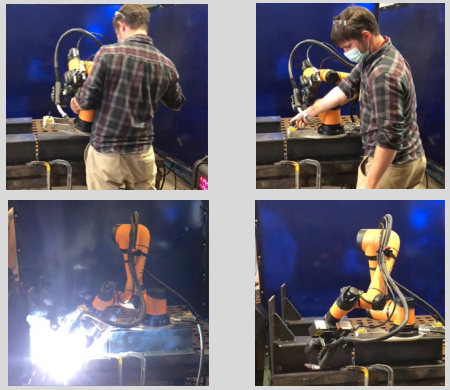
Project Benefits

- Increase arc-on time (70%+ arc on time)
- Reduce rework on weld wraps (wrap-arounds)
- Reduce exposure to fumes, heat, injuries
- Allow operators to focus on skilled rather than manual portion of tasks
- address shortage of skilled operators

Project Findings:

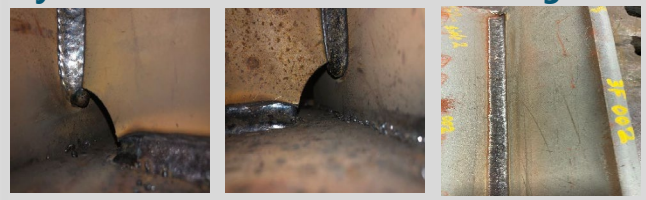
Increase operator throughput 10x

Automated Procedure: Place, Lock, Scan, Weld (Clockwise)



HMMR

Applied to welding deckplate/stiffener transition: 1 HMMR increases operator throughput 12x (increased speed, reduce rework operations). HMMR in place over 5 years shows a 700% ROI in welding costs



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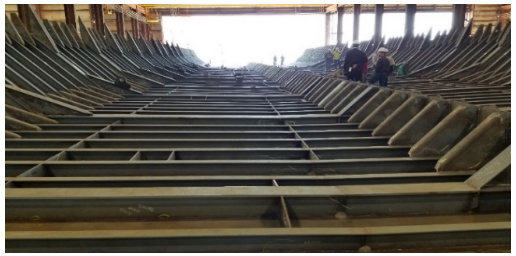

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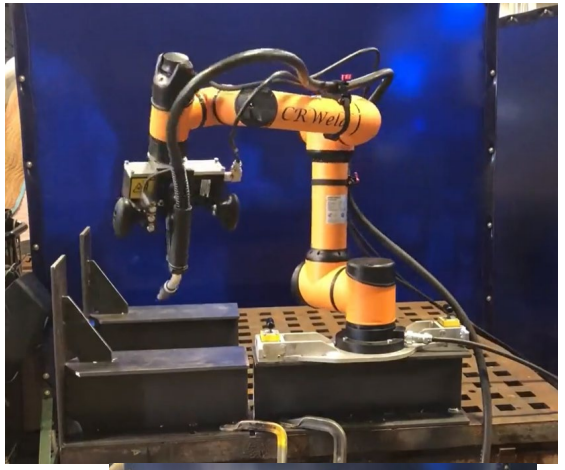

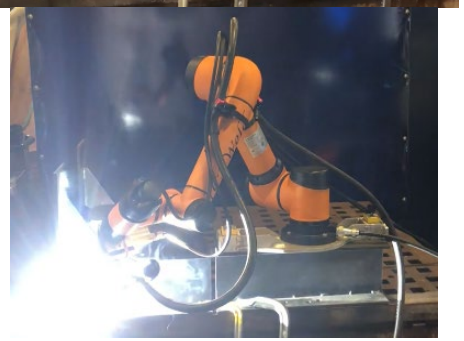

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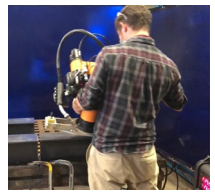

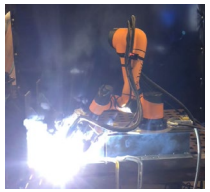

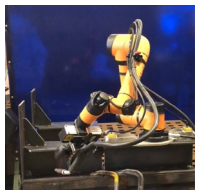

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