

Simplified Precision Welding Technique

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Overview

- Project team
- Project Overview
- Schedule
- Deliverables
- Communication

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Project Team

- EWI (prime)
 - Jim Hansen (PI), Tim Moore (Engineering support), Dennis Harwig (Senior Technical Leader)
 - Zane Bogosian (PM), Mark Schimming (VP Govt Business)
- ATI PM
 - Ryan Schneider
- NSRP Program Technical Representative (PTR)
 - Cody Whiteley
- Participant
 - HII-Ingalls – Jeffery Cook
 - NSWCCD – Kyle Lamone

Background

- Corrosion pits and scar repairs frequently result in oversized welds when using FCAW or GMAW processes
 - Excess heat may damage coatings and cause distortion
- Semi-automatic GTAW has been demonstrated as a potentially viable method to tack fillets and repair corrosion pits
 - This work will take established data from ManTech project S2831 – Semi-Auto GTAW Weld Process coupled with information from the equipment supplier to establish parameters and demonstrate weld quality necessary for implementation

Goals

- Develop semi-automatic procedures for corrosion pit repair
- Design and produce a fixture to aid the operator in the tacking or repair operation
- Determine qualification requirements for the process and complete testing to display a pathway to implementation

Task 1 – Project Initiation and Kickoff Meeting:

- Initiate project – issue subcontracts
- Project kickoff meeting – discuss project, current pit repair best practices, and inspection requirements
 - Determine NSWCCD requirements for process and operator qualification
 - Discuss shipyard implementation requirements

Task 1 – Progress

- Plate sizes and quantities determined with Ingalls
 - Plate is with Ingalls shipping and it is expected to arrive in the next two weeks
- A qualification pathway has been discussed with NSWCCD and Ingalls
 - More information on the qualification pathway on Slide 8

Task 1 – Pathway to Qualification

- EWI will develop pit repair parameters in the flat, horizontal and overhead positions
 - Repairs will be validated by macrographs, microhardness tests and bend tests
 - The heat input for the repair will be recorded for each position
- To demonstrate the ability to qualify the process in the shipyard, a 1" thick groove will be welded in the vertical up position
 - The groove will be welded at a heat input that is representative of the pit repair procedures developed earlier in the project
 - The plate will be inspected to MIL-STD-271 and MIL-SRD-2035A and inspected to Tech Pub 248 requirements
 - All weld metal tensiles, face and root bends, macroetch specimens as well as weld metal centerline and HAZ charpy v-notch tests will be analyzed

Task 2 – Development Corrosion Repair Parameters in Flat, Vertical and Overhead Positions

- Pit repair parameter sets will be developed in the flat, horizontal and overhead positions
- Heat input ranges will be recorded for each position and a 3G qualification plate will be welded at an average of these heat input ranges

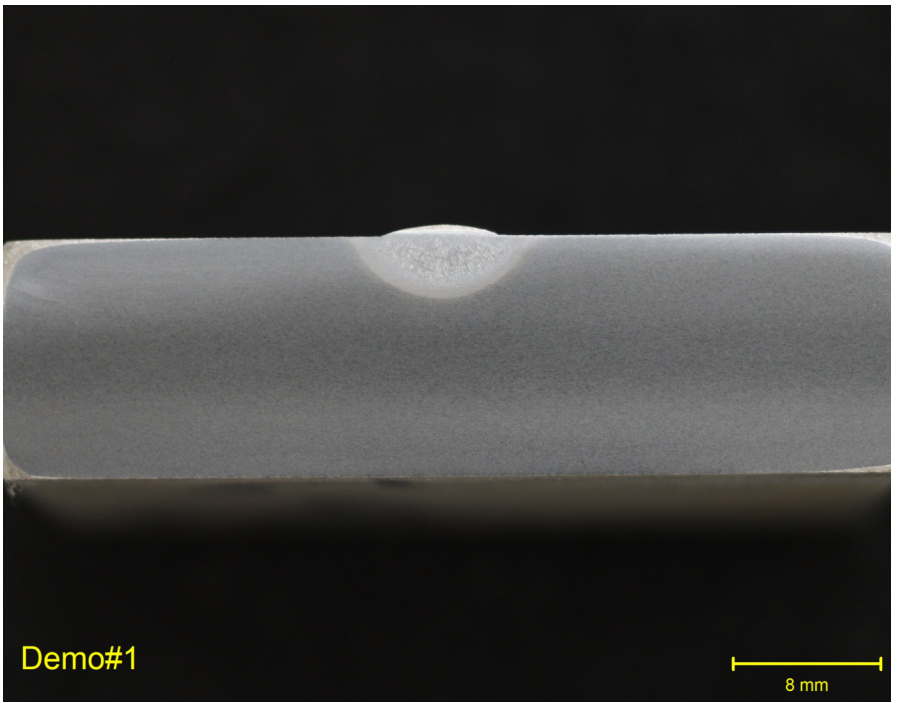
Task 2 – Progress

- The EWM TigSpeed system has been set up in EWI's Columbus laboratory and is ready for welding trials
- Preliminary parameter development has been completed on clean steel plate
- Ingall's is preparing pitted plate for shipment to EWI to begin parameter development

Task 2 – Progress

- EWI has started development on clean plate while the pitted plate is being prepared to ship

Amps (A)	161
Volts (V)	11.7
Wirefeed Speed (ipm)	39
Wirefeed Frequency (hz)	16
Tungsten Extension (mm)	14



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Task 3 – Fixture Development for GTAW Torch

- This task will develop an apparatus for the semi-automatic GTAW torch that will allow for use by a less experienced operator
 - With a torch fixture, the process will be able to operate more like a stud welder than a traditional welding torch
 - The TigSpeed system allows for one button control where the weld size can be set to accommodate the required tack or repair



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Task 4 – Shipyard Demonstration and Technology Transfer

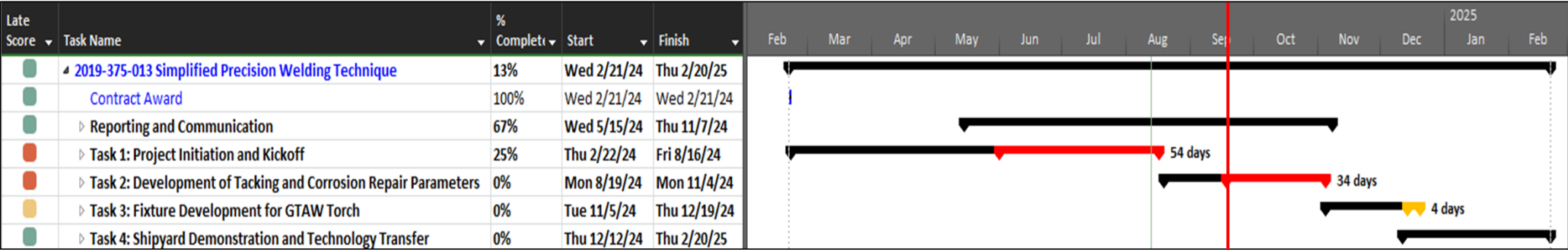
- Host shipyard demonstration at HII – Ingalls in Pascagoula, MS
 - Demonstrate corrosion pit repair procedures
 - Review project results
 - Next steps to support implementation
 - Tech Transition
 - Procedures and data will be available to potential U.S. shipbuilding industry users
 - Progress reports will be made to NSRP Panels throughout the project
 - Project results will be documented in a final written report and disseminated via NSRP

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Project Summary Schedule

Period of Performance: 2/21/24 – 2/20/25 (12 months)



- Task 2 tracking behind, but there is float in schedule to make up time
- Project should still finish project within PoP

Project Deliverables

Period of Performance: 2/21/24 – 2/20/25 (12 months)

Deliverable	Due Date	Date Submitted
Project kick-off meeting	3/20/2024	3/13/2024
Quarterly Report #1	5/15/2024	5/15/2024
Quarterly Report #2	8/9/2024	8/9/2024
Quarterly Report #3	11/4/2024	
Briefing at Spring Panel Meeting	TBD	
Final Report	2/20/2025	

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Project Communication

- Email EWI staff if any questions, concerns, request for updates, etc. at any time
 - Jim Hansen– jhansen@ewi.org
 - Zane Bogosian – zbogosian@ewi.org

Proposed Date	Event
5/16/24	Quarterly Telecon #1
8/15/24	Quarterly Telecon #2
11/7/24	Quarterly Telecon #3

Questions?

