



HLAW Process Verification and Implementation for Ship Production

Project Snapshot



Project Lead:

Huntington Ingalls Industries–
Ingalls Shipbuilding, Inc.

Project Dates:

Dec 2016 – Mar 2019

Objectives: Validate use of
HLAW as a single-sided
production welding
technique

Estimated Savings:

- \$3.06M projected cost savings per DDG-51 Hull
- \$2.75M projected cost savings per NSC Hull
- \$15.4M projected cost savings per LPD Hull

S2697 Hybrid Laser Arc Welding Process
Verification and Implementation for Ship
Production Rev A (1216)

Distribution Statement A: Approved for public
release; distribution is unlimited.

Huntington Ingalls Industries, Inc. – Ingalls Shipbuilding (HII-Ingalls Shipbuilding) is introducing a new panel line to improve productivity in ship manufacturing. A review of joining processes used in commercial shipbuilding worldwide has identified that Hybrid Laser Arc Welding (HLAW) can reduce the welding heat input used to join metals, thus minimizing distortion and therefore rework cost. Ingalls is procuring the capability to use HLAW in the panel line and understands that its processes must be characterized and accepted by NAVSEA for shipbuilding applications. HII-Ingalls Shipbuilding has had extensive collaboration with NAVSEA and has approval of the HLAW weld process qualification and certification test plan.

The project will focus on developing process parameters and conditions for single-sided HLAW butt welds for various strengths and thicknesses of steel compared to Ingalls' currently qualified baseline Submerged Arc Welding (SAW) process. The project will be executed in two phases. During Phase I, HLAW process parameters will be developed by EWI and the resultant weld quality will be evaluated. The business case will then be refined based on historical production data and phase one test results. Phase II will begin with fatigue and dynamic load testing for HLAW and the currently qualified baseline SAW process. HII-Ingalls Shipbuilding will then use the EWI developed parameters on the installed HII-Ingalls Shipbuilding HLAW panel line and validate weld quality through testing. This technology, once implemented, could potentially save an estimated \$3.06M per DDG-51 hull, \$2.75M per NSC hull and \$15.4M per LPD hull.

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