

# Improved Hull Fabrication Processes to Reduce Ship Construction Costs

**Status:** Implemented (Partial Implementation)

## PROBLEM / OBJECTIVE

Most of the production fitting and welding on DDG 51 and LHA class ships are performed manually using labor-intensive processes. These manual processes often yield inconsistent quality, resulting in construction deficiencies that must be corrected later with additional cost and labor. The Navy Metalworking Center (NMC) is leading an Integrated Project Team (IPT) to identify high-potential hull fabrication process improvements and to develop, test, and implement the solutions. In particular, the IPT is identifying and developing hull assembly fixturing, along with automated and / or mechanized processes for layout, cutting, and welding.

## ACCOMPLISHMENTS / PAYOFF

### **Process Improvement:**

The IPT evaluated current hull production processes at Ingalls Shipbuilding (Ingalls), and executed technical evaluations and time studies to identify areas that would benefit from improved fabrication methods. The team developed and downselected potential solutions for evaluation in the respective areas. The solutions consisted of prototype tools and fixtures as well as enhanced / integrated commercial-off-the-shelf items re-purposed and modified as needed for specific tasks. In November 2014, NMC issued the first batch of prototype tools for evaluation at Ingalls. Ingalls provided feedback that has resulted in the design, fabrication, and testing of refined prototypes for hull production. NMC is also investigating advanced leveling solutions for ship module alignment as well as advanced welding technologies for stiffener collar attachment.

### **Implementation and Technology Transfer:**

Due to successful shipyard evaluations, implementation of the project solutions began during the 3Q FY15 on LHA 7 and DDG 117. Ingalls has implemented portable jack supports for structures, tee beam alignment tools, ratcheting push-pull tools, and transverse stiffener jacks; the shipyard is also planning the implementation of advanced leveling solutions pending successful test trials. The solutions will be applied during 4Q FY15 to the Amphibious Assault Ship (LHA), Amphibious Transport Dock (LPD) and National Security Cutter (NSC) hulls under construction at Ingalls. Ingalls plans capital investments of approximately \$1M to integrate project solutions into hull production processes.

S2564 Hull Production Automation Methods  
Rev A (NOV15)



*Mechanized and/or automated processes will reduce labor and improve quality during hull fabrication. Ingalls photo*

### **Expected Benefits and Warfighter Impact:**

- Improvement in the hull production processes being identified is anticipated to result in a cost-savings of \$6.72M across LHA, LPD, and DDG platforms built at Ingalls during a five-year period due to labor savings.
- Additional affordability benefits will be seen through the improvement of fit-up and consistent increased weld quality as well as fewer one-time-use tooling, which will reduce material costs.

## TIME LINE / MILESTONE

Start Date: March 2014  
End Date: November 2015

## FUNDING

Navy ManTech Investment: \$1.2M  
Cost Share: (Ingalls IRAD) \$200K

## PARTICIPANTS

DDG 51 Program Office  
LHA Program Office  
Ingalls  
Naval Surface Warfare Center, Carderock Division  
NMC  
ONR Navy ManTech

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