

Improved Hull Fabrication Processes to Reduce Ship Construction Costs

Status: Implemented

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) led 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 identified and developed hull assembly fixturing, along with automated and / or mechanized processes for layout, cutting, and welding.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The IPT evaluated 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, 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 also investigated 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 implemented portable jack supports for structures, tee beam alignment tools, ratcheting push-pull tools, and transverse stiffener jacks; the shipyard also implemented additional fabrication aids and tools. The solutions have been applied to the Amphibious Assault Ship (LHA), Amphibious Transport Dock (LPD) and National Security Cutter (NSC) hulls under construction at Ingalls. Ingalls made approximately \$1M in capital investments to integrate project solutions into hull production processes.



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 identified is anticipated to result in a cost savings of \$6.7M 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

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LHA Program Office
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