

New Tooling Will Reduce Cost to Install and Repair VCS Pipe Assemblies

Status: Pending Implementation

PROBLEM / OBJECTIVE

Virginia class submarines (VCS) require approximately 45,000 labor-hours to install piping assemblies during construction due to extensive manual preparation, fitting, aligning and welding. The objective of this Navy Metalworking Center (NMC) project was to develop improvements that will reduce the labor-hours for on-hull pipe assembly installations, including welding processes.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

NMC worked with General Dynamics Electric Boat (EB) and Newport News Shipbuilding (NNS) personnel to develop and progressively improve several tools that will increase the on-hull installation efficiencies of pipe assemblies for VCS. NMC developed complete fabrication packages for a robotic internal pipe blending tool, a localized pipe purging tool, several internal pipe grinding fixtures, and a temporary hanger that mechanically attaches to the VCS hull frame. A video demonstration of these tools is accessible on the NMC website (<http://www.nmc.ctc.com>). This project leveraged the success of two recent NMC projects: Pipe Preparation and Welding Methods (S2224) and Large Diameter Pipe Process Improvements (S2326).

Implementation and Technology Transfer:

Industry proposals to fabricate the tools have been solicited and documented for shipyard use to facilitate implementation of this technology in VCS construction. NMC has confirmed that the potential fabricators will modify the tools as NNS and EB gain additional experience with their use. Implementation is expected at both EB and NNS in the construction of SSN 788 and 789 in FY 2014. NNS also plans to use the tools during CVN overhaul activities.

This article was prepared by the Navy Metalworking Center, operated by Concurrent Technologies Corporation, under Contract N00014-10-D-0062 to the Office of Naval Research as part of the Navy ManTech Program. Approved for public release; distribution is unlimited.



New tools will reduce the labor hours needed to install VCS pipe assemblies on-hull. NMC photo.

Expected Benefits and Warfighter Impact:

While the actual labor savings associated with use of these tools were not fully quantified during the project, EB and NNS had previously estimated that the project will meet or exceed the threshold target of a 20% overall labor savings based on anticipated implementation. This is equivalent to 9,000 labor-hours per hull, and equates to a projected savings of \$600K per ship using a conservative hourly rate of \$65 per hour.

TIME LINE / MILESTONE

Start Date: November 2011
End Date: March 2014

FUNDING

Navy ManTech Investment: \$1.3M

PARTICIPANTS

VCS Program Office (PMS 450)
Naval Surface Warfare Center, Carderock Division
EB
NNS
NMC