SHT Improvements Achieve Early Implementation on VCS

Status: Implemented (Partial Implementation)

PROBLEM / OBJECTIVE

Improving the design, manufacturing and application of Special Hull Treatment (SHT) on Virginia class submarines (VCS) can reduce installation and maintenance costs. SHT is installed via a bond-in-place (tile) or mold-in-place process, depending upon the location on the hull. The Navy Metalworking Center (NMC) led a ManTech project to evaluate several improvement areas to reduce cost and enhance performance.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

Electric Boat Corporation (EB) reviewed the bond-in-place installation process and materials and identified the following areas for further investigation:

- Improve tile manufacturing processes to reduce cost and rework
- Modify tile features to aid in installation
- Improve installation materials and processes to reduce installation time and increase reliability
- Enhance manufacturing process for multi-layer tile

The project team established requirements, identified candidate processes and materials, performed multi-staged technical evaluations, and generated a cost-savings analysis to verify that project metrics were being met.

Implementation and Technology Transfer:

Among the project results, EB provided recommendations to minimize material waste by casting to near-net thickness and increasing the number of stock tile sizes used to machine the final tile shapes. EB partially implemented near-net thickness molding on VCS tiles in the fourth quarter of FY15, achieving a material savings of $229,000 per hull, with a potential for a total of $440,000 per hull savings with full implementation. In addition, the VCS Program Office (PMS 450) has accepted the project-developed assembly process for multi-layer tile, which will be used to procure the tile for the large-scale mock-up and ship test patch.

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Improving SHT tile manufacturing and application processes will reduce cost and increase reliability while in service. (U.S. Navy photo)

Expected Benefits and Warfighter Impact:

Improvements to materials and/or installation processes will lower the cost to manufacture the tile, decrease installation labor and rework, lower overall installation time, and improve reliability. These savings include $440K per hull to cast tile to near-net thickness and an additional $125K per hull to create additional stock tile sizes. If PMS 450 successfully completes the alternative seam filler configuration, then an estimated $135K per hull can be avoided at Post Shakedown Availability and $450K can be avoided at each of the four Extended Dry-docking Selected Restricted Availabilities, due to increased durability of the SHT system. Results of this project will also benefit the Ohio Replacement Program (PMS 392), which will save an estimated $848K per hull by casting tile to near-net thickness and creating additional stock sizes.

TIME LINE / MILESTONE

Start Date:	March 2014
End Date:	November 2015

FUNDING

Navy ManTech Investment:	$1.2M

PARTICIPANTS

PMS 450
PMS 392
NSWCCD
EB
NMC
ONR Navy ManTech