Improved Abrasive Technology Capable of Reducing VCS Construction Labor Costs

Status: Technical Success

PROBLEM / OBJECTIVE

Recent advancements in abrasive technologies have greatly improved productivity in many industries, but these advancements cannot be transferred easily to nuclear shipbuilding due to stringent regulation and control of support material. The use of improved abrasives in Virginia Class Submarine (VCS) construction can result in significant savings associated with decreased labor, improved abrasive life, and reduced fatigue due to less vibration. The objective of this Navy Metalworking Center (NMC) project was to ensure that industry can manufacture abrasives that demonstrate improved material removal rates and/or longer abrasive life, as well as meet cleanliness and detrimental material requirements associated with nuclear shipbuilding.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The project team successfully segregated abrasive products for nuclear and non-nuclear work at General Dynamics Electric Boat (EB). This segregation enabled the use of commercially available improved abrasive products on >90% of the boat. The project evaluated several bonded and coated abrasive products from various vendors to determine which ones offered the greatest potential to reduce labor associated with abrasive operations. These evaluations included a representative matrix of ship construction materials in order to determine optimal abrasive life and efficiency as well as operator vibration exposure.

Implementation and Technology Transfer:

Implementation was planned for 2014 in support of SSN 786 construction. The agreement to segregate abrasive products for nuclear and non-nuclear work created the opportunity to use many of the commercially available products on the market. The product recommended by NMC, along with the supporting cost benefit and industrial hygiene data, met all of the project metrics but was not implemented because EB identified a lower cost abrasive that performs acceptably.

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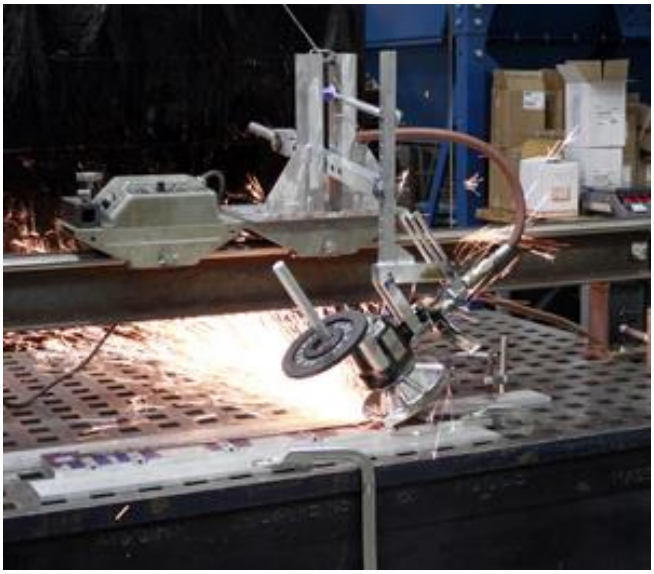

Improved abrasive technologies would allow shipbuilders to remove material faster, resulting in construction cost savings. NMC photo

Expected Benefits and Warfighter Impact:

Improved abrasive technologies would allow shipbuilders to remove material faster, with less fatigue and better hygienic conditions. Cost savings were estimated to be $758K per hull, which included a weighted average derived from improvements on all of the hardware, a 62% improvement in productivity, and an almost four-fold increase in abrasive life. Additional benefits were possible for overhaul activities.

TIME LINE / MILESTONE

Start Date:	February 2012
End Date:	September 2013

FUNDING

Navy ManTech Investment:	$633K

PARTICIPANTS

Virginia Class Program Office (PMS 450)
Naval Surface Warfare Center, Carderock Division
General Dynamics Electric Boat
Navy Metalworking Center
ONR Navy ManTech