

Improved Grit Blasting and Related Processes are Saving Labor in VCS Construction

Status: Implemented

PROBLEM / OBJECTIVE

Preparing pipe surfaces properly before applying coating is critical for coating longevity. The baseline practice at General Dynamics Electric Boat (EB) and Newport News Shipbuilding (NNS) in Virginia class submarine (VCS) construction was to wrap the piping, grit blast the surface, remove the wrapping, clean grit dust from the piping, and rewrap the piping prior to painting. To optimize the grit blasting parameters, a Navy Metalworking Center (NMC) led Integrated Project Team (IPT) conducted a series of trials to optimize blasting process parameter combinations such as variations of blast media type, blast media size, nozzle angle, and nozzle type. The IPT also looked at the associated processes of pipe wrapping and unwrapping.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The IPT developed and evaluated several improved pipe wrapping and unwrapping methods: neoprene rubber wrapping that is held in place with hook-and-loop fasteners can be installed and removed quickly and can be reused; 3M Impact Stripping Tape that results in a smooth surface that can eliminate the need to unwrap, clean, and rewrap pipes; 3M Cold Shrink End Caps that can be installed quickly and protect valves and gages; and 3M Aerospace Adhesive Removal Discs that rapidly cut through rubber and tape without scoring the steel piping.

The IPT also developed improved grit blasting parameters that use extra-long venturi nozzles and aluminum oxide grit, which increases productivity, decreases dust creation, and can be recycled.

Implementation and Technology Transfer:

EB has implemented the recommended grit blasting parameters in VCS construction, as well as the use of 3M Impact Stripping Tape, which will increase the efficiency of pipe wrapping for blast protection by approximately 75 percent. For submarine overhauls, Portsmouth Naval Shipyard has implemented Cold Shrink End Caps and the 3M Aerospace Adhesive Removal Discs. Project results apply to almost all ship classes.



Improvements in grit blasting and the protection of piping during blasting are saving labor costs in submarine construction. NMC photo

Expected Benefits and Warfighter Impact:

- Improved pipe wrapping and removal processes are expected to save approximately \$367K per hull in reduced labor, materials, and disposal cost. The majority of these savings are the result of reducing the labor associated with wrapping pipes prior to blasting by 60 percent.
- Improved grit blasting processes are expected to reduce labor by up to 25 percent.

TIME LINE / MILESTONE

Start Date:	May 2010
End Date:	March 2012

FUNDING

Navy ManTech Investment:	\$610K
--------------------------	--------

PARTICIPANTS

PMS 450
Naval Surface Warfare Center, Carderock Division
EB
NNS
NMC

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.