

Remotely Operated Mini Crawler Demonstrates Technology Potential in Maintenance Activities

Status: Technical Success

PROBLEM / OBJECTIVE

Performing surface maintenance on submarine and aircraft carrier bilges and tanks is often done in hazardous environments, possibly exposing workers to multiple safety hazards. In addition, some of the surfaces are physically inaccessible to the average shipyard worker. In order to reach those locations, shipyards must remove a significant amount of piping or equipment, causing additional work and cost. In a project funded by the Naval Sea Systems Command (NAVSEA) Paint Center of Excellence, the Navy Metalworking Center (NMC) led an Integrated Project Team (IPT) to develop a solution intended to reduce costs and improve worker safety. The IPT modified an existing, remotely operated crawler to perform a wide variety of inspection, de-coating, and preservation tasks in hazardous or inaccessible shipyard areas.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The IPT developed a remotely operated climber that is less than 10 inches tall and 15 inches wide. The small size allows the climber to take coating removal and inspection tools to spaces that are too small for humans. Following the development of the system requirements, including payload types and sizes, the IPT developed a prototype chassis and boom design. Commercial-off-the-shelf fittings were used to maximize the versatility and minimize the costs to make repairs and improvements. Following testing and refinement at NMC, the prototype mini climber was demonstrated for ship maintenance professionals at Norfolk Naval Shipyard (NNSY), Puget Sound Naval Shipyard (PSNSY), and the National Shipbuilding Research Program's Surface Preparation and Coating Panel.

Implementation and Technology Transfer:

Testing at NNSY identified issues with the mini climbers' ability to maintain surface adhesion in the challenging bilge environment. Consequently, the system no longer will be implemented in the intended application. Still, PSNSY & Intermediate Maintenance Facility's "moonshine" lab, a rapid improvement lab that develops and modifies new tools and equipment for shipyard-specific uses, continues to use the project-developed crawler as a prototype base to communicate ideas that involve some type of crawler for maintenance work.



A modified remotely operated climber was developed to carry a wide variety of inspection, de-coating and preservation technologies to reduce exposure to maintenance hazards. NMC photo

Expected Benefits and Warfighter Impact:

This project had the potential to provide the Navy with an estimated cost avoidance of nearly \$2.67M from reduced labor associated with bilge maintenance and preparation for human bilge maintenance.

TIME LINE / MILESTONE

Start Date:	April 2013
End Date:	April 2014

FUNDING

Navy ManTech Investment:	\$0
Cost Share: NAVSEA Paint Center of Excellence	\$380K

PARTICIPANTS

NAVSEA 04X
NNSY
NMC
International Climbing Machines
ONR Navy ManTech

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.