

Weld Shaver Tools Implemented in DDG 1000 Construction

Status: Implemented

PROBLEM / OBJECTIVE

Butt welding exterior ship panels together produces a weld reinforcement that exceeds DDG 1000 fairness requirements. As a result, approximately 23,000 feet of weld reinforcement must be hand ground flush with the hull. The manual weld removal process is slow, which increases shipbuilding costs, and the repetitive nature of hand grinding causes frequent injuries and costly medical expenses. A Navy Metalworking Center (NMC) project developed a lightweight, portable tool that mechanically faces the weld reinforcement, substantially reducing the amount of hand grinding and associated injury claims, labor costs, and production costs. The tool has been proven to remove 80 percent of the weld reinforcement height, in a single pass, at speeds well in excess of the 20 feet/hour target, versus the previous manual rate of three feet/hour. In addition, the tool can operate in a flat, horizontal and inverted orientation.

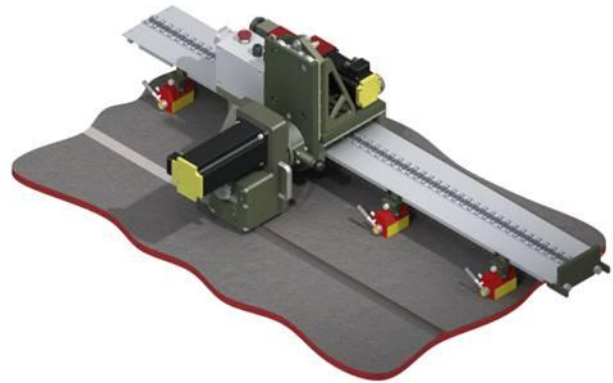
ACCOMPLISHMENTS / PAYOFF

Process Improvement:

Based on shipyard assessments, NMC and the project team developed the tool requirements and evaluated several metal removal technologies, including grinding, milling, and shaving. NMC generated and validated a track weld shaver (TWS) concept using commercially available hardware. PushCorp, Inc. was selected as the commercialization partner to support development of the tool, which was tested at Bath Iron Works (BIW) and Ingalls Shipbuilding (Ingalls).

Implementation and Technology Transfer:

The preproduction tools were delivered to BIW and Ingalls in June 2009, and BIW used them in the construction of DDG 1000. Ingalls used the weld shaver tool in the construction of DDG 1001 in June 2013. The use of the preproduction tools allowed the shipyards to take advantage of their benefits, identify potential tool enhancements for future production tool acquisitions and identify other processes that can leverage this technology. As a result of this project, the TWS technology is commercially available by PushCorp, Inc. BIW purchased a complete TWS system in 2011. A modified version of the tool was developed for weld back gouging, which further increases the value of this technology to the shipyards.



The TWS dramatically reduces manual grinding and the associated medical and production costs and greatly increases the removal rate of weld reinforcement.

Expected Benefits:

- Cost reduction due to TWS technology being faster than current hand grinding
 - Weld shaving estimated cost savings = \$2.77M for three DDG 1000 hulls
 - Back gouging estimated cost savings = \$1.41M for three DDG 1000 hulls
- The TWS technology could potentially be used for burning, welding, and beveling operations
- No harmful airborne particles or debris
- Metal shavings can be recycled

TIME LINE / MILESTONE

Start Date: July 2007
End Date: March 2010

FUNDING

Total ManTech Investment: \$1.3M

PARTICIPANTS

Bath Iron Works
DDG 1000 Program Office
General Dynamics Electric Boat
Naval Surface Warfare Center, Carderock Division
Navy Metalworking Center
Ingalls Shipbuilding
PushCorp, Inc.

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