Cost-Saving Alternative Flame Brazing Technology Implemented in CVN 78 Construction

Status: Implemented

PROBLEM / OBJECTIVE

Like most shipyards, Newport News Shipbuilding (NNS) uses a hand-held torch to manually flame braze fittings shipboard. This method is labor intensive due to the time required to reach the melting temperature of the filler material. Additionally, the process causes occasional paint damage as it is difficult to control the flame and negotiate the minimal clearances that may exist surrounding the fitting. The limited clearance also makes it difficult to manipulate the torch to achieve a uniform bond, which causes occasional pipe leaks. Paint damage and pipe leaks result in rework that further adds cost. The goal of this Navy Metalworking Center (NMC) project was to develop alternative flame brazing technology to be used on the majority of CVN 68 and CVN 78 Class aircraft carriers and Virginia Class Submarine (VCS) construction fittings to address these problems.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The new flame brazing technology uses a programmable logic controller, mass flow controllers and a specially designed burner to surround the fitting. NNS used the prototype flame brazing system developed during the NMC project to generate brazing procedures and qualification samples. NNS tested the qualification samples and provided the procedures and results to its Supervisor of Shipbuilding (SOS) for acceptance. SOS approved the alternative brazing procedure qualification in January 2012.

Implementation and Technology Transfer:

The transfer of the prototype system to the PMS 378 Program Office signified that the alternative flame brazing technology is capable for use in CVN and VCS construction and can be implemented at NNS. In June 2012, NNS used the prototype brazing system to successfully braze production pipe joints in the construction of CVN 78. NNS also plans to purchase additional brazing systems from one of three companies interested in commercializing the technology.

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Shipbuilding costs are being reduced by brazing pipe joints with a small, lightweight heating system as opposed to using a hand-held torch. This NNS photo shows the first CVN 78 production pipe being brazed using the new technology.

Expected Benefits and Warfighter Impact:

Using alternative flame brazing technology in this application will reduce the time required to braze each joint, as well as the amount of rework related to manual torch brazing. In addition, the alternative flame brazing technology will reduce training time and the need for highly skilled operators due to user-friendly operation. This will translate into significant labor and production cost savings. Implementing this alternative brazing technology at NNS will result in an estimated cost savings of $2.6M in the construction of three CVN and nine VCS hulls, and in the overhaul of seven CVN hulls. In addition, the proposed solution may benefit other platforms requiring flame brazing.

TIME LINE / MILESTONE

Start Date:	August 2009
End Date:	January 2012

FUNDING

Navy ManTech Investment:	$1.1M

PARTICIPANTS

NNS	PMS 378
Lean Enginnering	PMS 450
NSWCCD	NAVSEA05
NMC	