

Preventing Coating Damage from Welds Will Reduce New Construction Cost

Status: Pending Implementation

PROBLEM / OBJECTIVE

Small hanger or stud welds made in the latter stages of ship construction can damage the coating that has already been applied to the back side of the surface. The welding-induced heat can cause coating discoloration, delamination, and smoking. In some cases, the damage is not readily observable, but the damaged coating can fail prematurely. To preclude this damage, the coating is often removed from the back side of the structure prior to welding and is reapplied after welding. The labor to repair these damaged coatings in certain locations can be extensive. The objective of this Navy Metalworking Center (NMC) project was to identify and validate heat removal methods that would prevent or minimize damage to standard Navy coating systems during welding.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The NMC project identified the effects of stud arc and shielded metal arc welding on typical attachment and wall thickness combinations with two standard Navy coating systems. Project test results demonstrated that two cooling methods can be used effectively to prevent welding-induced damage to coatings for many of the attachment and wall thickness combinations.

Implementation and Technology Transfer:

Newport News Shipbuilding (NNS) is performing detailed investigations to confirm the project test results in the shipyard environment using their welding equipment and will develop technical notes to augment its standard welding processes. These notes will be reviewed with NNS welding and coating trades management to determine the best labor utilization mix for implementation on CVN 78 Class ships. The cooling methods will also benefit other ship classes.

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Cooling-assisted welding will prevent coating damage on the back side of plates and tank walls. NMC photo.

Expected Benefits and Warfighter Impact:

The project's weld test data with unassisted cooling confirms that the removal of certain evaluated coating systems from the back side of a structure will no longer be necessary for certain combinations of attachment size and wall thickness. Evaluation of the cooling-assisted weld test data concluded that welding parameter combinations that would normally cause coating damage can be prevented with the use of assisted cooling, thus eliminating the labor costs associated with coating rework.

Recommendations from this project may potentially result in a 20% reduction in coating rework labor. Cost savings projections will be developed after the technical notes are reviewed with NNS welding and coating trades management.

TIME LINE / MILESTONE

Start Date:	Aug 2010
End Date:	Aug 2011

FUNDING

Navy ManTech Investment:	\$0.5M
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PARTICIPANTS

Future Aircraft Carrier Program Office (PMS 378)
Naval Surface Warfare Center, Carderock Division
Newport News Shipbuilding
Navy Metalworking Center