

Hybrid Laser-Welded Metallic Sandwich Panel Technology Applied to DDG 1000

Status: Implemented

PROBLEM / OBJECTIVE

The Navy requested solutions to reduce weight and lower the center of gravity for surface ships to improve their performance at a reasonable cost. LASer-welded corrugated-CORE (LASCOR) metallic sandwich panels are stiff, lightweight steel structures that offer corrosion resistance, reduced weight and less distortion. This Navy Metalworking Center (NMC) project optimized the LASCOR design for materials, manufacturability, joining, structural and protection performance and cost for Navy applications.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

This ManTech project demonstrated the capability to manufacture large (78 x 240-inch) LASCOR panels using CRES 2003, a lean duplex stainless steel from Allegheny Ludlum. Material properties, large-scale structural, and corrosion testing have shown that these stainless steel LASCOR panels provide enhanced strength, protection and corrosion resistance. Potential LASCOR applications investigated for implementation included decks, bulkheads, covers, doors, ramps and other structural applications.

Implementation and Technology Transfer:

LASCOR panels have been implemented at Bath Iron Works (BIW) for DDG 1000's berms and personnel safety barrier panels. Approximately 50 percent of the 93 berms and personnel safety barrier panels have passed inspection requirements and have been successfully produced and delivered by Applied Thermal Sciences (ATS) to BIW as part of the first hull production order. These components are manufactured using hybrid-laser welding technology, CRES 2003 stainless steel and the metallic sandwich panel design technologies that were demonstrated on the NMC ManTech project. This combination of technologies was selected as the low-cost, technically compliant solution to meet weight, structural, heat and other requirements while offering corrosion resistance, and less distortion. The panels incorporate a variety of features such as integrated tie-down features, interior windows, attachments and other flexibility options required to support shipboard integration requirements.



LASCOR offers a modular weight-reduction opportunity for door, deck, bulkhead and other applications.

Expected Benefits:

- Implementing the use of laser-welded metallic sandwich panel technology for the DDG 1000 Deck Edge Safety Berms and Personnel Safety Barrier Panels offered a sound technical solution for application performance, weight, and corrosion resistance for the lowest price.

TIME LINE / MILESTONE

Start Date: March 2004
End Date: September 2009

FUNDING

Total ManTech Investment: \$6,485K

PARTICIPANTS

PEO Aircraft Carriers
Naval Surface Warfare Center Carderock Division
Newport News Shipbuilding
Navy Metalworking Center
Applied Thermal Sciences

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