

# HSLA-115 Used in Construction of CVN 78, Reducing Top-Side Weight and Lowering the Center of Gravity

**Status:** Implemented

## PROBLEM / OBJECTIVE

The Navy is seeking solutions to reduce weight and lower the center of gravity for surface ships to improve their performance at a reasonable cost. The goal of this Navy Metalworking Center (NMC) project was to reduce top-side weight and lower the center of gravity on the CVN 21 class of ships. The Integrated Project Team (IPT) pursued an alternate path—increasing the performance and strength of HSLA-100\* steel through heat treatment so that it could be used at reduced thickness, and thus, reduced weight, while meeting performance requirements.

\* HSLA = High-strength, low-alloy

## ACCOMPLISHMENTS / PAYOFF

### **Process Improvement:**

Successful vendor qualification of first article, full-size production plates of HSLA-115 (named for its increased minimum yield strength of 115 ksi), weld qualification evaluations and explosion testing and completion of Material Selection Information (MSI) certification data have been achieved. NMC and the IPT successfully submitted the MSI document ahead of schedule to support key shipyard need dates.

### **Implementation and Technology Transfer:**

The Future Aircraft Carrier Program Office has approved the use of HSLA-115 in the CVN 78 class baseline design, and HSLA-115 has been incorporated into the ship specifications and the fabrication document. NGSB-NN procured the first order of HSLA-115 for CVN 78 Class in March 2009 for the first unit, and construction began with HSLA-115 material in December 2009. More than 2,000 tons of HSLA-115 have been procured and delivered for CVN 78. Implementation of HSLA-115 was achieved ahead of schedule due to the combined efforts of the IPT.

This article was prepared by the Navy Metalworking Center, operated by Concurrent Technologies Corporation, under Contract No. N00014-06-D-0048 to the Office of Naval Research as part of the Navy ManTech Program. Approved for public release; distribution is unlimited.



*Increasing the performance and strength of HSLA-100 steel allowed the material to be used at a reduced thickness for CVN 78, lowering weight and the center of gravity on the ship.*

### **Expected Benefits:**

Implementation of HSLA-115 into CVN 78 provides improved survivability, strength and weight reduction at an affordable price.

- HSLA-115 reduces top side weight by 100 to 200 long tons per hull and lowers the center of gravity by 0.05 ft.
- Factors of safety are improved where thickness is not reduced to improve performance for critical applications.
- The HSLA-115 implementation is projected to have an overall neutral acquisition cost impact. Reducing weight and maintaining survivability performance aid the warfighter to carry out the mission.

## TIME LINE / MILESTONE

Start Date: June 2004  
End Date: February 2010

PEO Aircraft Carriers  
Naval Surface Warfare Center Carderock Division  
Naval Sea Systems Command  
Northrop Grumman Shipbuilding-Newport News  
Navy Metalworking Center  
Arcelor-Mittal Steel  
DDL Omni Engineering  
Puget Sound Naval Shipyard  
Navy Joining Center