

Manufacturing Improvements Result in Reduced Cost and On-Time Delivery of CVN 79 Weapons Elevator Doors

Status: Implemented

PROBLEM / OBJECTIVE

Manufacturing issues such as weld distortion can have a serious impact on ship production schedule and construction costs. For CVN 78, relatively thin steel plates are being used to produce the weapons elevator doors and, after welding and pressing operations, those doors did not consistently meet the required flatness and straightness tolerances. The Navy Metalworking Center (NMC) and Newport News Shipbuilding (NNS) employed a prioritized approach to address these challenges, while significantly reducing labor costs. The project focused on incremental improvements to the existing doors (Interim Corrective Action [ICA] doors), as well as an improved door configuration implementing a balanced weld approach (Permanent Corrective Action [PCA] doors).

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

NMC and NNS applied several manufacturing improvements, including removal of the back sheet, use of purchased pre-fabricated stiffeners, vertical down welding into the door cross section, improvements in camber compensation and weld sequencing, and introduction of flame straightening, to develop ICA doors for CVN 79. The approach was proven with two trial doors constructed by NNS.

For the PCA design, the project team further reduced labor and material costs by using Design for Manufacturing and Assembly principles that incorporate a balanced weld approach and tubular frame construction. NNS and NMC each constructed trial doors that validated the cost and labor savings and proved the viability of the PCA design.

Implementation and Technology Transfer:

NNS began production on CVN 79 doors in March 2013, implementing the ICA door details for all doors. As of July 2015, a total of 49 doors have been delivered, all ahead of schedule. Implementation of PCA doors is expected on CVN 80 in 2018. The producibility methods and improvements developed in this project can be applied to hatches, other ballistic and fragmentation doors and hull closures, or other applications or platforms.



Manufacturing improvements are saving cost and labor on the CVN 79 weapons elevator doors. (NMC photo)

Expected Benefits and Warfighter Impact:

Compared to CVN 78 doors, this project will achieve a net cost savings due to the substantial decrease in labor relative to the increased material costs for pre-fabricated stiffeners. In addition, the project achieved cost avoidance by avoiding late delivery of CVN 79 doors, for a combined cost savings and avoidance of \$25M for CVN 79. Implementation of PCA doors on CVN 80 and follow-on hulls is expected to provide additional cost savings of \$5.9M from both labor and material savings.

TIME LINE / MILESTONE

Start Date: January 2012
End Date: April 2014

FUNDING

Navy ManTech Investment: \$2.1M

PARTICIPANTS

PEO Aircraft Carriers EWI
NNS NMC
NAVSEA 05V3
Naval Surface Warfare Center, Carderock Division

This article was prepared by the Navy Metalworking Center, operated by Concurrent Technologies Corporation, under Contract N00014-10-D-0062 to the Office of Naval Research as part of the Navy ManTech Program. Approved for public release; distribution is unlimited.