

Surface Treatment Improvements Will Save Costs and Extend Service Life for CVN Elevator Support Structures

Status: Implemented

PROBLEM / OBJECTIVE

Cracks have been found in the aluminum alloy hitch girders and other support structures on several CVN aircraft elevators. A Navy investigation indicated that the cause is stress corrosion cracking. The elevator structure is made from thick plates of 5456 alloy in the H116 temper. This Navy Metalworking Center (NMC) project compared several treatment methods to mitigate cracking in thick section 5456-H116 aluminum plate components on CVN aircraft elevators. The selected method will be applied to designated crack-prone sections of new or in-service CVN elevators.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The Integrated Project Team examined three different treatment methods: weld buttering, ultrasonic impact treatment (UIT), and thermal spray coating. Treatments were applied to test weldments (illustrated at right) and then evaluated for residual stress and corrosion performance. Analysis of the test results revealed that either UIT with thermal spray or weld buttering were acceptable methods to prevent stress corrosion cracking on the aircraft carrier elevators. UIT alone was not an acceptable treatment.

Implementation and Technology Transfer:

Weld buttering was used to repair cracks a CVN hull in the first quarter of FY14. While further testing is required for UIT with thermal spray, this method may be implemented on future CVNs since it provides a similar benefit to weld buttering with potentially fewer installation labor hours. Both installation methods are planned for new construction in FY16.

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Implementing methods to prevent or delay the onset of cracks on CVN elevator structures will avoid costly repairs and down time. NMC photo

Expected Benefits and Warfighter Impact:

Effective methods to prevent or minimize the onset of stress corrosion cracking in the elevator support structures will save significant repair costs for carriers throughout their service lives.

TIME LINE / MILESTONE

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| Start Date: | October 2012 |
| End Date: | July 2013 |

FUNDING

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|--------------------------|--------|
| Navy ManTech Investment: | \$200K |
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PARTICIPANTS

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