

Exothermic Welding Process Validated for Use on CVN 78 for Installation of EMALS

Status: Implemented

PROBLEM / OBJECTIVE

The Future Aircraft Carrier Program Office (PMS 378) supports the use of exothermic welding to perform multi-cable, copper conductor splices for Navy shipboard power applications as a means of reducing total ownership cost. General Atomics (GA), the designer of the Electromagnetic Aircraft Launch System (EMALS), has specified the CADWELD® Exolon System from ERICO Products, Inc., as the exothermic welding process to be used to splice the EMALS shipboard power cables. GA also specified products from 3M Company (3M) to insulate these cable splices. A Navy Metalworking Center (NMC) project team evaluated the overall quality and performance of multi-cable, copper conductor splices fabricated using the CADWELD Exolon System process and facilitated qualification of the proposed process for shipboard use. Testing was also performed to validate the quality and performance of the recommended 3M insulation products for these cable splices. The results from this assessment were ultimately used during the project to develop an exothermic welding and insulation procedure for shipboard use.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The CADWELD Exolon exothermic welding process is very robust; overall performance and quality of the splices are not affected by the environmental conditions at the time the splice is fabricated. In addition, insulation of the splices using the recommended 3M insulation products is not affected by the environmental conditions at the time the insulation is applied. The project test program has verified that the electrical and mechanical properties of splices made using the developed installation procedure meet the requirements for splicing EMALS power cables aboard CVN 78 Class carriers.

Implementation and Technology Transfer:

NNS began using the developed installation and repair procedure for installation of the EMALS on CVN 78 during 2Q of FY14 and completed the last EMALS exothermic cable splice on CVN 78 in May 2015. In June, the Navy conducted a "dead-load" test using the new EMALS on CVN 78. A video of the test can be viewed [here on YouTube](#).



An exothermic welding process has been validated for use on CVN 78. NMC photo

Expected Benefits and Warfighter Impact:

- Reduced risk (quality and schedule)
- Increased system reliability and availability
- Support of ship operational requirements
- Enhanced, repeatable, and cost-effective installation and repair procedures
- Initiation of a fleet-wide process for splicing power cables ó especially applicable to future high-current applications, such as electric propulsion and pulse-energy systems

TIME LINE / MILESTONE

Start Date: March 2010
End Date: February 2012

FUNDING

Navy ManTech Investment: \$1.6M
Cost Share/Leverage (PMS 378): \$.04M

PARTICIPANTS

Future Aircraft Carrier Program (PMS 378)
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Naval Sea Systems Command
Naval Air Systems Command
Newport News Shipbuilding
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