

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

**Status:** Pending Implementation

## PROBLEM / OBJECTIVE

The Future Aircraft Carrier Program Office (PMS 378) supports the use of exothermic welding for performing 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 for splicing of the EMALS shipboard power cables. GA also specified products from 3M Company (3M) for insulation of 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 exothermic welding and insulation procedures for shipboard use.

## ACCOMPLISHMENTS / PAYOFF

### **Process Improvement:**

The CADWELD Exolon exothermic welding process has been shown to be 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:**

The validated weld and insulation processes will be applied in accordance with the developed installation and repair procedure during installation of the EMALS on CVN 78, which will take place by the fall of 2013. NNS is currently in the process of submitting the final qualification package to NAVSEA for approval.



*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 – 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)  
Naval Surface Warfare Center, Carderock Division  
Naval Sea Systems Command  
Naval Air Systems Command  
Newport News Shipbuilding  
Navy Metalworking Center

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