

# Newly Developed Welding and Cutting Parameters to Save 4,700 Labor Hours per DDG 1000 Class Ship

Status: Implementation

## PROBLEM / OBJECTIVE

DDG 1000 Class ships include a non-metallic composite deckhouse that is bolted to steel plates that are welded to the deck. Welding of these plates could potentially overheat the composite material and cause significant damage. The original approved procedure required this welding to be done in very short segments to avoid overheating, which would have been very time consuming and costly for the 20,000 feet of welding needed.

The Navy Metalworking Center initiated a rapid response project with Northrop Grumman Shipbuilding-Gulf Coast, Naval Surface Warfare Center-Carderock Division, and PMS 500 to identify welding and cutting process parameters that would permit welding in long lengths without damaging the composite material. The key elements of these improvements are control of weld speed and a process to improve the accuracy of the cut.

## ACCOMPLISHMENTS / PAYOFF

### **Process Improvement:**

The project team made welds and cuts on instrumented joints identical to the actual joints that will be used in construction to optimize the cutting and welding parameters to increase the permissible weld length without damaging the composite material. The final parameters selected are within the currently approved procedures and do not require additional qualification. The project team also identified other supporting technologies to make the cutting process more accurate and to ensure the composite material is not damaged by stray sparks during cutting.

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

Implementation occurred at the Northrop Grumman Shipbuilding facility in Gulfport, Mississippi, when the deckhouse was attached to the deck in July 2010. The same process is also applicable to attachment of the LPD 17 Class Advanced Enclosed Mast System.



The DDG 1000 composite deckhouse requires more than 20,000 feet of welding to attach it to the ship. The results of this project allow that welding to be done much faster than planned without damaging the nearby non-metallic composite material. (NGSB-GC photo)

### **Expected Benefits:**

- 4,700 labor hours / ship savings on three ships
- \$282K / ship cost savings on three ships
- Significant reduction in weld defects by reducing the number of weld starts and stops
- Reduction in schedule due to reduction in labor hours.

Start Date:

July 2009

End Date:

December 2009

## FUNDING

Total ManTech Investment:

\$0.19M

Cost Share: NGSB-GC provided test articles and labor

## PARTICIPANTS

DDG 1000 Program Office PMS 500  
Northrop Grumman Shipbuilding-Gulf Coast  
Naval Surface Warfare Center-Carderock Division  
Navy Metalworking Center

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