

# Optimized Alloy 625 Forming Practices in Use at Shipyard

**Status:** Implemented

## PROBLEM / OBJECTIVE

Thick-sectioned Alloy 625 plate was selected for the fabrication of several critical components on CVN 78. This material is known to be difficult to form, particularly at lower temperatures. This Navy Metalworking Center (NMC) project was initiated to identify optimal Alloy 625 forming practices for these applications and to identify maximum forming limits. The goal is to demonstrate that it is possible to achieve very large cold deformations in the fabrication of various components without impairing the mechanical/physical properties as well as to document the material's corrosion resistance. Fabrication of these components is occurring early in the production cycle for CVN 78; therefore, the-forming practices resulting from this project are being implemented into the fabrication process.

## ACCOMPLISHMENTS / PAYOFF

### **Process Improvement:**

A test matrix was developed where several forming variables were evaluated to characterize the forming parameters of this material. Variables included plate mechanical properties, bending radii and surface conditions. Forming tests were conducted on NMC's 850-ton forming press using tooling fabricated for these tests.

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

The end-user shipyard, Northrop Grumman Shipbuilding-Newport News (NGSB-NN), has implemented lessons learned from this project in the fabrication of key components of CVN 78. The shipyard reports that these lessons learned include forming limits, welding preparation, drawing improvements and preparation for blast and coat.

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Alloy 625 Forming Practices Benefit Shipyard

### **Expected Benefits:**

- Development of proven forming procedures for Alloy 625 will expedite fabrication of CVN-78 components
- Prevent potentially significant schedule delays during the construction of critical components of the carrier
- Prevent or minimize start-up problems that could arise due to the cold workability of this material
- Validate corrosion performance of the components and weld interfaces in seawater to support a 50-year service life

## TIME LINE / MILESTONE

Start Date:	February 2007
End Date:	December 2009

## FUNDING

Total ManTech Investment:	\$2.0M
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## PARTICIPANTS

PMS 378 – Future Aircraft Carriers Program Office  
Naval Sea Systems Command  
Northrop Grumman Shipbuilding-Newport News  
Ed Hibner, Consultant  
Navy Metalworking Center