

The following technical paper abstract information was recently submitted in connection with session DOD110,Metal Working

Offer Number: 14DOD-0034

Paper Title: Development of Reverse Sensitization Process for 5xxx Series Aluminum on Navy Ships

Author:

Rob Mason

Concurrent Technologies Corp

Florida

( 814 )269 6480

[masonr@ctc.com](mailto:masonr@ctc.com)

Abstract: 5xxx series aluminum alloys offer several advantages for ship construction and have been used for the superstructure on several United States Navy ships, including Ticonderoga Class cruisers and Littoral Combat Ships. However, these alloys can become sensitized over time when exposed to moderately elevated temperatures. This sensitization makes the aluminum material susceptible to intergranular cracking and, therefore, the sensitized aluminum must be cut out and replaced with new material. This replacement process is both expensive and labor intensive for the Navy. Through extensive testing and simulation efforts, a stabilization treatment has been developed to reverse sensitize and restore sensitized aluminum structures. This treatment involves a short exposure to a specific elevated temperature range for a specific time. The process is portable, so that in-service plate can be refurbished in place, on board the ship, rather than replaced. Implementation of this process will reduce required labor and enhance readiness for the aforementioned ships, as it will require as little as 30 minutes to apply, versus hours to cut out and remove sensitized plate and weld in new plate. It will also provide significant cost avoidance, with an anticipated cost avoidance of over \$25M for the Ticonderoga Class alone. This presentation will discuss the sensitization issue, the development of the reverse sensitization process, and the progress to date on the fabrication of a prototype reverse sensitization system.