

Alternative Material for Critical Submarine Component to Save Costs and Improve Mechanical Properties

Status: Pending Implementation

PROBLEM / OBJECTIVE

The torpedo tube muzzle door operating linkage for the Los Angeles class (SSN 688) and subsequent classes of Navy submarines includes several critical components produced from K-Monel® (Ni-Cu-Al) forgings. The components do not function as needed in a corrosive seawater environment and must be replaced after eight years of service. This project sought to substitute the K-Monel forgings with 15-5PH steel, which provides improved mechanical properties and corrosion resistance, negating the need to replace components during the submarine's lifetime.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

This project developed critical forging and heat treating parameters that will result in material properties tailored for this specific application. 15-5PH steel was evaluated for use on Los Angeles, Ohio, and Seawolf classes of submarines, as well in Virginia Class Submarine (VCS) construction.

Implementation and Technology Transfer:

15-5PH linkage components are planned for implementation on the Los Angeles and Ohio class in-service submarines during the next planned retrofit cycle, which should commence in FY14. Prior to implementation at least one set of 15-5PH components will be installed on a Los Angeles class submarine during an upcoming availability for a one- to two-year sea trial.

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Substituting 15-5PH forgings for critical Navy submarines components will improve mechanical properties and save labor and material costs. Corry Forge Company photo

Expected Benefits and Warfighter Impact:

- Estimated \$9.4M cost savings over the remaining life of all remaining in-service hulls by eliminating the need to periodically replace these components
- Material cost savings will result from replacing K-Monel with 15-5PH forgings in approximately 292 tube linkage assemblies on 70 submarines representing three different classes.
- 20-30 ksi yield strength and improved corrosion performance from using 15-5PH steel over K-Monel

TIME LINE / MILESTONE

Start Date:	October 2008
End Date:	October 2010

FUNDING

Navy ManTech Investment:	\$938K
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PARTICIPANTS

PMS 450
PMS 392
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NAVSEA 05P24
Naval Undersea Warfare Center
Naval Surface Warfare Center, Carderock Division
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ONR ManTech
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