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DDG-51 CLASS SLEWING ARM DAVIT MOTOR, SLEWING ARM WINCH MOTOR, AND TILT WHIP ANTENNA MOTOR CORROSION PROTECTION SYSTEM

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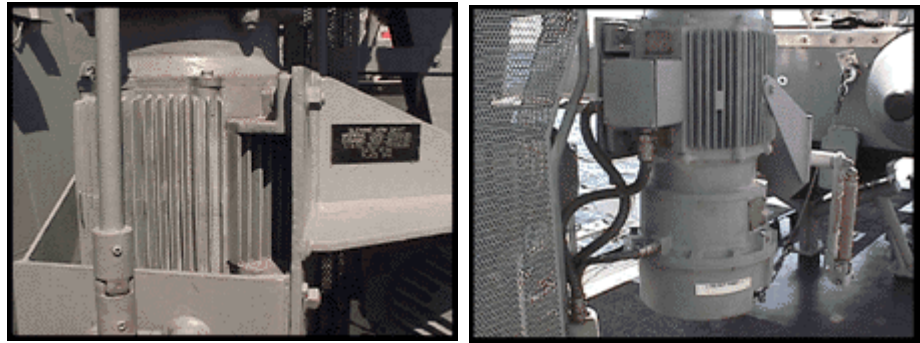
This article describes a recent effort by the DDG 51 Corrosion Control Integrated Product Team (CCIPT) to improve corrosion protection on motors for in-service ships. A previous motor corrosion improvement initiative on USS GONZALES (DDG 66) applied hypalon paint to the motor casings, scheduled along with a complete motor tear down. This was depicted in the winter, 1997 *Corrosion Chronicle*. Although the two-year inspection showed significant improvement of motors seen after that same length of service, the hypalon system was not considered optimal. Additionally, there is no economic justification to tear down a functional motor simply to mitigate corrosion. Building upon lessons learned, several topside motor corrosion control improvements were carried out on USS DECATUR (DDG 73) during her PSA. These reports follow:

PSA corrosion control team oversight indicated that topside electrical motors are an eyesore, constantly bleeding rust. PSA or any multi-week availability is an ideal time to address the problem of motor rusting. Areas include cooling vane edges, vane recesses, motor casing part lines, mounting rings and mounting feet. In general, the OEM delivered these motors to the Navy with poor paint adhesion and low paint millage. (Editors comment: the CCIPT is working this issue now.) In fact, over 90% of pre-INSURV corrosion team inspections and pre-PSA inspections identify these motors as a corrosion problem. The major question in preserving a motor that has seen extensive topside marine exposure is how best to remove the existing rust and prepare the surface for preservation, but not disassemble the motor?

Before any corrosion protection approach for an in-service motor is determined, a coating removal and surface preparation system must first be selected. The aim for backfit should focus on an approach that does not require the motor to be completely disassembled, yet still removes the old epoxy and silicone alkyd paint. Additionally, it should produce as little dust as possible, while imparting an anchor tooth profile on the steel that will permit successful adhesion of the re-coat.

The process selected for surface preparation is called the Sponge-Jet® blasting system. This system is ideal for use with motors since it reduces dust and particulate normally generated during surface preparation. This significantly reduces the risk of contaminating the motor. The process has been used on CG 47 and DDG 51 class ships to prepare antennas, with good results. The grit is encapsulated within a sponge-like binder (hence its name) that reduces particle bounce back while providing mechanical cleaning and scouring of the surface, especially in the deep recesses of the cooling fins. The process now has the capability to obtain a 3-4 mil anchor tooth.

A two coating system was used:



"USS DECATUR (DDG 73) SLAD motor. Images taken one year in service following post corrosion re-engineering."

First, due to the porous surface of the steel castings that were found after blasting, a high solids paint like Devoe BarRust® 236 was used. This was applied by conventional paint spray equipment as a mist coat. Two coats, 4 mils DFT (Dry Film Thickness) each, were applied to seal the pores, and to provide a tough barrier on the compromised surface. The topcoat was applied once the BarRust fully hardened.

Second, the top coating system selected for the new painted surface was FluoroTuff® at two coats of 2 mils DFT each. This is a superior ultraviolet (UV) resistant fluoropolymer paint that offered excellent stability, with chip and chloride resistance. In total, a 12-mil system was laid down.

Particular attention was necessary to prevent rusting at bolted joints, connections, and mounting pads. Gore-Tex gaskets were used under the shim pads and polysulfide sealant was applied to fasteners and faying surfaces.

This combination of low dusting, rigorous surface preparation, close attention to the choice of application of coatings, and careful use of sealants and dielectric barriers as demonstrated in this study could go a long way toward defining the electric motor corrosion repair standard for surface combatants.

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