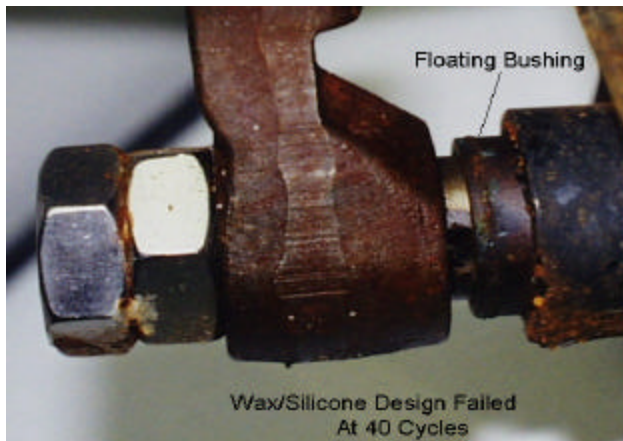


DeNOVUS

Case Study: Watertight Doors - U.S. Navy



PROBLEM

Current watertight door dog latch designs fail to function properly due to the presence of paint or other debris such as corrosion products on the exposed area of a floating bushing. The corrosion products are formed primarily from corrosion of a carbon steel sleeve, which houses the assembly and is welded to the door. Replacing the current wax filling and silicone oil with E-1270EPL and the addition of an external shield was evaluated as a solution.

TESTING

Door dog latch assemblies were subjected to a cyclic corrosion test in which each cycle consisted of an immersion in 5 % by weight salt water solution (15 minutes), drying at ambient lab conditions (75 minutes), and exposure to 100% relative humidity per ASTM-D2247 specification, but at a temperature of 120F (22.5 Hours). Periodically the amount of effort required to move the latch was measured and if the latch did not return properly after pushing, it was designated as having failed.

DISCUSSION

Exposure of the current design door dog latch to the cyclic corrosion test exposure resulted in a failed condition by 40 cycles of test exposure. The failed condition occurred because the floating bushing became stuck within the carbon steel sleeve and did not return properly. The floating bushing became stuck due to the presence of corrosion products in the interface area between the bronze floating bushing and the carbon steel sleeve. Replacement of the wax filling and/or silicone oil with E-1270EPL in the inner mechanism doubled the number of test cycles achieved (80 cycles). Further enhancement was achieved by using a stronger spring and by adding an external shield to entrap E-1270EPL around the exterior surface of the floating bushing. These additions extended the performance to a minimum of 110 cycles.

CONCLUSIONS

The E-1270EPL combined with noted design changes dramatically improved the cyclic corrosion performance of the water tight door dog

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Date: August 9, 2002

Revision

latch. The design is entering sea-trials in the Atlantic and Pacific fleets.

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