

Affordable Drive Train Housings Manufacturing Technology Objective Magnesium Corrosion Protection Program (MCP) Implementation

PROBLEM / OBJECTIVE

The objective of the Magnesium Corrosion Protection Program (MCP) is to develop and demonstrate dramatically enhanced corrosion resistance coatings to be applied across the fleet at depot level to reduce operations and support (O&S) costs and to extend the service life of magnesium components installed in the drive system of the Apache Longbow combat helicopter.

A holistic approach was taken starting with the development of a process to remove the existing surface finish and corrosion, followed by surface activation and the selection and application of organic coatings. All evaluations were performed on ZE41A-T5 magnesium alloy.



ACCOMPLISHMENTS / PAYOFF

Process Improvement:

An environmentally friendly, abrasive blasting process was developed for removing topcoat and primer from AH-64D magnesium components without removing the underlying chromate surface treatment.

Finish systems were then applied based on either Dow 7 and Low Cure (LC) Rockhard resin or Dow 7 and DeSoto PR205 primer had the best overall combination of features for Overhaul and Repair (O&R) of AH-64D magnesium components. Finish systems based on these coatings were significantly superior to the original baseline system on fielded AH-64D magnesium components.

Implementation and Technology Transfer:

The Overhaul and Repair processes developed in this Program were implemented in remanufacturing of AH-64D tail rotor gearbox and intermediate gearbox housings and covers that would have been scrapped due to corrosion. The Dow 7 / LC Rockhard finish system was selected because the Rockhard resin does not contain chromates.

Expected Benefits:

A specific goal of this Program was to reduce AH-64D Apache Longbow drive system O&S cost by 15%. The O&S cost savings for these magnesium components as

a result of incorporating the abrasive blasting processes and the enhanced MCP corrosion protection systems is estimated at 22%. Boeing engineering approved and implemented this Engineering Rework Instructions (ERI) repair process on the AH-64 Tailrotor Gearbox (TRGB), Nose Gear Box (NGB) and the Intermediate Gearbox (IGB) housings in accordance with the processes developed as part of MCP. Successful completion of the ERI's returned these components to a serviceable condition and met all of the requirements established by the U.S. Army Depot Maintenance Work Requirement (DMWR) and they were installed on the aircraft on the ReMan line at the Boeing Mesa facility.

To date the MCP O&R process has returned over 160 Apache Tail Rotor, Nose and Intermediate Gearboxes to service on the Boeing Mesa AH-64 ReMan line by applying the MCP developed enhanced corrosion protection system. The savings generated to date by returning these assets to service is \$1.9M and the estimated savings by end of program will be \$7.7M.

TIME LINE / MILESTONE

Start Date: September 2003
End Date: December 2005

FUNDING

Army ManTech: \$0.75M

PARTICIPANTS

The Boeing Company
AMRDEC/MS&T Division
AT&T Government Solutions, Inc.