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August 16, 2005

SUBJECT: USMC AAV Envelop Protective Cover Validation Test

The USMC has experienced substantial corrosion on the turret on the AAV (amphibious assault vehicle) resulting in continual maintenance on the turret and components attached to it. This has resulted in significant ongoing maintenance expense for the operating units, reconditioning and component replacement costs and an adverse impact on readiness.

At the request of the USMC, Shield Technologies performed a test on the AAV turrets to validate the corrosion resistance ability of the custom-sewn Envelop protective cover. The Envelop cover is a custom fabricated cover designed to fit over the turret. It is easily installed and has an integrated storage "bag" for easy storage when not in use.

The test was conducted at Marine Corps Base Hawaii, Kaneohe for 30 days beginning July 11, 2005, and concluding on August 11, 2005. The test involved 2 AAV units with Envelop covers and one control unit.

The test validated the severe corrosion climate in Hawaii and the extent of damage caused by corrosion on the control unit. The 2 units covered with the Envelop turret covers confirmed a reduction of 90-95% of the normal corrosion, which will result in reduced maintenance requirements, lower maintenance costs, and improved readiness.

The following report highlights specifics of the test. All inquiries and questions should be forwarded to Shield Technologies Corporation.

Thomas Nelson
Thomas Nelson
General Manager

USMC AAV TURRET ENVELOP PROTECTIVE COVER VALIDATION TEST

TEST PROCEDURE

Date of test initiation: Tuesday July 12, 2005 AM Weather was warm, 95% humidity. There was a heavy rain about 1 hour before the test was initiated. There was some visible water on the equipment when the covers were installed.

There were about 15 AAVs in the compound. Some were being cleaned with fresh water and some preventative maintenance was being performed on the external elements.

One of the most susceptible elements to corrosion is the turret. The main body of the AAV is made of aluminum, but the turret is made of ferrous metal and there is extensive rust on the main body of the turret but specifically on the mounts for the weapons (.50 cal and 40mm) and the brackets for the smoke grenade launchers. Further heavy rust was evident on the housing for the site housing. There was significant difference between the different units based on the length of time since they were removed and overhauled with new paint.

1. The first cover was put on #114. Existing rust was evident on a number of areas, but the rust was ground clean on the bracket for the "broken" smoke grenade adapter and on the top surface of the site housing. Although this unit was fully overhauled recently (within the last 4 months) and there was significant rust. The Envelop cover is loose, since there were no weapons in the mounts (thus no barrels extending). The cover can be tightened and there needs to be another pull strap on the front facing left side.

2. The second cover was put on #110. This turret had extensively more corrosion than #114. The same procedures were followed on this unit. The two areas that were ground clean was the 40 manlet and a ring on the back left (forward looking), used for lifting the turret.

3. The control unit was #109. The 40 manlet and the base of the site housing was ground clean. There was no protection put on these clean surfaces and the Marines were instructed to do no preventative maintenance on the external metal of the turret for the next 4 weeks.

The covers remained on units #114 and 110 until August 11. Unit # 109 was used as normal with no preventative maintenance on the turret exterior.

This USMC unit stores the turrets slightly off center, which is different than Quantico. This made it slightly more difficult to install the covers. A more uniform design is needed. This unit also stated that they never leave the weapons in the unit when a complete cover would be used. They did state that they might want access to open the hatch when the cover was on. They also have a Herculite "bra" for the two weapons that they use when they are crossing heavy water going to a maneuver to keep the salt water off the weapons and to keep the water from coming into the hatch.

TEST RESULTS

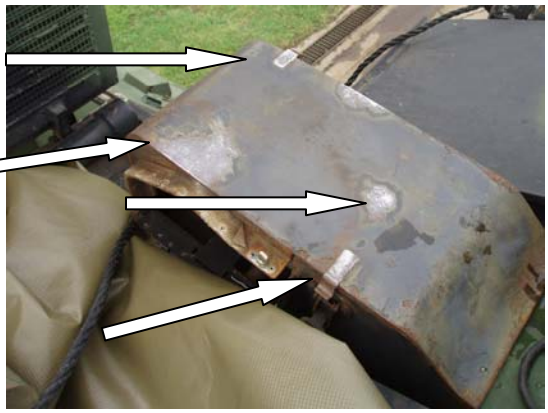
On Thursday August 11, 2005 the covers were removed and the equipment examined. The 2 covers were left on for the complete month with the exception of the removal and replacement of the cover on unit #114 for specific maintenance. Unit #110 was left on for the duration of the test. Unit #109 had no preventative maintenance on any area of the turret.

1. CONTROL (UNIT 109) not covered:

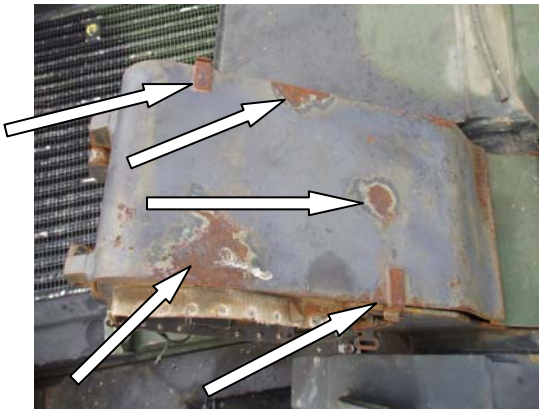
The control unit (#109) showed considerable new corrosion on all ground surfaces. This is normal corrosion for 1 month period of time in Hawaii.

CONTROL UNIT # 109: no cover for 1 month

Corrosion ground off in these areas.



Arrows indicate areas of the manlet where corrosion was ground off July 11



Ground manlet of control unit on Aug 11. Arrows indicate corrosion forming during test period .

Corrosion ground off in this area.

Ground edge of site housing on Control: July 11

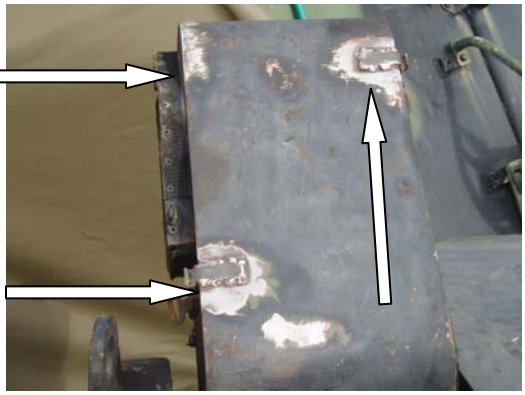
Ground edge of site housing on Control: Aug 11

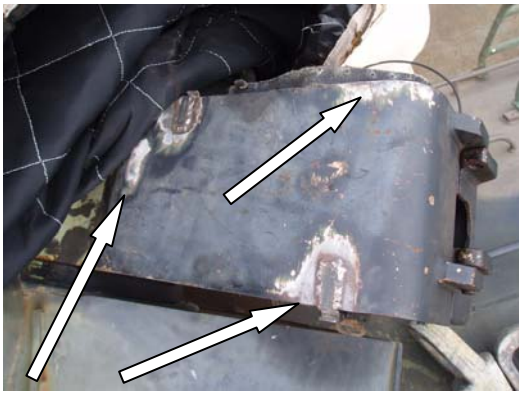
2. UNIT #110 covered with Envelop protective cover:

The ground areas of the manlet were clean with minimal change from the initial pictures of one month ago. The ground portion of the eyelet was also clean of any corrosion. Compared to the control unit, less than 5% of the corrosion was evident on unit #109. Please see comparative pictures 2.

TEST UNIT #110: Envelop protective cover for 1 month

Corrosion ground off in these areas.

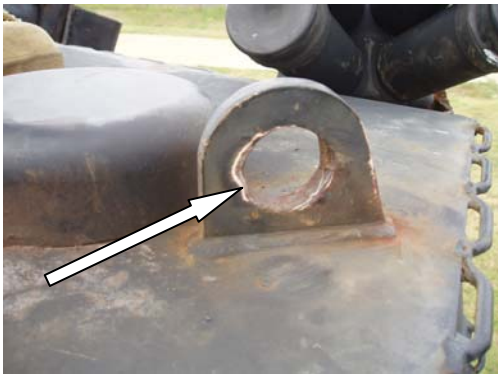


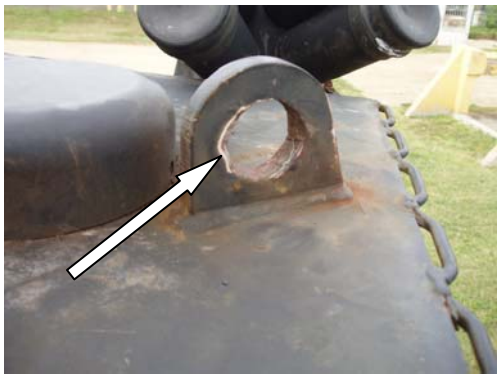


Ground down areas on Manlet on #110: July 11

Same areas of Manlet on #110: Aug 11

Corrosion ground off this area.





Ground Eyelet on #110: July 11

Eyelet on #110: Aug 11

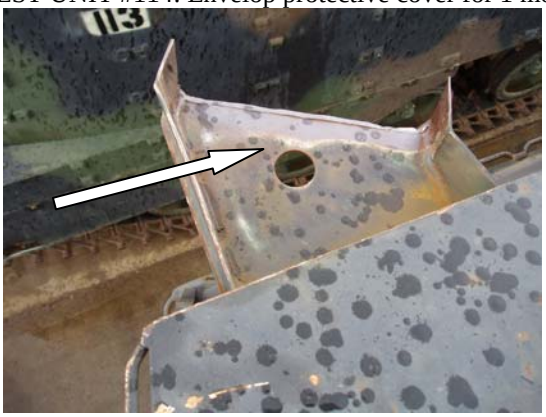
Envelop cover on unit #110

3. UNIT # 114 covered with Envelop protective cover:

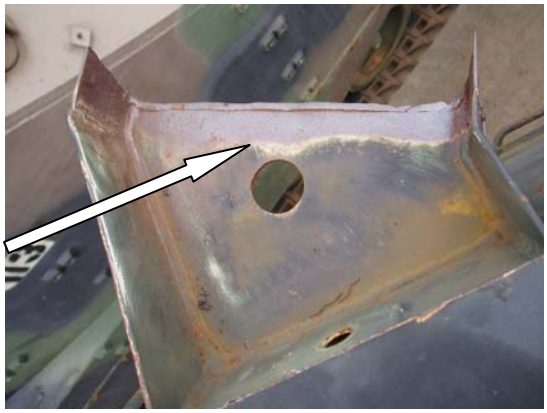
The ground area on the bracket for the smoke grenade launcher had very small evidence of corrosion. There was slightly more corrosion on the ground surfaces of the site housing. The smoke grenade bracket contained less than 5% of the corrosion found on the control unit and the top of the site housing had 10-15% of the corrosion found on the control unit. Please see comparative pictures 3. The Marines said that they did remove this cover a few times during the month for maintenance reasons.

TEST UNIT #114: Envelop protective cover for 1 month

Corrosion ground off on this area.

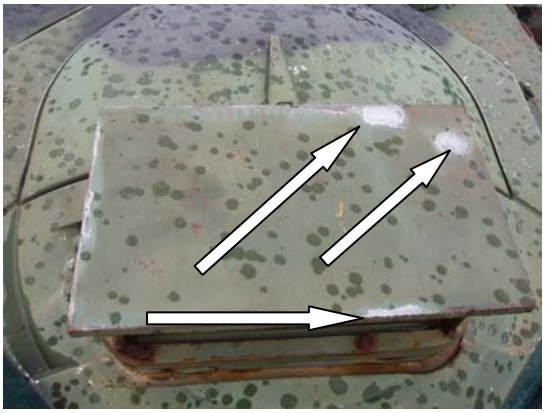


Ground "broken" attachment for smoke grenade July 11

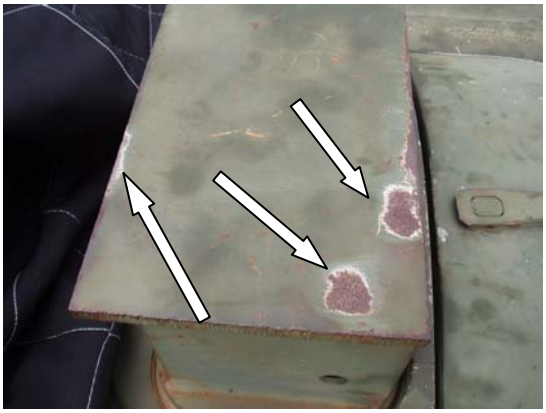


Ground "broken" attachment for smoke grenade Aug 11

Corrosion ground off at areas indicated by arrows.



Ground surface of the site housing on July 11



Ground surface on the site housing on Aug 11

The site housing was not protected as thoroughly as other sections due to the use of ballistic nylon to protect the internal components of the cover from the sharp edges of the site housing. This further validates the "wicking effect" of the quilt portion of the Envelop cover. Production covers will be designed to protect all metal objects with the same equal protection.

Envelop cover on #114

Conclusion:

The Envelop covers resulted in a reduction of over 90% of the new corrosion identified on the control turret. (The small level corrosion found on the top of the site housing is explained by the position of the cover and the use of ballistic nylon on the inside of the cover to protect the cover from tearing on the sharp edges of the site housing. This reduced the protective element on the immediate surface of the site housing. The final design of the turret cover will be made to assure full protection of metal surfaces.) The Envelop covers protected the metal surfaces from the normal high levels of corrosion with a cover that is easily installed and removed.

Summary:

The Envelop cover will reduce corrosion about 95% versus normal corrosion activity. With a newly conditioned turret, the Envelop cover will assist in maintaining the clean state for an extended period, resulting in immediate reduction in short term corrosion fighting surface maintenance and extended component life such as smoke grenades. The Envelop cover is expected to last in excess of 2 years, if properly used and maintained.