

ROI of Anti Corrosion Protective Covers

The U.S. Army (Active, National Guard and Reserve) experiences reduced readiness rates and increased corrective maintenance actions - as much as four times higher in areas of high humidity, high temperature, and high salinity. The Army Corrosion Control and Prevention Executive directed the preparation of a business case analysis (BCA) to quantify the extent of the problem.

The BCA [1] evaluated cost effectiveness of equipment covers against other corrosion prevention and control solutions and compared various methods for issuing covers to help Program Managers and Product Support Managers plan maintenance and product support.

The BCA concluded that covers reduce corrosion on equipment stored outside at any location and have an average return on investment (ROI) of 19:1.

The BCA used a corrosion-related corrective maintenance cost based on the 2009 Office of the Secretary of Defense Office of Corrosion Policy and Oversight Cost of Corrosion report which lists the top 20 contributors to the Army Ground Vehicle Corrosion Costs for Fiscal Year 2007, including the total (corrective and preventive) cost of corrosion-related maintenance for each system [2].

The BCA assumed a 20-year lifespan for ground systems, a two-year cover life and the cover cost to be \$500.00. The calculated ROI was 19:1 for this scenario. This ROI was exceeded only by currently constructed shed storage and general-purpose warehousing. The cost to construct a storage facility that includes both heat and power results in a less favorable ROI.

The purpose of a cover is to protect equipment from precipitation, dust and debris, and damaging ultraviolet (UV) rays [3]. Commercially available covers can be single-layer (like a canvas or vinyl rectangular shaped tarpaulin using ties or fasteners) or custom-fitted corrosion control covers. Transshield corrosion control covers use vapor corrosion inhibitors (VCIs), that form a molecular barrier between the asset and moisture, to provide superior corrosion protection [3]. VCIs are a key reason why the covers are effective.

Two ground vehicle covers, that have seen in-service use for over three and four years respectively, have been tested and sufficient VCIs were found to indicate that these covers were still effective [4]. The BCA ROI calculation adjustment, based on the VCI longevity data, is closer to 40:1 as shown in the table.

VCI Presence (Years)	ROI
2	19:1
3	29:1
4	39:1

ROI as a function of VCI presence in a cover

Expanding the analysis to address naval cover use; a 0.50 caliber gun and mount cover provide an ROI of 11:1 based on a two-year cover life. Assuming that there is sufficient VCI in naval covers to last three or four years, the ROI would be closer to 17:1 and 22:1 respectively.

Summarizing, the BCA concluded that:

- Covers reduce corrosion and protect equipment.
- Covers always provide benefit regardless of location.
- If equipment is stored outside, covers should be used.
- Custom-fitted covers are less likely to allow salt, sand, and other contaminants to reach the equipment than standard vinyl tarps.
- Decision-makers choose the cover that best fits their situation.

Ground vehicle covers, that have seen in-service use, are effective longer than the two-year BCA assumption. A more realistic ROI for these types of covers is closer to 40:1. When covers are used in more corrosive environments and on more expensive equipment, the ROI for covers is higher. Assuming that VCIs also remain present in naval covers, a more realistic ROI would be closer to 20:1.

Custom-fitted corrosion control covers provide an additional value not captured in the ROI calculation. Soldiers and sailors tend to be more diligent in protecting valuable equipment when leadership emphasize the need to store, clean, and handle covers properly.

In order for equipment covers to be effective, Department of Defense leadership at all levels must require, support, and enforce their use through policy, funding, training and continued emphasis.

References:

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2. The Annual Cost of Corrosion for Army Ground Vehicles, 2008-2009 Update, LMI for OSD CPO, May 2009
3. Sharman, D. J., Washburn, M., Ozol, S., The Wide Ranging Benefits of Corrosion Inhibitors, The Department of Defense Allied Nations Technical Corrosion Conference, August 2017
4. Ozol, S., Qi, N., Study of Vapor Corrosion Inhibitors Built into Corrosion Control Covers, Do VCIs Last the Life of the Covers?, AMPP Corrosion 2021, Paper No. 16175, April 2021