



A Product of Shield Technologies Corporation

Operational Readiness & Environmental Protection of Critical Assets



.50-caliber gun following no maintenance during two weeks in rough seas aboard the USS RUSSELL while training in the Pacific when covered with a traditional tarp.



.50-caliber gun following no maintenance during two weeks in rough seas aboard the USS RUSSELL while training in the Pacific when covered with Envelop Protective Covers.

Readiness

The outward appearance of “readiness” for any military unit used to depend upon weapons and systems that were highly visible – uncovered and primed for action. With heavy demands on the military since 2001, real readiness in weapons, sensors, and systems is increasingly hidden from view because

equipment is being covered and protected from persistent damaging effects of corrosion and environment.

How Big Is the Problem?

A Government Accountability Office (GAO) report in 2003 said environmental effects on the military’s readiness were a big problem, to the tune of \$20

billion annually as reported by the Department of Defense (DoD). Corrosion is, by some measures, the largest life-cycle cost associated with today’s systems. With increasing sophistication and cost of major weapons and equipment (and an understandable desire to preserve these national assets for near-term use and long-term viability), the DoD has aggressively moved to highlight the issue in recent years.

Envelop Covers Respond to Mandate

Cutting effortlessly through a calm sea, a modern Navy guided missile destroyer looks formidable by any measure. Yet, that same calm sea and seemingly placid environment are relentlessly eating away at the ship’s offensive assets. As manpower on Navy ships is reduced and the remaining crew’s level of sophisticated training increases, there is a mandate to spend fewer man-hours on maintenance and corrosion prevention.

A typical 25mm or .50-caliber deck gun requires seven to 10 hours per week of corrosion prevention, a figure that, frankly, is untenable

in today’s fleet. So, in 2003, sparked by the GAO report and a congressional mandate that rightly called for action, the Navy funded a Small Business Innovation Research (SBIR) project to find a more effective way to protect exposed assets from corrosion. Envelop covers were developed by Shield Technologies and patented as a result of the SBIR project.

“It’s all about readiness,” said Envelop General Manager Tom Nelson. “While this began out of high-level concern by the DoD and the Congress, it has become reality on the Navy’s deckplates when sailors have seen weapons systems and equipment so much better protected and ready for problem-free operation.”

Did You Know?

A Navy Close-In Weapon System (CIWS), inadequately protected, requires 400 man-hours of preventive corrosion maintenance per year...but less than 150 hours with an Envelop cover.



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Washington, D.C. April 3-5, 2007
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Details at www.sasexpo.org

Envelop Covers Return on Investment (ROI) for Naval Applications

- Product life expectancy – 3-4 times vinyl
- Lifetime cost of covers – 35% less
- Ongoing corrosion maintenance – 90% fewer man-hours
- ROI – 2 months



Growing Need for Constant Protection

When Gunner's Mates aboard USS PRINCETON grew weary of labor and costs associated with keeping their 5-inch MK 45 guns battle ready, they came to Envelop for help.

A customized, formfitting Envelop muzzle cover, including a rubber liner to hold it in place on the smooth barrel, was

developed. It has already proven its mettle. During a recent exercise in heavy seas, USS PRINCETON's aft gun mount was completely submerged. The Gunner's Mates report that the gun took no water down the barrel thanks to a tight, fitted gasket. The muzzle cover also remained in place when the

35-pound gas injection air system was activated accidentally during routine maintenance of the weapon.

Gunner's Mates aboard a Mayport-based frigate have similar positive results with an Envelop muzzle breach cover for the 76mm MK 75 gun. The cover, which has also

gone aboard the Coast Guard's WHEC and MEC cutters, protects the unpainted 76mm gun barrel that previously was exposed to the pervasive salt environment, and inadequately protected with vinyl or plastic. The Envelop muzzle breach cover has kept the expensive gun barrels in pristine condition.



Close-In Weapon System covered.

How Can We Help?

"Fighting corrosion is just one of the things that we need to constantly do so that we are always ready to perform the fundamental mission – to maintain our national security.

*Michael W. Wynne,
DoD Corrosion Executive*

Envelop's Fleet Support service providers are available to visit on-site. Call today! 651.289.3067

"We have sailed through some very rough seas and I was extremely pleased with how the guns looked once we took the covers off!"

Sailor, USS BENFOLD

Deck Equipment Runs the Gamut in Uniqueness and Size

From bridge equipment to small boat covers, to pier-side and mobile support equipment, the diversity of vital military equipment is staggering. Envelop is uniquely positioned in understanding existing

needs and supporting readiness through protection of these assets.

On the bridge, equipment ranges from signal flags to sophisticated electronic equipment. Envelop covers for

flag bags reduce mold, mildew, and rot. Custom manufacturing processes provide fitted covers for equipment as small as telegraphy keys and as large as the Marine Expeditionary Unit's water purification unit.



Helicopter Flight Deck Equipment Subjected to Heavy Corrosion



Flight deck Rapid Securing Device

An Engineman aboard USS JARRETT reports that the flight deck's Rapid Securing Devices (RSD) for the embarked SH-60B Seahawk helicopters undergo annual maintenance costs in the neighborhood of

\$500,000 each. With over 150 RSDs in the Navy's fleet, that's nearly \$8 million of waste, and significant impact on the readiness of the surface fleet's airborne weapons systems.

Envelop covers came aboard the JARRETT to provide a custom solution to eliminate RSD maintenance by highly trained Enginemen. The result is an Envelop cover that nearly eliminates RSD water intrusion on the close-to-sea-level flight decks of frigates, destroyers, and cruisers. The cover can be left in place during aircraft traverse operations, further reducing the man-hours involved with use of the RSD.

Defense Sustainment Consortium

The Defense Sustainment Consortium, established by the Advanced Technology Institute, is "committed to substantially reducing the cost of aging weapon systems," including the costs of sustainment in legacy systems. Learn about this industry-government partnership at dsc.atcorp.org.

Additionally, these covers provide complete protection during the postflight engine washdown procedure of the aircraft while it is secured in the RSD, an operation that previously led to RSD intrusion of engine wash agent.

The Envelop RSD covers are custom manufactured

in red material with integral hazard markings to comply with requisite shipboard aviation and flight deck safety policies and procedures.



M777 lightweight howitzer.

Envelop Covers Hit the Ground

Ken Napier, Senior Adviser, Shield Technologies

Why does the U.S. Army increasingly care about the effects of environmental degradation (corrosion, condensation, heat, sand and dust, ultraviolet rays)? Because upward of 70% of the overall life-cycle ownership costs of major Army programs are attributed to sustainment. Costs are important, but so is readiness. The Army and Marine Corps in particular have equipment and weapons systems on the ground in operational theaters that are in especially abusive environments. Not only do commanders want their gear to work properly, but they don't want their soldiers and marines performing needless hours of preventive maintenance on systems that can be protected with state-of-the-art covers.

Envelop Protective Covers, initially targeted for maritime use, now provides state-of-the-art soft technology covers for ground equipment. The Marine Corps will receive Envelop covers for its M777 lightweight howitzer, and covers are being designed to protect the Army's CROWS (Common Remotely Operated Weapons Station) and C-RAM (Counter Rocket, Artillery, and Mortar).

With Envelop covers, the U.S. Army has the unique opportunity to take advantage of a direct technology transfer from the Navy and significantly impact its major programs with sustainment costs, overall quality, and force-readiness improvements.



Custom Protection

Each cover is custom designed to fit weapons, sensors, and other critical assets. Shield Technologies has designed well over 100 unique covers. Optimum performance and corrosion protection are directly related to proper fit. The potential of corrosion and the effects of environmental damage are much too high to compromise with a “one size fits all” approach.



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Revolutionary Cover Construction Prevents Corrosion

An Envelop cover is a composite structure of four layers that work together synergistically to protect critical assets, thus drastically reducing maintenance requirements and increasing life

expectancy. The multilayer cover protects surfaces by drawing the moisture from underneath the cover and protecting the metal surfaces with EDCs (Electrolyte Displacement Compounds).

Outer Shell

Tough, flexible, waterproof fabric, permeable only to water vapor, allows moisture to evaporate. Traps corrosion inhibitors.

Inner Wicking Layer

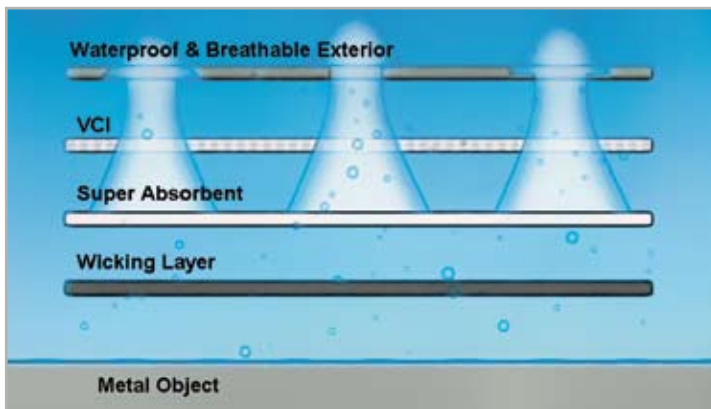
Innermost layer contacts metal surface. Hydrophobic fabric forms a hydrophilic structure and wicks away water from metal surface.

Absorbent Inner Matrix

Superabsorbent material stores water and releases it back to the environment when surrounding air is less than 100% relative humidity.

Corrosion Inhibiting Layer

Layer of corrosion inhibitors conditions the microenvironment beneath cover to reduce corrosion on metal surface.



Operations

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