Not Just a Cover
**Title:** Not Just a Cover

**Performing Organization:** Shield Technologies Corp, 895 Blue Gentian Road, Eagan, MN, 55121

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Standard Form 298 (Rev. 8-98)
Prepared by ANSI Std Z39-18
• Continued deployments are placing stress on unit and equipment readiness

• Higher priced, more sophisticated equipment requires careful lifecycle management

• Traditional methods of protection proved ineffective (Tarps/Shrink Wraps)

• MILCON costs are rising and fixed facilities at home provide no protection when equipment is deployed

• For the past 5 years Envelop Protective Covers has provided the US Military cost avoidance by reducing corrosion and the resulting degradation
The Problem

Individual Existing Corrosion Fighting Solutions Were Inadequate

- **Dehumidification Systems**
  - very expensive
  - cumbersome
  - very effective when RH < 50%

- **Vapor Corrosion Inhibitors**
  - moderate expense
  - hermetic environments required
  - effective if used properly

- **Tarps**
  - potentially inexpensive
  - *not effective*
  - establishes greenhouse effect

Increasing Cost
The Facts

• A 2003 GAO study (GAO-03-753) states that corrosion costs the US Military at least $20 Billion per year

• Corrosion mitigation is the largest controllable maintenance cost in the US Military (GAO-03-753)

• Cost of Corrosion for Army Ground Vehicles is $2.02 Billion per year (Report SKT50T1).

Envelope Covers overcome equipment degradation caused by corrosion
The Search

- The Navy recognized that surface treatments, such as coatings, corrosion inhibitors, oils, surface bonded corrosive resistant materials were not enough............ In addition when standard tarps were used to layer protection in many cases they accelerated corrosion (Greenhouse Effect)

- Initiated a search for a better form of protection that would
  - Act to remove moisture/water from the contained environment
  - Store and subsequently allow for the evaporation of that moisture vapor to the exterior of the contained environment
  - Provide VCI’s into the contained environment to reduce bonding of moisture with metal, electronic and optical equipment
  - Have a long lasting water proof outer cover
  - Not absorb petroleum products

Standard Tarps Enhance Corrosion

Envelop Protection System
The Development

- Envelop Protective Covers were designed in conjunction with the US Military to protect weapons, electrical components, optics, and critical equipment from the harshest environments
  - US Navy Small Business Research Grant (SBIR).

- Reduces degradation caused by Moisture, Heat, UV, Dust and Debris
  - Up to 90% reduction in corrosion
  - Maintains equipment within 10 degrees or less of ambient temperature
  - Reduces dust and sand build up by up to 95%
The Technology

Waterproof & Breathable Exterior

VCI

Super Absorbent

Wicking Layer

Metal Surface, Electrical Connection, or Optical Component
Results – USAF Sheltering Study

• One year long independent study
• Compared shelters, vinyl covers and Envelop Covers
• Envelop nearly 20 times as effective as shelters
• Envelop more than 10 times as effective as vinyl covers
The Results

  - Only approved soft cover for topside weapons and equipment – US Navy
  - Chosen to protect all M777 Howitzers (USMC) and HIMARS Launchers (US Army)
  - Selected by the Apache PM to protect the MTADS

- Proven to keep weapons and equipment functioning in all environments
  - Over 20,000 covers deployed worldwide on US Military weapons and equipment - including use in Iraq and Afghanistan

ROI ranges from 3:1 to over 20:1
The Results – M198 Howitzer

- Camp Lejeune, NC
- 30 day side by side validation

With Envelop Cover

Standard Maintenance
The Results – M2 .50 Cal. Machine Gun

• USS Russell – Pacific Ocean
• Two week validation while underway
• No maintenance performed on either weapon

Protected by Envelop Protective Covering
Protected by Standard Navy Tarpaulins
“These covers were very effective and greatly contributed to the howitzers being used for training in a minimum amount of time. “Busting” rust on the M198 generally takes 1 hour. After removing the covers it took less than 10 minutes. Over a longer period of time the covers would allow us to spend more time training and less time pulling maintenance. “

- SFC USA, Senior Instructor, E 1-78FA

USMC M198 Man Hour Analysis

Envelop Covers save from 2400-2900 Man Hours per year.
“These covers were installed on the howitzer from 12 Dec 07 through 29 Jan 08 without any maintenance being performed or the covers being removed. During this time the temperature ranged from 9 to 73 degrees with varying humidity, rain, 35mph winds, and dirt storms. Upon taking the covers off on 30 Jan 08 the M777A2 had zero rust and required no maintenance. “

- SFC USA, Senior Instructor, E 1-78FA
“Right now, several guns are not being utilized and are covered in the open behind our motor pool. The amount of rust / corrosion is minimal and the protection from the elements is outstanding.. “

- CPT USA, S-4 , 2-11th FA, Deployed in Iraq
<table>
<thead>
<tr>
<th>Asset Description</th>
<th>Initial cost of weapon</th>
<th>Annual Savings with Envelop</th>
<th>Daily Cost Avoidance with Envelop</th>
<th>Cost per day of Envelop Cover</th>
<th>Envelop ROI</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phalanx CIWS OGB</td>
<td>+ $3 million</td>
<td>$28,584</td>
<td>$78</td>
<td>$6</td>
<td>13</td>
<td>Operational cover provides 24/7 protection to vulnerable components of CIWS substantially reducing daily maintenance and repairs.</td>
</tr>
<tr>
<td>Mk96 .50cal</td>
<td>$8,000</td>
<td>$13,871</td>
<td>$38</td>
<td>$1</td>
<td>27.14</td>
<td>Weapon demands 1 hour of corrosion related maint per day. Envelop reduces to 1 hour per week.</td>
</tr>
</tbody>
</table>
The Covers

M777 LW 155mm Howitzer

M109 Paladin
The Covers

HIMARS Crane USMC

Bradley Fighting Vehicle

M1 Abrams – In development
HEMTT Wrecker

- Developed in conjunction with NJNG
- Protects critical maintenance and MT assets
The Covers

AH-64D MTADS

UH-60 Windscreen

Shadow UAS

M230 30mm Gun
• Helps to extends lifecycle on new expensive systems
  • M777 LW 155mm BN costs over $35M
  • MTADS for AH-64D BN costs over 38M

• Reduces Maintenance Costs
  • Repair parts
  • Hazmat
  • Man-hours

• Improves Readiness
  • Fewer equipment malfunctions and failures
  • More time spent training and less time spent on repetitive maintenance
    – Over 70% less corrosion maintenance (USMC M198)
The Opportunity

• Upon request Shield Technologies will personally deliver a protective cover to any unit for Demonstration/Evaluation

• Contact Mark Bechtel or Phil Simoes at Shield Technologies
  • Mark.Bechtel@envelopcovers.com
    – 715.441.0280 (Mobile)