DoD Corrosion Prevention and Control (CPC) Program

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OUSD(AT&L)/CPO
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Overview

- The Law
- Organizational Structure
- Working Integrated Product Teams
The Law
Public Law 107-314 Sec: 1067 [codified in 10 U.S.C. 2228]: Prevention and mitigation of corrosion of military infrastructure and equipment requires that:

- DoD designate a responsible official or organization
- DoD develop a long-term corrosion strategy to:
  - Expand emphasis on corrosion prevention & mitigation
  - Uniformly apply testing and certification for new technologies
  - Collect and share information on corrosion
  - Establish a coordinated R&D program with transition plans

- FY08 National Defense Authorization Act
  - Codified Corrosion Policy and Oversight activities
  - Required annual budget materials report

- FY09 National Defense Authorization Act
  - Required assignment of Military Department Corrosion Prevention and Control Executives
  - Required report to Congress on inserting corrosion planning into the acquisition process
(D) Establishment of a coordinated research and development program for the prevention and mitigation of corrosion for new and existing military equipment and infrastructure that includes a plan to transition new corrosion prevention technologies into operational systems, including through the establishment of memoranda of agreement, joint funding agreements, public-private partnerships, university research and education centers, and other cooperative research agreements.
DoD CPO IEAs

Information Exchange Agreements

✓ Australia
✓ Germany
☐ Canada (October)
☐ United Kingdom (October)
☐ France (November)
CPO IEA Highlights

• Annexed to Mutual Defense Agreements
• Sharing of CPC unclassified Information:
  - Tech Data for CPC approaches to common equipment & facilities
  - Test methods & results
  - Process & procedures
  - Strategies and methods
    ➢ Outreach and communications
    ➢ Training and certifications
The Law 10
U.S.C. 2228

Under Secretary Memo
DoD Strategic Plan
CPC guidebook

DoD Instruction
Organizational Structure
Corrosion Policy, Process, Procedure & Oversight

Working Integrated Product Team (WIPT)
HIGHLIGHTS:

- Engagement on Major Programs -- CPC Plan reviews
- In-Works
  - DFARs: CPC Plan Clause
  - Memo and Instructions: CPC Plan on earlier Milestones
  - Services CPC plan engagement on non-major programs
  - Improved CPC Coverage on Def Acq Guidebook
  - Develop Stds/Manual – portions of CPC Guidebook
Science and Technology
WIPT
Science & Technology

- Develop joint Service roadmap for coordinated S&T
- Establish knowledge base by platform, infrastructures and materials type
- Identify stakeholders
- Maintain summary inventory of CPC S&T projects
- Identify DoD corrosion needs currently not being addressed
- Facilitate obtaining additional or alternate funding for corrosion research
Nearly 500 corrosion R&D project plans submitted since 2005 from Services

- Project costs shared between DoD and Military Services
- Results of R&D project program
  - 236 projects selected in 8 years
  - Over $165 million funded
  - Projected life cycle cost avoidance: ~$9.4 billion
  - Projected return on investment approximately: ~50:1

- ROI Process certified by Gov’t Accountability Office
- Re-verification of ROI assumptions ongoing
Project Selection

- Process Evaluation Selection Team composed of OSD & Joint Staff Corrosion IPT members
- Services provided prioritized projects
- Projects selected based on established criteria
  - Joint emphasis
  - Less than two year performance period
  - New technology
  - Matching/complementary funds
  - ROI based on OMB guidelines
<table>
<thead>
<tr>
<th>Projects</th>
<th>Fiscal Year Code</th>
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<tbody>
<tr>
<td>Corrosion Inhibitive Organic-Based Dust Palliatives</td>
<td>F12AR11</td>
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<tr>
<td>Non-Hex Chrome Wash Primer</td>
<td>W12AR09</td>
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<tr>
<td>Peel and Stick Appliques</td>
<td>W12MC03</td>
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<tr>
<td>Coating Removal Methods</td>
<td>W12MC09</td>
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<tr>
<td>C-130 Non-Chrome Field Test</td>
<td>W12AF02</td>
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<tr>
<td>Corrosion Resistant Applique Adhesive</td>
<td>W12MC04</td>
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<tr>
<td>Assured Impressed Current Corrosion Protection</td>
<td>F12AR03</td>
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<tr>
<td>Vapor-Phase Coatings</td>
<td>F12AR14</td>
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<tr>
<td>Allowable Concrete Crack Widths for Reinforcement Mat</td>
<td>F12NV05</td>
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<tr>
<td>Cathodic Protection Anode Beds</td>
<td>F12NV02</td>
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<tr>
<td>Stress Corrosion Cracking/Corrosion Fatigue on HS Steel</td>
<td>W12NA06</td>
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<tr>
<td>Corrosion Inhibitor for Abrasively Blasted Surfaces</td>
<td>W12MC06</td>
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<tr>
<td>Fluoralpolymer Coated Fasteners</td>
<td>F12AF01</td>
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<tr>
<td>Powder Coat CARC Primer Systems + MC08</td>
<td>W12MC02</td>
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<tr>
<td>High Strength Fastener Certification</td>
<td>W12NS07</td>
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<tr>
<td>Durable Applique Repair Kits</td>
<td>W12MC07</td>
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<tr>
<td>Chromated Pre-Treatments for Steel</td>
<td>W12MC01</td>
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<tr>
<td>Field Repair of Protective Fabric Covers</td>
<td>W12MC05</td>
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<tr>
<td>Advanced CPC with Mildew Inhibitor</td>
<td>W12NA04</td>
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<td>Aviation Components Containers</td>
<td>W12AR10</td>
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<tr>
<td>Non-Destructive Detection of Corrosion Under Coatings</td>
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<tr>
<td>Robotic Thermal Spray Technology</td>
<td>W12NS01</td>
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<tr>
<td>Magnesium-Zinc Rich Primer</td>
<td>W12AR04</td>
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<tr>
<td>Corrosion Resistant Steel Improvements</td>
<td>W12NA05</td>
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<tr>
<td>Improved CARC Coating Transfer Efficiency</td>
<td>W12AR05</td>
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<tr>
<td>Self-Repairing Coating</td>
<td>F12AR12</td>
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<tr>
<td>2-Coat High-Performance Coating System</td>
<td>F12AR06</td>
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<tr>
<td>Condition Based Corrosion Prediction Model for Fuel Dist</td>
<td>F12AR07</td>
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<tr>
<td>Improved Non-Skid Color Topping</td>
<td>W12NS08</td>
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<tr>
<td>Crack Resistant Concrete Repairs</td>
<td>F12NV01</td>
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<tr>
<td>Fiber Reinforced Polymer Composite 3D Grid</td>
<td>F12AR01</td>
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<tr>
<td>Hybrid Composite Bridge Beams</td>
<td>F12AR15</td>
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Science and Technology
Metrics, Impacts and Sustainment

WIPT
Cost Impact
- Studies started in 2005.
- Produces detailed maintenance and corrosion cost information to the weapon subsystem level.
- Includes infrastructure and facilities.
- Includes environmental factors.

Availability Impact
- Studies started in 2010.
- Produces similar detail as the cost studies but measures loss of availability.
- Includes environmental factors.

Safety Impact
- Studies planned for 2012.
# Metrics – Cost of Corrosion

<table>
<thead>
<tr>
<th>Study Year Timeline</th>
<th>Study Segment</th>
<th>Annual Cost of Corrosion</th>
<th>Corrosion as a Percentage of Maintenance</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005-2006</td>
<td>Army Ground Vehicles</td>
<td>$2.0 Billion</td>
<td>14.8%</td>
<td>FY2004</td>
</tr>
<tr>
<td></td>
<td>Navy Ships</td>
<td>$2.4 Billion</td>
<td>19.3%</td>
<td>FY2004</td>
</tr>
<tr>
<td>2006-2007</td>
<td>DOD Facilities and Infrastructure</td>
<td>$1.8 Billion</td>
<td>15.1%</td>
<td>FY2005</td>
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<tr>
<td></td>
<td>Army Aviation and Missiles</td>
<td>$1.6 Billion</td>
<td>18.6%</td>
<td>FY2005</td>
</tr>
<tr>
<td></td>
<td>Marine Corps Ground Vehicles</td>
<td>$0.7 Billion</td>
<td>20.8%</td>
<td>FY2005</td>
</tr>
<tr>
<td>2007-2008</td>
<td>Navy and Marine Corps Aviation</td>
<td>$3.0 Billion</td>
<td>31.5%</td>
<td>FY2005 &amp; FY2006</td>
</tr>
<tr>
<td></td>
<td>Coast Guard Aviation and Vessels</td>
<td>$0.3 Billion</td>
<td>25.5%</td>
<td>FY2005 &amp; FY2006</td>
</tr>
<tr>
<td>2008-2009</td>
<td>Air Force Aircraft and Missiles</td>
<td>$5.4 Billion</td>
<td>32.2%</td>
<td>FY2006 &amp; FY2007</td>
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<tr>
<td></td>
<td>Army Ground Vehicles</td>
<td>$2.4 Billion</td>
<td>14.3%</td>
<td>FY2006 &amp; FY2007</td>
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<tr>
<td></td>
<td>Navy Ships</td>
<td>$3.2 Billion</td>
<td>26.3%</td>
<td>FY2006</td>
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<tr>
<td></td>
<td>All Other DOD Segments</td>
<td>$5.1 Billion</td>
<td>22.1%</td>
<td>FY2007 &amp; FY2008</td>
</tr>
<tr>
<td>2009-2010</td>
<td>DOD Facilities and Infrastructure</td>
<td>$1.9 Billion</td>
<td>11.7%</td>
<td>FY2005</td>
</tr>
<tr>
<td></td>
<td>Army Aviation and Missiles</td>
<td>$1.4 Billion</td>
<td>20.5%</td>
<td>FY2005</td>
</tr>
<tr>
<td></td>
<td>Marine Corps Ground Vehicles</td>
<td>$0.5 Billion</td>
<td>16.6%</td>
<td>FY2005</td>
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<tr>
<td>2010</td>
<td>Total DOD Annual Corrosion Cost</td>
<td><strong>$22.9 Billion</strong></td>
<td><strong>23.0%</strong></td>
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Using Corrosion Baseline Studies to Attack Corrosion Impacts

- Focusing on the top 10 corrosion cost and availability drivers for each model/design/series weapon system
- Determining the optimum blend of preventive and corrective corrosion maintenance
- Supporting decisions regarding the appropriate level of corrosion-related maintenance (field-level or depot-level)
- Identifying and assessing cross-Service or cross-platform issues (e.g., rotary wing corrosion issues across all Services)
- Selecting corrosion projects
- Influencing Science and Technology efforts
SPECIFICATIONS/STANDARDS & PRODUCT QUALIFICATION WIPT
Specs, Standards & Qualification

Link to Product Information Sheet and Specification Search Tool.
3,000+ CPC related Specs & Stds reviewed

Current Focus:
- MIL-STD-7179 – Finishes, Coatings & Sealant Specs
- MIL-S-5002 – Surface Treatments & Inorganic Coatings
- MIL-F-18264 – Organic Finishes Guidance Specs
- MIL-HNDK-1250 – CPC for Electronics & Assemblies
- MIL-HNDK-1568 – Materials and Processes
- MIL-HDBK-1587: Materials & Processes Requirements
- MIL-STD-1530: Aircraft Structural Integrity Program

Planned for FY12-FY13:
- MIL-STD-889: Dissimilar Metals
- MIL-STD-1783: Engine Structural Integrity Program
FACILITIES
WIPT
Facilities

Emphasis on Jointness

- Inter-Service Policy Development
- Technical Guidance
- Implementation of Innovative CPC Technologies
- Identification of Unique Facility Issues
- Training and Certification
- Sustainment Strategy and Cost Factors
## Matrix of Facilities

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<tbody>
<tr>
<td>CPC Projects FY 05-11</td>
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<tr>
<td>Utilities, Piping Systems &amp; Storage, Above Ground</td>
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<td>Utilities, Piping Systems &amp; Storage, Below Ground</td>
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<tr>
<td>Utilities, Piping Systems &amp; Storage, Direct Burial</td>
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<td>Buildings, Including Roofing</td>
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<td>HVAC Systems</td>
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<td>Roads, Airfields, Grounds</td>
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<td>Bridges &amp; Other Structures</td>
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<td>Piers &amp; Waterfront Structures</td>
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<td>Munitions Storage</td>
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OUTREACH & COMMUNICATIONS
WIPT
Communications & Outreach

- CPC Publications
  - CPC Guidebook – number of hits/downloads on website
  - Corrosivity Handbook
  - Program Manager’s Handbook
  - E-Magazine

- Video/Podcasts

- Websites
  - CorrDefense.org
  - CorrConnect.org (Training courses: industry/public)
  - DAU
Latest issue of CorrDefense magazine now on Web
CorrDefense Visits

The U.S. – 106,666 visits
The rest of the world – 46,976 visits
.mil addresses – 8,641 visits
Other ads – 145,001 visits

153,642 total visits over the past 3+ years
Educate yourself about corrosion.

Learning the kinds and causes of corrosion, and techniques on how to prevent, control and mitigate it is the first step in combating this process.

View all Courses  View News Articles

Access our compendium of resources about corrosion. Watch videos, perform interactive experiments and play games to learn about corrosion from the chemical, operational and economic standpoints.

- Be the first to know about emerging corrosion combating technologies.
- Perform interactive experiments and play games to learn about corrosion.
- Access and download technical documents and other reference materials.
- Communicate with authors, vetting authorities and other points of contact.

Corrosion Comprehension: Operating in Corrosive Environments

This video talks about how an environment affects the rate of degradation of materials. It introduces the quantitative measure of the reaction of a material to its operating environment, known as the ESI or the Environmental Severity Index. The ESI of DOD bases around the world are enumerated and explored.

Winner of the 2012 Telly Awards for Non-Broadcast Production in Education and Non-Broadcast Production in Government Relations

Principal Writers

[Images of principal writers]
DAU website
TRAINING & CERTIFICATION
WIPT
The Training WIPT identifies people who need corrosion training and certification, defines training and learning level objectives, develops curricula, and implements training and certification programs. This course you are taking was developed and implemented by the Training WIPT.

2,760 Graduates!
Training & Certification

Continuous Learning Modules In Development

- Polymers*
- Ceramics*
- “Introduction to Cathodic Protection”*
- “Advanced Cathodic Protection”*
- Coatings: Concrete, Tanks, and Splash Zones
- Architectural Coatings
- Fifteen CPC (non-accredited) College level courses

Videos of corrosion at three levels of learning: Knowledge, Comprehension, and Application*

* Now available in CorrConnect
Training and Certification

CorrConnect
CPC SCORM Compliant Courses

- News updates
- Courses
  - Cathodic Protection 1 & 2
  - CLM 038
  - Polymers
  - Ceramics
  - Coatings 1-2
- CPO
- University Akron Projects
- MVE
- Simulations & Tools
  - CorrSim
- Community
Training & Certification

UNIVERSITY OF AKRON UNDERGRADUATE
CORROSION ENGINEERING DEGREE

- College-level Engineering Modules
  - Engineering Principles for Control of Corrosion
  - Corrosion Management
  - Corrosion Material Technologies
  - Etc..

- Working towards Defense Acquisition University accreditation for DoD Acquisition workforce
Questions?