Corrosion Prevention and Control Program at Corpus Christi Army Depot

Army Corrosion Summit
February 9, 2010

John Macha
CCAD Material and Process Engineering Division
CPC Program Co-Manager
**1. REPORT DATE**
09 FEB 2010

**3. DATES COVERED**
00-00-2010 to 00-00-2010

**4. TITLE AND SUBTITLE**
Corrosion Prevention and Control Program at Corpus Christi Army Depot

**5a. CONTRACT NUMBER**

**5b. GRANT NUMBER**

**5c. PROGRAM ELEMENT NUMBER**

**5d. PROJECT NUMBER**

**5e. TASK NUMBER**

**5f. WORK UNIT NUMBER**

**6. AUTHOR(S)**

**7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)**
U.S. Army Corpus Christi Army Depot, Material and Process Engineering Division, 308 Crecy Street, Stop 28, Corpus Christi, TX, 78419

**8. PERFORMING ORGANIZATION REPORT NUMBER**

**9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)**

**10. SPONSOR/MONITOR’S ACRONYM(S)**

**11. SPONSOR/MONITOR’S REPORT NUMBER(S)**

**12. DISTRIBUTION/AVAILABILITY STATEMENT**
Approved for public release; distribution unlimited

**13. SUPPLEMENTARY NOTES**
2010 U.S. Army Corrosion Summit, Huntsville, AL, 9-11 Feb

**14. ABSTRACT**

**15. SUBJECT TERMS**

**16. SECURITY CLASSIFICATION OF:**

<table>
<thead>
<tr>
<th>a. REPORT</th>
<th>b. ABSTRACT</th>
<th>c. THIS PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>unclassified</td>
<td>unclassified</td>
<td>unclassified</td>
</tr>
</tbody>
</table>

**17. LIMITATION OF ABSTRACT**
Same as Report (SAR)

**18. NUMBER OF PAGES**
12

**19a. NAME OF RESPONSIBLE PERSON**

---

Standard Form 298 (Rev. 8-98)  
Prescribed by ANSI Std Z39-18
Outline

- Background
- Concerns/Issues
- Significant Actions
- Future Plans
Concerns/Issues

Background: Need to effectively process and store aerospace materials (some particularly susceptible to corrosion) in a marine environment conducive to aggressive atmospheric corrosion rates.

• Main Issues
  – Proper Practices
  – Aircraft Components
  – Facilities
Practices

• Revision of D.05 Process Standard: In Process Preservation of Ferrous and Non-Ferrous Parts
  – Guided by Cleaning and Corrosion Control TM (1-1500-344-23)
  – Selected preservative application based on parameters
    • Environment (indoors, indoors w/environmental controls, etc)
    • Duration of protection required (days, weeks, etc)
• Training of personnel—both initially planned and as issues arise. Examples include:
  – Periodic STAR4D training to increase quality/efficiency of coatings (primers/paints)
  – AMCOM CPC personnel training of MFG/Process Production Div (preservative application)
  – MPED “informal” training of personnel (paint shop, QC inspectors)
Components—Issues

- Certain parts can never be unprotected
- Indoor temperature/RH fluctuations (10°F/30%)
- Upon induction, parts routed to multiple processing stations
- Idle time dictated by shop workload, “pull”
Components—Current Actions

- Ongoing investigation/trial of VpCl
  - Bags
  - Films
  - Desiccants
- Vapors form passivating layer of ions on metal surface
- Trial parts bagged after initial inspection, then processed, unwrapped/inspected at each stop
  - Favorable initial results
  - Targets susceptible parts where preservative removal is not optimal
  - Long term: large-scale use as preservative supplement/replacement
Components—Current Actions

- Protective covers for outdoor use
  - Outdoor storage not ideal, sometimes unavoidable
  - Transport carts contain parts ranging in size, applied preservative
  - Cover system is multi-layer; includes waterproof, moisture wicking, CI layers
  - Still in initial phases; large scale incorporation upon successful trials
Future Plans—Components

- Expansion of Tagnite coating application to more shop areas/potential replacement for Type VI chromic acid brush-on for magnesium
- Prototype Type VII PMB media for topcoat/primer removal from magnesium without touching Rockhard coating
- Initial testing of VpCI MIL-PRF-87937, Type IV Aircraft Cleaning Compound in Airframes Cleaning
Facilities—Issues/Activities

- 2 million ft$^2$, 50 year-old main production facility
- 10 year, 9 phase replacement plan
- As with processed components, environment significantly accelerates facility degradation
- Cooling tower/test cell circulation systems of particular concern
- Better communication with industrial engineering, incorporating materials selection into facility projects (heat exchangers)
Future Plans—Facilities

• Possible implementation of dehumidification technologies for storage/production areas presenting greatest corrosion issues

• Use of internal corrosion monitoring systems to optimize chemical treatment/life of cooling tower/engine test cell pipelines

• More widespread use of VpCl emitters for electrical/toolboxes
Conclusions

- Local corrosion issues originate from combination of susceptible materials and detrimental environment
- Solutions often require action across several fields (material/regulatory/personnel)
- Future initiatives focus on process improvements, but proper training/adherence to new procedures essential for lasting effect