

USAFE/PACAF Corrosion Surveys

16 August 2011



**Capt Mary Gutierrez
Lead Corrosion Engineer
AFCPCO
AFRL/RXSSR**

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 16 AUG 2011		2. REPORT TYPE		3. DATES COVERED 00-00-2011 to 00-00-2011	
4. TITLE AND SUBTITLE USAFE/PACAF Corrosion Surveys				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Air Force Corrosion Prevention & Control Office (AFCPCO),AFRL/RXSSR,325 Richard Ray Blvd, Bldg 165,Robins AFB ,GA,31098				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 Presented at the 2011 Air Force Corrosion Conference held 16-18 Aug 2011 at Robins AFB, GA.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 33	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



Overview



- **Focus**
- **Team Members**
- **Survey Areas**
- **USAFE Itinerary**
- **USAFE Observations/Recommendations**
- **PACAF Itinerary**
- **PACAF Observations/Recommendations**
- **Summary**



Focus



- **AUTHORITY**

- Formerly AFI 21-105, Air and Space Equipment Structural Maintenance, 9 April 2003
- Now AFI 20-114, Air and Space Equipment Structural Management, 7 June 2011

- **PURPOSE**

- Evaluation of MAJCOM's corrosion program
- Assessment of condition of aircraft and equipment w/respect to corrosion
- On-site technical assistance and information exchange

- **APPROACH**

- Evaluation using AF and command instruction/T.O. guidance
- Emphasis on survey and not inspection
- Sound corrosion control materials and processes while complying with environmental restrictions



Team Members



USAFE

CARL PERAZZOLA, AFCPCO

CMSGT RONALD ALLISON, AFCPCO

MSGT ROBERT THIMM, **HQ USAFE**

OWEN JETT, AFCPCO (SKT, CMSGT RET)

MAC MCKENNA, AFCPCO (SKT, CMSGT RET)

MARK FOLEY, AFCPCO (SKT, SMSGT RET)

RUTH JETT, AFCPCO (SKT)

PACAF

CARL PERAZZOLA, AFCPCO

CAPT MARY GUTIERREZ, AFCPCO

CMSGT RONALD ALLISON, AFCPCO

MSGT STEVE HOLSINGER, **HQ PACAF**

DENNIS DOUGLAS, **HQ PACAF** (CMSGT RET)

OWEN JETT, AFCPCO (SKT, CMSGT RET)

DAN MARS, AFCPCO (SKT, CMSGT RET)

WES BARFIELD, AFCPCO (SKT)

JOE LEONE, AFRL CO-LOCATE



Survey Areas

- **Paint / Corrosion Control**
- **Structural Maintenance**
- **Wash Rack**
- **AGE Facilities**
- **Haz Mart**
- **Quality Assurance**
- **Flight Line Sampling / Support Sections**
- **Phase & Isochronal Phase Docks**
- **Plans & Scheduling**
- **Wheel & Tire**
- **Hydraulics**
- **Avionics**
- **Ammunition**
- **Armament**
- **Munitions**
- **Training**
- **Vehicle Maintenance**
- **Environmental Mgt**



USAFE Itinerary



- MORON AB, SPAIN 8 Dec 08
- LAJES FIELD, AZORES* 9-11 Dec 08
- SPANGDAHLEM AB, GERMANY* 15-16 Dec 08
- RAF LAKENHEATH, UK* 8-9 Jul 09
- RAF MILDENHALL, UK* 10 Jul 09
- AVIANO AB, ITALY* 13-14 Jul 09
- RAMSTEIN AB, GERMANY* 16-17 Jul 09

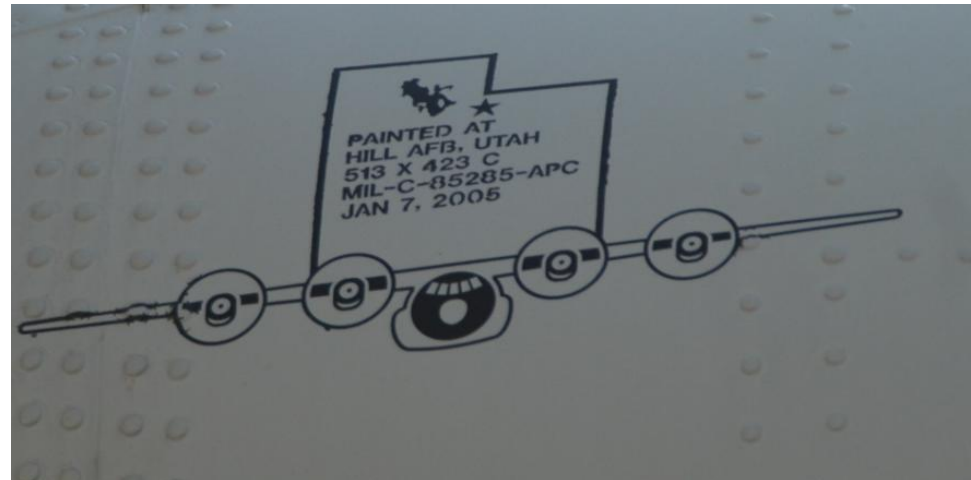
***Previous USAFE survey locations**



Observations

Paint/Corrosion Control

- Facility requirements require plans for future operations...present infrastructure requires validation for potential upgrade/replacement
- Good use of vacuum sanders, gun cleaners, approved materials
- Effective rotation of personnel amongst corrosion and structural sections
- No APC available for touch-up or full paints
 - APC is called out as topcoat for APC treated aircraft (identified in paint block)





Observations

Paint/Corrosion Control

- **Recommendations:**
 - Utilize aircraft down-time for max touch-up
 - WCMs be proactive in work-center materials / processes and work alongside QA to ensure program success
 - Procure TO-approved materials for touch-ups and ensure they are readily available in work centers





Observations

Structural Maintenance

- **Recommendations:**
 - Continue to research, procure, use appropriate materials





Observations

Aircraft Wash Rack

- Using good approved materials & processes...however, better materials are available (wash pads (melamine) & more aggressive soap – MIL-PRF-87937, Types 1 & 4)
- Good use of approved soaps, wash pads, other authorized materials
- **Recommendations:**
 - Ensure roles and responsibilities are clearly defined to personnel...local A/C specific brief recommended





Observations

AGE/GSE

- AGE program not as robust as A/C wash and paint program
- In place scoring systems could be used more effectively
 - Lack of touch-up program or CPC usage
 - Lack of repainting due to limited resources (manpower, money, facilities)
- **Recommendations:**
 - Ensure corrosion is addressed during periodic maintenance
 - Procure TO-driven materials such as two-component aerosols, SEMPENS, and hard-film CPC's for protection
 - Sheltering for equipment has been proven to reduce corrosion
 - Consider increased use of paint contracts (Aviano great prgm)





Flight Line

- Overall, a
- Recommended
 - Spot
 - board

Wheel & Tire

- Several
- Good practice
- Recommended
 - Ensure

WARNING

Provide adequate ventilation and specific respiratory and personal protective equipment as determined by bioenvironmental engineer or industrial hygiene office when using paint removers. Avoid breathing vapor and skin contact.



- (1) Strip paint using stripper meeting the corrosion and embrittlement requirement of paint stripper per Table 1-2.
- (2) If paint stripper with an oil seal is used, a detergent solution or solvent may be required to remove the oil.

SECTION III INSPECTION

2.9 VISUAL INSPECTION.

Visual inspection shall be accomplished at each tire change. Prior cleaning is required. Paint stripping is optional.

- Inspect wheel visually for cracks or indication of cracks. A four or five power magnifying glass may be used to aid in inspection. If any questionable indications are found, the wheel must be cleaned, stripped of paint, and inspected using **Fluorescent Penetrant Inspection (FPI)** per Table 1-2,

CAUTION

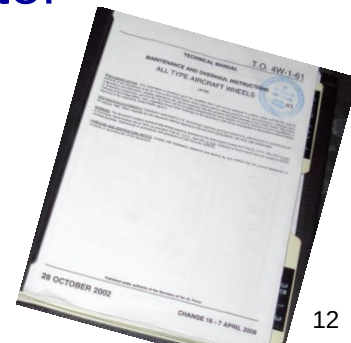
Do not use wire brush to assist paint removal.

- (3) Deionized water rinse (spray or immersion) immediately following chemical stripping.
- (4) Force air-dry or wipe dry immediately following rinse.
- c. Option in lieu of paint stripper. Paint may be removed by dry **abrasive blast** per Table 1-2. Dry abrasive blasting of aluminum and magnesium shall be limited to **plastic media** or **grain** per Table 1-2. If using plastic media on aluminum components, the following additional requirements shall apply:
 - (1) Web thickness of wheel component must be at least 0.031 inch.
 - (2) **Plastic media** per Table 1-2, with a maximum barcol hardness of 62 (approximate MOH hardness of 3.5 or less) may be used.
 - (3) Plastic media with a maximum grit size of 12 may be used.
 - (4) Blast with a stand-off distance of 12 inches and a nozzle to surface angle of approximately 60 degrees.
 - (5) Maintain gun pressure below 60 psi. Gun pressure is measured at the gun. Keep exposure to absolute minimum to remove paint residue.
 - (6) Remove all dust particles and media residue. A deionized water rinse (spray or immersion) may be used.
 - (7) Force air-dry or wipe dry immediately following rinse.

cross the

hers
actor-

OS





Observations

Armament

- Lack of paint program
- **Recommendations:**
 - Develop a pervasive maintenance painting program
 - Ensure only TO-driven materials used



Hydraulics

- Generally good use of qualified/approved materials



Observations



Ammo/Trailer Maintenance

- Generally good corrosion awareness throughout workcenters
- **Recommendations:**
 - Procure/use authorized materials for painting/touch-ups
 - Ensure trailers are incorporated into AGE paint program
 - Use TO 35-1-3 to establish a wash program

TO 35-1-3

TECHNICAL MANUAL

**CORROSION PREVENTION AND CONTROL,
CLEANING, PAINTING, AND MARKING
OF USAF SUPPORT EQUIPMENT (SE)**



Observations



HAZMAT Pharmacy

- Material approval/certification process lacking
- TO requirements not validated in approval/recert process, allowing procurement of unauthorized materials
- **Recommendations:**
 - Haz Mart open house to MX community to show-case availability of approved materials
 - Add verification to certification process (include QA for TO validation)



Observations

Avionics

- General lack of awareness or usage of avionics-grade CPCs
- Lack of awareness of contents of TO 1-1-689, Vol I, III, V
- **Recommendations:**
 - Publicize success stories of CPC usage in avionics systems
 - Use of TO approved spot cleaners



Vehicle Maintenance

- Civilian/DoD/MOA adds continuity to ensure effective program
- Units doing lots of organic repairs, while sending needed work downtown



Observations



Training

- **Recommendations:**
 - WCM develop local conditions oriented supplemental trg

Quality Assurance

- Very effective follow-up inspections of CCIs
- MSEP effectively addresses corrosion-related maintenance



PACAF Itinerary



- Yokota AB, Japan* 17 – 19 Feb 10
- Osan AB, Korea* 22 – 23 Feb 10
- Kunsan AB, Korea* 24 – 25 Feb 10
- Kwang Ju, Korea (Det 1 607 MMS) 26 Feb 10
- Suwon, Korea (Det 2 607 MMS) 01 Mar 10
- Kadena AB, Japan* 08 – 10 Jun 10
- Andersen AFB, Guam 14 – 15 Jun 10
- Elmendorf AFB, AK* 17 – 18 Jun 10
- Hickam AFB, HI* 23 – 24 Jun 10

***Previous PACAF survey locations**



Observations

Paint/Corrosion Control

- Good assortment of paints
- Limited supply of APC...paint AME with APC to match A/C
- Quality of facility, tools, equipment varied widely
- Good supply of portable vacuum sanders and units
- Good use of CPCs
- Good identification of blaster materials usage...improved tracking system for media change requirement
- Painting/touch-up program is not being fully utilized

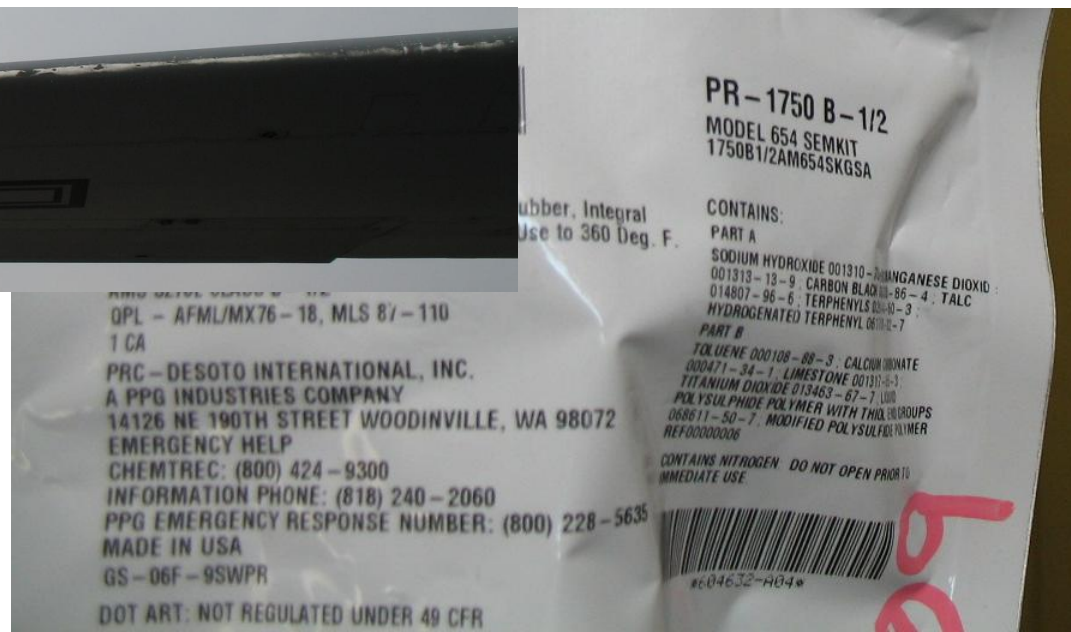




Observations

Paint/Corrosion Control

- Recommendations:
 - Rollers for touch-up applications
 - Sempens for all paint colors
 - Establish local OI for corrosion operations
 - Develop continuity books





Observations

Wash Racks

- Good supply of PPE and materials storage
- Overall good quality in washes-- performance depends on factors such as indoor vs. outdoor, contractor knowledge, and post inspection
- Excellent use of contractors for aircraft washing
- Overall quality of work looks good
- Good selection of soaps--ensure correct mixing ratio
- **Recommendations:**
 - Use hot water in all locations
 - Investigate soaps for best performance and environmental mix





Observations

Haz Mart Pharmacy

- Good supply of approved soaps, CPCs and materials
- Good understanding and use of SLED (SLES) system
- Outstanding use of temperature controlled environment for sealants and paints in tropical environments
- Excessive quantity levels of some materials
- **Recommendations:**
 - Haz Mart open house to MX community to showcase availability of approved materials





Observations

Wheel & Tire

- **Recommendations:**
 - Use Calla 296 for parts washer
 - Use PRF-680 for bearing washer
 - Smaller units share resources



Avionics

- **Recommendations:**
 - Establish paint program with fabrication flights across the command—good project for PACAF working group on corrosion



Observations

Phase Support & HSC

- Good supply of airframe grade type I and II CPCs
- Work cards generally easily accessible and broken out well





Observations



Plans and Scheduling

- Shared resource meetings have effective communication and positive feedback
- Washes effectively tracked, overdues well documented when in PDM or heavy maintenance
- Command Functional very involved in wash program throughout command

Quality Assurance

- Reviewed MSEP program - robust program
- **Recommendations:**
 - QA perform PEs on QAEs



Observations



Training

- Initial and recurring training requirements inconsistent throughout command
- Validate initial newcomers corrosion training requirements with CAF and MAF
- Ensure recurring corrosion training on annual cycle per AFI 21-101
- Develop local conditions oriented supplemental training per AFI 21-101



Observations

AGE

- Overall improved condition as compared to last MAJCOM survey
- Ensure proper mix ratio for soaps
- Preventive maintenance program lacking
- Limited CPC supply and usage





Observations

AGE

- **Recommendations:**
 - Procure Sempens in all colors for touch ups
 - Obtain hot water...most effective process
 - Investigate performance and environmental mix for soaps
 - Utilize WRM while inspecting/repairing severe in-use units
 - Zinc-Rich primer (MIL-PRF-26915) for bare metal prepped AGE
 - Paint touch-up of welding joints
 - Fog units with CPC before deployment to severe locations





Observations

Trailer Maintenance

- Very limited touch up capability
- **Recommendations:**
 - Work with WCM to obtain proper wash soaps
 - Use bearing washers for effective bearing repack



Hydraulics

- **Recommendations:**
 - Use Calla 602 LF and ensure proper soap amount and water temperature for foaming issues



Observations

Armament

- Good CPCs and lubricants available
- **Recommendations:**
 - Establish paint program with fabrication flights across the command—good project for PACAF working group on corrosion



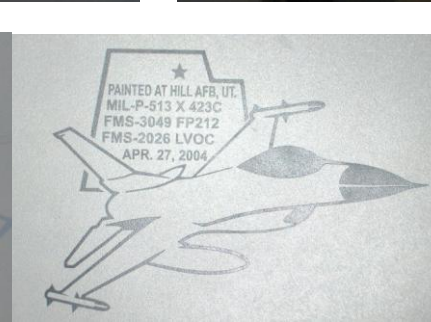
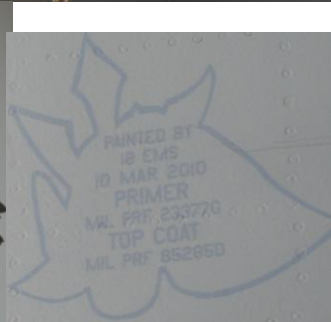


Observations



Flightline Sampling

- Overall C-17 paint systems in poor condition - need aggressive APC touch up
- Overall paint system in good condition for all other airframes
- Paint blocks incorrect/insufficient – Add paint blocks, don't remove!





Summary



- **USAFE** aircraft in very good condition with few exceptions
- AGE USAFE-wide requires attention
- New weapons systems bring new corrosion control challenges, requiring constant scrutiny of materials and processes
- Must work with program offices and OEM's to ensure cross-flow of communication and future success
- **PACAF** has greatly improved corrosion program with a focused effort on teamwork since last survey
- Recommend participation in aircraft CPABs & AF Corrosion Conference...Recommend MXG support \$\$
- Recommend WCM's review AFCPCO website and ensure active corrosion program throughout MXG



Questions?



- AFCPCO
- “AFRL/RXSSR” in the Global
- afcorr@robins.af.mil
- DSN 468-3284
- AF Portal, Search for RXSSR

