



Army ESD Efforts

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Report Documentation Page

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Army ESD Accomplishments

- Training complete at Anniston Army Depot (ANAD)
- Training session held at ARL attended by:
 - Boeing – Philadelphia
 - Sikorsky
 - Johns Hopkins University
 - Johns Hopkins Applied Physics Lab (APL)
- ANAD has completed repair of M1A1 Cannon Cradle
- CCAD has identified none rotating parts to be considered for ESD repair

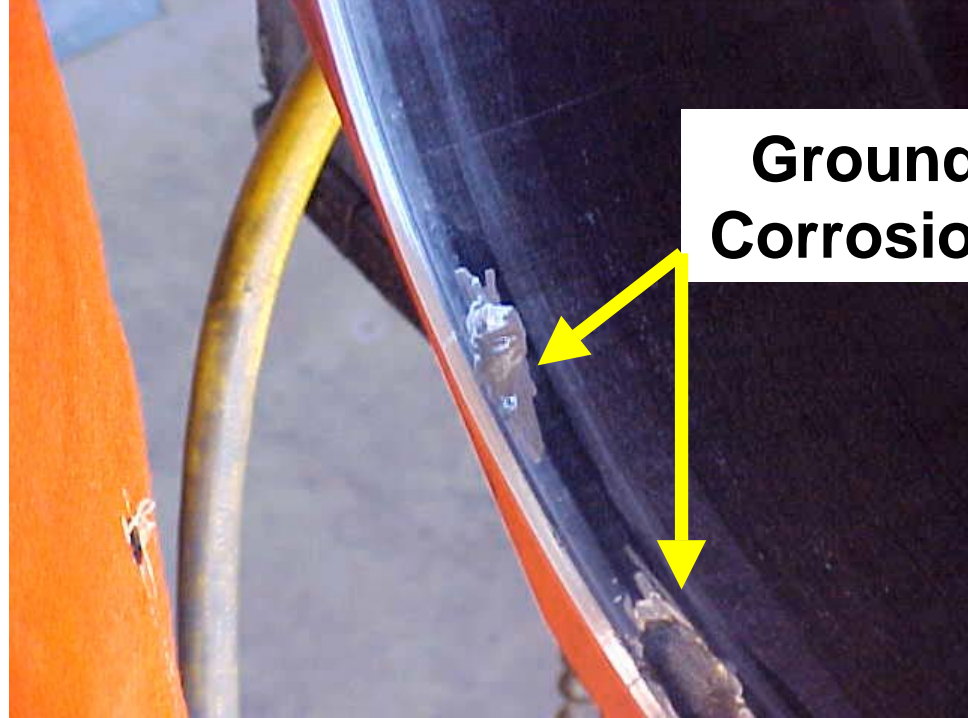


M1A1 Cannon Cradle Repair

- Large corrosion pits in chromed part
1/8" by 3/8" – 0.060" deep
- Build up pits with base material, 4130 steel
- Part cost approximately \$25K
- 75 damaged parts in storage
- Reclamation procedure has engineering approval
- Candidate parts list being reevaluated based on training and success with cradle repair



M1A1 Cannon Cradle Repair



**Ground Out
Corrosion Pits**



**Build up
in
Progress**



**Repaired Area
After Plating**

Success Story – Electrospray Deposition

The Problem:

- M1A1 Abrams Tank Gun Cradle Corrosion
- No Ability to Repair Large Pits
- Cradles in ~ 10% of Tanks Overhauled are Defective
- Deeply Corroded Cradles are Discarded



The Program:

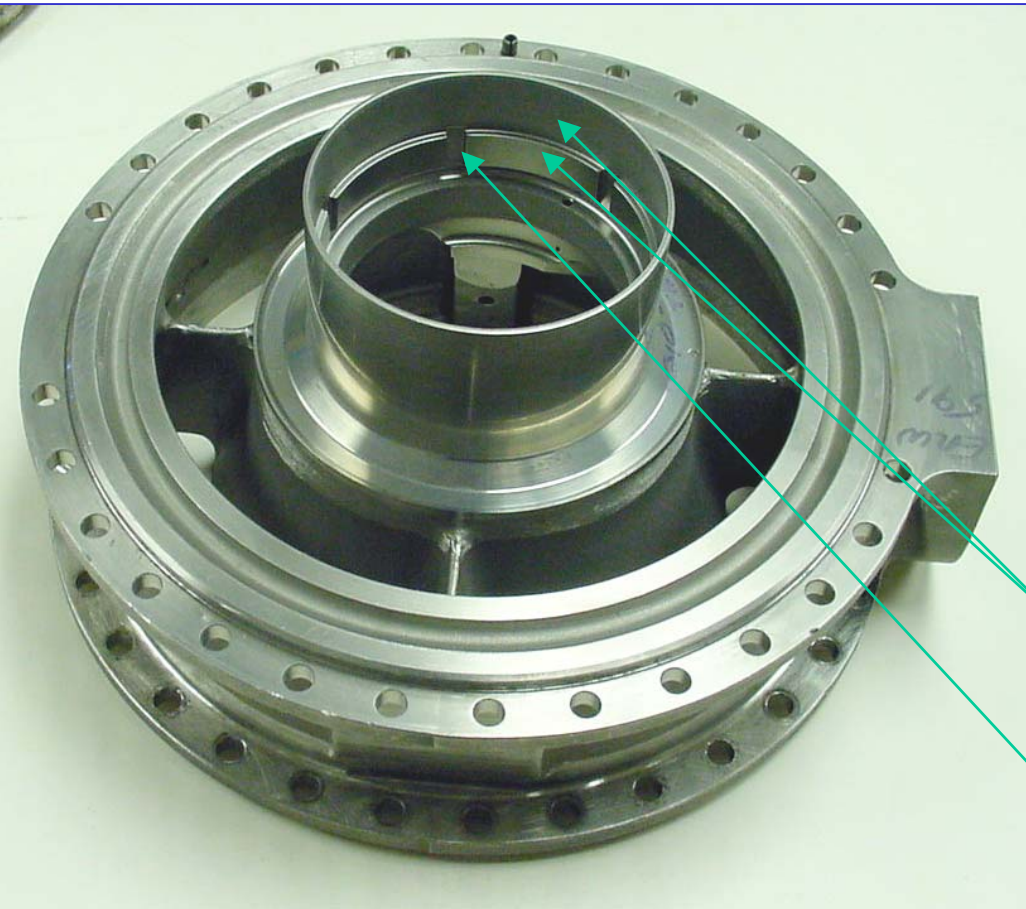
- Electrospray Deposition Process for Chromium Extended under SERDP
- Under Dem/Val in ESTCP
- Process Adapted by Anniston Army Depot to Repair Gun Cradles
- Process Implemented as Process PMD-03-39

Payoff:

- Reclamation of Serviceable Gun Cradles
- Cost Saving of \$360K per year at Anniston
- Cost of Cradle = \$25K
- Cost of Repair = \$770.00



M1 Intermediate Compressor Housing



- **Chrome plating performed in very localized areas**
- **Very complex geometry for HVOF thermal spray**
- **Ideal for ESD**

Chrome-plated areas

No coating allowed



TACOM/TARDEC

- Repair of flaws in Cr plating of 4130 rod
- Valve seat resurfacing
- Drive shaft yoke
- Examining list of applications being considered for laser repair
- Revising list of candidate parts based on successful experience with cradle repair



Technical

- Primary Technical Requirements
 - Wear
 - Corrosion resistance
- POCs
 - Tony Pollard, ANAD
 - Roger Wood TACOM-TARDEC
 - Jeremy Turner, ANAD



AMCOM/CCAD

- CCAD Dir Engineering Services is interested
- AMCOM/AMRDEC are decision making authorities
- T700 Stage 2 Blisk
- SH-60 Landing Gear
- Additional T700 Components



AMCOM/CCAD Technical

- Technical Requirements
 - Fatigue testing laboratory repair simulations
 - Endurance testing
 - Corrosion & wear (Cr repair applications)
- POCs
 - Kirit Bhansali AMRDEC Ch, Materials
 - Jim Holiday, CCAD Industrial Engr Div
 - Elaine Lambert, CCAD Materials Lab



ARL Support

- AMCOM & TACOM Applications
 - Define performance criteria
 - Develop test protocol
 - Execute lab and component testing
- Materials Characterization
- R&D Unique Coating Applications
 - HVOF/HVAF/Cold Spray/ESD



ARL Planned Efforts

- Metallurgical Characterization
 - HAZ
- Mechanical
 - Fatigue testing
- Corrosion
- Wear Resistance