

Joint Cadmium Alternatives Team (JCAT)

Overview of Projects
March 2005

Erin Beck

NAVAIR – Patuxent River, MD

Phone: 301-342-6183

E-mail: erin.beck@navy.mil



JCAT Overview of Projects

- The purpose of the JG-PP/ESTCP Joint Cadmium Alternatives Team (JCAT) is to identify and validate alternatives to cadmium for DoD weapon systems and NASA applications.
- The JCAT includes technical representatives from a variety of DoD organizations and from OEMs responsible for manufacturing DoD weapon systems who share their expertise about electroplated cadmium.
- The JCAT defines the functional properties of electroplated cadmium, the substrates and components to which it is currently applied, and the properties of candidate alternative coating systems.
- The JCAT began April 12, 1999 when technical representatives from NAVAIR, NAVSEA, NASA, AFMC, ARDEC, U.S. Marine Corps, NUWC, ARL, Boeing, AMCOM, TACOM, CECOM, NSWC, and JG-PP met to discuss technical issues regarding integrating cadmium replacement projects into a coordinated joint services program.

JCAT Overview of Projects

Coating Evaluation Efforts

- Cadmium Alternatives for Corrosion and Lubricity Applications
- Screening of Cadmium Alternatives
- Cadmium Alternatives for Landing Gear and Structural Components
- Cadmium Alternatives for Fasteners
- Cadmium Alternatives for Electrical Connectors
- Cadmium Alternatives for Springs

JCAT Overview of Projects

“Joint Test Report BD-R-1-1 for Validation of Alternatives to Electrodeposited Cadmium for Corrosion Protection and Threaded Part Lubricity Applications” October 2002

- Participants: Joint services, NASA, OEMs, CTC (NAVAIR/AFRL lead)
 - POCs: Erin Beck (NAVAIR), Major Allmann (AFRL), Joe Osborne (Boeing)
- Alternatives evaluated
 - ◆ Sn-Zn
 - ◆ alkaline Zn-Ni
 - ◆ Boeing Zn-Ni
 - ◆ IVD Al
- Results
 - ◆ IVD Al, alkaline Zn-Ni, Boeing Zn-Ni recommended to replace cadmium on low strength steel components
 - ◆ IVD Al, Boeing Zn-Ni, Sn-Zn are candidates to replace cadmium on high strength steel components
 - ◆ Brush Zn-Ni is recommended repair on cadmium and alternatives in this evaluation

JCAT Overview of Projects

“Testing Cadmium Plating Alternatives” March 2003

- Participants: AFRL (lead), NAVAIR, CTC
- Alternatives evaluated
 - ◆ Boeing Zn-Ni
 - ◆ Dacromet 320L
 - ◆ Dacromet 500B
 - ◆ Geomet L
 - ◆ Al-Mn
 - ◆ TigerPlate
 - ◆ Alumiplate
 - ◆ SermeTel 984/985
 - ◆ Zn-Ni-P
 - ◆ Zn-Ni-SiO₂
- Controls:
 - ◆ Cd
 - ◆ IVD Al
- Also evaluated Trivalent Chromium Posttreatment (TCP)
- Results:
 - ◆ SermeTel 984/985, Boeing Zn-Ni, Alumiplate most viable
 - ◆ Dacromet and Geomet coatings performed poorly
 - ◆ Others require more R&D and/or scale-up

JCAT Overview of Projects

“High Strength Steel Joint Test Protocol for Validation of Alternatives to Low Hydrogen Embrittlement Cadmium for High Strength Steel Landing Gear and Component Applications” July 2003

- Participants: Joint Services, OEMs, CTC (NAVAIR/AFRL lead)
 - ◆ POCs: Erin Beck (NAVAIR), Major Tim Allmann (AFRL)
- Alternatives being evaluated
 - ◆ Boeing Zn-Ni
 - ◆ Sn-Zn
 - ◆ Alumiplate
 - ◆ Sputtered Al
 - ◆ Al-Mn
 - ◆ Brush Zn-Ni (repair)
 - ◆ Brush Sn-Zn (repair)
 - ◆ Sermetel 249/273 (repair)
- Controls:
 - ◆ LHE Cd (tank and brush)
 - ◆ IVD Al
- Status:
 - ◆ Phase I tests underway
 - ◆ Phase II tests to begin summer 2005
 - ◆ Phase III tests planned for FY07
 - ◆ Field tests

JCAT Overview of Projects

“High Strength Steel Fastener Joint Test Protocol for Validation of Alternatives to Electrodeposited Cadmium for High Strength Steel Fastener Applications” March 2004 (draft)

- Participants: Joint Services, OEMs (NAVSEA/NAVAIR lead)
 - ◆ POCs: Tony Eng (NAVSEA), Erin Beck (NAVAIR)
- NAVSEA preliminary field tests
- Revised JTP draft planned ?
- JTP execution planned ?
- This effort is unfunded for FY05
 - ◆ Need to identify customers

JCAT Overview of Projects

“Joint Test Protocol J-02-EC-001-P8 for Validation of Corrosion Prevention Alternatives for Military Electrical Connectors” January 2004 (draft)

- Participants: Joint Services, OEMs, CTC (ARL/NAVAIR lead)
 - ◆ POCs: Michael Miller (CTC), Erin Beck (NAVAIR)
- Revised JTP draft planned ?
- JTP execution planned ?
- F-35 Lockheed Martin/Amphenol effort
- SAE AIR 5919
 - ◆ SAE planned to choose alternative for “W” finish connectors 10/04
 - ◆ No alternative met all performance criteria in MIL-DTL-38999
 - ◆ Task team formed to evaluate more alternatives

JCAT Overview of Projects

Cadmium Alternatives for Springs

- No JCAT efforts underway at this time

Questions?