

DoD Metal Finishing Workshop Out-brief

Hydraulic & Pneumatic Actuator
Break-out Session

22 May 2006

General Comments

- Replacement of Cr plating is the highest priority for actuator community, but is not a terribly high priority at all. Replacement of Cd, Ni, & Cr⁺⁶ is much lower on the priority list.
- Applications for Cr plating include piston ODs, cylinder IDs, and various linkage pins, etc.
- Cr plating is used to impart wear resistance and, in some cases, corrosion resistance. Key properties include surface finish and wear resistance.
- Cr plating is performed both in house and extramurally. Regulatory compliance is not deemed to be a big issue.
- Implementation barriers for alternative coatings include cost, lack of a centralized engineering authority, and lack of understanding of characteristics of the alternative coatings.

Remaining Needs for Cr Plating Replacement

- A. CURRENT & LONGER TERM NEEDS?
 - HVOF good for ODs, but still need solutions for IDs/NLoS (for dimensional restoration/ wear resistance) where plasma Tribaloy isn't suitable
- B. LOW HANGING FRUIT?
 - HVOF on piston ODs
 - OEMs already beginning to implement
- C. DATA, VALIDATION, TESTING, APPROVAL NEEDS?
 - Data for HVOF on ODs probably sufficient, but likely will require some focused testing for specific actuators before approval will be granted (e.g., specific configurations, loading conditions, & materials compatibility)
 - OEM support helps approval process within DoD

Remaining Needs for Cr Plating Replacement

- **D. WHAT NOT HAPPENING & WHY?**
 - No clear impetus for change based on cost-benefit analysis
 - Cost of complying with current regulations is acceptable
 - Performance improvement not big enough
 - Legacy aircraft reaching retirement age before positive payoff obtained
- **E. RDT&E NEEDS? WHICH ORGS NEED WHAT?**
 - Development/maturation of ID processes
 - Lower cost solutions (e.g., cheaper raw materials, cheaper final finishing)

Remaining Needs for Cr Plating Replacement

- F. BROAD BARRIERS / MISSING KNOWLEDGE?
 - Specs & standards
 - Funding for RDT&E and implementation
 - Knowledge of options by engineers & managers
 - Need stronger drivers for change!
 - Need to educate all levels of management re: policy & associated organizational direction
 - Need \$ & directives @ Program Manager level

Impact of New & Imminent OSHA / EPA / EU Regulations

- Lack of full understanding of regulatory requirements & the true cost of complying with them. (e.g., plating baths are compliant, but what about PPE, etc., for the entire facility?)
- Understanding & cost differs from location to location.
- Elimination of Cd, Ni, & Cr+6 is not high on the priority list for the actuator community, but the actuator community will follow as other communities implement changes.