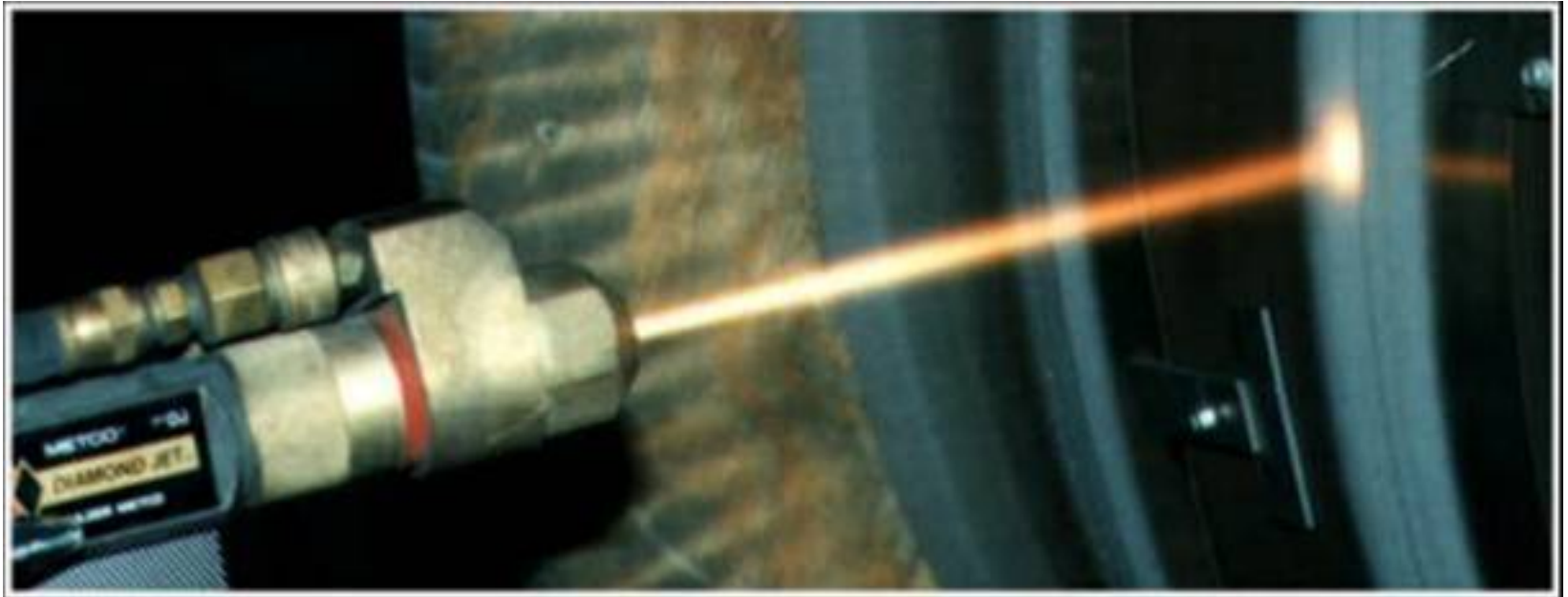


Hard Chrome Alternatives for Hydraulic Components



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Hard Chrome Alternatives for Hydraulic Components

- Rig Testing
 - Completed
 - C-130 rudder actuator
 - C-130 ramp cylinder
 - C/KC-135 main landing gear actuator
 - C/KC-135 aileron snubber
 - A-10 aileron actuator
 - B-1 horizontal stab actuator
 - T-38 aileron actuator



Hard Chrome Alternatives for Hydraulic Components

- Rig Testing
 - In progress
 - F-15 Pitch/Roll Channel Assembly (PRCA)
 - KC-135 Ruddevator – Using a Tungsten Carbide Cobalt Chrome Coating
 - KC-135 Ruddevator – Using a Tungsten Carbide Chromium Carbide Nickel Coating (Nickel Binder)



Hard Chrome Alternatives for Hydraulic Components

- Service Testing
 - In progress
 - C/KC-135
 - C-130
 - Two year plan, with mid-term option to terminate



Hard Chrome Alternatives for Hydraulic Components

- C/KC-135 Service Test includes:
 - Snubbers (2 units)
 - Main Landing Gear Actuator (2 units)
 - Main Landing Gear Door Actuator (2 units)
 - Ruddevator Actuator (2 units)



Hard Chrome Alternatives for Hydraulic Components

- C/KC-135 Service Test (cont)
 - Installation at MacDill AFB was completed April 2006
 - There has been no failures or issues reported.



Hard Chrome Alternatives for Hydraulic Components

- C/KC-135 Service Test (cont)
 - Installation at Grand Forks AFB was completed February 2006
 - The MLG Actuator being tested at Grand Forks AFB, was removed due to corrosion on the cylinder and a bearing problem. Neither of these failures were coating related.



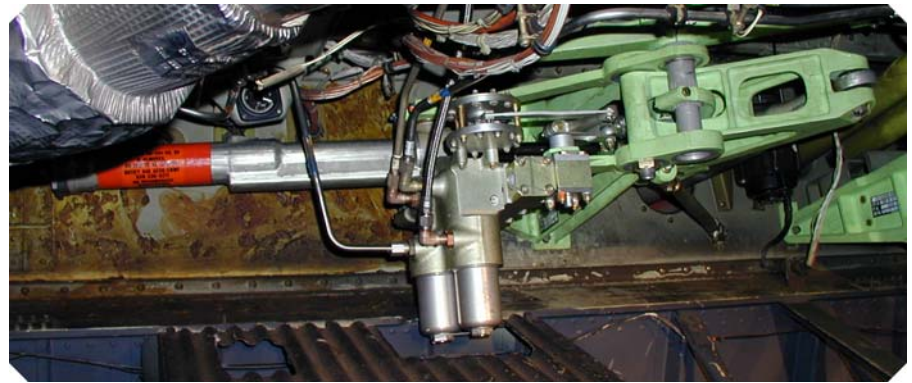
Hard Chrome Alternatives for Hydraulic Components

- C-130 Service Test includes:
 - Rudder Actuator (1 unit)
 - Aileron Actuator (1 unit)
 - Elevator Actuator (2 units)
 - Ramp Actuator (2 units)
 - Aft Cargo Door Actuator (2 units)



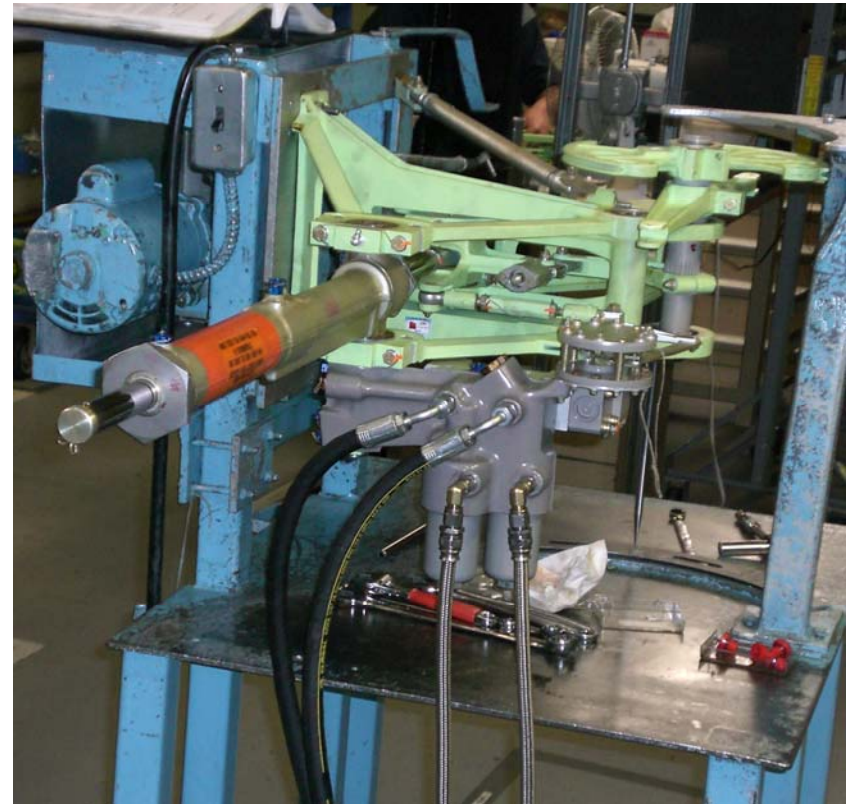
Hard Chrome Alternatives for Hydraulic Components

- C-130 Service Test (cont)
 - Installation at Little Rock AFB completed June 2006
 - There has been no failures or issues reported.



Hard Chrome Alternatives for Hydraulic Components

- C-130 Service Test (cont)
 - Installation at Delaware ANG completed July 2006
 - The Rudder Booster Actuator installed at Delaware ANG was removed due to the left rudder pedal sticking at the full left position. This failure is not believed to be coating related but analysis is in progress.



Hard Chrome Alternatives for Hydraulic Components

- Phase 4 – Implementation
 - B-1 Horizontal Stabilizer drawings updated, TOs under review by 448 ACSG/ENWF (formerly OC-ALC/LGERC) to prepare for implementation at overhaul
 - Component repair drawings for the C-130, C-135, and A-10 have been completed (ARINC and 448 ACSG/ENWF)
 - Implementation strategy under discussion with AF internal Technical Review Boards (TRBs), OEMs, SPOs (e.g., configuration issues, part numbers, etc.)



Hard Chrome Alternatives for Hydraulic Components

- Summary
 - 1 Actuator (B-1 Horizontal Stabilizer) has completed qualification testing and is ready for implementation.
 - 6 Actuators (C/KC-135 Aileron Snubber, A-10 Aileron, C/KC-135 MLG, C-130 Rudder Booster, T-38 Aileron and C-130 Ramp Cylinder) have successfully completed rig testing.
 - 8 C/KC-135 Actuators (MLG, MLG Door, Aileron Snubber, Ruddevator) were installed on two C/KC-135's for service testing.
 - The MLG actuator installed at Grand Forks AFB was removed from testing.
 - 8 C-130 Actuators (2 Ramp Cylinders, 2 Aft Cargo Door Cylinders, 2 Elevator Boosters, 1 Aileron Booster, and 1 Rudder Booster) were installed on two C-130's for service testing.
 - The Rudder Booster installed at Delaware ANG was removed from testing.
 - F-15 PRCA is on contract for rig testing and is approaching completion.
 - KC-135 Ruddevator Boost Assembly using the tungsten carbide cobalt chrome coating is on contract for rig testing and is approaching completion.
 - KC-135 Ruddevator Boost Assembly using the nickel binder coating is on contract for rig testing.
 - Numerous additional actuators will be considered for similarity pending successful completion of rig and service testing described above.

