Naval Advanced Amorphous & Thermal Spray Coatings Installed Successes

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Standard Form 298 (Rev. 8-98)  
Prescribed by ANSI Std Z39-18
Thermal Spray in the Navy

- Mil-Std-1687A “Machinery element Repair & Restoration”
- Used since 1980 controlled by SEA 05P24
- Naval Shipyards Norfolk, Portsmouth & Pearl Harbor have small capability
- Naval Center of Excellence closed at Puget Sound Naval Shipyards
- Aircraft Coatings at NADEP’s: Jax, North Island & Cherry Point
  - Landing Gear
  - Hydraulic Cylinder Chrome Replacement
USS Saipan LHA-2
Hydraulic Steering Rams

- Installed WC Hastelloy coating
- RAMS after 6 years at Sea
- No Gouging or Leaks
- Mirror Finish
- No Maintenance

RAMS Before
- Hard Chrome Peeling
- Surface Gouging Present
- Prone to Hydraulic Leaks
Nuclear Cooling Pump Casing

- Prone to Wear & Erosion Bearing Surfaces
- Installed HVOF Bronze Coating
- Corrected Problem
- Returned Pump to Service Quickly
- Fraction of Cost of New Pump
- New Pump is a Long Lead Time Item > 36 months
LCAC Lift Fan Repair

- Prone To Salt Water Pitting
- Corrosion in High Vibration Environment
- WC Hastelloy Coating
- No Corrosion after 5 years of Service
- Significant Reduction In Fleet Maintenance
Thermal Spray Processes

Oxy-Fuel

- Oxy-Fuel Wire
- Oxy-Fuel Powder
- HVOF

HVOF Portable Robotic System
Thermal Spray Processes (contd)

**Electric**
- Electric Arc Wire
- Plasma
- PTA Welding
Naval Advanced Amorphous Coatings Program

- Provide Significant Improvement to Non Skid for all Ships
- 75% Carrier Flight Deck Non Skid Replacement due to Corrosion
- Tests Confirm Significant Improvements in Coefficient of Friction and Corrosion Resistance
- Installed on Several Test Ships including Carrier 4.5 Acre Flight Decks
Applications

• Periscope Tube Reclamation
• Cylinder Refinish
• Valve Body Rebuild
• Valve Tappet Refinish
• Gate Valve Rebuild
• Ball Valve Refinish
Trident Submarine
Titanium Ball Valve
Refurbishment

- Trident Sea Water Ball Valve Replaced Every 18 months Due to Corrosion
- Replacement Spare Source Industrial Base Not Available
- Refurbishment using Alumina Titania Ceramic Nano Coating Applied (Proprietary)
- Refurbished Balls installed 8 years ago
- No Maintenance No Corrosion
- All Submarine Valves Now Required to be Refurbished with Nano Ceramic Coating.
Alumina Titania Nano Ceramic Coating
Rated SUB-SAFE
for All Submarine Valves

4000 Cycle Test No Failures
Where Could the US Army Use These Rugged Coatings?

- M-1A2 Abrams Tank Treads Pin Wear Out Replacement after 600 miles
- Rust Corrosion on Bogie Wheels and Tank Top & Sides
- Bradley Fighting Vehicle Treads Pin Wear Out Replacement after 800 miles
- Repairs Could be Done In Depots or Contractor Repair Centers
2009 Medium Truck Program
Procurement of Next Generation of 114,000 Tactical Vehicles

• Use of Certified Robotically Controlled Thermal Spray Installation to
  – Eliminate Corrosion
  – Improve Reliability
  – Engine/Transmission Component Improvement- Reducing Breakdowns

• Installation Should Be at Winning Contractor Plant Not an After Thought

• Required by Vehicle Specification by TACOM & MARCORSYSCOM
United States Army Corps of Engineers Facilities

- Benefits: Reduced Ownership Cost & Increased Reliability
- Canal Locks Valves & Lock Mechanism
- Pumps & Pump Housings
- Dredge Pump & Mechanical/Hydraulic Components Life Improvements
USACE Hopper Dredge
Weir Hydraulic Piston Rod
Chrome Plating
Replacement

Before Condition
Dredge 25 Foot Long
Hydraulic Piston Rod
Chrome Replacement

- Chrome Plating Heavily Pitted or Missing
- Required Smooth Piston Surface with 20 - 30 Ra Finish
- Chrome Replaced by Thermal Sprayed Austenitic Stainless Steel & Machined Tol. .002 In
- Expected Coating Life Greater than 15 Years
Conclusion

“Improved Reliability & Lower Operating Cost Is What Our Certified Thermal Spray Products & Installation Can Do For You”

Thank You!

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