

Naval Advanced Amorphous & Thermal Spray Coatings Installed Successes



James P Collis
A&A Company
Navy Certified Thermal Spray
Corrosion Control Consultant
(727) 584-2936
www.thermalspray.com

Robert Rigney
A&A Company
Technical Director
Navy Certified Thermal Spray Expert
(908) 561-2378
www.thermalspray.com

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE FEB 2009	2. REPORT TYPE	3. DATES COVERED 00-00-2009 to 00-00-2009	
4. TITLE AND SUBTITLE Naval Advanced Amorphous & Thermal Spray Coatings Installed Successes		5a. CONTRACT NUMBER	
		5b. GRANT NUMBER	
		5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)		5d. PROJECT NUMBER	
		5e. TASK NUMBER	
		5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) A&A Company Inc, 2700 South Clinton Avenue, South Plainfield, NJ, 07080		8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)	
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited			
13. SUPPLEMENTARY NOTES 2009 U.S. Army Corrosion Summit, 3-5 Feb, Clearwater Beach, FL			
14. ABSTRACT			
15. SUBJECT TERMS			
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	
			18. NUMBER OF PAGES 17
			19a. NAME OF RESPONSIBLE PERSON

Thermal Spray in the Navy



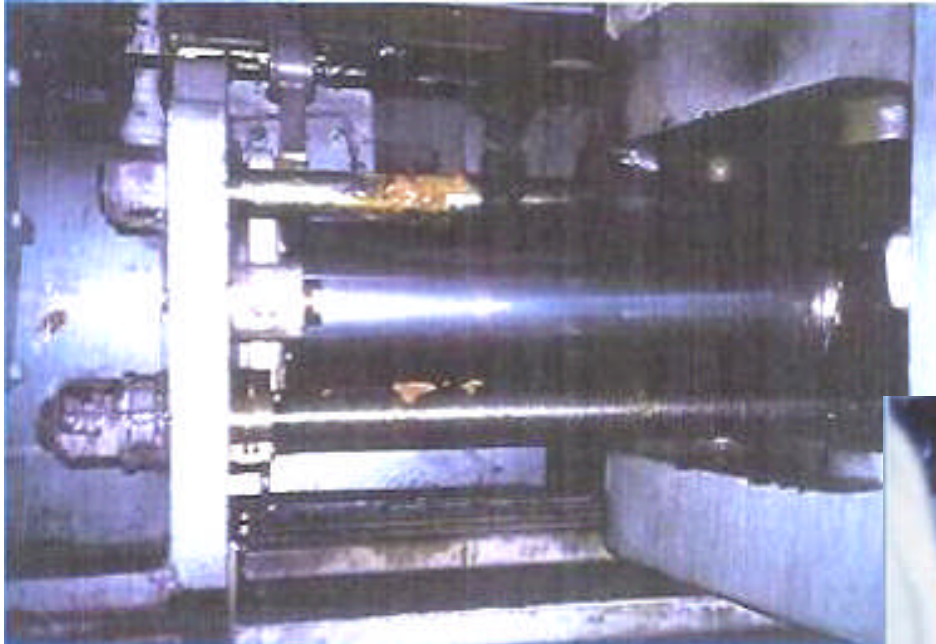
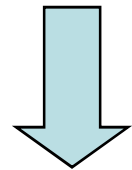
- **Mil-Std-1687A “Machinery element Repair & Restoration”**
- **Used since 1980 controlled by SEA 05P24**
- **Naval Shipyards Norfolk, Portsmouth & Pearl Harbor have small capability**
- **Naval Center of Excellence closed at Puget Sound Naval Shipyard**
- **Aircraft Coatings at NADEP’s: Jax, North 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

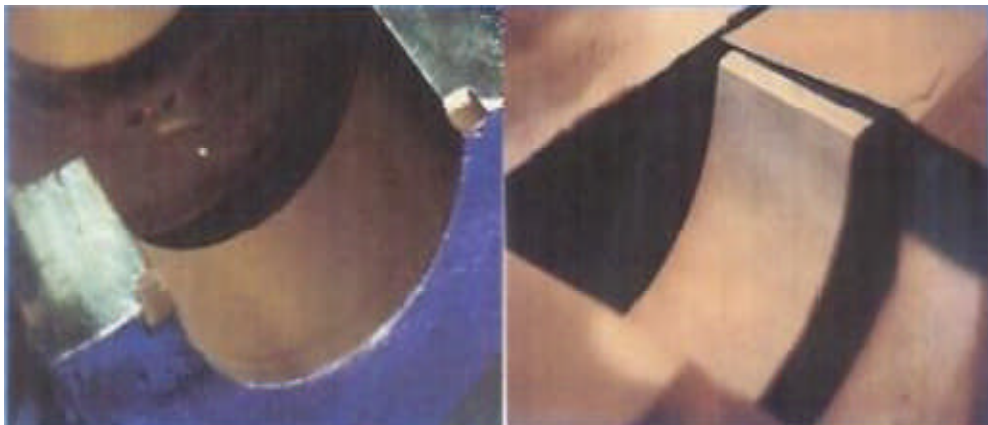




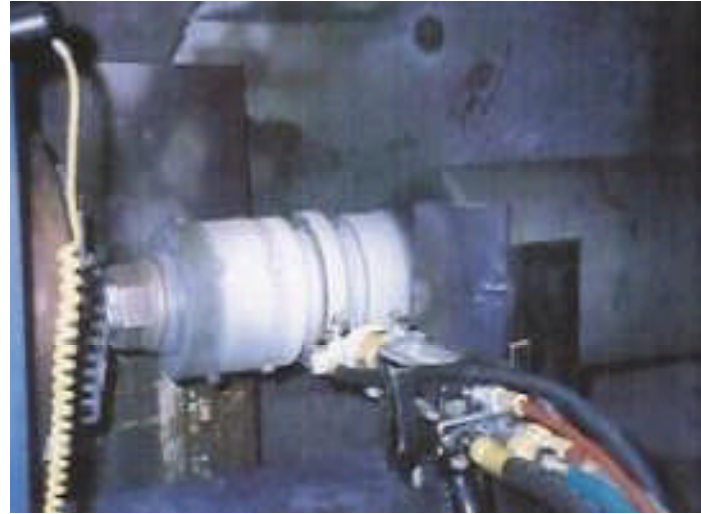
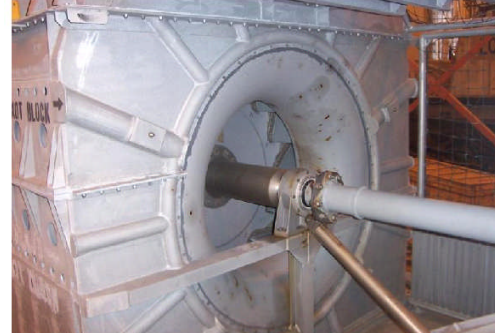
Nuclear Cooling Pump Casing



- 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



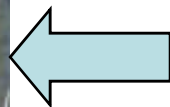
- Prone To Salt Water Pitting Corrosion in High Vibration Environment
- WC Hastelloy Coating
- No Corrosion after 5 years of Service
- Significant Reduction In Fleet Maintenance

Thermal Spray Processes



Oxy-Fuel

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



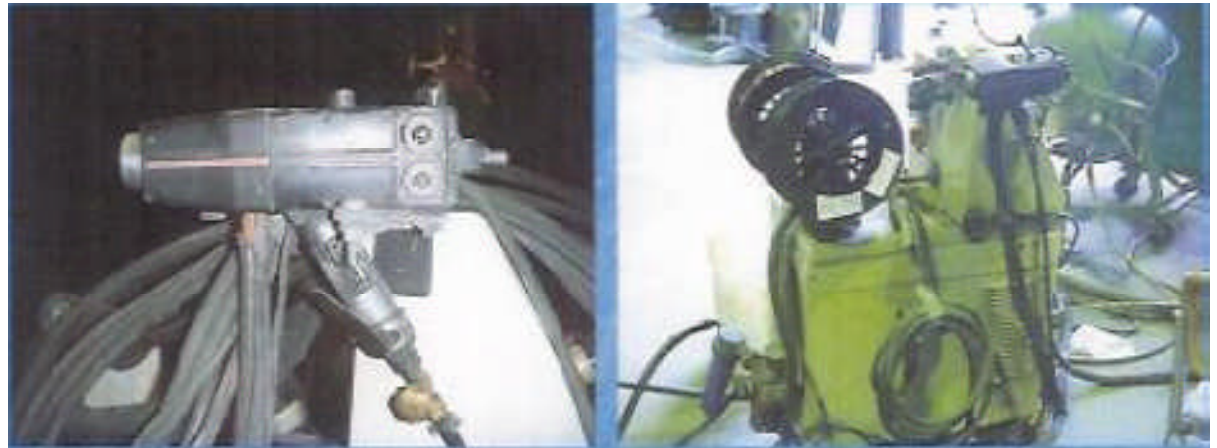
HVOF Portable Robotic System

Thermal Spray Processes (contd)



Electric

- Electric Arc Wire
- Plasma
- PTA Welding



Naval Advanced Amorphous Coatings Program



NAAC Non-Skid 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

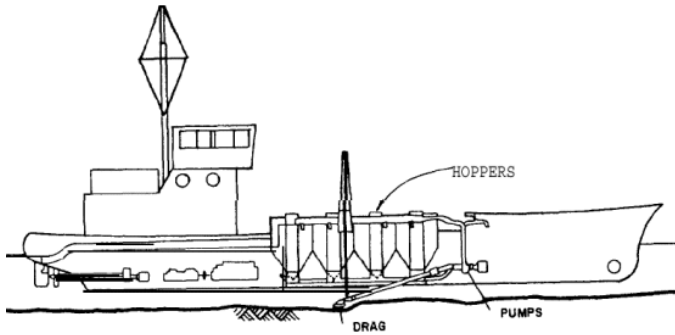


- **Benefits: Reduced Ownership Cost & Increased Reliability**
- **Canal Locks Valves & Lock Mechanism**
- **Pumps & Pump Housings**
- **Dredge Pump & Mechanical/ Hydraulic Components Life Improvements**

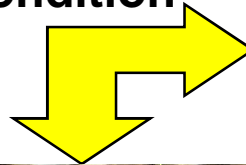




USACE Hopper Dredge Weir Hydraulic Piston Rod Chrome Plating Replacement



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!

**A&A COMPANY INC.
2700 SOUTH CLINTON AVENUE
SOUTH PLAINFIELD, NJ 07080
(908) 561-2378
Website: www.thermalspray.com**