

# **NAVAL SEA SYSTEMS COMMAND**

## **COATINGS & CORROSION CONTROL TECHNICAL AUTHORITY UPDATE**



### **NATIONAL SHIPBUILDING RESEARCH PROGRAM**

**March 2008**

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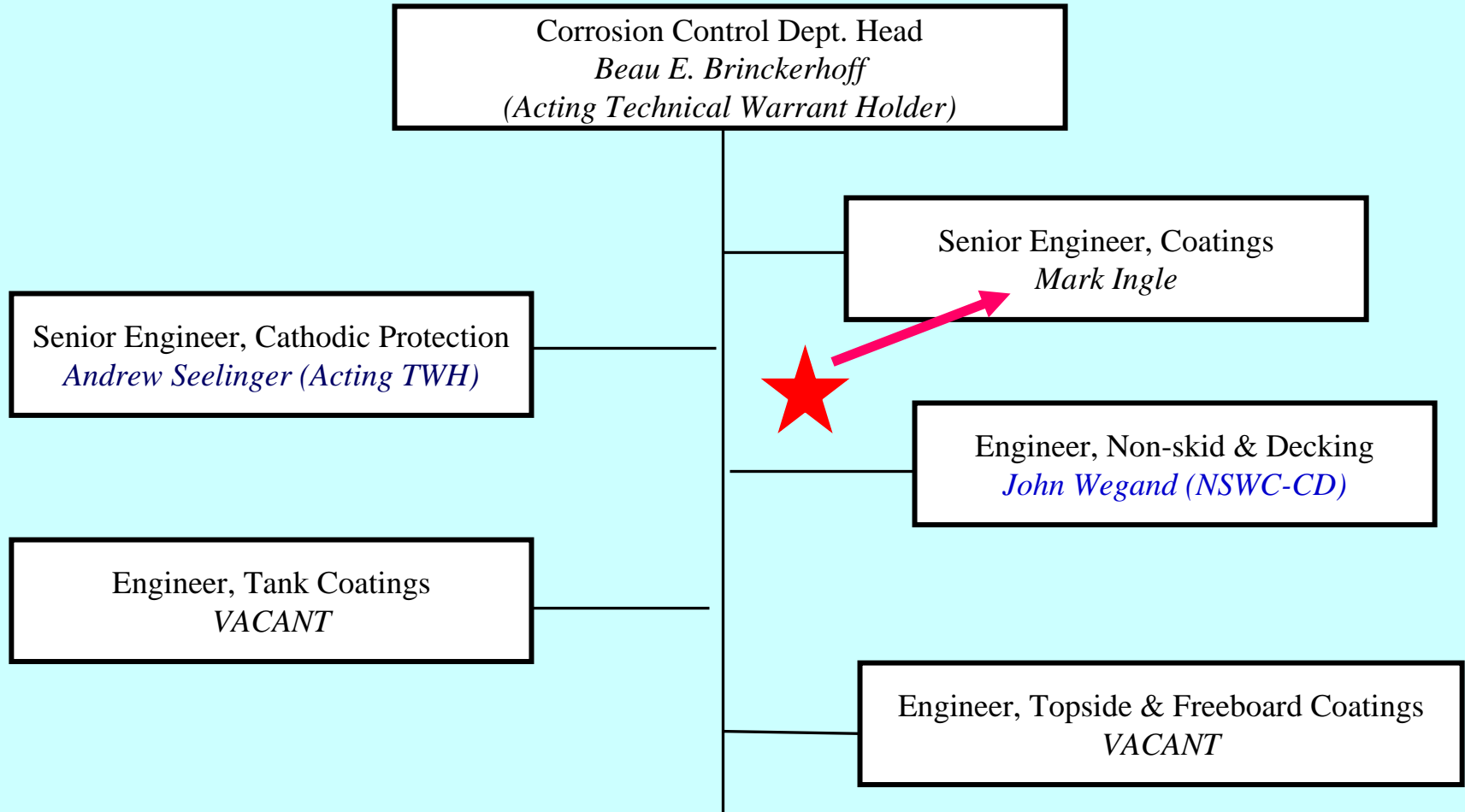
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# OBJECTIVES

- **Summarize Naval Sea Systems Command (NAVSEA) reorganization and changes in key coatings & corrosion control staff.**
- **Summarize NAVSEA progress toward reducing coating application costs:**
  - **Standard Item 009-32 as a Universal Paints Requirements Document.**
  - **Cumbersome Work Practices tasks:**
    - **Delete Stripe Coat.**
    - **Rapid Cure, Single Coat.**
    - **Induction Heating Coating Removal.**
    - **Paperless QA & QA Tools.**
- **Summarize NAVSEA documentation improvements & updates:**
  - **Paint Task Force.**
  - **Specification Update (Paint Conformance Testing).**
- **Discuss potential future NRSP Research Projects:**
  - **Retention of Flash Rust.**
  - **Retention of Preconstruction Primer.**



# SHIP INTEGRITY & PERFORMANCE (SI&P) Corrosion Control & Coatings Organization



Pre-decisional

# Universal Paints Requirement Document

- **Navy currently applies coatings to ships in accordance with:**
  - **NSTM 631 – Submarines & carrier maintenance painting & ship’s force painting.**
  - **Standard Item 009-32 – Contract painting on surface ships & selected work on carriers & submarines.**
  - **Submarine Maintenance Manual (631-081-015) – Submarine ship’s force & yard maintenance painting.**
  - **New construction contract, RCOH contract, other contracts.**
  
- **Reducing training, planning, and implementation costs associated with use of multiple documents.**
  
- **Plan to use Standard Item 009-32 as the Universal Paints Requirements document already initiated:**

<b>Document</b>	<b>Status</b>	<b>Goal</b>
<b>NSTM 631</b>	<b>Final updates complete &amp; approved. NSWC-SSES completing final document</b>	<b>Baseline requirements document Guidance for ship’s force painting.</b>
<b>Standard Item 009-32</b>	<b>NAVSEA update complete, Change Notice to be issued, carriers and submarines to use documents by 30 Sept. 2008</b>	<b>Standard document used for maintenance painting.</b>
<b>SMS 631-081-015</b>	<b>Key issued added to Standard Item 009-32</b>	<b>Convert to support ship’s force</b>
<b>Contracts</b>	<b>No change to existing contracts</b>	<b>Incorporate new paint concepts.</b>

# Cumbersome Work Practices

- NAVSEA forum initiated in the late 1990's to address cumbersome practices that could be engineered out of processes.
- Outcomes of cumbersome practices include:
  - Modification of practices/requirements that are redundant, un-needed, archaic, etc.
  - Improved practices within existing requirements.
  - New technology to achieve goals.
- Effort re-invigorated in 2007 as cooperative effort between SEA 04 (Shipyards) and SEA 05 (Engineering). Effort focused on eight key areas to achieve results in FY-08:
  - Rapid cure, single coat tank paints.
  - Delete stripe coat from high-solids tank paints.
  - Induction heating to remove paint.
  - Improved paint QA/QC tools.
  - *UT to replace RT.*
  - *Wear ring resurfacing.*
  - *Submarine Inspection.*
  - *Improved NDT tools.*

# Single Coat Preservation System

Portsmouth Naval Shipyard / SEA 05P23

## Problem:

Ultra-high-solids coatings require three coats (i.e., primer, stripe coat, and top coat) = Excessive Labor.

Legacy coatings require 24-hours between coats and seven days before service, for total process time of 14 days.

## Solution:

Single-coat system based on application of a single color of paint, during a single coating evolution in the tank, with multiple passes of the paint gun.

Cure time only one to three hours before touchup and one day before service for total, nominal process time of two days.



## Accomplishments:

SEA 05 issued new PPI 63101-001E2 on 18 Jan 08 with latest info for using Single Coat System – Products listed on QPL for seawater service.

Single Coat demonstrated on USS SAN FRANCISCO (SSN-711) and on USS OAK HILL (LSD-51) – one year seawater service.



## Bottom Line:

PNSY projected, potential cost reduction:

- Submarine - \$210K / availability
- Carrier – \$840K / availability

# Delete Stripe Coat

## Puget Sound Naval Shipyard / SEA 05P23

### Problem:

Legacy coatings retain 30% thickness on edges, stripe coat required to establish minimum required coating thickness. UHS coatings retain about 70% thickness on edges, may be able to delete stripe coat; replace stripe coat process with Objective Quality Evidence (OQE) on paint application.

### Solution:

Eliminate the stripe-coat requirement for UHS, with seawater applications initially, then all UHS systems. Add additional OQE checks of flat areas in close proximity to edges to ensure minimum coating thickness obtained.

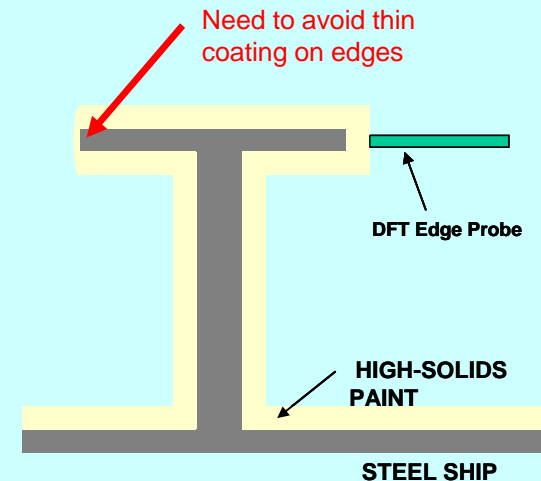


### Accomplishments:

Developed stripe coat Test & Evaluation plan.  
Developed protocol for edge measurements using small diameter dry film thickness gages; obtained units for Naval shipyards.

### Bottom Line:

PSNS projected, potential cost reduction for typical individual tanks: \$32K to \$13K.



# Induction Heating Coating Removal

Portsmouth Naval Shipyard / SEA 05P23

## Problem:

Current methods of coatings removal require media (e.g., mineral grit, shot, water, etc.), or cumbersome hand tools = Excessive Labor & Clean-up.

## Solution:

Use of the Induction Heating (IH) Coatings Removal System; coating stripped from heated substrate.

## Accomplishments:

- NAVSEA letter Ser 5000 - 07T/0226, 3 July 07 provided interim approval to PNSY, with conditional requirements addressing substrates, controls, etc.
- CNO visit to Portsmouth NSY on 8 January 2008.
- Draft Uniform Industrial Process Instruction (UIPI) is out for review.
- New units at, or being procured for, all Navy shipyards.

## Bottom Line:

PSNY projects, potential cost reduction:

Submarine - \$655K / availability.

Carrier - \$2,620K / availability.



# Surface Condition Measurement Tools

Puget Sound Naval Shipyard / SEA 05P23

## Problem:

Existing surface measurement technology is expensive, labor intensive, and has poor repeatability

## Solution:

Identify and qualify improved surface inspection tools. Verify these tools are compatible with the Paperless QA Initiative.

Dry Film Thickness meter.

Surface Profile meter.

Soluble Salt/Conductivity meter.



## Accomplishments:

- Proposed tools currently on the way to testers
- Test plan submitted for review

## Bottom Line:

PSNS estimated, potential cost reduction:

Submarines - \$64K / availability

Carriers - \$267K / availability



# **Paint Task Force**

## **SEA 05P23 / Regional Maintenance Centers**

- **Paint Task Force Chartered and first conference call conducted.**
- **Memorandum of Agreement between SEA 05 (RDML McCoy) and Commander, Regional Maintenance Centers, (RDML Orzalli) signed on 26 Feb. 2008.**
- **Paint Task Force leaders are NAVSEA 05P23 and Southwest Regional Maintenance Center, with input from contracts and other Regional Maintenance Centers.**
- **Portfolio of items to be addressed, similar to Cumbersome Work Practices, but for private yards and contractors:**
  - **Rapid Cure, Single coat**
  - **Paperless QA**
  - **Graduated QA**
  - **Induction Heating Coating Removal**
  - **Decision Tree**

# Coating Specification Conformance Testing

## SEA 05P23 / NAVSEA / Shipbuilders / Shipyards

- **SEA 05P23 alerted to paint specification conformance testing not being conducted by paint vendor or shipbuilder or shipyard.**
  - **Conformance tests vary by specification.**
  - **Conformance tests not run by paint vendor – consider their processes controlled (e.g., ISO 9000) and paints satisfy specification requirements.**
  - **Conformance tests include time consuming or replicative tests - spray, brush and roller application, as well as viscosity and density.**
  
- **SEA 05P23 suggested interim solution to issue using procedure analogous to those required by the *40 CFR 63* National Emissions Standards for Hazardous Air Pollutants.**
  - **Approach allows vendors to certify paints meet requirements even without tests and signature on standard form legally commits company to conformance.**
  - **Policy issued in Naval Message R 111749Z SEP 07.**
  
- **Longer term plan is LEAN event to work with paint vendors and users to simplify specification qualification tests to only those that are truly needed and those NAVSEA will require vendors & users to conduct.**
  
- **Goal is to reduce the costs associated with conformance tests and still get paint that satisfies Navy requirements.**

# **NAVSEA 05P23 Concept for New Start, FY-08 NSRP Task Retention of Flash Rust**

## **Follow-on Task to “Review of Acceptable Flash Rusting for Navy Ships.”**

- **Follow-on tasks derived from recommendations in Nov. 2007 NSRP report. NAVSEA task concept also leverages paint industry “best practices.”**
- **Prepare flash-rusted panels that will “fail.” Failed panels will have some form of medium or heavy flash rust would allow Navy to define when costly, catastrophic failures would occur.**
- **Develop a quantifiable test for excessive flash rust. NAVSEA concepts include:**
  - 1. Rapid cure adhesive on ASTM-D-4541 pull-off test buttons.**
  - 2. Colorimetric scratch test to determine rust adhesion.**
  - 3. Laser interferometry to determine rust density.**

# NAVSEA 05P23 Concept for New Start Preconstruction Primer Retention, NSRP SP-3 Task

## Follow-on Tasks to “Improved Rules for Painting U.S. Navy Ships During New Construction and Repair.”

- Follow-on tasks derived from recommendations in Dec. 2007 NSRP report. Plan also leverages paint industry “best practices” and experience.
- Develop objective quality evidence to allow retention of zinc-silicate preconstruction primer in critical-coated areas (e.g., underwater-hull, non-skid, tanks). Goal would be SSPC SP-XXX standard for secondary surface preparation of preconstruction primer. Key Issues:
  - Unique, long-duration exposure of pre-construction primer on Navy ships.
  - Quality of surface profile in blast-house.
- Produce panels that fail due to improperly prepared preconstruction primer and work back to a “go, no-go” test for surface cleanliness and profile.  
Ideas or Approach:
  1. Modify SSPC SP-10 to allow additional, residual zinc silicate in profile, but require >2 mils of profile after secondary surface preparation.
  2. Rapid cure adhesive on ASTM-D-4541 pull-off test buttons.
  3. Water-break/water-quality test of substrate quality.

# Conclusions

- **NAVSEA goal is to reduce coating application costs from ship acquisition through to ship disposal.**
- **NAVSEA making progress toward:**
  - **Making Standard Item 009-32 the Universal Paints Requirements Document.**
  - **Implementing findings of Cumbersome Work Practices tasks:**
    - **Delete Stripe Coat.**
    - **Rapid Cure, Single Coat.**
    - **Induction Heating Coating Removal.**
    - **Paperless QA & QA Tools.**
- **NAVSEA progressing with improvements in documentation:**
  - **Paint Task Force.**
  - **Specification Update (Paint Conformance Testing).**
- **NAVSEA would encourage NRSP SP-3 research projects evaluating:**
  - **Retention of Flash Rust.**
  - **Retention of Preconstruction Primer.**



# Backup slides