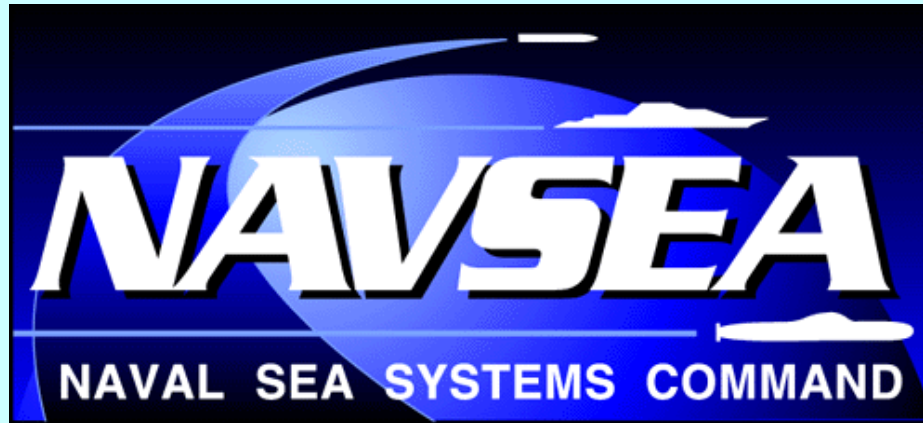


NAVAL SEA SYSTEMS COMMAND

COATINGS & CORROSION CONTROL TECHNICAL AUTHORITY UPDATE



NATIONAL SHIPBUILDING RESEARCH PROGRAM

June 2008

Mr. Mark Ingle, P.E.

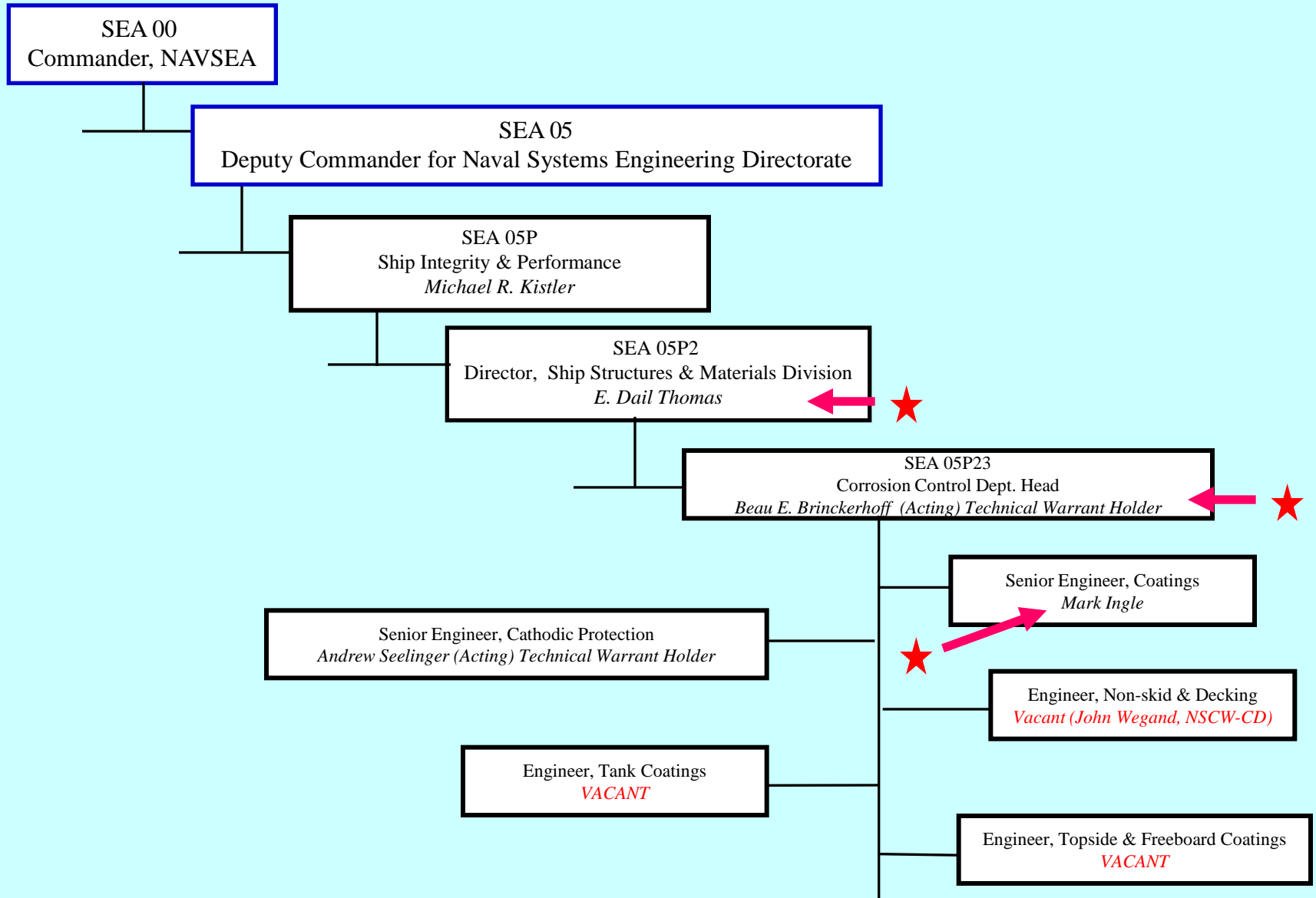
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OBJECTIVES

- **Summarize Naval Sea Systems Command (NAVSEA) paints and coatings staff changes.**
- **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 and updates:**
 - **Paint Task Force.**
 - **Specification Update (Paint Conformance Testing).**
- **Discuss potential future NRSP Research Projects:**
 - **Retention of Flash Rust.**
 - **Retention of Preconstruction Primer.**

NAVSEA Corrosion Control & Coatings Organization



NAVSEA COATINGS PROGRAM

Universal Requirements Document

Problem:

Training and infrastructure to conduct painting is related to requirements and drives costs. Today, Navy ship painting conducted to different requirements:

1. Shipbuilding contract such as ABS Naval Vessel Rules.
2. Maintenance painting in Naval shipyards to:
 - Naval Ships Technical Manual, Chapter 631, “Preservation of Ships in Service.”
 - Submarine Maintenance Manual.
3. Maintenance painting in commercial shipyards to NAVSEA Standard Item 009-32 “Cleaning and Painting; Accomplish.”

Solution:

Goal to reduce coating costs by reducing requirements to one “universal” paints requirement document.

1. Ship acquisition contracts unchanged – today.
2. Standard Item 009-32 for all other painting at Naval & Commercial shipyards on surface ships and submarines.

Accomplishments:

- Update to NSTM 631, signed, and is at printing activity for formatting and publication.
- Change 1 to FY-08 and FY-09 Standard Item 009-32 issued on 1 April 2008 include provisions for submarine painting.
- Letter authorizing use of Standard Item 009-32 as universal requirements document delivered for signature on 9 June 2008.

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 OQE on paint application.

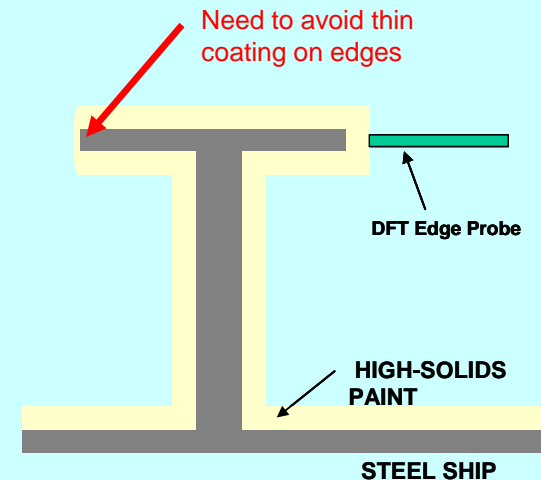


Solution:

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:

- Delete stripe coat system applied to two submarine tanks. QA process developed and demonstrated.
- Savings 10-20% of overall job time & cost.
- PPIs provided to support carrier RCOH bid.
- Standard Item 009-32 submission prepared. Plan to export to all high solids coating jobs.



NAVSEA COATINGS PROGRAM

Single Coat Tank Coatings

Problem:

- Ultrahigh-solids coatings currently require three coats (i.e., primer, stripe coat, and top coat).
- Twenty-four hours required between coats and seven days before service means nominal coating process takes fourteen or more days.

Solution:

- Single-coat system requires only one coat, with touchup as required.
- Cure time only one to three hours before touchup and one day before service, or the nominal total application time is two days.

Accomplishments:

- Single coat system applied to two amphibious ship tanks and nine submarine tanks.
- QA process developed and demonstrated.
- Time savings from 3 to 18 days per job.
- Standard Item 009-32 submission prepared. Plan to export to all seawater and dry void service in FY-08 with follow-on work on fuel & CHT tanks in FY-09.



Ballast Tank after one year.



Ballast Tank after one year.

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.

Solution:

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

Accomplishments:

- NAVSEA letter Ser 5000 - 07T/0226 dated 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) prepared, comments submitted, key issue is definition of process as “hot work.”
- New units at, or being procured for shipyards.

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 (DFT) meter.

Surface Profile meter.

Soluble Salt/Conductivity meter.



Accomplishments:

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

PSNS estimated, potential cost reduction:

Submarines - \$64K / availability

Carriers - \$267K / availability



Paint Task Force

SEA 05P23 / Regional Maintenance Standards

- **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 – NAVSEA covering cost of training shipyard on single-coat application.**
 - **Paperless QA - Arranged for software developer to communicate with NSRP.**
 - **Graduated QA - Working with SEA 02 (Contracts) to develop plan for graduated QA.**
 - **Decision Tree - To be added to Joint Fleet Maintenance Manual in July 2008.**

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 meets specifications.**
 - **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 difficult to fund. SEA 05P23 working with Electric Boat to conduct LEAN event.**
 - **New Naval message drafted.**
 - **Working with shipbuilder to chair LEAN event.**

NAVSEA 05P23 Concept for New Start

NSRP SP-3 Project to Reduce Costs by Allowing Retention of Flash Rust

Problem:

- Surfaces cleaned with hand lance waterjet equipment tend to develop *Moderate* flash rust which must be removed using a secondary surface preparation (increasing cost).
- Allowing paint application over moderate flash rust will result in cost savings provided risk of premature coating failure is mitigated.



Solution:

- Allow contractors to paint over moderate flash rust on hand-lance-prepared areas.
- Risk of painting over moderate flash rust has been shown to be low by numerous research projects and commercial practice.
- Need to develop tool to determine when surface has high level of flash rust instead of acceptable moderate level.

Accomplishments:

- NSRP completed 2007 project investigating the performance of coatings applied over moderate flash rusted surfaces on Navy ships with favorable results.
- NAVSEA and NSRP working to develop tool to determine when flash rust is excessive.
 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 COATINGS PROGRAM

Preconstruction Primer Retention

Problem:

- NAVSEA Standard Item 009-32 and the NVR require preconstruction primer (PCP) to be removed from critical coated surfaces before painting.

Solution:

1. Allow PCP to be retained on surfaces with appropriate coatings and QA/QC checks.
2. Require >2 mils of profile and SP-10 surface cleanliness, and <85% RH during surface preparation and PCP application.
3. Clean up installed plate before painting using either blasting or pressure wash.
4. Validate surface cleanliness with a “go, no-go” test (e.g., water-break test, pull test, cross hatch adhesion, etc.).

Accomplishments:

- Completed a test installation on USS VICKSBURG (CG-69). PCP was over coated with MIL-PRF-23236, Type VII coating.
- QA/QC checks were accomplished in accordance with Standard Item 009-32, and use of water break test before coating application.
- NAVSEA to track performance over years.



NAVSEA 05P23 Concept for New Start Relax Relative Humidity Requirements

Problem:

- Standard 009-32 requires the contractor to maintain the relative humidity in a tank or void space at a maximum of 50% from the start of surface preparation to cure of the topcoat.

Solution:

- Relax relative humidity requirement to 85% unless the manufacturer's recommendation is more restrictive.
- Paint manufacturers' product data sheets typically require that relative humidity be no greater than 85%. Frequently can achieve 85% with no extra controls or by heating the space.
- The IMO PSPC requirement is to maintain relative humidity below 85%.



Accomplishments:

- SSRAC proposed change submitted for FY-10 Standard Item 009-32.
- NAVSEA currently relates low humidity install to 20-year service life – need data.

NAVSEA 05P23 Concept for New Start Improve Paperless QA/QC Processes

Problem:

Paperless QA tools program is not as user friendly as it could be. The present system increases time required for the RMC& Contractor to collect and input the paperless data.

Solution:

Work with USFF N434 to Re-visit the software interfaces with electronic QA Tools product to incorporate changes identified during hot-wash, specifically:

- Incorporate instrument upload capabilities allowing data to automatically be transferred from the inspection instruments to the database.**
- Improve the e-mail alert system (adjudication notification).**

Accomplishments:

- NAVSEA working issue with USFF N434.**
- Need software to effectively support paperless QA.**

Conclusions

- **NAVSEA goal is to reduce coating application costs from new 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