Extended Recoat Windows for Non-Critical Zones

MegaRust

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Background

Source: https://news.usni.org

- The build sequence of Navy ships is long, and complex given all the compartments and fixtures that must be attached at various stages in the process.
- During the build sequence, primer application occurs in various non-critical areas. Topcoats are applied much later in the build sequence closer to final assembly and closeout. By the time this stage is reached, published primer recoat windows are often exceeded. These areas then require various levels of surface preparation to reactivate the surfaces for topcoat application.
- This part of the process is time and labor intensive. This project seeks to review multiple levels of surface preparation to determine which is the best course when recoat windows have been exceeded.

Anticipated Benefits

- More effective surface preparation for topcoat application in non-critical areas where primers have exceeded their recoat windows
- Reduced cost of surface preparation by extending the recoating window on interior non-critical areas (bulkhead and overhead)
- Optimize the most efficient surface preparation methods to ensure proper coating performance after passing recoating windows

Scope of Work

- Compare the various levels of surface preparation available for overcoating work.
- Determine adhesion and performance effects of the differing methods to find optimal performance.
- Identify and share best practices among shipyard coating experts.

Previous Work

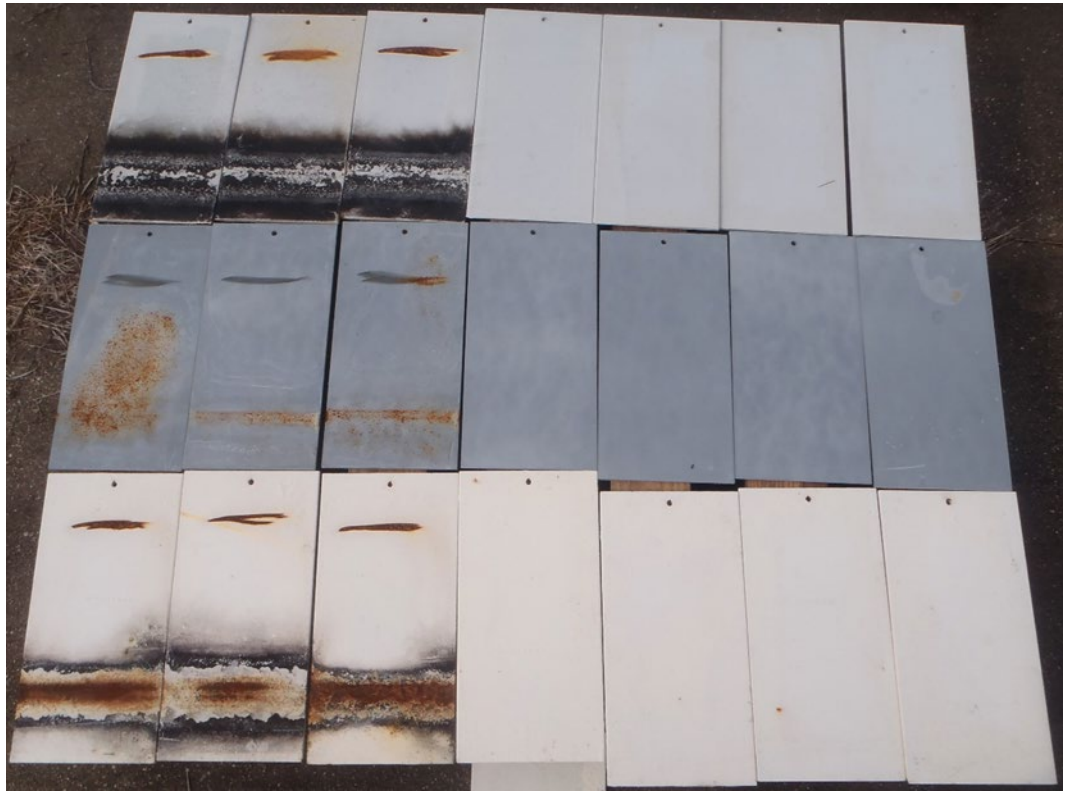
- Numerous studies have been performed by many different industries and even the Navy about proper surface preparation once recoat windows are missed.
  - Multiple SPC Panel Projects

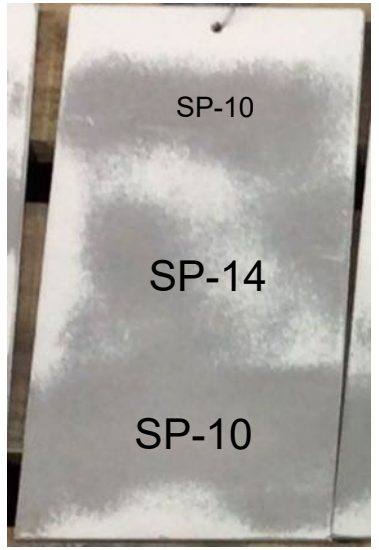
- However, as coating formulations and technologies continue to change and improve, shipbuilding standard practices need to be able to adapt to new processes efficiencies provided by these technologies.

- More recent studies have shown minimal, if any, differences in long term performance from surface preparation of non-critical areas that have surpassed primer recoat windows.

Previous Work - Retention of Type VI Epoxy under UHS Epoxy

This project assisting in developing the data needed to request Navy approval to apply a Type VII UHS epoxy over a Type VI epoxy in critical coated areas





Surface Preparation Methods
SP-3/SP-11
SP-7/SP-10
SP-14/SP-10

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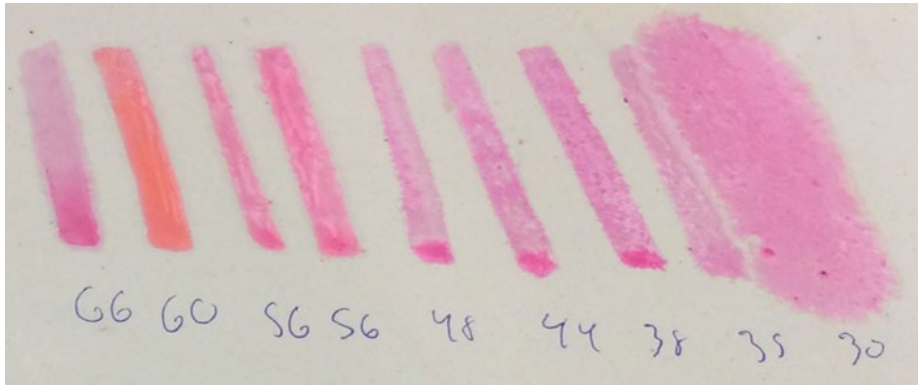

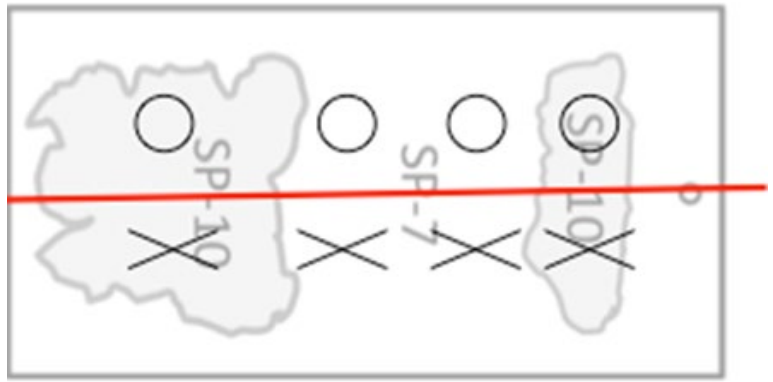

Characterizing Secondary Surface Preparation

- Visual Inspection
- Film Thickness
- Surface Profile
- Prepared Coating Surface Tension
- Dyne Pens (experimental)

Performance Evaluation

- Pull Off Adhesion (D4541)
- Knife Adhesion (D6677)
- Condensing Humidity (D4585)
- Impact Testing

Conclusion: No clear differences between new coated systems and overcoated systems

Previous Work – Internal Shipyard R&D

- Multiple Shipyards performed preliminary recoat testing on candidate coating systems
- Initial results showed a blow down with no other preparation had provided the greatest adhesion results.
  - Other tested processes: dry cloth wipe, cleaning with water, cleaning with solvent, hand abrasion

Previous Work – Other Industries

- During Bridge Projects (Specifically in the NE) recommended recoat windows are often missed due to weather, construction delays, etc.
- Coating vendors have worked with owners on various surface preparation methods when overcoating.
  - Pressure washing, sand injected pressure washing, power tooling, solvent wiping, hand sanding, and no preparation have been explored
  - Intercoat cleanliness (grease, oils, dirt) found to be greatest effect on adhesion and performance

Tasks

- Task 1 – Identify surface preparation methods currently used to reactivate primers in non-critical areas
  - Hold a Kick-off Meeting with the project team to discuss the current methods used to prepare primers for topcoat in non-critical areas. Best practices of all the yards will be discussed. The project team will identify testing strategies for production and long-term use.
- Task 2 – Evaluate coatings after application to prepared, primed surfaces
  - Based on the preparation methods identified in Task 1, laboratory testing of adhesion and performance will be performed on coatings applied over primers whose recoat windows have been exceeded.
- Task 3 – Final Report
  - The project team will assemble a comprehensive final report, including the results of the information review, details of sample preparation, and laboratory evaluations. The final report (or a version thereof) will be suitable for unlimited distribution.

Kick Off Meeting

Defined Objectives

- Topcoat the primer after months/years of having applied it.
- Generate data to support scheduling application of the interior "aesthetic coating" after outfitting, sometimes years after the primer coat application.
- Doing secondary surface preparation after outfitting is difficult, time consuming and potentially damaging to the integrity of the primer system. We want to validate that the adhesion of these two interior, non-critical coatings, isn't degraded (significantly) if the step to reactivate the recoat window is "skipped."
  - Overcoating 23236 Type VI in Noncritical areas with either
    - MIL - DTL - 24596
    - MIL – DTL- 24607
  - Discussed MIL-PRF-23236 Type VI Systems
    - International Intergard 264
    - Sherwin Williams SeaGuard 5000HS
    - PPG Amercoat 236
  - Discussed additional cases of investigating
    - MIL-DTL-24441
    - TT-P-645

Possible Surface Evaluation Methods

- Surface Characterization
  - Gloss Readings
    - Compare Readings to base gloss readings to determine is surface is chemically rough
  - Water Drop tests (Flat Surfaces only)
  - Solvent Resistance (Q-Tip)
    - Determine solvent stability

- Performance Tests
  - Adhesion
  - Impact
  - Humidity

Path Forward

- Finalize Test Plan (Draft Review in process)
- Work with Technical Community on test requirements
- Shipyard visits for field testing and panel sampling
- Lab testing to determine long term performance

Questions?

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