

Effect of Flash Rusting Over Water Jetted Surfaces on Coating Performance

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BACKGROUND

- Benefits of Water Jetting
 - Elimination of hazardous airborne pollutants and dust
 - Elimination of abrasive clean-up and disposal
 - Ability to conduct other work in the same area

BACKGROUND

- Drawbacks of Water Jetting
 - Inability to impart a macro profile on a steel substrate
 - Flash rust





Technical Approach

- Investigate the effects of varying degrees of flash rusting on marine coating performance
 - Panels previously weathered
 - Use UHP water jetting as surface preparation
 - Characterize panels based on degree of flash rust
 - Coat panels with standard Navy paint systems
 - Subject panels to natural and accelerated exposure testing



Test Procedure

- 120 panels prepared to an SSPC-SP 10 condition
 - Average profile: 2.4 mils
- Apply one coat of MIL-PRF-24441 F 150, Type III to one side of each panel
- Weather panels at marine exposure site at 45° angle facing South



Test Procedure (Cont.)

- Water jet panels according to the following procedure:
 - Freeboard system- Spot WJ-2 in three areas with sweep blast over remaining surface on the painted side and WJ-4 on the weathered side
 - Underwater Hull system- WJ-2 on both sides
 - Tank system- WJ-2 on the painted side and WJ-4 on the weathered side
- Blast control panels to SSPC-SP 10 condition



Evaluation of flash rusting

- Minimal Flash Rusting
 - Any rust less than the Light Flash Rusting category
- Light Flash Rusting
 - partially discolored by small quantities of light tan-brown, tightly adherent rust
 - Will not mark objects that are brushed against it
- Medium Flash Rusting
 - covered by a layer of light tan-brown rust
 - will mark objects brushed against it
- Heavy Flash Rusting
 - completely covered by dark tan-brown, loosely adherent rust
 - will mark objects brushed against it



Coating Systems

- Freeboard
 - 2 coats of MIL-PRF-24441 epoxy
 - 2 coats of alkyd topcoat
- Underwater Hull
 - 2 coats of DOD-PRF-24647 epoxy
- Tanks
 - 2 coats of MIL-PRF-23236 epoxy
- Non-Skid
 - 2 coats of primer
 - 1 coat of MIL-PRF-24667 Type I, Comp G Non-Skid



Testing

- Atmospheric Testing
 - Sea Isle City, NJ marine exposure test site
 - 45° angle, facing South
- Immersion Testing
 - Natural filtered seawater
- Condensing Humidity Cabinet
 - IAW ASTM D 4585 "Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation"



Testing (Cont.)

- Accelerated Corrosion Chamber
 - IAW ASTM G 85 "Standard Practice for Modified Salt Spray (Fog) Testing"
- Cathodic Disbondment Testing
 - IAW ASTM G 8 "Test Method for Cathodic Disbondment of Pipeline Coatings"