



Review of Acceptable Flash Rusting for Ship Coatings

Status Report – June 18, 2008

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Background

- FY07 NSRP project
 - Ship inspection data suggest no significant performance difference between MFR and LFR
 - Round robin suggested that inspectors should be able to differentiate between MFR and HFR
- NSRP FY08 follow-on study
 - Based on feedback from Fleet Forces Command
 - Confirm that results are not unique to the shipyard/primer which was observed
 - Continue to collect data defining the risk of painting over MFR



Project Status

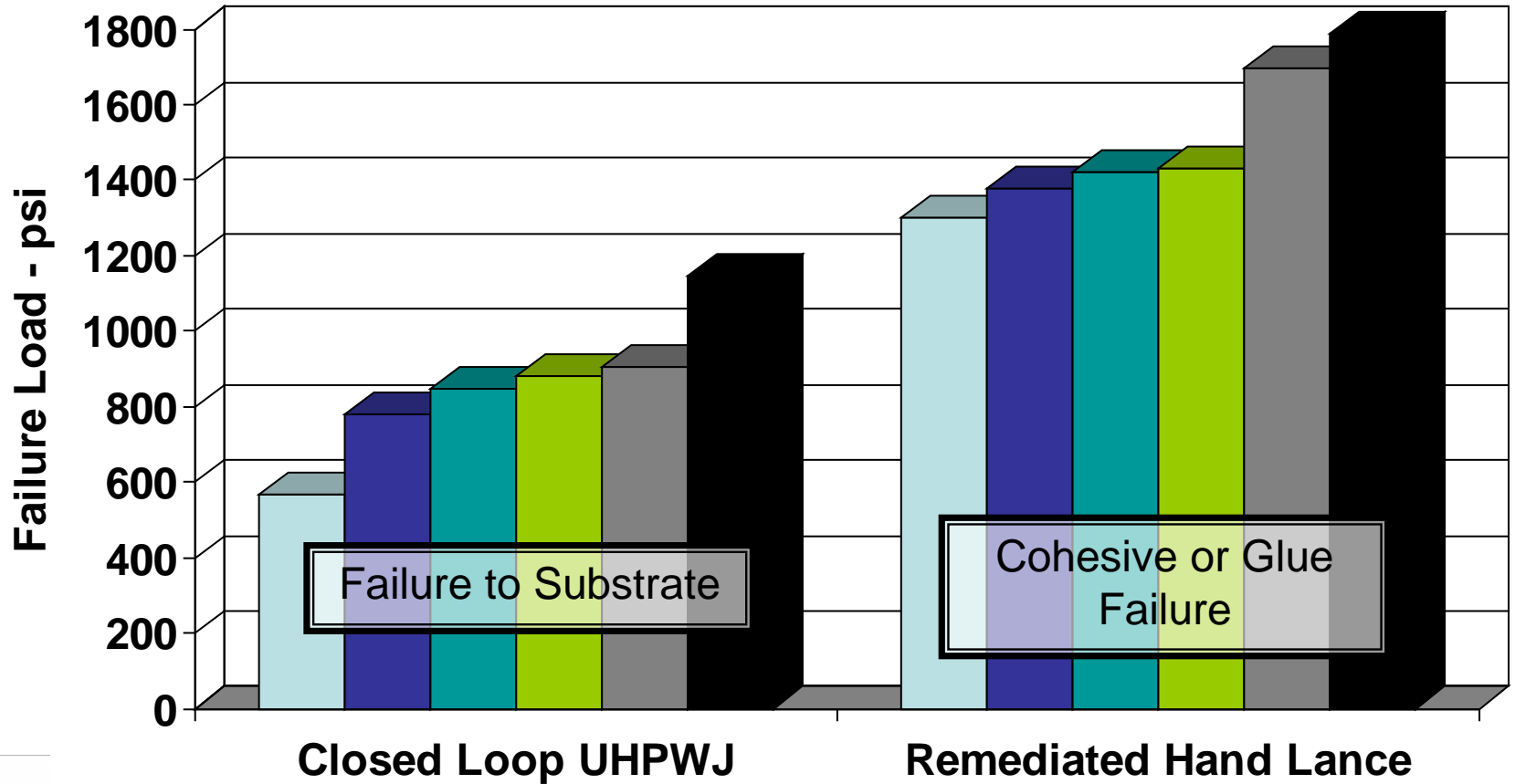
- Anecdotal stories and reports on Navy UHP projects
 - Ship inspection status
- SSRAC proposal status
- Planned testing



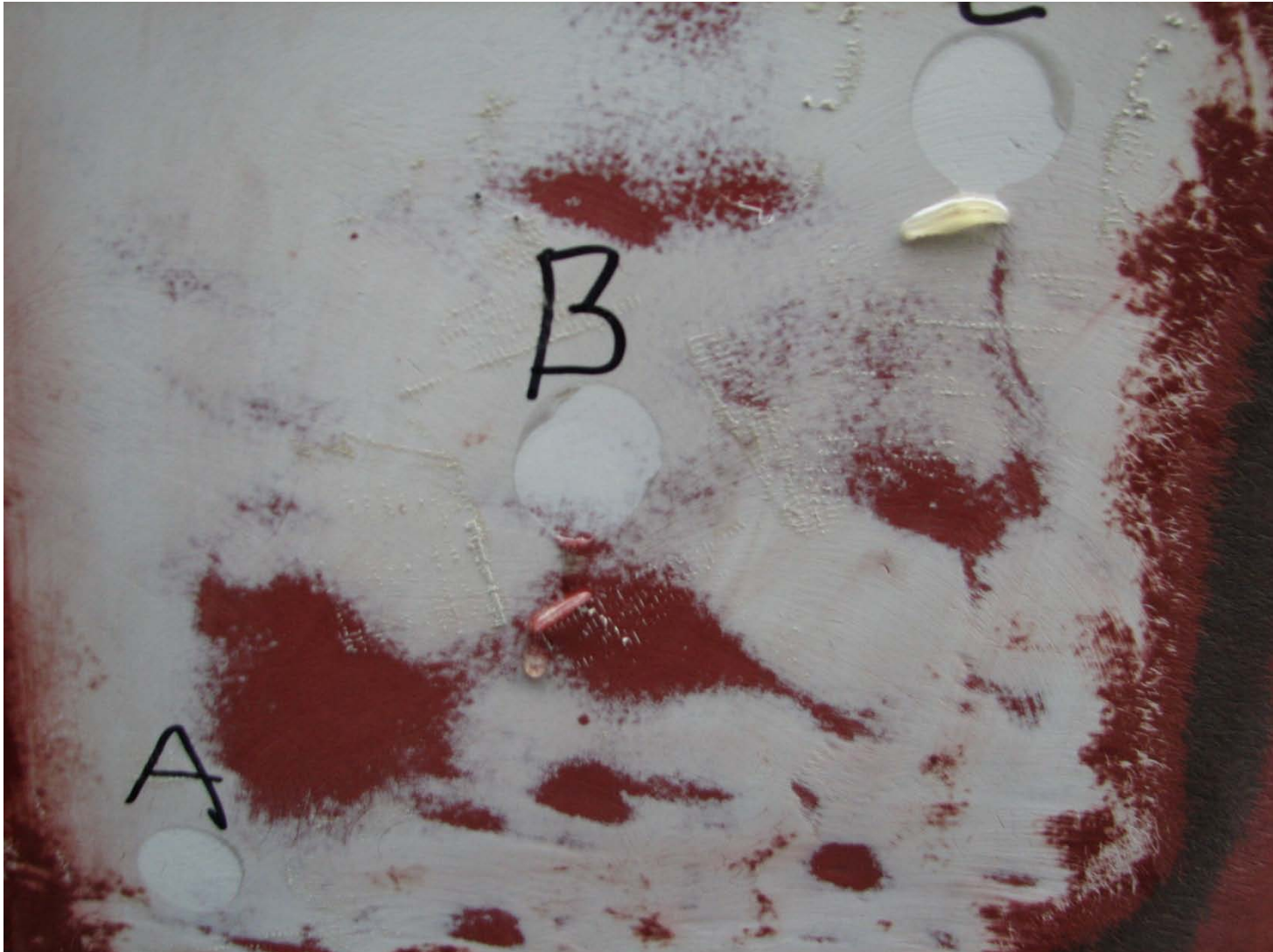
Further Inspections

- Completed
 - USS STENNIS (CVN-74)
 - Excellent adhesion observed
 - Relied on testimony regarding initial condition
 - Limited testing performed based on SY constraints
 - USS ENTERPRISE (CVN-65)
 - Limited spot hand lance work in 2002 – could not identify specific location
 - Records show they spent great deal of time reducing MFR on hand lance areas & eventually abandoned UHPWJ
 - USS HALYBURTON (FFG-40)
 - UWH preserved in October 2005(2.5 years)
 - Hand lance areas similar to machine cleaned
 - USS THE SULIVANS (DDG-68)
 - UWH preserved in October 2004 (3.5 years)
 - Hand lanced areas had secondary prep to achieve LFR condition

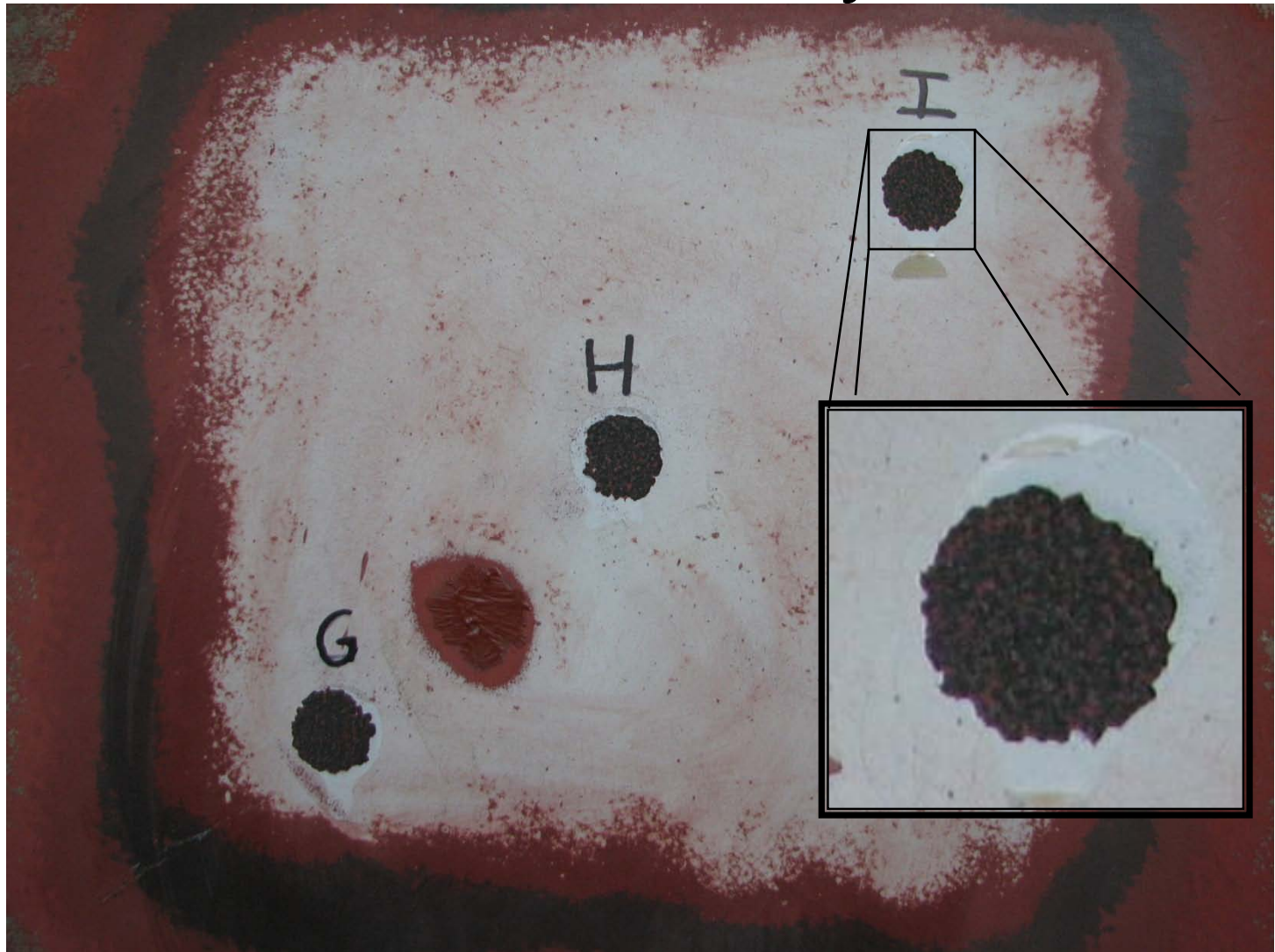
USS The Sullivans



UHPWJ Cleaned Surfaces



Hand Lance Remediated with Dry Ice Blast



Ship Histories Being Documented

- USS BELLEAU WOOD (LHA-3)
 - UHPWJ in 1996-1997 with hand lance equipment, MFR and HFR noted
 - Sunk in 2006
- USS LAMOURE COUNTY (LST-1194)
 - Freeboard areas with MFR were painted and accepted based on pull tests in May, 1997
 - Ship sunk sometime after September, 2000
- USS ASHLAND (LSD-48)
 - UHP cleaned (maximum HB-2M) & painted around 1996 and abrasive blasted around 2006
 - After 10 years, condition was “typical”
- USS ESSEX
 - UWH waterjetted 8-9 years ago, presently in Japan
- USS NASSAU (LHA-4)
 - Hydrocat work done by NNSY, presently collecting information
- USS DULUTH (LPD-6)
 - UWH done in San Diego with hand lance in 1997, current status unknown
 - Left in-tact epoxy, but some HB2-M appears to have been painted over



Input Welcome

- We are actively looking for ships to inspect
 - MARMC is working with the team to identify possibilities
- We welcome other historical inspection on Navy ship UHP for inclusion in our report
 - West Coast, PSNS is providing historical info
- If you wish to provide input or participate in this project, contact

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Original SSRAC Proposal

- Paragraph 3.10.5.1 and Tables
- Problem & Rationale
 - Remediation of moderate flash rust in areas prepared with open UHPWJ equipment is costly and does not appear to offer a significant benefit in either service life or risk reduction.
- Proposed Change
 - Allow moderate flash rusting on water jetted surfaces in place of a maximum of light flash rusting.



The Original Problem “Hand Lance Areas”



Alternate SSRAC Proposal

- Paragraph 3.10.5.1 and Tables
- Problem & Rationale
 - It is in the contractors best interest to use closed loop UHPWJ equipment on the largest possible surface area
 - Up 30% of the surface areas on the UWH and freeboard require the use of open UHPWJ equipment ("hand lances")
 - Costly secondary surface preparation procedures are required to remediate the "moderate flash rust" condition to a "light flash rust"
 - Remediation of moderate flash rust does not appear to offer a significant benefit
 - Surface preparation costs for an underwater hull can be reduced by 20% if the remediation is not required
- Proposed Change
 - Allowing H-B 2½ M on hand lance prepared areas providing that the hand lance cleaned areas are kept to the minimum feasible....Evidence of the coating manufacturer concurrence shall be provided.



Testing per 05P23 Recommendation

- 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
- Perform preliminary evaluation of quantifiable tests for excessive flash rust. NAVSEA concepts include:
 - Rapid cure adhesive on ASTM-D-4541 pull-off test buttons
 - Colorimetric scratch test to determine rust adhesion
 - Laser interferometry to determine rust density
- CWP project proposed to look at process

Concluding Comments

- Continue to build body of evidence that painting over moderate flash rust does not considerably increase risk of coating failure
- Navy is seriously looking at making changes which would allow some level of MFR on surface
- Anticipate delivering report in January, 2009

