Assessing the Need for 50% Relative Humidity During Tank Painting

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50% RH REQUIREMENT

- REVIEW OF PAST WORK JUSTIFYING THE REQUIREMENT
- BASED ON 1995 ENGINEERING FOR REDUCED MAINTENANCE (ERM) PROGRAM FOR TANKS AND VOIDS –
- GOAL WAS TO ACHIEVE 15-20 YEAR SERVICE LIFE FOR COATING SYSTEMS PRIOR TO REPLACEMENT.

50 % RH REQUIREMENT

HIGHLIGHTS OF ERM TANK PROTOCOL

- HP FRESHWATER WASHSOWN
- ACTIVATE DH TO MAINTAIN MAX 50% DH THROUGH CURE
- EDGE RADIUSING/GRIND ROUGH WELDS
- SP-10 QUALITY BLAST
- SOLUBLE CHLORIDE CHECKS TO 3 ug/cm^2
- HIGH SOLIDS EPOXY COATING SYSTEM - (MIL-P-24441 TY IV)
- MANUALLY STRIPE ALL EDGES, WELDS, HOLES
- 100% HOLIDAY CHECKS OF SYSTEM
- ENFORCEMENT OF STRICT QA – START TO FINISH

50 % RH REQUIREMENT

AFTER SHIPBOARD TRIALS, FURTHER MODIFICATIONS INCLUDED:

- ELIMINATE EDGE RADIUSING – REPLACE WITH EDGE RETENTION COATING SYSTEM
- ALLOW SPRAY STRIPE vs. MANUAL STRIPE
- ELIMINATION OF 100% HOLIDAY CHECKS

3 MAIN CRITERIA USED TO JUSTIFY 50% RH

- 1. CONTINUOUS DH INHIBITS THE FORMATION OF “RUST BACK”, OR FLASH RUSTING, ELIMINATING NEED FOR COSTLY RE-BLASTING TO MEET SP-10 PRIOR TO PAINTING
- 2. CONTINUOUS DH ALLOWS FOR BLAST TO BE HELD IN SP-10 CONDITION INDEFINITELY ALLOWING FOR CONTINUOUS SURFACE PREP WORK (REGARDLESS OF AMBIENT CONDITIONS)
- CONTINUOUS DH ALLOWS FOROPTIMUM ENVIRONMENTAL CONDITIONS FOR EPOXY CURE AND ELIMINATES THE POTENTIAL OF INTER-COAT DELAMINATION DUE TO AMINE BLOOM

DH ELIMINATES RUSTBACK

- VERNON STUDY SHOWED ACCELLERATED CORROSION OF BARE STEEL OVER 55-60% RH. SHIPYARD EXPERIENCE ROUTINELY VALIDATED THIS FACT
- SIGMA RECOMMENDED 50%, INTERNATIONAL 40-60%, EUROPEAN SY RANGES 25-65% RH FOR TANK PAINTING
- RUSTBACK CREATES MORE BLASTING, CLEAN-UP AND INSPECTION FOR LARGE TANKS

DH HOLDS THE BLAST

- FOR LARGE TANKS, TYPICAL RUST BLOOM FORMATION OVER NIGHT. LARGE TANKS FOUND ON AMPHIBS (LHD, LHA, LPD, LPH, LSD)
- RESULTS IN "BLAST–THEN-PAINT…BLAST–THEN-PAINT…" SCENARIO
- ELIMINATES COLD JOINTS, REPEATED DUST CLEANINGS, RECOAT WINDOWS EASILY ACHIEVED, HUGE MAN-HOUR SAVINGS
- PRODUCTION REMAINS IN CONTROL OF THE PAINT SHOP, NOT THE AMBIENT CONDITIONS.

DH HOLDS THE BLAST (continued)

DH PROVIDES OPTIMUM CURING

SOLVENT EVAPORATION

- EARLIER COATINGS WERE 55-65% SOLIDS – HIGH POTENTIAL FOR SOLVENT ENTRAPMENT. HARDER FOR SOLVENTS TO EVAPORATE IN HIGH HUMIDITY CONDITIONS.
- WITH DH- SOLVENT EVAPORATES QUICKLY, RETURNING THE TANK TO SERVICE QUICKER

AMINE BLOOM

- AMINE BASED CURING AGENTS REACT WITH MOISTURE AND CO2 IN THE AIR TO FORM WAXY FILM – DIFFICULT TO REMOVE AND CREATES INTER-COAT DELAMINATION. DH ELIMINATES THIS POTENTIAL