CH2MHILL

More than Just New Paint

Factors for Successful Outcomes in Steel Water Reservoir Coating

PNWS
IDAHO • OREGON • WASHINGTON

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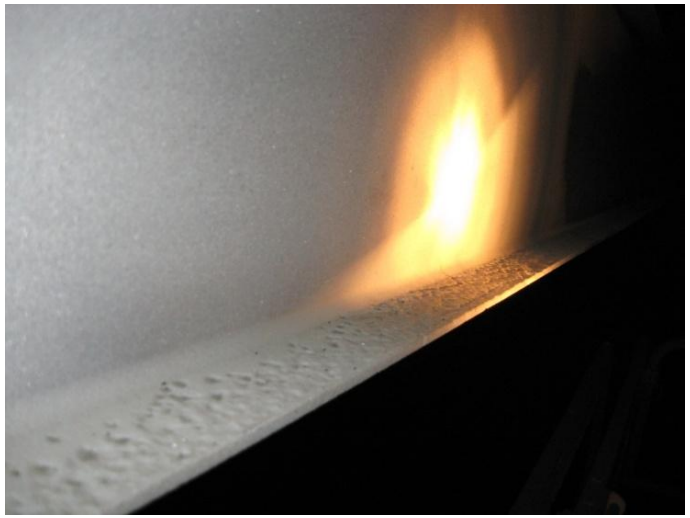
Why Paint Steel Tanks?

- Corrosion Control
- Reduces Iron Content
- Reduces Disinfection Requirements
- Aesthetics

Service Life

- Interior – NSF Epoxy
  - 20 to 25 years
  - Overhead often dictates replacement
- Exterior – Epoxy Primer/ Polyurethane Finish
  - 20 to 25 years
  - Add 10 to 15 with overcoat
  - Newer formulations extend gloss and color retention



Successful Painting Projects

- Experienced Contractor
- High Quality Paint Products
- Specifications
- Manufacturer's Involvement
- Environmental Conditions
- Inspection
- Documentation
- Warranty

Warranty Inspection is Important

- Warranty Inspection - Always!
  - Schedule for one month before end of warranty period
  - Drain tank and inspect
  - Invite contractor
  - Identify defects
  - Repair
  - Re-inspect
  - Use diver inspection if tank cannot be drained
- Critically Important
  - Can be very costly if major defects are not discovered in time

Potential Tank Painting Repair Costs

2 – 4MG Ceilings	*>$400,000*
1 – 3 MG Walls/Floor	*>$300,000*
2 – 3 MG All Interior	*>$750,000*

Problematic Painting Projects

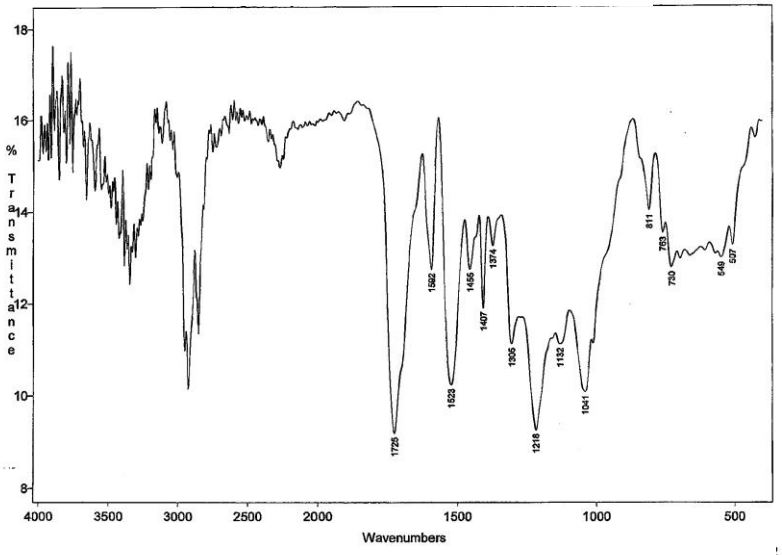
- Coating Failure in 3 to 5 years
- Loss of Adhesion
  - To metal
  - Between coats
- Blisters
- Excessive Pinholes/Holidays
- Cracking/Checking
- Fading

Common Contributing Factors

- Inadequate Surface Preparation
  - Cleanliness
  - Contaminants
  - Surface profile
- Application Issues
  - Excessive holidays
  - Too thick, too thin
  - Environmental (temperature, humidity)
  - Ventilation
- Inadequate Cure

Failure Analysis

- Field Testing
  - Visual observations
  - Paint thickness
  - Adhesion
  - Surface profile
  - Paint and liquid samples
  - Mill scale
- Laboratory Testing
  - Microscopic examination of samples
    - Contamination
    - Surface profile
  - Specialized tests
    - Spectroscopy
    - Chromatography



Paint Sample Spectrograph

Construction Inspection

- Why
  - Improve chances of successful project
  - Documentation
- Who
  - Owner staffed
  - Owner staffed w/ Consultant assistance
  - NACE Certified Coating Inspector
- When
  - Full time or part time
    - Blast, shop and field
    - Coating application
    - Cure

Documentation

- Contractor Information
- Coating Materials
- Dates
  - Beginning of surface preparation
  - Primer application
  - Brush blast
  - Application of subsequent coats
  - Coating completion date
  - In service date
- Environmental Conditions
  - Daily temperatures (high and low)
  - Relative humidity
- Site Visit Frequency
  - Every day
  - Photographs
- Separate File

Conclusions

- Most steel tank painting projects are successful
- Specifications are important
- Consider longer warranty period
- Inspection helps ensure a longer coating service life
- Sometimes things happen
- Specialized companies are available to help
- Be prepared

Questions

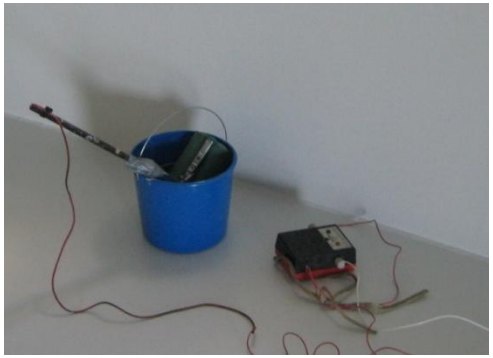
Common Coating Inspection Tools

Dry Film
Paint Thickness Gauge

Surface Profile Gauge

Dull Putty Knife

Relative Humidity
Gauge



Low Voltage Holiday
Detector

Other Tools:
Wet Film Thickness Gauge
Surface Temperature Gauge
Ambient Temperature Gauge
Inspection Mirrors
High Intensity Lights
Portable UV Lights