PLANNING FOR RECOATING STEEL RESERVOIRS

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Introduction

- Steel reservoirs
  - Most common
  - Lowest capital cost
  - Highest O&M cost
  - Easy to overlook
- Our plan today
  - Discussion of issues and ideas to consider
  - Better understanding of how to plan for recoating
  - Upgrades to consider
  - Provide means for more accurate budgeting

History of Coating Systems- Interior

- Lead primer
- Coal Tar Epoxy
- Vinyls
- Epoxy
- Zinc primer

History of Coating Systems - Exterior

- Red Lead / Alkyd Finish
- Vinyls
- Epoxy / Urethanes
- Zinc / Epoxy / Urethanes

How to Determine When to Re-coat

- Exterior
  - Typical lifespan of new coating system is approx 25 years; 10-15 years for a top coat
  - Aesthetic vs. threat
  - UV, biological, vandalism
  - Topcoat vs. re-coat vs. maintenance coating
  - Failure signs: rusting, cracking, chalking

How to Determine When to Re-coat

Tnemec NW

ROTHILL

How to Determine When to Re-coat

Tnemec NW

ROTHHILL

How to Determine When to Re-coat

- Interior
  - Typical lifespan of new coating system is approx 20-25 years; 0-5 years for spot repairs
  - Aesthetic vs. threat
  - Off gas, cycle zone, architecture
  - Re-coating or maintenance coating
  - Failure signs: Rusting, blisters, peeling

Determine Type of Re-coating Required

- Maintenance Coating
  - Spot repairs
  - Balance cost vs. return
- Re-coating
  - Interior should usually be replaced if coating has failed
  - Exterior depends upon type of coating failure and number of previous coatings
  - Is lead present >5mg/l in TCLP test?
- Topcoating
  - Exterior can often be topcoated
  - Know what you have before you decide
  - Set your expectations accordingly

Determine New Coating System

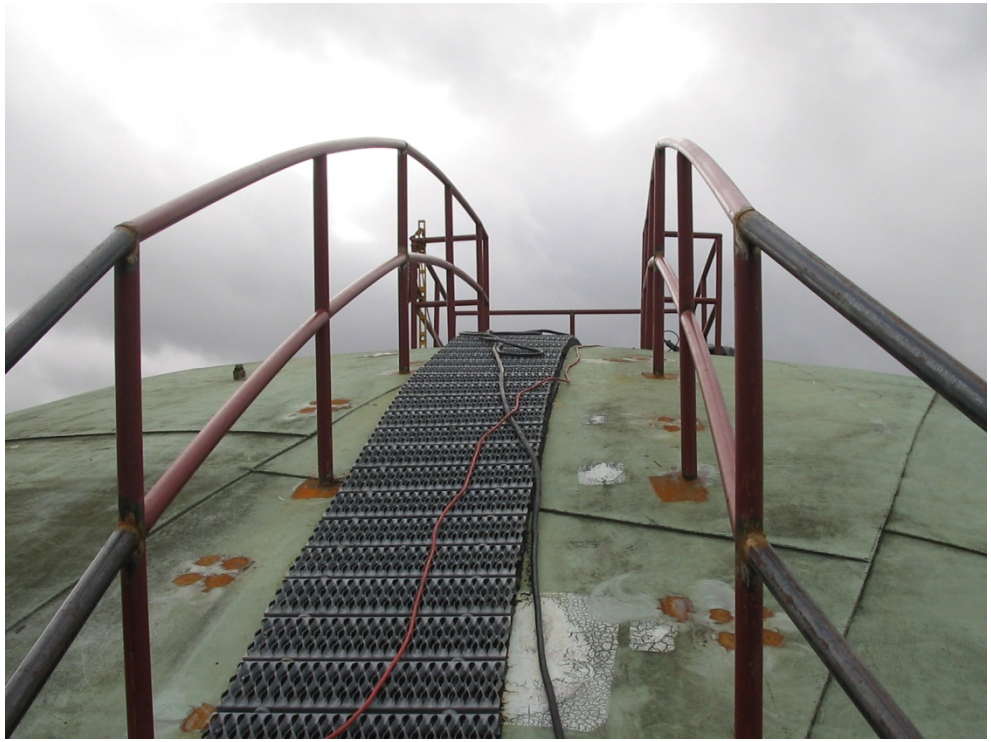
- Interior
  - Commonly uses zinc-rich primer and epoxy topcoat
  - NSF approved
- Exterior
  - Depends upon whether recoating or topcoating
  - Recoating is usually with zinc-rich primer, epoxy intermediate coat, and polyurethane topcoat
  - Topcoating is usually with epoxy tie-coat and polyurethane topcoat
  - Compatibility and UV protection

Environmental Conditions

- To encapsulate the exterior or not?
  - Homes, schools, businesses nearby
    - Rolling vs. spraying
    - Noise and dust
  - Time of year
    - Best painting weather during typical high demand time
    - Allows dehumidification and environmental control
    - Environmental – contain blasting waste

Safety Feature Upgrades

- Ladder and landing system
  - Allows safer access to top of reservoir
- Safety Tie-offs
  - Allows personnel to move outside of protective railings on top of reservoir



Safety Feature Upgrades

- Railings
  - Add railings from ladder to roof vent
  - Walking surface or additives
- Vent and access hatch security

Seismic Feature Upgrades

- Seismic codes have changed over time
- Issues
  - Enhancements to existing seismic feature
  - Additional seismic anchors
  - Foundation Improvements
- Consult a structural engineer

Security Feature Upgrades

- Vent
  - Secondary housing or cage
- Security cameras
- Intrusion switches
- Lockable hatch to the ladder
- Access hatch
- Monitor/Control systems

Other Feature Upgrades

- Active corrosion control systems
- Mural
  - Can be either complex or simple
  - Helps to minimize impact on surrounding area
- Interior manifold/Check valves
  - Improve water circulation within the reservoir
  - Exterior piping modifications/separate fill/draw line
  - Chlorine monitors and facilities
  - Control valves, flow meters, seismic monitors

Timing Design and Construction

- Design and preparation of bid documents
  - 3-6 months depending upon complexity of project
- Construction
  - 3-6 months depending upon complexity and size of project
  - Can be much longer for very large reservoirs or if extensive metal work and enhancements are required
  - Can reservoir be taken offline during high demand?

Construction Observation

- NACE-certified people
- Daily but not necessarily full-time
- Possibly best money spent
  - Right coatings are used
  - Proper environmental conditions are met
  - Weld standards are met
  - Blast and surface prep standards are met
  - Stripe coats are applied
  - Proper thickness of coatings are applied

Budgeting

- Interior coating removal and recoating approx $7-8/SF
- Exterior coating removal and recoating approx $7-8/SF (lead under threshold)
- Exterior coating removal and recoating approx $15-16/SF (lead over threshold)
- Exterior topcoating and spot repair approx $4-5/SF
- Encapsulation $3-3.50/SF

Various Issues

- Telecommunication facilities
- Metal works and repair
  - Painters, rails and plugs
  - Corrosion
  - Stiffeners
- Access cuts
- Surface preparation
- Full vs. empty

What We Have Not Discussed

- In service video inspection
- Lab, destructive and pilot testing
- Surface preparation standards
- Environmental monitoring
- Hazardous materials
- Bidder pre-qualification

Summary

- Steps for confident planning
  - Know the existing coating systems on the reservoir
    - Is lead present?
    - How many times has the reservoir been top coated
    - What types of coatings are on the reservoir
  - Assess the anticipated life of the coating
  - Anticipate feature upgrades
  - Include design, observation, and construction costs
  - Set the right expectations

Questions?

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