Construction Red Flags

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William (Clay) Herndon, P.E.
General Site Management & Safety

• Site Safety
  – Site Specific PPE
    • Hard Hat, Safety Glass, Vest
  – What does the Contractor provide?
    • Safe working environment for inspection

• Training to consider
  – Site Safety
  – Trench Safety
  – Confined Space
  – Fall Protection
  – Concrete
  – Nuclear Gauge
  – Coatings
• Site Management
  – Clean Site
  – Safe Site
  – Construction Materials and Debris
  – Positive Drainage
  – Labels on bags
  – Recyclables in Trash (LEED)
Who’s Responsible?

- **What is Quality Assurance?**
  - Also know as verification testing
  - Also known as acceptance testing
  - Paid for by Owner (or under Engineer’s Contract)

- **What is Quality Control?**
  - Testing done by contractor for their own process control
  - Paid for by contractor
Earth Work
“Construction Red Flags”

• Is the Proper Equipment in Use?
  – Large Equipment in Tight Areas
• Thickness of Lifts Being Placed
• Use the “Heel” Test
• Material Type in Use
  – Sand
  – Clay
  – Stabilized
• Soil Moisture
• Color Changes
• Organics Debris
Formwork & Rebar
“Construction Red Flags”

• Concrete Reinforcing
  – Size of Bar
  – Spacing
  – Lap
    • Projection from Foundation
  – Corner Bars
  – Clearance
  – Tie Pattern
  – Cleanliness
  – Accessories
    • Chairs
    • Bolsters
Formwork & Rebar
“Construction Red Flags”

- Concrete Reinforcing
  - Confirm Spacing at Doors
  - Verify Proper Adhesive is Being Used
  - Verify Rebar is not Torch Cut
Formwork & Rebar
“Construction Red Flags”
Formwork & Rebar
“Construction Red Flags”
Concrete
“Construction Red Flags”

• Pre-Placement
  – Pre-Placement QC Inspection Complete?
  – Does the Contractor Have the Appropriate Equipment?
  – Is there a Contingency Plan in Place?
  – Is Water Stop Installed Properly?
  – Is Curing Compound/Blankets Onsite?
  – Are Construction Joints Installed Properly?
  – Is the Desired Finish Approved?

• Placement
  – Is the Contractor.....
    • Monitoring Time to Placement?
    • Monitoring Batch Times?
    • Monitoring Vibration Cycles?
    • Monitoring Consistency of Mix?
    • Monitoring Placement Method?
Concrete
“Construction Red Flags”

• Placement
  – What to Look For.....
    • Batch Tickets for Batch Time and Mix Design Number
    • Batch Tickets for Added Water
    • Contractor is Using an Approved Method of Placement
    • Formwork and Rebar is Secure During Placement
    • Time to Placement and Time to Placement Between Lifts
    • Hanging forms are Removed in a Timely Manner

• Post-Placement
  – Curing Methods are Being Followed
  – Once Formwork is Removed....
    • Look for Signs of Cold Joints
    • Honey Combs
    • Desired Finish is Achieved
Concrete
“Construction Red Flags”
Coatings
“Construction Red Flags”

• Quality Control Program
  – Does your Contractor Have a QC Program?
  – QC Program Should Include
    • Procedures
    • Follow SP Guidelines
    • Testing Procedures

• Pre-Application
  – Confirm QC Procedures in Place
  – Confirm Appropriate Equipment is Onsite
  – Confirm QC Plan will Accommodate for
    Instances of Inclement Weather or
    Equipment Failure
Coatings
“Construction Red Flags”

• Surface Prep
  – Verify Approved Material is Being Used
• Application
  – Verify QC Program is Followed
  – Verify Applicator is Using QC Equipment
    • Wet Mil Gauge
  – Application is Even and There are No “Runs” Present
  – Stripe Coat Applied to Edges
  – Verify Coating is Applied Adequately
• Post-Application
  – Test Coating
    • Dry Mil Gauge
    • Spark Test/Holiday Testing
  – Lessons Learned – Revisit Coatings Prior to Completing a Work Activity
Coatings
“Construction Red Flags”
Stored Materials
“Construction Red Flags”

• Handling of Materials
  – Per Spec and Manufactures Recommendations
  – Use Proper Equipment with Proper Means of Transporting Material
  – Limit Number of Time the Material is Handled
Stored Materials
“Construction Red Flags”
Pipeline
“Construction Red Flags”

• Trench
  – Trench widths: Minimum and maximum
  – Trench height: Minimum and maximum

• Embedment/Backfill
  – Place between pipe and trench, not on top
  – Improper material used
  – “Placing” vs. “Dumping”
  – Compaction of embedment

• Handling
  – Non-abrasive slings or belts
  – No forklifts or rolling off trailer
  – Crane vs other equipment
Pipeline
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- **Compactors**
  - Right equipment for the space
  - Dual wheel mounted on a track hoe
  - Jumping Jack (9-12 inch wide space)
  - Flat plate vibrating compactors
  - Pneumatic Compactors
    - Fine graded aggregate max lift
    - ~12inches, can achieve 95% density
    - Good in tight spaces, especially the haunches

- **Compaction**
  - Max lift (Spec and material type)
  - Testing Frequency
  - Moisture
Pipeline
“Construction Red Flags”

• Nuclear Gauge
  – Typical of testing the lifts of embedment material between the sidewall of the pipe and the trench wall
  – For tight areas, the Troxler gauge must be adjusted with a **trench offset or sidewall correction factor**
  – The technician must be trained to enter this correction factor before starting measurements
  – The trench wall acts as a rebounding surface and returns more electrons to the gauge than normal causing readings to be skewed and show higher density than actual
Pipeline
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