DAVID EVANS
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Bridge Decks Beyond Maintenance

Presented by

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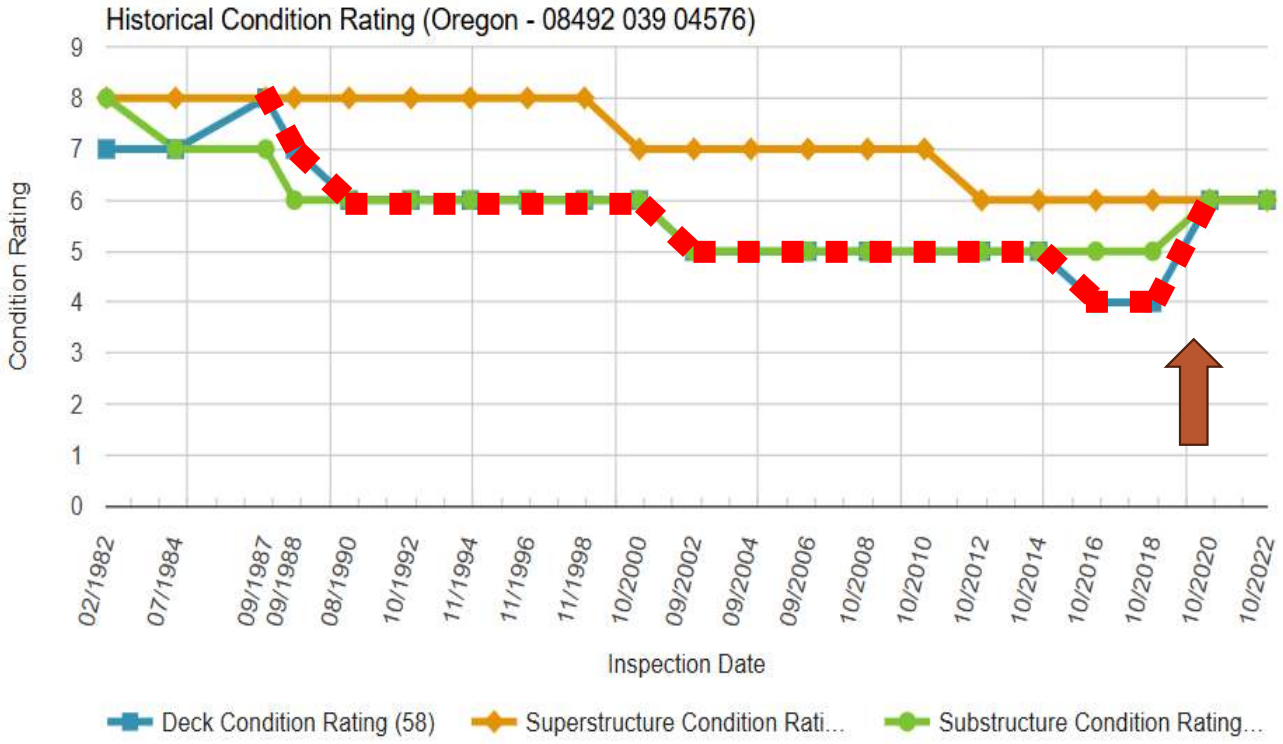
Rehabilitation vs Preservation

Condition Assessment

- Review Existing Inspection Data
- Review Condition Trends
- In-depth inspections and testing
  - Acoustic Sounding
  - Chloride Testing
  - Ground Penetrating Radar

Existing Bridge Data



Source: https://infobridge.fhwa.dot.gov/

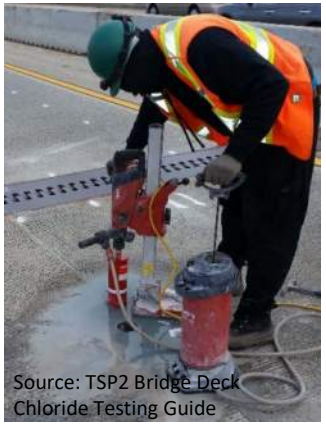
- Review NBI and Element Level Data from Routine Inspections
- Condition Trends over Time
- Project History

NDE – Fills in the missing info

Acoustic Sounding = Delaminations

GPR = Reinforcement Depths, Deterioration Modeling

Chloride Testing = Corrosion Potential



Condition Assessment – Rehabilitation?

- NBI Rating of 4 (Poor)
- Widespread Delaminations
- Frequent Patching History
- Deck evaluation can help determine removal and repair limits.

Construction Quality – Rebar clearances

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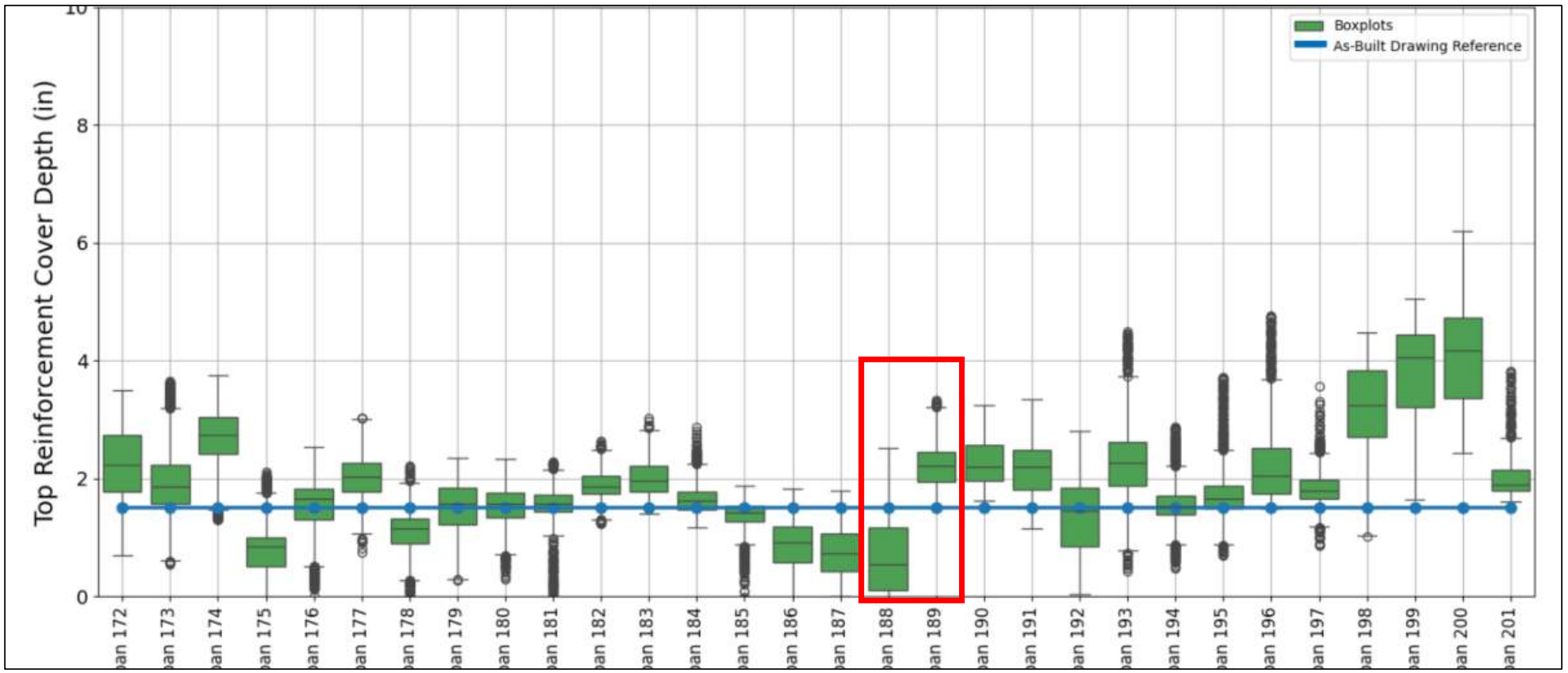
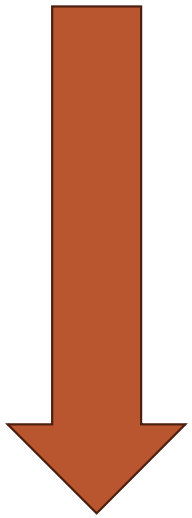


Acoustic Sounding - Variable Exposure

Evaluate Deck Preparation Requirements

Least Invasive/Fastest/Cheapest



Most Invasive/Slow/Expensive

• Deck Cleaning
  • Shotblasting
  • Pressure Washing
• Isolated Concrete Patching
	Maintenance

• Milling • Selective Hydrodemolition • Deep Hydrodemolition	Beyond Maintenance

Deck Preparation - Cleaning

Shot Blasting:

- Decks in good condition.
- Fast and inexpensive.
- Provides a clean and roughened surface.
- Achieved exposed aggregate condition.
- Leaves the surface dry for polymer overlays.

Deck Preparation – Isolated Repairs

Concrete Patching:

- Not a solution for poor decks.
- Watch out for significant quantities.
- History of frequent patching indicates deck may need more invasive preparation.
- Follow manufacturer instructions.

Deck Preparation - Milling

- Provides uniform removal depth.
- Preferred option for removal of existing overlay.
- Removal of original deck may require structural overlay.
- Faster than hydrodemolition
- Verify reinforcement depths (GPR and physical checks)

Hydrodemolition - Selective

- Set for minimal sound concrete removal ~ ¼”.
- Poor quality concrete will be removed as part of the work.
- Great preparation for cementitious overlays.

Hydrodemolition - Deep

- Best option when chloride contamination is below the reinforcing.
- Slower than selective hydrodemolition.
- Wastewater containment.
- Potential for blow throughs.
- Dense reinforcement blocks the effectiveness below reinforcement.

When to Perform Deep Hydrodemolition?

- > 5% existing patching
- > 15% deck patching is anticipated
- High risk of chloride induced corrosion in reinforcement

Deep Hydro Triggers Structural Overlay

Treatment/Overlay Selection

- Sealers
- Thin Epoxy Overlays
- Polyester Polymer Concrete Overlays
- Cementitious Overlays
  - High Performance Concrete
  - High Early Strength Concrete

Deck in good condition

Deck is structurally sound and needs a new wearing surface.

Long service life. Typically, not paired with hydrodemolition.

Structural overlays. Common to pair with hydrodemolition.

Case Study – Yamhill Oflow

- **Built in 1963**
- **300’ Reinforced Concrete Deck Girder**
- **6-inch deck with 1 inch design clearance.**
- **ADT = 23,000**

Condition Assessment

Deck Condition

- Deck in Poor Condition
- Frequent Patching and Repairs
- Shallow Rebar < 1”
- High Level of Chlorides

We need to remove 1-2 inches of concrete with Hydrodemolition

Overlay Selection

PROJECT CONSTRAINTS		OVERLAY OPTIONS
• Preparation – Deep Hydrodemolition	→	• High Performance Concrete / High Early Strength Concrete
• Weekend Closure Permitted – Rapid Curing	→	• High Early Strength Concrete

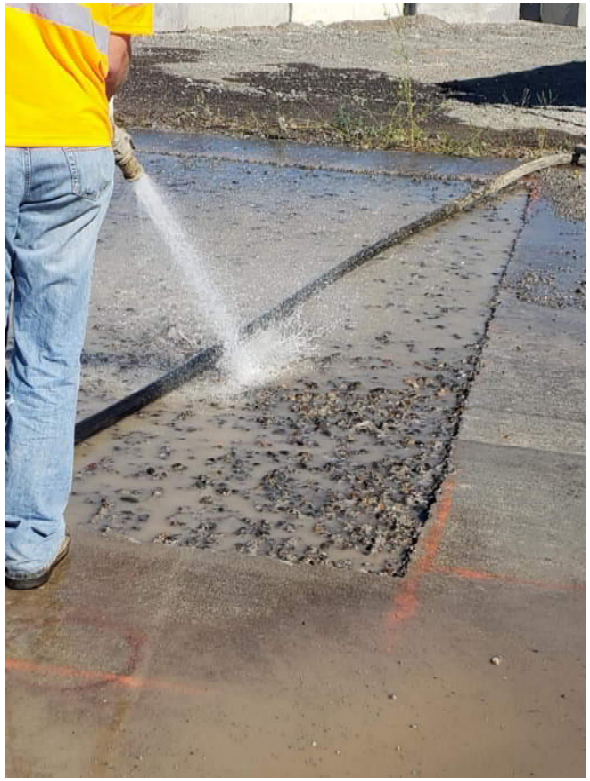
Yamhill Oflow - Construction Photos

Deep Hydrodemolition


Valley
Lincoln

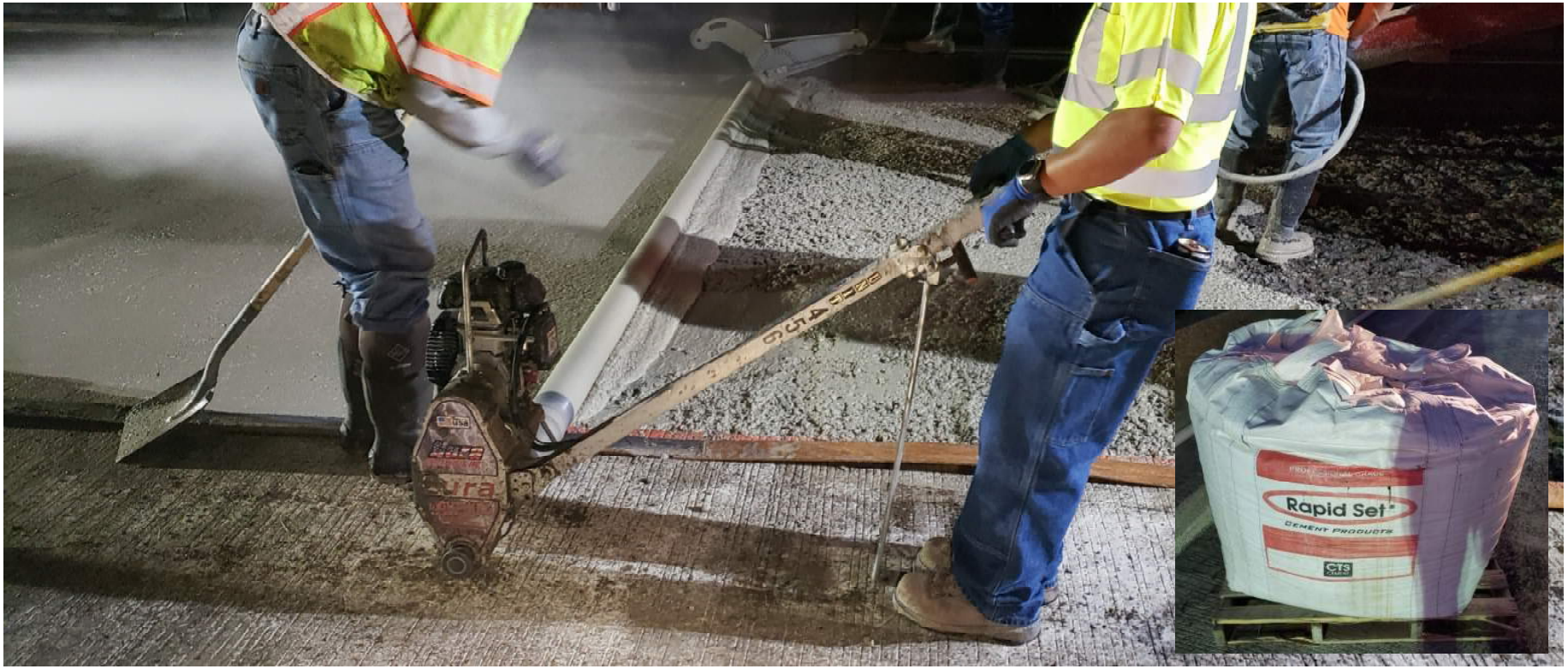

WILDISH

Cleaning up Debris… lots of waste water



Prepared surface is covered

Placing High Early Strength Overlay:




WILDISH


MINI-MIX
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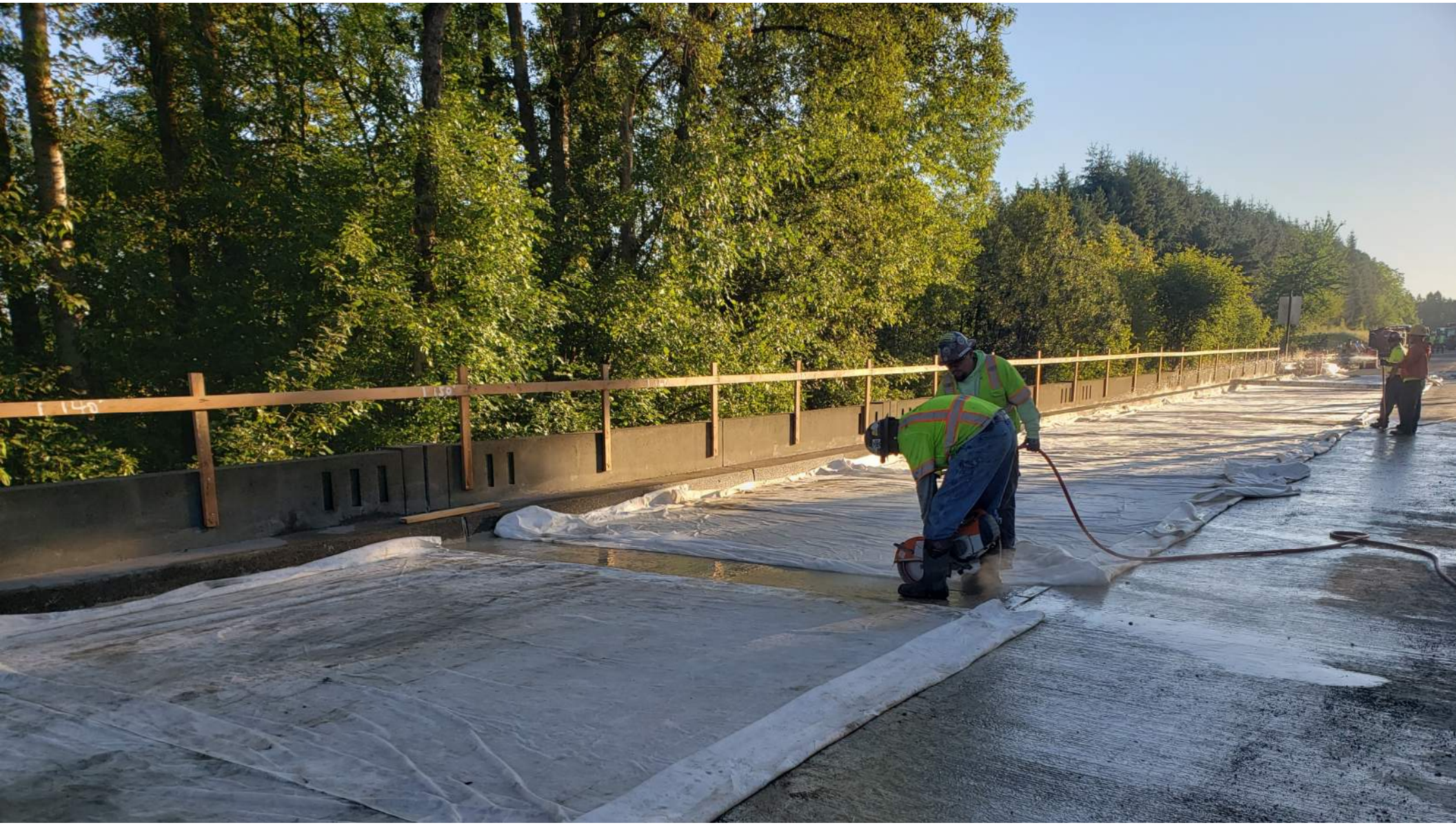
Rapid Set


WILDISH

Float and Tine Finish

3-hour Wet Cure – Blankets within 15 minutes



Finished Product

Questions

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