

Maintenance Painting of a 20-year Old Metallized Through Truss

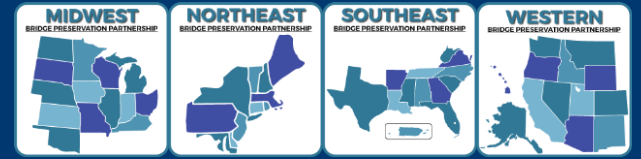
Todd S. Thompson, PE – South Dakota DOT

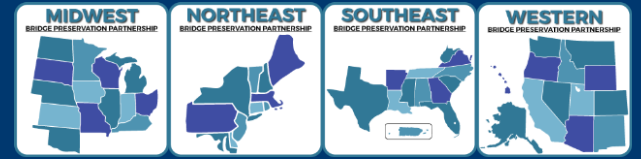
J. Peter Ault, PE – KTA-Tator

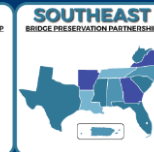
Aberdeen Truss

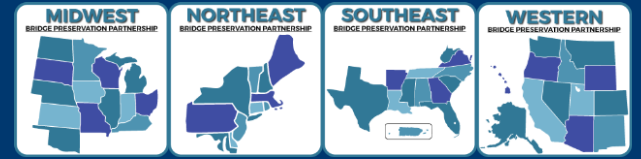
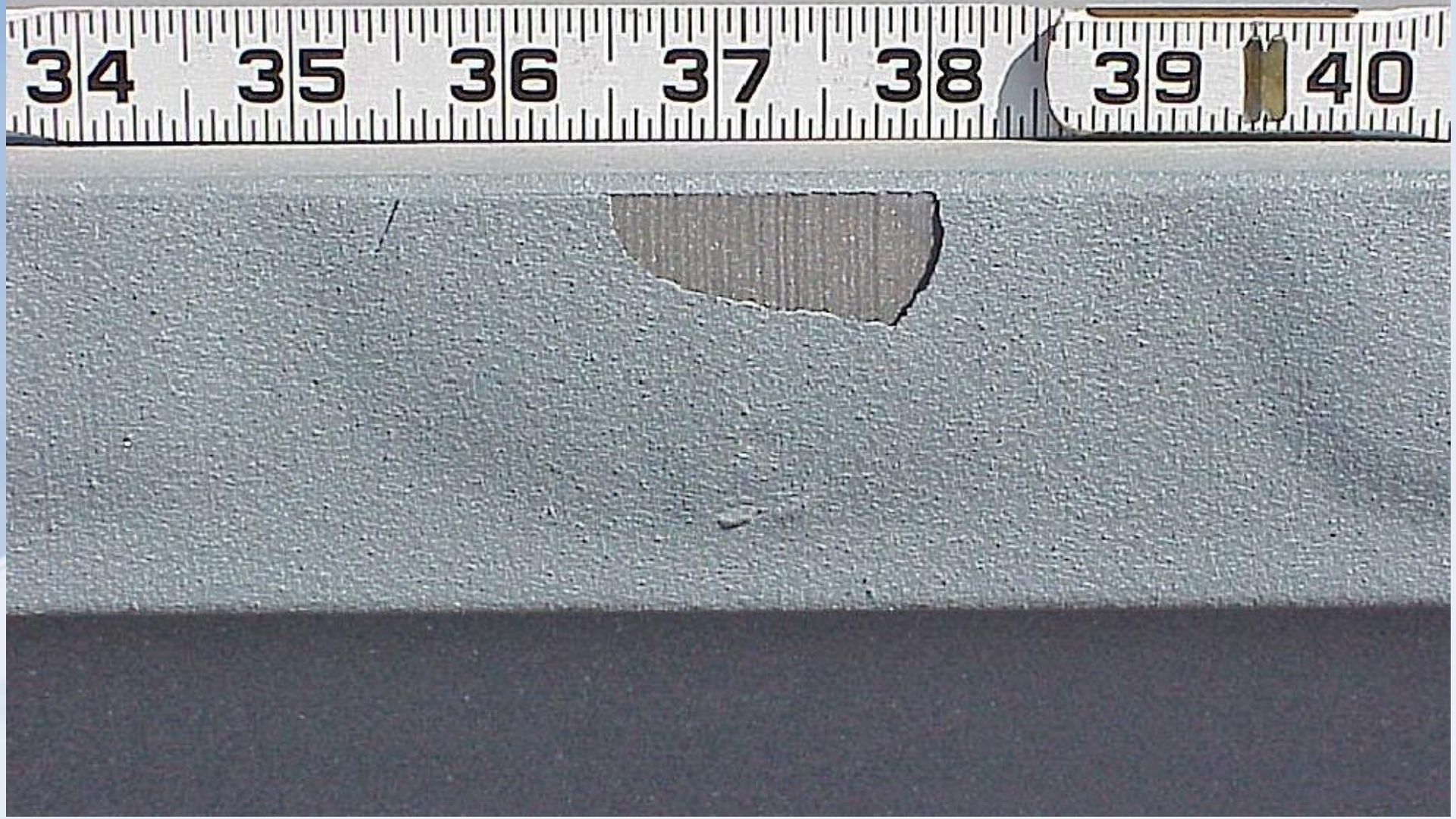


- Built in 2001 and 2002
- Built on the adjacent grade and launched over BNSF RR during a small window
- Truss fabricated and metallized in Pacific Northwest
 - One of our partner states did the shop inspection for us
 - Shipped by RR to Aberdeen and final assembly done onsite
- Metallizing damaged during shipment and field repairs made





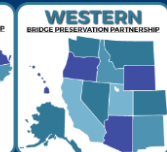
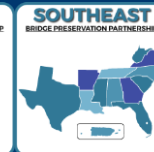


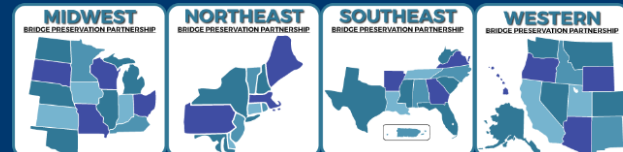




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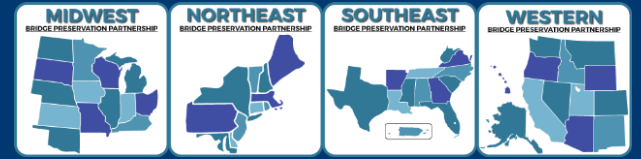


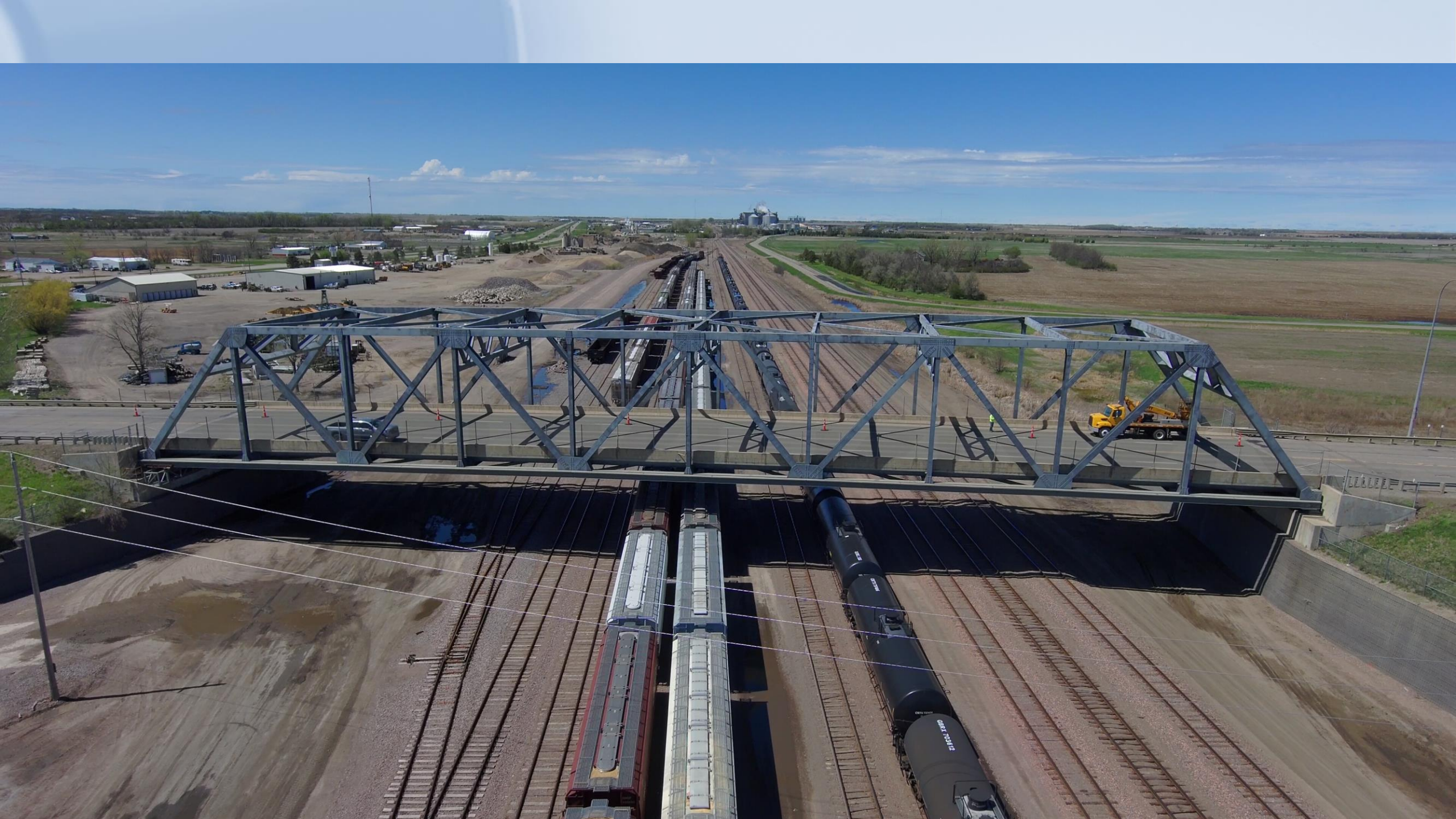






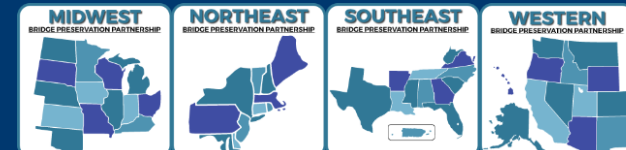
07/07/2015







05/09/2012

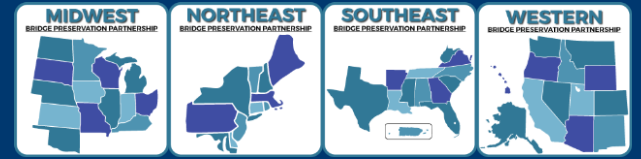


Inspections

- Inspectors started to notice issues with the metallizing in some locations
- Decided we were not sure why this was happening
- Contracted with KTA-Tator for initial investigation to the cause(s) and then another contract to help us address the problem(s)
- SDDOT Developed plan set and let Fall 2023 with construction starting the Spring of 2024

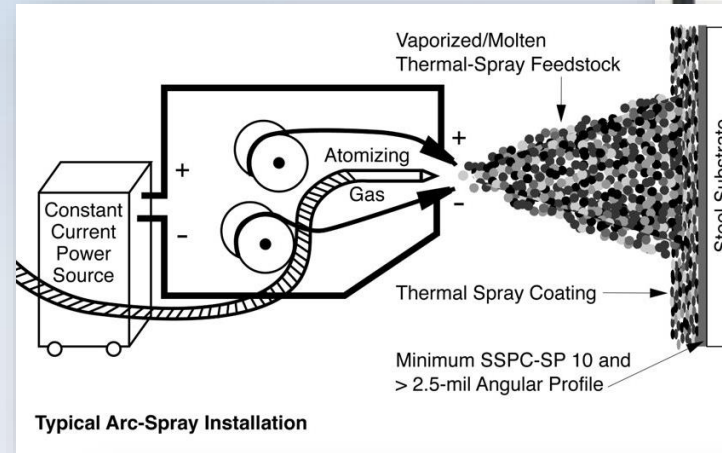


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2019 Failure Investigation

- Fabricated, metalized and seal coated in a shop
 - SSPC SP5, White Metal Blast Cleaning; surface profile of 2.5 to 4.0 mils
 - 85/15 Zinc-Aluminum TSM, 10 to 12 mil thick
 - Theoretical 1.5-mil sealer coat applied to all metallized surfaces
- Field repairs reported



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2019 Failure Investigation

- Coating investigation showed
 - Delamination of field repair coating
 - Blistering and delamination on flame cut
 - Mottled appearance due to uneven break
 - No significant section loss due to corrosion



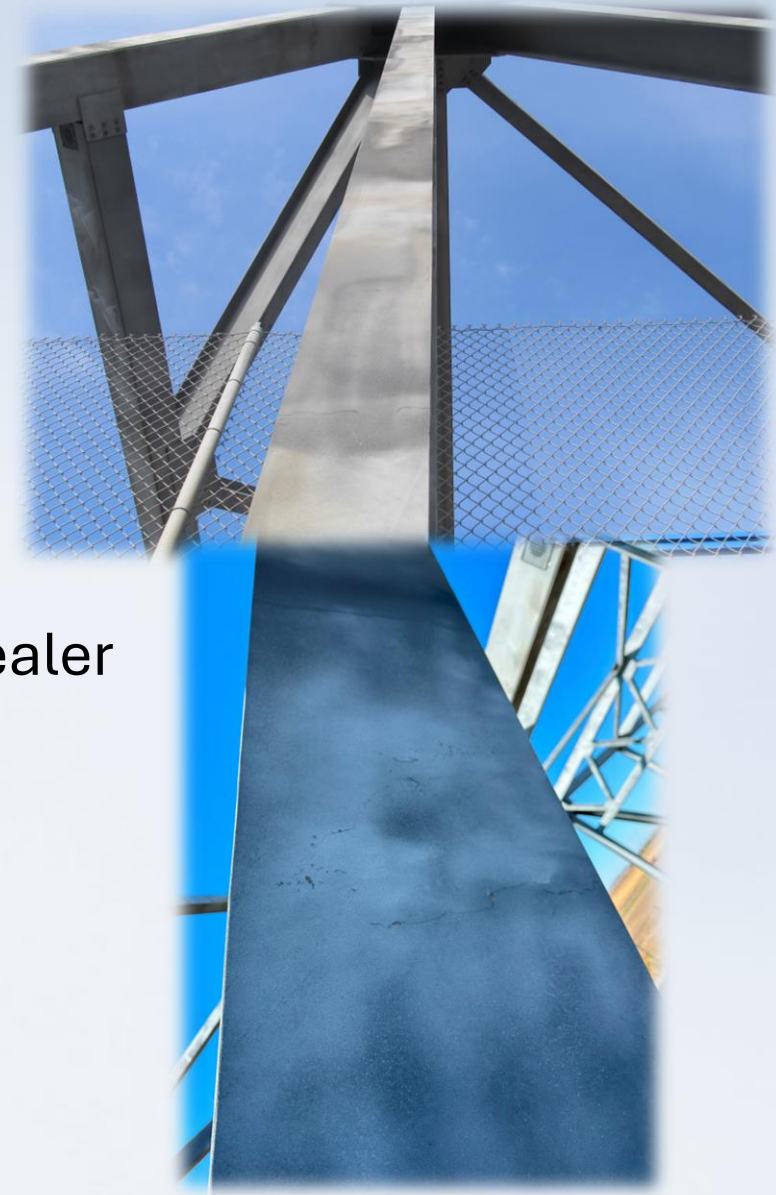
2019 Failure Investigation

- Coating investigation showed
 - Delamination of field repair coating
 - Blistering and delamination on flame cut edges
 - Mottled appearance due to uneven breakdown of sealer
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2019 Failure Investigation

- Coating investigation showed
 - Delamination of field repair coating
 - Blistering and delamination on flame cut edges
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 - No significant oxidation loss or pitting corrosion



2019 Failure Investigation

- Coating investigation showed
 - Delamination of field repair coating
 - Blistering and delamination on flame cut edges
 - Mottled appearance due to uneven breakdown of s
 - No significant section loss due to corrosion



Repair Options

- Full removal, full replacement metallizing
- Full removal, full replacement metallizing/sealer/polyurethane/clear coat
- Full removal, Zinc/epoxy/urethane
- Spot repair, metallizing with full overcoat
- Spot repair, conventional coating system with full overcoat

Repair Options

- Full removal, full replacement metallizing (original system)
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- Full removal, full replacement metallizing (original system)
- Spot repair, metallizing with full overcoat
- Spot repair, conventional coating system with full overcoat

Repair was half of the installed cost, half the life-cycle cost, and has a comparable service life to removing the existing coating and replacing it with the original system

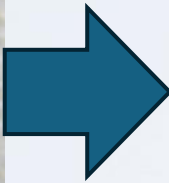
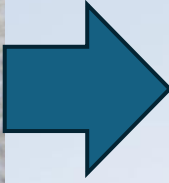
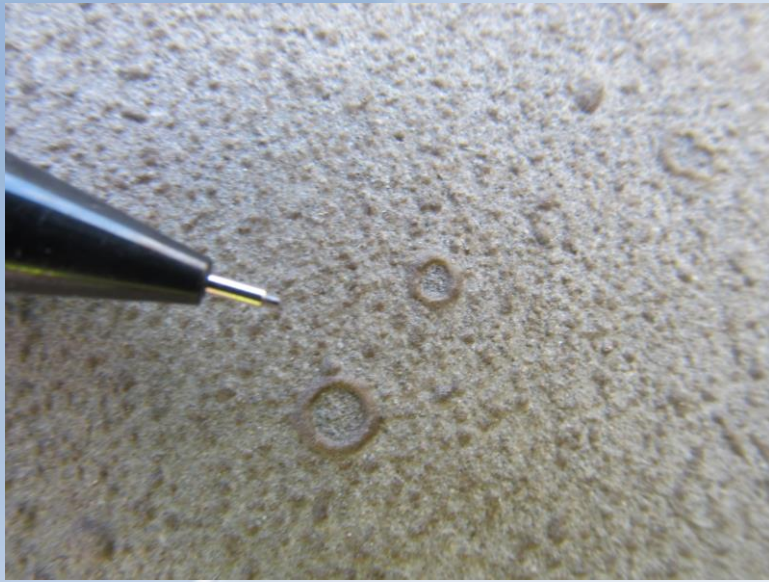
Special Provision for Spot Repair and Overcoating

- Flame Cut Edges
 - Solvent Clean as necessary
 - Grind accessible edges (no adjacent welds)
 - Prepare to SP-10, Near White Metal Blast Cleaning
 - Apply organic zinc primer, epoxy intermediate and urethane topcoat
- Remainder of the Structure
 - Solvent Clean as necessary
 - Prepare to SP-18, Thorough Spot and Sweep Blast Cleaning for Industrial Coating Maintenance
 - Apply organic zinc primer to bare steel locations
 - Apply penetrating primer to retained metallizing
 - Apply epoxy intermediate and urethane finish coat to all surfaces

Project Demonstration



Project Demonstration



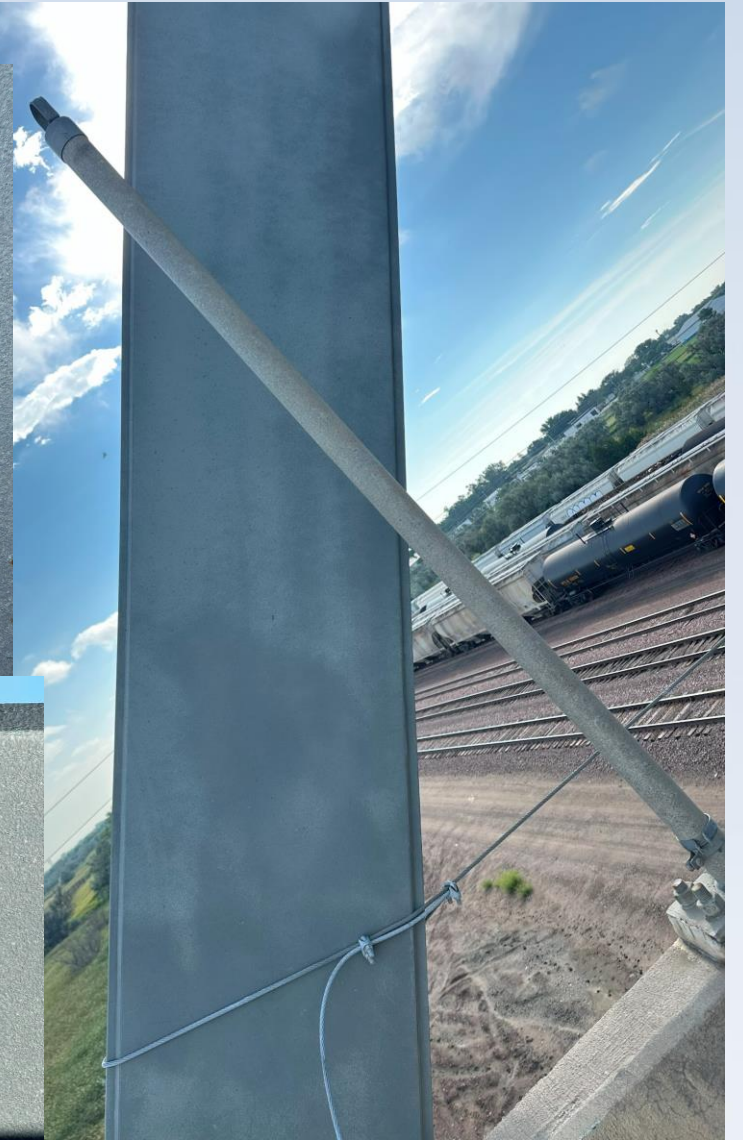
Project Demonstration



Project Demonstration



Project Execution – Existing Condition

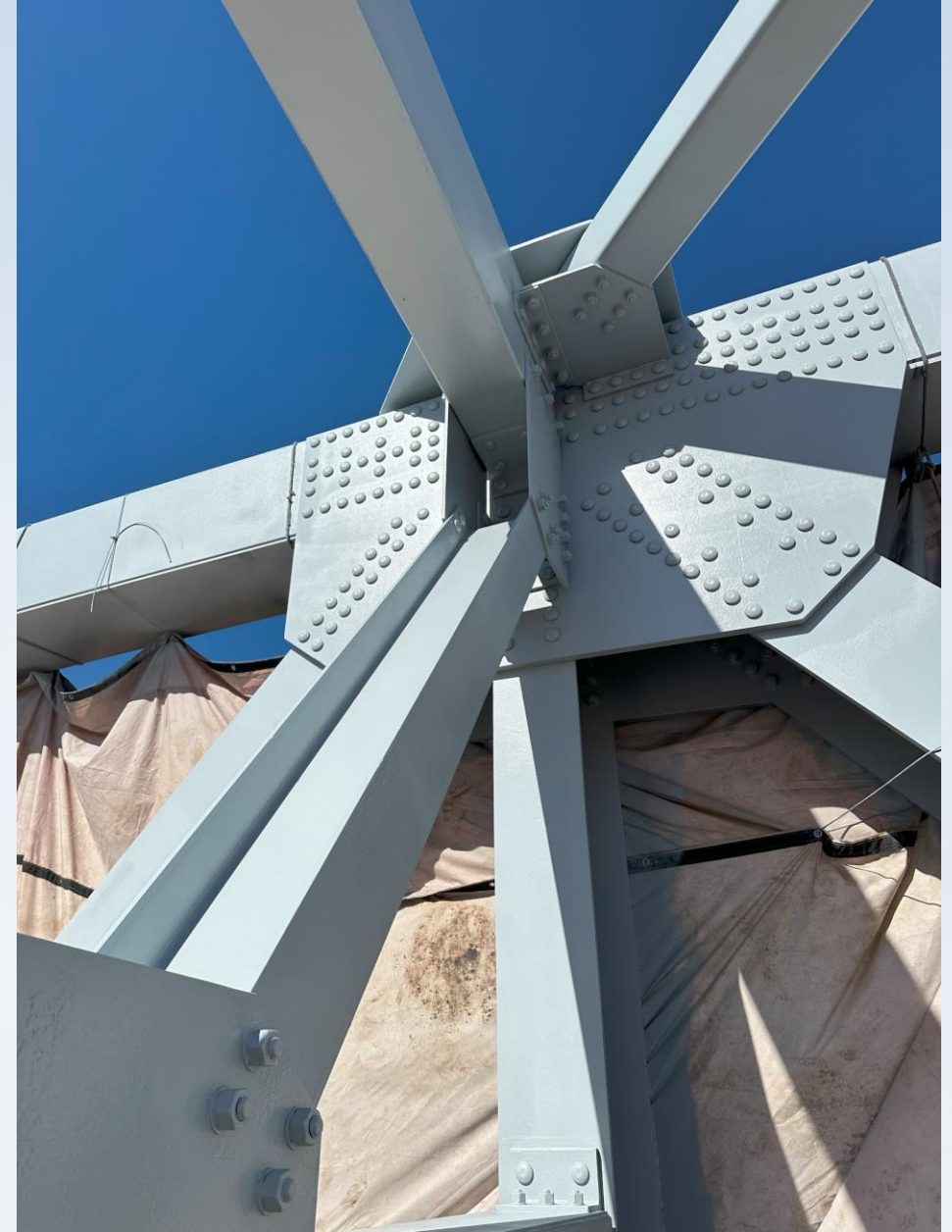


Project Execution – Surface Preparation



Project Execution – Coating Application

- Overcoat System
 - 9.5-18 mils DFT over retained metallizing
 - Penetrating Primer (1.5-2 mils)
 - Epoxy Intermediate (5-10 mils)
 - Polyurethane Finish (3-6 mils)
 - 10 mils of metallizing remained
 - 3 mils on galvanized fasteners
- Where metallizing was removed, Organic zinc primer (3-5 mils) was applied before the penetrating primer



Project Execution – Coating Application



Thank You!

