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POLYQUIK®
PERFORMANCE PRODUCTS



Concrete & Bridge Repair, Protection & Preservation

Gary Williams. National Sales Manager
PolyQuik Performance Products Division of The
Willamette Valley Company

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Mike Jirka, WVCO SpikeFast Sales Manager for Norfolk Southern



WVCO

The Company
that brought SpikeFast to
the market

- SpikeFast® is a polymer compound injected into existing or pre-drilled holes in ties.

- SpikeFast enables the existing tie to hold coach screws to keep the chair/ baseplate in place.
- Existing holes filled with SpikeFast can be re-filled, with no deterioration in strength.
- Very fast return to service through quick cure mechanism
- SPIKEFAST extends the working life of Rail ties

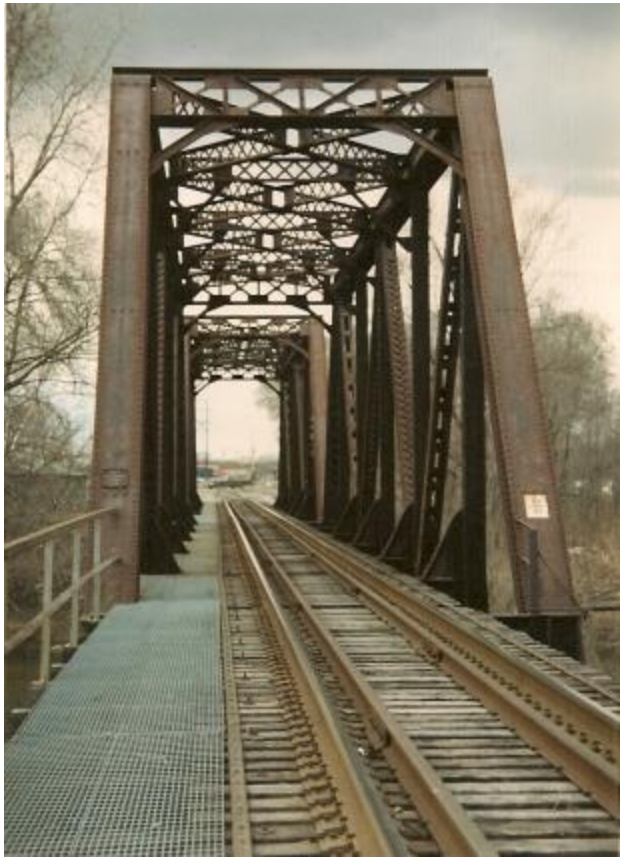
Extend the Working Life of Your Infrastructure



East Rochester, NY



Manville, NJ



Shelby County, IN

From Exec Summary: Rail Capital Improvement Project Report
Albany – Schenectady Capacity Improvement: Main Track Project

- “The bridges were found to be in generally fair to poor condition.
- Common deficiencies included bearings and seat areas covered in damp debris with the bearings exhibiting significant corrosion (several were in a frozen condition with sheared anchor bolts), spalled and cracked substructure concrete and primary member corrosion with section losses in isolated areas.
- Superstructure paint systems were typically in advanced stages of failure”

Federal Hwy Administration. Office of Infrastructure

More than 25 percent of the Nation's 600,000 bridges are rated as structurally deficient or functionally obsolete.

Bridge Preservation

PREVENTATIVE MAINTENANCE 2 kinds:	REHABILITATION
•CYCLICAL (Non Condition Based) • CONDITION BASED ACTIVITIES – a reactive approach	FUNCTIONALLY OBSOLETE and/or TOTAL REPLACEMENT

NS Infrastructure Issues

- Ageing Infrastructure
- Concrete Deterioration on and around deck
- Exposed Reinforcing steel
- Leaking Bridges
- Bearing Pad Deterioration
- Column Deterioration
- Timber Spike Deterioration

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What Technologies are currently being used?

- Concrete Repair: Epoxy based repairs & Cementitous repairs.
- Limitations: Temperature sensitive, environmentally unfriendly, labor intensive.





Older technology can be more expensive in more ways than price. Wear & tear on more workers.
These systems are not very resistant to freeze/thaw conditions which is often why they failed in the first place.

Concrete Repair

1985 Technology





Concrete Repair

2014 Technology





FastPatch Products

- Fast setting, sag resistant, for horizontal or vertical repairs of cracks, joints, spalls & columns.

- 5G kits to 250g Totes for very fast concrete repair that can be coated over the same day.

- Traditional methods take much longer to cure and delay the coating process.

- WVCO offer a single source solution.

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FastPatch Products

How & Why Does this Technology Work & Last Longer?

- Integral Flexibility
- Shock Absorbing Ability

Equals:

- Freeze/Thaw Resistance
- Impact Resistance
- Long lasting, maintenance-free performance

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Cold Weather..

- Cementitous technology cannot be used at or below freezing because of the water content ..
- Epoxies are often preferred because of high early strength capabilities
- In cold weather epoxies need pre-conditioning (heating in tents)
- Epoxies often fail to gain full strengths when compromised by cold conditions
- Both technologies have very long cure times in comparison to the FastPatch systems

Concrete Repair



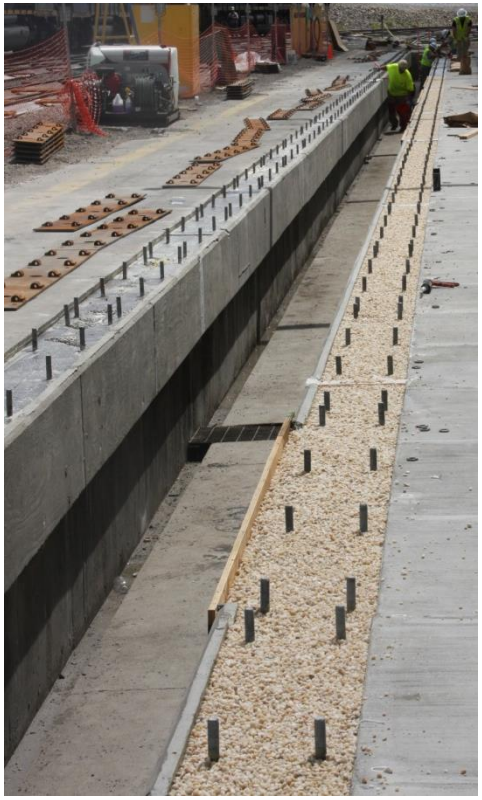
Concrete Repair



- Return concrete to full and safe integrity
- Anchor bolts
- Minimize downtime
- Ensure long lasting & durable performance

Clean, dry and sound concrete needs to be exposed…

Pre-set Gravel & Metered Material





Completed Repairs

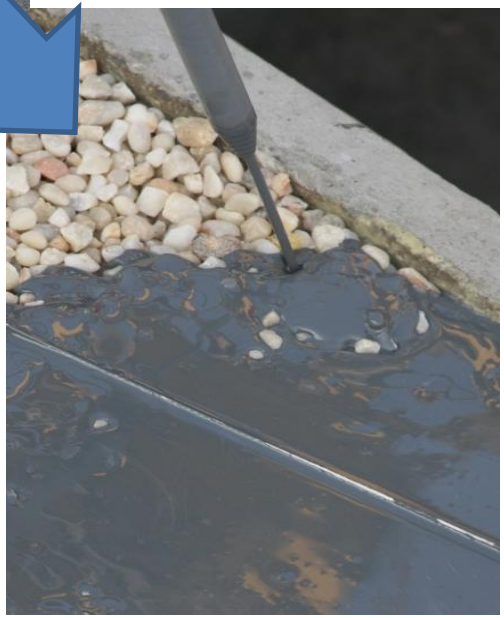


Concrete Repair Versatility









Bridge Base Plates



Erosion of the supporting columns, grout and corrosion of the base plates themselves



Issues:

1. A durable, high strength fix is required
2. Do not keep the bridge out of service
3. Do not repeat the repair

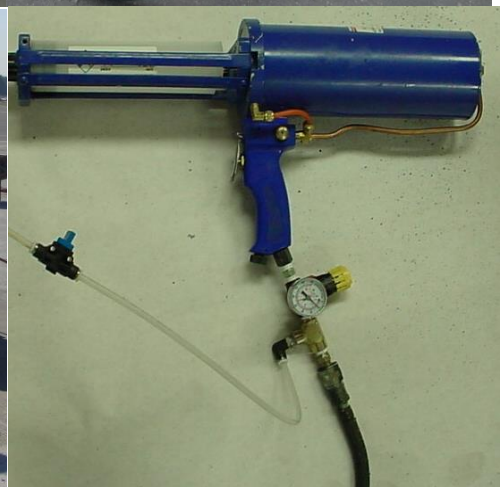
Customized & Creative Solutions





In order to “drop in” on a bearing pad to insert the Polyurethane grout, we have used a cherry picker from land and a meter in the back of a pick-up to access the voids once the bridge has been jacked up





For even tighter access the material can be caulked in using pneumatic or battery operated equipment.

Column Repairs

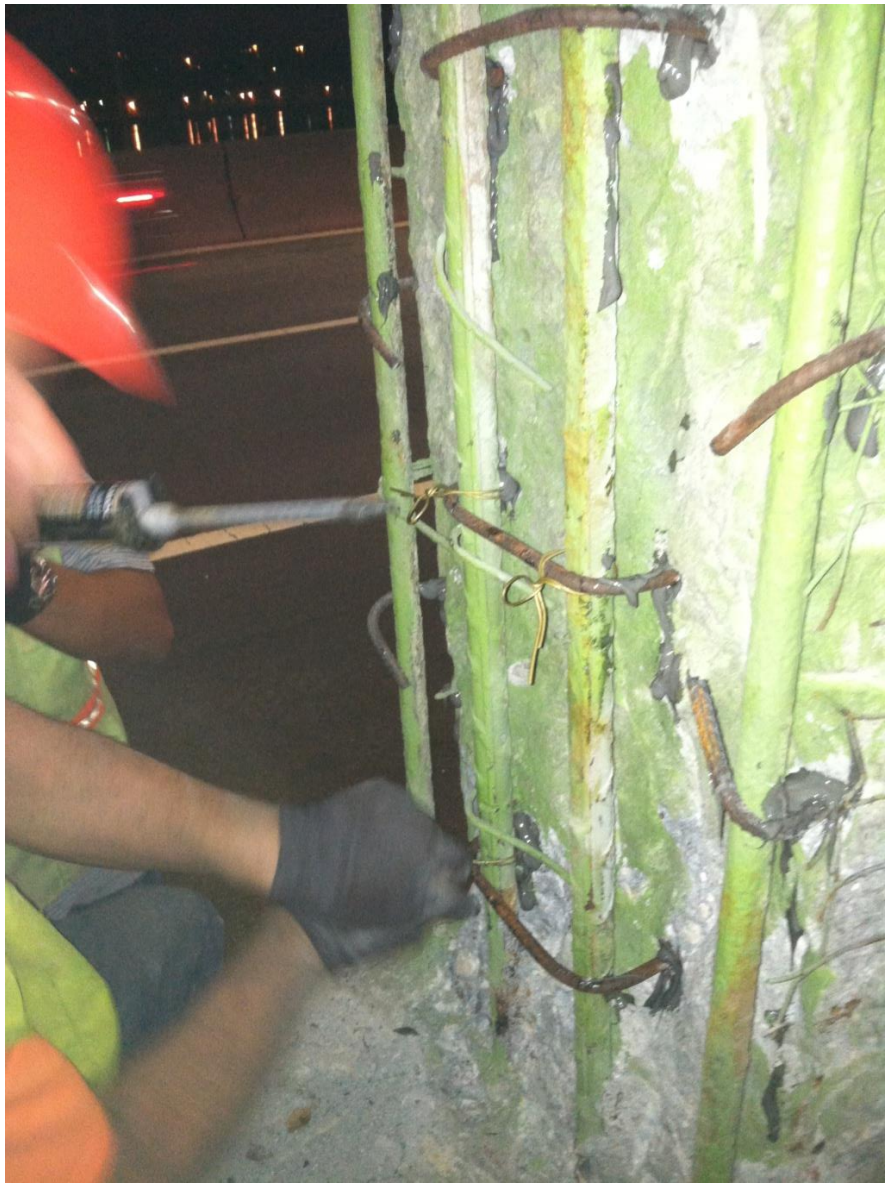


Deteriorated concrete removed to expose reinforcing steel and square cut to accept repairs



Column Repairs

Any new steel or bars that need re-anchoring are set with Famocrete in lieu of epoxy. Compatable with FastPatch and very fast to cure.



Column Repairs





Forms are set, FastPatch is poured in and the forms are stripped after 1 hour.

Profile: Hump Maintenance, Loiusville, KY. 9/1/2013



Pumping of the rail indicates that maintenance of the foundation is required



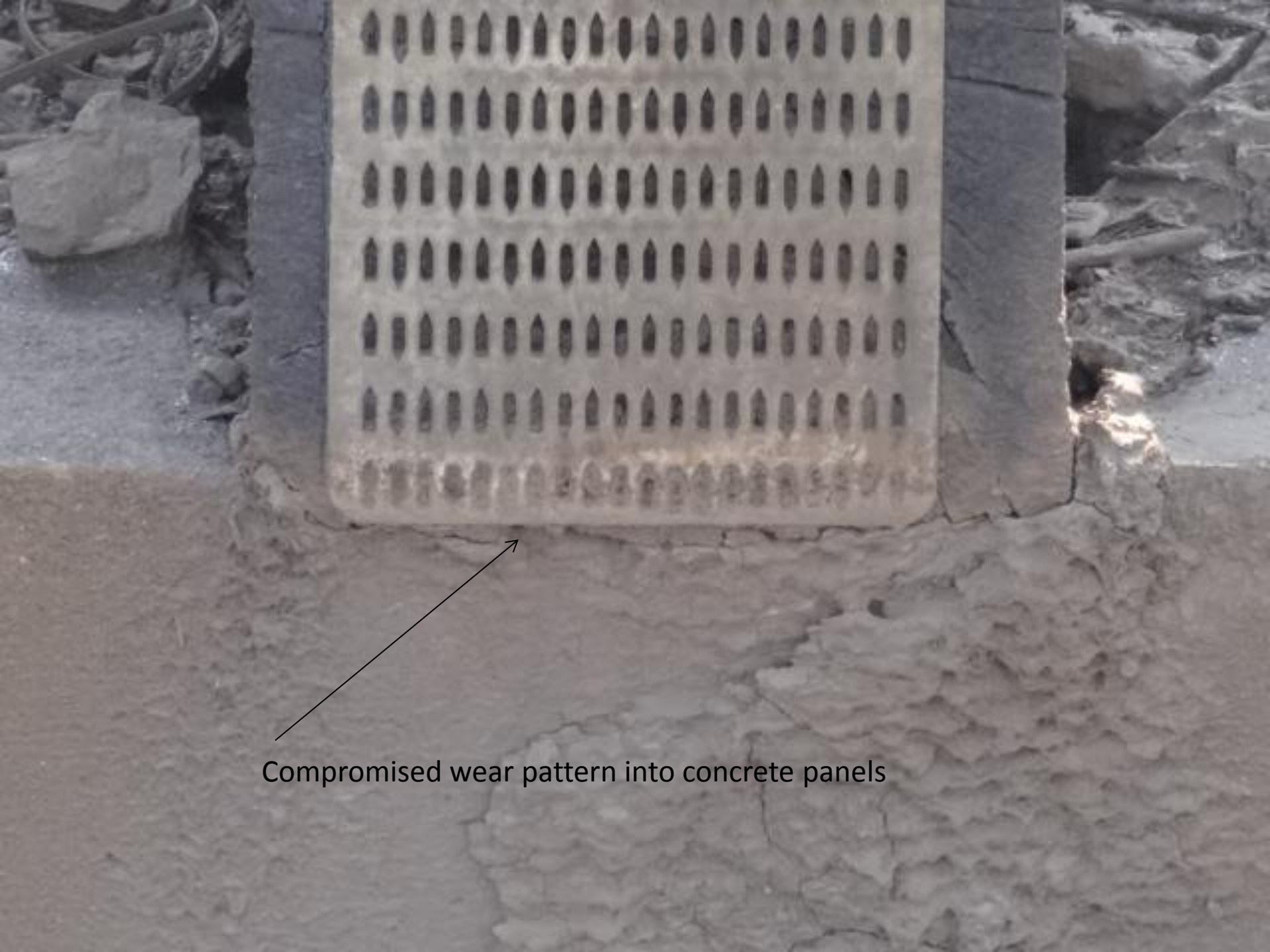
Approach slab leading up to the hump and scale



Uneven bed for ties where concrete had worn at differing rates



Old ties would be removed and worn concrete replaced with FastPatch MD.


Compromised wear pattern into concrete panels



Ties Removed and Substrate Received Nature's Powerwash … Mud would be removed by Sump truck

Note the bowl shaped wear pattern. These were NOT saw-cut prior to repair



Approach slab sloped up to the scale

Foam & FAMOCRETE used to form the ties prior to FastPatch placement

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Exposed Degadeck Polymer Concrete

Degadeck is a very fast set repair system that has a high compressive strength .



Removal of failed Degadeck Polymer Concrete.

3rd replacement in 12 months.

Very hard, toxic material required pulverizing and this led to further cracking….



Crack within the Polymer Concrete. The rail had started to pump, highlighting the need for repair

About ½ of the Polymer Concrete removed.

A crack at the base meant full removal was necessary



Sump pump vacuuming out water after storm.

A limitation of Polyurethane technology is its sensitivity to excess moisture. Substrate must clean and dry.



Drying out the hole for the placement of new material

Substrate must be dry and dust free prior to priming & installation of FastPatch. After removing excess water with the pump, a propane torch can be used to dry out the surface of the concrete



Clean, dry gravel is placed as the FastPatch is metered into the repair area. 50% of the volume may be displaced with the gravel to add compressive strength and to reduce the overall cost.



FastPatch placed up to the top edge of the shoe. Full contact with underside of shoe



Completed repair. Over 60 x 50lb bags of gravel used. 300g of FastPatch. Back in service within an hour.

Locomotive Maintenance Pits



Stress from impact and movement on concrete edge from Locomotive causes deterioration

Profiled, primed and repaired in hours





FastPatch is extended with gravel and then plates placed over the top within an hour of installing the FastPatch. Rail can then be fixed to the plates and the whole pit put back into service immediately.

Locomotive Maintenance Pits



Ease of access with metered technology

Waterproofing

- SPRAY APPLIED ELASTOMERS (Polyurea)
- Instantly Cures = Fast Return to Service
- 500% Elongation = Expands & Contracts
- High Tensile Strength (3000psi) vs Low Tensile of existing MMA systems (1800psi)
- 100% solids, 0-VOC and no odor vs Highly Toxic & unstable MMA's
- Made in America



Polyurea



- Long lasting
- Flexible (>450% elongation) for outstanding membrane performance
- High Chemical resistance and robust wear characteristics
- Approved applicator program ensuring correct specification and installation
- Very fast return to service

Polyurea





Can be shop-applied or field applied. Low temp application (below zero) to above 120f

Polyurea is Versatile (sample)

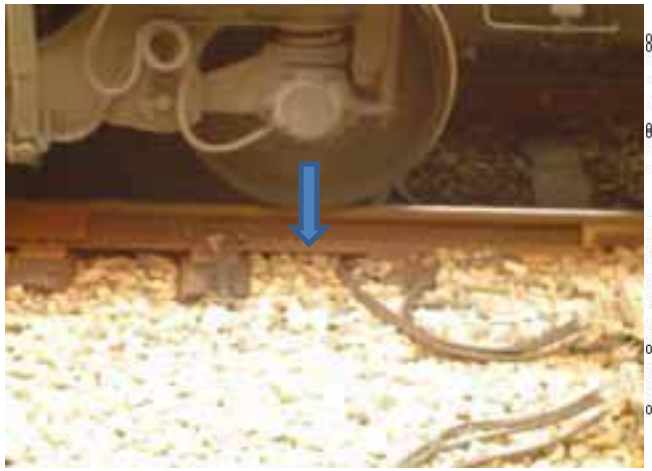


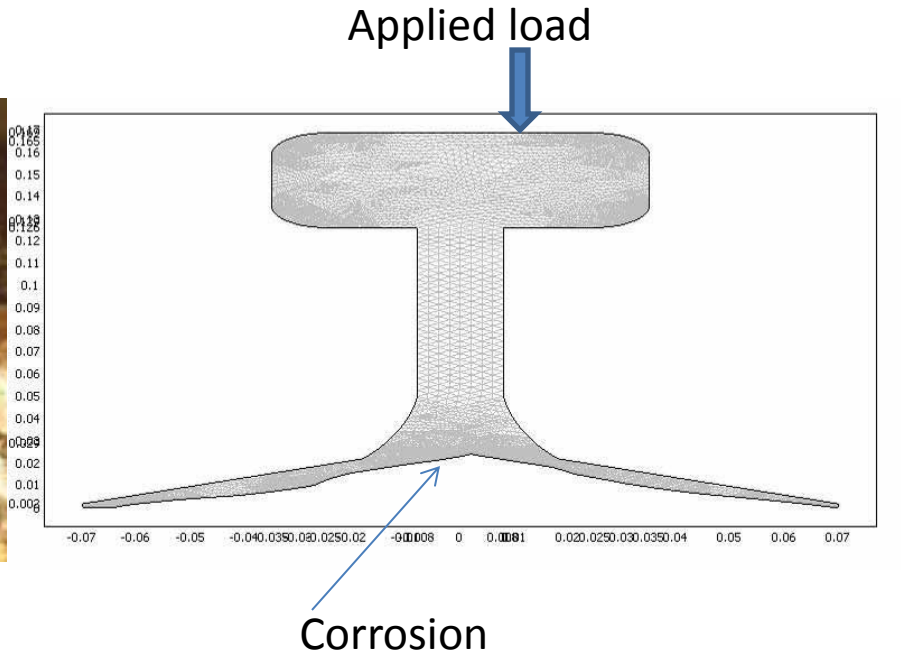
Can be applied over concrete, steel or wood with equal effectiveness.

What does it cost?

- Product for product Polyurea technology is viewed as more expensive than Epoxy, MMA and Paint technologies.
- As the scope of projects increase the price per square foot installed is often lower with Polyureas because production rates increase and downtime is massively reduced.
- Polyurea systems are approved by AREMA

Rail Base Corrosion





Starts when the steel is cracked or damaged in some way to allow the corrosive process to begin. Full report about how and why it occurs: http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_webdoc_37.pdf

Rail Base Corrosion

Most severe indication of corrosion was seen in systems with underground (tunnel) sections, in locations with significant history of humidity. Conversely, transit systems located above ground in the open air exhibited only minimal corrosion





Rail slice shows uniform corrosion at bottom and side of rail but nothing on ball of rail. We can apply a protective coating up the ball of the rail.

Solutions... as per Chapter 7 in TRB report

- Conduct proper track maintenance and cleaning practices
- Install suitable insulation to prevent stray currents
- Redirect water present along the tracks
- Identify potential locations for corrosion and prevent the presence of stray currents
- Avoid direct contact between rail and track components (fastening system, ballast, ties)
- Recognize that timber ties are marginal insulators particularly when chemically treated
- Use continuously welded rail where possible; where joint bars are present, use bonding wires for proper connections

- *Use coated and/or encased insulator materials for embedded tracks*

Coated Rail for Lifelong Protection



Spray coating the rail, or at least the underside, means that rail base corrosion cannot occur. This is obviously a preferable solution when applied before the rail is placed but it can be done in the field. The coating will also prevent any current leaking….

Geo-Membrane Panels

- Pre-sprayed panels that can be placed in the field and adhered on-site.
- Same seamless waterproof membrane but with additional wear characteristics
- Very fast installation over

minimally prepped and

a variety of substrates

- No overspray
- Eg: over timbers





Concrete & Steel Bridge Decks



Extend the Life with WVCO Technology



Infrastructure repair from embedded rail, to shops, to bridge plates & pads, to bridge decks to secondary containment…



Willamette Valley Company