

ITD Program Launch

Moderated by:

Ed Welch, PE - NCPP

Presented by:

Brian Mintz, GM - Phoscrete Corporation

Lorella Angelini, Civil Engineer - Angelini Consulting Services

Walter Peters, PE - Oklahoma Department of Transportation

ITD: TSP2's National Working Group

- Industry Technology Demonstrations
- Innovative Technology Documentation
- Working Group Chair: Ed Welch
- NCPP Work Team: Brian Mintz & Lorella Angelini

ITD Pilot Program

- The Industry Technology Demonstrations (ITD) Program is a AASHTO TSP-2 field demonstration program designed to introduce innovative materials and technologies for Bridge and Pavement Preservation to DOTs.
- ITD is open to other Owners including Municipalities, Airports, Military, Port Authorities, and Private Industry.

ITD is a Collaboration of 4 Parties

- Owner
- Manufacturer
- Consultant
- AASHTO TSP2

Owners' Goals



Learn

Share



Other Party's Goals

- AASHTO TSP2
 - NTPEP, APEL, ITD
- Manufacturer

Work Scope

- Promote best practices
- Develop general guidance
- Monitor and share

The 'living concrete' that can heal itself



Innovative Technology - **WOW!**

- Is it on the QPL?
- Who else is using it?
- Let's try it out and watch how it performs over a couple of winters.
- Repeat 50x

Problem Statement

- Incomplete Documentation
- Bias of Case Studies and References
- One Strike and You're Done
- Difficulty of Inter-Agency Knowledge Sharing
- Long Process to bring new technology to market

An Innovator's Slow Road to Credibility

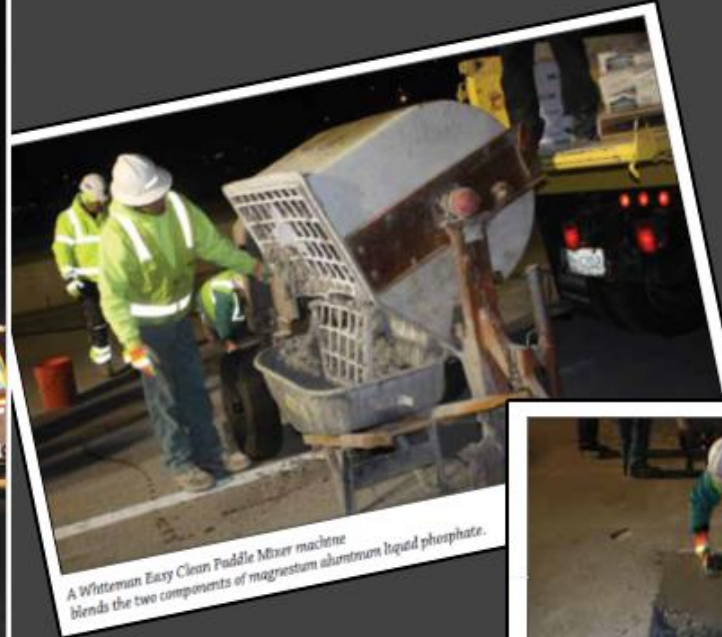
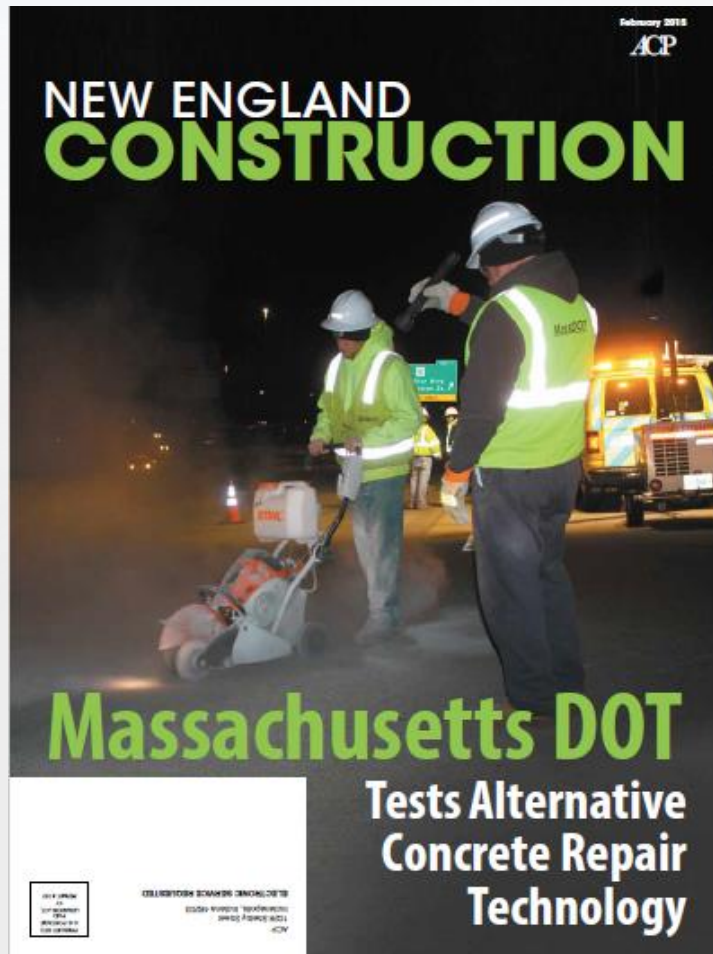
"Engineers want (and deserve) to see proof first hand before they are confident specifying new or innovative products. Examples of success from states that already work with our material help get us through the early stages of acceptance with new owners. **We now have 35 years field experience with our overlay**, and the first ones are still performing today. That history of success is a slow road to the credibility we developed."

– Merritt Hanson, Kwik Bond Polymers

ITD: A Faster Path to the Best Solutions

- Demonstrate
- Observe
- Document
- Share
 - BOTH Successes and Failures

First ITD Installation - December 2014



Manufacturer Involvement

- On-Site Installation Support
- Compensates Consultant
- Responsible for Follow Up

Independent Consultant

- Experience
- Credibility
- Reporting

Owner's Commitment

- Identifies location
- Purchases product
- Mobilization and installation
- Performs scheduled inspections

Manufacturer Experience

- MALP ITD Pilot Program Overview
- Owners are receptive
- Hard to get follow up inspections without going on-site

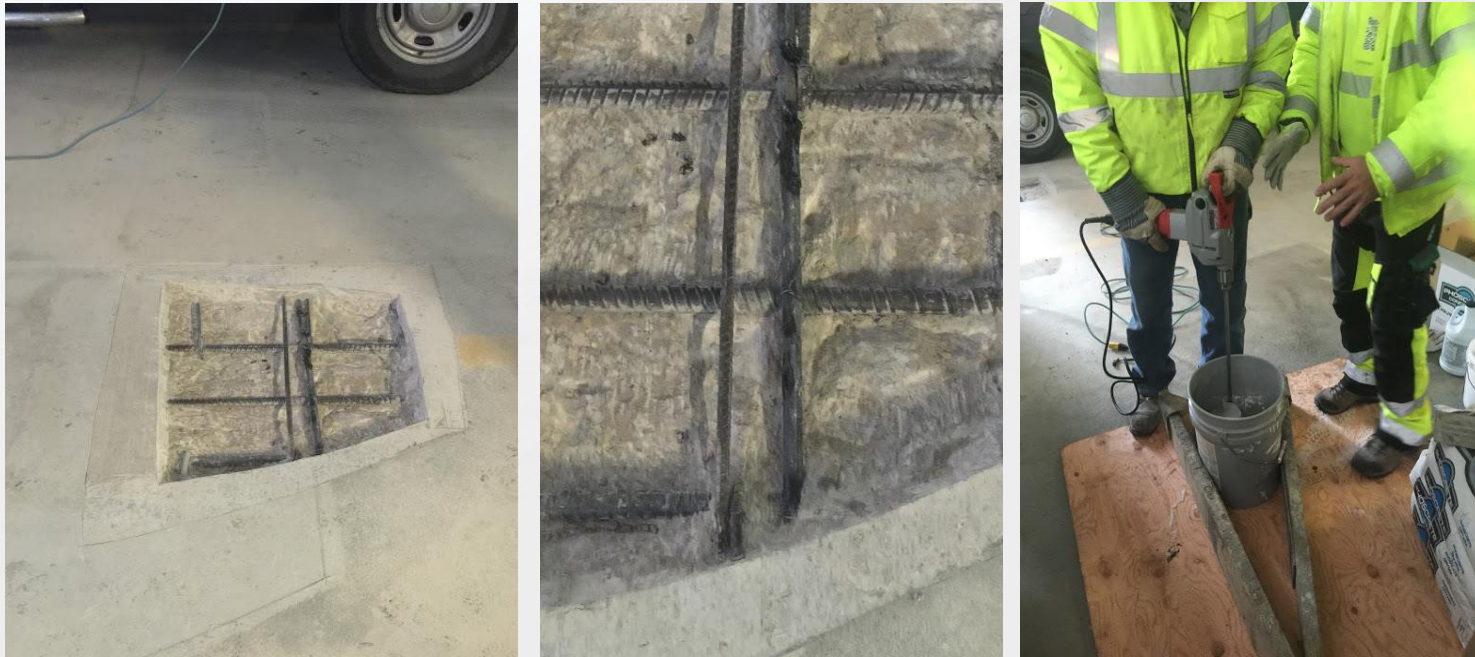
Consultant's Experience Parking Garage

Lorella Angelini, Civil Engineer – Angelini Consulting Services
City of Minneapolis

City of Minneapolis Parking Garage

- Marquette Ramp
 - 11th Street & Marquette
 - 5th Floor - Covered area
 - Post-tensioned structure built in 1976
 - Deck has been patched several times
 - Patches are protected with polyurethane membrane
- Application:
 - MALP Concrete (Phoscrete HC)
 - Two patches: square and trapezoid
 - On 12-22-2015: Ambient temperature: 29 - 31 F
- Representatives from:
 - City of Minneapolis (Owner)
 - Phoscrete (Manufacturer)
 - Consultant (ACS)

Surface Preparation & Mixing



Trapezoid Patch: 2 x 2 ft. - 4 in. deep. Square Patch: 2 x 2 ft. - 3 in. deep
Saw cut edges. Dry concrete. CSP = 5. Clean rebars.
45 sec. mixing time per batch with an electric drill with auger.

Application & Finishing

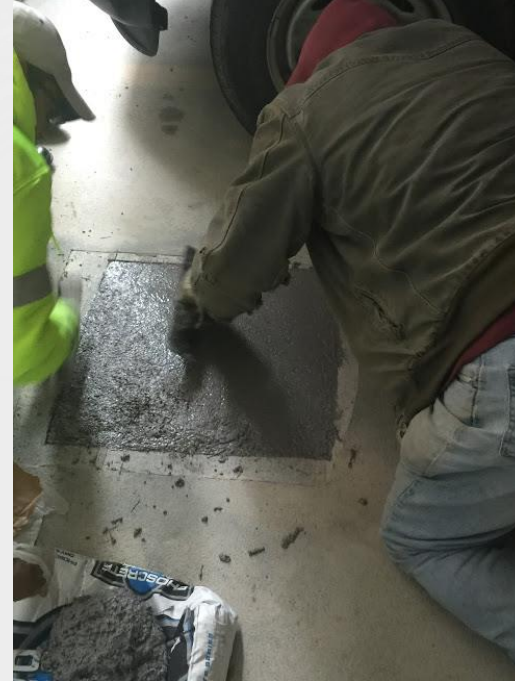


Time between 1st & 2nd batch = 3 mins.

Installation time per patch: 15 mins.

Crew: 1 person at the mix, 1 at the pour, 1 for troweling

Completed Installation (Dec. 2015)



Job completed from 10:00 to 11:00 am.
Parking stall reopened at 12:00 pm
Ambient temperature: 29 - 31 °F

1-Month Inspection (Jan. 2016)



Unexpected color pattern with the square patch: a dark gray color at the center.

No cracks. No debonding in both patches tested with hammer and drag chain.

6-Month Inspection (Jul. 2016)



After approx. 7 months, the square patch regained an almost uniform color.
No cracks.
No debonding in both patches tested with hammer and drag chain.



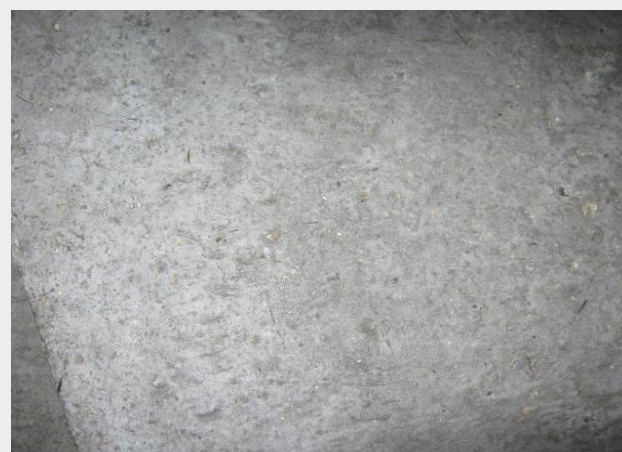
1-Year Inspection (Feb. 2016)



Square patch: a few fibers are visible on the surface, probably due to abrasion.

No cracks.

No debonding.



Trapezoid patch: some minor scaling probably due to scaling.

No cracks.

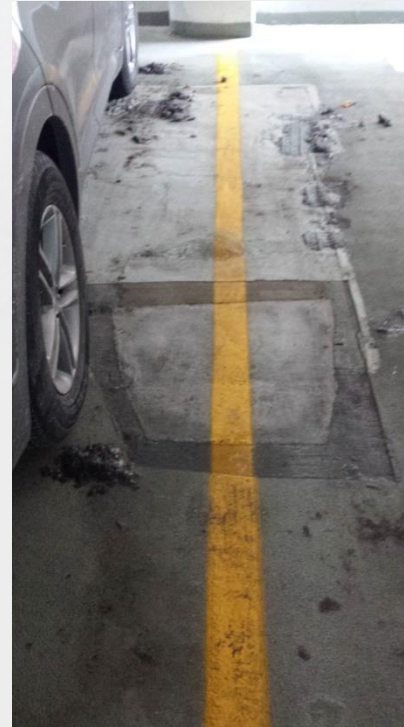
No debonding.



2-Year Inspection (Dec. 2017)



Square patch: No cracks.
No debonding (sound test with a rod).



Trapezoid patch: Hairline crack at the center of the patch. Approx. 3 inch long. No debonding.

Next Steps

- 5-year inspection
 - City of Minneapolis is not going to protect the two patches with a coating.
 - This will allow a thorough evaluation of Phoscrete HC durability over time.

Owner's Experience: Soffit Repair

Walt Peters, PE - Oklahoma DOT
Packsaddle Bridge
US-283 over South Canadian River,
NBI 21132, Roger Mills/Ellis Counties

Industry Technology Demonstration: MALP Concrete (Phoscrete VO)

- Installation and inspection of low pH repair material that encapsulates rusted rebar.

Training: Maintenance Yard Shattuck OK



Mixing Phoscrete On-Site



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PRACTICES WE CAN NOT AFFORD TO DEFER

Very Little Surface Preparation Required



Rusted Chair



Surface preparation



**Wendy Love, our
Division 6
Superintendent 1, of
the Bridge Crew uses
a small grinder for
surface preparation.**



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PRACTICES WE CAN NOT AFFORD TO DEFER

Labor intensive, minimal training required



**Application
does not
require a lot of
skilled labor.**



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PRACTICES WE CAN NOT AFFORD TO DEFER

Completed Patch



Material can be applied in subfreezing weather.



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PRACTICES WE CAN NOT AFFORD TO DEFER

Corrosion Resistant Material



Anode will form at the lower pH region which in this case is at the repair material.



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PRACTICES WE CAN NOT AFFORD TO DEFER

Crack measures 0.03"



One year later...



No apparent rust stains



Comparison

4/7/17



2/16/18



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PRACTICES WE CAN NOT AFFORD TO DEFER

Adjacent section not in repair area



ODOT Analysis



Phoscrete appears to have potential to help with concrete repairs with corrosion showing up on some of our bridges.

ITD Challenges

- Manufacturer responsibilities
 - Preliminary data collection
 - Training and supervision
 - Reporting problematic installations
- On-Site Consultant
 - Collect pertinent data
 - Establish relationship with owner
 - Schedule inspections
- Agency commitment to follow up

ITD Program Launch

- Reboot the MALP ITD
 - Looking for 6-12 Owners to participate
- Open to Other Innovative Products
 - Application on website
- Attend ITD Working Group Meeting Thursday
 - Discuss next steps
- Join ITD Working Group!

ITD Feedback?

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