Innovative Products, Methods, and Techniques Used for Deck Patching

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Milwaukee, Wisconsin
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Presented by:
Tom Donnelly (Transpo); Brian Mintz (Phoscrete); Matt Ross (CTS)
Literature Search

SHRP 1993

NTPEP 2007

PennDOT 2008
Deck Patching – Systematic Approach

Source:
"Rapid Concrete Bridge Deck Protection, Repair and Rehabilitation"
- M. Sprinkel, A. Selliars, R. Weyers
- SHRP-S-344
- 1993
- 111 pgs.
Survey MWBPP’s

• Iowa DOT

• Michigan DOT
District Repair Crews responses:

District 1:
We are using Rapid Set Concrete mix, we have some cracking issues but we like it for the most part. We don’t patch during winter months unless it’s an emergency then we’ll use a product called MG crete.

District 4:
We use RAPID-SET concrete mix and haven’t had any problems arise. We try not to patch during the winter months and have found that ACC patch works until the weather warms up.

District 5:
We also use Rapid Set with very few issues, we have had issues with other rapid setting concrete mixes. We try to do most of our patching before November and after March, depending on the weather conditions, there are some steps we have taken to do some patching in colder weather (hot water, warm the substrate/concrete, etc.) but we always try to adhere to the manufacturers recommendations. We have used other mixes successfully such as MG Krete between November and March but very limited.

District 6:
Rapid set CTS is what we use. Have not had any problems with it. Pavement Mend SL is a fall back material. No problems with it either. Cost is higher. I had problems with other mixes in the IM491.20. I just avoid those products. We plan our work through the year to not have those occurrences in the cold months. Acc patch and Dura patch usually work to get us to warm weather.
## District Crew Response Summary

<table>
<thead>
<tr>
<th>District</th>
<th>Deck Program</th>
<th>Rapid Set</th>
<th>Time</th>
<th>Winter/Emergency</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>Yes</td>
<td>Mar-Oct</td>
<td>MgKrete</td>
<td>cracking</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
<td>Yes</td>
<td>Mar-Oct</td>
<td>ACC</td>
<td>none</td>
</tr>
<tr>
<td>5</td>
<td>Yes</td>
<td>Yes</td>
<td>Mar-Oct</td>
<td>Hot H₂O; MgKrete</td>
<td>some</td>
</tr>
<tr>
<td>6</td>
<td>Yes</td>
<td>CTS; Pavemend</td>
<td>Mar-Oct</td>
<td>ACC/Durapatch</td>
<td>some</td>
</tr>
</tbody>
</table>
Michigan DOT

- 7 Regions
- Each Has At Least One Bridge Repair Crew
  - 3 Regions Have Mobil Mixers

Regional Process:
1. Inspection & Scoping
2. Region Discussion
3. Prioritize (Hi, Med, Lo)
4. Crews Decide & Schedule
   - Moved Up, If Critical
   - Optimize Closure: Joints, Seal Cracks, Patch, etc.
Michigan DOT

Central Office Support
7 Regions + >300 Locals

1. Assess Regions Needs
2. Education & Support
   • Hands-On Training
   • Spring Meetings
   • Annual Meeting
   • Summer Job-Site Support

2. Procurement
   • Equipment
   • Materials
     • Portland Cement
     • Materbuilders 1060
     • Transpo T-17
Industry Presentations

TRANSPO INDUSTRIES, Inc.
www.transpo.com

C T S Cement Manufacturing Corporation

Rapid Set®

PHOSCRETE CONCRETES
Transpo T-17 MMA Polymer Concrete

Presented by:
Tom Donnelly (Transpo Industries)
Transpo T-17 MMA Polymer Concrete

Newark Airport

Fulton, IL.

St. Ignace, MI.
Phoscrete Concrete Repair
Capabilities Briefing
Fix It Once, Fix It For Good.
Fix it with Phoscrete!

Long-Lasting Repairs
Rapid Return to Service
Easy to Mix, Place, & Finish
Phoscrete with MALP+ Technology
7 Years Experience DOT Infrastructure Concrete Repair

1. Traffic-Ready in 1 Hour
2. No Sandblasting, Primers, Curing
3. Accepts Coatings after only 1 Hour
4. Works in Sub-Freezing Temperatures
Phoscrete HC Packaging
Horizontal/Castable

- Phoscrete HC
  - 50 lb. Dry Mix
  - 1 Gal. Liquid Activator
  - Mix in standard 5 gallon bucket
  - No water in mix
Phoscrete VO Packaging

Vertical/Overhead

- Phoscrete VO
- 11.3 lb. Pail
  - Liquid + Dry
  - Mix at location with battery-powered drill
Rapid Return to Service
Nevada DOT 5/12/2011

- I-15 Las Vegas

  Strengths after only [1] hour:
  - 4,000 psi compressive
  - 1,500 psi bond
  - 400 psi flexural
Simple Site Preparation

WSDOT 6/16/2011

• Yakima, WA
  – NO Sandblasting
  – NO Primers
  – NO Curing Compounds
  – NO SSD
Simple Site Preparation
WSDOT 6/16/2011

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Self-Consolidating Material
WSDOT 6/16/2011

• Yakima, WA
  – Use standard concrete finishing tools
  – Everything cleans up with water
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Phoscrete HC – Bridge Joint Nosing
WSDOT 7/5/2011

- I-5 Nisqually, WA
  - Resists Chloride Attack
  - No Shrinkage Cracking
  - Accepts Sealant after 1 hour
Phoscrete HC
Full Span Joint Rehab

- Ralph Hodges
- NCDOT
Rocky Mountain NC
3/25/2013
Phoscrete HC – Full Depth Repairs

WSDOT 4/5/10
Phoscrete HC – Form and Pour

USBR 1/18/2012

• Folsom Dam Spillway
  – Chemical and Mechanical Bond
Phoscrete HC – Highway Renewal

KYTC 10/9/2009

• I-65 Lexington
  – 10,000 Partial Depth Repairs
  – Freeze/Thaw and Salt-Scale Resistant
Phoscrete VO – Bridge Column

ICA 9/20/2012

- Tampa/Lithia
  - Stops Rust on Contact
  - Inhibits Halo Effect
Phoscrete VO – Bridge Beam

ICA 3/2/2012

- I-395-Miami
  - Hand pack and trowel finish
Phoscrete VO – Pre-Cast Panels

Bouygues - Miami Tunnel 7/27/2012
Phoscrete SG – Shotcrete/Gunite
MoDOT 1/5/2012

- 100/109 Bridge
  St. Louis, MO
  - 1 cy per hour
    application rate
Phoscrete SG – Bridge Repair
MoDOT 1/5/2012

- 100/109 Bridge St. Louis, MO
  - Fiber-Reinforced
  - Low Rebound
Cold Weather Concrete Repairs
MoDOT 1/20/2012

- I-44 St. Louis
  +28°F Ambient Temperature
- No water in mix
Cold Weather Concrete Repairs

MassDOT 12/5/2014

- I-90
  Worchester
  +23°F Ambient Temperature
Cold Weather Concrete Repairs

KYTC 2/4/2016

- US-27
- Nicholasville, KY
- +34°F Ambient Temperature
Fix It With Phoscrete!

We are available to answer any questions and discuss your application requirements.

Thank You!

Contact:

Phoscrete Corporation
265 S Federal Hwy, Suite 320
Deerfield Beach FL 33441

(561) 420-0595 main office
(561) 420-0599 fax

www.phoscrete.com
info@phoscrete.com
C T S Cement Manufacturing Corporation

Built Fast ... Built to Last

LowP for Bridge Deck Preservation
Advanced Concrete Technology

Rapid Set LowP Cement

- Advanced Cement Technology for overlays and repairs
- Rapid Set LowP Cement requires only the addition of water and aggregates to produce a concrete with performance characteristics greater than any other cement based overlay concrete plus corrosion resistance.
LowP

- Cement Technology that produce same “Life Cycle” performance characteristics as LMC, SFC RSLMC
- Improve Very Early Tensile Strength Gain - Latex and SFC Delay This
- Reduce Cement Paste
- Low Permeability – Low Porosity
- Rapid Bond Development
- Lower In-Place Unit Costs and “Cost to the Public” for Overlays and Repairs
RT 95 Foxboro, MA
Full Depth Repairs
Concrete produced in Volumetric Mixer
Full Depth Patch Placement
LowP Bridge Deck Overlay being Placed
Bridge open to Traffic
Rapid Set LowP
Structural Considerations

• Early Strength Development
  • 2 -3 Hour Early Tensile Strength Resists Movement Induced Cracking
  • Resume Construction or Traffic Sooner
• Reduce Drying Shrinkage
  • 2 to 3 Hours Wet Cure
• Faster Monolithic Bond – Pull Off Tests in 24 Hours
• Permeability – 500 to 900 Coulombs at 56 days
• Freeze Thaw  Resistance
Wet Cure

- **Rapid Set LowP**
  - 2 to 3 Hours
  - 3000 psi  Ready for Traffic

- **RSLMC**
  - 3 to 4 Hours
  - 3000 psi  Ready for Traffic

- **LMC 3 Days Wet Cure**
- **SFC 7 Days Wet Cure**
- **Low Slump 1 Day**
  - Expect Shrinkage in LMC, SFC, LS concrete
Rapid Set LowP
Advanced Cement Technology

• No Need For Latex – Less Cost and Handling
• Less Mobile Mixers Per Placement
• Less Cement Content - Less Shrinkage
• Concrete Cost Competitive with LMC
• In-Place Cost Less Than RSLMC, LMC, SFC
• Very Fast Tensile Strength Development
• Ready for Traffic in as Little as 2 Hours
CTS Cement Manufacturing
Advanced Cement Technology

Thank You

Matthew W Ross P.E.
Regional Sales Manager - Midwest
Thank You!