Concrete Pavement Preservation Guide

Mid West Pavement Preservation Partnership
Kansas City, Missouri
September 28, 2015

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Course Developers

CP Tech Center

FHWA and DOT

Industry

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Applied Pavement Technology

Dale Harrington  
CP Tech Center
Why Concrete Pavement!
Bellefontaine, Ohio 1925
Presentation Outline

• Introduction: Pavement Preservation
• Background: Concrete Pavement Preservation Guide
• Guide Contents and Highlights
• Status and Future Plans
Introduction: Pavement Preservation

• Proactive means of managing pavement condition (before severe deterioration occurs)
• Focus on extending pavement life and restoring functional condition

• Benefits:
  – Cost savings
  – Improved pavement conditions
  – Increased functional performance (e.g., smoothness, safety, noise)
  – Reduced environmental impacts
Pavement Preservation Window
Favorable Characteristics for Preservation

• Few or limited structural problems
• No materials-related distress
• Pavements in overall relatively good condition
Background: Concrete Pavement Preservation Guide

• Original manual developed 2008 & updated in 2014
• CP Tech Center (FHWA sponsorship)
• Recommendations on:
  – Pavement evaluation
  – Treatment application, design, construction
• 13 state DOT workshops held throughout U.S., 2014-2015
New Preservation Guide

• CP Tech Center (FHWA sponsorship)

• Goals:
  – Incorporate recent developments
  – Expand certain topics
  – Add chapter on concrete overlays

• Published September 2014
## Technical Committee

<table>
<thead>
<tr>
<th>Organization</th>
<th>Number of Participants</th>
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<tbody>
<tr>
<td>FHWA</td>
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<td>Industry</td>
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<td>University</td>
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## Chapters/Topics in Guide

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<tr>
<th>1. Introduction</th>
<th>7. Retrofitted Edge Drains</th>
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<td>4. Slab Stabilization</td>
<td>10. Joint Resealing and Crack Sealing</td>
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<td>5. Partial-Depth Repairs</td>
<td>11. Concrete Overlays</td>
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Guide Highlights
—Treatment Commentary—

• Common Treatments
  – Full-depth repairs
  – Dowel bar retrofit
  – Diamond grinding
  – Partial-depth repair
  – Joint sealing

• Growing Treatments
  – Cross stitching
  – Thin Concrete Overlays

• Less Common Treatments
  – Slab stabilization
  – Retrofitted edge drains
Guide Highlights — Partial-Depth Repairs —

- Removal and replacement of small, shallow areas of deteriorated concrete
- Expanded use as repair technique
- Greater use of milling for preparation
  - Productivity
  - Bonding
- New patching materials
Guide Highlights
—Full-Depth Repairs—

• “Workhorse” treatment
• Removal/replacement of concrete pavement at deteriorated joints/cracks
• Renewed focus on workmanship
  – Dowel bar installation
• Need for rapid opening times
  – Accelerated materials
  – Precast repairs
Guide Highlights —Precast Concrete Repairs—

• Advantages
  – Better quality concrete
  – Controlled curing
  – Minimal weather impacts
  – Rapid opening

• Experience in CA, CO, DE, MI, MN, MO, NJ, NY, IL, TX, UT, VA (add KS)

• Good performance to date
Guide Highlights
—Utility Cut Repairs—

• Opening street to gain access to utilities
• On-going issue of returning pavement to good condition
• Guidance on:
  – Sizing cuts
  – Creating/removing
  – Jointing
  – Backfilling
  – Embedded steel
  – Opening to traffic
Guide Highlights
—Dowel Bar Retrofit—

• Installation of dowel bars in existing joints to improve load transfer
• Increased use on cracks
• Renewed focus on patching materials
  – Durability
  – Shrinkage
Guide Highlights
—Cross Stitching—

• Accepted treatment for
  – Early longitudinal cracks in new construction
  – Longitudinal cracks in older pavements
  – Misaligned tie bars

• Advantages:
  – Quick and easy to install
  – Less intrusive

• Good performance
Guide Highlights
—Diamond Grinding—

• Removal of thin layer of concrete to restore smoothness
• Boon to concrete pavement preservation
• Diamond grinding texturing “families”
  – Conventional
  – City street
  – Texture grind
  – NGCS
Guide Highlights
—Next Generation Concrete Surface (NGCS)—

• Manufactured concrete pavement surface
• Uses conventional grinding equipment in two-phase operation
  – Flush grinding
  – Longitudinal grooving
• Low-noise surface
• New and rehabilitated pavements
Guide Highlights
—Concrete Overlays—

• Thin concrete overlays for preservation improvements
• Bonded only
  – 3 to 4 inches thick (preservation)
• Unbonded
  – 4 inches ≥ 6 inches (minor rehabilitation)
  – ≥ 6 inches (major rehabilitation)
What’s New

- Increased Importance Placed on PMS
- Inclusion of Chapter on Concrete Overlays
- Updated Equipment Technologies: GPR MIT SCAN, MIRA, etc
- Incorporated new PDR Techniques
- Inclusion of FHWA ASR Initiatives
- Inclusion of Precast Repairs, Utility Cuts, and CRCP Guidelines
- Emphasis on Noise Surface: NGCS
And Now Ready For Implementation
<table>
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<tr>
<td>October 5-8, 2015</td>
<td>Northern California</td>
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<td>October 20, 2015</td>
<td>Illinois</td>
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<td>March 28-31, 2016</td>
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Web Based Training Module

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Pavement Preservation Module 1: Introduction

The presentation is available as an attachment from the paperclip icon in the bottom right-hand part of the screen.
CP Tech Center

Manuals and Guidelines

Concrete Pavement Preservation Guide (2nd edition), 2014
Preservation and Rehabilitation of Urban Concrete Pavements Using Thin Concrete Overlays: Solutions for Joint Deterioration in Cold Weather States, 2014
Guide for Partial-Depth Repair of Concrete Overlays, 2012
Guide to Concrete Overlays: Sustainable Solutions for Resurfacing and Rehabilitating Existing Pavements (3rd edition), 2012

Reports

Long-Life Concrete: How Long Will My Concrete Last?, 2013
Concrete Pavement Surface Characteristics: Key Findings and Guide Specifications, 2012
Rehabilitation of Concrete Pavements Utilizing Rubblization and Crack-and-Seat Methods, 2008
The National Center for Pavement Preservation (NCPP) was established by Michigan State University and FP2, Inc. to lead collaborative efforts among government, industry, and academia in the advancement of pavement preservation by advancing and improving pavement preservation practices through education, research and outreach.
## Concrete Pavement Repairs

### Joint Repairs

<table>
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<th>Presentation Title</th>
<th>Presenter</th>
<th>Date</th>
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<tr>
<td>Joint Distress in Portland Cement Concrete Pavements</td>
<td>Larry Sutter</td>
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<td>Role of Joint Seal Effectiveness in Concrete Pavement Performance &amp; Rehabilitation</td>
<td>Dan Zollinger</td>
<td>Aug-12</td>
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<td>Joint Resealing on PCC Pavements</td>
<td>Rick Stone</td>
<td>Nov-10</td>
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### Diamond Grinding & Texturizing

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<tr>
<td>Innovative Textures</td>
<td>Larry Scofield</td>
<td>Sep-14</td>
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<td>Diamond Grinding: Overview of Pavement Performance in Texas</td>
<td>Feng Hong</td>
<td>May-13</td>
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<td>Diamond Grinding</td>
<td>Matt Ross</td>
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### Dowel-Bar Retrofit

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<td>Dowel-bar Retrofit Using Polyester Polymer Concrete</td>
<td>Shakir Shatnawi</td>
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### Full & Partial Depth

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<td>Precast Concrete Pavements</td>
<td>Shiraz Tayabji</td>
<td>Apr-14</td>
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<td>Partial Depth Concrete Patching</td>
<td>Robert Blight</td>
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<td>Preservation of Rigid Pavement - Full Depth and Partial Depth Repairs</td>
<td>Moon Won</td>
<td>May-13</td>
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<td>Pavement Preservation with Thin Lift Concrete Overlays</td>
<td>Dale Harrington</td>
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<td>Urban Slab Replacement</td>
<td>Craig Hennings</td>
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<td>The Whitetopping Rehabilitation Alternative</td>
<td>Jim Cable</td>
<td>Oct-09</td>
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<td>Concrete Slab Jacking and Stabilization</td>
<td>Andy Bennett</td>
<td>Oct-10</td>
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Thank You!