

CP Tech Center Updates



National Concrete Consortium
Philadelphia, PA
April 2-4, 2013



Dale S. Harrington P.E., Representing the National CP Tech Center

Technical Assistance

On the average of at least twice a week the CP Tech Center provides Technical Assistance on concrete pavement questions to state, city or counties throughout the country. Typically spend between 2 to 8 hrs for each with about 4 hours as the norm.



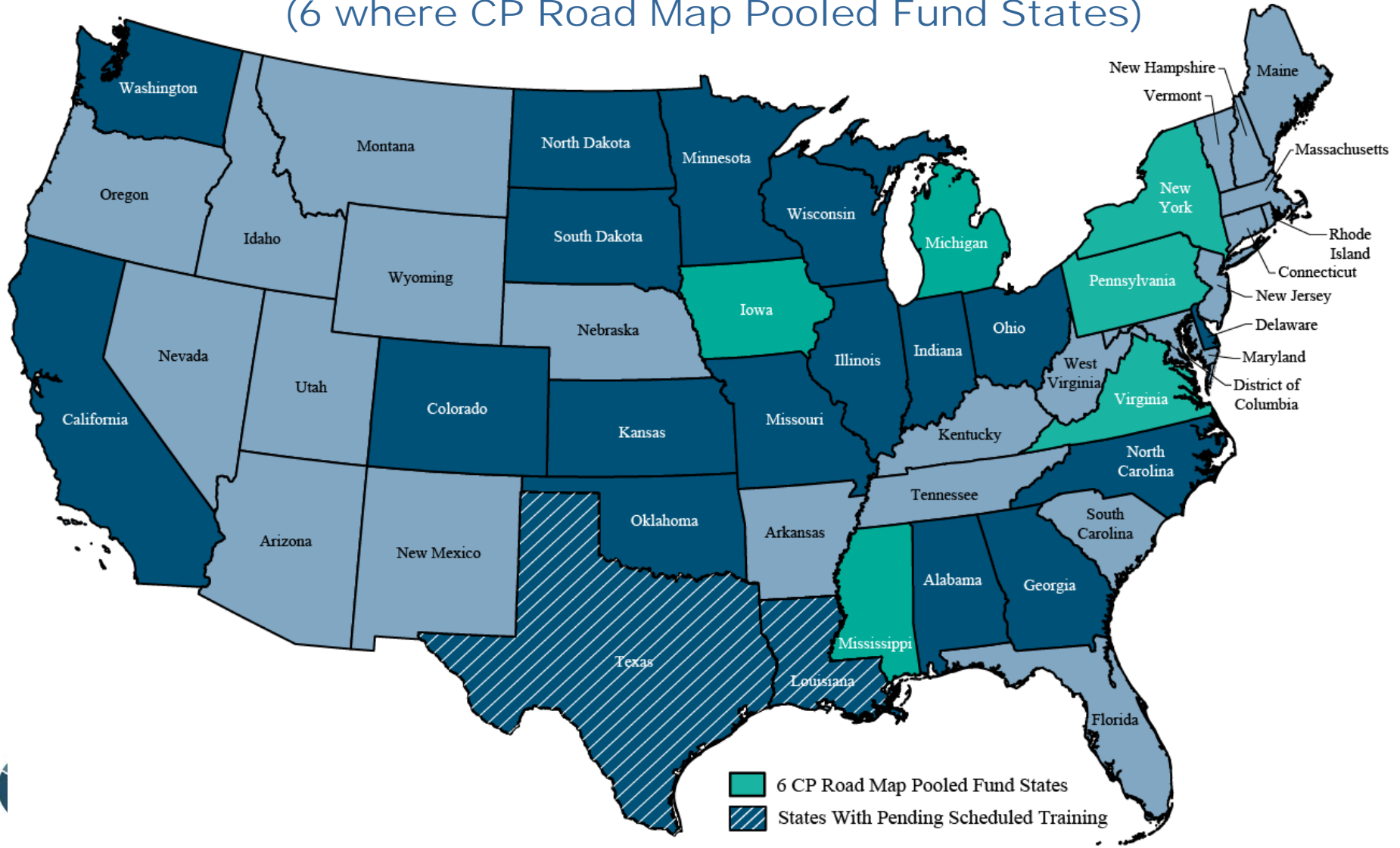
Education and Training

- Workshops and presentations in 13 states, 3 countries
- Total audience >1500
- Students
 - 1 MS, 3 PhD
- Professor's Workshop



25 Scheduled Training States

(6 where CP Road Map Pooled Fund States)



Training Opportunities

The curriculum that is available for 2012 was for a one-day training workshop or seminar on the following choices:

1. IMCP Manual, Integrated Materials and Construction Practices for Concrete Pavement: You may select specific subjects within the manual for emphasis if that is of interest.
2. Concrete Pavement Preservation Training
3. Design and Construction of Concrete Overlays
4. Roller Compacted Concrete
5. Concrete Pavement Surface Characteristics
6. Concrete Paving Mixture (COMPASS Software explanation)
7. Quality in Concrete Paving Process (Quality Assurance Training)
8. Early Age Cracking
9. Cement-Based Integrated Pavement Solutions



Concrete Overlay Field Application Program

Final Report: Volume I

July 2012

National Concrete Pavement
Technology Center



Sponsored through
Federal Highway Administration (DTFH-61-06-H-00011 (Work Plan 13))



IOWA STATE UNIVERSITY
Institute for Transportation

- Concrete Overlay Field Application Report (July 2012)
- Report summarizes the 26 state site visits or workshops in 24 states
- 28 Concrete Overlay Field Reports (2008-2012) where written for each of the states

Concrete Overlay Field Application Program
Site Visits



Long-Term Plan for Concrete Pavement Research and Technology—The Concrete Pavement Road Map (Second Generation): Volume I, Background and Summary

PUBLICATION NO. FHWA-HRT-11-065

MARCH 2012



 U.S. Department of Transportation
Federal Highway Administration

Research, Development, and Technology
Turner-Fairbank Highway Research Center
6300 Georgetown Pike
McLean, VA 22101-2296



CP Road Map

The Long-Term Plan for Concrete Pavement Research and Technology (CP Road Map) is a holistic strategic plan for concrete pavement research and technology transfer.

The CP Road Map is a living plan that includes 12 distinct but integrated research tracks leading to specific products and processes.

The resulting improvements will help the concrete pavement industry meet the challenges and achieve the industry's full potential in the 21st century.



CP Road Map

Volume I describes:

- why the research plan is needed
- how it was developed
- what the plan generally includes.
- research management plan

Volume II describes:

- Detail the 12 tracks of research.
- 270 project statements (\$275 to \$500 million)
- track goal, track action items



Priority Tracks

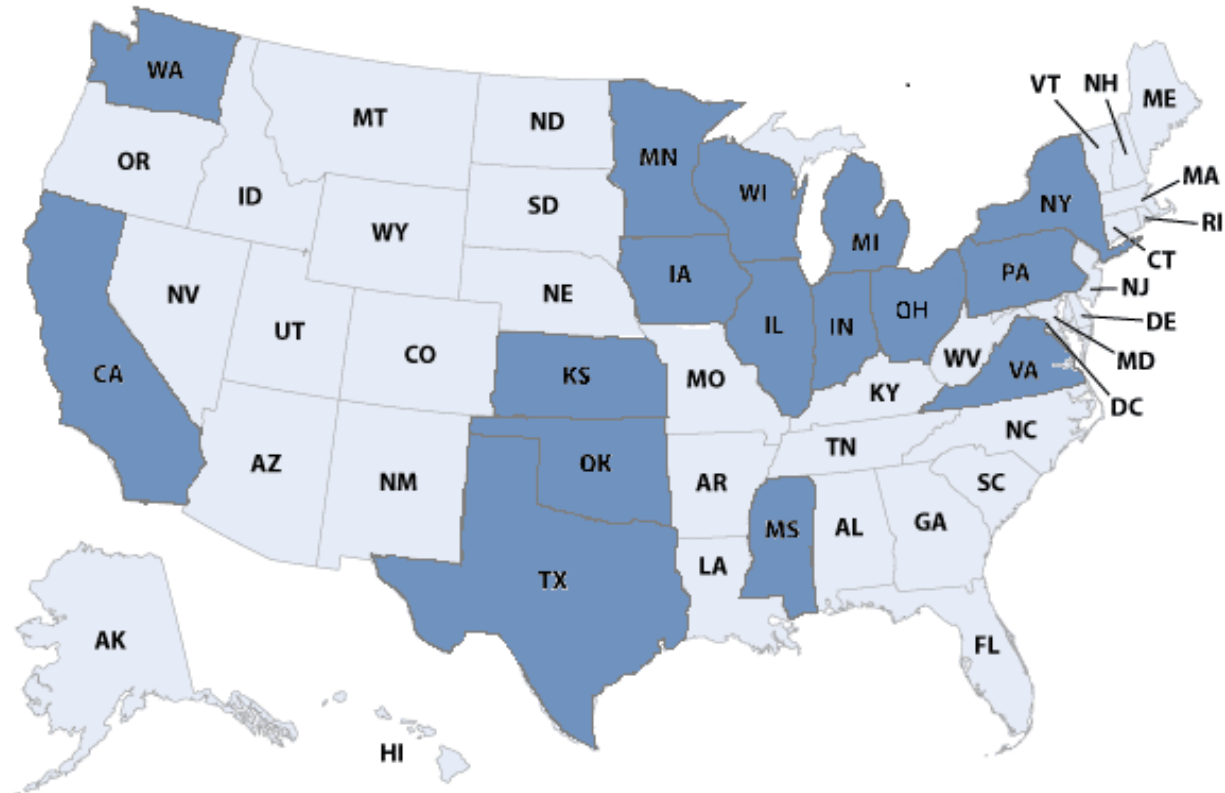
1. Materials and Mixes for Concrete Pavements
2. Performance-Based Design Guide for New and Rehabilitated Concrete Pavements
3. Intelligent Construction Systems and Quality Assurance for Concrete Pavements
4. Optimized Surface Characteristics for Safe, Quiet, and Smooth Concrete Pavements
5. Concrete Pavement Maintenance and Preservation
6. Concrete Pavement Construction, Reconstruction, and Overlays
7. Concrete Pavement Economics and Business Management
8. Concrete Pavement Sustainability



CP Road Map

17 Research Highlighted States

- Ohio
- Oklahoma
- Illinois
- Kansas
- California
- New York
- FHWA's TFHRC
- Texas
- Iowa
- Mississippi
- Virginia
- Washington
- Pennsylvania
- Minnesota
- Wisconsin
- Michigan
- Indiana



Kansas DOT Research (CP ROADMAP E_NEWS)

Updates from the States:

The Kansas Department of Transportation (KDOT) performs concrete pavement research through the Bureau of Materials and Research, program includes:

- KDOT Research Reports Catalog
- Kansas University Transportation Center
- Kansas State University Transportation Center

Recently completed concrete pavement research projects.

- Accelerated Testing for Studying Pavement Design and Performance – Thin Bonded Rigid Overlay on PCCP and HMA.
- Durability of Classed Limestone Coarse Aggregate Study, US-169, Johnson County, Kansas.
- Evaluation of Joint Sealant Materials, US-36, Doniphan County, Kansas.
- Control of Pavement Smoothness in Kansas.



Moving Advancements into Practice (MAP) Briefs

1. Concrete Pavement Sustainability
2. Full-Depth Repairs
3. Precast Concrete Pavements
4. CP Road Map, 2nd edition
5. Full-Depth Reclamation of Asphalt Pavements with Cement
6. Potential Materials Incompatibilities
7. Partial-Depth Repair
8. Preventing Joint Deterioration
9. Fly Ash as an SCM
10. Intelligent Compaction for Bases and Subbases
11. SmartCure for Intelligent Construction



Figure 1. Schematic of SmartCure measuring device in the field.



Tech Briefs

1. Design of Concrete Overlays Using Existing Methodologies
2. Recommendations for Standardized Dowel Load Transfer Systems for Jointed Concrete Roadway Pavements
3. Variability and Visualization of Tire-Pavement Noise Measurements
4. Specifications for Reducing Tire-Pavement Noise
5. Measuring and Reporting Tire-Pavement Noise Using On-Board Sound Intensity
6. Measuring and Analyzing Pavement Texture

TECH SUMMARY May 2011
Design of Concrete Overlays Using Existing Methodologies

TECH BRIEF September 2011
Recommendations for Standardized Dowel Load Transfer Systems for Jointed Concrete Roadway Pavements

TECH BRIEF August 2011
Variability and Visualization of Tire-Pavement Noise Measurements
 Concrete Pavement Surface Characteristics Program

TECH BRIEF May 2011
Concrete Pavement Specifications for Reducing Tire-Pavement Noise
 Concrete Pavement Surface Characteristics Program

TECH BRIEF May 2011
Measuring and Reporting Tire-Pavement Noise Using On-Board Sound Intensity (OBSI)
 Concrete Pavement Surface Characteristics Program

TECH BRIEF January 2011
Measuring and Analyzing Pavement Texture
 Concrete Pavement Surface Characteristics Program

Authors: Robert Otto Raasmussen, Richard Sohanay, Paul Wiegand, Dale Harrington

Introduction: Pavement texture is defined by the irregularities on a pavement surface that deviate from an ideal, perfectly flat surface. As shown in Figure 1, the World Road Association (PIARC) has established standard categories of texture, classified by wavelength. These categories include microtexture (wavelengths up to 0.5 mm), macrotexture (0.5 to 50 mm), megatexture (50 to 500 mm), and roughness (wavelengths larger than 500 mm).

Figure 1: World Road Association (PIARC) texture definitions and their influence on pavement surface characteristics.

Texture Wavelength	1 μm	10 μm	100 μm	1 mm	10 mm	100 mm	1 m	10 m	100 m	1000 m
Microtexture	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macrotexture	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Megatexture	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Roughness	No	No	No	No	No	No	Yes	Yes	Yes	Yes

Figure 1 Legend: Microtexture (0.5 mm), Macrotexture (0.5 to 50 mm), Megatexture (50 to 500 mm), Roughness (> 500 mm). Influence on pavement surface characteristics: Skid Resistance, Rolling Resistance, Noise Quality, Wet Surface Friction, Dry Surface Friction, Splash and Spray, Tire Wear, Vehicle Noise, Pavement Noise, and Vehicle Wear.



Next Generation Concrete Pavement Road Map- Solicitation No. 1329

- Pool Fund Committee States (2013-2017) - \$15,000 per year
- Georgia, Oklahoma, Iowa, Michigan
- \$400,000 minimum; collected \$300,000
- **Solicitation Number: 1329**
- **Date Posted: Jun 18, 2012**
- **Last Updated: Jan 1, 2013**
- **Expires: Apr 1, 2013**



Project Deliverables

1. Maintain the CP Road Map as a living document, through periodic updates, as determined by the TAC.
2. Next Gen CP Road Map E-news
3. Map Briefs(Moving Advancements into Practice)
4. Database - Keep a limited PCC pavement project database
5. Website – Maintain CP Road Map website with table of research being conducted from data base.
6. Facilitate the creation of Next Gen CP Road Map Track Leadership Committees
7. Provide outreach to other national research programs, such as (SHRP2).
8. Develop complete and focused research needs statements
9. Provide national training on critical subjects where possible



Project Deliverables

10. Identification and discussion of prioritized technical training and implementation/deployment needs
11. Receive an annual report on the activities regarding each CP Road Map Track and prioritize future research needs.
12. Encourage TRB Committee (concrete pavement) related participation and support of the CP Road Map by asking appropriate TRB Committees to appoint a liaison to participate on the TAC calls and meetings and keep the TRB Committees updated.
13. Conduct TAC meetings
14. Discuss and maintain a prioritized list of research needs



Where Do We Go?

Need to Determine the Future of the
CP Road Map



Concrete Overlay Field Application Program



Iowa Task Report US 18 Concrete Overlay Construction Under Traffic May 2012

Sponsored through
Federal Highway Administration (DTPH-61-0-6-H-00011 (Work Plan 13))



IOWA STATE UNIVERSITY
Institute for Transportation

- CP Tech Center, IDOT, FHWA set out to demonstrate and document the design and construction of a 4" concrete overlay on a two-lane roadway while maintaining through traffic. The work was scheduled for an 18.82 mile section of US 18 in northeastern Iowa in the summer of 2011
- Eight State DOT's visited the construction
- Lesson learned are included
- Training is currently being held for the 6 IDOT Districts in Iowa.

Guide to

CONCRETE OVERLAYS

of Asphalt Parking Lots



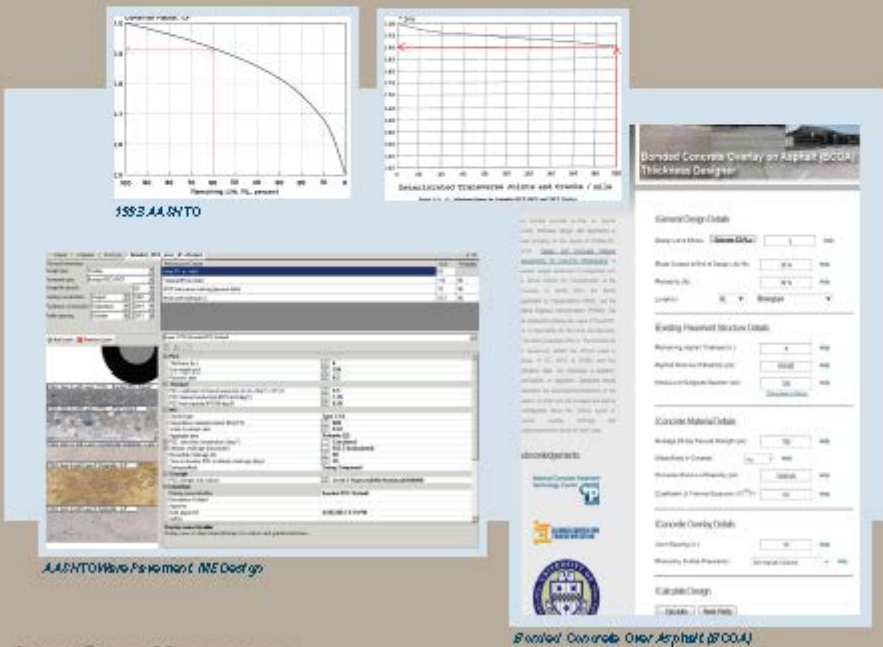
New 2012 “*Guide to Concrete Overlays of Asphalt Parking Lots*”
provides:

- Information for decision makers and practitioners in selecting, designing and constructing successful concrete overlays on asphalt parking lots.
- Guide provides the latest technical information

Guide to the Design of _____

CONCRETE OVERLAYS

Using Existing Methodologies



October 2012

- Guidance for the Design of Concrete Overlay Using Existing Methodologies October 2012.
- Guide provides user-friendly explanation of the concrete overlay software programs for each type of overlay and provides examples computer runs with screen shots.

Traffic

Design Life (years):

Opening Date:

Initial two-way AADTT:

Number of lanes in design direction:

Percent of trucks in design direction (%):

Percent of trucks in design lane (%):

Operational speed (mph):

Traffic Volume Adjustment: Edit

Axle load distribution factor: Edit

General Traffic Inputs: Edit

Import/Export

Traffic Growth:

OK Cancel

GUIDE FOR CONCRETE PAVEMENT JOINT
REHABILITATION WITH THIN

CONCRETE OVERLAYS



A practical approach to understanding and successfully using concrete overlays, from selection to opening

- Guide for Concrete Pavement Joint Rehabilitation with Thin Concrete Overlays will be available February 2013.
- Guide demonstrates potential applicability of thin concrete overlays as a longer term solution (15 years and greater).
- Previous US experiences with thin concrete overlays are highlighted along with adapted practices to provide solutions for pavements with joint deterioration.



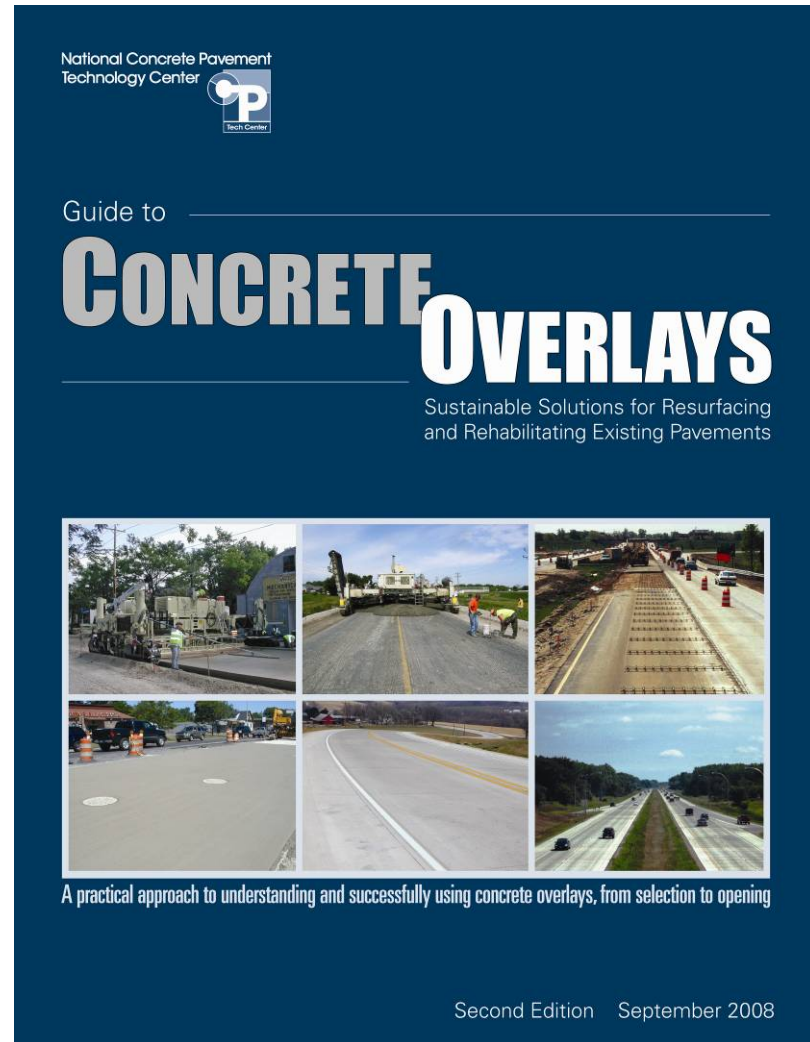
Update Concrete Overlay Guide

3rd edition- Summer 2103

Contents

1. Overview of Overlay Families
2. Overlay types and uses
3. Evaluations & Selections
4. Six Overlay Summaries (11"x17 "sheets)
5. Design Section
6. Miscellaneous Design Details
7. Overlay Materials Section
8. Work Zones under Traffic
9. Key Points for Overlay Construction
10. Accelerated Construction
11. Specification Considerations
12. Repairs of Overlays

<http://www.cptechcenter.org/>



GUIDE FOR

PARTIAL-DEPTH REPAIR OF CONCRETE PAVEMENTS

April 2012



- Guide for Partial-Depth Repair of Concrete Pavements available June 2012.
- Guide summarizes standard partial-depth repair techniques. The guide describes three different types of partial-depth repairs which allow the opportunity to repair badly deteriorated concrete joints on a limited basis without a full-depth repair.

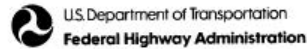


CONCRETE PAVEMENT PRESERVATION WORKSHOP

FHWA Publication No. FHWA-HIF-XX-XXX (to be assigned by FHWA)

February 2008

Draft Reference Manual

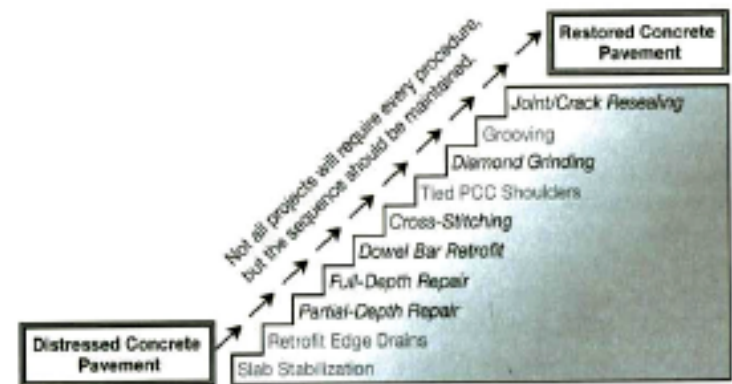


Prepared for
Federal Highway Administration Office of Pavement Technology
400 7th Street AW
HIPT 20
Washington, D.C. 20590

Prepared by
National Concrete Pavement Technology Center
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2711 South Loop Drive, Suite 4700
Ames, IA 50010-8664

Update Concrete Pavement Preservation Manual

- Contains 10 Chapters on Preservation Techniques



- 10 Training Modules and Instructor Guide
- Held Numerous Workshop for State DOTs

The Crossroads of Concrete Overlays



Technology Deployment:
140million SY / yr of 5"Overlays



Technology Deployment



State DOTs
Supported with
Information and
Technology Related
To Concrete
Overlays



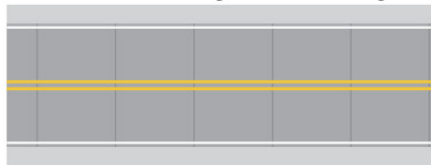
Educated DOT,
City & County Staff



Industry Training and Certification



Status Quo:
11 million SY / yr of Overlays



No Technology Deployment



State DOTs
Remain Status Quo



Research Completed

- Mix Design and Analysis Track (MDA)
 - Effect of Paste Quality on Performance
 - Effect of Aggregate Systems
 - Guide Spec and Commentary
 - Air Void System Needs
 - XRF for field evaluation

Research Completed

- Ternary
 - Laboratory Concrete
 - Field Demonstrations
- Deicer Scaling
- Joints
 - Joint Deterioration Causes
 - Joints Manual 2nd Ed
- Surface Characteristics



Research Underway

- Mix proportioning
- Joints
 - Mechanisms
 - Patch mixtures
- Deicer Phase 2
- Internal Curing Bridge Deck
- Environmental
 - TiO₂
 - Albedo
- Paste permeability



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THANK YOU!

Dale S. Harrington
Representing the National Concrete Pavement
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www.cptechcenter.org

