



National Concrete Consortium (NCC) E-News December 2017

In association with the CP Road Map Program

The **NCC E-News** is the newsletter of the Long-Term Plan for Concrete Pavement Research and Technology ([CP Road Map](#)), a national research plan developed and jointly implemented by the concrete pavement stakeholder community. To find out more about the CP Road Map or to get involved, contact [Steve Klocke](#) or [Dale Harrington](#) (515-964-2020).

Moving Advancements into Practice (MAP) Brief

Moving Advancements into Practice (MAP) Briefs describe promising research and technologies that can be used now to enhance concrete paving practices.

The December 2017 MAP brief, *Performance Assessment of Nonwoven Geotextile Materials Used as Separation Layer for Unbonded Concrete Overlay of Existing Concrete Pavement Applications in the U.S.*, provides an overview of the national performance experience of nonwoven geotextile separation layers as an alternative to hot-mix asphalt separation layers in unbonded concrete overlay applications.

[Download the December 2017 MAP Brief.](#)



News from the Road

News from the Road highlights research around the country that is helping the concrete pavement community meet the research objectives outlined in the CP Road Map.

Assessment of Limestone Blended Cements for Transportation Applications

Research at the Georgia Institute of Technology compared the use of Type IL limestone-blended cement to conventional Type I/II portland cement. Type IL and I/II cement, in varying degrees of fineness, were provided by five cement producers.

The results of the investigation found that differences in mechanical properties of concretes made with each cement type were higher between plants than between the Type I/II and Type IL cement from the same plant. The fineness of the portland cement and the interground limestone had the most significant effect on paste and concrete properties.

The use of supplemental cementitious materials (SCM), including fly ash and blast furnace slag, demonstrated that increases in compressive strength and reductions in the



Rapid chloride penetration testing

permeability of the concrete were more pronounced in the portland-limestone cement (PLC) than in blends with ordinary portland cement; however, these benefits were often accompanied by increases in early-age shrinkage in the in the PLC-SCM concretes.

The research recommends that Type IL cement may be allowed for use in place of Type I/II cement when performance requirements such as shrinkage cracking are specified.

This project was sponsored by the Georgia Department of Transportation and was completed by K. Kurtis, L. Kahn, A. Shalan, B. Zaribaf and E. Nadelman. [Click here to access the full document.](#)

This project is contributing to objectives identified in CP Road Map [Track 1: Materials and Mixes for Concrete Pavements.](#)

Guide Specification for Internally Curing Concrete

The National Concrete Pavement Technology Center completed a new guide specification for internally curing (IC) concrete. The concept of IC involves the replacement of a portion of the fine aggregate with pre-wetted lightweight fine aggregate (LWA). The wetted LWA supplies curing water from within the concrete, which provides a more uniform rate of hydration, thereby reducing shrinkage cracking.

This document includes a technical brief that explains the concepts behind IC, tools for use in mixture proportioning and QC, and discusses potential concrete pavement applications; however, the primary objective of the document is to provide guidance for the development of project specifications for IC concrete. The guide specifications are intended to be used by public agencies in conjunction with their standard specifications for concrete.

This publication was sponsored by the FHWA in conjunction with pooled-fund partner states of Iowa, Georgia, Michigan, Oklahoma, and Pennsylvania, and completed by Jason Weiss and Luca Montanari with the input and assistance of numerous other state DOTs and industry experts. [Click here to access the full document.](#)

This project is contributing to objectives identified in CP Road Map [Track 1: Materials and Mixes for Concrete Pavements.](#)

Concrete Repair Best Practices

The Missouri DOT performed a series of case studies to evaluate six concrete pavement restoration (CPR) methods. The project studied a variety of projects from states throughout the country. Interviews with contractors and agency representatives were completed to obtain a unique viewpoint on the techniques. The report summarizes CPR techniques for cross stitching, dowel bar retrofit, diamond grinding, full-depth repair, partial-depth repair, and slab stabilization.

A technical brief was developed for each method. The briefs includes a description of the rehabilitation method and the type of deficiencies it is intended to mitigate, considerations for the appropriate use of the technique, recommended material and construction specifications, keys for inspection and acceptance of the work, and anticipated performance of the restoration method.



Centrifuge used to determine the moisture properties of lightweight fine aggregate



Inserting dowel assembly into slot for dowel bar retrofit

This report was completed by Michael Darter with Applied Research Associates, Inc. [Click here to access the full document.](#)

This research is contributing to objectives identified in CP Road Map [Track 7: Concrete Pavement Maintenance and Preservation.](#)

Thin Whitetopping Selection Procedure

The Minnesota Department of Transportation (MnDOT) has developed a step-by-step selection procedure for evaluating whether an existing HMA pavement is a candidate for a bonded concrete overlay of asphalt (BCOA), also known as whitetopping.

The six-step evaluation begins with a desk review to gather information about the project including traffic levels, percent trucks, original pavement design, and geotechnical properties. Next, pavement coring is completed to verify that a minimum of three inches of HMA will remain after milling and to examine the overall condition of the HMA. A site visit and distress survey are completed to identify distresses that may prohibit a successful BCOA. Additional coring and laboratory testing is then completed to investigate issues identified during the distress survey. Next, preliminary cost estimates including pre-overlay repairs, the volume of concrete necessary to adjust the profile or cross slope, and mitigation of vertical constraints such as transitions at bridges and driveways are prepared. Finally, a report with the design recommendations is completed.

This project was completed by P. Taylor, J. Vandenbossche, G. Fick, and D. Harrington for the National Concrete Pavement Technology Center at Iowa State University. [Click here to access the full document.](#)

This research is contributing to objectives identified in CP Road Map [Track 8: Concrete Pavement Construction, Reconstruction, and Overlays.](#)

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Moderate-severity fatigue cracking in HMA

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