



CP Road Map E-News April 2015

The **CP Road Map 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](#), 515-964-2020.

New 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 April 2015 MAP Brief, "Concrete Pavement Curling and Warping: Observations and Mitigation," describes the mechanisms thought to be responsible for pavement curling and warping and strategies for mitigation.

[Download the April 2015 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.

International Conference on Concrete Pavements

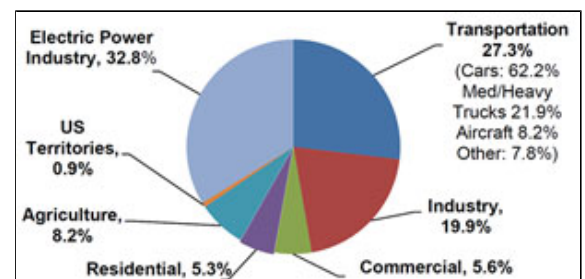
The International Society for Concrete Pavements (ISCP) has announced that the 11th International Conference on Concrete Pavements will be held in San Antonio, Texas, August 28–31, 2016. This conference began in 1977 and is held every four years.

The ISCP has issued the first call for papers for the conference. Letters of intent for the conference are due April 30, 2015. Details on the conference and instructions for submitting papers can be found by [clicking here](#).



FHWA Publishes New Reference Document on Sustainable Pavement

The FHWA has developed a new reference document on pavement sustainability. This timely publication, *Towards Sustainable Pavement Systems: A Reference Document*, was developed for use by owners, designers, contractors, and suppliers as the pavement community strives to incorporate sustainable practices into all phases of the pavement life cycle. The document summarizes the vast body of research and practical information that has been developed regarding sustainable pavement practices.



The main concepts covered include sustainable materials, design of sustainable pavements, sustainable

construction practices, sustainable maintenance and preservation, considerations for sustainability while the pavement is in use, sustainable end-of-life considerations, pavements as part of sustainable communities, and assessment of pavement sustainability.

This project was sponsored by the FHWA and completed by T. Van Dam et al. at Applied Pavement Technology, Inc. [Click here to access the full document.](#)

This research is contributing to objectives identified in CP Road Map [Track 12: Concrete Pavement Sustainability.](#)

Drinking Water Treatment Waste as a Low-Cost Curing Agent for Concrete

This paper presents results from a preliminary study that investigated the potential of using drinking water treatment waste sludge as an internal curing agent for concrete. The concept consists of using the high water content, primarily calcium carbonate material, as a concrete admixture. Two other commonly used internal curing agents, prewetted lightweight fine aggregate and a superabsorbent polymer, were investigated as a comparison. Cement mortars were tested for compressive strength, degree of hydration, and shrinkage. Micrographs of mortars containing the three different internal curing agents were compared visually to evaluate the distribution of internal curing agents and relative hydration.

Results show that drinking water treatment waste is an effective internal curing agent, improving cement hydration and compressive strength and mitigating autogenous shrinkage.

This report was completed by Q. Nowasell and J. Kevern and was published in the ACI Materials Journal, Volume 112 (January–February 2015). A full transcript of the report is may be obtained by [clicking here.](#)

This research is contributing to objectives identified in CP Road Map [Track 12: Concrete Pavement Sustainability.](#)

Louisiana Investigates Polyurethane Foam for Faulted Joints

The Louisiana Department of Transportation and Development (DOTD) investigated the use of polyurethane foam (PF) as a way to lift and correct faulted joints on a four-mile stretch of LA 1 Bypass in Natchitoches, Louisiana. This segment of LA 1 carries an average daily traffic (ADT) of 15,800 with 20 percent trucks and consists of a 32 year old 9 inch concrete pavement with star lugs as load transfer devices. The pavement experienced faulting as high as one inch and had an International Roughness Index (IRI) value between 150 and 450.



The Louisiana DOTD elected to level the road with PF as an alternative to more costly alternatives such as reconstruction or patching and overlay. The PF leveling process consisted of sawing full depth through the joint to free up the joint for leveling, drilling holes through the slab and base course at various intervals, and injecting PF through the holes while monitoring the vertical displacement of the slab until the fault level was reduced to 1/4 inch.

Unfortunately, the results of the project found that while the PF process was able to successfully reduce faulting, it was at the expense of load transfer efficiency (LTE). On this project, 80 percent of the joints were found to have poor LTE, while none of the joints had good LTE. In addition, 20 percent of the joints required load transfer improvement. Based upon these results, the report recommends that the PF correction process should *not* be used as a pavement preservation treatment.

This report was completed by K. Gaspard and Z. Zhang by the Louisiana Transportation Research Center for the Louisiana DOTD. [Click here to read the full report.](#)

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

Backcalculation of Existing Pavement for Bonded Concrete Overlays of Asphalt

Bonded concrete overlays of asphalt (BCOA), previously known as ultrathin whitetopping, have become increasingly common in Illinois in the past 15 years. No methods exist for assessing in situ properties under loading for this type of overlay. A procedure to backcalculate layer properties from falling weight deflectometer tests does exist for concrete slabs on grade with infinite dimensions, but this method is not applicable to finite-sized BCOA slabs with multiple layers and interfaces.

Based on two-dimensional finite element modeling of BCOA pavements, a backcalculation procedure was derived for a range of expected slab sizes, effective concrete pavement thicknesses, joint load transfer efficiencies, and foundation layer stiffnesses. The backcalculated effective concrete thickness quantifies the load carrying capacity of the BCOA pavement, the variation of the structural capacity as a function of distance along the roadway, and potentially the condition of the concrete–asphalt bond interface and the underlying asphalt concrete layer. Application of the BCOA backcalculation procedure to falling weight deflectometer data collected from several projects in Illinois confirmed the reasonableness of the procedure through observed performance and estimated layer thicknesses from construction.

This report was completed by D. King and J. Roesler at the University of Illinois at Urbana-Champaign and was published in the Transportation Research Record: Journal of the Transportation Research Board, Volume 2457-08. A full transcript of the report is may be obtained by [clicking here](#).

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

Updates from the States: Nebraska

In the State of Nebraska, research is coordinated through the Nebraska Department of Roads (NDOR) Research Program. This program brings together people from various areas of the transportation industry (public and private) and uses their pool of knowledge and experience to prioritize statewide research ideas. A council made up of representatives from various transportation entities—cities, counties, consultants, contractors, FHWA, NDOR, and the University of Nebraska—prioritizes the research ideas.



Based on the proposals received, the Research Section submits a research program to the NDOR Research Advisory Committee (RAC). The RAC is made up of NDOR division heads and district engineers, as well as an FHWA representative. The RAC reviews and edits the proposed program and approves the research program for the next fiscal year. Furthermore, research results are implemented through new specifications, standard plans, test methods, new or revised procedures, computer programs, manual changes, or policy and procedure directives.

Although the majority of concrete materials research is conducted through in-house research, the majority of projects are conducted for the NDOR under contract by the University of Nebraska, other universities, or private organizations. Collaborative research also offers the NDOR the ability to further leverage state funds and includes partners such as the Transportation Research Board (TRB), Transportation Pooled Fund (TPF) Program, state highway agencies, and the Nebraska Transportation Center (NTC).

[Read on for more information about concrete pavement research in Nebraska...](#)

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