



CP Road Map E-News January 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 January 2015 MAP Brief, "Producing Freeze-Thaw Durable Concrete" describes the importance of developing a good air-void system in concrete mixes.

[Download the January 2015 MAP Brief.](#)



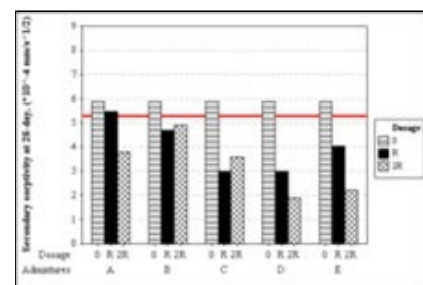
News from the Road

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.

Developing Standards for Testing Permeability-Reducing Admixtures

Concrete mixtures with low permeability are desirable because they resist the penetration of water and aggressive chemicals, thereby improving the durability and longevity of the structure. One approach for reducing permeability is the addition of permeability-reducing admixtures, which help fill and block capillary pores in the cement paste.

Manufacturers of permeability-reducing admixtures utilize a variety of test methods to evaluate their products. These methods vary widely from product to product, as there is currently no standardized protocol for evaluating the effectiveness of these admixtures.



This research investigated the fresh and hardened properties of mixtures containing commercially available permeability-reducing admixtures. The aim was to develop a standard test protocol useful to specifiers in comparing products.

The project evaluated the fresh and hardened properties on concrete mixtures produced with five different permeability-reducing admixtures. The results of these tests and recommendations for a testing protocol are presented in the final report.

This project was sponsored by FHWA, with support from Transportation Pooled Fund partners. The research was completed by P. Taylor, H. Ceylan, and E. Yurdakul at the National Concrete Pavement Technology Center at Iowa State University. [Click here to read the full report.](#)

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

Washington State DOT Evaluates the Environmental Impact of Evolving Pavement Material Practices

In a recent project, the Washington State DOT (WSDOT) utilized Roadprint, an online Life Cycle Analysis (LCA) tool, to quantify the greenhouse gas emissions and energy consumption changes for pavement material practices at WSDOT between 1990 and 2010. During this time period, WSDOT began using both fly-ash and slag in its concrete mixes.

The result of this study indicate that, compared to concrete pavements without supplemental cementitious materials, the current use of fly-ash in concrete mixtures results in a 19% reduction in greenhouse gases and an 18% reduction in energy consumption. Likewise, the use of slag reduces greenhouse gas emissions by 22% and energy consumption by 16%. The report also found that greenhouse gas emissions and energy consumption could be further reduced if fly-ash and slag were utilized to their ultimate potential.

This report was completed by S. Muench et al. for the Washington State DOT and was presented at the 2014 TRB Annual Meeting. [Click here to read the full report.](#)

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

Virginia DOT Finds PCC Overlays an Effective Alternative to HMA

In 2012, the Virginia DOT (VDOT) rehabilitated a 5.1-mile section of the westbound lanes of US 58 using a 4-inch bonded concrete overlay over a 2.6-mile section and a 7-inch unbonded concrete overlay with an asphalt separation layer over a 2.2 mile section. The remaining 0.3 mile section was reconstructed. The existing pavement is an 8-inch continuously reinforced concrete pavement on a 6-inch cement-treated base.

Both overlay sections were constructed using stringless paving and were completed on schedule. A significant improvement in ride quality was observed on both segments when compared to the existing pavement, and subsequent inspection shows the overlaid sections are performing well.

Based upon the concrete overlay performance and cost, this report recommends the VDOT allow concrete overlays as an alternate design on future overlay projects.

This report was completed by M. Sprinkel et al. at the Virginia Center for Transportation Innovation and Research for the Virginia Department of Transportation. [Click here to read the full report.](#)

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

Long-Term Performance of Concrete Pavements with Diamond Grinding

Diamond grinding has been used by various agencies to improve ride quality, increase skid resistance and reduce tire/pavement interface noise. The Texas Department of Transportation has used diamond grinding on both jointed concrete pavement and continuously reinforced concrete pavement. This study performed accident analysis both before and after diamond grinding on a recent project section. After the completion of diamond grinding, accidents with fatalities and incapacitating injuries were reduced by approximately 62% and 46%, respectively. In addition, the international roughness index (IRI) was reduced by approximately 44 in./mi, or 40%, immediately after treatment.

This study also analyzed eleven other projects to derive a statewide trend on various surface characteristics of pavements due to diamond grinding, with the oldest section studied approximately eight years after treatment. Immediately after diamond grinding, the average skid number increased 5.6, or by about 30%. Similarly, there was an average IRI reduction of approximately 60 in./mi, or about 40%, immediately after



the diamond grinding.

In addition, this study investigated the deterioration rate of the diamond ground surface improvements due to time and traffic. The results indicate that, each year, the skid number decreases by approximately 2.0 and the IRI increases by approximately 1.7 in./mi.

This report was completed by D. Chen and F. Hong and was published in the February 2015 ASCE Journal of Performance of Constructed Facilities. [Click here for a link to the article summary.](#)

This research is contributing to objectives identified in CP Road Map [Track 4: Optimized Surface Characteristics for Safe, Quiet, and Smooth Concrete Pavements.](#)

Updates from the States: Iowa

Concrete pavement research for the state of Iowa is accomplished through research programs run by the Iowa Department of Transportation (Iowa DOT) Research and Technology Bureau, and guided by the Iowa Highway Research Board (IHRB). Pavement research is conducted in-house at the DOT and through various partnerships.

The DOT often partners the University of Iowa, Iowa State University, and the University of Northern Iowa in order to accomplish research goals. The Institute for Transportation (InTrans) and the National Concrete Pavement Technology Center (CP Tech Center) at Iowa State University are actively involved with Iowa DOT through DOT-University partnerships on a number of concrete pavement research efforts. Iowa DOT is also actively involved in many Transportation Pooled Fund (TPF) projects associated with concrete pavements. TPF projects include state partnerships that bring together a group of people interested in accomplishing research on the same topic as well as several other state DOTs, academic research centers (such as the CP Tech Center), industry agencies, and the federal government.



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

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