CP Road Map E-News December 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 best practices and promising research that can be used now to enhance concrete paving.

The December 2015 MAP Brief, "Internal Curing," discusses the emerging practice of curing concrete from the inside out to achieve more complete hydration, earlier strength gain, and lower permeability while also reducing shrinkage and cracking. These benefits all lead to a pavement that performs better and lasts longer.

Download the December 2015 MAP Brief.

NCC State Survey Summaries

Member states of the National Concrete Consortium have the ability to poll other member states regarding specifications, materials, construction, research, or other issues related to concrete paving. This section highlights some of the questions posed and answers received through the NCC's ListServ feature.

Curing Compound Application Rates

Indiana polled the NCC group regarding methods of curing concrete. One of the responses to this inquiry was the curing compound application rate for pavements. Most state DOT specifications set this rate as the maximum square feet of pavement that can be covered per gallon. Some states vary the application rates depending on the weather and if the pavement surface is tined or dragged. The results summarized here are for normal weather conditions with a tined surface. Application rates were received from 33 states. A majority of these states have application rates between 100 and 150 square feet per gallon.

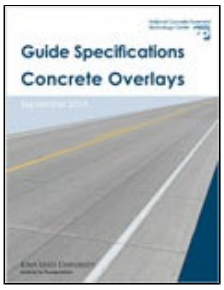
News from the Road

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.

Guide Specifications for Concrete Overlays

The National Concrete Pavement Technology Center has published new guide

specifications intended to aid state agencies and local governments in the development of contract documents for concrete overlay projects.



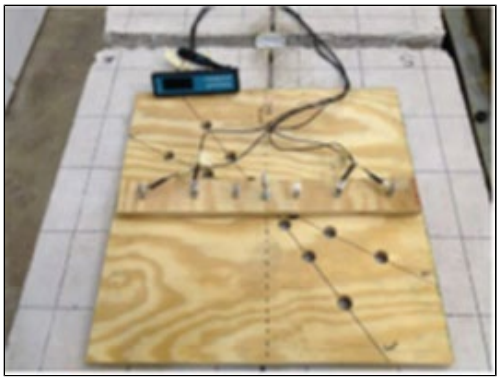
The guide specifications describe the various types of concrete overlays and provide recommendations for overlay materials, equipment, surface preparation, concrete placement, finishing, curing, testing, measurement, and payment.

This project was funded through a partnership between the FHWA, and the states of Iowa, Georgia, Michigan, Oklahoma, and Pennsylvania. The specifications were developed by Gary Fick and Dale Harrington through the National Concrete Pavement Technology Center at Iowa State University. Click here to access the full document.

This project is contributing to objectives identified in CP Road Map Track 8: Concrete Pavement Construction, Reconstruction, and Overlays.

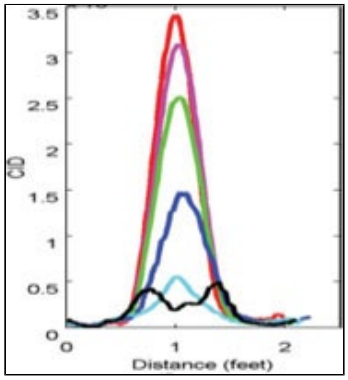
Early Detection of Joint Distress in Portland Cement Concrete Pavements

Excessive joint deterioration has been observed in Midwestern states. This deterioration is generally attributed to a failure in the joint sealant, which allows water to enter the saw-cut joint, where it becomes trapped and leads to premature deterioration.



The Indiana Department of Transportation (INDOT), as well as several surrounding states, have observed excessive joint deterioration on jointed plain concrete pavements. The deterioration is generally occurring in the joint behind the backer rod and joint sealant; as such, it is difficult to detect even if standing directly above the joint. Unfortunately, by the time that this joint deterioration is observed, it is often too late and costly partial depth repairs are necessary. This project investigated the potential of electrical resistivity and ground penetrating radar as two techniques to detect premature joint deterioration.

As concrete becomes saturated, its electrical resistivity decreases. Measuring the electrical resistivity between probes placed on either side of a joint was found to be an effective method for determining whether the concrete surrounding the joint was saturated. In addition, measuring the difference in resistivity between probes placed perpendicular to the joint versus probes oriented near the axis of the joint successfully indicated whether the joint contained standing water.



Ground penetrating radar (GPR) was also assessed as a method for detecting fluid accumulation in pavement joints; however, the resulting waveforms are difficult to interpret. A signal processing approach termed complexity-invariance distance (CID) was used to obtain a single number that reflects the potential for fluid in the joint.

These methods show promise for determining the fluid levels in pavement joints without removing the joint sealant. This information could help determine which joints may be susceptible to early failures and allow for preventative actions to be taken before serious joint deterioration occurs.

This project was sponsored by the Indiana Department of Transportation and completed by D. Harris et al. at the Joint Transportation Research Program at Purdue University. 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.

Evaluation of Concrete Grinding Residue Application on Vegetation

Diamond grinding is a successful restoration technique for correcting faulted joints, roughness, and surface irregularities in pavement surfaces. During the process, a slurry of concrete grinding residue (CGR) is generated from the cooling water and material removed from the pavement surface. Traditionally, this material has been discharged to the vegetation along the roadside. The CGR material is generally considered to be non-hazardous; however, depending on the quantity of surface removed and types of aggregates in the pavement, the slurry can have a liming effect on the soil, causing an increase in pH. For these reasons, the handling and disposal of CGR has come under greater regulatory control.

In Nebraska, recent regulations (NPDES permit # NEG500000) have set the limit on roadside application of CGR to five dry tons per acre or the "agronomic liming rate," whichever is lower. The agronomic liming rate is defined as the rate that beneficially adjusts the pH of the soil to enhance plant growth. These regulations caused concern that the agronomic limits may restrict application rates to less than five tons per acre.

A two-year study by the Nebraska Department of Roads (NDOR) evaluated the effect of CGR application on existing vegetation in medium to fine grained soils (loam and silty-loam). The results found that the application of CGR at rates of up to 40 tons per acre did not have an adverse effect on existing vegetation, soil chemical properties, or water quality. The study did not look at the effect on coarser textured soils and cautions that these soils may react differently. The results of the study confirmed that the agronomic liming rate for medium- to fine-grained soils is significantly greater than the five ton per acre limit set in Nebraska's NPDES permit.

This project was sponsored by the Nebraska Department of Roads and completed by M. Mamo, D. McCallister, and W. Schacht at the University of Nebraska-Lincoln. Click here to access the full document.

This research is contributing to objectives identified in CP Road Map Track 12: Concrete Pavement Sustainability.

Newsletter staff

- Steve Klocke, Snyder and Associates, Program Manager
- Dale Harrington, Snyder and Associates, Program Manager
- Sabrina Shields-Cook, Editor

The National Concrete Pavement Technology Center at Iowa State University provides operations support services to the CP Road Map program.
CP Tech Center
2711 S. Loop Drive, Suite 4700
Ames, IA 50010
Phone: 515-294-5798
Fax: 515-294-0467
Email: Program Management ~ Communications ~ Webmaster