CP Road Map E-News August 2014

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 August 2014 MAP Brief, "Deicing Salts and Concrete Pavements," describes different deicing chemical alternatives, the potential impact of each chemical on concrete pavements, and recommendations to minimize damage from deicing salts on new pavements.

Download the August 2014 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.

MnROAD Celebrates 20 Years of Success

The Minnesota Department of Transportation owns and operates MnROAD, a unique cold weather pavement research facility located near Albertville, MN. MnROAD celebrated its 20th anniversary this summer on August 6, 2014, and is looking towards the future. Over the years, MnROAD has been very successful in producing implementable research that has provided benefits for its research partners. As the current Phase II (2007-2015) draws to a close, MnROAD is again looking to its research partners to help develop and fund future MnROAD test sections and research needs expected to begin in 2016.

Phase III (Starting 2016) is expected to focus on maintenance and rehabilitation. Three subcommittees have been formed to help in the development of prioritized ideas that will be marketed to fund the research and required test sections. The subcommittees include a rigid pavement subcommittee, a flexible pavement subcommittee, and a pavement preservation subcommittee.

If you or your organization are interested in getting involved with MnROAD and its future endeavors, please contact Ben Worel at MnROAD.

Kansas Evaluates the Benefits of Internal Curing for Highway Pavements

The Kansas DOT (KDOT) is in the process of evaluating the properties of internally cured concrete pavement. KDOT's contractor placed concrete containing lightweight aggregate for internal curing on US 54 near Iola, Kansas in early May 2014. The pavement is heavily instrumented with moisture sensors and vibrating wire strain gauges, and the location is outfitted with a weather station. The instrumentation will monitor vertical strain data and moisture at three levels in the concrete slabs for evaluation of shrinkage and curling.

A control section, constructed with standard concrete, will be paved in July 2014 and will be instrumented and monitored in the same manner as the lightweight aggregate section.

At this point, Kansas DOT staff have observed that the internally cured pavement appears to behave differently as it cures and dries out, but without the control section they don't have any data to determine the effectiveness of the lightweight aggregate.

For additional information on this project, contact Dave Meggers with the Kansas DOT.

This project is contributing to research objectives identified in CP Road Map Track 1: Materials and Mixes for Concrete Pavements.

Research Finds Environmental Factors Impact Loss of Support and Load Transfer Efficiency

Research by the New York State Department of Transportation and the Ohio Department of Transportation on Interstate 490 near Rochester, New York investigated two areas: 1) loss of support from environmental factors including curling and warping during curing and early use and 2) pavement performance with varying diameters and spacing of load transfer devices.

The evaluation for loss of support included the installation of strain gauges, thermistors, and linear variable displacement transducers (LVDT's), along with the use of a falling weight deflectometer (FWD) and Dipstick® Road Profiler. The study found that when pavement is placed during hot weather, a positive temperature gradient develops (i.e., the top of the slab is warmer than the bottom). As the concrete cures and the slab cools, significant upward deflections of the pavement corners may develop as early as the second day after placement. FWD testing confirmed that slab curling can be a major cause of loss of support.

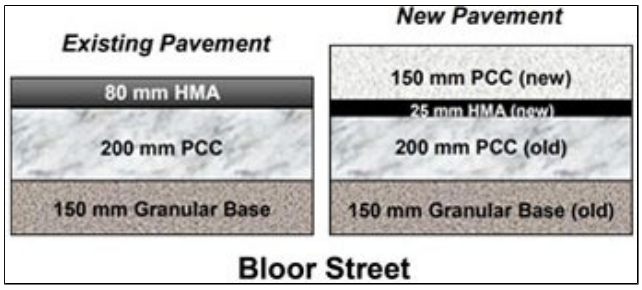
The project also studied the load transfer efficiency of various dowel bar configurations. The results indicate that during cool weather, when the temperature gradient of the slab was negative (top of slab cooler than the bottom) and curling of the slab was high, pavements with the smallest dowel bar diameter and narrowest joint spacing experienced less deflection than slabs with larger diameter dowels and wider joint spacing. When temperatures increased, there was less variation in the test results due to the fact that warmer temperatures lead to reduced curling and slabs that are more fully supported.

This research was completed by Sargand, Khoury, and Morrison at the Ohio Research Institute for Transportation and the Environment (ORITE) for the Ohio Department of Transportation and the New York State Department of Transportation. Click here to read the full report.

This project is contributing to research objectives identified in CP Road Map Track 6: Innovative Concrete Pavement Joint Design Materials and Construction and Track 9: Evaluation, Monitoring, and Strategies for Long-Life Concrete Pavements.

Toronto Evaluates Long-Term Performance of Unbonded Concrete Overlay

Heavy, slow-moving traffic can be extremely damaging to asphalt pavements. The T-intersection of Bloor Street and Aukland Road in Toronto is



subjected to a traffic volume in excess of 30,000 AADT, with a high percentage of transit buses. In the first ten years of service, an estimated 3.5 million ESAL's were imparted to the pavement by transit buses alone. Many of the vehicles moving through this intersection are slowing to turn or stop at the traffic signal. This combination of traffic volume, vehicle type, and traffic movements caused severe rutting and shoving of the asphalt pavement. The resulting performance required the City of Toronto to intervene with frequent "mill and overlay" treatments to address safety concerns. It was clear that traditional rehabilitation was not addressing the issues and a more permanent solution was required. In 2003, the City of Toronto, in collaboration with the Cement Association of Canada, elected to rehabilitate the intersection with the City's first unbonded concrete overlay.

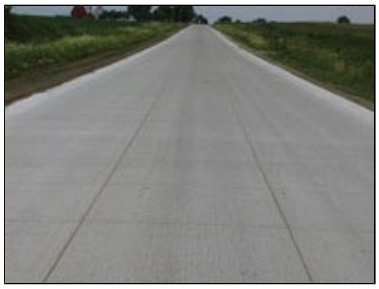
A 275-foot long unbonded concrete overlay was constructed on Bloor Street (Aukland Road was reconstructed as a conventional JPCP). The existing Bloor Street pavement consisted of a 3-inch asphalt surface over an 8-inch concrete base with a granular subbase. Preparation for the overlay involved removal of existing asphalt layer followed by full-depth patching and sealing of the concrete base. The unbonded overlay consisted of a 1-inch asphalt bond breaker with a 6-inch concrete overlay. Dowel baskets were installed at turning and stopping locations, and contraction joints were cut at a spacing of 5 feet. The overlay was constructed over the course of two weekend closures to minimize traffic delays.

The 2013 report summarizes the pavement rehabilitation strategy and follows up on the pavement's performance through the first ten years of service. The study indicates that the overlay has shown excellent performance with no major functional or structural issues. The recurring issues prior to rehabilitation (e.g., rutting, shoving, and other pavement distress) have been mitigated. The report concludes that concrete overlays are an excellent rehabilitation option for urban pavements subjected to high volumes of traffic.

This report was completed by Kivi, Tighe, et al. at the University of Waterloo for the Transportation Association of Canada. Click here to read the full report.

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

Updates from the States: Federal Highway Administration



The Federal Highway Administration's (FHWA's) Office of Research, Development, and Technology (RD&T) is located at the Turner-Fairbank Highway Research Center (TFHRC), a federally owned and operated national research facility in McLean, Virginia. This world-class facility houses more than 20 laboratories, data centers, and support facilities, and conducts applied and exploratory advanced research in vehicle-highway interaction, nanotechnology, and a host of other types of transportation research in safety, pavements, structures, human-centered systems, operations and intelligent transportation systems, and materials.

The Office of Infrastructure RD&T conducts and oversees research and development programs that address critical highway infrastructure needs and priorities of national importance. The office is organized under two broad program areas: Pavements and Structures. FHWA's pavement research and development program (pavement materials, pavement design and construction, and long-term pavement performance) provides technologies and solutions to advance both the state of the art and the state of the practice in highway pavement engineering.

Read on for more information about concrete pavement research at FHWA...

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