CP Road Map E-News July-August 2011

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 Dale Harrington, dharrington@snyder-associates.com, 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.

Full-Depth Reclamation for Concrete Pavements has recently been published under CP Road Map Track 7: Concrete Pavement Maintenance and Preservation.

Download MAP Brief (667 kb pdf).

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.

Innovative Pavement Research Foundation investigates optimum use of fly ash in airfield concrete pavements

The April 2011 report, *Proportioning Fly Ash as Cementitious Material in Airfield Pavement Concrete Mixtures*, by authors Chetana Rao, Richard Stehly, and Ahmad Ardani, addresses the selection of fly ash sources and replacement levels in order to optimize airfield paving operations and long-term pavement performance. Specifically, the study seeks to provide guidelines for optimizing mixes incorporating fly ash to obtain the desired level of strength, durability, workability, finishing and placement properties, and cost-effectiveness. The authors have also developed a user guide that outlines benefits associated with the use of fly ash and remedial measures to take when construction difficulties occur. In addition, a catalog serves as the implementable product of this study which provides likely ranges of fly ash replacement levels, mix design components/admixtures, and curing practices for project-specific conditions. In conclusion, the study finds that current specifications do not permit the ideal combination of fly ash cement in proportioning concrete mixtures for performance. To read more about this research, click on the following link:

http://www.iprf.org/products/IPRF_Research_Report_Final_apr2011.pdf

This research is helping to fill knowledge gaps outlined in CP Road Map Track 1: Materials and Mixes for Concrete Pavement..

Minnesota researchers evaluate cold weather performance of pervious concrete pavements

The December 2010 report, *Performance Evaluation of In-Service Pervious Concrete Pavements in Cold Weather*, by authors Mary Vancura, Lev Khazanovich, and Kevin MacDonald, examines the performance of 29 pervious concrete pavement sections throughout Minnesota. These pavement sections were used to

characterize and categorize typical distress mechanisms, mix designs, maintenance strategies, and ultimately evaluate the long-term viability of pervious concrete in any climatic region. While there was a significant range in both occurrence and severity, three primary distresses were observed; impermeability, raveling, and cracking. However, these distresses were not shown to have a significant effect on the structural integrity of the pavement. In fact, it was shown that although the modulus of elasticity and flexural strength of pervious concrete is lower than conventional concrete pavement, selection of an appropriate pavement thickness, base material, and base material depth effectively enables pervious concrete pavement to obtain adequate bearing capacity. For more information, please follow the link below:

http://www.rmc-foundation.org/images/MN%20Pervious%20Study%20Final%20Report.pdf

This project is meeting research objectives outlined in CP Road Map Track 9: Evaluation, Monitoring, and Strategies for Long Life Concrete Pavement, and as an advanced material, it also falls under CP Road Map Track 1: Materials and Mixes for Concrete Pavement.

Pennsylvania DOT examines premature deterioration of jointed concrete pavement sections

In the April 2011 report, *Premature Deterioration of Jointed Plain Concrete Pavements*, Dr. J.M. Vandenbossche and University of Pittsburgh researchers conducted an in-depth evaluation of six jointed plain concrete pavement (JPCP) sections experiencing premature deterioration. A large amount of data was used for assessment purposes including Falling Weight Deflectometer (FWD) data, manual and historic automated distress surveys, and laboratory material characterization data from field samples. Ultimately, it was determined that a variety of fatigue, materials-related distress, and construction issues were the cause of the premature deterioration. The researchers recommend improvements to the current open-graded base design and refinement of the concrete mixture design specification. In addition, recommendations are provided for concrete paving, finishing, and curing operations. Lastly, although alkali-silica reaction (ASR) was identified in three of the project sections, it does not appear to pose a problem when the approved concrete mixture design is used. Detailed information regarding this study and a copy of the final report can be obtained by clicking on the following link:

ftp://ftp.dot.state.pa.us/public/pdf/BPR_PDF_FILES/Documents/Research/Complete%20Projects/Extending%20Pavement%20Life/Premature%20Deterioration%20of%20Jointed%20Plain%20Concrete%20Pavement.pdf

This research can be categorized under CP Road Map Track 9: Evaluation, Monitoring, and Strategies for Long Life Concrete Pavement.

New Jersey researcher utilizes nanotechnology to strengthen concrete

Doctoral candidate Jon Belkowitz is exploring the use of nano-silica to strengthen concrete mixtures and ultimately prevent the occurrence of materials-related distress, such as alkali-silica reaction (ASR). In order to prevent ASR, the use of nano-silica enables concrete to resist the residual stresses and expansive nature of gel formed during the ASR reaction, causing it to crack and crumble from within. Additionally, this research seeks to alter the properties of excess water within the concrete, and potentially prevent the formation of gel altogether. This study not only has civil engineering applications, such as pavements, but spans many different disciplines. Mr. Belkowitz states, "through the use of nanostructure characterization tools, we now have the ability to gain a better understanding of the hydrated cement matrix that makes up concrete." To read more about this research, follow the link below:

http://buzz.stevens.edu/index.php/belkowitz_concrete

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

Updates from the States: California

The California Department of Transportation (Caltrans) is responsible for identifying concrete pavement research needs and developing associated standards, specifications, and test methods. Strategic direction is provided by the Caltrans Pavement Program Steering Committee (PPSC), while the Pavement Management Council (PMC) is responsible for establishing appropriate practices for concrete pavement design, construction, rehabilitation, and maintenance. In addition, the Rock Products Committee (RPC) coordinates research efforts between Industry and FHWA.

Read on for more information about concrete pavement research in the State of California...

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The National Concrete Pavement Technology Center at Iowa State University provides operations support services to the CP Road Map program.
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