

Minutes

National Concrete Consortium Meeting
March 31 – April 2, 2009
San Antonio, Texas

Presentations and documents from the spring 2009 Tech Transfer/National Concrete Consortium can be found on the National CP Tech Center web site at the following address:

http://www.cptechcenter.org/t2/ttcc_ncc_meeting.cfm.

Tuesday, March 31 - Research and Technology Transfer Activities of National Interest

Ongoing Research and Technology Transfer Projects

- Update on Joint Deterioration Pooled Fund – Dan Johnston, SD DOT
A copy of the TPF Solicitation 1227 overview was provided to the group. Contact Dave Huft, at the South Dakota DOT with questions (dave.huft@state.sd.us).
- ASR – National perspective – Gary Crawford, FHWA
The group was given an update on the FHWA ASR Development and Deployment Program. Much of the key information provided in the presentation can be found on the FHWA website at: <http://www.fhwa.dot.gov/pavement/concrete/asr.cfm>. Gina Ahlstrom (gina.ahlstrom@dot.gov) is leading this effort and can be contacted for more information.
- ASR – Texas activities – Brian Merrill, TX DOT
Alkali-silica reactivity is as big an issue in Texas as corrosion of reinforcing steel. For excessive expansion of concrete due to ASR to occur, four conditions must exist: the aggregate must be sufficiently reactive; the pH of the pore fluid must be high (high alkalinity); the amount of reaction product formed (ASR gel) must be large; and there must be enough water available in the concrete. The University of Texas has a large outdoor exposure sight that is studying various ASR mitigation methods. High performance concrete has been shown to mitigate ASR in two ways: 1) physical mitigation because the permeability of the concrete is much lower ; and 2) chemical mitigation where SCMs react with calcium hydroxide which lowers the alkalinity of the concrete and ties up free calcium ions needed to form ASR gel.
- TPF 5(179) Permeability Update – Nancy Whiting, Purdue University
The objective of this project is to develop a test procedure that directly evaluates the transport properties of concrete and relates these to anticipated performance under exposure conditions. The research team is reviewing each test to determine cost, time, basic principles, conditioning, and data obtained. An open house is planned for early 2010.

Tom Adams of the American Coal Ash Association shared information on recent deliberations by the EPA on disposal of coal combustion products (CCPs). The EPA is considering whether to designate fly ash as a hazardous material. He will send our group a copy of the letter that was sent to the EPA and the Office of Resource Conservation and Recovery in response to these deliberations.

- **Mix Design Analysis Pooled Fund and Track Update – Tom Cackler, CP Tech Center**
Tom Cackler gave an update on the Mix Design Analysis pooled fund which is being coordinated by Peter Taylor. Seven states currently belong to the pooled fund. The four sub-tracks of the project include: tests, models, specifications, and communication. The pooled fund TAC will meet every six months in conjunction with the TTCC meetings.
- **IMCP Training on Demand Modules – Dale Harrington, CP Tech Center**
The CP Tech Center has established interactive online training modules (supported by FHWA and State Pooled Funds) which are being developed and will be made available on the NHI and the CP Tech Center web sites. At the time of the NC² meeting two modules remain to be recorded and the project is expected to be completed by the end of May 2009.

The Center is working with FHWA on a national training calendar and with ACPA on the distribution of IMCP CD's. The Center is also working with NHI/TC³ to provide national training on concrete pavement overlays and concrete preservation, similar to the IMCP efforts.

Nineteen IMCP workshop programs were held between February 2007 and February 2009. The workshops were very well received and obtained very favorable rankings from the attendees.

- **Overlays Programs - Dale Harrington, CP Tech Center**
State DOTs who agree to construct overlays through the Concrete Overlay Field Application Program are eligible to receive technical assistance in the form of workshops and field reviews. Currently there are nine states in the program and eleven states who are interested in joining. Field reviews have been held in the participating states, reports were prepared and are being submitted to FHWA, the project team, and participating DOTs for review regarding the selection of projects for potential funding. Coordination continues with CPTP to present the overlay program to potential states, and field reviews will follow the presentation to begin the selection process for potential overlay projects in states.

As a response to the need for a simple and straightforward guide to compliment existing documents, a proposal for a Guide to Existing Concrete Overlay Design Methodology has been submitted to FHWA. The guide will identify critical and sensitive design variables on existing pavement systems. An interim product consisting of tech brief(s) will be developed. Peer review will be ongoing throughout the project.

Preservation Workshops

- A 1½-day workshop on PCC Pavement Preservation with reference documents, instructional materials, and handouts has been developed under a cooperative agreement between the CP Tech Center and FHWA. The workshop provides national training on concrete pavement preservation techniques and practices and will contain the same modules that were developed for the reference manual. Six preservation workshops will be held throughout the country. Workshops have been conducted in Colorado and Kentucky and two are scheduled for Missouri and Utah. Two openings are available for state preservation workshops through this phase of the program.

New Proposed Research and Technology Transfer Projects

- Aggregates + Nanotechnology = Cost Effective High Performance Concrete – Steven Cramer, University of Wisconsin-Madison
It is believed that several problems with aggregates (ASR/ACR, etc.) can be avoided by the application of special nanoporous coatings. An additional benefit of the coatings is improved bonding between the aggregates and cement paste.

Other Technical Topics and Presentations

- Dowel Basket Standardization –John Staton, Michigan DOT, and Glen Eder, WG Block
Findings were presented from a survey taken of the 19 NCC state DOTs relative to their details and requirements for load transfer dowel bar assemblies for concrete pavements. The survey showed that while there are a lot of similarities between states, there are also a lot of inconsistencies. Most of the state DOTs responding to the survey would not be opposed to developing standard basket design guidelines. Matt Zeller of the Minnesota Concrete Paving Association volunteered to head a task group to move the issue forward.

Glen Eder of WG Block then presented the manufacturer's perspective. He shared details of various types of dowel baskets and frames. Standardization would significantly decrease manufacturing costs and lead times. Aspects that need to be considered for standardization include epoxy coating thickness, dowel diameter vs. pavement thickness, frame wire sizes, steel grades, and tolerances. Consideration should minimally be given to regional standardization based on climatic conditions.

- Dowel placement tolerances – Ron Meskis, Guntert and Zimmerman
With reference to dowels in the transverse joint, several states specify different alignment tolerances depending on whether dowels are placed using a welded wire assembly or an automated dowel bar inserter. The challenge to the specifying authority is to consider one specification for dowel bar tolerances which would apply to either method of dowel bar placement. Data was presented proving that dowel bars placed with automatic dowel bar inserters are just as accurate as dowels in baskets. Advantages for using dowel bar inserters over welded dowel assemblies is higher productivity, lower installation costs, and a concrete pavement solution that is more cost competitive.
- Quiet Concrete Pavements - Ron Meskis, Guntert and Zimmerman
As an industry we have put most of our attention on the product that comes out of a slip form paver, and though we have specifications for the desired texture, we don't spend enough time inspecting/enforcing the specification for the final textured surface. This results in less smooth and noisier pavements - features that we have identified as needing improvement in order for concrete pavements to be more widely accepted by state DOTs and the traveling public. Solutions were presented on how to better monitor and enforce the texturing specifications so that states get a product that meets their expectations.
- CP Road Map - Paul Wiegand
The group was updated on past activities of the CP Road Map and a presentation of the proposed change in direction for the Operations Support Group (OSG) was given. The OSG will help connect industry, DOTs, and researchers with common needs/interests for

collaboration on research through meetings (face to face and video conferences) that will connect the needs of all parties to the Road Map. The OSG will assist in tech transfer program implementation.

- FHWA's QC/QA program – Jim Grove
The QC/QA initiative builds on the information obtained through the Materials and Construction Optimization pooled fund study. It is aimed at agency inspectors and contractors. FHWA's mobile lab will conduct field tests for two weeks. Data collected will be used in a two-day seminar in that state (state furnishes the facilities).
- Thermal stresses in large section transportation projects – Ralph Browne, Texas DOT
This presentation focused on the simplification of mass concrete specifications and the use of a software program called *ConcreteWorks* to predict outcomes. Its temperature predictions have normally been within 10% of measured results—much more accurate than the Schmidt method. It can be downloaded at www.texasconcreteworks.com at no cost. It is written in visual basic and simple to use. Within the program approximately 80 cracking frame tests are imbedded and used to predict thermal cracking. Texas requires contractors to use the program.
- Walking tour of DEF (delayed ettringite formation) damage in San Antonio.

Wednesday, April 1 Technical Program

Business Session – John Staton

- TCCC/NCC financial report. Revenue, expenses, and current balance were shared with the group.
- Election of officers. The following individuals were elected to serve on the NCC Executive Committee:
AASHTO Region 1: Mike Brinkman, New York DOT.
NCC Chair: Brett Trautman, Missouri DOT.
Contractor: Matt Ross, Penhall Company.
Supplier: Steve Tritsch, CMC Americas.

At the spring 2010 meeting, elections will take place for the following three positions:

AASHTO Regions 2 and 4 representatives.

Academia representative.

At-large representative.

The possibility of regional meetings under the NCC umbrella including contractors was suggested.

- NCC logo - It was decided not to use the modified MC2 logo but instead to have a graphic designer work on a new logo for the organization.

Technical Focus – Steel Reinforcement - Moderator: Lisa Lukefahr

- CRCP: The National View – Ted Ferragut
Continuously Reinforced Concrete Pavement (CRCP) is a viable long life pavement option with benefits that owners may want to consider in the pavement selection process. CRCP, with its

high proportion of steel, eliminates joint cutting, carries extremely heavy loads in industrial/urban situations, provides a smooth and quiet ride, and is easily overlaid at the end of its initial service life. The Concrete Reinforcing Steel Institute, in cooperation with the Federal Highway Administration, is working with state DOTs and industry leaders to develop training workshops, newsletters, and brochures to help owners interested in building sections.

- CRCP: The Texas View – Moon Won
Texas has seen poor performance with JCP. CRCP provides a good ride, more options for rehabilitation, and requires little maintenance. Lessons learned: stagger laps of longitudinal steel, use a non-erodible subbase, use tied concrete shoulders, and have adequate slab thickness. Transverse cracks don't necessarily cause performance problems if they are kept tight.
- Dowel Bar Issues and Alternatives in Pavements – Steve Tritsch
Wheel loads are conveyed from slab to slab via aggregate interlock, stabilized bases, and dowel bars. Dowel bars are the most reliable, cost-effective method of load transfer. Optimizing their placement and physical characteristics is critical. *DowelCAD 2.0* is a program that was developed for ACPA by Transtec for economizing on dowel bar construction costs. It can be downloaded at www.pavement.com/dowelcad.
- Reinforcing Steel – Understanding the Process; Understanding the Issues
The group was given a tour and technical program at the CMC steel plant.

Thursday, April 2 State Reports — John Staton

- Questions on bridge ride quality were distributed to state representatives prior to meeting. Copies of the responses were given to the attendees and are posted on the web site.

Suggestions for future topics included:

- Comprehensive concrete training/T2 program
- Practical ways for sustainable concrete for paving/structures w/ CO2 emission and LCA
- SHRP2 Projects update
 - R07 Performance specs
 - R21 Composite pavement (two-lift concrete)
 - R06-E Real time smoothness during construction
- Drainage systems/pavement foundations
- Roller compacted concrete pavements-consider IT
- Session on using FHWA ASR protocol
- Concrete overlays
- Fabric bond breakers
- New NDT equipment
 - Pavement depth
 - Steel location (plastic concrete)
- “D cracking” update
 - New test procedures
 - Ways to address

General Discussion

- MnDOT passed out a survey on concrete washout and slurry to the state rep's. MnDOT will summarize everyone's responses and forward to the CP Tech Center for distribution to the group.

We need to address if we have an environmental problem, and if we don't we need to communicate that fact. The cost increase would be huge to capture slurry, treat it, etc. Some issues brought up by environmental groups are not backed by good science. Kansas will ask their environmental people what to expect in terms of demands. States can bring concerns to AASHTO and FHWA. Can we get national support after we establish what some of the problems are? There may be trade offs for smooth roads.

- Larry Sutter updated the group on his low cement content study. He indicated that with high cement content you are almost doomed to failure. The question is how low you can go and maintain durability. You can never separate the materials from the process.
- Matt Zeller asked for a state DOT rep to help work on the dowel basket standardization task force. Maria Masten-MnDOT volunteered to help put something together and send around for review. Glen Eder will assist.
- The fall 2009 meeting will take place in **St. Louis, Missouri**. Holcim's new plant may be open in time for the group to tour it. A five-inch overlay was placed in front of Holcim's new plant.
- Through a show of hands, six states indicated they use inertial IRI profiler. Michigan uses ProVal software developed by Transtec. Oklahoma doesn't use IRI because most bridges are less than 100 feet so IRI isn't effective. A ten-foot straight edge and the profilograph are used. They exempt drainage basins.
- For our next meeting ask all states if grinding is allowed on bridges.
- Pressure relief joints - Sometimes the material comes out during rainfall. There is a new product, made of rubber from waste tires, that doesn't float up as easily. Cold pour sealant is placed on top. Iowa DOT has a short report on it.
- Several people commented that it had been a great meeting with excellent presentations.

Meeting adjourned.