**Minnesota Department of Transportation**



**MEMO**

Office of Materials and Road Research

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**DATE:** December 19, 2013

**TO:** TAP members

**FROM:** Tom Burnham, Project Manager

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**SUBJECT:** Minutes from 2nd TAP meeting for TPF 5-269 (Transportation Pooled Fund) Project “Development of an Improved Design Procedure for Unbonded Concrete Overlays.”

The second Technical Advisory Panel meeting for the Transportation Pooled Fund Project 5-269 “Development of an Improved Design Procedure for Unbonded Concrete Overlays” was held on December 16, 2013. The meeting was conducted via a web meeting based out of the MnROAD facility. The meeting was hosted by Tom Burnham (Project Manager, MnDOT) and the project team members Lev Khazanovich (U of Mn) and Julie Vandenbossche (U of Pitt).

Meeting attendees were:

Gina Ahlstrom – Federal Highway Administration

Tim Andersen - Minnesota Department of Transportation

Andy Bennett - Michigan Department of Transportation

Chris Brakke – TPF State Rep - Iowa Department of Transportation

Tom Burnham – Project Manager - TPF State Rep – Minn. Dept. of Transportation

Andre Clover - Michigan Department of Transportation

Tim Clyne - Minnesota Department of Transportation

Jeff Dean – TPF State Rep - Oklahoma Department of Transportation

Michael Eacker - Michigan Department of Transportation

Rod Garver - Minnesota Department of Transportation

Rob Golish - Minnesota Department of Transportation

Kyle Hoegh – University of Minnesota

Andrew Jenkins – TPF State Rep - Kansas Department of Transportation

Maureen Jensen - Minnesota Department of Transportation

Lev Khazanovich – Principal Investigator – University of Minnesota

Ben Krom – TPF State Rep – Michigan Department of Transportation

Maria Masten - Minnesota Department of Transportation

Randell Riley - Illinois Chapter, ACPA

Steve Sachs – University of Pittsburgh

Derek Tompkins - University of Minnesota

Julie Vandenbossche – Co-Principal Investigator - University of Pittsburgh

Matt Zeller – Concrete Paving Association of Minnesota

Not able to participate:

Shongtao Dai - Minnesota Department of Transportation

John Donahue – TPF State Rep - Missouri Department of Transportation

Deb Fick – Project Coordinator - Minnesota Department of Transportation

Dale Harrington – CPTech Center

Bernard Izevbekhai - Minnesota Department of Transportation

Jay Page - TPF State Rep – Georgia Department of Transportation

Medhi Parvini – California Department of Transportation

Nilesh Surti - TPF State Rep – North Carolina Department of Transportation

Mark Synder - Co-Principal Investigator – Consultant

Ben Worel - Minnesota Department of Transportation

Meeting Summary

The meeting began with introductions by the participants.

Next, Lev Khazanovich gave a PowerPoint presentation summarizing the current status and recent findings from the project.

The research project team met with Minnesota pavement experts in November 2013 to gather information about the historical performance of unbonded concrete overlays (UBOLs) in Minnesota. Identified during that meeting were MnDOT’s extensive pavement management system records that could be mined for performance histories of UBOLs in Minnesota. Minnesota pavement experts also transferred their personal knowledge and experience with UBOLs to the team.

The work in Task 1, Literature Review and Database Assembly, is nearly complete. A late start with the project contract has resulted in the Task 1 completion date shifting to the end of January 2014.

Contract development with the University of Pittsburgh is moving very slowly. There is a backlog of contracts to be approved, due to a recent retirement in the contract administration department at the U of Pitt. Once the contract is in place, work on Task 2, Laboratory and Field Testing, will begin.

The work accomplished in Task 1 was presented next. So far, six existing design procedures have been reviewed. More detailed review of the structural models will be done soon. Lev stated that the intention remains to incorporate (or append) the new UCOCP design procedure into the recently completed BCOA-ME (whitetopping) design procedure developed by Julie Vandenbossche. Lev suggested that findings from the NCHRP 01-51 project (A Model for Incorporating Slab/Underlying Layer Interaction into the MEPDG Concrete Pavement Analysis Procedures), of which he is the principal investigator, could be used to benefit this project.

Lev next presented a table of the six existing UBOL design procedures the team considered for review. These design procedures include AASHTO 1993, Corps of Engineers, Rollings, PCA, Minnesota, and MEPDG. The merits of various design factors were discussed. While the MEPDG can be used to design UBOLs, the design is accomplished using empirical factors based on LTPP data. Lev suggested that this model needs improvement.

Next, the use of geotextile fabric interlayers was discussed. Lev explained that the concept came from European practice, where the fabric was used to separate cement treated bases from new concrete pavement. Using fabric as an interlayer for UBOLs is gaining popularity in the U.S. One of the major objectives of this pooled fund project is to characterize all types of interlayers, including geotextile fabrics. There was discussion among the TAP members on whether there is a need to characterize asphalt type interlayer. There was generally agreement that there are still situations where an asphalt interlayer is needed, such as projects with severe joint faulting, or other areas where the new concrete overlay would “key” into the existing concrete pavement underneath.

A review of a Michigan DOT study on UBOLs was discussed. The importance of drainage within a UBOL system was emphasized. The study suggested several cross-section changes to improve drainage in UBOLs.

The creation of a national UCOCP project performance database was discussed next. As mentioned previously, the research team met with Minnesota pavement experts to understand the general experience with UBOLs in Minnesota. Out of that meeting, it was discovered MnDOT has a large pavement management database containing long-term performance history of UBOLs in Minnesota. 619 MnDOT road sections with UBOLs were analyzed for performance trends. The presence of outlier data was discussed. The behavior of the sections, as quantified by surface rating, was also discussed.

Lev reminded the TAP members that a UBOL performance history survey was sent recently to the state DOTs participating in the pooled fund. Tom emphasized that it is often much more effective to arrange meetings with the state DOTs and pavement experts to gather case histories and expert opinions on the performance of UBOLs in their respective states. The team agreed that this is planned once some of the survey results come back.

***Action Item: TAP members are encouraged to complete the UBOL performance surveys, as well as arrange for technology transfer meetings with the research team.***

Next, Lev and Julie discussed activities planned for 2014. Lev requested that participating DOTs identify some UBOL projects to be constructed in 2014, where ultrasonic tomography (MIRA) testing could be done. This testing could be conducted at all stages of the construction, and preferably when lanes were closed to traffic.

Julie requested that DOTs send field samples cut from projects during their construction in 2014. Specifically, the beam shaped samples would be cut once an asphalt interlayer has been placed on the existing concrete, prior to the concrete overlay. She stated that it is too difficult to get field type compaction of HMA in a laboratory. MnDOT has already committed to sending Julie samples during the 2014 construction season.

***Action Item: TAP members are to identify UBOL projects to have MIRA measurements done on them.***

***Action Item: TAP members are to identify UBOL projects that could have beam samples cut for them prior to overlay.***

The meeting concluded with a recommendation by Tom Burnham that the next TAP meeting be held in about 6 months, or when the team wished to share and discuss substantial findings.

***Action Item: Tom Burnham and the research team will schedule a TAP meeting in approximately 6 months to share progress on the project with the TAP.***

For those participants unable to attend, the following questions and answers occurred in the chat section of the web meeting window:

Ben Krom asked: Could you please explain the Surface Rating (SR)?

*Derek Thompkins replied: SR is based on distress assessment by MnDOT Pvt Mgmt office. They use 2D images to assess condition of first 500 ft of every mile of project surveyed.*

*More information can be found here:*[*http://www.dot.state.mn.us/materials/pvmtmgmtdocs/Rating\_Overview\_State.pdf*](http://www.dot.state.mn.us/materials/pvmtmgmtdocs/Rating_Overview_State.pdf)

Randy Riley asked: Is this an automated assessment or do individuals enter into the analysis?

*Derek Thompkins replied: 2 individuals at MnDOT Pvt Mgmt conduct the analysis*

*It's limited to those two people to maintain consistency across projects/sections*

*In general it's a reliable metric, but it can miss some distresses that are hard to see without depth ... like ravelling*

*Not a concern for PCC though*

Randy Riley asked: This has been a long-term project. Do they make adjustments for when people change. A couple of blips in there seemed to correspond across several of the data sets.

*Derek Thompkins replied: It's possible, I can't account for the history, only how they represent it. MnDOT pvt mgmt would have to step in here to answer that.*

Maureen Jensen asked: IRI is an automatic measure (laser). Distress is done by the staff - at least one has been there for more than 30 years, plus we do quality checks

*Derek Thompkins replied:*

*Just to be clear, Maureen, Randall was asking about SR (distress) only.*