**Minnesota Department of Transportation**



**MEMO**

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**DATE:** April 13, 2016

**TO:** TAP members

**FROM:** Tom Burnham, Project Manager

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

The fifth 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 February 22, 2016. The meeting was conducted via a web meeting based out of the MnDOT Materials and Road Research Laboratory. The meeting was hosted by Tom Burnham (Project Manager, MnDOT) and the project team members Lev Khazanovich (U of Mn), Mark Snyder (Consultant) and Julie Vandenbossche (U of Pitt).

Agenda

* Introductions (5 minutes) – Tom Burnham
* Project overview (5 minutes) – Tom Burnham
* Project Contractual Status – (5 minutes) – Lev Khazanovich
* Project Update/Task 2 Report (40 minutes) – Mark Snyder and Julie Vandenbossche
* Discussion on Task 2 Findings (15 minutes)
* Project Update/Task 3 Report (40 minutes) – Lev and Julie
* Discussion on Task 3 Findings (15 minutes)
* Schedule next meeting

Meeting Summary

The meeting began with introductions by the participants.

Tom then gave a brief summary of the objectives of the project.

Next, Lev gave an update on the work completed on Task 2 of the project. He stated that sub task 2.3, titled: “Provide Guidelines on the Need for Drainage,” involved much more of the team’s efforts than originally planned. Mark Snyder then went through some slides explaining the recommendations of the team. The team concluded that positive drainage is necessary to protect interlayers. Mark also described the findings from lab testing of fabric interlayers, as well as some considerations for the drainage design of interlayers, including net inflow and time-to-drain. Mark concluded by suggesting some needed research related to the drainage of unbonded concrete overlay systems. A copy of Mark’s presentation is attached to these minutes.

Next, Julie provided a summary of work completed in Task 2. She began by describing the surprising consolidation and fatigue of HMA interlayers observed during the lab testing conducted in Task 2. In particular, the open graded PASSRC used by MnDOT experienced the most amount of degradation during the testing. She also described the frictional restraint provided by various interlayers, with the standard thickness fabric providing the least friction. Julie reiterated that reflective cracking in the overlay beams could not be generated when the bottom of the beam was fully supported. Also, fabric interlayers tend to increase resistance to reflective cracking compared to HMA interlayers. Julie suggested that the testing of additional beam samples extracted from a 6’x6’ panel project in Pennsylvania would be very informative. ***Action item: Tom suggested that Julie send a proposal for extra work to the TAP for consideration***. John Donahue from Missouri mentioned that they observed problems in projects with 6’x6’ panels, particularly near transitions with other pavement systems.

Julie next talked about the occurrence of joint faulting in overlays on HMA interlayers. She stated that efforts were being made to create a predictive model using FEM.

A copy of Julie’s presentation is attached to these minutes.

Lev then presented on findings from the work on Task 3: “Structural Model Development.” He stated that the team’s model accounts for all layers of the structural pavement system, compared to the single layer system used by AASHTO-ME. He later addressed a question asking about designing for situations where joints between the old slabs and the overlay lie on top of each other. He stated that would be the worst case scenario in terms of faulting, and that it happens rarely in the field, so designing for it might result in too conservative of designs. Lev said that the Totsky model was chosen due to its ability to model the “cushioning” properties of interlayers. It is also incorporated in the ISLAB 2005 FEM model that was chosen for the analyses in this study.

Lev next talked about the development of a longitudinal cracking model. He stated that modeling showed that it is difficult to predict the amount and progression of longitudinal cracking. Modeling was also carried out examining the effect of underlying cracks and joint distress on the stresses in an overlay. Finally, modeling was carried out on 6’ x6’ panels to characterize their typical stresses.

Next, Julie presented on the 3D FEM model under development that will address issues like joint faulting in the overlay as a result of erosion and/or consolidation of HMA interlayers. Tom Burnham asked about consideration of excess or lack of cushioning provided by fabric interlayers. Lev stated that even for very thin overlay slabs (Minne-ALF testing), fabric interlayers have not caused any type of reflective cracking due to excessive contact stresses between layers. Randy Riley asked about consideration of doweled versus undoweled joints in the overlay with respect to load transfer efficiency, as well as the contribution of fiber reinforced concrete mixes toward improve performance. Lev stated that the team will consider these issues as part of the next task. Julie finished her presentation by requesting that TAP member states send her any UBOL faulting data that they can find. ***Action item: TAP member states should send UBOL faulting data to Julie as soon as possible.***

The research team suggested that based on both modeling and laboratory results, reflective cracking is not a critical distress to consider in the design of unbonded concrete overlays (other distress types will control). A copy of Lev and Julie’s presentation is attached to these minutes.

The meeting concluded with discussion on the schedule of the remaining tasks. The team has requested that due dates for Tasks 4 and 5 be extended by several months. They believe that the current completion date for the final task will not have to be changed. Tom suggested that the team prepare a contract amendment asking for new due dates for Tasks 4 and 5, as well as requesting additional funds for the testing of beam samples from Pennsylvania.

The next TAP meeting is planned for fall 2016, or the delivery of the prototype version of the new design procedure coming out of Task 4, whichever is sooner.