IOWA HIGHWAY RESEARCH BOARD (IHRB)

Minutes of May 31, 2013

Regular Board Members Present

A. Abu-Hawash
K. Jones
V. Dumdei
R. Younie
S. Okerlund
D. Schnoebelen
W. Weiss
J.D. King
P. Assman
K. Mayberry
T. Wipf

Alternate Board Members Present

D. Sprengeler

Members with No Representation

R. Knoche
R. Kieffer
E. Steffensmeier
R. Fangmann

Secretary - M. Dunn

Visitors

Vanessa Goetz	Iowa Department of Transportation
Jesus Rodriguez	Iowa Department of Transportation
Leighton Christensen	Iowa DOT Library
Jeramy Ashlock	Iowa State University/InTrans
Bob Steffes	Iowa State University/InTrans
Sunghwan Kim	Iowa State University/In Trans
Halil Ceylan	Iowa State University/In Trans
Kasthurirangian Gopalakrishnan	Iowa State University/In Trans
John Cunningham	ICPA
Dale Harrington	CP Tech Center

The meeting was held at the Iowa Department of Transportation Ames Complex, Materials East/West Conference Room, on Friday, May 31, 2013. The meeting was called to order at 9:00 a.m. by Chairperson Ahmad Abu-Hawash with an initial number of 10 voting members/alternates at the table.

Minutes

Motion to approve Minutes from the April 26, 2013 meeting

Motion to Approve by 1st R. Younie 2nd W. Weiss
Motion carried with 10 Aye, 0 Nay, 0 Abstaining.

*****1 member joined the table. Total voting members = 11.**

FINAL REPORT TR-643, Evaluating Roadway Subsurface Drainage Practices, Halil Ceylan, ISU/In Trans

BACKGROUND

The detrimental effects of water in pavement structures are known to cause and/or accelerate the following distresses:

- AC pavements: stripping of asphalt, rutting, fatigue cracking, separation of pavement layers, and increased roughness
- PCC pavements: pumping, faulting, fatigue cracking, D-cracking, shrinkage cracking, reactive aggregate distress, increased roughness

Iowa subgrade soils, in general, are fine-grained and have low permeability and poor drainage quality by AASHTO standards, less than 10 feet per day (< 5 inches/hour). Iowa also receives over 20 inches of precipitation a year and is considered a wet climate. Considering all this, lack of subsurface drainage systems in Iowa pavements can lead to potential saturation of subgrades and subbases for long periods of time (SUDAS 2010). The presence of subsurface drainage systems (including granular bases, open-graded granular or treated layers and longitudinal edge drains and outlets) is generally believed to be beneficial to the performance of both AC and PCC pavements. Notes: not to scale; the drainage design used in Iowa is slightly different.

OBJECTIVES

The specific objectives of this project are as follows:

- Conduct an extensive performance review of pavement subdrains in Iowa.
- Include the condition of the drains and a determination of whether they are functioning as designed.
- Evaluate a corresponding pavement to determine if pavement deterioration is occurring at the drain locations.
- Determine the cause of the problem if there are drains that are not functioning properly.
- Make recommendations for improvements to the pavement drainage system, when appropriate.

DISCUSSION

Q. Do we have an optimal percentage of recycled vs. virgin aggregates?
A. It is not easy to use the blended pavements in the field. Due to economics, we will be using predominately recycled aggregates. Minnesota implemented blending and it has reduced the formation of the TUFA in the drain system.

Q. Are there metrics other than drain outlet condition that can be used in correlation with the performance of subdrains?
A. The concern for this project was what extent the condition of the outlet predicts pavement performance? There are other factors, but we did not investigate those within this study.

Q. Do they daylight the granular back fill around the pipes so if the pipe was clogged there would still be a mechanism for water to get out or does it have to go through the outlet?
A. There are cases where blockage is at the outlet where water still finds its way out.

Motion to Approve by 1st K. Jones. 2nd V. Dumdei.
Motion carried with 11 Aye, 0 Nay, 0 Abstaining.

PROPOSAL, Evaluating Roadway Subsurface Drainage Practices – Phase II

BACKGROUND

The general design considerations for whether or not to include subsurface drainage systems in concrete pavements were summarized by Mallela et al. (2000):

- Site conditions
  - ✓ Subgrade permeability
  - ✓ Site freezes or not?
  - ✓ Pavement section is at grade or a cut section?
- Traffic Conditions
  - ✓ High traffic loads have the greatest need for subsurface drainage
- Design Conditions

Past experience, anticipated paving quality, and the cost implications of including drainage are some other factors recommended for considering drainage feasibility (Mallela et al. 2000).

OBJECTIVES

The proposed research is a follow-up investigation of the IHRP research project entitled "Evaluating Roadway Subsurface Drainage Practices". The primary objectives of this proposed Phase II research are listed below:

- Evaluate the seasonal variation effects (dry Fall 2012 vs. wet Spring/Summer 2013, etc.) on subdrain outlet condition and performance
- Investigate the characteristics of tufa formation in Iowa subdrain outlets (i.e., identify the factors influencing the tufa formation and prevention, at what stage does tufa formation start influencing subdrain outlet performance, etc.)
- Investigate the condition of composite pavement subdrain outlets
- Examine the effect of resurfacing/widening/rehabilitation on subdrain outlets (e.g., the effects of patching on subdrain outlet performance)
- Identify a suitable drain outlet protection mechanism (like a headwall) and design for Iowa subdrain outlets based on a survey of nearby states

Q. Why are you proposing continuing research with blockage of outlets when it's been established in this study that the subdrains have little effect on the pavement distress?
A. This research is looking at the drainage system and the performance. The pavements selected were relatively new and distress takes time to become evident. We know from experience that if we do not have a drainage system in place our pavement will deteriorate.

Q. Was their focus looking at the subbase and underneath these drains and how well they are connected?
A. The focus was on the outlets and not the whole system.

Q. Do you think the distress pavement response is immediate in terms of the drain ability of the sub base?

A. With the performance of a blocked outlet the water is finding its way out. The pavements that were selected were newer ones. What you see as stress or non-stress pavement may or may not apply.

Q. Do we keep maintenance on the outlets?
A. The reason for this research, "what is a functioning outlet and what is the cause affect". What this research has found is, almost any drainage outlet condition will not cause damage to the pavement. This does not mean that maintenance will ignore outlets.

Motion to Approve by 1st K. Jones, 2nd W. Weiss.
Motion carried with 11 Aye, 0 Nay, 0 Abstaining.

DISCUSSION

The following FY-13-14 First round RFP drafts were reviewed for distribution and approved without modification:

- **RFP-IHRB-14-01 Iowa DOT Library Services, Collection, & Technology Assessment**
- **RFP-IHRB-14-02 Validation of Gyratory Mix Design in Iowa**
- **RFP-IHRB-14-05 Impact of Curling and Warping on Concrete Pavement**

- **RFP-IHRB-14-04 Mitigation of Sedimentation at Multi-box Culverts**
  It was recommended to request a sole-source proposal from Dr. Marian Muste, University of Iowa since he has performed the initial work with the subject and the continuity would greatly benefit the project.

Motion to approve sole-source by 1st J.D. King, 2nd R. Younie
Motion carried with 11 aye, 0 nay, 0 abstaining.

- **RFP-IHRB-14-03 Increasing the Stability of Unbound Shoulder Materials**

Iowa DOT Research staff are continuing to develop the scope of this project and this RFP will be delayed 1 month to the June meeting for review.

NEW BUSINESS
None

ADJOURN

The next meeting of the Iowa Highway Research Board will be held Friday, June 28, 2013, in the East/West Materials Conference Room at the Iowa DOT. The meeting will begin promptly at 9 a.m.

Mark J. Dunn

Mark J. Dunn, IHRB Secretary