

IOWA HIGHWAY RESEARCH BOARD (IHRB)

Minutes of April 27, 2018

Regular Board Members Present

K. Jones	P. Assman
S. Okerlund	J. Thorius
R. Knoche	M. Parizek
T. Wipf	P. Hanley
W. Weiss	
P. Geilenfeldt III	
L. Bjerke	

Alternate Board Members Present

D. Claman
D. Harness
D. Sprengeler

Members with No Representation

B. Skinner

Secretary – V. Goetz

Visitors

Tammy Bailey	Iowa Department of Transportation
Brian Worrel	Iowa Department of Transportation
Francis Todey	Iowa Department of Transportation
Chris Brakke	Iowa Department of Transportation
Mike Nop	Iowa Department of Transportation
Danny Waid	Iowa County Engineers Association
Khyle Clute	InTrans/Iowa State University
Neal Hawkins	InTrans/Iowa State University
Skylar Knickerbocker	InTrans/Iowa State University
Alice Alipour	InTrans/Iowa State University
Jeremy Ashlock	InTrans/Iowa State University
Brian Moore	Wapello County
Katelyn Freeseaman	Bridge Engineering Center

The meeting was held at the Iowa Department of Transportation Ames Complex, Materials East/West Conference Room, on Friday, April 27, 2018. The meeting was called to order at 9:00 a.m. by Chair Wade Weiss with an initial number of 13 voting members/alternates at the table.

1. Agenda review/modification

Motion to Approve by P. Geilenfeldt III; 2nd J. Thorius
Motion carried with 13 Aye, 0 Nay, 0 Abstaining

2.Minutes Approval from the March 2018 Meeting

Motion to Approve March 2018 by M. Parizek; 2nd R. Knoche
Motion carried with 13 Aye, 0 Nay, 0 Abstaining

3. Final Report – TR-652, “Durable Pavement Marking and Grooving”, Neal Hawkins, Iowa State University, \$125,000.

Background

While the initial scope of this project was to evaluate different durable markings and pavement grooving configurations to make better choices for year-round markings, limited funding, difficulty in finding a contractor for a small test site, and adverse weather conditions caused the project to be revised to omit the field evaluation.

Instead, the project focused on supporting PMT decision making considering challenging financial conditions, and particularly supporting efforts to determine paint truck and material choices by looking at peer states, and by looking at contracting options for installation on the state system.

The research team sought to help the PMT understand the pavement marking practices in other states. That meant looking at the practices at DOTs in Illinois, Kansas, Minnesota, and Wisconsin, as well as preliminary details of practices in California, Colorado, Indiana, Oklahoma, Oregon, and Texas.

Objectives

The objective of this project was to support the Iowa Department of Transportation (DOT) Pavement Marking Task Force (PMT) in achieving better pavement markings statewide.

Benefits

The Iowa DOT has begun to assess locations, pavement marking line types to stripe, materials options, retro reflectivity levels, and installation methods. The identification and use of more durable pavement markings may be the key toward improving visibility, operations, and most importantly, safety.

A demonstration project will be established on I-35 in one direction only, roughly just north of Ames to just north of US 20.

If the demonstration is deemed a success, the Iowa DOT can establish a long-term contractor applied durable marking program. This would allow Iowa DOT paint crews to provide a much higher level of pavement marking guidance on the rest of the roadway network.

The program could also minimize disruptions to travel on the interstates by requiring much less frequency of painting, which would benefit both mobility and safety.

A draft specification was also developed for consideration by the PMT for the purchasing specification for contractors.

Motion to Approve by R. Knoche; 2nd P. Assman
Motion carried with 13 Aye, 0 Nay, 0 Abstaining

Discussion

Q. What is the expected life?

A. 2 to 4 years without the groove, 4 or more years using the grooving.

Q. When there is a centerline rumble strip, when you paint over it, does it provide a good benefit?

A. Yes, you do get a benefit of seeing/reflecting the paint on the vertical surfaces inside the rumble.

Q. Will you report back to the board with life expectancy?

A. Yes, we would be glad to come back and share the results.

Q. Does Minnesota have their own epoxy crew?

A. Yes, they do have their own crew.

4. Final Report – TR-685, “Feasibility of Granular Road and Shoulder Recycling”, Jeremy Ashlock, Iowa State University/InTrans, \$175,000.

Background

Granular-surfaced roads and shoulders frequently experience extensive surface damage caused by heavy agricultural traffic loads, freeze-thaw cycles, and wet-dry cycles. Such damage increases maintenance requirements and reduces safety.

Current practice to address surface damage typically involves covering the entire road surface with fresh aggregate followed by blading with little or no compaction. Meanwhile, most state department of transportation (DOT) specifications for the gradation and plasticity of granular surface materials are neither performance based nor strictly followed.

Consequently, sub-optimal gradations can be placed. This may lead to the rapid degradation of the freshly placed aggregate material to smaller particles and the generation of fugitive dust, which further contributes to a costly cycle of recurring maintenance.

Granular-surfaced roads typically require a smaller top size for better stability and ride quality and a small number of plastic fines to bind the aggregate and reduce aggregate loss.

Objectives

The importance of index properties such as maximum aggregate size, gradation, plasticity, and abrasion characteristics has long been recognized. However, very few studies to date have focused on quantifying the effects of gradation and plasticity on the performance and durability of granular surface materials.

Benefits

The set of recommended testing, design, and construction procedures developed in this research can provide state secondary roads departments with more cost-effective solutions for building or reconstructing granular road systems with improved performance and durability, with the option of recycling existing surface course and subgrade materials.

The gradation optimization spreadsheet developed in the field performance study was distributed to Iowa county engineers on the Iowa County Engineers Service Bureau website. Several counties have begun using it and providing feedback.

Motion to Approve by P. Geilenfeldt III; 2nd J. Thorius

Motion carried with 13 Aye, 0 Nay, 0 Abstaining

5. STIC Final Report – “Iowa DOT Traffic Operations Open Data Service”, Skylar Knickerbocker, Iowa State University/InTrans, \$56,000.

Background

The Iowa DOT is committed to providing open data by implementing a new program providing a high quality, near real-time, free open data service through the Institute for Transportation (InTrans). This open data service provides operations-related data to any commercial, public or private entity to develop their own applications or integrate these data into their existing hardware, software and logistics systems. The one-stop data service will provide considerable savings to DOT and local agency staff who currently must seek out this information from multiple sources, formats, and accessibility.

Objectives

The goal of this project was to establish the Iowa Department of Transportation (DOT) open traffic data service, which will allow vendors and agencies to provide near real-time, proactive alerts to commercial drivers regarding traffic conditions along their routes. The objective was to make the data service available and allow third-party vendors the opportunity to develop their own end-user applications, rather than creating an application itself.

Benefits

The open data service has proven to be an asset for the Iowa DOT. The service enables access to important data as well as to value added data feeds. This service is advantageous to both internal and external DOT users.

A sample of how the feeds are being used within the DOT include the following:

- Project prioritization tool for the Office of Location and Environment (OLE)
- LCPT for the Office of Traffic and Safety
- Operations dashboard in the Traffic Management Center (TMC) for the Office of Traffic Operations
- Work zone alert feed, developed during the 2017 construction season, which identifies slow and stop conditions across the state, at each work zone for the TMC Operations Dashboard and for text alerting to DOT staff
- The feeds also include a unified sensors feed (location and speed data), performance measures for INRIX and sensors, work zone congestion detection, DMS and ATMS historical archiving, and a Waze clean data feed.

Discussion

Q. Did this involve coordination with other programs with InTrans?

A. We do coordinate with others, but focused with operations.

Q. Is this being shared with outside services?

A. We have it internal, we want to share right with consultants

Motion to Approve by R. Knoche; 2nd T. Wipf
Motion carried with 13 Aye, 0 Nay, 0 Abstaining

Member joined

6. Proposal: “Implementation of Recommendations for Eliminating Longitudinal Median Joints in Wide Bridges”, Brent Phares, Iowa State University/InTrans, \$148,551

Background

Iowa Highway Research Board project TR-661 was completed to determine the maximum width of a continuous deck that can be used without negatively impacting performance. TR-661 consisted of a combination of tasks including bridge inspections, finite element modelling, short-term bridge testing, long-term bridge testing, and the development of recommendations.

The study of the other factors—pier type, girder type, girder spacing, and number of spans—showed that these factors had little effect on the strain in the deck near the abutment.

One of the primary conclusions of this work was that the development of cracking in bridge decks seems less dependent upon the total width of the deck and more so on internal restraint of the abutment to temperature changes and gradients. The following recommendations were made:

- If deck cracking is a major concern in certain situations, the use of a stub abutment is recommended.
- To obtain a better understanding of bridge deck behavior, a bridge with both integral and stub abutments is recommended to be monitored for long-term behavior and performance.
- Based upon the FEM results, an effective solution to reduce cracking in the deck might be to place an isolation pad between the soil and back side of the abutment.
- Vertical expansion joints in the abutment do theoretically help to reduce the strain in the deck and control the maximum strain location in the deck. However, implementation presents several problems.

Based upon the results of the research, a 115ft long, 228ft wide bridge in Blackhawk County, IA that has incorporated the thermal isolation pad idea listed above was designed. The bridge was planned for the 12/19/2017 letting with construction to follow as part of a large, multi-year project. The work proposed here is to document the design, construction, and performance of the yet-to-be-constructed bridge with a specific focus on the successfulness of the crack mitigation efforts.

Objectives

The objectives of the proposed research are to:

- 1) *Review the literature on the requirements for bridge width limitation.*
- 2) *Field instrument the wide bridge to be constructed in Blackhawk County, IA.*
- 3) *Synthesize the findings to develop further recommendations and/or adoption.*

This objective will be achieved by reviewing the data collected from the field investigation to determine the effectiveness of the thermal isolation details based upon system performance. These recommendations can then be reviewed by the DOT for possible use in the design of future bridges.

Benefits

The findings of this study will provide verification and implementation of recommendations regarding a potential detail for thermally isolating bridges from harmful thermal gradients. The use of this detail will result in bridges with longer service lives and notably less deck cracking.

Motion to Approve by K. Jones; 2nd D. Claman
Motion carried with 14 Aye, 0 Nay, 0 Abstaining

7. RFP:

- a. **IHRB-18-10** – *“Fiber-Reinforced Concrete in Bridge Decks”*, \$120,000

Motion to Approve by K. Jones; 2nd R. Knoche
Motion carried with 14 Aye, 0 Nay, 0 Abstaining

8. New Business

9. Regular Meeting Adjourn

The next regular meeting of the Iowa Highway Research Board is scheduled for June 1, 2018 at 9:00 a.m. in the East/West Materials Conference Room at the Iowa DOT.

VG