IOWA HIGHWAY RESEARCH BOARD (IHRB)

Minutes of December 8, 2011

Regular Board Members Present

A. Abu-Hawash
D. Ahart
J. Berger
V. Dumdei
J. Joiner
J.D. King
R. Knoche
J Moellering
M. Nahra
D. Schnoebelen
C. Scholz
E. Steffensmeier
W. Weiss
T. Wipf
R. Younie

Alternate Board Members Present

None

Members with No Representation

None

Secretary - M. Dunn

Visitors

Vanessa Goetz	Iowa Department of Transportation
Lori Pflughaupt	Iowa Department of Transportation
Donna Buchwald	Iowa Department of Transportation
Scott Neubauer	Iowa Department of Transportation
Basak Bektas	Iowa State University/InTrans
Brian Keierleber	Buchanan County
Neal Hawkins	Iowa State University/CTRE
Vern Schaefer	Iowa State University/CCEE
Jerry Ashlock	Iowa State University/CCEE
Bob Steffes	Iowa State University
Ben Hull	Lee County
Chris Williams	Iowa State University
Sung Hwan Kim	Iowa State University
Kasthurira Gopalakrishnan	Iowa State University
Keith Knapp	Iowa State University

The meeting was held at the Iowa Department of Transportation Ames Complex, Materials East/West Conference Room, on Thursday, December 8, 2011. The meeting was called to order at 1:00 p.m. by Chairperson Doug Schnoebelen with an initial number of 15 voting members/alternates at the table.

Agenda

No changes were made to the Agenda.

Motion to approve Minutes from the September 30, 2011 meeting by R. Younie. 2nd by R. Knoche. Motion carried with 15 Aye, 0 Nay, 0 Abstaining.

******* Changes to Board membership for 2012 *******

Tim Simodynes will replace Kent Nicholson as Iowa DOT alternate to Bob Younie.
Wade Weiss will replace Mark Nahra as County TRB Representative.
Bob Kieffer will replace Wade Weiss as County District 1 representative.
Russ Stutt will replace Bob Kieffer as County District 1 alternate.
Paul Assman will replace Ron Hayden as County District 3 alternate.
Kevin Mayberry will replace Dan Ahart as County District 4 representative.
Todd Hagan will replace Kevin Mayberry as County District 4 alternate.
Jeff May will replace John Joiner as City representative.
Dan Whitlow will replace Jeff May as City alternate.

*******Selection of IHRB Chair/Vice-Chair for 2012*******

Chair: Nomination of Ron Knoche, by J. Joiner. 2nd by R. Knoche. Motion carried with 15 Aye, 0 Nay, 0 Abstaining.

Vice-Chair: Nomination of A. Abu-Hawash, by B. Younie. 2nd by V. Dumdei. Motion carried with 15 Aye, 0 Nay, 0 Abstaining.

FINAL REPORT TR-597, "Wet Reflective Pavement Marking Evaluation", Neal Hawkins, Iowa State University/InTrans ($125,000)

BACKGROUND
Water significantly decreases pavement marking retroreflectivity, which can make it difficult for drivers to stay in their lanes and/or on the road when traveling under wet night and low visibility conditions. Pavement markings provide critical guidance to motorists. However, seeing pavement markings under wet night conditions is problematic given that the presence of water can significantly decrease a marking's retroreflectivity. Driving under these conditions can cause both stress and fatigue to motorists, which can have an impact on operations and safety.

OBJECTIVES
Many new pavement marking products are being introduced to address wet night visibility. This evaluation provides the Iowa Department of Transportation (DOT) with information to consider on how 16 different products performed in Iowa over a two-year evaluation period.

The test deck layout provided an opportunity to analyze the 16 products under a variety of conditions, which included installation technique (grooved or surface-applied), line type (left yellow edge line, white center skip, and white edge line), retroreflectivity (dry and wet), and cost.

BENEFITS
This evaluation serves as a resource for the Iowa DOT Pavement Marking Task Force in assessing the utility of these types of markings in improving visibility and overall safety for the motoring public. The documented performance of the various products and treatments will assist the Iowa DOT and local agencies in determining when and where use of these products might be most effective.

Motion to Approve by R. Younie. 2nd by M. Nahra.
Motion carried with 15 Aye, 0 Nay, 0 Abstaining.

FINAL REPORT TR-601, "Roadway Lighting and Safety: Phase II-Monitoring Quality, Durability and Efficiency", Neal Hawkins, Iowa State University/InTrans ($100,000)

BACKGROUND

This Phase II project follows a previous project titled Strategies to Address Nighttime Crashes at Rural, Unsignalized Intersections. Based on the results of the previous study, the Iowa Highway Research Board (IHRB) indicated interest in pursuing further research to address the quality of lighting, rather than just the presence of light, with respect to safety.

The previous study confirmed that lighting may have an impact on driver safety at rural intersections. The research used lighting as a strictly binary measure during analysis, meaning that the lighting was either present or absent.

Results showed that the ratios of night-to-day and total night crashes were lower at lighted intersections compared to unlighted intersections. While the results showed lighting enhances driver safety, the data did not account for the quality or level of light at intersections. Moreover, lighting levels at a few locations may detract from driver safety or may provide no safety benefit.

The Center for Transportation Research and Education (CTRE) teamed with a national research leader in roadway lighting, Virginia Tech Transportation Institute (VTTI) to collect the data for this phase of the study.

OBJECTIVES

1. Collect field lighting levels for 101 study intersections from Phase I. This gave the research team an opportunity to determine the impact of illumination levels on safety (nighttime crashes). To accomplish this, the Center for Transportation Research and Education (CTRE) teamed with Virginia Tech Transportation Institute (VTTI) to complete the data collection.
2. Analyze these data to establish a relationship between crash performance and illumination at rural unsignalized intersections. This included a robust statistical analysis based on Bayesian techniques.
3. Investigate lighting levels at rural intersections, considering a number of factors (uniformity, glare, lamp durability, and efficiency-energy consumption).

BENEFITS

Based on the findings from both the Phase I and II studies, lighted intersections experience fewer crashes when compared to unlighted conditions. Quantifying the safety contribution of light quality remains elusive at best. Even with the far majority of intersections falling below standard illumination levels, the presence of lighting still made a significant impact on safety when compared to non-lighted locations.

Motion to Approve by M. Nahra. 2nd by E. Steffensmeier.
Motion carried with 15 Aye, 0 Nay, 0 Abstaining.

ANNUAL REPORT and PROPOSAL, for Continuation of funding HR-296, "Iowa Local Technical Assistance Program (LTAP), submitted by Keith Knapp, Iowa State University ($145,000 is requested from IHRB)

OBJECTIVES

The primary objective of Iowa LTAP is to provide quality training events and technical transportation-related information that is useful to local transportation agencies. These activities need to be completed, within current LTAP funding, in a manner that is effective and efficient. Desirably, these activities are also provided when they are most needed by local transportation agencies, and in a format that is useful and useable. New knowledge and tools, developed through IHRB research or other entities (e.g., the Midwest Transportation Consortium (MTC)), are always incorporated, as appropriate, into either existing or new LTAP activities.

The strategic planning and decision-making needed to make Iowa LTAP a premier technology transfer resource is guided by the following principles:

*Define and respond to customer needs;

*Provide quality customer service through various methods;

*Evaluate effort and track performance to improve service and communicate impacts;

*Apply fiscal responsibility through the selection of economically feasible activities/tasks;

*Strive for predictable program funding and continue with highly capable staff;

*Expand and strengthen state and national organizational partnerships that may enhance services

Three of the 2011 initiatives will continue in 2012 and remain an ongoing part of regular Iowa LTAP activities. These initiatives include the Local Roads Safety Liaison (as funding is available), the Iowa Public Employees Leadership Academy (now the Institute), and the exploration of new collaborations. Five new major initiatives are proposed below for the Iowa LTAP during the 2012 calendar year. The overall objective of these initiatives is to provide better and/or more services to our local transportation agency clients and customers. Additional funds are requested in this proposal for Initiative #2: Initiate National Highway Institute Bridge Inspection Training Program.

Motion to Approve by W. Weiss. 2nd by D. Ahart.
Motion carried with 15 Aye, 0 Nay, 0 Abstaining

PROPOSAL: "Pilot Project for a Hybrid Road-Flooding Forcasting System on Squaw Creek,"
Ricardo Mantilla, University of Iowa, ($173,178)

OBJECTIVES

The objective of this project is to design, implement and evaluate a hybrid flood forecasting system that combines real-time stream level observations with a state-of-the-art distributed hydrologic models called CUENCAS. The system will, over time, provide accurate predictions of flooding potential for each and every road/stream intersection in a river basin. The observation component of the system is accomplished with a stream-level sensing device, which uses ultrasound technology to measure the distance from the bridge deck to the stream water surface. The hydrologic model provides a faithful representation of the waterways in a river basin and does not rely on calibrated parameters. However, it depends on the accurate description of travel times along the channels of the river networks.

The proposed project leverages the developments and the resources of the Iowa Flood Center, an academic research center at the University of Iowa established by the Iowa Legislature in July 2009. The research will lead to improvements in the IFC flood forecasting system. It will establish the basis for a customized real-time flood and flashflood forecasting system for the State's roads and bridges increasing public safety.

Motion to Approve by V. Dumdei. 2nd by A. Abu-Hawash.
Motion carried with 14 Aye, 0 Nay, 1 Abstaining (D. Schnoebelen).

Selection of Proposal Responding to RFP IHRB 10-07, "Evaluating Roadway Subsurface Drainage Practices"

OBJECTIVES
The objective of this project is to conduct a comprehensive performance review of pavement subdrains in Iowa. The review should include the condition of the drains and a determination of whether they are functioning as designed. A corresponding pavement evaluation should be performed to determine if pavement deterioration is occurring at the drain locations. If there are drains that are not functioning properly, a determination of the cause of the problem should be made. Recommendations should be made for improvements to the pavement drainage system, when appropriate.

1. Thanos Papanicolaou, University of Iowa, ($115,138)

2. Vernon R. Schaefer, Iowa State University/InTrans, ($120,000)

3. Halil Ceylan, Iowa State University/InTrans, ($119,975)

Motion to Approve RFP IHRB 10-07 #3 by Halil Ceylan, Iowa State University/InTrans by J. Berger. 2nd by A. Abu-Hawash. Motion carried with 13 Aye, 0 Nay, 2 Abstaining (Schnoebelen and Wipf)

DISCUSSION of Possible Pooled Fund Project - Traction Coefficients for Geometric Design of Horizontal Curves and Stopping Sight Distance for Very Low Volume Roads

The Board was contacted by Maureen A. Kestler, USDA Forest Service, regarding its interest in participating on a pooled fund project with Minnesota DOT/Minnesota Local Roads Research Board.

AASHTO cites the Forest Service when it comes to traction coefficients for geometric design of horizontal curves and stopping sight distance for very low volume roads. However, the coefficients of friction are from back in the 1970's. With the evolution of design vehicles over time, MnDOT is considering a study to re-visit the traffic coefficient issue: evaluate assumptions, determine what old numbers are still applicable, and test for obtaining ones that need to be updated. They are planning on doing an interagency agreement with USACE CRREL, as they have a heavily instrumented vehicle (coincidentally a former Forest Service vehicle). MnDOT plans to do a small project, but were thinking if any local roads boards and States might have an interest, perhaps we should all collectively be planning a more comprehensive test program (primarily more funding to go to CRREL for more testing).

The Board discussed the project, citing some concern with whether the results of the study would change designs by the Counties. It was determined that more information regarding the possible study was needed before taking action on the request. The Board directed Mark Dunn to follow-up with Maureen Kestler and request additional information before formal Board action would be taken.

NEW BUSINESS

Proposal: For the IHRB to add load rating as part of the new culvert design software Foth Infrastructure and Environment is developing under project TR-620. Because there is a current project underway to develop a program to design box culverts using the LRFD design specifications, an opportunity to expand this system to include load rating is available.

The FHWA is strongly requesting that all culverts be load rated. There has never been a software program for the Iowa DOT or Local agencies to use to load rate new or existing box culverts. With the development of a new design software through the IHRB, it is requested that this software also include a load rating analysis. A load rating should be performed as part of the original design so it can be used as soon as a new structure is built and put into service. The load rating should include a rating factor based on LRFR specifications for Inventory and Operating capacities as required for the National Bridge Inventory (NBI). All structures designed using the LRFD specifications and built after October, 2010, are required to be load rated using the LRFR method.

A second function of this new load rating software, if it is cost effective, is the ability to rate any existing culvert using the LRFR method. This would provide one system for rating all box culverts. A single system would provide consistency and uniformity among all load rating calculations. The analysis should include rating factors for all Legal trucks currently used for posting purposes. Recommended posting limits for these Legal trucks should be part of the output of this system.

The estimated additional cost for rating new structures and to load rate existing box culverts is $60,000.

Motion to Approve by M. Nahra. 2nd by J.D. King
Motion carried with 15 Aye, 0 Nay, 0 Abstaining

ADJOURN

Motion to Adjourn by M. Nahra. 2nd by A. Abu-Hawash.
Motion carried with 15 aye, 0 nay, 0 abstaining.

The next meeting of the Iowa Highway Research Board will be held Friday, January 27, 2012, in the East/West Materials Conference Room at the Iowa DOT. The meeting will begin promptly at 9 a.m.

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Mark J. Dunn, IHRB Secretary