

# IOWA HIGHWAY RESEARCH BOARD (IHRB)

*Minutes of July 31, 2009*

## **Regular Board Members Present**

A. Abu-Hawash  
J. Adam  
D. Ahart  
J. Berger  
V. Dumdei

S. Gannon  
J. Joiner  
J. Waddingham  
W. Weiss

## **Alternate Board Members Present**

S. Nambisan for James Alleman  
D. Schnoebelen for Keri Hornbuckle  
J. Moellering for S. Rinehart  
E. Steffensmeier for B. Moore

## **Members With No Representation**

J. Krist  
M. Nahra

## **Alternates Present as Guests**

R. Younie  
W. Zitterich

## **Secretary - M. Dunn**

## **Visitors**

Edward Engle  
Chris Poole  
Mary Starr

Iowa Department of Transportation  
Iowa Department of Transportation  
Iowa Department of Transportation

Satya Kalindindi  
Bart Bergquist

Iowa State University/InTrans/CTRE  
University of Northern Iowa

The meeting was held at the Iowa Department of Transportation's Ames Complex, Materials East/West Conference Room, on Friday, July 31, 2009. The meeting was called to order at 9 a.m. by Chairperson Jim Berger with an initial number of 11 voting members/alternates at the table.

## **Agenda**

Item 4 be postponed until the September 25, 2009 meeting.

## **Approval of the Minutes**

Motion to approve minutes from the June 26, 2009 meeting by D. Ahart. 2<sup>nd</sup> by V. Dumdei.  
Motion carried with 11 aye, 0 nay, 0 abstaining.

**\* Two Members Joined the Table\***

**Report TR-546, “Revision to the SUDAS Traffic Signal Design Guide,”** Neal Hawkins (\$80,000)

**BACKGROUND**

Changes in technology have an impact on standard practice, materials, and equipment. The traffic signal industry is constantly producing more energy efficient and durable equipment, better communications, and more sophisticated detection and monitoring capabilities. This project updates the traffic signal content within the Statewide Urban Design and Specifications (SUDAS) Design Manual and Standard Specifications.

**CONCLUSIONS**

This project included a complete revision to the content and format of existing SUDAS traffic signal specifications. New content was added and all proprietary references were eliminated. In some cases, agencies will use this information as the base specifications but will need to add supplementary information about specialty high-tech items such as fiber optic cables, modems, communications cabinets, video monitoring equipment, specialty poles, etc. Specifications were developed to match the standard SUDAS three-part format.

This project included a complete revision to the content and format of the existing SUDAS traffic signal design chapter. Instead of printing various parts of the Manual on Uniform Traffic Control Devices (MUTCD), this new chapter provides hyperlinks to not only the MUTCD but also to other state DOT resources.

**Motion to Approve** by S. Gannon. 2<sup>nd</sup> by J. Joiner.

Motion carried with 13 aye, 0 nay, 0 abstaining.

**POOLED FUND REPORT, “Heavy Agricultural Loads,”** Edward Engle, Iowa DOT Secondary Roads Research Coordinator, Research and Technology Bureau

The Board funded participation in this project (to take place in Minnesota) about two years ago. This is a three year project. The second year has just been completed.

The states of IL, MN, IA (initial states providing funding) and WI (recently joined) are participating in this pooled-fund project as well as manure application associations. The University of Minnesota (testing) and Iowa State University (technical assistance) are also participating.

For this project, a special section of road was designed and built as a low-volume road simulator. A 5.5 inch and a 3.5 inch asphalt was constructed. Testing is also being done on the main loop of PC built previously.

The project’s main objective is to determine pavement responses to agriculture equipment on low-volume roads using heavily instrumented sections of road and a typical semi (regular 80K lbs) and overloaded semi (100K lbs).

Testing has been completed in the spring and the fall of each year when the subgrade is the weakest.

Vehicles used include tankers, terragators, trucks, a standard semi and an over-loaded semi. Iowa Department of Transportation (Iowa DOT) personnel are particularly interested in testing a material transfer vehicle that asphalt pavers have been using to bring asphalt out onto the grade to be put under the paver. When empty, the vehicle weighs 60K lbs and carries 25 tons of asphalt; the effects of this testing on the test roadway are a concern to other pooled fund participants, so this testing will take place last, in the fall of 2010.

## **FIRST ROUND RFP REVIEW AND DISCUSSION FOR IHRB-09-02 AND IHRB-09-04**

### **IHRB-09-02 - Investigation of Iowa Bridge Separation Barrier Design**

It is anticipated that the research will follow a two-phase approach. The first phase will involve computer modeling and simulation to determine barrier and railing combinations with the potential to meet the full-scale crash testing criteria. Following this phase, the research team will draft a summary of findings to be presented to the technical committee in a face-to-face meeting at the Iowa DOT. The technical committee, with input from the research team, will select a single barrier and railing design combination with which to move forward. The second phase will involve design of the pedestrian railing and transitions, full-scale crash testing of the chosen separation rail, and development and publishing of a report of findings.

1. Determine the lowest vertical-faced concrete barrier height sufficient to meet AASHTO MASH TL-2 crash testing requirements.
2. Develop a pedestrian/bicycle railing for use with the low-height vertical-faced concrete barrier.
3. Provide crashworthy transition designs for the approach and trailing ends of the pedestrian railing.

The proposed funding for this project is \$250,000. Funding for Phase 1 is estimated at \$50,000. The remaining cost for Phase 2 is based on an assumption of three full-scale crash tests at \$50,000 each plus \$50,000 for additional design and report preparation. The anticipated time to complete this project is 12 months.

C: This project has already been approved for funding, however, the RFP has been updated as of yesterday afternoon. There is good reason to sole source this project.

C: Yes, there are three places where we could do crash testing: Virginia, Texas and Nebraska. However, we have a pooled-fund (led by Iowa) with Nebraska and this will facilitate cooperation and help lower costs.

C: Anytime there's a bridge next to a pedestrian way (next to an intersection, for instance), there's a concern. Presumably, this project is of more interest to the state and cities than to the counties. Many requests have been made over the past few years for trails.

C: If you get near a urban area, usually there's a request for a trail added to the bridge, especially if there's a sidewalk or trail coming in; everyone's talking trails because of tourism and how they connect communities and school systems and the addition of safety. But much of this type of thing is added at the last minute, and requirements haven't been determined. We have to know what we're doing and why, and not just in the cities. Sometimes this affects the counties because the trails are going through the counties—we're trying to accommodate people—and it's not just in the city. Sometimes it's near a school system outside the city limits where they need a new bridge. I think it's important to know what we're doing. We want both pedestrians and cars and trucks to be safe. We have some issues that need to be addressed. This won't solve all of those, but it will give us a basis for making some of those decisions.

C: Maybe warrants should be discussed. It's a consideration of both speed and quantity of both kinds of traffic.

A: That to me is a totally different issue. If you're going to put it in, you need to know how. It's frustrating because we need to know how to do things correctly or at least, better than we're doing them now.

Q: Is the Board satisfied with the funding suggested?

A: Yes.

C: After Phase I, we can decide if we do or do not want to do a Phase II.

Q: Is full scale testing on the road or in the lab? I'm concerned that it's \$50,000 for each crash test.

A: We're hoping we can get by with only two crash tests. The RFP assumes three but hopefully, we'll only need to do two. Phase I will use computer simulation to determine what will be crash tested using various height

concrete rails with steel railing on top. From the designs simulated (that we believe would pass a full scale crash test), we'll choose the one we like best and crash that one.

Q: So you're going to create one design?

A: I'm hoping that the design will consist of the base height of the concrete and the offset of the steel rail on top; how far back from the base of the concrete that top rail sits. These are the two variables. If we can locate that top railing so it's outside the limits of where a truck would impact it under crash conditions, then we're free to design basically any kind of aesthetic railing we want out of any type of material. From past simulations, it is estimated that the offsetting of the top railing needs to be at least one foot; frequently, that means we mount the rail on the backside of the barrier which means reducing the width of the sidewalk. This is a concern. So we want the option of mounting it on top if at all possible.

C: A consensus has been reached to sole source the project.

### **IHRB-09-04 Timber Abutment Piling and Back Wall Rehab and Repair**

As funds for replacement decline and lose buying power due to construction cost inflation, effective renovation and repair techniques to extend the life of these bridges becomes even more important. Many counties have tried assorted techniques to strengthen or repair weakened or damaged piling, but there is little empirical evidence to measure the effectiveness of these techniques that are in some cases are little more than a "band aid" solution. Cracked and failed piling in particular have been patched in some cases, but no measurement of the effectiveness of the repairs has been studied, particularly whether full load transfer from the superstructure to the undamaged pile below has been achieved.

Railroads have long used commercial products such as Osmose to treat and extend the life of timber trestle bridges under their jurisdiction. No known study of the material's use on highway bridges over streams has been conducted to determine the effectiveness of these materials

This study will review existing products for timber preservation and repair and their effectiveness in extending the life expectancy of bridge components. The study should also poll techniques used by county and other engineers to repair and restore load carrying capacity of piling damaged by deterioration and cracking. The study will review methods used to repair failed piling and determine or suggest effective methods for transferring bridge loads through the failed portion of the pile to assure safe load capacity is restored. Field load testing for verification of load transfer may be necessary for some repair methods.

C: The RFP is accepted as written.

### **NEW BUSINESS**

Discussion by the University of Iowa and the University of Northern Iowa to host the IHRB Travel Meeting:

Doug Schnoebelen, representative from the University of Iowa (U of I): We thought it would be an opportunity for IHRB to come to Iowa City and tour our model annex with our new flume, sediment study, with a short demo of our multi-beam sonar hydroacoustics (looking at scour and sediment transport) and computer modeling in 3-D. We could visit the Mississippi River station and go out on the boats or maybe invite some folks from the Army Corps of Engineers or the DNR. We're interested in bringing researchers together with the Board. (IHRB's last visit was in 2006.)

Bart Bergquist, representative from the University of Northern Iowa (UNI): We sent a list (dispersed to the Board) and one of the first suggestions on that was the Tallgrass Prairie Center, home to the Native Roadside Vegetation Center. I know you've visited previously (five years ago) and if it's been long enough and there've been enough changes in that operation it might be worth visiting again.

**VOTING:** After discussion and voting, it was determined that the annual IHRB Travel Meeting for 2009 will be held in September at the University of Northern Iowa and that the University of Iowa will host the Travel Meeting at the *Lucille A. Carver Mississippi Riverside Environmental Research Station* in 2010.

Votes for UNI: 7

Votes for U of I: 6

Midwest Research Symposium: The Research Symposium will be hosted by Iowa State University August 20-21 at the Gateway Hotel in Ames. There will be over 140 presentations. Note: Wednesday, August 5<sup>th</sup> marks the deadline for early registration.

The FY 2008 Annual Report “Research, Intelligent Transportation Systems, and Technology Transfer Activities” was distributed to each member at the table. The report is prepared annually and encompasses all of the projects being pursued by the Research and Technology Bureau.

## **ADJOURN**

### **Motion to Adjourn**

Motion by S. Nambisan. 2<sup>nd</sup> by D. Schnoebelen.

Motion carried with 13 aye, 0 nay, 0 abstaining.

The September 2009 meeting of the Iowa Highway Research Board will be held **FRIDAY, September 25, 2009 at the University of Northern Iowa as it hosts the Annual IHRB Travel Meeting.**

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**Mark J. Dunn, IHRB Secretary**