IOWA HIGHWAY RESEARCH BOARD (IHRB)
Minutes of May 29, 2009

Regular Board Members Present

A. Abu-Hawash
J. Adam
D. Ahart
J. Berger
V. Dumdei
S. Gannon
J. Joiner
M. Nahra
S. Rinehart
J. Waddingham
W. Weiss

Alternate Board Members Present

W. Zitterich for J. Adam beginning with Agenda Item 6

Members With No Representation

J. Alleman
B. Moore
K. Hornbuckle
J. Krist

Alternates Present as Guests

R. Younie

Secretary - M. Dunn

Visitors

Steve De Vries	Iowa County Engineers Association Service Bureau
Edward Engle	Iowa Department of Transportation
Sandra Larson	Iowa Department of Transportation
Mary Starr	Iowa Department of Transportation
Jeramy Ashlock	Iowa State University-InTrans
Shashi Nambisan	Iowa State University-InTrans
Paul Wiegand	Iowa State University-InTrans
Omar Smadi	Iowa State University-InTrans
Sri Sritharan	Iowa State University-InTrans
Rob Middlemis-Brown	United States Geological Survey
Bart Bergquist	University of Northern Iowa

The meeting was held at the Iowa Department of Transportation's Ames Complex, Materials East/West Conference Room on Friday, May 29, 2009. The meeting was called to order at 9 a.m. by Chairperson Jim Berger with an initial number of 10 voting members/alternates at the table.

Agenda

No changes were made to the Agenda

Approval of the Minutes

Motion by J. Joiner to approve minutes from the April 24, 2009 meeting. 2nd by Vicki Dumdei. Motion carried with 10 aye, 0 nay, 0 abstaining.

Introduction of IHRB Research Participant

Head of the Department of Industrial Technology Bart Bergquist, the University of Northern Iowa, was introduced. He spoke briefly to the Board and welcomed future collaboration on transportation research.

*** One Member Joined the Table***

FINAL REPORT TR-572, "Improving Safety for Slow-Moving Vehicles on Iowa's High Speed Rural Roadways," Neal Hawkins, Iowa State University/InTrans ($99,881)

BACKGROUND
This project included a literature review that examined regional and national SMV crash statistics and laws across the United States, a crash study based on three years (2004 to 2006) of Iowa SMV crash data, and soliciting the concerns and recommendations of three SMV communities in Iowa: the Amish communities in Buchannan and Davis Counties and farmers in Marion County.

CONCLUSIONS
SMV safety on Iowa's high speed roadways should be based on an understanding of crash performance and input from these special groups. A practical approach should include:

- A systematic approach to identifying specific safety problems
- Close coordination with the community
- Identification of solutions
- Local involvement in the process

Agencies can begin by taking the following steps:
- Identify roadways where horses and buggies or other SMVs mix with vehicular traffic
- Review and analyze routes with evident buggy traffic to identify problem areas
- Recognize that the needs and solutions for different SMV types vary greatly, e.g., horse versus motor powered SMV
- Consider the adequacy of existing roadway signage, lighting, grade, curvature, pavement treatments, shoulder treatments, and shoulder widths
- Identify short and long term needs and solutions
- Reach out to local groups and creating a dialogue to exchange ideas, share constraints, and plan for long term solutions
- Coordinate activities between City, County, and State agencies in order to maintain consistent signage and roadway treatments and address the safety needs of the SMV roadway users
- Develop consistent safety campaign information for driver awareness and understanding

SMV operators should take the following steps:
- Go beyond minimal lighting and conspicuity requirements to alert motorists of their presence
- Notify agencies of their concerns in areas which offer minimal sight distance and no shoulder or ability to get out of the traveled lane
- Educate operators to drive safely on the roadway and operate their vehicles consistently

Q: Regarding rumble strips – what type are you referring to?
A: The ones that run parallel with the road. They are difficult to drive on and bad for horses and buggies; another issue is moving across the shoulder.

C: Maybe buggies should be banned off divided highways.
A: Buggy drivers do try and stay off the main roads, however, many farms are 20-40 miles from town and farmers also need to reach their fields which can be miles apart.

C: One of the issues is unrestricted growth in the size of implements of husbandry. Combines with double-front wheels can be 20-feet wide; we're barely keeping them on some of our gravel roads. There's no room for those meeting these vehicles to pull off of the road. Perhaps there should be some limitations through a state law.

C: European law requires that motor graters and tractors have lights on the outside edge.
A: We looked at the required lighting for both horse-and-buggy and tractors, and did an extensive literature search. One answer is policy and the other is practical solutions.

Q: Did you check any differences between counties that put up warning signs and those who don't?
A: No. It's important though to know where those signs are; that would be a good study.

C: In Davis County, District personnel have worked on solutions to the rumble strips and had discussions with the community; there are some good solutions.
A: Yes, I was fortunate enough to be part of those discussions and shared what's happening nationally and here in Iowa. The best approach is a specific solution for a local area.

C: What we've done is try to get rid of all our narrow bridges on our gravel roads. This is better for buggies and for large farm equipment.
A: Buggies do prefer gravel.

Q: Do your ATV statistics include snowmobiles?
A: Yes, as much as we could, but we didn't focus on snowmobiles. Most of the time they're down in the ditches and do not go slow. We focused on the Amish community; this is how they get to their fields, to town, and around their farm. This is how they provide goods and food to us, and they were our priority.

Q: Is there a TAC looking at this report and where to go with these recommendations?
A: An Implementation report is being written and will be sent to us shortly.
C: Yes. Information was shared with the Amish community in Davis County and solutions worked out for application.

C: District 5 shared that with the other districts; those with Amish communities are looking at this research. I don't think you would have enough statistics on crashes to reach conclusions on the signage though.
A: It's usually a small area.
C: We're considering not using rumble strips at all in areas where the Amish are traveling, or making wider areas where they can get on and off the shoulder. Trying to identify those areas is the issue. Right now one big issue is farm equipment on expressways. When you have 65 mph, merging is a problem as volumes get higher.

Motion to Approve by J. Adam. 2nd by M. Nahra.
Motion carried with 11 aye, 0 nay, 0 abstaining.

FINAL REPORT TR-576, "PHASE II: Investigation of Electromagnetic Gauges for Determination of In-Place Density of HMA Pavements," Chris Williams, Iowa State University/InTrans ($50,896)

BACKGROUND
Two electromagnetic density gauges are manufactured today: the Pavement Quality Indicator (PQI) 301 from TransTech and the PaveTracker 2701 from Troxler. Both gauges use similar technology to measure the HMA's dielectric constant—a conductivity indicator—and relate increases or decreases in dielectric constant to asphalt density changes.

To determine the ability of the PQI 301 and PaveTracker 2701 to measure adjusted asphalt density, field measurements were collected over three to five consecutive paving days at seven paving projects. For each day/lot, 20 randomly selected locations were tested with the gauges and 7 cores were taken.

CONCLUSIONS

- With the limited sample size, the adjusted density measurements for both electromagnetic gauges were determined to be inadequate for full quality control and quality assurance use.
- The PaveTracker 2701 was determined to measure adjusted density better than the PQI 301.
- Based on the results of this study, the PQI 301 gauge should not be used for quality control or quality assurance in Iowa.
- The PaveTracker 2701 can be used for quality control, but it provides no benefit for quality assurance. Because the gauge would need to be calibrated to core density every day, the gauge does not provide any additional efficiency for owner agencies.
- The PaveTracker 2701 may be applicable for quality assurance if the number of necessary core locations per day can be reduced and supplemented with additional PaveTracker 2701 readings.

C: A similar study in Missouri was done with similar results; however, a permeability test was developed that can be done the same day.
Q: What is the outlook for improving this technology?
A: Electromagnetic properties depend on the frequency used to send the signal down into the pavement; this signal is affected by temperature and moisture. TransTec is looking at this and has an interest in moving forward; they're looking at a $400 device and the Iowa DOT is also looking into this. An interim study is being done until there is improvement.

Motion to Approve by J. Adam. 2nd S. Rinehart.
Motion carried with 11 aye, 0 nay, 0 abstaining.

ADD FUNDING TR-519, "Developing Flood-Frequency Discharge Estimation Methods for Small Drainage Basins in Iowa," David Eash, USGS ($156,055) (Extend through December 31, 2011)

BACKGROUND
A new version of the PeakFQ program that includes the EMA analysis method was released by the USGS in November 2007. The EMA analysis method improves the estimation of flood-frequency discharges for gages that include censored data, such as historical adjusted streamflow records or crest-stage gage records that include less-than-value discharges. Because about 30 percent of the 509 gages included in the TR-519 study use historical adjusted streamflow records, and about one-half of the crest-stage gage records for Iowa include less-than-value discharges, the USGS Office of Surface Water (OSW) recommends the use of EMA flood-frequency analyses for computing flood-frequency discharges for the TR-519 study. EMA analyses will provide better estimates of flood-frequency discharges for these types of streamflow records compared to standard PeakFQ analyses. EMA analyses will also provide better estimates of 95 percent confidence limits.

OBJECTIVES
The objectives of this proposed amendment to Project TR-519 are to update flood-frequency discharges through the 2008 water year for all streamgages included in the Iowa flood-estimation study, including:

1. Use EMA flood-frequency analyses to compute at-site station skews through the 2008 water year for all Iowa flood-estimation study gages to be included in the regional skew study using Bayesian GLS regression.
2. Cornell University will develop new regional skews for all gages included in the Iowa flood estimation study using Bayesian GLS regression analysis.
3. Use EMA flood-frequency analyses and new regional skew values determined from Bayesian GLS regression analysis to update flood-frequency discharges through the 2008 water year for all gages included in the Iowa flood-estimation study.

The USGS has developed the StreamStats program to further the agency mission of providing hydrologic information and understanding needed by others to ensure that damages caused by flood hazards are minimized and the best use and management of the Nation's water resources is enabled. StreamStats for Iowa will facilitate the rapid, accurate, and reproducible estimation of flood-frequency discharges for gaged and ungaged stream sites in the State. Also, the program will provide an updateable and extensible platform that will provide basin characteristics values (such as drainage area, main-channel slope, etc.) and create a downloadable shape file of the basin boundary that may be useful for other studies in water resources.

Q: How will this affect the budget overall and the Innovative budget?
A: This should not affect our budget too much because a certain amount of funding has been reserved for the final RFP to be addressed, and that RFP will go out at a lower amount than first estimated. We can proceed with an estimate of $200K for the Innovative proposals.

Q: Is there a reason that USGS isn't offering to split the difference with us?
A: There is a 55/45% split on the cost of the project not associated with Cornell University. A lot more work is going to be done.

Q: In return for the time extension, will the 2008 discharges be captured?
A: Yes, there will be updates to the flood frequency discharge rates though 2008; we're ready to begin those now for the development of the regression analysis. However, that was not part of the original budget.

C: In one branch of the Maquoketa River, the top 10 record floods according to the gaging station at Manchester occurred since 2002. I don't know if there's another river in the state that you can say that about. Four of those greatest discharges occurred in 2008 alone; so here you're showing me some value added to the dollar.

Motion to Approve by W. Weiss. 2nd M. Nahra.
Motion carried with 11 aye, 0 nay, 0 abstaining.

PROPOSALS DISCUSSION for 08-08 ***Assessment of Iowa County Roadway Financing Needs***

Iowa County Engineers Association (ICEA) Service Bureau - Steve De Vries ($154,316)
Iowa State University/InTrans, CTRE and CCEE - Nadia Gkritza ($150,000)

Voting: Each Member was allowed one vote with eight votes needed for approval. With eight votes gained by one of the proposals, no second vote was necessary.

C: I noticed when reviewing these two proposals that both were responsive to the problem statement as it was written and sent out; the advantage I saw from the ICEA proposal was that it gives us a tool that is on-going and can be managed if something changes with our funding. For instance, if the minimums we're required to levy change, or if we have money injected in the future from fuel tax increases, we'll still continue to have staff and product available that we can continue using and also adaptable to changing circumstances. The CTRE proposal is one that I think tends to be a snapshot, where we'll have to pay for additional research in the future to update it and bring it up to current conditions. I also think the ICEA proposal took a harder look at the history of where we may have failed previously, and I liked some focus on that; in considering these proposals, I like knowing where have we failed before. I'm leaning toward the ICEA proposal.

C: The Executive Board of County Engineers heard a presentation on the ICEA proposal last Friday and it was overwhelming supported for the reasons stated; it isn't a static test. It's an on-going test that would allow different scenarios in the future for our Road Use Tax distribution and increases for Road Use Tax for counties, etc. A number of different variables including those things mentioned such as implements of husbandry,

biofuels, etc. could be presented. All of those can potentially be used with this to create numbers we can use in the future.

VOTING - A unanimous vote (11) in favor of the Iowa County Engineers Association (ICEA) Service Bureau's proposal was made.

Motion to Approve by M. Nahra. 2nd J. Waddingham.
Motion carried with 11 aye, 0 nay, 0 abstaining.

INNOVATIVE RFPs - Discussion and Selection of Short List Presentations for June's Meeting
* EACH BOARD MEMBER AT THE TABLE RECEIVED FOUR VOTES – ONE PER PROJECT *

Mark: How voting is done is based on the number of proposals received. Last year, we only had four Innovative proposals so we asked all of the PIs to present. In previous years, we've had as many as 14 so we selected a smaller group to come back and present at the following meeting and based on those presentations, the Board made a selection. My recommendation is that since we can probably fund 2-3 of these with the 200K (depending on which ones are selected) that we try and pick four to come back and present next month. Then of those four, vote to approve however many the Board decides at that point to fund.

C: We aren't necessarily ranking these proposals?
A: No. This isn't a weighted vote. This vote will select the top four to return for presentation.

Q: Will this spend all of our Innovative money if we pick two or three?
A: We have 200K for this year, and now is the only time we'll go through the process for this fiscal year. We'll set aside another 200K for the next year (2010). For example, if we selected a couple at 75K, we may be able to do a third one at 50K; it depends on which projects are selected and their budgets. I'm expecting three of them to be selected.
Q: So we're not looking at something coming in later?
A: Not for this fiscal year (2009). We go through the Innovative proposals process once a year. Next spring, we'll put out the Innovative RFP again with whatever amount of funding the Board decides on.
C: This will select which ones we want to hear presentations on.

C: Proposal numbers one and five: I feel they need to have collaboration with existing work being done at Iowa State (ISU) because we're spending a lot of money on structural health monitoring there and would like to see corroboration so we end up with a product that will compliment current work. We'd like PIs of these proposals to actually sit down with us and ISU to discuss how we can have some connectivity between current work and what they are proposing. If I do pick these two out of the four, I'd like this to be a condition of approval.

Mark: Yes. That could be a condition of approval of these proposals. We can incorporate that into the administration of the proposals and contracts.
C: If these projects end up being the top two, I'd like to see their scopes refined to compliment existing work we're doing. We're investing quite a bit of money in structural health monitoring in Iowa and we'd like to see them work together and not go in completely different directions.

Q: What is going on at ISU that brings up this situation?
A: In the last five years or so we've (Iowa DOT and ISU) been instrumenting girders, looking at fatigue cracks and trying to come up with different approaches to how instrumentation should be done and how to protect or detect damages because of out-of-plane bending or other fatigue problems; on top of that we have one project not funded through the IHRB but funded directly through the Iowa DOT and another project that is a pooled-fund study and we're trying to get some other states involved (CALTRANS is already part of this research), so

we're going to have a major investment in this. Basically, we're trying to come up with methods of detection and figure out the capacity of bridges after certain damaging events.

Q: What I was looking at is number five (*On-the-Spot Damage Detection Methodology for Highway Bridges During Natural Crises)*; The University of Iowa (U of I) had an earlier proposal to look at sensors behind bridge abutments, scour and possible underground backwall failures, however, that one didn't became a study.

C: The biggest thing I see in the UI approach is that they're trying to use acceleration instead of strain to predict and figure out the stresses and performance of the structure, but it's really comparable. The one from the University of Northern Iowa (UNI) looks more at wireless sensors rather than connective sensors and I think one of the reasons why ISU did not consider this is cost. They are a lot more expensive and if you want to use a truly wireless sensor, you have to use a reliable self-power sensor. For that, there's a lot of work to be done. There isn't one currently on the market to just pick up and use even though there's a lot of research going on.

C: I didn't see how they could make this project specific to floods. That isn't necessarily an area of structural failure like ISU is focused on but there also isn't a good description.
C: That's why we want to see them work together to compliment what is being done; there's value in both.

C: Do the county engineers see value in proposal number eight? I'm interested to know if you see value in this.
A: We've seen a lot of products and they all cost about the same; we've never found that cheap silver bullet for that. Some of us have tried a couple new soy-based products on a small scale**.**

VOTES-NUMBER IN LIST & PROPOSAL TITLE

10 1. *Wireless Sensor Networks for Infrastructure Monitoring*, M.D. Salim, University of Northern Iowa/ Department of Industrial Technology ($74,842)

0 2. *Innovative Nitrogen Removal for IDOT Rest Area Wastewaters*, Gene Parkin, The University of Iowa ($74,960)

4 3. *Green and Sustainable Wastewater Management for Highway Rest Stops Using Phyto-Treatment*, Say Kee Ong, Iowa State University/InTrans ($74,896)

3 4. *A Prototype of Adaptive Vehicle Routing System for Congestion Relief Based Upon Wireless Access in Vehicular Environments (WAVE) Technology*, Hong "Jeffrey" Nie, University of Northern Iowa/ Department of Industrial Technology ($69,726)

10 5. *On-the-Spot Damage Detection Methodology for Highway Bridges During Natural Crises*, Salam Rahmatalla, The University of Iowa/CEE ($69,092)

8 6. *Field Testing of a Small-Scale, Segmentally Precast Bridge Pier for Accelerated Construction*, Jon Rouse, Iowa State University/InTrans ($74,913)

3 7. *Cost-effective End Bearing Piles for Deep Foundations*, Sri Sritharan, Iowa State University/InTrans ($75,000)

0 8. *Utilization of Biobased Products in Dust Control Applications for Unpaved Roads in Iowa*, Halil Ceylan, Iowa State University/InTrans ($50,000)

*** Items receiving top votes: Numbers 1, 5 & 6**

DISCUSSION: Travel Meeting
Mark: There are a few possible locations for IHRB's Travel Meeting; however, the Travel Meeting has been delayed and moved to July because of budget restrictions for this fiscal year. Are there any thoughts on various projects we should visit or special things going on in any of your areas you'd like included as a possibility?

C: It might be good to visit a project that's close; last year we went up to the I-35 bridge reconstruction project in Minnesota and also visited the MnROAD facility.
A: Buchanan County completed the UHPC girder bridge last fall - that might be a option.

C: Preferably it will be a completed project because trying to visit during construction is almost impossible when there's a set meeting date and a moving timetable on a construction project. We've tried that in the past and it didn't work out too well.
C: With the UHPC project there are a few things going on: a fabric reinforced abutment and also, a couple years ago a high-slump concrete on a bridge deck overlay was completed that would have four-to-five years of performance on it now.
C: That would be a possibility.

Q: Did Doug Schnoebelen from the University of Iowa invite IHRB to visit U of I?
Mark: He mentioned they'd be interested but nothing specific was discussed; however, I'm sure they'd be interested in hosting us if we chose to do that, too. They have the facilities and there's been enough change on the Board that there are probably quite a few Members and Alternates who haven't seen some of those facilities. We've visited Buchanan County as well, but we'd be visiting new projects as opposed to some of the previous ones. If Board Members or Alternates have any other ideas, please email me and I'll compile a list of alterntives for discussion at June's meeting.

NEW BUSINESS
None

ADJOURN
Motion to Adjourn
Motion by A. Abu-Hawash. 2nd by S. Rinehart.
Motion carried with 11 aye, 0 nay, 0 abstaining.

The June 2009 meeting of the Iowa Highway Research Board will be held **FRIDAY, June 26, 2009 at 9:00 a.m. in the East/West Materials Conference Room at the Iowa DOT.**

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Mark J. Dunn, IHRB Secretary