

IOWA HIGHWAY RESEARCH BOARD (IHRB)

Minutes of January 28, 2005

Regular Board Members Present

J. Adam	L. Jesse
L. Brehm	J. Joiner
S. Dockstader	J. Krist
R. Ettema	C. Marker
T. Fonkert	M. Nahra
R. Gould	R. Schletzbaum
L. Greimann	C. Schloz
J. Ites	

Alternate Board Members Present

A. Abu-Hawash
J. Berger
B. Younie

Board Members with No Representation

None

Secretary

M. Dunn

Visitors

Brian Keierleber	<i>Buchanan County</i>
Max Grogg	<i>Federal Highway Administration</i>
Sara Buseman	<i>Iowa Department of Transportation</i>
Ed Engle	<i>Iowa Department of Transportation</i>
Sandra Larson	<i>Iowa Department of Transportation</i>
Mark Masteller	<i>Iowa Department of Transportation</i>
Kevin Merryman	<i>Iowa Department of Transportation</i>
Rob Baker	<i>Iowa State University</i>
James Cable	<i>Iowa State University</i>
Charles Jahren	<i>Iowa State University</i>
Ed Jaselskis	<i>Iowa State University</i>
Brent Phares	<i>Iowa State University</i>
Sri Sritharan	<i>Iowa State University</i>
Muhannad Suleiman	<i>Iowa State University</i>
J. Hans van Leeuwen	<i>Iowa State University</i>
David White	<i>Iowa State University</i>
Terry Wipf	<i>Iowa State University</i>
Dale Harrington	<i>Iowa State University/CTRE</i>
Mike LaViolette	<i>Iowa State University/CTRE</i>
Omar Smadi	<i>Iowa State University/CTRE</i>
Rosanne Edwards	<i>NNW, Inc.</i>
Marian Muste	<i>The University of Iowa</i>
Hosin "David" Lee	<i>The University of Iowa</i>
Thanos Papanicolaou	<i>The University of Iowa</i>

The meeting was held in the East/West Materials Conference Room at the Iowa Department of Transportation (Iowa DOT), Ames, Iowa. The meeting was called to order at 9:00 A.M. by Larry Jesse with 14 voting members/alternates at the table.

Agenda review/modification

- No additions or modifications.

Approval of the minutes

- Charles Marker moved to approve the minutes as submitted from the December 9, 2004 meeting. Lyle Brehm seconded. Carried with 14 yes, 0 no, and 0 abstaining.
- An additional voting member joined the table, bringing the voting member/alternate count to 15.

Announcement of new member and alternate appointments for 2005.

- Larry Jesse mentioned that all the changes to the member and alternate member appointments for 2005 were listed in the December 9, 2004 meeting minutes.
- It was noted that the 2005 IHRB membership list was sent in the Board packet and paper copies were available at the meeting. The list is also available on the Research web site at www.dot.state.ia.us/materials/research/ihrb/iowa_highway_research_board.
- The list of meeting dates was also available at the meeting and is on the web site as well. It was pointed out that this year the April and May meeting dates have been adjusted to avoid having the May meeting the Friday prior to Memorial Day and to allow for adequate preparation time between meetings.

Attendees' comments on the Annual TRB 84th Annual Meeting

- Todd Fonkert thanked the Board for the opportunity to attend the meeting and felt that it was very beneficial to attend.
- Mark Nahra brought back some information from a session on the use of traffic control devices at railroad crossings. It was asked if some of the information could be put on the Service Bureau web site.

Review of proposals received from 2nd Solicitation for FY 04-05

- It was asked of the Board if they wanted to continue to receive the mailing when RFPs are sent out for solicitation since there is thorough review by the Board prior to sending them. It was decided that the Board should continue to get them.

IHRB 04-21, "Development of an Improved Integral Bridge Abutment-to-Approach Slab Connection"

- One proposal was received from Brent Phares and Michael LaViolette, Iowa State University (ISU)/Center for Transportation Research and Education (CTRE); and Dean Bierwagen, Iowa DOT.

- *Comments and discussion:*
 - Mark Dunn mentioned that this project is somewhat related to TR-481, “Identification of the Best Practices for the Design, Construction, and Repair of Bridge Approach Sections”, (final report presented later in the meeting). The Bridge Design Office wants to try a couple of designs and have them monitored to work on improving settlement problems with bridge approaches. TR-481 was focused more on the backfill, embankment and settlement issues and this project will look more at the structural aspect.
- *Issues/Concerns that the board would like staff to address:*
 - None
- *Vote to approve:*
 - John Joiner moved to approve the proposal with the recommended funding split of 48% Primary, 48% Secondary and 4% Street. John Adam seconded. Carried with 15 yes, 0 no, and 0 abstaining.

IHRB 04-17, “Effective Shoulder Design and Maintenance”

- One proposal was received from David J. White, Charles Jahren, Muhannad Suleiman, and E. Thomas Cackler, ISU/CTRE.
- *Comments and discussion:*
 - None
- *Issues/Concerns that the board would like staff to address:*
 - None
- *Vote to approve:*
 - Charles Marker moved to approve the proposal with the recommended funding split of 45% Primary and 55% Secondary. Mark Nahra seconded. Carried with 15 yes, 0 no, and 0 abstaining.

IHRB 04-13, “Evaluation of Transverse Joint Forming Methods in PCC Pavement”

- One proposal was received from James Cable, ISU/CTRE.
- *Comments and discussion:*
 - Mark Dunn reviewed the ground work that has been done to this point. A test project in Buchanan County was done with modifying dowel baskets with a vertical piece of steel with the intent to induce a transverse crack. This research will test a variety of designs and expand to cover several consecutive joints.
- *Issues/Concerns that the board would like staff to address:*
 - None
- *Vote to approve:*
 - Lyle Brehm moved to approve the proposal with the recommended funding split of 50% Primary and 50% Secondary. Todd Fonkert seconded. Carried with 15 yes, 0 no, and 0 abstaining.

IHRB 04-11, “Evaluation of Design-Flood Frequency Methods for Iowa Streams”

- One proposal was received from Allen Bradley, The University of Iowa (U of I).

- *Comments and discussion:*
 - There was a comment on the opportunity of scalability of the information after the evaluation is completed. This could possibly lead to a follow-up study after this project. With having the goal of the adjustment factor being established through future studies, Jon Ites volunteered to be on the advisory committee to help ensure the scope of the research stays on track and considers the long-term objective.
 - The proposal refers to the rational method being applied nation wide, which is one of its weaknesses. This study was aimed as being Iowa specific, however to get enough sites/data, it looks beyond Iowa borders. It was asked that the Principal Investigator (PI) be cautious that the sites outside of Iowa are representative of something that would be similar to Iowa data.
 - It was mentioned that the SUDAS committee would be interested in being involved with this project. Dr. Ettema will forward that information to Dr. Bradley.
- *Issues/Concerns that the board would like staff to address:*
 - None
- *Vote to approve:*
 - Lyle Brehm moved to approve the proposal with the recommended funding split of 51% Primary, 45% Secondary and 4% Street. Jeff Krist seconded. Carried with 15 yes, 0 no, and 0 abstaining.

IHRB 04-14, “Design Procedures and Field Monitoring of Submerged Barbs for Streambank Protection”

- One proposal was received from Thanos Papanicolaou and Marian Muste, U of I.
- *Comments and discussion:*
 - There was a question about the funding split and the amount of use of the information by the counties. While some counties don’t use the technique, it was agreed that some of the counties would get good use from the information.
- *Issues/Concerns that the board would like staff to address:*
 - None
- *Vote to approve:*
 - Charles Marker moved to approve the proposal with the recommended funding split of 48% Primary, 48% Secondary and 4% Street. Mark Nahra seconded. Carried with 15 yes, 0 no, and 0 abstaining.

Problem Statement, “Putting Stringless Paving into Practice”

- Dr. James Cable, ISU/CTRE, reviewed the background of the stringless paving project done in Washington County and the shortfall of that project with not getting the smoothness profile so that the contractor would receive incentive pay. It was explained that there has been ongoing communication with Geologic Survey Systems (with the GPS system) and Gomaco (with the robotic stations), the two companies which have been working with stringless technology. Brian Keierleber, Buchanan County, has two overlay projects which lead to this problem statement. Dr. Cable discussed the project sites, one rural and one going through a small town; the need for the companies to contribute from their end for the development/field testing of the technology; and that the study would only move forward with Board funding if the technology is used.

- It was clarified that the cost analysis will be in the savings from not having to survey and stake/run string versus the cost of using the technology.
- It was questioned if the technology has changed enough to get the type of accuracy needed for incentive pay. Dr. Cable answered that Gomaco claims to have done enough work with the system to get the incentive pay. CMI Terex Corporation has recommended that different valves be put on their pavers to control the oil flow and that should produce a pavement which would earn incentive pay.
- *Motion:*
 - Jeff Krist moved to accept the problem statement. Mark Nahra seconded.
- It was mentioned that it would be good to have this perceived as more of an area of potential labor savings, particularly for the counties, to get a good ride yet not have to run the stringline; not so much thought of as a focus to allow the paver to receive incentive pay. The paving companies, at times, haven't made smoothness incentive even with the stringline run. Support for having this project go through with contribution from the companies or not was expressed.
- It was mentioned that moving to this technology allows more impact on the final pavement based on the profile built into the 3-D model. It also shows benefits in cities where there are many trees, various obstacles, and narrow right-of-way to work around; and in counties where there are narrow shoulders and the need for a location through which traffic can pass.
- The amount of Board funding anticipated to be requested is \$100,000 to \$110,000 for testing.
- Dr. Cable and Mark Nahra will discuss options about how to structure paving incentive for this type of project.
- There was support expressed for having the stringline to help visually detect needed changes versus support expressed for the GPS providing a more continuous and accurate measure. It was agreed that not all smoothness issues are associated with the stringline.
- *Vote:*
 - Carried with 15 yes, 0 no, and 0 abstaining.

Final Report TR-481, "Identification of the Best Practices for the Design, Construction, and Repair of Bridge Approach Sections"

- Dr. David White, ISU/CTRE, presented the motivation for the research; the team contributing the project; the main research objectives; the 6 categories and organization of the report; the paving notch analysis; the scaled bridge approach model; the video showing the water management bridge approach model; the summary of the testing results; and recommendations from the research, including design examples which were provided in the report and implementation being recommended on a pilot test basis.
- It was mentioned that there was no noticeable difference between different types of abutments.
- There was chem grouting found throughout the state, however, based on these results, it doesn't seem to prevent the problem and it also has to be redone periodically. There are some applications that the backfill material could be removed and replaced with flowable mortar,

however, then there is a drainage issue. Dr. White recommended the alternative of adding porous backfill and a geocomposite drain for both new bridges and rehabilitation. The model did not, however, simulate erosion.

- Rob Ettema moved to approve the final report. Roger Gould seconded. Carried with 15 yes, 0 no, and 0 abstaining.

Final Report TR-457, “Development of a Manual Crack Quantification and Automated Crack Measuring System”

- Dr. Hosin “David” Lee, U of I, presented the problem motivating the research; the project objectives; the 3 main tasks, including development of manual crack quantification software, verification of automatic analysis output from the consultant, and development of a new automatic crack imaging procedure; and the conclusions from the project.
- The software has been given to Mark Dunn for distribution.
- Roger Schletzbaum moved to approve the final report. Jon Ites seconded. Carried with 15 yes, 0 no, and 0 abstaining.

Extension Proposal TR-474, “Validation of the Mix Design Process for Cold-In-Place Rehabilitation Using Foamed Asphalt”

- This extension proposal was presented to the Board at the last IHRB meeting by Mike Heitzman, Iowa DOT, due to a scheduling conflict for Dr. Hosin “David” Lee, U of I, the project’s PI. With the questions that were posed at the meeting, the Board tabled the proposal and requested that Dr. Lee be present to provide answers.
- Dr. Lee explained that the current presentation would address the areas of concern that were covered in the minutes from the December 2004 meeting. Acknowledgement was given to the steering committee members and the dates of the 2 meeting held were listed. The differences between the revised tasks and the 6 tasks in the original research plan were highlighted. The issue of the equipment not being delivered was addressed. The machine, which has recently been improved, is due from a different vendor in March 2005. The following eight concerns from the previous meeting, Mike Heitzman’s responses at the meeting, and Dr. Lee’s additional responses were reviewed:
 - **Concern 1**
 - *It was agreed that there was a consistency benefit to the study with keeping the same graduate students; however, it was questioned if that was the responsibility of the Board to fund; some of the additional expenses of the project have been covered by the original funds.*
 - *Mike Heitzman’s response:* Graduate students have been doing more testing due to the breadth that was added with increased samples and increased testing procedures.
 - *Dr. Lee’s response:* Graduate students have been working continuously throughout the project. Additional funding mainly includes two graduate student salaries for 9 months.
 - **Concern 2**
 - *The shift in the project scope with the additional test being added.*
 - *Mike Heitzman’s response:* No standardized test: tests are being developed as the project progresses. Additional testing on curing is not a change in overall direction but a change in

breadth. There were two steering committee meetings and the group agreed with the importance of looking at laboratory curing.

- *Dr. Lee's response:* Curing condition is one of the most critical issues for simulating field performance. Determining the optimum curing temperature and duration is critical in the mix design. No, there is no shift in the project scope.

- **Concern 3**

- *The laboratory curing issue should have been brought as a separate proposal*

- *Mike Heitzman's response:* With the RAPs already collected, it was more economical and more appropriate to group it with the current Phase II research.
- *Dr. Lee's response:* We have come to realize the significant impact of the curing condition on mix design. Without the optimum curing condition, the mix design may not be consistent.

- **Concern 4**

- *If the students will be kept busy during the time prior to the Equipment getting delivered.*

- *Mike Heitzman's response:* Laboratory curing study could be done immediately.
- *Dr. Lee's response:* Before the equipment is to be delivered in March 2005, the new test protocols need to be researched thoroughly. Graduate students need to be trained before the equipment is delivered

- **Concern 5**

- *A more clear understanding of the increase in the expense and what it is going to. Having more information will help see if the Board feels that it is beneficial to approve that kind of expansion of the project at this point.*

- *Dr. Lee's response:* Additional funding will all go to two graduate students' stipends. Given the complexity of the new performance test procedure, it is critical for two students be trained. Two graduate students are needed to perform the SPT tests accurately.

- **Concern 6**

- *The increase in samples and moving ahead with additional testing without coming to the Board, when taking on more testing would likely mean the need for more funds. The Board was concerned that this information was just getting to them now.*

- *Dr. Lee's response:* Early in the stage, the PI took on more testing because he thought it would produce the better research result. In late summer of 2004, however, he realized that the project could not be completed within the given schedule and budget, mainly due to the cancellation of the equipment by the vendor. The PI sought the alternate vendor and the new contract had to be negotiated. He wanted to seek wisdom from the ten experts serving on the advisory committee. The committee meeting was held on November 17, 2004, where the committee recommended that the PI should seek the additional time and funding from the Board. It is PI's fault that he did not come sooner to the Board to seek help.

- **Concern 7**

- *Questioned if the steering committee fully understood the impact that the increase in testing would have on the project budget. The steering committee's decision to increase the number of samples and expand the tests provided the ability to look at the new results with confidence.*

- *Dr. Lee's response:* The steering committee did not fully understand the impact that the increase in testing would have on the project budget until the committee meeting on November 17, 2004. The extension on the schedule and budget became apparent to the PI on September 3, 2004, when Cox and Sons withdrew their contract to deliver the equipment by

September 30, postponed from August 31. The PI was in a hurry to find the alternate equipment manufacturer. The PI regrets that he did not seek the help from the Board sooner.

- **Concern 8**

- **If the equipment had arrived on time, there would have likely been a need to ask for only a small extension due to the 5-6 months needed for the performance testing.**
 - *Dr. Lee's response:* The PI regrets that the first vendor cancelled the delivery at the last minute although the PI gave the contract to the vendor in April 2004. During the delay, however, two graduate students and four undergraduate students had worked continuously. The PI underestimated the large workload associated with the phase II study.
- It was clarified that training for the new equipment was included in the original proposal.
- It was asked if the university has recovered any of the cost associated with the failure of the delivery of the equipment. Bid bonds are in place in some areas of business to protect against things like this. It was stated that the original vendor is a small company and the loss may not be recoverable. The university has covered the increased cost incurred.
- Dr. Lee was thanked for coming to clarify the justifications. It was felt that the verbal presentation was more thorough than the written proposal. The time frames seemed to line up better when looking at the course of action taken after finding out about the failure of delivery of the equipment, the notification of the advisory committee and the IHRB meeting schedule. It was felt that the end product will be better with the expanded areas that were added to the project. To not go forward with the project at this point would be counter-productive.
- It was mentioned that other projects have shown expansion of work and were able to stay within the initial budget. It was expressed that the Board will be watching that this incident doesn't set a precedent and that PIs should know not move ahead with work, which would increase cost, prior to addressing the Board. It was agreed that this was a good lesson learned for PIs and academic research units with regard to interacting with the Board.
- Charles Marker moved to approve the extension proposal. John Adam seconded. It was agreed to keep the funding splits as listed. Carried with 14 yes, 0 no, and 1 abstaining.

Final Report TR-499, "Effectiveness of Electrochemical Chloride Extraction (ECE) for the Iowa Avenue Pedestrian Bridge"

- Rosanne Edwards, NNW, Inc., presented the location of the test bridge; information on the chemistry of corrosion; the ECE procedure; the procedure and data on the results of the lab tests; the plan, list of tests, results and evaluation of the field test; and the project's benefits and conclusions.
- It was questioned how the chloride is physically removed - as a gas or liquid. It comes off as soluble ions and is diluted by the water being applied.
- It was pointed out that on tables six and seven, the measurement should be concentration, not density.
- It was recommended that the report include some of the photos that were being shown in the presentation. It would be a benefit to show the layout of the material.

- In the conclusion, it was indicated that 50% of the chloride was removed. It was asked how it is known that 50% is a sufficient amount of removal to stop the growth and damage of chloride. The half-cell test which followed the ECE removal process showed that the potential was less than the threshold value.
- Jon Ites moved to approve the final report. Roger Gould seconded. Carried with 15 yes, 0 no, and 0 abstaining.

Final Report TR-459, “Reuse of Lime Sludge from Water Softening and Coal Combustion Byproducts”

- Dr. J. (Hans) van Leeuwen, ISU, reviewed those who supported the project; the original problem statement; and the results of the feasibility study, including the use of lime sludge in cement production, air pollution control, dust control on unpaved roads, wastewater neutralization, and geotechnical applications.
- Rob Baker, the ISU graduate student who worked on the project, continued with the specifics on the geotechnical research that was done and explained the properties of lime sludge, the lab and field tests that were done on the material and results of those tests, the project conclusions and recommended future work.
- It was clarified that lime sludge doesn’t vary much from region to region like fly ash does.
- In thinking practically, it was observed that lime sludge could be converted to be a product that might work in an embankment; however, it was wondered where it would work out economically in very many cases. Dr. van Leeuwen explained that the cities are in need of disposing the product and pay to do so. Also, water treatment plants are in all major cities, likely close to major construction, which would aid in lower transportation costs. The proposal which follows proposes looking at the economics in more detail. The dewatering cost was thought to be minimal as well.
- The potential of leaching was questioned. It was expected that the potential was fairly low due to the high ph of the material. It is likely that lime sludge would prevent leaching more than regular soil. This is another area of research that is recommended in the following proposal.
- Jeff Krist moved to approve the final report. John Joiner seconded. Carried with 15 yes, 0 no, and 0 abstaining.

Proposal, “Reuse of Lime Sludge from Water Softening and Coal Combustion Byproducts

- Dr. J. (Hans) van Leeuwen, ISU, presented the background; the objectives; the research plan, including the data collection, the leaching tests, the CBR tests, and the report and technology transfer; the expected products/deliverables; the benefits; the schedule; and the budget of the next phase of research.
- The change in the percentages of support from the different jurisdictions, comparing the last phase to this phase, was explained to be due to the low balance in the Street fund.

- Much support from individual cities and other private sector entities went into the first part of this research. With this area of study being related to transportation/construction, support is being asked of the IHRB.
- The funding split was questioned due to the relatively low amount of benefit that is foreseen that the counties may gain from the project versus their level of funding at 30%. It was asked if there was a time urgency for this next phase, or if it could come back when additional money is added to the Street fund (July 1, 2005). The consistency value with having the same graduate student work on the project was presented as a major benefit.
- It was expressed that with the balance of the overall funds that the Board has, that it would be beneficial to move forward as a unified Board with transportation research that would benefit the state as a whole.
- This research was said to be a good opportunity to find a use for something that all communities in Iowa with water treatment facilities need to get rid of; and, as far as the transportation economics, which are proposed to be addressed in this next phase, the potential use and benefits for lime sludge usage as a fill material are very broad based and could benefit all jurisdictions.
- There was concern that the research was more of a solid waste disposal issue than a transportation usage issue. It was mentioned that fly ash started with the same intent, finding a use for a waste product. Fly ash also has greater inconsistencies in the chemical properties than lime sludge.
- Jeff Krist moved to approve the proposal. John Joiner seconded. Carried with 8 yes, 7 no, and 0 abstaining.
- With the counties' participation in funding the project, it was specifically asked that the economics are reviewed to include the comparison of the usage of lime sludge versus ag lime, as well as the other areas of focus listed in the proposal.

Final Report TR-485, “Erosion Control for Highway Applications - Phase II: Development and Implementation of a Web-Based Expert System for Erosion and Sediment Control Measures”

- Dr. Marian Muste, U of I, reviewed the background and motivation, including highlights of the main reasons for the direction taken in the study; the literature review synthesis; the database information and implementation; the web-database features, including a demonstration of the web-based database system; the detailed review process; and the conclusions of the project.
- One voting member left the table, leaving the voting member/alternate count at 14.
- Jeff Krist moved to approve the final. Mark Nahra seconded. Carried with 14 yes, 0 no, and 0 abstaining.

Proposal, “Implementation of the Water Quality Control BMPs and Design & Specifications Manuals in the Iowa Stormwater Runoff Control Interactive Manual”

- Dr. Marian Muste, U of I, established this proposal as an outgrowth from the previously reviewed web-database final, and introduce Mark Masteller, Iowa DOT Roadside Office, to review the handout provided by Dale Harrington, ISU/CTRE.

- Mark Masteller, described this next phase of the project as a statewide effort by multiple agencies, including federal, state, county, and city, on how the state deals with stormwater. The 4 main parts of the research and the funding sources listed on the handout were highlighted. The research being proposed to the Board is to fund the inclusion of the DNR sponsored part listed in 2B on the handout and have stormwater quality practices added to the web-based expert system.
- Dr. Muste continued with the information on the feedback discussions and need for adding the water control measures; the timing of working jointly with Stephen Jones, ISU, in the development stages and having the system ready to plug in the information; the objectives and outcomes, including adding BMPs, design practices and specification manuals; the plan for database transfer, maintenance and training; and the benefits and outlook on other potential future uses for the database.
- The issue of deciding on which server the information will reside was discussed. It is possible that it may reside on the DOT server or, since it is tied into the new SUDAS design specifications being developed, that site could be another option with the DOT having a link to it.
- The goal of the final product is to have the erosion & sediment control and water quality control BMPs and Design & Specifications Manuals all in one easy-to-use system. It is anticipated that the SUDAS specifications will be ready for the system by the summer. Dr. Muste's part of the project is to get the system ready so the information can be plugged in when completed.
- Lyle Brehm moved to approve the proposal. Mark Nahra seconded. Carried with 14 yes, 0 no, and 0 abstaining.

Review of Calendar of Activities

- The Board was reminded that the brainstorming session to develop a list of topics to be considered for ranking for next fiscal year's priority projects will take place at the February Board meeting. Topic submissions may also be sent to Mark Dunn ahead of time. The topic submission should include a paragraph describing the research need and if there is any time issue that needs attention.
- May is the month for the IHRB's traveling meeting and the Board was asked to think of ideas of locations so that it can be discussed at the next meeting. Following are a few ideas submitted: travel to Buchanan County if the stringless paving project lines up; or visit The U of I and tour the lab to see the new machine for the TR-474 project.

New Business

- It was mentioned that a draft of the Technology Transfer brochure for David White's TR-481 project was available on the table.
- The software from the research projects approved at this month and last months meetings will be sent out from Mark Dunn's office.

Lyle Brehm moved to adjourn the meeting. Lowell Greimann seconded. Carried with 14 yes, 0 no, and 0 abstaining.

Date of Next Meeting: THE NEXT MEETING WILL BE HELD FRIDAY, FEBRUARY 25, 2005 AT 9:00 A.M. IN THE EAST/WEST MATERIALS CONFERENCE ROOM AT THE IOWA DOT, CENTRAL COMPLEX, IN AMES, IOWA.

Mark Dunn, IHRB Secretary