IOWA HIGHWAY RESEARCH BOARD (IHRB)
Minutes of September 26, 2008

Regular Board Members Present

A. Abu-Hawash
J. Adam
J. Berger
S. Gannon
J. Joiner
B. Moore
M. Nahra
J. Rasmussen
S. Rinehart
J. Waddingham

Alternate Board Members Present

R. Souleyrette for J. Alleman
R. Younie for V. Dumdei

Members With No Representation

K. Hornbuckle
J. Krist
D. Waid

Secretary - M. Dunn

Visitors

Jon Ites	Buena Vista County
Max Grogg	Federal Highway Administration
Chris Kahle	Iowa Department of Natural Resources
Chris Brakke	Iowa Department of Transportation
Tim Crouch	Iowa Department of Transportation
John Hinrichsen	Iowa Department of Transportation
Sandra Larson	Iowa Department of Transportation
Scott Schram	Iowa Department of Transportation
Mary Starr	Iowa Department of Transportation
James Cable	Iowa State University/CCEE

The meeting was held at the Ames Holiday Inn Conference Center, 2609 University Blvd., Ames, Iowa. The meeting was called to order at 9:00 a.m. by Vice Chairperson Jim Berger with an initial number of eleven voting members/alternates at the table. One member later joined the table, bringing the voting total to twelve.

Agenda

Item number eleven was moved to Item four.

Approval of the minutes

Motion by R. Younie to approve minutes from the July 25, 2008 meeting. 2nd by M. Nahra.
Motion carried with 11 aye, 0 nay, 0 abstaining.

DISCUSSION & SELECTION OF PROPOSALS FROM 08-09 FIRST ROUND RFPs

RFP 08-01 ***Development of Updated Specifications for Roadway Rehabilitation Techniques***, Charles Jahren (60,000)

BACKGROUND
Several projects sponsored by the Iowa DOT have recently been conducted on asphalt road maintenance and rehabilitation techniques, including selection, design, and construction. It would be highly beneficial to modify specificationsw documents to reflect the findings of this important new research. In addition, it would be desirable to coordinate revisions to the SUDAS and Iowa DOT documents so they are complementary and easily revised to reflect findings of future research projects.

OBJECTIVES
1. Make recommendations to improve the SUDAS and Iowa DOT standard specifications. Incorporate results of recent research on seal coat, slurry seal, micro-surfacing, and fog sealing.
2. Obtain input from stakeholders. Assess the extent cold-in-place recycling and stabilization should be included in the SUDAS manuals. Based on input, recommend appropriate additions to SUDAS manuals for cold in-place recycling and appropriate modifications to the SUDAS manuals for stabilization.
3. Develop best management practices for selection and use of asphalt roadway rehabilitation techniques. Include in the SUDAS Design Manual.

Motion to Approve by J. Joiner. 2nd by J. Adam.
Motion carried with11 aye, 0 nay, 0 abstaining.

RFP 08-04 ***Investigation of Warm-Mix Asphalt Using Iowa Aggregates***, H. "David" Lee ($125,000)
RFP 08-04 ***Investigation of Warm-Mix Asphalt Using Iowa Aggregates***, Chris Williams ($124,997)

C: There are elements in Chris William's proposal concerning QA/QC requirements and also in the implementation and utilization of RAP that are more in line with what we're looking for in this research. In that regard, I lean toward the William's proposal.

C: William's proposal seemed to answer the RFP better.

C: Anything worthy of implementation needs to have that QA/QC element and to have it from the start is a big advantage.

Motion to Approve by B. Moore. 2nd by M. Nahra.
Motion carried with11 aye, 0 nay, 0 abstaining.

*** One Member Joined the Table***

PROPOSAL ***Evaluation of the Buena Vista IBRD Bridge: A Furthering of Accelerated Bridge Construction in Iowa***, Terry Wipf, Iowa State University/CTRE ($70,044)

BACKGROUND
This proposal is a request for supplemental funding to evaluate ABC bridge construction. Buena Vista County, with the assistance of Iowa DOT and the Iowa State University Bridge Engineering Center (BEC), proposes construction of a single span bridge using rapid construction techniques. Although not complete, the current design concept involves the use of precast, pretensioned components for both the bridge substructure and superstructure. This application and demonstration represents an important step in the development and advancement of these techniques in Iowa and nationwide.

Prior funding for the design and construction (which included materials) of this project has been obtained through the Innovative Bridge Research and Deployment (IBRD) Program sponsored by the Federal Highway Administration (FHWA). One requirement of the IBRD Program is that the resulting bridge be tested and evaluated. This project will provide supplemental funding needed to meet the obligations of the previously obtained IBRC funding. The successful implementation of this approach has far reaching implications in the State of Iowa where proven rapid construction techniques could result in significant reductions in costs. This project directly addresses the IBRC goal of demonstrating (and documenting) the effectiveness of innovative materials and construction techniques for the construction of new bridge structures.

OBJECTIVES
• Assist the Iowa DOT and Iowa County Engineers in fully leveraging the FHWA Innovative Bridge Research Construction Program funding

• Perform testing and evaluation of precast components for a bridge project in Buena Vista County to assess overall design, construction, and structural performance; evaluation of performance will be formulated through comparisons with design assumptions, recognized codes and standards including the AASHTO specifications.

C: The team will focus on system components rather than the construction schedule. ABC costs more than normal bridge construction with advantages including accelerated construction, public access, use as emergency routes and ease of re-use. Buena Vista County has acquired FHWA funding of roughly $200,000 but this amount will not cover construction costs; the additional funds needed are being sought from the Board.

C: This is a good project; we (Iowa DOT) are helping the project by providing design at no charge. It's a good concept and using and advancing these concepts are advantageous to the state.

Q: What was the full funding amount?
A: The initial application four years ago was for $340,000; after two years it came down to $200,000. But we're scaling back on some of the components for the project.

C: We're trying to make ABC more attractive to counties and cities without asking them for the costs of monitoring and the research portion of the project.

Motion to Approve by M. Nahra. 2nd by A. Abu-Hawash.
Motion carried with12 aye, 0 nay, 0 abstaining.

PROPOSAL ***Improving Concrete Overlay Construction*****,** Paul Wiegand Iowa State University/CTRE ($250,000)

BACKGROUND
As our highway system ages and available funding shrinks, agencies are looking for efficient methods to preserve and extend the service life of existing pavements. In addition, the highway agencies are being asked to minimize the time of exposure to construction and inconvenience by the traveling public. Despite completion of hundreds of concrete overlay projects, some highway agencies are reluctant to use concrete overlays. Some agencies believe that concrete overlays are expensive and difficult to build, and should be used only in limited applications. Because of this belief, it is very important that efficient construction methods be developed to meet the public need for mobility, safety, and access to property.

OBJECTIVES
1. Reduce quantity overrun concerns with GPS mapping of the proposed project. Reduce construction survey time with GPS mapping and evaluate GPS and 3-D construction equipment control (milling machine, slipform paver and cure cart). Develop ways to establish the profile grades and machine control before or immediately after the contract letting by the highway agency so that construction is not impacted.

2. Evaluate the use of GPS to control longitudinal joint sawing.

3. Evaluate milling by the standard practice of string line control and by GPS control. Determine the best way to establish the level of need and timing of milling for existing asphalt surface preparation.

4. Evaluate the use of innovative bond breaker materials.

5. Determine innovative ways of handling traffic control for the construction of single lane overlays as part of a two lane or multilane overlay. Evaluate the impact of haul road selection on road opening time.

6. Investigate potential ways using both existing and new paving train components so that the length of the paving operation is minimized.

7. Evaluate pavement strength versus opening time and completion of project time.

Q: Will ISU's earthwork center and mobile lab be used?
A: Yes, those costs are listed under 'Other Direct Costs & Services' in the proposal; the earthwork center is charged off on a per-test basis and the mobile lab on a hourly charge.

Q: Is the FHWA funding approved?
A: It has been identified and is currently going through the approval process.

Motion to Approve by J. Joiner. 2nd by M. Nahra.
Motion carried with12 aye, 0 nay, 0 abstaining.

CONTINUATION OF HR-140 "Collection and Analysis of Streamflow Data," Greg Nalley, USGS ($234,257)

BACKGROUND
The proper and efficient design of highway bridges and culverts depends to a considerable extent on accurate hydrologic information. Additional importance has been given to accurate hydrologic data in recent years because of increasing emphasis on the environmental aspects of stream crossings.

Research project HR-140 was established July 1, 1968, by consolidating three separate research projects then under contract between the USGS and the Iowa State Highway Commission. For the USGS, Iowa Water Science Center, HR-140 funds three separate programs: (1) continuous-record streamflow-gaging stations in Iowa, (2) partial-record (creststage) gaging stations in Iowa, and (3) flood profiles of Iowa streams.

The cooperative program is subject to annual renewal, and is supported with funds from both the Geological Survey (45%) and the Department of Transportation (55%). The stream-gaging progress for FY08 was (as in previous years) based on field trips run every six weeks; the data is worked up in real-time and presented on the web. Database records are finalized (30%) every 120 days and that is on-going.

In June, flooding caused over 200 high-water measurements to be made; because of acoustics used, no indirect measurements had to be made. Of those 200, 25 were funded through HR-140 funds; there are 89 crest-stage

gages across the sate also funded through this project. A new design (two installed) for gages will be used in the future because old gages only show high water levels. However, the new gages record every 15 minutes and gather much more information. One of the new gages alerted USGS to flooding this spring.

The Upper Iowa, Cedar and Iowa Rivers will be profiled from data collected during the 2008 flood.

OBJECTIVES

1. Operate, maintain, and publish streamflow data for 25 continuous-record gaging stations located throughout the State.

2. Operate, maintain, and publish high-flow data for 89 partial-record (crest-stage) gaging stations located throughout the State.

3. Collect and publish water-surface profiles and storm and flood description information for significant flood events of interest to the Iowa DOT. Collect and compile data from the June 2008 flood on the Upper Iowa, Iowa, and Cedar Rivers including over 80 bridge sites and 600 river miles.

Q: We obtained high-water marks from the Des Moines River during the flood; would that information be useful to you?
A: The Office of Bridges and Structures and FEMA are collecting high-watermark data from the flood; for our purposes that data would not apply.

C: It is vital to capture what we've seen from floods to make better predictions and do a better job at protecting our bridges.

Motion to Approve by M. Nahra. 2nd by A. Abu-Hawash.
Motion carried with 12 aye, 0 nay, 0 abstaining.

PROPOSAL ***Roadway Lighting and Safety: Phase II – Monitoring Quality, Durability and Efficiency***, Neal Hawkins (for Omar Smadi), ISU/CTRE ($100,000)

BACKGROUND
In Iowa, approximately 24% of all crashes and 40% of fatal crashes in 2003 occurred under dark conditions. The US DOT and National Highway Transportation Safety Administration (NHTSA) report that nationally, 45% of fatalities occur under dark conditions versus 27% of total crashes.

Recent Iowa State University research has shown that lighting may have an impact on driver safety at rural intersections. These results indicate lighting enhances driver safety, however, the data does 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. Identifying optimal lighting levels will likely enhance the detection of relevant driver information and therefore provide a safety benefit. There is a need to identify how intersection infrastructure and geometry influence lighting levels and corresponding crash rates.

This Phase II study follows project TR-540, "Strategies to Address Night-Time Crashes at Rural, Unsignalized Intersections." Based upon the results of TR-540, the Iowa Highway Research Board indicated interest in pursuing further research which addresses the quality of lighting rather than just the presence of light with respect to safety. In Phase II, CTRE staff will team with a national research leader in roadway lighting, Virginia Tech Transportation Institute (VTTI), through funding from the National Safety Center. VTTI will replicate the TR-540 study, develop roadway illumination monitoring equipment, and work with CTRE to complete Phase II work objectives (contributing $50,000 for a van they developed and will bring to Iowa to collect data).

OBJECTIVES

- Work with VTTI to collect field light levels for all study intersections. This will give the research team an opportunity to determine the impact of illumination levels on safety (nighttime crashes).

- Analyze data to establish a relationship between crash performance and illumination at rural unsignalized intersections.

- Investigate lighting levels at rural intersections which considers a number of factors (uniformity, glare, lamp durability, and efficiency-energy consumption).

- Develop recommendations to address lighting design and maintenance.

Q: Will headlight research be included in this study?
A: Yes, VTTI does a lot of headlight research that will be incorporated into data.

C: If there was some way to make a stop sign more visible (or more reflective) that would be beneficial.
A: Sometimes at unlighted intersections those signs are what we're seeing and using; we're not against less lighting at rural intersections. We're just trying to find out how much light is needed to be effective.

C: Our lights are on all night; if you could figure out how to use them only when needed that would be good.
A: There are some places in Europe where they have motion sensor lighting in rural areas.
C: The problem is that it takes so long for them to come on.
C: When headlight output is angled down for glare prevention there's a distinct cut-off where that light hits (for instance, driving down into a valley).
A: People are looking for guidance while driving and not getting it.

Motion to Approve by J. Waddingham. 2nd by B. Moore.
Motion carried with12 aye, 0 nay, 0 abstaining.

PROPOSALS Updating J- & H-Standards to LRFD, Dean Bierwagen, Iowa DOT

Part I – ***Updating Portions of the Three-Span Prestressed Concrete Beam Bridge Standards to LRFD Specifications***, WHKS & Co. (Superstructure) ($170,972)

BACKGROUND
There isn't a lot of engineering to be done in Part I; it's more about adding details to updates being made to the abutment LRFD standards. These include:

- Abutment design update (LRFD)
- Abutment wing
- Open rail
- Paving block
- Miscellaneous

OBJECTIVES
Using a combination of structural, geotechnical and LRFD specialists, this project will update portions of the Three Span Prestressed Concrete Beam Bridge Standards (H24, H30, H40 and H44 Standards). This involves updating the abutment piling to conform to the LRFD Specifications, modifying the abutment wings, revising the 'F' and open-railing end sections, and making other miscellaneous revisions.

Part II – ***Updating Portions of H-Standard Three Span Prestressed Beam Bridges T-Pier and Pile Bent Pier Update to LRFD Specifications***, Foth Infrastructure & Environment, LLC (Substructure) ($399,000)

BACKGROUND
- Pile bent design LRFD
- T-pier design LRFD

OBJECTIVES
- Complete the requested design services efficiently using a combination of commercial software programs developed to quickly and accurately complete repetitive design tasks.
- Design new pile supported T-pier footings for Structural Resistance Level-2 (SRL-2) pile capacities.
- Update current H-Standard detail sheets to reflect any adjustments made to the current designs.
- Detailed new sheets for the SRL-2 pile supported footings consistent with the current formatting.

C: This is part of LRFD implementation. Iowa DOT was required to begin implementation of standards starting October 2007; we're trying to get county standards up-to-date. That's a federal participation requirement.

C: This should be 100% County funded since the state will provide equal in-kind contributions.

Motion to Approve 100% County Funding for Parts I and II by Steve Gannon. 2nd by M. Nahra.
Motion carried with 12 aye, 0 nay, 0 abstaining.

*** One Member Left the Table***

FINAL REPORT TR-525, "Design Guide for Improved Quality of Roadway Subgrades and Subbases,"
Vern Schaefer, Iowa State University/CTRE ($153,212)

BACKGROUND
The performance of a pavement depends on the quality of its subgrade and subbase layers. As the foundation for the pavement's upper layers, the subgrade and subbase layers play a key role in mitigating the detrimental effects of climate and the static and dynamic stresses generated by traffic. Therefore, building a stable subgrade and a properly drained subbase is vital for constructing an effective and long lasting pavement system.

BENEFIT
This manual synthesizes current and previous research conducted in Iowa and other states into a practical, geotechnical design guide (proposed as Chapter 6 of the SUDAS Design Manual) and construction specifications (proposed as Section 2010 of the SUDAS Standard Specifications) for subgrades and subbases. This design guide is intended to help improve pavement foundations and thereby extend pavement life.

Topics covered include the important characteristics of Iowa soils, the key parameters and field properties of optimum foundations, embankment construction, geotechnical treatments, drainage systems, and field testing tools, among others.

Motion to Approve by R. Younie. 2nd by J. Rasmussen.
Motion carried with 11 aye, 0 nay, 0 abstaining.

FINAL REPORT TR-571, "GIS-Based Decision and Outreach Tools for Aggregate Source Management," Bob Libra, Iowa Geological Survey (86,357)

BACKGROUND
Rural and suburban residents have become increasingly resistant to the establishment or expansion of quarries and sand pits in their vicinity. This has increased haul distances for road projects, which in combination with rapidly rising fuel prices has increased costs for aggregate at the job site. Land use conflicts have also raised concerns over adequate supplies of certified high-quality aggregate required for certain state and federal projects. Zoning decisions affecting aggregate operations are typically made by county zoning programs and boards of supervisors, readily available mapping tools are needed to show current and potential sources in relation to adjacent land use, natural and cultural resources, and development trends. Such mapping tools represent a first step towards establishing local and state-wide plans for assuring aggregate availability.

BENEFIT
This data will be used in a web-based tool for planning future aggregate source access by making the data available prior to planning and development of residential/business subdivisions. Given the current outlook on fuel prices and the resulting aggregate transportation costs, Iowa DOT should continue to give consideration to developing a long-range, state-wide aggregate plan. The groups involved in the technical advisory, outreach, and support aspects of this project might form the core of such an effort. Visit the mapping homepage at: www.iowadnr.gov/mapping/index.html.

Q: If you're downloading data from the website to your own mapping software, is it available by county?
A: The data on the website is for the entire state but you can search by county. If you select only a county, that's all the information you will have opened.
C: I was looking at this as a tool for planning and zoning.
C: The Iowa DOT has also said it is a good tool for investigation.

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

PROPOSAL ***Field Testing and Evaluation of a Demonstration Timber Bridge***, Travis Hosteng, Iowa State University/CTRE ($88,336)

BACKGROUND
Timber bridges have long been a viable alternative for bridge owners. However, the use of timber bridges has decreased in the past couple decades. One reason for this is the misconception that timber bridges and poor serviceability go hand in hand. This is largely the result of premature deterioration of asphalt wearing surfaces found on timber bridges. Asphalt wearing surfaces are typically used not only to protect the timber deck components from vehicular wear and tear, but also to protect the superstructure from moisture induced deterioration. Previous research at Iowa State University has led to the development of deck treatment alternatives that could potentially limit or prevent the deterioration of asphalt wearing surfaces on timber bridges.

In order to ensure that these alternatives offer the greatest benefit to bridge owners, the proposed research consists of field testing and evaluating a demonstration timber bridge designed to utilize these deck treatment alternatives in combination with an asphalt wearing surface. The research will be performed through a cooperative effort of researchers at Iowa State University (ISU), the United States Department of Agriculture (USDA) Forest Products Laboratory (FPL) and Delaware County Engineering staff.

OBJECTIVES
1. Construct a 76-ft long bridge comprised of glued-laminated girders and a transverse timber deck in Delaware County through additional funding provided by the USDA FPL.

2. Perform field testing and evaluation of a glued-laminated timber girder bridge with transverse deck panels and an asphalt wearing surface to assess overall design, construction, and wearing surface performance.

3. Design and install monitoring systems on the demonstration field timber bridge to collect overall bridge construction and in-service bridge performance over a period of approximately 2 years.

4. Evaluate performance through comparisons between design assumptions, previous research, and existing bridge performance records.

C: We're covering the expenses of construction; we're asking the IHRB to cover the instrumentation and the research component of this project.

Q: Will you instrument the girders too?
A: Yes, we'll be instrumenting strain and deflection on the girders and deflection on the deck panels.

C: Something else we're working with on this project is using a different attachment to the transverse panels on the deck; we will not use brackets for attachment.

Motion to Approve 100% County Funding by J. Waddingham. 2nd by J. Adam.
Motion carried with 10 aye, 0 nay, 1 abstaining.

NEW BUSINESS
The Travel Trip to MnDOT and the I-35W bridge reconstruction site on September 4-5 was a good trip; discussions took place regarding where joint involvement and/or sharing of information could take place between Iowa DOT and MnROAD. When preliminary results from the heavy agricultural load project are in, we'd like to invite MnDOT personnel down for a presentation.

Also, IHRB meetings will again be held at the Iowa DOT's Materials East/West Conference Room beginning in October, 2008. Board Members and visitors to meetings will still be required to check in at the Front Desk, but an escort is no longer required.

ADJOURN

Motion to Adjourn
Motion by M. Nahra. 2nd by B. Moore.
Motion carried with 11 aye, 0 nay, 0 abstaining.

The October 2008 meeting of the Iowa Highway Research Board will be held **FRIDAY, October 31, 2008 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