IOWA HIGHWAY RESEARCH BOARD (IHRB)
Minutes of September 28, 2012

Regular Board Members Present

A. Abu-Hawash
B. Younie
J. King
J. Schnoebelen
E. Steffensmeier
W. Weiss
T. Wipf
C. Schloz

Alternate Board Members Present

P. Assman for J. Moellering
D. Whitlow for J. May

Members with No Representation

J. Berger
K. Mayberry
V. Dumdei
R. Knoche
R. Kieffer

Secretary - M. Dunn

Visitors

Vanessa Goetz	Iowa Department of Transportation
Lori Pflughaupt	Iowa Department of Transportation
Donna Buchwald	Iowa Department of Transportation
Matt Haubrich	Iowa Department of Transportation
Linda Narigon	Iowa Department of Transportation
Scott Neubauer	Iowa Department of Transportation
Andy Wilson	FHWA Iowa Division
David Eash	USGS
Dan Christiansen	USGS
Jon Nania	USGS
Brent Phares	Iowa State University/CCEE
Andrew Casciona	Iowa State University
Joana Peralta	Iowa State University
Shibin Lin	Iowa State University
Lisa McDaniel	FHWA Iowa Division

The meeting was held at the Iowa Department of Transportation Ames Complex, Materials East/West Conference Room, on Friday, September 28, 2012. The meeting was called to order at 9:00 a.m. by Chairperson Ahmad Abu-Hawash with an initial number of 9 voting members/alternates at the table.

Agenda

No changes were made to the Agenda.

Motion to approve Minutes from the June 29, 2012 meeting
1st by B. Younie. 2nd by D. Schnoebelen.
Motion carried with 9 Aye, 0 Nay, 0 Abstaining.

PROPOSAL ***Bridge Inspection, Load Rating, and Maintenance Manuals - Phase 2***, Scott Neubauer, Iowa DOT Office of Bridges and Structures, ($306,977)

BACKGROUND
Under a project funded by the Iowa Highway Research Board, HDR will provide services to the Iowa Department of Transportation to develop Bridge Inspection, Load Rating and Maintenance manuals with the intent of capturing existing Office of Bridges and Structures (OBS) policies and procedures, highlighting policies and procedures pertinent to Local Public Agencies (LPA), and summarizing current and past knowledge of DOT staff in these areas. The manuals would utilize a .pdf format in order to have sections or pages that may be linked to Iowa DOT's Structure Inventory and Inspection Management System (SliMS) software. The manuals would provide the required technical information and guidance to allow DOT Bridge staff, LPA staff, consultants, and District maintenance personnel to consistently inspect, evaluate and maintain National Bridge Inventory (NBI) bridges. These manuals will provide a framework for policy guidance to all bridge owners and employees as well as to independent bridge consulting firms working for the State or local entities.

OBJECTIVES
Phase II will have four tasks:

1. Project Management, QC and Meetings
2. Inspection Manual
   Chapter 1 - Regulations, Administration & Policies
   Chapter 2 - Condition Evaluation (Inspection & Recording) of Bridges – For Iowa DOT Personnel
   Chapter 3 – Reporting and Quality Assurance / Quality Control (QA\QC) – For Iowa DOT Personnel
   Chapter 4 – Condition Evaluation (Inspection & Recording) of Bridges – For Local Public Agency Personnel
   Chapter 5 – Reporting and Quality Assurance / Quality Control (QA\QC) – For Local Public Agency Personnel

3. Rating Manual
   Preface
   Chapter 1 – Introduction
   Chapter 2 - Load Rating Process
   Chapter 3 - Data Collection
   Chapter 4 - General Requirements
   Chapters 5 thru 17 – Bridge Types
   Chapter 18 – SIIMS Processes

4. Maintenance Manual

Chapter 1 – Deck Expansion Joints
Chapter 2 – Bridge Decks and Overlays
Chapter 3 – Bridge Drainage Systems
Chapter 4 – Bridge Railings
Chapter 5 – Bridge Bearings
Chapter 6 – Bridge Superstructures
Chapter 7 – Bridge Substructures
Chapter 8 – Bridge Approaches and Approach Slabs
Chapter 9 – Culvert Maintenance
Chapter 10 – Miscellaneous Bridge and Structure & Maintenance

DISCUSSION
Q: Does it deal with culverts and large pipes too? (Referring to the rating manual)
A: We will add as it progresses. We don't have a rating process yet. This is something that will be added as it progresses. This will be a "living manual" so we will be able to make updates as needed. We will be making Box Culvert rating part of the program.

Q: Is there any information regarding using railroad flat cars? They are becoming more and more typical.
A: We can include that under the "Miscellaneous" chapter. We will work with Iowa State on that.

Motion to Approve by E. Steffensmeier. 2nd by B. Younie.
Motion carried with 9 Aye, 0 Nay, 0 Abstaining.

PROPOSAL ***Development of Non-Petroleum Based Binders for Use in Flexible Pavements - Phase 2***, Chris Williams, Iowa State University/InTrans, ($144,882)

OBJECTIVE
The objective of this research is to use combinations of bio-oil and other polymers such as rubber for partial replacement in asphalt. Laboratory studies of full replacement blends will be on-going. The optimal blend will be used in a demonstration project. We are confident the optimal blend will show improved shear resistance, reduced temperature susceptibility, and resistance to deformation.

BENEFIT
The benefits of this research are potentially very substantial as a lower cost binders could be developed that performs as well as asphalt binders currently being used. Further, the blends will lower hot mix asphalt plant production temperatures and thus reduce plant emissions. Lastly, the bio-oil binder represents the development of green materials/technologies that are renewable and lessen the reliance on foreign crude oil and creates economic opportunities for rural communities via the establishment of fast pyrolysis units producing products for use in Iowa as well as for export.

DISCUSSION:

Q: What are the feed stocks for these oils?
A: Oakwood, switch grass and corn stalk. The one that showed better properties at this time for us has been the wood. They have very good properties however they are different so the treatments we need to perform will be different. Those are the ones we are using. Because of our location, these are the three we are focusing on.

Q: You mentioned a commercial partner producing the oil. Is there some sort of match coming from them in terms of materials.
A: Yes we have a partner, but they are not producing large amounts of these materials. Right now this material is being used for burning as a production of energy, which is a waste of this material since it has such good properties. These people have a very large facility in Wisconsin. They are planning on having more facilities but it depends on the success of this one. They provide large amounts for demonstration projects.

Motion to Approve by T. Wipf. 2nd by W. Weiss.
Motion carried with 9 Aye, 0 Nay, 0 Abstaining.

**********One member joined the table, now there are 10 voting members**********

FINAL REPORT *TR-616, Timber Abutment Piling and Back Wall Rehabilitation and Repair*, Brent Phares, Iowa State University/InTrans, ($150,843)

BACKGROUND
Based on previous National Bridge Inventory data, Iowa has nearly 20,000 bridges on low-volume roads (LVRs). Thus, these bridges are the responsibility of the Iowa county engineers. Of the bridges on Iowa county roads, 24 percent are structurally deficient and 5 percent are functionally obsolete.

A large number of the older bridges on the LVRs are built on timber piling with timber back walls. In many cases, as timber abutments and piers age, the piling and back wall planks deteriorate at a rate faster than the bridge superstructure. As a result, a large percentage of the structurally-deficient bridges on LVRs are classified as such because of the condition of the timber substructure elements.

OBJECTIVES
The objectives of this research were to complete the following:

- Review existing products for timber preservation and repair and to document their effectiveness in extending the service life of various bridge components
- Determine techniques used by county and other engineers to repair and restore the load-carrying capacity of piling damaged by deterioration and cracking
- Review methods used to repair failed piling
- Determine/develop effective methods for transferring bridge loads through the failed portion of the pile

• Determine that safe load capacity is restored by the repair methods (existing or new) determined to be structurally efficient

DISCUSSION

- Several counties have implemented various techniques to strengthen/repair damaged piling; yet, there is minimal data documenting the effectiveness of these techniques
- Preventative maintenance
  - Deterioration has not started, but the conditions or potential are present
- Remedial maintenance
  - Deterioration is present but the capacity or performance of the structure is not affected
- Major maintenance
  - Significant deterioration is present and immediate corrective measures to restore the structure to original condition are required

Recommendations

The researchers provide the following recommendations regarding the assessment, preservation, repair, and rehabilitation of timber substructure elements:

- Utilize multiple methods to more accurately assess the condition of timber substructure elements including any or all of those previously mentioned in this summary
- Make provisions for physically protecting timber structure elements from environmental conditions (e.g., precipitation), debris, and other damage-causing objects
- Adhere to the AWPA standards for the treatment and care of timber bridge elements
- Be cognizant of applying preservative treatments to cut or fastened portions of timber substructure elements to avoid point of entry for biological decay mechanisms
- When decay or damage is present, conduct maintenance activities at the earliest possible stage to avoid increased cost associated with maintenance postponement
- The addition of mild-steel reinforcement in the form of angles, channels, W shapes, or similar has the ability to provide increased load capacity to mildly- or moderately-decayed existing pile
- Field adjustability can be achieved with few minor and relatively inexpensive parts when completing the posting method of repair
- The current method of casting a single pile with corrugated steel pipe and concrete effectively restores the desired stiffness within the casted portion of the pile and this method has been used in numerous locations around the state

Motion to Approve by W. Weiss. 2nd by C. Schloz.
Motion carried with 10 Aye, 0 Nay, 0 Abstaining.

IMPLEMENTATION DISCUSSION

There was a discussion regarding the implementation readiness of the final report. The consensus was the final report information is immediately implementable, but the format of that information could be improved for use in the field. It was recommended that a field guide be developed for city and county engineers and their maintenance crews. The field guide include:

- A brief description of the repair, including the steps for constructing each.

- Formatting similar to the CP Tech Center cross stitch guide.
- A description of the anticipated longevity of each treatment.

A proposal will be requested from the InTrans Bridge Engineering Center and Iowa LTAP.

PROPOSAL HR-140, *Collection & Analysis of Streamflow Data*, Jon Nania, USGS ($260,340)

BACKGROUND

Research project HR-140 was established July 1, 1968, by consolidating three separate research projects then under contract between the U.S Geological Survey (USGS) and the Iowa State Highway Commission. For the USGS, Iowa Water Science Center, HR-140 funds three separate programs: (1) continuous-record streamgages in Iowa, (2) partial-record crest-stage gages in Iowa, and (3) flood profiles of Iowa streams. The oldest of these three programs began operation in 1950; the other two began in 1957 and 1959.

Need to continue collection of streamflow data for Iowa. The efficient and safe design of bridges and culverts depends to a considerable extent on accurate hydrologic information. The Office of Bridges and Structures obtains the necessary hydrologic information from several sources; however, much of this information is obtained from the USGS. The cooperative program HR-140 is subject to annual renewal and is supported with funds from both the USGS and the IDOT.

In the design of a bridge or culvert, the engineer must provide adequate capacity for flow under or through the structure, as well as providing for vehicular traffic across it. In addition, attention must be given to what affect the structure, including its approach embankments, will have on the existing natural and man-made drainage facilities in the area. To satisfactorily resolve these matters, the designer needs reliable information about the amount of water flowing in the stream and, most important, about the magnitude and frequency of floods.

Project HR-140 is subject to annual review and renewal. The activities included in the project may be discontinued or changed at that time. USGS personnel are equipped for and are experienced specialists in collecting, compiling, and publishing streamflow information. The USGS Federal-State Cooperative Program funds 40 percent of project HR-140.

OBJECTIVES

The objectives of this proposed research are to:

(1) Operate, maintain, and publish streamflow data for 21 continuous-record streamgages located throughout the State

(2) Operate, maintain, and publish high-flow data for 88 partial-record (crest-stage) streamgages 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 IDOT. Publish data for the August 2010 flood on the South Skunk River for 20 bridge sites and 128 river miles.

The total cost of the research is $433,900. The USGS requests $260,340 from the Iowa Highway Research Board to fund this research. The USGS estimates a 40/60 cost share for this study. This is an increase of $21,695 from Fiscal Year 2012 which is an increase of $10,695 over FY11.

The proposed study period is 12 months; October 1, 2012, through September 30, 2013.

Q: Funding/cost: Does it provide a real reduction in cost to have your gages automatic and replace some of the older style ones?
A: It helps us not incur more costs as there is cost for travel. It helps us keep our cost the same.

Q: Is there a one-time investment we can do to update sites (modernize) so we can save money on maintenance in the long run? Project cost creep happens with long-term projects but we have a fixed budget also.
A: We can look into it, and explore options. The newer devices do collect better data, reduce site visits. We are starting to install them as seasonal gages. Those are about $3,000.

USGS will come back at a later meeting to present options for keeping costs down to avoid project cost creep.

Motion to Approve by D. Schnoebelen. 2nd by W. Weiss.
Motion carried with 10 Aye, 0 Nay, 0 Abstaining.

REVIEW PROPOSALS FROM 2012 FIRST ROUND SOLICITATION:

RFP IHRB 12-05 *Development of a Subgrade Drainage Model for Unpaved Roads,* Thanos Papanicolaou, University of Iowa, ($73,653)

The objectives of this project are the following:
1. Determine if county roads are exhibiting moisture related distress or frost boil failure that can be attributed to poor subgrade drainage performance.
2. Determine whether there are design and/or maintenance alternatives that will improve subgrade drainage performance.
3. Develop a model for evaluating post-construction subdrain performance using soil borings and/or NRCS soil maps. The model should work under saturated and unsaturated conditions and for a wide range of key design hydraulic and geotechnical parameters. The model reliability should be tested by using NRCS maps for identifying the soil type in the problem areas and comparing the maps to the collected soil cores from the problem areas.

Motion to Approve by W. Weiss. 2nd by J. King.
Motion carried with 10 Aye, 0 Nay, 0 Abstaining.

*****One member left the table (9 voting members)******

RFP IHRB 12-01 *Iowa Pavement Asset Management Decision Framework,* Doug Gransberg, Iowa State University/InTrans, ($120,000)

The project has five objectives to accomplish the final goal of developing a pavement asset management framework for selecting a pavement treatment through evaluating benefits of various treatment options from "do nothing" to full replacement.
a. Develop a framework for selecting feasible treatment options when the conditions of a pavement section is given

b. Develop a methodology in assessing return on investment values of various treatment options available for Iowa pavements
c. Develop a spreadsheet based decision aid tool for selecting the most appropriate treatment option that can be used by Iowa DOT as input to current system and used in a stand-alone mode by local transportation agencies.
d. Conduct case studies using the tool developed in this project and validate the tool.
e. Train Iowa DOT and local agency engineers for rapid dissemination of the tool

Motion to Approve by B. Younie. 2nd by D. Schnoebelen.
Motion carried with 9 Aye, 0 Nay, 0 Abstaining.

RFP IHRB 12-02 *Durable Pavement Marking and Grooving,* Neal Hawkins, Iowa State University/InTrans, ($125,000)

The project objectives are to evaluate the pavement marking materials and installation procedures, including:
• Installation of a durable pavement marking test deck to evaluate these materials under Iowa roadway conditions. Use different combinations of marking materials, beads, and installation practices (surface applied and grooved).
• Monitor pavement marking performance in terms of durability (presence) and retroreflectivity over 24 months or 2 winters using high-speed video, under wet and dry conditions.
• Develop a performance versus cost guideline to assist state and local agencies in making more informed pavement marking selection decisions.
• Include test sections with short segments for each combination with a control section of surface applied markings in-between each. Dimensions of the groove should vary in depth, width and shape (90 degree vertical edges versus a groove which is more concave in shape).

Motion to Approve by B. Younie. 2nd by E. Steffensmeier.
Motion carried with 9 Aye, 0 Nay, 0 Abstaining.

RFP IHRB 12-03 *Assessment of Non-Destructive Testing Technologies for Quality Control/Quality Assurance of Asphalt Mixtures,* Jeramy Ashlock, Iowa State University/InTrans, ($82,707)

The primary objective of the proposed research is to assess the accuracy and suitability of a range of NDE technologies for QC/QA of asphalt pavement. As described above, off the- shelf technologies to be examined include Geogauge, low-radiation nuclear, and EM systems. Additionally, customized surface wave testing methods will be examined using ground-coupled and air-coupled sensors. Analyses of the surface wave tests will be performed using programs written by the ISU researchers. Therefore, while it would be difficult to modify the hardware or software of the off-the-shelf NDE technologies, the researchers can easily customize the SWM testing procedures and software for optimum performance on asphalt pavements. Upon completion of the primary project objectives, the ability of the individual NDE technologies to replace core samples for QC and/or QA of asphalt pavements will be determined. Assuming one or more of the NDE technologies are identified as suitable replacements for destructive coring, an implementation plan will be formulated to include recommendations for calibration procedures, methods for assessing measurement variability, and routine performance of the NDE tests by Iowa

DOT personnel. The secondary research objective is to perform a preliminary study on QC/QA and subsequent health monitoring of asphalt pavements using embedded MEMS sensors (described in the following section), and depending on the advice of the TAC; periodic NDE testing as well. Results of the preliminary study will be summarized, and recommendations will be made for further research or implementation of MEMS sensors for QA/QC and health monitoring on a larger scale.

Motion to Approve by T. Wipf. 2nd by E. Steffensmeier.
Motion carried with 9 Aye, 0 Nay, 0 Abstaining.

NEW BUSINESS

Every Day Counts (EDC)-Presented by FHWA

- 6 initiatives:
  - Reducing project deliver time
  - Reducing construction time
  - Innovative contracting
  - Safety
  - Mobility
  - Environment
- Local FHWA division would like the IHRB to serve as the EDC STIC (Statewide Transportation Innovation Council) for Iowa
  - **Established in each state**
  - **Membership to reflect the diversity of the highway industry in the state**
  - **Provides multi-stakeholder leadership that will facilitate the deployment of innovation in each state**

STICs will have an important deployment role

- ✓ Boost implementation success
- ✓ Provides a state partnership in innovation
- ✓ Offers opportunities for national collaboration

Motion to Approve by J. King. 2nd by B. Younie.
Motion carried with 9 Aye, 0 Nay, 0 Abstaining.

ADJOURN

Motion to Adjourn by B. Younie. 2nd by D. Schnoebelen.
Motion carried with 9 aye, 0 nay, 0 abstaining.

The next meeting of the Iowa Highway Research Board will be held Friday, October 26, 2012, in the East/West Materials Conference Room at the Iowa DOT. The meeting will begin promptly at 9 a.m.

Mark J. Dunn

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Mark J. Dunn, IHRB Secretary