IOWA HIGHWAY RESEARCH BOARD (IHRB)

Minutes of September 24, 2010

Regular Board Members Present

A. Abu-Hawash
J. Alleman
J. Berger
V. Dumdei
J. Joiner
R. Kieffer
R. Knoche
M. Nahra
J. Waddingham
R. Younie

Alternate Board Members Present

E. Steffensmeier

Members With No Representation

D. Ahart
K. Hornbuckle
J. Moellering
C. Schloz

Secretary - M. Dunn

Visitors

Ken Dunker	Iowa Department of Transportation
Edward Engle	Iowa Department of Transportation
Sandra Larson	Iowa Department of Transportation
Mary Starr	Iowa Department of Transportation
Chris Albrecht	Iowa State University
Keith Knapp	Iowa State University
Shashi Nambisan	Iowa State University
Jennifer Shane	Iowa State University
Kelly Strong	Iowa State University
Bart Bergquist	University of Northern Iowa

The meeting was held at the Iowa Department of Transportation Ames Complex, Materials East/West Conference Room, on Friday, September 24, 2010. The meeting was called to order at 9 a.m. by Chairperson Jay Waddingham with an initial number of 9 voting members/alternates at the table. Two members later joined the table bringing the total number of voting members to 11.

Agenda

No changes were made to the Agenda.

Motion to approve Minutes from the July 30, 2010, meeting by J. Berger. 2nd by J. Alleman. Motion carried with 9 aye, 0 nay, 0 abstaining.

Two Members Joined the Table

Iowa State University Introduces New LTAP Director

Iowa State University InTrans Director Shashi Nambisan introduced new Iowa Local Technical Assistance Program (LTAP) Director Keith Knapp, who spoke briefly to the Board about his background and primary goals for the program.

FINAL REPORT TR-564, "Adding Scour Estimation to the Iowa Bridge Backwater Software," LaDon Jones, Digital Control Inc. ($52,000)

BACKGROUND
In August of 2002 the Iowa Highway Research Board funded TR-476, "PCVAL: A Computer Program for Valley Stage-Discharge Curves and Bridge Backwater Calculations." The resulting software, titled: *Iowa Bridge Backwater*, released in November of 2003. The software computes design flowrates using USGS methodology, stage discharge curves for a valley cross-section, and the estimated increase in the upstream water surface elevation resulting from the reduction in flow area caused by the structural components of a bridge. This increase in water level, compared to conditions without the bridge, is called the bridge backwater.

In addition to adding scour estimation to the software, an updated user manual was created for this project. The appendix documents methods and equations used for calculations. The main body describes how to use the software and the appendices cover technical aspects.

OBJECTIVES
The *Iowa Bridge Backwater* software performs calculation tasks, including: Design Discharge Estimations, Stream Rating Curves, Floodway Encroachment, Bridge Backwater and Bridge Scour.

BENEFITS
Iowa regulations limit the amount of backwater that is acceptable, and backwater estimation is required as part of bridge permitting. The *Iowa Bridge Backwater* software is used by the Iowa DOT, the Iowa DNR, and Iowa County Engineers. The *Iowa Bridge Backwater* software has been a valuable tool of estimating the impacts of bridges on river hydraulics.

Q: During the 2010 flood, the Ames, Iowa, 6th Street Bridge was impacted (it became a choke point where water backed up and diverted around Hilton Coliseum). Could a model like this be used for each of the bridges in town to confirm this? Are there profiles of area bridge substructures available to do that?
A: This is a simplified method, meaning that if you wanted to do a complicated model, you'd run one of the HEC-RAS models, which is much more inconclusive of multiple bridges along a stream. This looks at just a single location for initial design by county engineers.

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

PROPOSAL Continuation of HR-140H, "Collection and Analysis of Streamflow Data," David Eash and Jon Nania, U.S. Geological Survey ($249,650)

BACKGROUND
The proper and efficient design of highway bridges and culverts depends, to a considerable extent, on accurate hydrologic information. In recent years, additional importance has been given to accurate hydrologic data 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. This cooperative program is subject to annual renewal and supported with funds from the Geological Survey (45%) and the Department of Transportation (55%).

OBJECTIVES
Prepare data concerning specific locations of interest to the Iowa DOT through a continuing, cooperative program between the Iowa DOT and the USGS.

BENEFITS
The Office of Bridges & Structures obtains necessary hydrologic information from several sources; however, roughly 80% of this information is obtained from the Water Resources Division of the United States Geological Survey (USGS), which through HR-140 provides reliable information regarding amounts of water flowing in streams and more importantly, information on the magnitude and frequency of floods.

Q: Could real-time stream gages (to be installed on the Winnebago River and other locations through the DNR) in combination with this information, help predict flooding? Are there partnerships in place to create a bigger picture if other people are doing similar work?
A: It's always good to see more rivers being monitored. However, our focus is on discharges from streams. I'm not sure if others are getting discharge data from stream gages; it may be stage-only data—which is helpful in its own way. However, we share discharge data with the weather service for predicting floods. I'm not sure how it would tie in directly with that. We'd be happy to talk with them.

C: The Flood Center has sensors collecting bridge readings which result in bridge ratings. The University of Iowa has its own web site where readings are downloaded, with the end goal of providing both flow rate and stage information, but it's probably only accessed by the local community at this point.

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

FINAL REPORT TR-548, "Investigation of the Impact of Rural Development on Secondary Road Systems," Chris Albrecht, Iowa State University ($80,000)

BACKGROUND
Many Iowa counties are experiencing an increase in rural development. Two specific types of development focused on for this research were rural residential developments and livestock production in Iowa. This research combines economic, spatial, and legal analysis methods to address impacts of rural development on the Secondary road system and provides guidance in addressing the challenges associated with this development.

OBJECTIVES
Examine service, budgetary, and policy impacts created by rural growth for county Secondary road departments and include consideration of economic and policy impacts and customer expectations for county road service.

BENEFITS
This research assists county Secondary road staff in assessing service and fiscal impacts of proposed rural developments. In addition, it assists decision makers in better understanding implications of development for Secondary road systems. Ultimately, the project may lead to new policies and mechanisms for service and fiscal impacts of rural development.

Q: When running calculations on whether there are benefits to the road system, did you take into consideration that some counties don't collect taxes on properties for a certain number of years after they're built?
C: I don't think this project took tax free periods into account; that was something we debated.

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

REVIEW PROPOSALS FROM 2010 FIRST ROUND SOLICITATION

RFP IHRB 10-01 ***Improving Accuracy of the Deflection and Camber Predictions for Prestressed Concrete Bridge Girders,*** Matt Rouse, Iowa State University ($250,000)

OBJECTIVES
Quantify the camber of prestressed bridge girders through measurements made, and pertinent existing data evaluated, during the fabrication and erection of the girders and the bridge, making it possible to develop more accurate predictions of girder camber at erection and/or increase the camber of the girders if this is desired.

BENEFITS
Better understanding of camber behavior and improved predictive tools will facilitate smooth construction, avoid difficult field problems for which there may be no good solution, ensure better service performance, and ultimately reduce life-cycle costs for Iowa's prestressed bridge inventory.

C: We received some small modifications for this proposal late last night; however, the budget remains the same. There is a revised copy here for each of you. Ahmad Abu-Hawash discussed some minor changes to the proposal following distribution of the updated document to IHRB:

> Nothing major has been changed. Thirty beams will have extensive monitoring and testing. However, the main thing we wanted to include was that all beams produced during the monitoring period, not just 30 beams, receive monitoring. It's not going to require too much additional effort for the research team, because data will be recorded by the plant inspectors or the precaster. Other changes include some language pertaining to sweep, camber and the haunch issue. Overall the proposal met our objectives.

Motion to Approve by A. Abu-Hawash. 2nd by M. Nahra.
Motion carried with 11 aye, 0 nay, 0 abstaining.

RFP IHRB 10-02 ***Optimization of Snow Drifting Mitigation and Control Methods for Iowa Conditions,*** George Constantinescu, The University of Iowa, ($152,290)

OBJECTIVES
Optimize the design of passive snow-control measures for Iowa roadways so that impacts from drifting snow on roadways is minimized or eliminated. The focus will be on providing optimized solutions for limited-area right of ways and topographies with a snow drifting history, resulting in cost-effective solutions to the problem.

BENEFITS
This research will use advanced tools to fill gaps in our understanding of the effect of local topography and limited area right of way constraints on the design of snow fences and, consequently, enhance our capabilities to develop better approaches to mitigate snow drifting. Benefits include reduction in snow and ice removal costs, vehicle crashes, road closures, and pavement maintenance costs. Another benefit of optimized snow fences can be reduced traffic delays.

Motion to Approve by R. Younie. 2nd by A. Abu-Hawash.
Motion carried with 11 aye, 0 nay, 0 abstaining.

RFP IHRB 10-03 ***Risk Mitigation Strategies for Operations and Maintenance Activities,*** Kelly Strong, Iowa State University ($79,826)

OBJECTIVES
Reduction in frequency and intensity in loss events (property damage, personal injury and fatality) during operations and maintenance activities.

BENEFITS
Primary benefits will be reduced risk of injuries, fatalities, and property damage for operations and maintenance employees and the traveling public. The research results can be implemented by Iowa DOT staff, county engineers, municipal transportation directors, and any other transportation professionals responsible for operations and maintenance activities, including field personnel. Results will be used to develop a standard process for identifying highest risk operations and maintenance activities and developing mitigation strategies to reduce those risks.

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

RFP IHRB 10-04 ***Alkali Content of Fly Ash - Measuring and Testing Strategies for Evaluating Compliance,*** Scott Schlorholtz, Iowa State University ($149,791)

OBJECTIVES
1. Determine if and at what content level fly ash with soda dosing has increased potential for alkali silica reactivity (ASR) as well as any other potential performance impacts in the concrete both during mixing and placing as well as long-term (good or bad).
2. Evaluate field concrete containing high-alkali fly ash and moderately reactive fine aggregate to see if ASR-related distress has occurred.
3. Determine a better method for determining available alkali in fly ashes with soda dosing.
4. Perform a literature review and/or a survey to determine if there are other materials and methods for emission control that may impact the mid-west power plants and their fly ash chemistry.

BENEFITS
The primary benefits of this research will consist of an improved procedure for rapidly determining or calculating the available alkali content of fly ash. This will help Iowa DOT engineers to avoid using high-alkali fly ash in projects that could be susceptible to ASR. The improved procedure should be less expensive to conduct; and hence, could be performed on a higher frequency to provide quality assurance (QA) information on fly ash.

Motion to Approve by J. Berger. 2nd by J. Joiner.
Motion carried with 11 aye, 0 nay, 0 abstaining.

ADJOURN
Motion to Adjourn by J. Joiner. 2nd by J. Alleman.
Motion carried with 11 aye, 0 nay, 0 abstaining.

The next meeting of the Iowa Highway Research Board will be held on Friday, October 29, 2010, in the East/West Materials Conference Room at the Iowa DOT.

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Mark J. Dunn, IHRB Secretary