Long-Term Bridge Performance Committee Letter Report: January 27, 2014

DETAILS

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Long-Term Bridge Performance Committee

TRB TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

January 27, 2014

Mr. Victor M. Mendez
Administrator
Federal Highway Administration
U.S. Department of Transportation
1200 New Jersey Avenue, SE
HOA-1, Room E87-314
Washington, DC 20590-9898

Dear Mr. Mendez:

Re: 4th letter report of the TRB Long-Term Bridge Performance (LTBP) Committee

I am writing to report the findings and recommendations of the Transportation Research Board (TRB) LTBP Committee that were developed at its meeting on December 3, 2013. The committee's membership roster is attached.[1]

As you know, this Federal Highway Administration (FHWA) long-term program addresses the challenges faced by federal, state, and local transportation agencies in the operation and maintenance of their deteriorating highway bridges. The program will collect research-quality data on a large representative sample of in-service U.S. highway bridges and analyze these data to improve understanding of the mechanisms and timing of bridge deterioration due to the effects of age, materials, traffic, and weather. The data collection and analysis will also help evaluate the effectiveness of intervention options in ameliorating this deterioration.

Through a contractual arrangement with FHWA, the National Research Council of the National Academies provides advice and assistance on the conduct of the LTBP program through the work of its TRB LTBP Committee.

The agenda[2] of this meeting consisted of briefings by FHWA staff and contractors, each followed by a question-and-answer period and discussion. The topics included the status of the LTBP program; reports by the committee's expert task groups on durability and preservation, evaluation and monitoring, and traffic and truck weights summarizing their recent meetings; and updates on the status of identification and inclusion of bridges in the program's monitoring clusters and corridors. Additional topics included the mid-Atlantic states field testing plan, automated data collection, the LTBP Strategic Bridge

[1] See Attachment 1.
[2] See Attachment 2.

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Performance Matrix, recent contracting actions, publications, and the traffic and truck weight pooled-fund study.

At the conclusion of these open sessions, the committee held a closed session to deliberate on its findings and formulate its consensus recommendations, which are summarized here:[3]

[LR04/01]

We recognize the hard work of the LTBP team members and congratulate them for their many accomplishments to date, especially in view of the limited funding and staffing they have experienced. The following are worthy of special mention:

<> The face-to-face meetings with state bridge engineers to plan and coordinate their participation in the LTBP program,

<> The close relationship established with the LTBP state coordinators,

<> The newsletters and Tech Briefs published to keep LTBP's stakeholders informed, and

<> The innovative use of the Robotics Assisted Bridge Inspection Tool (RABIT™) to assess the structural condition of the Arlington Memorial Bridge.

These efforts bring credit to FHWA and visibility to the LTBP program. They encourage the states to participate in the monitoring of their bridges and to use program products as they are developed.

We suggest that the LTBP team seek opportunities to brief the states' transportation executives at American Association of State Highway and Transportation Officials meetings about the plans and progress of the program. The briefings should focus on the program's forthcoming benefits: reduced maintenance costs, extended life, more effective evaluation procedures, and—eventually—more durable bridges.

[LR04/02]

We understand that, in 2010, FHWA's State Transportation Innovation Council (STIC) concept was introduced to state transportation departments as a process by which new ideas could be evaluated and implemented quickly.

Pennsylvania's STIC, for example, was established with members from a cross section of various stakeholders, state agencies, local governments, research organizations, and industry partners. To assist the STIC in selecting initiatives to be promoted and implemented, technical advisory groups (TAGs) were also created to review, evaluate, and provide suggestions on potential benefits and uses of the proposed initiatives. The TAGs are also responsible for tracking the chosen initiatives' progress and developing deployment plans.

[3] The committee's advice is presented as a set of finding/recommendation pairs. A committee finding is a conclusion based on the meeting's reading material, presentations, and discussions. A committee recommendation is a suggested action by the LTBP team as a consequence of this finding. Each finding–recommendation pair is given a unique designator to facilitate future referencing. This designator is [letter report number/recommendation number]. The usual format of a finding–recommendation pair is a paragraph summarizing the committee's finding and a paragraph containing the committee's recommendation. The latter paragraph appears in italicized and underlined type.

We suggest that the LTBP team consider using the STIC concept to encourage state transportation departments to support LTBP by soliciting, evaluating, selecting, and funding efforts to develop and implement LTBP products.

[LR04/03]

We understand that the Moving Ahead for Progress in the 21st Century legislation authorized $115 million in FY 2013 for FHWA's Highway Research and Development Program (HRDP), that $36 million of this amount was allocated by FHWA to infrastructure, and that LTBP has received approximately $7.5 million from this account. We further understand that LTBP's funding for FY 2014 will be determined when an additional $115 million is divided among HRDP's program areas (infrastructure, safety, planning and environment, operations, policy, and exploratory advanced research), and then when infrastructure's portion is subdivided among its programs. Simply put, LTBP's funding depends on discretionary decisions made annually at two levels within FHWA and is subject to change from year to year.

A long-term program requires a long-term commitment to provide adequate funding and staff to achieve its stated goals. LTBP is such a program and is at a critical juncture. The initial planning stages, the definition of the testing protocols, and the selection of monitoring clusters are essentially complete. Extensive fieldwork is commencing, and the data collection and data analysis activities that follow need to be planned, funded, and implemented on a multiyear basis.

We recommend that funding and critical staffing positions in support of the LTPB program be given high priority to ensure its long term success. We also recommend that the LTBP team develop and follow a "business plan", based on their funding and staffing level, consisting mainly of a prioritized list of the critical activities that need to be conducted, with schedules, milestones, budgets, and outputs identified for each activity. LTBP's annual request for resources should be based on this prioritized list, progress measured against the schedules and milestones, and expenditures monitored against the budgets. This plan should be updated as time progresses and needs change, but at any time the work underway should correspond to the current plan. The plan should also address contingencies by identifying the activities that would be added or subtracted, expanded or contracted, if resources were increased or decreased.

[LR04/04]

LTBP is conducting a number of special studies or activities, such as the performance of unpainted weathering steel bridges, the NBI converter, protocols for prestressed concrete girders, and chloride contaminated PT grout. Each of these subjects is important and worthy of study. The results will contribute significantly to overall health and performance of bridges. Now that these efforts are nearing completion, it is important for the LTBP Team to shift its focus and return to its main effort concentrated on the performance of untreated bridge decks.

We recommend that LTBP reduce its ancillary activities, concentrate its work on the high-priority topics reported by the states as needing the most attention (untreated decks, treated decks, joints, bearings, steel bridge coatings, and prestressed concrete members --- wires, strands, tendons), and focus its data collection efforts on the specific data needed for these studies.

We also recommend that LTBP coordinate its work with the work of others, such as the FHWA Bridge and Structures Design and Construction R&D activity, the FHWA Innovative Bridge Research and Deployment program, the University of Illinois at Chicago Bridge Research Center, among others, to leverage their data and information.

[LR04/05]

The LTBP Bridge Portal for advanced visualization of bridge performance data will be a valuable product, and we support its development, implementation, and operation at the earliest possible date. The portal will allow users to access and query data concerning deterioration processes and search for bridge structures on the basis of cross-domain criteria such as bridge type or age, weather, traffic, geographic area, and condition ratings from the past 20 years. Visualization tools will provide a map-based user interface and graphical representations of query results. Built-in statistical applications will allow users to compare a specific bridge with structures of a similar type, age, or location. We recognize that the portal is to be moved from external web hosting to an FHWA internal server, and thus it must satisfy many requirements that extend beyond the specific needs of LTBP. We also recognize that the satisfaction of these requirements is a time-consuming process that could cause delays in meeting LTBP's objectives.

We recommend that all of the requirements necessary for moving the LTBP Bridge Portal onto an internal FHWA server be addressed and met as soon as possible.

[LR04/06]

One of LTBP's stated objectives is to develop data-driven decision-making tools. One of these tools is a bridge performance index, a single number indicating the structural health of the bridge. Performance indicators often rely too heavily on expert opinions or are based on unproven assumptions, the data on which they rely are usually incomplete and lack documentation, and many causes of poor performance are hidden and escape detection. We doubt that one performance index can be developed that will pertain to all types of bridges, all types of loadings, and all types of deterioration. While we remain open to a convincing argument that an all-encompassing single index can be developed, we suspect that several distinct performance indices will be needed to cover all situations.

We recommend that LTBP retain as an objective, for the time being, the development of a single bridge performance index that applies to all bridges in all circumstances

but also recommend that, as a backup, it add the objective to develop other indices that apply to more limited situations.

[LR04/07]

In an earlier letter report, we recommended that LTBP consider including locally-owned bridges in each of the data collection clusters and corridors. We were pleased to learn in FHWA's response that this will be considered to the extent possible, with each cluster and corridor adequately representing the nation's bridges, regardless of ownership, with respect to configuration, materials, loads, environment, and maintenance strategy.

We repeat our recommendation that locally owned bridges remain an integral part of the program to emphasize LTBP's relevance. These bridges are a substantial fraction of the nation's bridge inventory, and warrant inclusion because they are typically older and built according to standards less rigorous than those governing National Highway System bridges.

In closing, as before, we recognize that the preparations for this meeting required extensive effort by many people. We appreciate everyone's efforts and particularly thank Hamid Ghasemi, Susan Lane, Thomas Saad, Robert Zobel, and their colleagues for a highly informative and productive meeting.

Sincerely,

Ananth K. Prasad
TRB LTBP Committee

Attachment 1: Roster, TRB Long-Term Bridge Performance Committee
Attachment 2: Agenda, Meeting of the TRB Long-Term Bridge Performance Committee, December 3, 2013

Attachment 1

Roster
TRB Long-Term Bridge Performance Committee

Ananth K. Prasad, Chair Secretary Florida Department of Transportation	Jugesh Kapur Senior Associate Bridge Engineer Burns and McDonnell *Chair, TRB Expert Task Group for LTBP Bridge Traffic and Truck Weights*
Malcolm T. Kerley, Vice Chair President NXL Construction Services, Inc.	John M. Kulicki[4] Chairman and CEO Modjeski and Masters, Inc.
Sreenivas Alampalli Director, Structures Evaluation Service Bureau New York State Department of Transportation *Chair, TRB Expert Task Group for LTBP Bridge Evaluation and Monitoring*	Richard D. Land Chief Deputy Director California Department of Transportation
R. Scott Christie Deputy Secretary for Highway Administration Pennsylvania Department of Transportation	Sandra Q. Larson Systems Operations Bureau Director Iowa Department of Transportation
Karl H. Frank Chief Engineer Hirschfeld Industries	Andrzej S. Nowak Chair, Department of Civil Engineering Auburn University
Bruce V. Johnson State Bridge Engineer Oregon Department of Transportation *Chair, TRB Expert Task Group for LTBP Bridge Durability and Preservation*	Kenneth D. Price Vice President, National Bridge Practice HNTB Corporation

[4] Absent.

Attachment 2

Agenda
Meeting of the TRB Long-Term Bridge Performance Committee
December 3, 2013

Room 206, The National Academies' Keck Building
500 Fifth Street NW, Washington, DC 20001

This committee provides an ongoing peer review of the Long-Term Bridge Performance (LTBP) program, which is a 20-year research effort to measure and monitor the performance of a nationally representative sample of bridges. The committee reviews the LTBP program's plans, operations, progress, and products and provides advice to FHWA on the program's strategic plan; data definition, standardization, quality control, and collection efforts; sampling plan; and overall R&D program management and direction.

7:30–8:00 a.m.	Continental Breakfast	
8:00–8:15 a.m.	Welcome and Introductions	Robert Raab Ananth Prasad FHWA
8:15–8:30 a.m.	Review of BCOM's Role, Scope, and Operations Letter Report No. 3	Ananth Prasad Robert Raab
8:30–9:15 a.m.	Reports from Three Expert Task Groups • Evaluation and Monitoring • Durability and Preservation • Traffic and Truck Weights	 Sreenivas Alampalli Bruce Johnson Jugesh Kapur
9:15–10:00 a.m.	LTBP Program Update FHWA Response to Letter Report No. 3	FHWA
10:00–10:15 a.m.	Break	
10:15–11:00 a.m.	Clusters and Corridors Update, Mid-Atlantic States Rollout, Memorial Bridge, and Automated Data Collection	Rob Zobel Sue Lane
11:00 a.m.–noon	LTBP Strategic Bridge Performance Matrix	Rob Zobel Dennis Mertz
Noon–1:00 p.m.	Lunch	
1:00–1:30 p.m.	Closed Session: Biases and Conflicts of Interest	Robert Raab
1:30–3:00 p.m.	LTBP Program Updates • IDIQ Contract, Meetings with States, Timelines of Bridge Practices, and Publications • Truck Pooled-Fund Study	 Sue Lane Tom Saad
3:00–3:15 p.m.	Next Steps, Scheduling of Next Meeting	Ananth Prasad
3:15–3:30 p.m.	Break	
3:30–5:00 p.m.	Closed Session: Committee's Consensus Recommendations	Ananth Prasad Robert Raab
5:00 p.m.	Adjournment	

("BCOM" is the 4-character label of the TRB Long-Term Bridge Performance Committee used for convenience in internal communications.)
("IDIQ" is an acronym for what the U.S. General Services Administration terms an Indefinite Delivery, Indefinite Quantity contract. See http://www.gsa.gov/portal/content/103926.)