



Long-Term Bridge Performance Committee Letter Report: August 3, 2012

DETAILS

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AUTHORS

Long-Term Bridge Performance Committee

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TRANSPORTATION RESEARCH BOARD

OF THE NATIONAL ACADEMIES

August 3, 2012

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: 2nd 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 May 30–31, 2012. The committee's membership roster is attached.

The LTBP program is a long-term program of the Federal Highway Administration (FHWA) to address the challenges faced by federal, state, and local transportation agencies in the operation and maintenance of their deteriorating highway bridges. The objective of the program is to collect research-quality data on a large representative sample of in-service U.S. highway bridges and to 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 in evaluating the effectiveness of intervention options in ameliorating this deterioration.

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

The agenda¹ 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; findings and recommendations of the durability and preservation, evaluation and monitoring, and traffic and truck weights expert task groups (ETGs); the reference and cluster² bridge methodology; selection of the first clusters; addressing the needs of the bridge community; status of the bridge portal; outreach—plans for industry day; and documents for committee and ETG review.

¹ See Attachment 1.

² We understand that the term "cluster" means, in the context of the LTBP program, a geographically compact group of bridges that will be studied as part of a representative sample of U.S. highway bridges.

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:

- [LR02/01]³ We congratulate FHWA's LTBP Team (the team) for the establishment of a single point of contact for, and coordinator of, the many groups and individuals who serve as contractors supporting the program.
- [LR02/02] We thank the team for providing us with copies of LTBP's draft protocols and documents and with a recently created strategic plan to continue our learning about the program. Our productivity is bound to increase as our knowledge of the goals, activities, accomplishments, and plans of the program broadens and deepens.

We suggest that information about the LTBP program, especially the testing protocols, be disseminated to stakeholders more quickly. Measures to expedite the administration's document review and approval processes should be explored, developed, and implemented if feasible to speed the release of documents.

We recommend that LTBP's strategic plan be rewritten to increase its clarity and specificity. The objectives of the program (for example, "to develop performance-based criteria for maintenance and rehabilitation strategy selection") should be defined, and its products (such as software facilitating the use of such a data-driven decision-making tool) should be identified.

The various judgments by bridge owners that would be facilitated or improved by new data-driven decision-making tools should be identified, as well as the data needed to support the development of these tools. Furthermore, mechanisms for delivery of these tools to the owners should be explored.

- [LR02/03] LTBP's clustering methodology is based in part on the climate zone designations of the U.S. Department of Energy (DOE) (marine, hot-dry, mixed-dry, hot-humid, mixed-humid, cold, very cold), but the appropriateness of these zones to bridge performance is not explained. We agree that climate zones are pertinent to the design of bridge clusters in this investigation. Climate is among the many factors affecting bridge performance (deterioration) that the LTBP program will address, such as traffic volumes and loads, freeze-thaw cycles, deicing chemicals, rain, and high wind, as well as bridge design, construction, materials, age, and maintenance. We doubt, however, that adequate explanations can be provided for zones that relate to energy consumption and not to bridge performance.

We recommend that LTBP adopt climate zone designations that are more pertinent to a study of bridge performance and how structures composed of steel and concrete deteriorate because of direct and indirect environmental factors. For example, given that multiple freeze-thaw cycles and salt (either agency-applied in wintry conditions or naturally occurring in coastal areas) are known to cause bridge deterioration, climate zones based on the presence or absence of these causes would be more pertinent to this research than DOE

³ Each finding–recommendation pair is shown as a “bullet” that is given a unique designator of [letter report number/recommendation number] to facilitate future referencing. The usual format of a bullet consists of a paragraph summarizing the committee's finding and a paragraph containing the committee's recommendation. The latter paragraph appears in italicized and underlined type.

zones.

- [LR02/04] Data collection is the first step in any long-term performance research program. In its pilot phase, LTBP has made significant progress in gaining hands-on experience in the collection of bridge data. However, the plan for achieving defined objectives and delivering identified products that are supported by this data collection is not yet evident.

We recommend the development of a data collection plan that supports the achievement of defined objectives and the delivery of identified products. To accomplish this, the major factors affecting bridge performance should be listed, and the physical manifestations of these factors and their measurement should be addressed. The measuring equipment and its installation, calibration, and maintenance should be discussed. Finally, the measurement protocols and the timing and frequency of data collection should be determined.

Related to data collection is data integrity. What is it for LTBP, and how will it be achieved?

- [LR02/05] We concur with the team that only a small number of the 600,000 U.S. highway bridges can be instrumented and studied in a research program of LTBP's size and resources. We congratulate the team for its strategy of studying carefully selected clusters of representative bridges. However, we are concerned that the decision to exclude bridges that are locally owned from the sample will leave out approximately half of the bridges in the United States. At its core, LTBP is an investigation into the causes and mechanisms of bridge deterioration. For LTBP to fulfill expectations that it is a comprehensive study of U.S. highway bridges to explain this deterioration, and to deliver products that can be used to improve performance and extend bridge life, the new knowledge and products must be applicable to all bridge types and loadings.

We recommend the inclusion of locally owned bridges in the study and, even if the number of such bridges to be included is small, the development of products that are applicable to issues faced by their owners.

- [LR02/06] The team is congratulated for recognizing that outreach to the state agencies and other program stakeholders should begin early in the life of the program and continue throughout its term—and for undertaking a number of outreach efforts.

We suggest that LTBP seek to use Engineering News Record, Public Roads, and other public media to disseminate timely information about the status of the program. In addition, coordination of LTBP outreach with the outreach efforts of other research programs [such as the Strategic Highway Research Program 2 (SHRP 2)] should be explored as a means by which each of these efforts could help the others. We would like to receive a briefing at our next meeting on LTBP's efforts in outreach coordination.

Outreach, if successfully implemented, will engender feedback, and this is to be encouraged. The future users of LTBP's products should have a voice in formulating the product development plan. The team should welcome this input because it can help ensure that the program delivers products that bridge owners need and want. Related to this is review of LTBP's data collection protocols by state agencies. The state agencies will be the users of the protocols, so they should have a say in the protocols' development and refinement.

- [LR02/07] A research program as important and extensive as LTBP needs to monitor its progress continually, to sense and react to incipient problems, and to know whether it is progressing toward its predefined goals at an acceptable pace. An examination of the ways in which other large research programs (such as SHRP 2) conduct self-assessments of their progress is likely to suggest methods that are appropriate for LTBP.

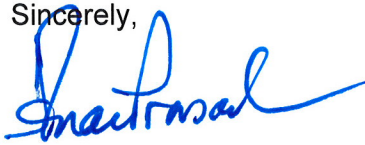
We suggest that LTBP define what is "success" for the program and how it can be measured. We would like to know how the team plans to determine whether it is progressing at an acceptable pace toward meeting the program's objectives. In simple terms, what is the report card?

- [LR02/08] Access to LTBP data is a complicated matter. Some believe that data collected in a publicly funded project should be available to everyone. Others believe that these data, in the hands of people intent on causing harm, pose a threat to national security. Still others believe that people who are not professionally trained in analyzing and interpreting the data might draw incorrect conclusions and cause distractions for state agencies required to react to such misinterpretations.

We suggest that LTBP distinguish between measurement data and derived data and develop policies that address the matter of access to each of these data types. The former consist of the numerical values that are collected in the laboratory and in the field. The latter consist of the numerical values and indices that are calculated through use of formulas or algorithms to process the measured values. We suggest further that every effort be made to provide the widest possible access to LTBP's measurement data, but we caution that any state-by-state comparisons of derived data should only be released after the states involved have concurred.

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 Firas Ibrahim, Hamid Ghasemi, Susan Lane, Robert Zobel, and their colleagues for a highly informative and productive meeting.

Sincerely,



Ananth K. Prasad
Chair
TRB LTBP Committee

Attachment 1: Meeting agenda
Attachment 2: Roster of committee members indicating attendance at the meeting of
May 30–31, 2012

Attachment 1

Agenda

TRB Long-Term Bridge Performance Committee
 May 30–31, 2012
 The National Academies' Keck Building
 500 Fifth Street, NW, Washington, D.C., 20001

This committee provides an ongoing peer review of the 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.

Wednesday, May 30, Keck 201

7:30–8:00 a.m.	Continental Breakfast	
8:00–8:30 a.m.	Welcome - Introductions - Meeting Objectives - Administrative Matters	Prasad Raab Trentacoste
8:30–9:30 a.m.	Expert Task Group Reports - Bridge Durability and Preservation - Bridge Traffic and Truck Loads - Bridge Evaluation and Monitoring (on May 31)	Raab Johnson Kapur
9:30–10:00 a.m.	Letter Report No. 1	Raab Prasad FHWA
10:00–10:15 a.m.	Break	
10:15 a.m.–noon	LTBP—Closing the Loop	FHWA
Noon–1:00 p.m.	Lunch	
1:00–3:00 p.m.	Reference and Cluster Bridge Methodology	FHWA
3:00–3:15 p.m.	Break	
3:15–5:00 p.m.	Selection of Initial Clusters	FHWA
5:00 p.m.	Adjourn for the Day	

Thursday, May 31, Keck 201

7:30–8:00 a.m.	Continental Breakfast	
8:00–8:15 a.m.	Expert Task Group Reports (continued) - Bridge Evaluation and Monitoring	Alampalli
8:15–9:45 a.m.	LTBP—Addressing the Needs of the Bridge Community; Bridge Portal	FHWA
9:45–10:00 a.m.	Break	
10:00–10:45 a.m.	LTBP Outreach—Plans for Industry Day and Publications	FHWA
10:45 a.m. –noon	Specific Requests for Feedback	FHWA
Noon–1:00 p.m.	Lunch	
1:00–2:00 p.m.	Closed Session—Committee Consensus	
2:00 p.m.	End of Meeting	

Attachment 2

**ROSTER OF THE TRB LONG-TERM BRIDGE PERFORMANCE COMMITTEE
INDICATING ATTENDANCE¹ AT THE MEETING OF MAY 30–31, 2012**

ANANTH K. PRASAD, Chair

Secretary
Florida Department of Transportation

Malcolm T. Kerley, Vice Chair
Chief Engineer
Virginia Department of Transportation

John E. Breen
Nasser I. Al-Rashid Chair Emeritus
University of Texas

R. SCOTT CHRISTIE

Deputy Secretary for Highway
Administration
Pennsylvania Department of
Transportation

W. Gene Corley
Senior Vice President
CTL Group

KARL H. FRANK

Chief Engineer
Hirschfeld Industries

BRUCE V. JOHNSON

State Bridge Engineer
Oregon Department of Transportation

JUGESH KAPUR

State Bridge and Structures Engineer
Washington State Department of
Transportation

JOHN M. KULICKI

Chairman and CEO
Modjeski and Masters, Inc.

RICHARD D. LAND

Chief Deputy Director (Interim)
California Department of Transportation

SANDRA Q. LARSON

Research and Technology Bureau Director
Iowa Department of Transportation

ANDRZEJ S. NOWAK

Professor
University of Nebraska

Kenneth D. Price
Vice President, National Bridge Practice
HNTB Corporation

¹ Attendees of the meeting are indicated in underlined bold capital italics.