



YEAR IN REVIEW 2005

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U.S. Department of Transportation
Federal Highway Administration

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LTPP

2005 Year in Review

INTRODUCTION

Improving the productivity and mobility of the national highway transportation system are key goals of the Federal Highway Administration (FHWA). During 2005, FHWA's Long-Term Pavement Performance (LTPP) program continued to work toward these goals through its efforts to provide answers to "how" and "why" pavements perform as they do. To better understand pavement performance, the LTPP program gathers and processes data describing the structure, service conditions, and performance of more than 2,400 pavement test sections in North America. Highway engineers can use these data and findings from the analyses conducted to date to help them make decisions leading to more cost-effective and better performing pavements.

The LTPP program was designed as a partnership when it was initiated as a 20-year Strategic Highway Research Program (SHRP) project in 1987. The State and Canadian Provincial highway agencies, the American Association of State Highway and Transportation Officials (AASHTO), the Transportation Research Board (TRB), the Canadian Strategic Highway Research Program (C-SHRP), and FHWA all continued to play key roles in helping the program achieve its goals in 2005. Our partners stay informed about research results and other program activities through our Web site, our e-mail newsletter, publications, meetings, and workshops in cooperation with State highway agencies (SHAs), industry trade associations, and professional societies.

In 2005, LTPP worked hard to develop a new operational plan for the future under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). A summary of the plan follows below. In addition, LTPP continued to focus on improving the quality and quantity of data in the LTPP database, and on addressing gaps in the materials and traffic data through the Materials Data Action Plan and the Specific Pavement Study (SPS) Traffic Data Collection Pooled Fund Study.

THE OPERATIONAL PLAN FOR THE FUTURE UNDER SAFETEA-LU

The funding requirement estimated by TRB for LTPP from 2004 through 2009 was \$120 million, or approximately \$20 million per year. From October 1, 2003 through August 10, 2005, the LTPP program operated under a series of extensions to the Transportation Equity Act for the 21st Century (TEA-21) legislation and continuing resolutions, which provided funding to the LTPP program at a rate of \$9.4 million per year. On August 10, 2005, SAFETEA-LU was signed into law with funding for the LTPP program set at \$10.12 million per year. The LTPP program is not expected to receive the \$10.12 million amount specified in the legislation because the funding under Title V - Surface Transportation Research Development and Deployment is overdesignated, and an across-the-board reduction will be applied to correct the overdesignated of funds. Consequently, the LTPP program is likely to receive approximately \$7.1 million per year. The appropriation bill for fiscal year (FY) 2006 authorizing money for programs under SAFETEA-LU has been passed. However, the impact of this bill on the LTPP program is not yet known; it is possible that the program may experience even further cuts in funding.

With this budget, it will not be possible to perform many of the TRB recommendations. Although the future of LTPP is not clear at this time, the most responsible course of action for use of program funds is to prepare for both a transition of LTPP activities past 2009 and for a possible program termination in 2009. Similar to the way management of the LTPP program was transitioned from SHRP to FHWA in 1992, September 2009 is being treated as another significant transitional milestone in the program.

Program Deliverable

The primary priority program deliverable for LTPP in September 2009 will be a quality pavement performance database and supporting ancillary information and document warehouse that enables researchers to better fulfill the goals of understanding pavement performance on which the LTPP program was founded. The database to be provided by September 2009 will have the following specific attributes:

- It will contain complete data sets—i.e., inventory, materials, traffic, climate, maintenance and rehabilitation, and pavement performance data—for most LTPP test sections.
- The content of the database will have been reviewed and checked through quality control/quality assurance (QC/QA) processes and data studies, and the database will be as error-free as time and the program budget will allow.
- The content of the database will be documented; the manner in which data were collected as well as the quality of the data also will be documented.
- It will be accessible to the public.
- It will conform to Federal Government information dissemination quality guidelines.

How Funds Will Be Used

LTPP program funds provided by the SAFETEA-LU legislation will be used for the following priority activities:

Completing data sets

- Continue implementation of the Traffic Data Action Plan at SPS project sites to collect missing traffic volume, classification and load data.
- Continue implementation of the Materials Data Action Plan at SPS project sites to acquire missing materials property data.
- Perform one more set of profile and manual distress measurements on active LTPP test sections.

Maintaining and improving the database and ancillary information

- Continue the database QC/QA activities and data feedback report resolutions.
- Complete the database and the program documentation.
- Improve direct user access to the database and ancillary information.
- Provide annual data releases.

Developing a post-2009 plan and report to secure the legacy of the LTPP program

- Storage, maintenance, and user support of the LTPP database and associated information.
- Storage and user support of the LTPP Materials Reference Library.
- Continue collection of missing data and monitoring of LTPP test sections that have not reached the end of their performance life.
- Continue implementation of the LTPP Strategic Data Analysis Plan.
- Continue implementation of the LTPP Product Development Plan.

Coordinating activities

- Continue program coordination with TRB, State/Provincial highway agencies, AASHTO, and other FHWA offices.
- Continue internal program coordination.

THE LTPP MATERIALS DATA ACTION PLAN

One area where LTPP database gaps exist is in the SPS materials data. The SPS projects materials testing was originally done by State and Provincial highway agencies. These agencies did an excellent job testing the samples from the SPS projects. The LTPP program still needs the agencies' support because, for a variety of reasons, some of the test results never made it into the database. To address this problem, a materials action plan was developed by FHWA.

Rather than asking SHAs to obtain and test additional samples, FHWA decided to award a single contract to perform all of the material tests. The LTPP regional contractors, with assistance from State and Provincial highway agencies, are developing testing plans and acquiring core samples of asphalt and concrete pavements and bulk samples of the subbase and subgrade materials from the SPS-1, -2, -5, -6, and -8 projects to be shipped to the materials testing contractor. On September 7, 2005, the materials testing contract was awarded to Braun Intertec, and work began on October 1, 2005.

SPS TRAFFIC DATA COLLECTION POOLED FUND STUDY

The LTPP program embarked on the second phase of its SPS Traffic Data Collection pooled fund study. The study is designed to improve the quality and increase the quantity of monitored traffic data from the LTPP program's SPS-1, -2, -5, -6, and -8 projects. The goal is to obtain research quality traffic data, which is defined as at least 210 days of data in a year collected with equipment of known calibration. Data collection is scheduled to last for at least 5 years. To date, nearly half of the 37 States with SPS sites and a few non-SPS States have contributed approximately \$3.4 million to the study.

The SPS experiments were designed to learn how factors such as cumulative traffic loading affect pavements of different compositions, environmental conditions, and layer thicknesses. Answering these questions will help States design and build longer lasting, high-volume pavements.

Phase I of the pooled fund study involved assessing, evaluating, and calibrating the current weigh-in-motion (WIM) systems used to collect traffic data at the SPS sites across the country. Under Phase II, new WIM equipment will be installed and maintained as necessary at test sites to ensure high-quality data collection. The WIM sensors collect information on factors such as vehicle and axle weights, vehicle classification, and speed. The quality of the WIM data highly depends on the pavement in which the system is installed: smoother pavements reduce the amount of truck suspension and pavement dynamics, allowing the WIM system to better estimate static wheel loads.

The first WIM installation took place on Interstate 57 near Champaign, IL, during July 2005. The Phase II contractor, International Road Dynamics (IRD) Inc., installed a bending plate WIM system. Prior to the installation, the site location was profiled, and the data collected were analyzed using the LTPP WIM smoothness index profile software. This software, developed by the LTPP program, was then used to determine the optimal location for installing the WIM system. The profile data let transportation agencies know whether a pavement is smooth enough to install a WIM system that will meet the LTPP program's accuracy requirements. The Illinois Department of Transportation (IDOT) built a 152-meter(m) (500-foot (ft)) section of new portland cement concrete pavement and did some grinding to the concrete pad in order to meet the requirements. After calibration and a self-evaluation of the WIM system was completed by the Phase II contractor, followup validation was performed by the study's Phase I contractor, MACTEC Engineering and Consulting, Inc. Data collection at the site began in September 2005.

A second WIM installation took place on US-15 near Frederick, MD, in October 2005. The Phase II contractor installed a bending plate WIM system. Similar to the slab built by IDOT, the Maryland State Highway Administration also built a concrete slab for the WIM system. The pad is 122 m (400 ft) of nonreinforced plain portland cement concrete pavement, and grinding was done to this section of pavement to meet the LTPP requirements. Data collection for this site will begin early 2006 after calibration and validation takes place.

Also in 2005, Michigan, Texas, and Washington installed their own WIM systems. These agencies installed the recommended WIM technology suggested by FHWA using their own in-house staff. The Texas and Michigan sites passed the field validations. The Washington site will be evaluated in 2006. The LTPP program expects to perform the majority of the WIM installations in 2006.

OTHER 2005 ACCOMPLISHMENTS

Falling Weight Deflectometer Calibration Center Improvement Pooled Fund Study

FHWA initiated a pooled fund study in 2001 to address the needs of the SHRP/LTPP Falling Weight Deflectometer Calibration Centers. The study is designed to address aging equipment and software, as well as long-term support for the calibration centers. A contract was awarded to Cornell University in September 2004. Since then, two meetings of the Technical Advisory Committee (TAC) have been held to discuss progress made so far, as well as to determine future TAC goals. Updates to the equipment, software, and procedures are currently under test. The updated calibration procedure is due to be delivered and installed at the four existing SHRP/LTPP calibration centers in September 2006. Additional

work under the study, including technical support and the establishment of additional facilities, will require additional participation by other States. To date, 15 States are participating in the study, and they have committed \$615,000.

LTPP Standard Data Release #20

LTPP made available the latest edition of the world's largest pavement performance database in Standard Data Release #20. The Standard Data Release is available as a five CD-ROM set or on a single DVD-ROM containing the most current pavement performance data in zipped Microsoft Access® 2000 database files. Along with the complete LTPP pavement performance database, the release contains a user reference guide, tutorial, and other information about the database, including what is new since the previous release. Also included is an application called the Table Navigator, which contains definitions for database fields and codes and allows users to expand, collapse, and search the LTPP database structure. A manual for the Table Navigator is also included. In addition, a CD with documentation for the LTPP Program is included with the Standard Data Release.

The Standard Data Release will be updated with new data every year. For more information, or to obtain a copy, contact LTPP Customer Support Services at ltppinfo@fhwa.dot.gov or call 202-493-3035.

The LTPP Web Site Got a New Address!

www.fhwa.dot.gov/pavement/ltpp/index.cfm

FHWA upgraded the LTPP Web pages as part of a larger pavements topics-based Web site. The topic-based Web site has been established as the central source of FHWA's technical information on pavements and can be accessed at www.fhwa.dot.gov/pavement. The new pages were designed to make it easier to navigate through the focus areas of the entire FHWA Pavement Program and provide better access to the FHWA Knowledge System, including publications, software, and information on upcoming events, workshops, and training. Although the basic content of the LTPP site has not changed, the design has been improved and the layout is now consistent with other pavement topic sections. The LTPP Web site continues to also be accessible through the Turner-Fairbank Highway Research Center site, www.tfhrc.gov.

Introduction of the LTPP Newsletter

To meet the need for more frequent and direct contact with our partners, the LTPP Team introduced the LTPP e-mail newsletter as a way to communicate regularly on the progress and activities of the LTPP program. The first issue, March/April 2005, was sent to our e-mail distribution list of more than 600 recipients, including LTPP State Coordinators, members of AASHTO, TRB LTPP Committee and Expert Task Group members, FHWA division offices and resource centers, and other interested individuals from industry and academia. The newsletter provides brief updates on the progress of important program activities, including data collection, data releases, new products and publications, pooled fund studies, and data analysis. Current and previous issues are also available on the Web at www.fhwa.dot.gov/pavement/ltpp/news.cfm.

LTPP and the Mechanistic-Empirical Pavement Design Guide

LTPP data played an important role again this year in enhancing the *Mechanistic-Empirical Pavement Design Guide* (M-E PDG). LTPP data were not only used to validate and calibrate the design procedure, they were also used as input for models/equations to characterize materials and to determine the effects of various environmental conditions.

2006 International Contest on LTPP Data Analysis

FHWA and the American Society of Civil Engineers (ASCE) cosponsored the International Contest on LTPP Data Analysis. Now in its sixth year, the contest is designed to encourage university students, professors, and highway department engineers from around the world to use the LTPP database. The contest deadline for submitting entries is June 30, 2006. Prizes include cash awards and certificates. For more information, visit the Web site at www.fhwa.dot.gov/pavement/ltpp/contest2006.cfm.

THE FUTURE UNDER SAFETEA-LU

The schedule associated with the planned LTPP activities under SAFETEA-LU legislation is as follows:

- Pavement performance monitoring activities will be completed by September 30, 2008.
- A post-LTPP Program plan will be prepared by the end of FY 2007. This plan will secure the legacy of LTPP and will contain recommendations for pavement performance monitoring beyond FY 2008 and for implementation of the data analysis and product development plans after FY 2009. The plan will also contain a recommended schedule and associated budget for completing the recommended activities.
- SPS materials and traffic data collection activities will continue through, and in some cases beyond, 2009. The inclusion of those data collected in FY 2009 or later into the database will be addressed as part of the post-2009 plan.
- Update of the virtual weather data in the database will be completed during calendar year 2008.
- The final upload of regional data to the national database under SAFETEA-LU will take place during the first quarter of FY 2009. The remaining three quarters of FY 2009 will be dedicated to the final review and QC/QA of the data contained in the database prior to its last release on September 30, 2009.
- The 2009 state-of-the-program report and the LTPP research history report will be completed by the end of FY 2009.
- LTPP Program funding under SAFETEA-LU continues through September 30, 2009.

LTPP 2005 PUBLICATIONS

- *Quantification of Smoothness Index Differences Related to Long-Term Pavement Performance Equipment Type* (FHWA-HRT-05-054)
- *Structural Factors of Jointed Plain Concrete Pavements: SPS-2—Initial Evaluation and Analysis* (FHWA-HRT-01-167)
- *Estimating Cumulative Traffic Loads, Volume II: Traffic Data Assessment and Axle Load Projection for the Sites with Acceptable Axle Weight Data, Final Report for Phase 2* (FHWA-RD-03-094)
- *Study of LTPP Pavement Temperatures* (FHWA-RD-02-071)
- *Improving Pavements with Long-Term Pavement Performance: Products for Today and Tomorrow* (FHWA-RD-03-049)
- *The Distress Identification Guide from the Long-Term Pavement Performance Program: Asphalt Concrete Pavements* (FHWA-RC-05-001)
- *The Distress Identification Guide from the Long-Term Pavement Performance Program: Jointed PC Concrete Pavements* (FHWA-RC-05-002)
- *The Distress Identification Guide from the Long-Term Pavement Performance Program: Continuously Reinforced Concrete Pavements* (FHWA-RC-05-003)
- *LTPP Information Management System Pavement Performance Database User Reference Guide* (September 2005 update to FHWA-RD-03-088)
- *LTPP Newsletter*, published in 2005: *March/April, May/June, July/August, September/October, November/December*

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