

LONG-TERM PAVEMENT PERFORMANCE PROGRAM



YEAR IN REVIEW 2006

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U.S. Department of Transportation
Federal Highway Administration

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LTPP

2006 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 2006, FHWA's Long-Term Pavement Performance (LTPP) program worked 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 2,513 pavement test sections in North America. Highway engineers use these data and data analysis findings to help make decisions that lead 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, the Transportation Research Board (TRB), the Canadian Strategic Highway Research Program, and FHWA all continued to play key roles in helping the program achieve its goals in 2006. These partners stay informed about research results and other program activities through the LTPP Web site, e-mail newsletter, publications, meetings and workshops, industry trade associations, and professional societies.

In 2006, the funding provided to the LTPP program by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was not adequate for meeting all of the program's needs. As a result, LTPP implemented a new operational plan to focus available resources on the most critical and time-sensitive issues. The primary priority program deliverable for LTPP in September 2009 will be a quality pavement performance database and supporting ancillary information along with a document warehouse that will enable researchers to better understand pavement performance. In collaboration with the TRB LTPP Committee, the LTPP program developed a framework for writing a post-2009 report, which will detail what needs to be done to secure the legacy of the LTPP program.

2006 ACCOMPLISHMENTS

LTPP Operational Plan

The first order of business in 2006 was the implementation of the LTPP Operational Plan. The purpose of the plan was to make adjustments to pavement performance monitoring to optimize the use of program resources based on the funding provided by SAFETEA-LU. The adjustments focused LTPP monitoring resources on the following major pavement families, which comprise the majority of test sections in the LTPP program General Pavement Study (GPS) and Specific Pavement Study (SPS) experiments:

- New hot-mix asphalt (HMA) pavements: test sections in the GPS-1, GPS-2, SPS-1, SPS-8 (flexible), and SPS-9 (new construction) experiments.
- New jointed plain concrete pavements: test sections in the GPS-3, SPS-2, and SPS-8 (rigid) experiments.
- HMA overlays on HMA pavements: test sections in the GPS-6, SPS-5, and SPS-9 (overlay) experiments.

- HMA overlays on portland cement concrete pavements: test sections in the GPS-7 and SPS-6 experiments.

The LTPP program developed specific requirements that test sections had to meet for continued monitoring. Test sections that did not meet the criteria were placed “out-of-study,” which means that the sections are no longer monitored. These test sections include those that are part of experiments GPS-6A, GPS-7A, GPS-9, SPS-3, SPS-4, and SPS-7.

The changes to LTPP operations were immediate and far reaching. For example, the LTPP program reclassified approximately 350 sections as out-of-study; therefore, 21 percent fewer test sections are in-study now compared to this time last year. Approximately 49 percent of the test sections in the LTPP program are currently out-of-study.

The LTPP Operational Plan also impacted the program’s data analysis and product development activities. Data analysis activities that are currently funded will be completed by the end of 2009. However, no further investment of LTPP program funds will be dedicated to formal data analysis projects through 2009. The LTPP program will integrate the 34 analysis project statements that currently comprise the LTPP Analysis Strategic Plan into the FHWA pavement program, the University Transportation Centers program, and the Pavement Roadmaps research initiatives. The LTPP program will rely on other funding mechanisms within FHWA to develop products of benefit to the highway community.

SPS Traffic Data Collection Pooled Fund Study

In 2001, FHWA established a pooled fund study to evaluate and install weigh in motion (WIM) systems at LTPP SPS projects. In 2006, researchers with the traffic pooled fund study installed seven new WIM systems. In addition, researchers identified eight more sites for new WIM systems and have planned installations at these sites beginning in spring 2007. Thirteen sites were field validated and passed LTPP performance requirements for collecting research quality traffic data. Out of a total of 64 possible SPS-1, -2, -5, and -6 test sites, 38 of these sites are participating in this study.

Each of the newly installed WIM sites is using the LTPP classification scheme for SPS WIM sites. Members of the TRB Expert Task Group (ETG) on LTPP Traffic Data Collection and Analysis (known as the Traffic ETG) developed and field tested this scheme. The Traffic ETG officially adopted the use of this scheme in March 2006. For consistency at all pooled fund sites, the LTPP program office asked some of the States that installed their own WIM systems to consider using this classification scheme. LTPP recognizes that this scheme is a work in progress and should be used as a starting point for enhancements to further improve the process for properly classifying vehicles. The LTPP program will include data collected in 2006 from several of these participating SPS test sites in the January 2007 release of the LTPP database.

Materials Action Plan

In 2006, FHWA developed a materials action plan (MAP) to fill the gaps in the SPS materials database. The MAP involves the following items: (1) development of material sampling plans by LTPP regional contractors to fill project gaps, (2) acquisition of material samples by State departments of transportation and LTPP regional contractors, and (3) testing of material

samples by the LTPP material testing contractor. FHWA also is storing material samples at the Materials Reference Library in Reno, NV, for future testing. FHWA has sampled approximately 66 percent of the scheduled SPS projects. The LTPP Materials Tracking System contains more than 10,000 samples. To date, the LTPP program has ordered tests to be performed on 8,000 of these samples, and more than 2,000 tests already have been completed.

New Regional Support Contracts

The LTPP program awarded four new regional support contracts on June 30, 2006. The contracts have a 12-month base period with four 12-month option years. The objective of these contracts is to provide technical services in support of the development and conduct of the LTPP studies established by SHRP.

Each regional support contractor is responsible for collecting, processing, and providing data quality at the test sections within the geographical boundaries of their LTPP region. The contracts also include a task order for collecting data for FHWA's Highways for LIFE program.

LTPP Standard Data Release #20 and New Community of Practice Web Site

LTPP made available the latest edition of the pavement performance database in Standard Data Release (SDR) #20. The SDR is available as a five CD-ROM set or on a single DVD-ROM and contains the most current pavement performance data in zipped Microsoft® Access™ 2000 database files. Along with the complete LTPP pavement performance database, the SDR contains a Database User Reference Guide, tutorial, and other information about the database, including what is new since the previous release. The SDR also includes an application and manual for Table Navigator, which features definitions for database fields and codes and enables users to expand, collapse, and search the LTPP database structure. In addition, a Reference Library CD with documentation for the LTPP program is provided with the SDR. For more information or to obtain a copy of the SDR, contact LTPP Customer Support Services at ltppinfo@fhwa.dot.gov or call 202-493-3035.

In 2006, the LTPP program provided additional guidance for using the SDR by adding a Community of Practice Web site at the FHWA Highway Community Exchange. The LTPP program undertook these efforts because SDR users can find it daunting to navigate and extract the most relevant information from the database, which has hundreds of tables, thousands of fields, and millions of records. This Web site also provides SDR users with a forum to post questions and share experiences.

LTPP Customer Support Service Center Relocates

Effective January 1, 2006, the LTPP Customer Support Service Center (CSSC) was relocated to FHWA's Turner-Fairbank Highway Research Center (TFHRC) in McLean, VA. The LTPP CSSC was established in Oak Ridge, TN, in December 1997, to provide a single point of contact for LTPP data and information requests. The LTPP program office decided to move the service center to TFHRC as part of the LTPP Operational Plan. The CSSC provides technical assistance and guides users to needed information. In 2006, LTPP received more

than 500 requests for data, software tools, resource documents, research reports, and other information.

LTPP CSSC Contact Information:
Federal Highway Administration
LTPP Customer Support Service Center
6300 Georgetown Pike, HRDI-13
McLean, VA 22101-2296
202-493-3035
ltpinfo@fhwa.dot.gov

Falling Weight Deflectometer (FWD) Calibration Center Improvement Pooled Fund Study

FHWA initiated a pooled fund study in 2001 to address the needs of the SHRP/LTPP FWD calibration centers (TPF-5 (039), FWD Calibration Center and Operational Improvements). FHWA designed the study to address aging equipment and software issues, as well as long-term support for the calibration centers. FHWA awarded a contract to Cornell University in September 2004.

Cornell researchers finalized the new calibration hardware, software, procedures, and protocols. The researchers also provided installation and training services to the SHRP/LTPP regional calibration centers in Colorado, Minnesota, Pennsylvania, and Texas. For more information on the study or to learn how to participate in future work, visit www.pooledfund.org and search for TPF-5(039) or contact Eric Weaver at 202-493-3153 or eric.weaver@fhwa.dot.gov.

Falling Weight Deflectometers: Transferring the Technology

With the restructuring of LTPP operations under SAFETEA-LU, the LTPP program discontinued most FWD testing. Therefore, less demand for the equipment prompted the LTPP program to transfer excess units to other groups. In 2006, the LTPP program transferred four of its FWD vehicles to FHWA's Western Federal Lands Highway Division, Central Federal Lands Highway Division, TFHRC in McLean, VA, and the National Center for Asphalt Technology at Auburn University in Alabama.

LTPP PRODUCTS

DataPave Online-ERD File Builder

In 2006, the LTPP program secured funding for the future development of the DataPave.com Web site. In addition, the LTPP program enhanced the site with an application called ERD File Builder. The application enables users to “read” (convert binary file formats to text) longitudinal road profile measurements for all LTPP sections for data analysis. Developed by the Engineering Research Division (ERD) at the University of Michigan Transportation Research Institute, the ERD format facilitates automated plotting of simulation data, experimentally measured data, and data from various analysis programs.

The LTPP DataPave Online Web site registered a total of 504 new users in 2006. A total of 6,782 data exports were performed during this period. The volume of data exported was 3.26 gigabytes. The most requested data was from the “Monitoring” module of the pavement performance database and the most exported file format was “Compressed Microsoft® Access.”

Distress Identification Guides (Pocket Edition)

In 2005, the LTPP products team developed a set of three weatherproof and tearproof pocket versions of the very popular *Distress Identification Manual*. Each pocket guide focuses on a different type of pavement: asphalt concrete, jointed portland cement concrete, and continuously reinforced concrete pavements. In 2005, the number of copies requested exceeded the amount printed originally; thus, they were reprinted in 2006. This was possible with help and funding from several Federal and State partners.

LTPP/American Society of Civil Engineers (ASCE) International Data Analysis Contest

In 2006, the LTPP products team sponsored the sixth annual ASCE/LTPP International Contest on LTPP Data Analysis. The contest encourages university students, professors, and highway department engineers from around the world to get involved in using the LTPP database.

Distress Viewer and Analyzer (DiVa)

The LTPP products team moved forward with the development of this LTPP application. Originally developed to help the LTPP regional contractors examine trends in the distress data collected by the program, DiVa is now a stand-alone program that can be run with the SDR under the Microsoft® Windows® XP operating system. The application is now under beta testing and will be available in the first quarter of 2007.

GETTING THE WORD OUT

LTPP announces research results through its Web site, meetings, publications, research reports, and interactions with State highway agencies, industry trade associations, and professional societies. In 2006, LTPP continued to spread the word about the program and its results through many venues. A list of LTPP’s 2006 publications follows on the next page. An annotated bibliography of these and other reports from previous years is available in the Library section of the LTPP Web site www.fhwa.dot.gov/pavement/ltpplibrary.cfm.

LTTP 2006 PUBLICATIONS

- Effects of Multiple Freeze Cycles and Deep Frost Penetration on Pavement Performance and Cost: Final Report (FHWA-HRT-06-121)
- Falling Weight Deflectometer Data Collection Manual (FHWA-HRT-06-132)
- Falling Weight Deflectometer Maintenance Manual (FHWA-HRT-05-153)
- Guidelines for Review and Evaluation of LTTP Backcalculation Results (FHWA-RD-05-152)
- Guidelines for the Collection of Long-Term Pavement Performance Data (FHWA-HRT-06-067)
- Highway Concrete Technology Volume I – Field Evaluation of SHRP C-202 Test Sites (Alkali-Silica Reaction (ASR)) (FHWA-RD-02-082)
- Highway Concrete Technology Volume II – Field Evaluation of SHRP C-203 Test Sites (Freeze-Thaw Resistance) (FHWA-RD-02-083)
- Highway Concrete Technology Volume III – Field Evaluation of SHRP C-205 Test Sites (High-Performance Concrete) (FHWA-RD-02-084)
- Highway Concrete Technology Volume IV – Field Evaluation of SHRP C-206 Test Sites (Early Opening of Full-Depth Pavement Repairs) (FHWA-RD-02-085)
- Highway Concrete Technology Volume V – Field Evaluation of SHRP C-206 Test Sites (Bridge Deck Overlays) (FHWA-RD-02-086)
- Improving Pavements With Long-Term Pavement Performance: Papers From the 2003-2004 International Data Analysis Contest (FHWA-HRT-06-109)
- Long-Term Pavement Performance Inventory Data Collection Guide (FHWA-HRT-06-066)
- Long-Term Pavement Performance Maintenance & Rehabilitation Data Collection Guide (FHWA-HRT-06-068)
- LTTP Information Management System Pavement Performance Database User Reference Guide (October 2006 update to FHWA-RD-03-088)
- LTTP Materials Characterization Program: Verification of Dynamic Test Systems with an Emphasis on Resilient Modulus (FHWA-RD-02-034)
- LTTP Newsletters, published in 2006: *March/April, May/June, Fall*
- LTTP Product List 2006 (FHWA-HRT-06-119)
- LTTP 2005 Year In Review (FHWA-HRT-06-086)
- Materials Reference Library Product Brief (FHWA-HRT-06-116)
- Optimization of Traffic Data Collection for Specific Pavement Design Applications (FHWA-RD-05-079)
- Optimization of Traffic Data Collection for Specific Pavement Design Applications TechBrief (FHWA-HRT-06-111)
- Quantification of Smoothness Index Differences Related to LTTP Equipment Type TechBrief (FHWA-HRT-06-064)
- Rehabilitation of Asphalt Concrete Pavements - Initial Evaluation of the SPS-5 Experiment: Final Report (FHWA-RD-01-168)
- Rehabilitation of Jointed Portland Cement Concrete Pavements - SPS-6 Initial Evaluation and Analysis (FHWA-RD-01-169)
- Review of the Long-Term Pavement Performance Backcalculation Results - Final Report (FHWA-HRT-05-150)
- Seasonal Variations in the Moduli of Unbound Pavement Layers (FHWA-RD-04-079)
- Study of LTTP Pavement Deflections (FHWA-RD-03-093)
- Verification of Virtual Weather Stations Phase I Report: Accuracy and Reliability of Virtual Weather Stations (FHWA-RD-03-092)

THE FUTURE UNDER SAFETEA-LU

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

- Pavement performance monitoring activities will be completed by December 31, 2008.
- LTPP is developing a post-2009 program plan and anticipates that it will be ready for distribution in early 2007. The plan will discuss what is required to preserve the LTPP investment after 2009. Toward that end, the document will (1) address the current status of the program, (2) identify the work still to be done after 2009, (3) recommend a framework for completing those post-2009 activities, and (4) identify what will be lost if the post-2009 work is not completed.
- SPS materials and traffic data collection activities will continue through and in some cases beyond 2009. The inclusion of those data collected in fiscal year 2009 or later into the database will be part of the post-2009 plan.
- LTPP will complete the update of the virtual weather data in the database during 2008.
- The final upload of regional data to the national database under SAFETEA-LU will take place during the first quarter of 2009. LTPP will dedicate the remaining three quarters of 2009 to the final review and quality control/quality assurance checks of the data contained in the database prior to its last release in the fall of 2009.
- LTPP Program funding under SAFETEA-LU continues through September 30, 2009.

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