LTPP Newsletter

Developing New MEPDG Default Traffic Datasets Using Research Quality Traffic Data

The Long-Term Pavement Performance (LTPP) program has evaluated the applicability and identified the limitations of the existing Mechanical-Empirical Pavement Design Guide (MEPDG) global traffic loading defaults. The research quality weigh-in-motion (WIM) data from the LTPP Specific Pavement Study (SPS) Traffic Data Collection Pooled-Fund Study was used to develop improved global default axle loading values.

The MEPDG requires detailed axle loading information in the form of normalized axle load spectra (NALS), number of axles per truck class and axle group types, and axle spacing inputs. These data are obtained from WIM sites. Due to the high cost and time required to collect segment-specific truck loading data, the majority of MEPDG designs and analyses are expected to rely on default axle loading values. To improve the defaults currently used in the MEPDG, the research quality WIM data from LTPP's traffic pooled-fund study was used to develop improved MEPDG traffic loading defaults.

In addition to developing improved traffic loading defaults, a stand-alone guide and database software application called LTPP Pavement Loading User Guide (LTPP-PLUG) were developed to provide guidance in development of axle loading defaults and in selection of the defaults for MEPDG use for sites that lack site-specific WIM data or have data of limited quality. This application can work with LTPP and user-provided WIM data summaries and produces axle load distribution input files for use with the National Cooperative Highway Research Program (NCHRP) 1-37A and DARWin-ME^{TM} software products. The report documenting this data analysis study is being finalized and will:
- Provide an assessment of the original MEPDG axle loading defaults.
- Describe the data selection criteria.
- Include a data reliability assessment.
- Present findings from the traffic data review of the pooled-fund study data.
- Describe a methodology to generate new traffic loading defaults.
- Provide a description of the new traffic loading defaults and recommendations for their applicability.

The results of this study will be of interest to LTPP users and highway agencies involved in implementation of the MEPDG procedures. Axle loading default distributions developed in this study represent the variety of axle loading conditions observed at the LTPP SPS Traffic Data Collection Pooled-Fund Study sites, thus providing alternative default loading conditions for MEPDG use.

For more information contact Deborah Walker at deborah.walker@dot.gov or (202) 493-3068.

Refining the LTPP Classification Scheme

One of the by products of the LTPP SPS Traffic Data Collection Pooled-Fund Study was developing a standard class scheme to be used at the pooled-fund study sites. Although this scheme was deployed throughout the country, it was not field tested and validated. The objectives of the class scheme study were to:
- Evaluate and refine the LTPP vehicle classification scheme in order to provide an accurate and consistent vehicle classification process that is applicable in all States.
- Determine the sensitivity of the MEPDG to errors caused when one vehicle classification scheme (such as the LTPP Scheme) is used to develop the load spectra used in a pavement analysis, but a different scheme (e.g., a State-specific scheme) is used to collect the truck volume counts used for that pavement design.
- Use this new knowledge to assist in the development of new default load spectra for MEPDG.
- Develop guidance on how to most effectively apply these new defaults.

The original LTPP vehicle classification scheme for use in WIM systems was shown to work as accurately as any State scheme, with the exception of when classifying a limited number of very large trucks (6+ axle Class 7 trucks, 7+ axle Class 10 trucks, and 10+ axle Class 13 trucks). Minor extensions to the original

LTPP Scheme fixed these minor limitations. Using the load spectra collected as part of the LTPP traffic pooled-fund study, the project then determined the sensitivity of the MEPDG to the use of inaccurate vehicle classification algorithms. Based on these sensitivities, guidance was provided to develop new default load spectra for use in the MEPDG. The project then developed guidance for pavement analysts to quickly and easily select from those default load spectra when using the MEPDG. This guidance was adopted in the LTPP-PLUG software for selecting among default load spectra.

The LTPP Scheme is ready for use and can be adopted by any State agency. However, because it uses axle weight data in the classification process, the scheme can only be applied at WIM scales. It cannot be used in conventional automatic vehicle classification equipment. The default axle load spectra based on data collected by LTPP using this classification scheme are now available for use in the MEPDG. These defaults are most effectively selected using the PLUG software. The PLUG also provides step-by-step guidance for use by States in developing their own State-specific default load spectra. State-specific load spectra can then be uploaded into the PLUG software for development of the MEPDG traffic loading inputs.

For more information contact Deborah Walker at deborah.walker@dot.gov or (202) 493-3068.

Summary of SDR 27.0 Updates

The latest LTPP Standard Data Release (SDR) 27.0 is scheduled to be released at the 2013 Transportation Research Board (TRB) Annual Meeting. SDR 27.0 will contain the following key changes:

1. *Thumb drive version only:* In order to be more environmentally conscientious, LTPP has decided to only distribute a thumb drive version, starting with SDR 27.0 (previously, DVD and thumb drive versions were distributed). The DVD version consumed a significant amount of resources including DVDs, ink cartridges to develop the graphics, paper, plastic cases, and energy to duplicate. A limited number of DVD sets will be available by special request from the LTPP Customer Support Service Center at ltppinfo@dot.gov or (202) 493-3035.

2. *Reinterpreted Ohio dynamic load response (DLR) data:* The DLR data is considered a unique data set for researchers who are interested in modeling vehicle-pavement interaction dynamics. LTPP SPS-1 (asphalt concrete (AC)) and SPS-2 (Portland cement concrete (PCC)) sections in Ohio were instrumented with strain gauges to measure pavement surface deflections, linear variable

differential transformers (LVDT) to measure in situ pavement deflections, and pressure cells to measure truck loads. With raw sensor traces of better quality available, LTPP engaged in a major effort to update the DLR data to better capture pavement deflection trace peaks and valleys and truck loads, correct the sensor locations that were previously mislocated, and revise wheelpath offset data. Thus, a DLR data set of improved data quality will be published with SDR 27.0.

3. *Addition of a new load transfer efficiency (LTE) computed parameter:* LTE is computed from falling weight deflectometer (FWD) measurements at joints and cracks on PCC pavements. LTE is an important parameter considered by highway engineers in pavement design and performance monitoring, especially in improving structural models of rigid pavements. LTE is a complex parameter because its computation depends on several factors such as load plate position, drop load, doweled or undoweled joint, conditions of the soil foundation underneath a joint/crack, etc. The new LTE computed parameter will provide for more efficient data analysis and improves the usability of FWD data in SDR 27.0.

4. *Beta Release of consolidated data tables:* Based on customers' feedback, LTPP has completed a project to consolidate some of the data tables with an aim to simplify access to and retrieval of data from the SDR and make the database easier to use. The table consolidation effort is not only intended to simply combine identical tables but also modify presentation of the data to users.

To get your copy of SDR 27.0, visit the LTPP booth (2120) during TRB Week or contact the LTPP Customer Support Service Center at ltppinfo@dot.gov or (202) 493-3035.

ASCE Data Analysis Contest Update

The LTPP program, in cooperation with the American Society of Civil Engineers (ASCE), has periodically held an International Data Analysis contest. The purpose of this contest was to provide an incentive for innovative use of LTPP data to solve common pavement engineering problems. In 2012, the contest has received a welcome overhaul, including development of a revised participant guide.

One of the most important changes is the incorporation of a general topic and a challenge topic. In previous years, paper topics were left to discretion of the researchers. Beginning this year, a set of topics (general and challenge) will be provided for consideration to all contestants. New general and challenge topics will be added each year for consideration by the contestants.

Since the topics have been added, ASCE and LTPP also made changes to the structure of the categories and awards. Winners of the contest will present their findings to the transportation community at large. In addition to this, the FHWA will publish the winning papers. We believe that these changes will enhance the contest and make it a much stronger and worthwhile event. We encourage participation from State highway agencies, academia (domestic and foreign), individuals, or groups. The contest is complete for 2012, but be on the lookout for the announcement for the 2013 Data Analysis Contest!

For more information about the contest, contact Deborah Walker at deborah.walker@dot.gov or (202) 493-3068.

In Brief

InfoPave—LTPP Develops Next Generation Web Interface Portal

In April 2012, the FHWA awarded a contract to develop the next generation LTPP Web Interface Portal (WIP). The primary objective of this contract is to develop and maintain an effective Web interface program for the LTPP Information Management System (IMS). This program, named LTPP InfoPave, will provide access to the LTPP IMS on demand and provide tools to maximize user understanding and utilization of the information. When fully developed, InfoPave will be the focal Web site of the LTPP program, providing the public easy and effective access to LTPP data and information for many years to come.

The performance period of this contract is 60 months, consisting of a base period of 24 months and option periods of up to 36 months. LTPP InfoPave Version 1.0 is being developed during the base period. Currently, work is underway to develop a framework for LTPP InfoPave Version 1.0. Two public Webinars were conducted to solicit user input with regard to software functionality and features. LTPP InfoPave 1.0 is expected to be released to the public in January 2014 at the TRB Annual Meeting.

For more information, contact Yan ("Jane") Jiang at jane.jiang@dot.gov or (202) 493-3149.

LTPP Meetings at the TRB 92nd Annual Meeting

LTPP State Coordinators, the FHWA LTPP team, other FHWA officials, members of the TRB LTPP Committee and its expert task groups, TRB staff, and other pavement technology professionals will meet for an annual review of progress in the technical activities of the LTPP program. So, if you are in Washington, D.C. for the 2013 TRB Annual Meeting, please make plans to attend the LTPP State Coordinators' Meeting on Sunday, January 13 and the LTPP Technical Session on Monday, January 14.

More information about each meeting can be found at the TRB website http://www.trb.org where you can also easily add the meetings to your TRB schedule.

**Long-Term Pavement Performance
State Coordinators' Meeting
Session 148**
Sunday, January 13, 2013, 9:30 a.m.- noon
Marriott Wardman Park Hotel, Virginia C
Washington, D.C.
William H. Temple, Executive Director, Concrete and Aggregates Association of Louisiana, presiding
Sponsored by Long-Term Pavement Performance (LTPP) Committee (E1002)

Welcome from Federal Highway Administration
Jorge E. Pagan-Ortiz, Federal Highway Administration Director of Infrastructure Research and Development

TRB Long-Term Pavement Performance Committee Report
William H. Temple, TRB LTPP Committee Chairman and Executive Director, Concrete and Aggregates Association of Louisiana

LTPP Not Business as Usual:
Monitoring of New Experiments
Jack H. Springer, FHWA, LTPP Team Member
Improving User Accessibility to LTPP Data with InfoPave
Yan "Jane" Jiang, FHWA, LTPP Team Member

Louisiana's Experience with Warm Mix Asphalt Mixtures
William King, Materials Research Administrator, Louisiana Department of Transportation and Development, Louisiana Transportation Research Center

Implementation and Performance of Warm Mix Asphalt in Ontario
Stephen Lee, Head of Pavement and Foundation Office, Ministry of Transportation Ontario Materials Engineering Research Office

Washington's Current Activities in Pavement Preservation
David Luhr, State Pavement Management Engineer
Washington State Department of Transportation, Materials Laboratory

Warm Mix Asphalt Research in Ohio
Shad Sargand, Russ Professor,
Ohio University, Civil Engineering Department

2012 International Data Analysis Contest Award
C. Michael Walton, President and
Jon Esslinger, Director
Transportation & Development Institute of ASCE

Future of LTPP and Your Involvement
Aramis López, FHWA, LTPP Team Leader
Office of Infrastructure Research and Development

Direct Application of LTPP Data and Products on the MEPDG
Session 254
Monday, January 14, 2013, 10:15 a.m. - 12:00 noon
Marriott Wardman Park Hotel, Delaware B
Washington, D.C.
Larry Wiser, Research Civil Engineer,
Federal Highway Administration, presiding
Sponsored by the Long-Term Pavement Performance (LTPP) Committee (E1002)

New MEPDG Traffic Loading Defaults Using LTPP Data
Olga Selezneva, Principal Engineer
Applied Research Associates, Inc.

LTPP's Easy PLUG for Selecting MEPDG Load Spectrum
Mark Hallenbeck, Director
University of Washington, TRAC

Improved Climate Data for LTPP, MEPDG and Other Infrastructure Applications
Chuck Schwartz, Professor
University of Maryland, Department of Civil and Environmental Engineering

DAWG Forum on Pavement Performance Data Analysis
Saturday, January 12, 2013, 9:00 a.m.- 6:00 p.m.,
Shoreham Hotel, Washington, D.C., Hampton
A. Robert Raab, Transportation Research Board, presiding
Sponsored by Data Analysis Working Group (DAWG) Committee

The TRB Data Analysis Working Group (DAWG) will sponsor this forum to discuss methods of analysis of pavement performance data. Briefings will be presented on techniques for extracting, processing, and analyzing pavement performance data bases, as well as on preliminary results of applications of these techniques. Pavement researchers, designers, and managers, as well as others interested in the analysis of data describing the development of distresses in pavements are encouraged to attend. Annual Meeting registration is required to attend all workshops.

New Publications

- Estimation of Key PCC, Base, Subbase, and Pavement Engineering Properties From Routine Tests and Physical Characteristics (TechBrief)
  FHWA-HRT-12-032 2012 **[PDF]**

- User's Guide: Estimation of Key PCC, Base, Subbase, and Pavement Engineering Properties From Routine Tests and Physical Characteristics (Report)
  FHWA-HRT-12-031 2012 **[PDF]**

- Estimation of Key PCC, Base, Subbase, and Pavement Engineering Properties From Routine Tests and Physical Characteristics (Report)
  FHWA-HRT-12-030 2012 **[PDF]**

- Relating Ride Quality and Structural Adequacy for Pavement Rehabilitation and Management Decisions (Techbrief)
  FHWA-HRT-12-046 2012 **[PDF]**

- Long-Term Pavement Performance Ancillary Information Management System (AIMS) Reference Guide
  FHWA-HRT-12-058 2012 **[PDF]**

- Simplified Techniques for Evaluation and Interpretation of Pavement Deflections for Network-Level Analysis
  FHWA-HRT-12-023 2012 **[PDF]**

- Simplified Techniques for Evaluation and Interpretation of Pavement Deflections for Network-Level Analysis: Guide for Assessment of Pavement Structure Performance for PMS Applications
  FHWA-HRT-12-025 2012 **[PDF]**

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