

Celebrating 20 Years of Pavement Data Collection

The Long-Term Pavement Performance (LTPP) Program is the first-ever research program that has collected pavement performance data for 20 years on nearly 2,500 test sections in North America. This year's LTPP State Coordinators' Meeting and LTPP Box Session at the 89th Annual Transportation Research Board (TRB) Meeting highlighted this accomplishment. This article provides a synopsis of the presentations that were given in these TRB sessions.

Recently retired Chief Engineer of the Louisiana Department of Transportation, **William Temple** presided over the LTPP State Coordinators' Meeting. Mr. Temple was named Chairman for the TRB LTPP Committee after the resignation of Victor Mendez. Mr. Mendez served as the Chairman of this committee for several years prior to being confirmed as the Federal Highway Administrator the summer of 2009.

Mr. Temple gave a report on the TRB LTPP Committee's assessment of the LTPP Program. He commended the Federal Highway Administration (FHWA) on resolving the funding issues with the traffic pooled-fund study and being successful in securing funds from non-LTPP funding sources to start some data analysis projects that were put on hold due to funding shortfalls within the LTPP program. He also emphasized that while many of the benefits of the LTPP Program are identified, there are still many more to be realized. One major benefit of the program mentioned by Mr. Temple is the LTPP database. He related that the Committee applauds FHWA for securing the database, but they believe that more should be done such as establishing a National Pavement Performance Database that will survive organizational changes. Mr. Temple's final point in his opening remarks was "The database is yours—use it!"

Using it is exactly what FHWA management wants you to do. **Jorge Pagán-Ortiz**, the Office Director for Infrastructure Research and Development, stated in his remarks that we need to use the database to be more innovative; to design pavements of the future with climate change in mind; to be more responsive to the challenges we may encounter in terms of resources, land use, and the environment; and to better understand the behavior of pavements by analyzing

data collected from the test sites. Mr. Pagán-Ortiz's point was that we need to start thinking about what's next for pavement design, construction, data collection, and analysis; and the LTPP Program should play a significant role in this future.



Figure 1. Mr. Jorge Pagán-Ortiz addressing the LTPP State Coordinators' Meeting.

Aramis López, Team Leader for the LTPP Program began his presentation by expressing gratitude to everyone involved with the LTPP Program – including LTPP partners and stakeholders, the LTPP TRB Committees and LTPP staff. He went on to say, however, "Our job is not done." While mentioning the challenges he faced in making some tough decisions due to funding limitations, Mr. López reiterated FHWA's commitment to completing the program as it was intended. Thus, the reason behind writing [LTPP Beyond FY 2009: What Needs to Be Done?](#)

Mr. López outlined the four key focus areas for LTPP in the next 5 years. First, the LTPP database will be secured. This is a lesson that LTPP learned from the American Association of State Highway Officials (AASHO) Road Test. Although valuable, the AASHO data is not available and Mr. López emphasized that this will not happen with LTPP data and he outlined the backup protocols that are in place and in practice routinely. Second, he committed the LTPP Program to continuation of technical support to database users. Third, he mentioned that LTPP will further develop the LTPP database by continuing data collection on those test sites that are still performing well and capture the decline in performance for overlays. In addition to collecting performance data, he assured stakeholders that LTPP will further develop the database by taking advantage of software interfaces that will give users the ability to interact more effectively with the database in order to obtain, efficiently and effectively, the data they

need. Fourth, he committed to continue LTPP data analysis and product development and to strategically engage and complete the more than 60 projects on the LTPP Data Analysis Strategic Plan (“the Tablecloth”). However, he mentioned that new projects need to start while some analysis projects need to be re-visited using the latest LTPP data.

Mr. López concluded his presentation by stating that the first 20 years of LTPP data collection provided an abundance of accomplishments and benefits for stakeholders. However, the work is not yet complete. Mr. López expressed the need to not only continue the partnership with states, but to strengthen it as well. Therefore, visits with our State partners will resume.

As mentioned previously, the database is one of the main benefits from LTPP that is available to researchers for pavement researchers, Academia for class assignments, and States for implementation of new procedures. It has changed over the last 20 years and will continue to change as more data are added and further enhancements are made as part of the post-2009 LTPP activities. **Gary Elkins**, part of the LTPP Contractor Team, stated that the first release of the LTPP database in 1991 had data for 226 test sections compared to Standard Data Release (SDR) 24 released in 2010 which had data for 2,509 test sections.

In addition to the SDR, many users also rely on LTPP DataPave Online to obtain the data they need. **Riaz Ahmad**, another member of the LTPP Contractor Team, provided users with a glimpse of what they can expect to see in the “next generation” of DataPave Online. This enhanced version will include many new features such as the manual distress survey maps and videos of the surveys. There will be an enhanced Google Maps interface and overhead imagery of the test sites. Probably the most exciting enhancement that is planned for the “next generation” is related to new LTPP data search functions. There will be two methods to search and extract LTPP data; one for the novice user and one for the more experienced user. Both methods will build on standard structured query language (SQL) scripts to aid the user in accessing and downloading the necessary data.

An alpha version will be tested by the LTPP Team the first half of 2010 with a beta version available to larger group of users to test the second half of 2010. It is anticipated that LTPP DataPave Online – Next Generation will be in full production in 2011.

As we work to improve the use of the database, we have also been working for the past several years to make sure that the data in the database is as robust and error free as possible. One area in particular in which we have improved the quality, quantity, and reliability of the data is in the traffic area. **Steven Jessberger** of the FHWA, in collaboration with

Rick Reel of the Florida Department of Transportation, gave a summary of the results of the LTPP Specific Pavement Study Traffic Data Collection Pooled-Fund Study, TPF-5(004). Mr. Jessberger stated that before this pooled-fund study, there was a lack of quality weigh-in-motion (WIM) data and that we needed to get better data. On average each of the 28 sites that are part of this study has 215 days of traffic data. A by-product of this study is the implementation of the LTPP Classification Scheme at the 28 sites. This classification is being analyzed under a separate LTPP data analysis project to make it more universal. Mr. Jessberger stated that this scheme is one of the best currently available and that one of his goals is to help make this an LTPP product. Collect data correctly once then use it many times was the sentiment Mr. Jessberger left with the audience.

Not only is it important to collect the data once and use it many times, it is also important to collect the final performance data at the end of a pavement’s service life. In other words, according to **Anne-Marie McDonnell** of the Connecticut Department of Transportation, we have to finish the work we started.

Connecticut’s Specific Pavement Study (SPS) -9A (SUPERPAVE™) site was identified to be part of their Pavement Preservation Project that received funding from the American Recovery and Reinvestment Act of 2009. Consequently this site was scheduled for an overlay. Knowing this, Ms. McDonnell described how she worked quickly to arrange for not only the final point to be collected for LTPP’s needs, but to also use this opportunity to perform some forensic work at the site for other pavement research needs. According to Ms. McDonnell, there is value in finishing the work (collecting the final data point) which supports the need for a national pavement performance database.

While the LTPP database benefits the pavement research community by providing data that is not available from other sources, there are additional benefits that have come from the LTPP Program. **William Temple** experienced this firsthand as Chief Engineer of the Louisiana Department of Transportation by using various guidelines and forensic protocols that were developed under LTPP. In his closing presentation, Mr. Temple specifically mentioned how using the LTPP pavement performance data can actually save money on projects (Alternate Design/Alternate Bid) and that LTPP data is used to calibrate the Mechanistic-Empirical Pavement Design Guide. In addition, Louisiana is looking to the traffic pooled-fund study for direction in collecting quality WIM data. The agency recently found five years of unusable WIM data because the equipment was out of calibration as evidenced by the documented shifts of the Gross Vehicle Weight graphs. Mr. Temple emphasized that users should not only focus on the data collected from the LTPP Program but also use the program’s concepts, ideas, and field equipment protocols, which will help States with projects unique to them.

The box session, which is more technology oriented than the coordinators' meeting, focused on LTPP's quality control/quality assurance (QC/QA) processes and provided initial findings on the impact of rehabilitation alternatives for asphalt pavements.

Mark Gardner, member of the LTPP Contractor Team, stated that self-assessment is a very painful process. He related the many lessons LTPP learned over the years, including: regular training of staff was important in collecting quality data; proper use of the equipment and required maintenance and calibration was necessary; and consistency in data collection across the nearly 2,500 test sites is an extremely important quality control issue. He related to the audience how development of standard forms and data collection procedures were essential in order to establish a more uniform data collection process.

Having the data collection and QC/QA processes in place allows data analyses to be performed with confidence. In his presentation, **Manuel Ayres**, member of the LTPP Data Analysis Team, found that there was no significant difference in roughness and rutting between Virgin and Recycled Hot Mix Asphalt (HMA) mixes. The study looked at the SPS-3, -4, -5, and -6 test sites. The final report will be published later this year.

Contact LTPP Customer Support Services at ltppinfo@dot.gov or (202) 493-3035 to get a copy of the PowerPoint® presentations from the LTPP State Coordinators' Meeting and LTPP Box Session.

Standard Data Release 24 is Here!

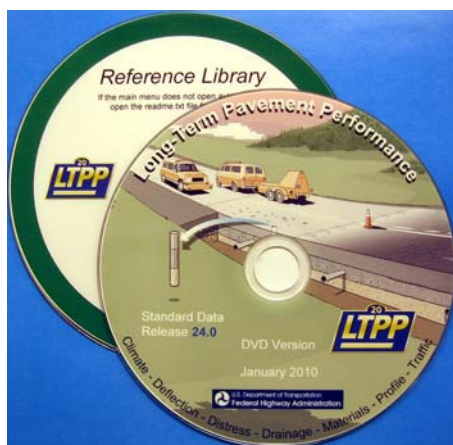


Figure 2. The SDR 24 DVD Set.

New and updated data from the FHWA's LTPP Program is accessible with the new SDR 24. The most current release of the world's largest pavement performance database was made available to the public at the 89th Annual TRB Meeting in January 2010. SDR 24 is a single DVD that contains the pavement performance data from more than 2,500 test sections in Microsoft Access® format and can be obtained at no charge.

SDR 24 is the LTPP Program's 20-year data collection milestone release. Many improvements and additions have been incorporated into this release significantly increasing the number of available data elements, as outlined below.

Two New MON_DRAIN_PERM Tables

These tables contain measurements and calculations made as part of the drainage study undertaken as part of National Cooperative Highway Research Program (NCHRP) project 1-34D and included in the final NCHRP report 583, *Effects of Subsurface Drainage on Pavement Performance*.

Nine New TST_ESTAR Tables

Dynamic modulus, $[E^*]$, is a fundamental property that defines the stiffness characteristic of HMA mixtures as a function of loading rate and temperature. These tables house the newly developed dynamic modulus $[E^*]$ computed parameter data, which contain the inputs used by the Artificial Neural Network (ANN) models as well as the outputs those models created. Details on the models and intermediate calculations can be found in the soon to be published report, *LTPP Computed Parameter: Dynamic Modulus*.

Thirty-six New Traffic Analysis Tables

For the first time, the LTPP Traffic Analysis (LTAS) database is included in this data release. The LTAS database contains daily and monthly traffic data used in the annual traffic estimates stored in the pavement performance database; traffic monitoring equipment locations; statistical summaries used in the quality review of traffic data; data errors; and other information used in the traffic data review and analysis procedure. The database is structured as a standalone series of Access® databases that follows the same type of functional structure as the pavement performance database.

As part of the preparation of SDR 24, the LTPP Program conducted an extensive and focused review of all data modules. This review consisted of a series of data studies to pinpoint missing data issues and analyze between-module data inconsistencies to improve the overall quality of the database.

Also available with the SDR is a Reference Library DVD of LTPP documents which contains research reports, technical briefs, resource documents, and database utilities such as Table Navigator. The Table Navigator application contains definitions for database fields and codes and allows users to expand, collapse, and search the LTPP database structure.

To obtain copies of SDR 24 or for more information, contact LTPP Customer Support Services at ltppinfo@dot.gov or (202) 493-3035.

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