# LTPP Pavement Performance Database
# Release Notes
# Standard Data Release 29
# April 2015

## Introduction

The Long-Term Pavement Performance (LTPP) program has collected a large quantity of data and information on the performance of selected in-service pavement test sections in North America. These data are designed to serve a broad range of research needs related to pavement performance in the areas of pavement engineering, pavement materials engineering, and pavement management. A primary objective of LTPP is to provide access to this data and related information to researchers, highway agency personnel, and others interested in pavement performance related research.

To meet this objective, LTPP developed a Standard Data Release (SDR) that provides access to LTPP data in a convenient format, free of charge. The LTPP SDR is delivered in Microsoft® Access 2000 format. As the LTPP program is an on-going operation, new releases contain data from previous releases, additional data collected since the last release, new modules and tables, changes made in response to errors in previously released data, and other updates.

SDR data is extracted from the production Pavement Performance Database (PPDB). The data in the PPDB is generally organized by data type into modules such as Inventory (INV) and Rehabilitation (RHB). The data is extracted by module where possible; some modules are divided into multiple databases due to the limitation on the size of Access databases. These Access databases are compressed using the zip standard.

The purpose of this document is to highlight changes between each standard data release. Changes to the standard data release dating back to release 16 (July 2003) are contained in this document for historical reference.

## Release 29

This is the 29th public release of data from the LTPP program. Some of the notable updates, additions, deletions, and changes made to the data since the January 2014 data release include the following:

### New Tables

In SDR 29, 33 new tables were added. 22 new MERRA climate tables, 13 new backcalculation (BAKCAL) tables, and 8 new profile/texture (MON_HSS) tables.

*MERRA Tables*

The new MERRA tables contain climate data summaries from Modern-Era Retrospective Analysis for Research and Application (MERRA). This dataset provides continuous hourly precipitation, humidity, temperature, wind, and solar radiation estimates. Due to the size of the data, the hourly tables are not actually part of the SDR, but are included here because they will be made available to the user using other means.

The new tables are similar to the existing CLM_VWS tables, which provide similar data from a different data set consisting of terrestrial observations. The new MERRA tables are:

- MERRA_GRID_ID:  This table contains location, elevation and assignment of ID to each MERRA grid centroid.

- MERRA_HUMID_DAY:  This table contains humidity 2 meters above MERRA centroid by date.

- MERRA_HUMID_HOUR:  This table contains humidity 2 meters above MERRA centroid by date and hour.

- MERRA_HUMID_MONTH:  This table contains humidity 2 meters above MERRA centroid by year and month.

- MERRA_HUMID_YEAR:  This table contains humidity 2 meters above MERRA centroid by year.

- MERRA_PRECIP_DAY:  This table contains precipitation at MERRA cell centroid by date.

- MERRA_PRECIP_HOUR:  This table contains precipitation at MERRA cell centroid by date and hour.

- MERRA_PRECIP_MONTH:  This table contains precipitation at MERRA cell centroid by year and month.

- MERRA_PRECIP_YEAR:  This table contains precipitation at MERRA cell centroid by year.

- MERRA_SITE_LINK:  This table contains assignment of test sections to MERRA cells.

- MERRA_SOLAR_DAY:  This table contains solar radiation and cloud cover at MERRA cell centroid by date.

- MERRA_SOLAR_HOUR:  This table contains solar radiation and cloud cover at MERRA cell centroid by date and hour.

- MERRA_SOLAR_MONTH:  This table contains solar radiation and cloud cover at MERRA cell centroid by year and month.

- MERRA_SOLAR_YEAR:  This table contains solar radiation and cloud cover at MERRA cell centroid by year.

- MERRA_TEMP_DAY:  This table contains air temperature 2 meters above MERRA cell centroid elevation by date.

- MERRA_TEMP_HOUR:  This table contains air temperature 2 meters above MERRA cell centroid by date and hour.

- MERRA_TEMP_MONTH:  This table contains air temperature 2 meters above MERRA cell centroid elevation by year and month.

- MERRA_TEMP_YEAR:  This table contains air temperature 2 meters above MERRA cell centroid elevation by year.

- MERRA_WIND_DAY:  This table contains wind 2 meters above MERRA cell centroid by date.

- MERRA_WIND_HOUR:  This table contains wind at MERRA cell centroid by date and hour.

- MERRA_WIND_MONTH:  This table contains wind 2 meters above MERRA cell centroid by year and month.

- MERRA_WIND_YEAR:  This table contains wind 2 meters above MERRA cell centroid by year.

*BAKCAL Tables*

The new BAKCAL tables contain backcalculation information for deflection data sets in the MON_DEFL tables.  These tables nominally replace the MON_DEFL_FLX and MON_DEFL_RGD tables, which were last available in Release 20.0. The new BAKCAL tables are:

- BAKCAL_BASIN:  This table contains identifying information for each deflection basin used in the backcalculation process.

- BAKCAL_BEST_FIT_BASIN_LAYER:  This table contains best fit backcalculation modulus values for each deflection basin.  This table only has information for PCC surfaced sections only.

- BAKCAL_BEST_FIT_BASIN_MASTER:  This table contains backcalculation fit and quality measures for each deflection basin.

- BAKCAL_BEST_FIT_LAYERS:  This table contains layer thicknesses used calculation of layer modulus values using the BEST FIT procedure.

- BAKCAL_BEST_FIT_SECTION_LAYER:  This table contains best fit backcalculated modulus values for each FWD pass.  This table only has information for PCC surfaced sections only.

- BAKCAL_BEST_FIT_SECTION_MASTER:  This table contains best-fit backcalculation quality measures and other non-layer specific information for each FWD pass.  This table only has information for PCC surfaced sections only.

- BAKCAL_LAYER_LINK:  This table contains mapping of backcalculation layers to the current TST_L05B layering structure.

- BAKCAL_MODULUS_BASIN_LAYER:  This table contains backcalculated modulus values for each measured deflection basin.

- BAKCAL_MODULUS_BASIN_MASTER:  This table contains backcalculation fit and quality measures for each deflection basin.

- BAKCAL_MODULUS_SECTION_LAYER:  This table contains backcalculated modulus values averaged for each FWD pass.

- BAKCAL_MODULUS_SECTION_MASTER:  This table contains backcalculation quality and fitment information applicable to a given FWD pass.

- BAKCAL_PASS:  This table contains identifying information for each FWD pass used in the backcalculation process.

- BAKCAL_STRUCTURE_LAYERS:  This table contains layer thicknesses used for backcalculation of layer modulus values.

*MON_HSS Tables*

The new MON_HSS tables contains information from the new longitudinal profile/texture units, as well as all of the data that was previously in MON_PROFILE_MASTER and MON_PROFILE_DATA.  The new tables are:

- MON_HSS_PROFILE_ELEVATION_150:  This table contains high speed survey profile elevation data at 150mm or 152.4mm intervals.

- MON_HSS_PROFILE_ELEVATION_25:  This table contains high speed survey profile elevation data at 25mm or 25.4mm intervals.

- MON_HSS_PROFILE_SECTION:  This table contains high speed survey section level profile computed parameters and statistics based on 150 mm interval data.

- **MON_HSS_RUN_NO:** This table contains identification of each high speed survey run made during each visit

- **MON_HSS_TEXTURE_SECTION:** This table contains high speed survey section level texture computed parameters and statistics.

- **MON_HSS_TEXTURE_SEGMENT:** This table contains high speed survey texture data for 100mm segments.

- **MON_HSS_UNIT_ID:** This table contains high speed survey unit identification.

- **MON_HSS_VISIT_NO:** This table contains Information related to each high speed survey site visit.

*Tables Excluded*

MON_PROFILE_MASTER and MON_PROFILE_DATA are no longer part of the SDR. The information that was in these tables in now in the MON_HSS series of tables.

MON_HSS_FAULT_VALUES: This table has been added to the central database to store high speed survey fault data but has not yet been populated.

*Other Notes*

SECTION_COORDINATES has a new field for elevation. The ELEVATION field contains elevation derived from the coordinates.

MON_DEFL_LOC_INFO has two new fields for location – LATITUDE and LONGITUDE. For this SDR, the fields exist but are not populated.

The structure of TST_AC02 has been modified. The table previously had one BSG field that either contained a coated or uncoated value. The table now has BSG for uncoated values, and COATED_BSG for coated values. This is now consistent with the data sheet.


# Release 28

In SDR 28 the Data Compilation View (DCV) tables were promoted from beta to full SDR table status. This includes the six new tables and the 18 tables that were included in SDR27 as beta.

*New Tables and Table Name Changes*

Six new tables were added to the DCV module. All of these tables contain data combined from existing tables. Unlike the tables in most other PPDB modules, the tables in the DCV module do not have a module designation in the table names. These new tables are:

- **MNT_IMP_SOURCE.** This table contains the location of the detailed information for

those events included in MNT_IMP.  The source tables which contain available data from entries in the MNT_IMP table include MNT_ASPHALT_CRACK_SEAL, MNT_ASPHALT_PATCH, MNT_ASPHALT_SEAL, MNT_GMG, MNT_IMP, MNT_PCC_CRACK_SEAL, MNT_PCC_FULL_DEPTH, MNT_PCC_JOINT_RESEAL, MNT_PCC_PART_DEPTH, RHB_MILL_AND_GRIND, SPS2_PCC_FULL_DEPTH, SPS3_CHIP, SPS3_CRACK, SPS3_SLURRY, SPS4_CRACK_SEAL_GENERAL, SPS4_PCC_CRACK_SEAL, SPS5_AC_PATCHES, SPS6_DIAMOND_GRIND, SPS6_PCC_CRACK_SEAL, SPS6_PCC_FULL_DEPTH, SPS6_PCC_JOINT_RESEAL, SPS6_PCC_PART_DEPTH, and SPS7_MILLING tables.

- SECTION_LAYOUT: This table contains section layout and location information. This table contains combined data from INV_ID, INV_GENERAL, SPS_ID, SPS_GENERAL, and SPS_PROJECT_STATIONS.

- SECTION_STRUCTURE_HISTORY: This table contains information on dates of structural changes to each section, including original construction, milling, overlays, and crack and seat events. It contains a mixture of data extracted from the EXPERIMENT_SECTION, RHB_IMP, SPS_ID, INV_AGE, and SECTION_LAYER_STRUCTURE tables.

- STABILIZATION_DETAILS: This table contains information on stabilization types and quantities for unbound layers compiled from the INV_STABIL, SPS1_SUBGRADE_PREP, SPS2_SUBGRADE_PREP, SPS8_SUBGRADE_PREP, and SPS9_SUBGRADE_PREP tables.

- SUBGRADE_PROPERTIES. This table contains the physical properties of subgrade material. Contains data from INV_SUBGRADE which has been expanded to the test section level. Data from the INV module does not include properties from test sections newly constructed after the start of the LTPP program in 1987.

- UNBOUND_LAYER_PROPERTIES. This table contains physical properties of unbound layers expanded to test section level from data contained in the INV_UNBOUND table. Data in this table is constrained to that reported by participating highway agencies for pavement structures whose initial construction was completed prior to inclusions into the LTPP program.

## *Tables Excluded*

All tables included in SDR 27 are also included in SDR 28.

## *Other Notes*

The TST_PC03 data has been updated with new information provided by the FHWA lab at Turner-Fairbanks Highway Research Center.  The new data is primarily repeat tests on

previously tested PCC cores.

The DTE field in MON_DEFL_DROP_DATA has been removed. This field was never populated. Load transfer efficiency calculations are provided in MON_DEFL_LTE.

The structure of SPSWIM_VALIDATION_INIT has been modified to include three new fields: OUT_OF_STUDY_TPF, LAST_FULL_YEAR, and COMMENTS.


# Release 27

*New Tables and Table Name Changes*

In SDR 27, 33 new tables were added and seven existing tables were renamed. One new table was added for falling weight deflectometer (FWD) load transfer efficiency computations, 14 new tables for interpreted Dynamic Load Response (DLR) measurements, and 18 new tables that contain data combined from multiple existing tables. Seven of the existing DLR tables were renamed.

*FWD Load Transfer Efficiency*

One new table, MON_DEFL_LTE, was added to the FWD_Data_Without_Drop_Data database to contain the results of load transfer efficiency computations from FWD measurements at transverse joints and cracks on portland cement concrete pavement layers.

- MON_DEFL_LTE.  This table contains load transfer efficiency computation from falling weight deflectometer measurements from the J4, J5, C4, and C5 LANE_NO measurements at transverse joints/cracks on jointed and continuously reinforced portland cement concrete pavements. The LTE computation is not corrected for slab bending effects.

*DLR Tables*

The new DLR tables are the reinterpreted data from Ohio, which were removed from SDR 26. Due to differences in the interpretation method and table restructuring, this data is being added back into the database using a table name format starting with DLR_OH. The data tables containing DLR data from North Carolina that were retained in SDR 26 were renamed using a name format that begins with DLR_NC to distinguish this data from the Ohio DLR data. The DLR module now contains the following tables:

- DLR_NC_LVDT_CONFIG_PCC. This table contains LVDT gauge settings and location information for North Carolina DLR tests.

- DLR_NC_LVDT_TRACE_SUM_PCC. This table contains LVDT trace summary information developed using DLRCheck for North Carolina DLR tests.

- DLR_NC_MASTER_PCC. This table contains North Carolina DLR site and instrumentation summary information for Dynamic Load Response on AC sections.

- DLR_NC_STRAIN_CONFIG_PCC. This table contains North Carolina DLR test sensor gauges - device, settings and location information.

- DLR_NC_STRAIN_TRACE_SUM_PCC. This table contains North Carolina Data Load Response strain trace summary information.

- DLR_NC_TEST_MATRIX. This table contains North Carolina Dynamic Load Response test matrix summary information.

- DLR_NC_TRUCK_GEOMETERY. This table contains North Carolina Dynamic Load Response truck geometry summary information.

- DLR_OH_LVDT_CONFIG_AC. This table contains LVDT gauge configuration settings and location information for Ohio DLR AC test sections.

- DLR_OH_LVDT_CONFIG_PCC. This table contains gauge configuration settings and location information for Ohio DLR PCC test sections.

- DLR_OH_LVDT_TRACE_SUM_AC. This table contains interpreted LVDT peak values from AC pavement measurements at the Ohio DLR test site.

- DLR_OH_LVDT_TRACE_SUM_PCC. This table contains interpreted LVDT peak values from PCC pavement measurements at the Ohio DLR test site.

- DLR_OH_MASTER_AC. This table contains site summary instrumentation measurement information for Ohio DLR AC sections.

- DLR_OH_MASTER_PCC. This table contains site summary instrumentation measurement information for Ohio DLR PCC sections.

- DLR_OH_PRESSURE_CONFIG_AC. This table contains pressure gauge configuration settings and location information for Ohio DLR AC test sections.

- DLR_OH_PRESSURE_TRACE_SUM_AC. This table contains interpreted pressure peak values from AC pavement measurements at the Ohio DLR test site.

- DLR_OH_STRAIN_CONFIG_AC. This table contains strain gauge configuration settings and location information for Ohio DLR AC test sections

- DLR_OH_STRAIN_CONFIG_PCC. This table contains strain gauge configuration settings and location information for Ohio DLR PCC test sections.

- DLR_OH_STRAIN_TRACE_SUM_AC. This table contains interpreted strain peak values from AC pavement measurements at the Ohio DLR test site.

- DLR_OH_STRAIN_TRACE_SUM_PCC. This table contains interpreted strain peak values from PCC pavement measurements at the Ohio DLR test site.

- DLR_OH_TEST_MATRIX. This table contains test matrix summary information for the Ohio DLR tests.

- DLR_OH_TRUCK_GEOMETERY. This table contains Ohio load response truck geometry summary information.

*Data Compilation Views*

The tables in the new Data Compilation View (DCV) module contain data compiled from other existing tables with the primary intent of reducing the number of tables a user needs to look at for similar types of data elements. In addition to combining data, these tables also expand linked and project level data to create individual test section level records. Coded values have been replaced with the code description to alleviate the need to perform the linking necessary to get those values otherwise. While this information is technically implemented as a "view" in database terminology, it is presented as tables in the SDR.

The tables in the DCV module are included in SDR 27 as a beta or trial release in the interest of receiving data user feedback. The module is being released as volume 2 in SDR 27 to indicate a separation from the other PPDB data tables. Unlike most other PPDB modules, the views do not have a module designation in the table names. The new tables in the DCV module are:

- AC_AGG_GRADATION. This table contains gradation information for aggregate used in AC mixtures. Contains data from INV_GRADATION, RHB_ACO_AGGR_PROP, RHB_CMRAP_COMBINED_AGG, and RHB_HMRAP_COMBINED_AGG.

- AC_AGG_PROP. This table contains physical properties of aggregate used in AC mixtures. Contains data from INV_PMA, RHB_ACO_AGGR_PROP, RHB_CMRAP_COMBINED_AGG, RHB_HMRAP_COMBINED_AGG, SPS1_PMA_AGGREGATE_PROP, SPS2_PMA_AGGREGATE_PROP, SPS8_PMA_AGGREGATE_PROP, and SPS9_PMA_AGGREGATE_PROP.

- AC_ANTISTRIP. This table contains information on anti-stripping agents used in AC mixtures. Contains data from INV_PMA_ORIG_MIX, RHB_ACO_MIX_PROP, SPS1_PMA_MIXTURE_PROP, SPS2_PMA_MIXTURE_PROP, SPS8_PMA_MIXTURE_PROP, and SPS9_PMA_MIXTURE_PROP.

- AC_BINDER_PROP. This table contains properties of the binder used in AC mixtures. Contains data from INV_PMA_ASPHALT, RHB_ACO_PROP, SPS1_PMA_AC_PROPERTIES, SPS8_PMA_AC_PROPERTIES, and SPS9_PMA_AC_PROPERTIES.

- AC_MIX_PROP.  This table contains AC Hveem and Marshall mixture information. Contains data from INV_PMA_ORIG_MIX, RHB_ACO_LAB_MIX, RHB_CMRAP_LAB_MIX, RHB_HMRAP_LAB_MIX, SPS1_PMA_MIXTURE_PROP, SPS2_PMA_MIXTURE_PROP, SPS8_PMA_MIXTURE_PROP, SPS9_PMA_MIXTURE_PROP, and SPS9_PMA_MIX_DES_PROP.

- AC_MOISTURE_SUSCEPTIBILITY. This table contains results from moisture susceptibility tests on AC samples. Contains data from INV_PMA_ORIG_MIX and RHB_ACO_MIX_PROP.

- AC_VOLUMETRICS. This table contains volumetric properties of AC mixtures as reported by agencies. Contains data from INV_PMA_ORIG_MIX, RHB_ACO_LAB_MIX, RHB_ACO_MIX_PROP, RHB_CMRAP_LAB_MIX, RHB_CMRAP_MIX_PROP, RHB_HMRAP_LAB_MIX, RHB_HMRAP_MIX_PROP, SPS1_PMA_MIXTURE_PROP, SPS2_PMA_MIXTURE_PROP, SPS8_PMA_MIXTURE_PROP, SPS9_PMA_MIXTURE_PROP, SPS9_PMA_MIX_DES_PROP, and SPS9_SP_PMA_MIXTURE_PROP.

- PCC_ADMIXTURE. This table contains properties of admixtures used in PCC mixtures. Contains data from SPS8_PCC_MIXTURE_DATA, SPS2_PCC_MIXTURE_DATA, RHB_PCCO_MIXTURE, and INV_ADMIX.

- PCC_AGG_GRADATION. This table contains gradation information for aggregate used in PCC mixtures. Contains data from INV_GRADATION, RHB_PCCO_AGGR, SPS2_PCC_MIXTURE_DATA, and SPS8_PCC_MIXTURE_DATA.

- PCC_AGG_PROP. This table contains physical properties of aggregate used in PCC mixtures. Contains data from RHB_PCCO_AGGR, SPS2_PCC_MIXTURE_DATA, SPS8_PCC_MIXTURE_DATA, and INV_PCC_MIXTURE.

- PCC_JOINT_FORMING. This table contains methods used to create the joints on PCC layers. Contains data from RHB_PCCO_JOINT_DATA, SPS8_PCC_JOINT_DATA, SPS2_PCC_JOINT_DATA, and INV_PCC_JOINT.

- PCC_JOINT_SEALANT. This table contains properties of joint sealants used during initial placement of PCC layers. Contains data from RHB_PCCO_JOINT_DATA, SPS8_PCC_JOINT_DATA, SPS2_PCC_JOINT_DATA, and INV_PCC_JOINT.

- PCC_JOINT_SPACING. This table contains joint spacing used on PCC layers. Contains data from RHB_PCCO_JOINT_DATA, SPS8_PCC_JOINT_DATA, SPS7_PCCO_JOINT_DATA, SPS2_PCC_JOINT_DATA, and INV_PCC_JOINT.

- PCC_LOAD_TRANSFER. This table contains properties of load transfer devices used on PCC layers. Contains data from INV_PCC_JOINT, RHB_PCCO_JOINT_DATA, SPS8_PCC_JOINT_DATA, and SPS2_PCC_JOINT_DATA.

- PCC_MIX_DESIGN. This table contains PCC mix design properties. Contains data from INV_PCC_MIXTURE, RHB_PCCO_MIXTURE, SPS2_PCC_MIXTURE_DATA, and SPS8_PCC_MIXTURE_DATA.

- PCC_REINFORCING. This table contains physical properties of reinforcement used in PCC layers. Contains data from SPS2_PCC_STEEL, RHB_PCCO_STEEL, and INV_PCC_STEEL.

- PCC_STRENGTH. This table contains strength properties of PCC layers. Contains data from RHB_PCCO_STRENGTH and INV_PCC_STRENGTH.

- PCC_TIE_BARS. This table contains properties of tie bars placed in PCC layers. Contains data from RHB_PCCO_JOINT_DATA, SPS8_PCC_JOINT_DATA, SPS2_PCC_JOINT_DATA, and INV_PCC_JOINT.

*Tables Excluded*

The only tables that were in SDR26 that will not be in SDR27 are the renamed DLR tables which contained data from North Carolina. The following tables will not be in SDR27 as a result of the renaming:

- DLR_LVDT_CONFIG_PCC
- DLR_LVDT_TRACE_SUM_PCC
- DLR_MASTER_PCC
- DLR_STRAIN_CONFIG_PCC
- DLR_STRAIN_TRACE_SUM_PCC
- DLR_TEST_MATRIX
- DLR_TRUCK_GEOMETERY

*Other Notes*

The CLM_VWS tables have been updated to include new weather stations, and climate information to 2013.

The TST_PC03 data has again been updated with new information provided by the lab. The new data is primarily repeat tests on previously tested cores.

Some of the databases in the FWD drop data and profile data volumes had to be reorganized to keep within the 2 GB limit on MS Access databases.

# Release 26

This is the 26th public release of data from the LTPP program. Some of the notable updates, additions, deletions, and changes made to the data since the January 2011 data release include the following:

*Tables Added*

No new tables were added to the database for SDR 26.

*Tables Excluded*

Problems were found with the Ohio DLR data that warranted excluding the data from this release.  All of the DLR data on AC surfaces were from Ohio, and as a result, the AC DLR tables are not populated for SDR 26, and have therefore been excluded.  These excluded tables are:

- DLR_LVDT_CONFIG_AC
- DLR_LVDT_TRACE_SUM_AC
- DLR_MASTER_AC
- DLR_PRESSURE_CONFIG_AC
- DLR_PRESSURE_TRACE_SUM_AC
- DLR_STRAIN_CONFIG_AC
- DLR_STRAIN_TRACE_SUM_AC

There are several LTAS tables that were previously included that have been excluded because they did not contain data of interest to users. These tables are:

- ESAL_PER_VEH
- STAT_QC_A_AX
- STAT_QC_A_AX_9_DD
- STAT_QC_BC_AX
- STAT_AC_BC_SPACE
- STAT_QC_GVW_9_DD
- COMP_CL_CT
- COMP_WT_CT
- COMP_AX
- COMP_GVW
- ESAL_FACTOR_SN_5_PT_2_5

*Other Notes*

RHB_CMRAP_COMBINED_AC, RHB_CMRAP_LAB_AGED_AC, and RHB_CMRAP_MIX_PROP are included in the release for the first time.  Although these tables have existed for some time now, they had not previously been populated, and were therefore not included in the Standard Data Release.  There is now one record in each of these tables.

DD_VOL was included in the LTAS database for the first time.  This table contains the accepted daily volume records.

The TST_PC03 data has again been updated with new information provided by the lab.  The new data is primarily retests of previously tested cores.

The SURVEY_WIDTH fields in the MON_DIS_* tables have been updated, and are now effectively complete.  There are only a handful of records left with no recorded survey width.

The structure of MON_DIS_PADIAS_AC has been significantly altered.  The longitudinal cracking has been split into wheelpath and non-wheelpath, and the reflective cracking has been redistributed to either longitudinal or transverse as appropriate.  These changes make the structure of this table more compatible with the other distress tables, and allow for easier tracking of changes in distress over time.

LTPPDD, LTPPTD, CODES, and CODETYPES all now contain information for the tables in all five volumes.  The LTAS information in the corresponding TRAFFIC tables is still also available separately in LTAS_Administration on Volume 5 for use as a standalone traffic data set.


# Release 25

This is the 25th public release of data from the LTPP program. Some of the notable updates, additions, deletions, and changes made to the data since the January 2010 data release include the following:

*Tables Added*

Five new TRF_ESAL tables were added to the PPDB in the TRF module.  These tables contain the annual ESAL estimates and computation parameters for the LTPP lane based on traffic monitoring measurements and computed using the 1993 AASHTO Guide for Design of Pavement Structures methodology. Previously, these tables and the associated computation program were contained on the Reference Library disk as part of the ESALCalc utility software that was distributed with the SDR.

- TRF_ESAL_AC_THICK. This table contains the thicknesses and other various properties of the layers in an AC pavement used to calculate ESALs.  There may be slight differences between these thicknesses and those in SECTION_LAYER_STRUCTURE based on the input needs of the software.

- TRF_ESAL_COMPUTED.  This table contains the yearly ESAL estimates for each section with an acceptable sample of axle load measurements contained in the LTPP database in the indicated year.

- TRF_ESAL_DRAINAGE_COEFF.  This table contains the drainage coefficient for unbound base and subbase layers used in the ESAL calculation and the climate zone that the coefficient is based upon.

- TRF_ESAL_INPUTS_SUMMARY. This is the master table that contains a summary of all of the input data used in the annual ESAL estimate.  It includes properties such as pavement type, functional classification, climatic characterizations, and general structural properties.

- TRF_ESAL_PCC_COMP_THICK.  This table contains the values used to compute the value of the effective thickness of the PCC layers used in the ESAL calculation. The table includes information on the thickness of multiple PCC layers and whether or not they are bonded.

One new table was added in the LTAS database.

- HH_CL_CT.  This table contains the hourly classification volumes from classification records for sites included in the SPS Traffic pooled fund.

### *Other Notes*

RHB_ACO_ SP_MIX_PROP is included in the release for the first time.  Although this table has existed for some time now, it had not previously been populated, and was therefore not included in the Standard Data Release.  There is now one record in this table.

The TST_PC03 data has again been updated with new information provided by the lab.  This includes some new data not previously available, and some replacement data.

The SURVEY_WIDTH fields in the MON_DIS_* tables have been updated. However, there are still approximately 700 manual distress surveys from the Southern Region that have not had the SURVEY_WIDTH field populated. Data users interested in this missing data should contact LTPP Customer Support Service Center, which should have it available by the time of this data release.

Traffic data for all lanes reported to the LTPP program have been added to the LTAS DB. Previously, traffic data for only the LTPP study lane were available.

Data issues significant enough to affect proper interpretation of the DLR data contained in SDR 25 and all previous data releases have been found. LTPP efforts to correct and enhance this data have not been completed. Because of these problems, those wishing to analyze the DLR data should not use the data provided in SDR 25 without first contacting LTPP Customer Support Service Center at LTPPINFO@dot.gov to obtain information on identified problems and request corrected data.

## Release 24

This is the 24th public release of data from the LTPP program. Some of the notable updates,

additions, deletions, and changes made to the data since the January 2009 data release include the following.

***Tables Added***

Two new MON_DRAIN_PERM tables. These tables contain measurements and calculations made as part of the drainage study undertaken as part of NCHRP project 1-34D and included in the final report – NCHRP report 583 'Effects of Subsurface Drainage on Pavement Performance'.

- MON_DRAIN_PERM_CALC. This table contains the calculated permeability and other drainage characteristics resulting from NCHRP 1-34D. The values in these new MON_DRAIN tables were taken from the appendices in the report.

- MON_DRAIN_PERM_MEAS. This table contains the field measurements made in support of the permeability calculations conducted as part of NCHRP 1-34D. These values are necessary to get the values in the MON_DRAIN_PERM_CALC table.

Nine new TST_ESTAR tables. These tables house the newly developed dynamic modulus |E*| computed parameter data, which contain the inputs used by the developed Artificial Neural Network (ANN) models, as well as the outputs those models created. Dynamic modulus, |E*|, is a fundamental property that defines the stiffness characteristic of hot mix asphalt (HMA) mixtures as a function of loading rate and temperature. Details on the models and intermediate calculations can be found in the report ***LTPP Computed Parameter: Dynamic Modulus*** included on the LTPP Reference Library distributed with the SDR.

- TST_ESTAR_MASTER. This is the master linking table for all of the new TST_ESTAR tables. It contains the information necessary to relate the information in the tables keyed with the ESTAR_LINK field to the rest of the database.

- TST_ESTAR_GSTAR_CAM_COEFF. This table contains the coefficients necessary to use the Christensen-Anderson-Marasteanu (CAM) model to predict |G*| input values.

- TST_ESTAR_GSTAR_INPUT. This table contains the |G*| information used as input to the two G* based E* ANN models.

- TST_ESTAR_VISC_MODEL_COEFF. This table contains the A and VTS values used to generate the input viscosity values.

- TST_ESTAR_VISC_INPUT. This table contains the viscosity values used as input to the two viscosity based |E*| ANN models.

- TST_ESTAR_VOLUM_INPUT. This table contains the volumetric data (VMA and VFA) used in the |G*| and viscosity based |E*| ANN models.

- TST_ESTAR_MR_INPUT. This table contains the resilient modulus data used in the

resilient modulus based |E*| ANN model.

- TST_ESTAR_MODULUS.  This table contains the modulus values predicted by the various E* models for a given temperature and frequency.   The data in this table is very similar to the data required for input into the MEPDG.

- TST_ESTAR_MODULUS_COEFF.  This table contains the Sigmoidal and Shift Factor fitting function coefficients. These values are developed from the modulus values contained in the TST_ESTAR_MODULUS tables, and will fail QC if the resulting curve does not match the modulus values well enough.

The LTPP Traffic Analysis database has been added as a separate set of databases.  This 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 following the same type of functional structure as the pavement database.

The following tables will be included as part of this new LTAS database:

- COMP_AX.  This table contains comparison data sets for axle distributions based on 14 days of weight data immediately after a site validation for SPS-1, -2, -5 and -6 sites.

- COMP_CL_CT.  This table contains comparison data sets for vehicle counts based on 14 days of classification data immediately after a site validation for SPS-1, -2, -5 and -6 sites.

- COMP_GVW.  This table contains comparison data sets for GVW distributions based on 14 days of weight data immediately after a site validation for SPS-1, -2, -5 and -6 sites.

- COMP_WT_CT.  This table contains comparison data sets for vehicle counts based on 14 days of weight data immediately after a site validation for SPS-1, -2, -5 and -6 sites.

- DD_AX.  This table contains daily axle group counts by vehicle class and axle group using the agency's classification scheme.

- DD_CL_CT.  This table contains count data by site, year, month, day, lane, and direction based on classification data records using the agency's classification scheme.

- DD_GVW.  This table contains daily GWV data by vehicle class using the agency's classification scheme.

- DD_WT_CT.  This table contains count data by site, year, month, day, lane, and direction based on weight data records using the agency's classification scheme.

- ERR_CL.  This table contains a record for each lane and direction by date that was rejected in processing classification data.

- ERR_WT.  This table contains a record for each type of error encountered for each lane and direction by date while processing weight data.

- ESAL_FACTOR_SN_5_PT_2_5.  This table is hard coded with the factors to be used in computing average ESALs per vehicle for the purposes of graphical evaluation of relative changes in loading. The factors are for a flexible pavement with a structural number of 5 and a terminal serviceability of 2.5.

- ESAL_PER_VEH.  This table contains for every site, year, month, lane, direction and vehicle class the average ESALs per vehicle based on the ESAL factors found in ESAL_FACTOR_SN_5_PT_2_5. They are used solely for evaluating reasonableness of weight data.

- MM_AX.  This table contains monthly axle group counts by day of week by vehicle class for buses and trucks using the Traffic Monitoring Guide (TMG) 13-bin scheme.

- MM_CT.  This table contains monthly vehicle class counts summarized separately for weight and class data by day of week using the Traffic Monitoring Guide (TMG) 13-bin scheme.

- MM_GVW.  This table contains monthly GVW data by day of week by vehicle class for buses and trucks using the Traffic Monitoring Guide (TMG) 13-bin scheme.

- SHRP_INFO.  This table describes the relationship between an LTPP section or project and the traffic data collected used as inputs to estimation of pavement loading.

- SITE_EQUIPMENT_INFO.  This table is used to identify the type of equipment installed and the classification schemes being used with that equipment.

- SPSWIM_VALIDATION_INIT.  This table contains a listing of all sites being validated by the SPS WIM Pooled Fund Study including date of initial validation

- STAT_QC_A_AX.  This table contains first axle weights by site, year, month, day, lane, direction, vehicle class, and axle group using the agency's vehicle classification scheme.

- STAT_QC_A_AX_9_DD.  This table contains average steering axle weights and their standard deviations for all class 9 vehicles as population and for class 9 vehicles weighing 60,000 pounds or more where a class 9 is not necessarily a 5-axle tractor trailer combination.

- STAT_QC_BC_AX.  This table contains B-C axle weights by site, year, month, day, lane, direction, and vehicle class using the agency's vehicle classification scheme. The B-C axle is axles 2 and 3 from the front of the vehicle separated by 8 feet or less.

- STAT_QC_BC_SPACE.  This table contains B-C axle spacing by site, year, month, day, lane, direction and vehicle class using the agency's vehicle classification scheme.

- STAT_QC_GVW_9_DD.  This table is used to accumulate gross vehicle weights of class 9 vehicles in kips where a class 9 is not necessarily a 5-axle tractor trailer combination. The data is stored by site, year, month, day, lane and direction.

- TRAFFIC_ANALYSIS_TRACKER.  This table tracks when daily, monthly, and annual summaries and annual estimates were last updated.

- TRAFFIC_CLASS_CONVERT_DATA.  This table describes how the agency classes are divided among the TMG 13-bin classification scheme being used for LTPP reporting purposes.

- TRAFFIC_CLASS_CONVERT_MASTER. This table has a minimum of two records for every state or province in SHRP_INFO covering the entire LTPP study period 1/1/1990 to 12/31/2050. One refers to the relationships for classification data, the other to those for weight data.

- TRAFFIC_CODES.  This table contains a listing of all of the codes used by the traffic tables.

- TRAFFIC_CODE_TYPES.  This table contains the codes and the sources used in creating the Codes List report for the traffic data base.

- TRAFFIC_PURGES.  This table contains purges pending or applied to traffic data.

- TRAFFIC_REGIONS.  This table contains the correspondence between the state code and the region that the state belongs.

- TRAFFIC_RS_CHANGES.  This table stores information on changes made to record status including the reason(s) why the modification was made.

- TRAFFICDD.  This table is the data dictionary for the LTAS database, and provides a listing of all data tables and their associated fields for the LTPP traffic analysis software.

- TRAFFICTD.  This table provides a description of all data tables used for the LTPP traffic analysis software.

- TRF_MONITOR_AXLE_DISTRIB.  This table has annual estimated axle distributions by vehicle class and axle group for the LTPP lane only. It is identical to the table of the same name in the pavement database.

- TRF_MONITOR_LTPP_LN.  This table has annual estimated counts by vehicle class and axle group for the LTPP lane only. It is identical to the table of the same name in the pavement database.

- YY_AX.  This table contains yearly axle group counts by day of week by vehicle class for buses and trucks using the Traffic Monitoring Guide (TMG) 13-bin scheme.

- YY_CT. This table contains yearly vehicle class counts summarized separately for weight and class data by day of week using the TMG 13-bin scheme.

- YY_GVW. This table contains yearly GVW data by day of week by vehicle class for buses and trucks using the Traffic Monitoring Guide (TMG) 13-bin scheme..

Additionally, two mostly empty databases are included – one with all the PPDB tables and one with all the LTAS tables. The PPDB database is included in Volume 1 and is named SKELETON. The tables normally contained in the Administration module are populated in this database, but the rest are unpopulated. The LTAS database is included in Volume 5 and is named TRAFFIC_SKELETON. Again, the tables that contain more general administrative information are populated. These databases may serve as a useful tool for those wishing to create project level databases or create a version of the tables in an alternate format.

*Other Notes*

The TST_PC03 (PCC Coefficient of Thermal Expansion) table has been altered somewhat with the addition of several new fields. TEST_SEQUENCE is included to indicate several tests on the same sample; EQUIP_MANUFACTURER contains codified manufacturer information; PRIMARY_AGG_CLASS and SECONDARY_AGG_CLASS replace the old AGGR_TYPE_PCC field and use codified values instead of the open text previously used.

Additionally, the data in TST_PC03 has been updated with new information provided by the lab. The new data set includes a significant increase in the number of available records, and replaces the previous data set entirely, which was incorrect due to faulty calibration values.

The profile elevation data in MON_PROFILE_DATE for manual Dipstick measurements has been updated since the last release using a corrected algorithm. The previous values were generally not filtered correctly and had large values reflecting actual elevation changes in the pavement surface. The new process removed these elevations changes and presents the Dipstick data consistently with the data collected by the inertial profilers.

Nearly 1000 new values have been added to the SURVEY_WIDTH field in the MON_DIS_PADIAS42_AC, MON_DIS_PADIAS42_CRCP, and MON_DIS_PADIAS42_JPCP tables. These values were taken from the distress maps by the MRL contractor.

# Release 23

This is the 23nd public release of data from the LTPP program. Some of the notable updates, additions, deletions, and changes made to the data since the January 2008 data release include the following:

*Tables Added*

SECTION_LAYER_STRUCTURE . This table is a master pavement layer structure table. It is a copy of the contents of the TST_L05B table. It was added to the administration module and is included in all MS Access pavement databases in the SDR for user convenience.

TRF_MEPDG_HOURLY_DIST. This table contains annual average hourly distribution of trucks by hour in the LTPP lane. The computations were performed following the algorithm contained in the Mechanistic-Empirical Guide for the Design of New and Rehabilitated Pavement Structures developed under NCHRP project 1-37A.

SMP_FROST_PRESENCE. This table contains the number of frozen layers on a test day from interpretation of the measurement on SMP test sections.

*Tables Removed*

MON_DIS_PADIAS_CRCP. This table was removed since it is now empty. Records from the MON_DIS_PADIAS tables are removed when matching records are contained in the MON_DIS_PADIAS42 tables. This means all of the data previously in the table was reinterpreted using the newer method.

RHB_CMRAP_MIX_PROP. The three records that used to be in this table were removed in reaction to a Data Analysis Operations Feedback Report. Since the table is now empty it was removed from the data release.

MEPDG_AX_BINS. Although the MEPDG tables in release 22 were renamed in release 23, this table was removed since the information that was previously contained in the table was added to the renamed TRF_MEPDG_AX_DIST table.

*Other Notes*

RHB_ACO_SP _PROP is included in the release for the first time.  Although this table has existed for some time now, it had not previously been populated, and was therefore not included in the Standard Data Release.

The tables named MEPDG_* in release 22 were renamed TRF_MEPDG as follows:
- MEPDG_ADTT_LTPP_LN was renamed TRF_MEPDG_AADTT_LTPP_LN
- MEPDG_AXLE_DIST was renamed TRF_MEPDG_AX_DIST
- MEPDG_AXLE_DIST_ANL was renamed TRF_MEPDG_AX_DIST_ANL
- MEPDG_AXLE_DIST_ANL_VAR was renamed TRF_MEPDG_AX_DIST_ANL_VAR
- MEPDG_AXLE_PER_TRUCK was renamed TRF_MEPDG_AX_PER_TRUCK
- MEPDG_MONTHLY_ADJ_FACTORS was renamed TRF_MEPDG_MONTH_ADJ_FACTOR
- MEPDG_VEHICLE_CLASS_DIST was renamed TRF_MEPDG_VEH_CLASS_DIST

The new tables were added to the TRF module in the SDR.

In the TRF_MEPDG_AX_DIST table, records where the percentage distribution value for the

axle bin weight range was zero were added to the table. Previously the zero values were left out of the MEPDG_AXLE_DIST table.  The resulting increase in size of the table requires that it be split into five databases due to the limitation of the size of MS Access tables.

This data release contains an update of the climate tables in the CLM module with new data through 2006. For this update, the virtual weather stations statistics were recomputed using the new test section coordinates contained in the SECTION_COORDINATES table.

The data contained in the SMP_FREEZE_STATE and SMP_FROST_PENETRATION table were replaced with the results of a LTPP analysis project which reinterpreted all of the frost measurements on SMP test sections. The new table SMP_FROST_PRESENCE was added as part of this effort.

During the final processing of the upload data it was discovered that the majority of profile elevation data contained in the MON_PROFILE_DATA tables from manual Dipstick measurements had not been filtered in accordance with LTPP guidelines. The problem was traced back to an incorrect setting in the ProQual program used to process LTPP longitudinal profile data prior to upload into the database. While filtered profile data was used in the computation of the ride statistics, the wrong set of profile elevation measurements was loaded into the database. The problem was not able to be corrected prior to the data release. This problem is also present in other data releases.

In the SECTION_COORDINATES table, project level entries were added for all SPS sites. When individual test section coordinate measurements were available using the new global positioning equipment, the SPS project level ID was set to the coordinates of the first test section at the site in the direction of traffic. When new measurements were not available, older measurements were used to populate these records. All SPS sites now contain an entry in the SECTION_COORDINATES table. Use of the SPS_GPS_LINK table is no longer necessary to find the location of SPS site linked to a GPS section.

The SURVEY_WIDTH fields in the MON_DIS_PADIAS42_AC, MON_DIS_PADIAS42_CRCP, and MON_DIS_PADIAS42_JPCP tables were populated with information extracted from the raw survey reports contained in the AIMS data files. The SURVEY_WIDTH field was added to the pavement distress tables since the magnitude of transverse and areal distresses can vary significantly depending on the width of the pavement included in the distress survey. Not all records were able to be updated due to differences in reporting requirements over time.

A significant update was made to the AGGR_TYPE_PCC field in the TST_PC03 table for data included in previous data releases. The TST_PC03 table contains the results of thermal coefficient of expansion tests on PCC layers. The AGGR_TYPE_PCC filed contains information on the classification of the coarse aggregate used in the PCC mix. The type of coarse aggregate used in a PCC mixture has been a primary variable associated with differences in the thermal coefficient of PCC mixes.

# Release 22

This is the 22nd public release of data from the LTPP program. Some of the notable updates, additions, deletions, and changes made to the data since the November 2006 data release include the following:

There are no deleted tables in this release because of structural changes to the database or tables that contain no records.

## *Tables Added*

The most significant addition to data release 22 is the addition of tables containing data extracted from the LTPP traffic database formatted for use as inputs to the Mechanistic-Empirical Guide for the Design of New and Rehabilitated Pavement Structures developed under NCHRP project 1-37A, the MON_DIS_LINK table, and the SECTION_COORDINATES table.

MON_DIS_LINK. This table links distress records in various distress tables that are considered to be part of the same survey.

SECTION_COORDINATES. This table contains updated coordinates for most GPS and SPS test sections measured using high precision global positioning receivers. Where new coordinate measurements have not been made, the previous coordinates contained in the INV_ID and SPS_ID tables were transformed to the new fractional degree and negative longitude format used in this table. The coordinate location fields in the *ID tables have been removed.

SMP_TDR_AUTO_MOISTURE_TLE. This table contains volumetric and gravimetric contents calculated using the transmission line equations (TLE) and micromechanics model to interpret TDR traces store in the SMP_TDR_AUTO table.

SMP_TDR_AUTO_CALIBRATION_TLE. This table contains the values used to calibrate the micromechanics model to each specific TDR sensor used as the basis of volumetric moisture and density computations contained in the SMP_TDR_AUTO_MOISTURE_TLE table.

MEPDG_ADTT_LTPP_LN. This table contains estimates of the annual average daily truck traffic in the LTPP test section lane computed using three different estimates of the inputs.

MEPDG_AXLE_DIST. This table contains normalized axle distributions by month, truck class and axle group. Records in this table are generated from the MM_AX table in the LTPP traffic database that contain at least 210 days of WIM data for a calendar year.

MEPDG_AX_BINS. This table contains the weight range of axle weight bins for data contained in the MEPDG_AXLE_DIST, MEPDG_AXLE_DIST_ANL, and MEPDG_AXLE_DIST_ANL_VAR tables.

MEPDG_AXLE_DIST_ANL. This table contains the annual average normalized axle distribution by class and axle group.

MEPDG_AXLE_DIST_ANL_VAR. This table contains the mean and variance of the elements of the normalized axle distributions by vehicle class and axle type for all years of available site specific monitoring data where at least two years with 210 days of weight data exist.

MEPDG_AXLES_PER_TRUCK. This table contains the annual average number of axles by vehicle class and axle type by year.

MEPDG_MONTHLY_ADJ_FACTORS. This table contains the adjustment factor for of ADTT for each truck class by month.

MEPDG_VEHICLE_CLASS_DIST. This table contains the percentage of trucks by vehicle class within the truck population (FHWA Classes 4-13) on an annual basis.

*Other Notes*

In the MON_DIS_AC_REV and MON_DIS_PADIAS42_AC tables, the fields for raveling, bleeding, and polished aggregate fields where changed from zero to null for pavement surfaces with a preventative maintenance surface treatment as defined in the LTPP directive D-29. This action was taken since by directive these type of defects are not supposed to be rated on these types of pavement surfaces. These rules where based on implementation of the SHRP SPS-3 study, but should not be interpreted as meaning that maintenance applications such as chip seals and slurry seals do not bleed or lose aggregate. The original intent of the SPS-3 data collection guidelines was to evaluate how the selected maintenance treatments affected the existing pavement prior to application of the treatment. These distress data collection rules were applied to all LTPP test sections.

The MAY_OUTPUT field was removed from the MON_PROFILE_MASTER table because the index is no longer relevant to current practice and it had quality issues associated with its computation from some data sets.

In the various MON_DIS_* tables a new field named SURVEY_WIDTH was added that is not currently populated. This field is being added to indicate differences of the width of pavement distress surveys. Differences in the width of measured distress features cause apparent discrepancies in time series analysis of extent of distress features such as transverse cracking. LTPP plans to start to populate this field for the next data release. Advanced database users can add data to these fields for current research objectives based on information contained in the various distress data forms currently contained in the Ancillary Information System available upon request from LTPP customer service.

In this release, the status of data in the inventory module was set to frozen. Frozen status means that LTPP made one last significant effort to review and correct data contained in this module. Required future changes to this data will be made centrally in order to reduce program costs on a priority basis.

# Release 21

This is the 21<sup>st</sup> national release of data from the LTPP program. Some of the notable updates, additions, deletions, and changes made to the data since the November 2005 data release include the following:

*Tables Added*

TST_SS14_UG14_MASTER, TST_SS14_UG14_DATA, and TST_SS14_UG14_COMMENTS. These three tables contain the results from Dynamic Cone Penetrometer tests performed on SPS test sections as part of the SPS Materials Action Plan. This data release contains measurements from several sections. More data is expected to become available in the next data release.

TST_SAMPLE_COMBINE. The purpose of this table is to document the multiple locations used when a sample is combined in order to have enough material to perform a laboratory test. For example, it is often necessary to combine samples of unbound material from different core/borehole locations since the layer is not thick enough to provide enough material to be obtained from one hole. A new sample numbering convention code is being used, which uses an X in the SAMPLE_NO field to indicate the sample is a combined sample. This new convention will be used for materials from the SPS Materials Action Plan. If resources permit, attempts will be made in the future to add entries to this table for previously combined samples which currently use the * or ** convention in the SAMPLE_NO field.

TST_SAMPLE_BASIC_INFO. This table is a view that combines basic sampling information from all the other sampling tables to make certain internal automated quality control checks operations easier, and to provide the user with a single source for sampling information. Information contained in this table comes from TST_ASPHALT_CEMENT, TST_FRESH_PCC, TST_SAMPLE_BULK_AC_AGG, TST_SAMPLE_COMBINE, TST_SAMPLE_LAB_AC_MIX, TST_SAMPLE_LOG, TST_SAMPLE_LOG_LAB, TST_SAMPLE_LOG_SPS_3_4, and TST_UNCOMP_BITUMINOUS.

*Tables Removed*

The results of the backcalculation analysis performed on Falling Weight Deflectometer (FWD) data extracted from the database in 1997 have been removed from the SDR because the results of the analysis were valid for a fixed point in time and the rest of the database is dynamic. If users are interested in obtaining this data they should request a copy of SDR 20 from LTPP Customer Service (LTPPINFO@dot.gov). The tables containing the results of the backcalculation analysis removed are:

MON_DEFL_FLX_BAKCAL_BASIN
MON_DEFL_FLX_BAKCAL_LAYER
MON_DEFL_FLX_BAKCAL_POINT
MON_DEFL_FLX_BAKCAL_SECT
MON_DEFL_FLX_NMODEL_POINT
MON_DEFL_FLX_NMODEL_SECT

MON_DEFL_RGD_BAKCAL_BASIN
MON_DEFL_RGD_BAKCAL_LAYER
MON_DEFL_RGD_BAKCAL_POINT
MON_DEFL_RGD_BAKCAL_SECT

MON_CATEGORY. This table is being discontinued due to changes to monitoring frequencies in response to the LTPP budget under the SAFETEA-LU legislation. The new monitoring frequencies are contained in LTPP Directive GO-38 available from the WWW.LTPP.ORG web site.

### *Other Notes*

#### *Data from the SPS Materials Action Plan*

The SPS Materials Action Plan (MAP) was initiated to address the issue of missing materials test data from test sections in the Specific Pavement Study (SPS) experiments. This data release contains the first material test results from this activity. A partial set of data updates are contained in this data release since material sampling and testing are still being performed. This data release contains more material sampling data than material property test results since testing always lags behind field sampling.

#### *Data from the SPS Traffic Pooled Fund Study*

The traffic pooled fund study is designed to address deficiencies and improve the quality and quantity of monitored traffic data from the SPS -1, -2, -5, -6, and -8 projects. This five-year study consists of two phases. Phase I consists of assessing, evaluating, and calibrating the current Weigh-In-Motion (WIM) and Vehicle Classification (VC) systems used to collect traffic data at the SPS sites across the country. Phase II consists of installing and maintaining new WIM equipment as necessary to ensure high-quality data collection. This is the first release of data from Phase II of the study for the Colorado SPS-2, Maryland SPS-5, and Illinois SPS-6 project sites. The data release also contains traffic data from sites validated as part of Phase I from Florida SPS-1 and 5, Ohio SPS-1 and 2, Texas SPS-1, and Michigan SPS-1.

#### *Photographic Distress and Transverse Profile Data Reconciliation*

After SDR 20, a major effort was made to reconcile pavement distress and transverse profile measurements performed using photographic based technology. The objective of this reconciliation was to resolve discrepancies between field measurements and data contained in the database. This effort has resulted in the addition of approximately 600 distress surveys stored in the MON_PADIAS42_* tables and 1,400 transverse profile measurements stored in the MON_T_PROF_* tables. Some of these data date back to the start of pavement test section monitoring in1990.

# Release 20.0

This was the 20th national release of data from the LTPP program.  This release contains some revisions to data included in the January 2005 Data Release.   In addition, several tables have been added to this release as noted below:

*Tables Added*

TST_SAMPLE_BULK_AC_AGG. This new table in the Material Testing module contains information on bulk aggregate sampled at asphalt concrete plants for test sections included in the SPS-9 SuperPave experiment.

TST_SAMPLE_LAB_AC_MIX. This new table in the Material Testing module contains information on laboratory mixed AC samples for test sections included in the SPS-9 SuperPave experiment.

*Tables Removed*

RHB_ACO_SP_PROP. This table was added in SDR 19 and has no data in it yet.  It will be included in future releases if data becomes available.

*Other Additions to Release 20.0*

*CONSTRUCTION_NO added to tables:*

The field CONSTRUCTION_NO field was added to the following Material Testing tables: TST_ASPHALT_CEMENT, TST_FRESH_PCC, TST_SAMPLE_BULK_AC_AGG, TST_SAMPLE_LOG_SPS_3_4, TST_UNCOMP_BITIMINOUS.

*Other Notes*

*Backcalculation Tables:*

This is the last release of the FWD backcalculation tables in the SDR. This data was calculated from FWD data that was available in 1997.  It has become cost prohibitive to continue updates and support these data elements in response to changes and corrections are made to the baseline FWD data. An update was made to these tables to remove records which could no longer be traced to the source FWD data, and to correct these tables with changes made to the source data tables.

*MON_T_PROF_CROSS_SLOPE table*

Population of this table for manual transverse profile measurements for all previous measurements was completed for this data release. From this data, a data user now has the capability of determining if ruts can hold water from a transverse cross slope perspective.

## Known Data Issues Not Yet Reported

The mechanism for reporting LTPP data problems is currently called the Data Analysis/Operations Feedback Report (DAOFR). ~~LTPP data users can view resolved and unresolved DAOFRs at the LTPP web site: http://www.fhwa.dot.gov/pavement/ltpp.~~ Removed from web site in 2013.

The following unresolved data issues reported in the release notes for data release 19 have not yet been fully addressed. DAOFRs will be prepared in the near future to better document these previously identified problems. Unresolved data problems previously identified in this data upload have already been submitted as DAOFRs to FHWA.

| Table | Problem |
|---|---|
| AWS_HOURLY_DATA | For site 350101, the pyranometer readings are suspect. |
| MON_DIS_JPCC_FAULT | For certain sections, the faulting values are very inconsistent over time. |
| MON_DIS_JPCC_FAULT | The POINT_LOC value assigned to a given crack or joint varies slightly over time on some sections |
| MON_DIS_JPCC_FAULT | For certain POINT_LOC's on given section, there are large spikes in the measured faulting value. |
| MON_DIS_JPCC_FAULT | For a given POINT_LOC, the CRACK_OR_JOINT designation changes over time for some sections. |
| MON_DIS_*_REV | Many null values should in fact be recorded as zero. |
| MON_DIS_AC_REV | The fatigue cracking values on 010102 are suspect. |
| MON_DIS_CRCP_REV | For 185518, OTHER indicates multiple patches, while the patching fields indicate only one. |
| MON_DIS_AC_REV | For a number of sites, BEFORE_TEMP and AFTER_TEMP are zero during summer months, indicating that the values should probably be null instead. |
| MON_DIS_JPCC_REV | Inconsistent rating of transverse cracking on sections 290704, 290705 |
| MON_DIS_JPCC_REV | inconsistent rating of map cracking on section 100210 |
| MON_DIS_JPCC_REV | On section 124000, 7/21/99, OTHER indicates presence of map cracking, though map cracking field contain zeroes. |
| MON_DIS_JPCC_REV | For the 8/7/91 survey on the 2906** sections, OTHER indicates pumping, while the pumping fields indicate none. |
| MON_DIS_JPCC_REV | For 18A430, 5/1/91and 370201, 9/19/02, OTHER indicates polished aggregate, but POLISH_AGG_A = 0. |
| MON_DIS_JPCC_FAULT | EDGE and WHEELPATH measurements differ by > 12mm |
| SMP_ATEMP_RAIN_HOUR | Temperatures very low for certain dates on sections 131031(-42) and 351112 (-49) |
| SMP_ATEMP_RAIN_DAY | hourly average in HOUR outside min and max  values in DAY |
| SMP_ELEV_PCC_DATA | Sections 274040(9/22/93), 484143(9/25/97), and 833802(various dates) have questionable elevation data. |
| SMP_ELEV_AC_DATA | Questionable elevation data on 310114, 390901, 460804, 469187, 501002, 831801, and 906405. |
| SMP_MRCTEMP_AUTO_DAY_STATS | 483739, THERM_NO =18(after 5/6/00) and 11(after6/6/00) have very high values - looks like bad sensor. |
| SPS9_PMA_PROFILE | 180901, 0902, 0904, and 0905 have zero PROFILE_INDEX, which is not a reasonable value. |
| TRF_EQUIPMENT_MASTER | Where sensor type is null, it should be N. |

| Table | Problem |
|---|---|
| TST_AC01_LAYER | Sections/layers: 04_1021 layers 6,7; 18_5518 layers 9,10; 18_6012, layer 11; 19_3006 layers 5,6; 19_3055 layers 5,6; and section 27_1085 layer 5, do not have matching layers in TST_L05B |
| Various | In many TST tables, there are SAMPLE_NO entries that do not have a match in one of the sampling tables. |
| Various | In many TST tables, there are LOC_NO entries that do not have a match in one of the sampling tables. |
| TST_AC02 | For many sections, the LAYER_NO reported does not have a match in TST_L05B. |
| TST_AC04 | comments indicate multiple samples, but LOC_NO or SAMPLE_NO are for a single sample. |
| TST_AE01 | There are many ASH_CONTENT values over 2, which may indicate the test was not performed properly. |
| TST_HOLE_LOG | Many section have holes with locations far outside section boundaries (+/1 200'). |
| TST_HOLE_LOG | There are many records with negative TRANS_POS, but a LOC_NO not indicative of shoulder testing. |
| TST_HOLE_LOG | Many of the values in REPL_LOC_NO are not in LOC_NO for that section. |
| TST_HOLE_LOG | For many SPS testing locations, POINT_LOC is within another section according to SPS_PROJECT_STATIONS. |

# Release 19.0

This was the 19th national release of data from the LTPP program.  This release contains some revisions to data included in the July 2004 Data Release.  This Data Release also includes a new software program, ESALCalc.  In addition, several tables have been added to this release and some deleted, as noted, below:

*Tables Added*

*MON_T_PROF_CROSS_SLOPE:*  This new table contains the elevation of the last data point, relative to the begin point, of manual transverse profile measurements made using the Dipstick device. This allows the transverse profile data to be de-normalized so that the true elevation profile, relative to the outside edge of the pavement lane, may be computed. This table is expected to be fully populated in 2006.

*SMP_TDR_MANUAL_MOISTURE:*  This table contains volumetric and gravimetric moisture content computed from dielectric constants interpreted and calculated from manually recorded TDR traces.

*CLM_VWS_HUMIDITY_DAILY, CLM_VWS_PRECIP_DAILY, CLM_VWS_TEMP_DAILY, CLM_VWS_WIND_DAILY:*  These four tables were created to mirror similar monthly and annual climatic tables and to allow more selective analysis of the various daily data elements.  These tables replace the table CLM_VWS_DATA_DAILY.  In addition, all Climatic tables contain data that were recomputed from Level E data provided by a national weather agency.

*RHB_ACO_SP_* Tables*

Three new Rehabilitation tables were added to this SDR. These tables are used for non-recycled asphalt pavement overlays using SuperPave properties. The tables and their description are listed in the table below:

| SDR Table Name | Contents |
|---|---|
| RHB_ACO_SP_AGGR_PROP | This table contains SuperPave AC overlay aggregate properties. |
| RHB_ACO_SP_MIX PROP | This table contains SuperPave AC overlay mixture properties as placed. |
| RHB_ACO_SP_PROP | This table contains SuperPave AC overlay asphalt cement properties. |

**Tables Removed**

*MON_T_PROF_DEV_CONFIG:* This table contains information on equipment configuration settings used to capture, digitize, and interpret transverse profile measurements using the photographic and manual dipstick measurement methods. Note that transverse profile measurements based on the photographic method are obtained at the same time as the photographs for the film-based distress interpretations. Since this table provides little information to the data user, it is no longer included in the SDR.

*Rehabilitation Tables*

Several Rehabilitation tables were removed from this Data Release since there are no data stored in the tables. Listed below are the tables that have been removed:

RHB_CMRAP_COMBINED_AGG
RHB_CMRAP_LAB_AGED_AC
RHB_CRACK_SEAT_PCC
RHB_PCCO_STEEL
RHB_PRESSURE_RELIEF
RHB_RCYPCC_COMBINED_AGGR
RHB_RCYPCC_CONSTRUCTION
RHB_RCYPCC_JOINT
RHB_RCYPCC_MIXTURE
RHB_RCYPCC_NEW_AGGR
RHB_RCYPCC_STEEL
RHB_RCYPCC_STRENGTH

*SPS Tables*

Several SPS tables were removed from this Data Release since there are no data stored in the tables. Listed below are the tables that have been removed:

SPS4_TRANSIENT_GENERAL
SPS4_TRANSIENT_MEASURE
SPS6_TRANSFER_EFFICIENCY
SPS7_LOAD_TRANSFER
SPS7_PCC_CRACK_SEAL
SPS7_ TRANSFER_EFFICIENCY
SPS7_UNDERSEALING
SPS8_PCC_FULL_DEPTH
SPS9_AC_PATCHES
SPS9_DIAMOND_GRIND
SPS9_PCC_JOINT_RESEAL
SPS9_RUT_LEVEL_UP
SPS9_UNDERSEALING

*TST_SC06:* This table was intended to contain measurements of excess asphalt in bituminous mixtures obtained by using a loaded wheel and sand cohesion. Although the table structure exists, no data for this test were ever loaded into the database. Since this table is empty, it is not included in the SDR.

*TST_SC13:* This table was intended to contain measurements of the polish value of aggregates used in chip seals applied to SPS-3 sections only. Although the table structure exists, no data for this test were ever loaded into the database. Since this table is empty, it is not included in the SDR.

*TRF_MONITOR_BASIC_INFO:* This table has been replaced by outputs from the ESALCalc software.

### Other Additions to Release 19.0

*ESALCalc Software*

A computer program called ESALCalc is included in the January 2005 SDR. This software will compute annual ESAL estimates from traffic monitoring data and pavement structure data. A manual is included with the software.

*Restructuring of Data Modules and CD Contents*

Two data modules had to be restructured due to database size limitations in Microsoft® Access 2000. The Climate module was split into three databases: Climate_Daily_Humid_Precip, Climate_Daily_Temp_Wind, and Climate_Summary_Data. The two Climate_Daily_* databases contain daily tables, while the Climate_Summary_Data database contains monthly, annual, and all other Climate tables.

The Seasonal Monitoring Program (SMP) module was divided into two new databases: Seasonal_Monitoring and Seasonal_Monitoring_TDR_Meas. The time-domain reflectometry (TDR) measurement tables are in the Seasonal_Monitoring_TDR_Meas database, while all other

SMP tables are in the Seasonal_Monitoring database.

In addition, the data modules had to be rearranged on CDs 1 and 2. The SMP and Backcalculation modules were added to CD 2, which also contains FWD Measurements. This CD has been renamed "Seasonal Monitoring and Deflection". CD 1 remains the same, minus the SMP and Backcalculation modules. CD 1 is referred to as the "Primary Data Set".

## *Issues Identified Since Release 18.0*

Below is a table that describes data issues found during a review of the July 2004 Data Release. Data analysts should review this list when performing research.

| Table | Issue |
|---|---|
| AWS_HOURLY_DATA | For site 350101, the pyranometer readings are suspect. |
| EXPERIMENT_SECTION | The TRAFFIC_RS field is not populated correctly for some records. |
| MON_DIS_JPCC_FAULT | For certain sections, the faulting values are very inconsistent over time. |
| MON_DIS_JPCC_FAULT | The POINT_LOC value assigned to a given crack or joint varies slightly over time on some sections. |
| MON_DIS_JPCC_FAULT | For certain POINT_LOC's on given section, there are large spikes in the measured faulting value. |
| MON_DIS_JPCC_FAULT | For a given POINT_LOC, the CRACK_OR_JOINT designation changes over time for some sections. |
| MON_DIS_*_REV | Many null values should, in fact, be recorded as zero. |
| MON_DIS_AC_REV | The fatigue cracking values on 010102 are suspect. |
| MON_DIS_CRCP_REV | For 185518, OTHER indicates multiple patches, while the patching fields indicate only one. |
| MON_DIS_AC_REV | For a number of sites, BEFORE_TEMP and AFTER_TEMP are zero during summer months, indicating that the values should probably be null instead. |
| MON_DIS_CRCP_REV | On section 485328, 1/22/01, PHOTO_VIDEO = P, but comments indicate no pictures obtained. |
| MON_DIS_CRCP_REV | 485274, 2/11/97 has LONG_JOINT_SEAL_NO = 0, LONG_JOIN_SEAL_DAM_L > 0. |
| MON_DIS_JPCC_REV | Inconsistent rating of transverse cracking on sections 290704, 290705. |
| MON_DIS_JPCC_REV | For a number of surveys on various sites, the number of map cracking areas is zero, but the area is non-zero. |
| MON_DIS_JPCC_REV | Inconsistent rating of map cracking on section 100210. |
| MON_DIS_JPCC_REV | On section 124000, 7/21/99, OTHER indicates presence of map cracking, though map cracking field contains zeroes. |
| MON_DIS_JPCC_REV | For 313033, 11/16/99 and 290605, 7/20/95, PUMPING_NO = 0 while PUMPING_L > 0. |
| MON_DIS_JPCC_REV | For the 8/7/91 survey on the 2906** sections, OTHER indicates pumping, while the pumping fields indicate none. |

| Table | Issue |
|---|---|
| MON_DIS_JPCC_REV | For 18A430, 5/1/91and 370201, 9/19/02, OTHER indicates polished aggregate, but POLISH_AGG_A = 0. |
| MON_DIS_JPCC_FAULT | EDGE and WHEELPATH measurements differ by > 12mm. |
| SMP_JOINT_FAULT | Various fault values are entered to 0.1mm, but the device is supposed to read to 1mm only. |
| SMP_ATEMP_RAIN_HOUR | Temperatures very low for certain dates on sections 131031(-42) and 351112 (-49). |
| SMP_ATEMP_RAIN_DAY | Hourly average in HOUR outside min and max values in DAY. |
| SMP_ELEV_PCC_DATA | Sections 274040 (9/22/93), 484143 (9/25/97), and 833802 (various dates) have questionable elevation data. |
| SMP_ELEV_AC_DATA | Questionable elevation data on 310114, 390901, 460804, 469187, 501002, 831801, and 906405. |
| SMP_ATEMP_RAIN_DAY | 483739 (2/15/97) has null daily values where there is sufficient info in the hourly table (>20 hours) to calculate it. |
| SMP_MRCTEMP_AUTO_DAY_STATS | 483739, THERM_NO =18(after 5/6/00) and 11(after6/6/00) have very high values - looks like bad sensor. |
| SPS9_PMA_PROFILE | 180901, 0902, 0904, and 0905 have zero PROFILE_INDEX, which is not a reasonable value. |
| TRF_EQUIPMENT_MASTER | Where sensor type is null, it should be N. |
| TST_HOLE_LOG | 460901, FIELD_SET = 1 has multiple construction numbers associated with it - which can cause incorrect CN assignment. |
| TST_AC01 | 089020, FIELD_LAYER_NO = 4 has an average thickness of zero. |
| TST_AC01_LAYER | 2606** layers 4, 5, 6, 260902 layers 5, 6, 7, 469197 layer 5, and 511423 layer 6 do not have matching layers in TST_L05B. |
| TST_AC01_LAYER | For 18A959, there are records with FIELD_LAYER_NO = 1 (which would be subgrade). |
| Various | In many TST tables, there are SAMPLE_NO entries that do not have a match in one of the sampling tables. |
| Various | In many TST tables, there are LOC_NO entries that do not have a match in one of the sampling tables. |
| Various | In many TST tables, there are LAYER_NO entries that do not have a match in TST_L05B. |
| Various | Some records in TST_AE03, PC03, PC06, SS01_UG01_UG02, SS04_UG08, UG04_SS03, and UG05_SS05 have test results reported for layers inappropriate for the test type (bound layers for unbound tests, etc…). |
| TST_AC04 | Comments indicate multiple samples, but LOC_NO or SAMPLE_NO are for a single sample. |

| Table | Issue |
|---|---|
| TST_AE01 | There are many ASH_CONTENT values over 2, which may indicate the test was not done properly. |
| TST_HOLE_LOG | Many sections have holes with locations far outside section boundaries (+/- 200'). |
| TST_HOLE_LOG | There are many records with negative TRANS_POS, but a LOC_NO not indicative of shoulder testing. |
| TST_HOLE_LOG | Many of the values in REPL_LOC_NO are not in LOC_NO for that section. |
| TST_HOLE_LOG | For many SPS testing locations, POINT_LOC is within another section according to SPS_PROJECT_STATIONS. |
| TST_L05B | Several records have inconsistent LAYER_TYPE and DESCRIPTION. |

## Release 18.0

This was the 18th national release of data from the LTPP program.  This release contains some revisions to data included in the January 2004 Data Release.  New tables included for the first time in this release and updates are noted in the following:

### Ground Penetrating Radar Module

In 2003, Ground Penetrating Radar (GPR) measurements were performed on a subset of LTPP sections to provide an estimate of layer thickness variations within the monitoring portion of the test section. The measurements were performed on all SPS-1 project sites still in-service at the time. Measurements were also performed on one selected SPS-2, and SPS-5, and SPS-6 project site. The results of the measurements are stored in the GPR data module.  Listed below are the tables and a brief description of each:

| SDR Table Name | Contents |
|---|---|
| GPR_MASTER | One record is included in GPR_MASTER for each measurement pass on a test section. Typically there are two measurement passes on a test section. |
| GPR_THICK_POINT | This table contains the results of the thickness interpretations from the GPR measurements. |
| GPR_THICK_SECT | This table contains statistics on the thickness and dielectric constant from data contained in the GPR_THICK_POINT table whose stations fall inside the monitoring portion of the test section. |
| GPR_LINK_LAYER | This table provides a link between pavement layers identified in the GPR measurements and pavement layers identified by other means. It is not possible to identify layers with similar material properties with GPR measurements. To analyze GPR data, multiple layers in the |

| SDR Table Name | Contents |
|---|---|
| | physical pavement structure can be combined into a single layer. |

### *Drainage Inspection Tables*

Three new tables were added to the Monitoring module containing data information on the condition of the edge drain systems installed at the SPS-1, and -6 projects. In the future, tables may be added for other drainage feature evaluations.  Listed below are the tables and a brief description of each:

| SDR Table Name | Contents |
|---|---|
| MON_DRAIN_MASTER | This table contains information on the permanent features of the edge drain system and the location of the lateral openings. |
| MON_DRAIN_CONDITION | This table contains information regarding the condition of the lateral openings and the area around the lateral openings at the time of inspection. |
| MON_DRAIN_INSPECT | This table contains information on the results of the video edge drain inspection. |

*TST_UNBOUND_SPEC_GRAV:*  This table contains the specific gravity of unbound base and subgrade materials. Since this test was not specified in the original material test guidelines for LTPP sections, data are only available for a subset of test sections. The current source of this data is from resilient modulus tests performed by one of the LTPP contract laboratories. Although not required, that laboratory contractor included this measurement in their test results. Test data are currently available for test sections in the North Atlantic and Southern Regions. Depending on budget constraints, it is planned to obtain these measurements from SPS project sites in the future. There are no plans to obtain this data from other GPS test sections. This table is currently undergoing population and not all of the available data have been entered.

### *Climate Data*

This release contains a major data update to the Climatic module covering the period from 1997 to 2002. Additions and corrections were made to the CLM_SITE_VWS_LINK table to add links for test sections and SPS projects missing in the previous data releases. The QC on the CLM tables was run with a "no manual upgrade" policy. A very small percentage of records failed one or more checks and were left in the database with a non-level E RECORD_STATUS.

### *Data Dictionary and Codes*

This data release contains a major revision to the data dictionary contained in the LTPPDD table and the codes contained in the CODES table. Some of the revisions included removing fields no longer needed, modifying field descriptions, updating the field indicating the data sheet used to record the data, and adding missing codes.

*Tables Removed*

Three tables that were included in previous releases were removed from this release.  TST_L06 and TST_L07, which contained the sample disposal record for AC and PCC specimens, were removed since they contained information of little use to a data analyst. The table SMP_WATERTAB_DEPTH_AUTO was also excluded since there was no data in the table, and no data is expected in the future.

## Release 17.0

Data Release 17.0 was made available in January 2004.  This release contains some revisions to data included in the July 2003 Data Release. No changes or updates have been made to data in the climatic and dynamic load response modules.

*SuperPave Asphalt Binder and Mixture Tests*

Data Release 17 contains, for the first time, the data from SuperPave-related asphalt binders and mixtures. This data includes test results from the dynamic shear rheometer, bending beam rheometer, direct tension, gyratory compaction, and volumetric and gravimetric properties of gyratory compacted specimens. This data represents only a partial set of available data. LTPP contractors are still in the process of entering these data and resolving errors. More data are expected to be included in Release 18. Data users are encouraged to contact LTPP Customer Service with questions or problems that they may find in the contents of these new tables.

To store these data, the following eleven tables were added to the material test module (TST).

| SDR Table Name | Contents |
| --- | --- |
| TST_LINK_LAYER | Links between TST_ID and layers in TST_L05B |
| TST_LINK_SAMPLE | Links between TST_ID and samples in TST_SAMPLE_LOG |
| TST_AE07_MASTER | Sample and configuration information for Dynamic Shear Rheometer (DSR) test |
| TST_AE07_DATA | Data from Dynamic Shear Rheometer (DSR) test |
| TST_AE08_MASTER | Sample and configuration information for Bending Beam Rheometer (BBR) test |
| TST_AE08_DATA | Data from Bending Beam Rheometer (BBR) test |
| TST_AE09_MASTER | Sample and configuration information for Direct Tension (DT) test |
| TST_AE09_DATA | Data from Direct Tension (DT) test |
| TST_SP01_MASTER | Sample and configuration information for gyratory compaction test |
| TST_SP01_DATA | Data from gyratory compaction test |
| TST_SP02 | Asphalt mix volumetric and gravimetric information |

Since some of these tests represent samples of materials used in more than one layer on multiple test sections, a field named TST_ID is used as primary key in these tables to link material test

results to test sections and pavement layers. The TST_LINK_LAYER table provides a linkage between TST_ID and test sections and pavement layers in the TST_L05B table, using the fields STATE_CODE, SHRP_ID, CONSTRUCTION_NO, and LAYER_NO. The TST_LINK_SAMPLE table provides linkage between TST_ID and material sampling information contained in TST_SAMPLE_LOG using the fields STATE_CODE, SHRP_ID, FIELD_NO and SAMPLE_NO.

### Supplemental Test Section QC

This is the first data release that includes the results of quality checks on data from supplemental test sections constructed on the Specific Pavement Studies sites. The RECORD_STATUS field in records for supplemental test sections should now be populated as it is for other test sections. Although the majority of the new checks worked as expected, data users may find some anomalies that have not been corrected. Please contact LTPP Customer Service with questions or issues related to supplemental section QC.

### SPS 9 Construction Data

SPS-9 construction data was first released in the July 2003 data release. Work continues on entering SPS-9 construction data to the SPS module.

### Traffic Monitoring Data

Processing of traffic monitoring data collected between 1999 and 2002 has been substantially completed. Work continues on loading and resolving errors in "problem" data sets from this time period. More traffic monitoring data is expected to be available in the next data release.

### Distress Data

Distress data processed by version 1.0 of the Padias software is being reprocessed with version 4.2 of the software.  Distress survey records that have been migrated to the MON_DIS_PADIAS42 tables over the past several data releases have been removed from the MON_DIS_PADIAS tables.


## Release 16.0

Data Release 16.0 was available in July 2003. This release contains some revisions to data included in the January 2003 Data Release and includes new pavement monitoring, construction and materials test data collected through May 2003.

One new table, TRF_MONITOR_LTPP_LN, was added to the Traffic module for this release. Another table, TRF_MONITOR_AXLE_DISTRIB, was restructured.  The old TRF_MONITOR_AXLE_DISTRIB table was structured as one record per axle type per weight bin or 160 records per site per year. All bins and all axle types are present for every site (even some without weight data).  The new TRF_MONITOR_AXLE_DISTRIB has one record per

axle type per vehicle class or a maximum of 40 records per site per year.  If an axle type or vehicle class was not weighed, there is no record in the database.

LTPP is in the process of implementing new and improved traffic analysis software and clearing the backlog of unprocessed traffic monitoring data. The two tables noted above contain the output from the new analysis software for pre-1998 data previously processed using the old software and post-1998 data that had not previously been processed and released. It is anticipated that the backlog of un-processed traffic monitoring data will be cleared in 2004. Some of the tables containing data created by the old traffic analysis software have been removed from this release.

This release also contains the first release of data from all of the SPS-9 construction data tables.

A new table, LTPPTD, was added to the administration module. This table contains table descriptions for all of the tables included in the release. The Table Navigator software included in the release automates the database schema, including descriptions of all tables, fields and codes.