

National Research Council

# STRATEGIC HIGHWAY RESEARCH PROGRAM



SPECIFIC PAVEMENT STUDIES  
DATA COLLECTION GUIDELINES  
FOR EXPERIMENT SPS-2  
STRATEGIC STUDY OF STRUCTURAL FACTORS  
FOR RIGID PAVEMENTS

STRATEGIC HIGHWAY RESEARCH PROGRAM  
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SPECIFIC PAVEMENT STUDIES  
DATA COLLECTION GUIDELINES FOR EXPERIMENT 2,  
STRATEGIC STUDY OF STRUCTURAL FACTORS FOR RIGID PAVEMENTS

INTRODUCTION

This document provides guidelines and instructions for collection of data for the Specific Pavement Studies SPS-2 experiment, Strategic Study of Structural Factors for Rigid Pavements. Forms for recording and reporting this data are also included.

This report should be used in conjunction with the following reports:

- Operational Memorandum No. SHRP-LTPP-OM-018, "Specific Pavement Studies: Construction Guidelines for Experiment SPS-2, Strategic Study of Structural Factors for Rigid Pavements", December 1990
- Operational Memorandum No. SHRP-LTPP-OM-022, "Specific Pavement Studies: Materials Sampling and Testing Requirements for Experiment SPS-2, Strategic Study of Structural Factors for Rigid Pavements", April 1991
- Operational Guide No. SHRP-LTPP-OG-001, "Data Collection Guidelines for the Long Term Pavement Performance Studies"
- Operational Guide No. SHRP-LTPP-OG-006, "SHRP-LTPP Guide for Field Materials Sampling, Testing, and Handling", May 1990
- Operational Guide No. SHRP-LTPP-OG-004, "SHRP-LTPP Interim Guide for Laboratory Material Handling and Testing", February 1991
- Other SHRP-related guides and operational memoranda

Data elements that will be collected for this experiment are classified into the following groups:

Test Section Location Reference Table  
Construction  
Field Materials Sampling and Testing  
Laboratory Materials Testing  
Deflection  
Profile  
Distress  
Skid Resistance  
Traffic  
Climate  
Maintenance  
Rehabilitation

The data collection and reporting process for SPS test sites requires the completion of specific data sheets from the Data Collection Guide for Long-Term Pavement Performance Studies which were developed for the General Pavement Studies (GPS) and data sheets developed specifically for Specific Pavement Studies (SPS). The SPS project-specific data sheets address construction data and aspects of the materials sampling and testing activities.

This report addresses the data to be collected during site construction. Data obtained from monitoring activities performed after construction will be reported on data forms similar to those used for the GPS test sections.

#### PROJECT VERSUS SECTION SPECIFIC DATA

In contrast to the General Pavement Studies test sections, each SPS site includes several test sections. Several data items including traffic, climate and some inventory data elements will be applicable to all test sections of an SPS site. Also, several construction data items such as concrete mix design data and surface thickness will apply to more than one test section. However,

a large portion of the data elements will be specific to each test section. Data items common to all test sections will be referred to as "project level data" while data items specific to each test section will be referred to as "section specific data."

#### SPS TEST SECTION NUMBERING SCHEME

The structure of the SPS test section numbering scheme will differ from that used for the GPS test sections to help identify project and test section specific data. Each GPS test section is identified with a six digit code consisting of a two digit STATE CODE and a four digit SHRP SECTION ID number. Also, each SPS test section will be identified with a six digit code that will consist of a two digit STATE CODE and a four digit SHRP SECTION ID number. However, this SHRP SECTION ID number will consist of a two digit SPS PROJECT CODE and a two digit TEST SECTION NUMBER.

The far left two digits are the STATE CODE designator. The same STATE CODE used for GPS test sections will be used for the SPS experiments. Table A.1 of the LTPP Data Collection Guide lists the STATE CODE for all states and provinces, District of Columbia, and Puerto Rico.

The middle two digits are the SPS PROJECT CODE. The first digit of this code is the multiple site designator to distinguish between multiple sites of the same SPS experiment constructed in the same state or province. A zero "0" is assigned to the first site of a specific SPS experiment constructed in a state or province. An "A", "B", "C", etc. is assigned to the second, third, fourth, etc. project of the same SPS experiment constructed in the same state or province. The second digit of this code designates the SPS experiment number, i.e. "2" for SPS-2 test sites.

The far right two digits are the TEST SECTION NUMBER. A different two digit number is assigned for each test section on a test site. The test section numbers for the SPS-2 test sections are specified in Operational Memorandum No. SHRP-LTPP-OM-018, "Specific Pavement Studies: Construction Guidelines for

Experiment SPS-2, Strategic Study of Structural Factors for Rigid Pavements", December 1990. Test section numbers for the supplemental test sections on the SPS project should be specified by the SHRP regional office in coordination with the participating highway agency.

Thus, the combination of the STATE CODE and SPS PROJECT CODE uniquely identifies each SPS test site. For "section specific data", the assigned TEST SECTION NUMBER in combination with the STATE CODE and SPS PROJECT CODE numbers will be used. However, for "project level data" "00" will be used as the TEST SECTION NUMBER to differentiate these data from the "section specific data", for which a test section number (01 through 24, or higher for supplementary test sections) should be used.

## FIELD MATERIALS SAMPLING AND TESTING

Field materials sampling and testing shall be performed following the guidelines outlined in Operational Memorandum No. SHRP-LTPP-OM-021, "Specific Pavement Studies: Materials Sampling and Testing Requirements for Experiment SPS-2, Strategic Study of Structural Factors for Rigid Pavements", April 1991. This operational memorandum incorporates by reference the material included in Operational Guide No. SHRP-LTPP-OG-006, "Field Materials Sampling, Testing, and Handling" which was developed for the General Pavement Studies. This Guide will form the basis for the conduct of a substantial portion of the field materials sampling and testing activity for the SPS-2 experiment. The operational memorandum for the SPS-2 experiment includes revised field data forms and new data sheets for recording data from materials sampling and testing activities performed during construction.

### REVISED FIELD DATA FORMS

As the requirements for the materials sampling of SPS projects differ from those for GPS sections, the field materials sampling and testing data forms used in the GPS program were modified. The primary changes common to each form relate to test section number, sampling location referencing, and sampling area number.

Test Section Number. The six digit test section identification numbers on the data forms have been subdivided into three, two digit fields representing the state code, SPS project code, and test section number. The structure of this number is described in the section entitled, "SPS Test Section Numbering Scheme", of this report.

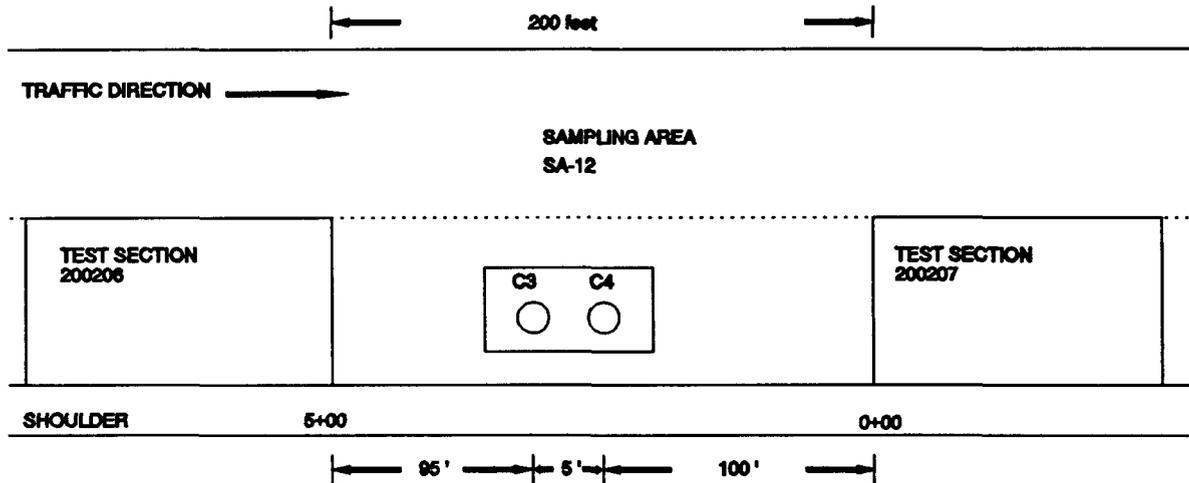
Sample Location Reference System. All material sampling and field testing data forms which reference the location of a sample or test use a station, offset and sampling area number. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. These sampling numbers are developed as part of the materials sampling plan for the test site and should run in sequential order in the direction of traffic.

The station to be specified on these data forms is referenced from either the beginning or end of the test sections adjacent to the sampling area. For expediency in the field, the station number designated on the form is relative to the test section number designated on the data form. Thus, if the sampling area occurs after the referenced test section, the station number should be greater than 5+00. If the sampling area occurs in front of the designated test section, the station number should be negative. This station number should not be the reference project station number, as outlined in the section entitled, "Construction Data" of this report. Thus, the relative test section station number and the reference project station number will be the same only on the first test section of a project, since the beginning point of the first test section is defined as the project station 0+00. The offset distance is measured from the outside edge of the test section lane to the core location.

Figure 1 illustrates the location referencing system to be used for SPS material samples. In this example, a sampling area, designated SA-12, is situated between sections 200206 and 200207. In sampling area SA-12, two 4-inch diameter C-Type cores, C3 and C4, are located 5 feet apart and three feet from the edge of the lane. The location of these two cores can be specified relative to either test section 200206 (alternative 1) or test section 200207 (alternative 2). In alternative 1, the station number of core C3 is 5+95 since it is 95 feet past the end of section 200206. Core C4 is located at station 6+00. In alternative 2, the station numbers of cores C3 and C4 are -1+05 and -1+00, respectively since they occur in advance of test section 200207. Thus when specifying the sampling locations on the field data form, the station number written on the form must correspond to the test section.

#### LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING DATA SHEETS

Most of the LTPP-SPS Material Sampling and Field Testing data sheets use the same top block of information related to the test section and project.



	Alternative 1 Location referenced to test section 200206	Alternative 2 Location referenced to test section 200207
<b>CORE C3 LOCATION</b>		
STATE CODE	20	20
SPS PROJECT CODE	02	02
TEST SECTION NO	06	07
STATION	5+95	-1+05
OFFSET	03	03
<b>CORE C4 LOCATION</b>		
STATE CODE	20	20
SPS PROJECT CODE	02	02
TEST SECTION NO	06	07
STATION	6+00	-1+00
OFFSET	03	03

In this example of the location referencing system, designated sampling area SA-12 is situated between sections 200206 and 200207. In SA-12, two 4" C-type cores are specified, C3 and C4, to be 5 feet apart and three feet from the edge of the lane. The location of these two cores can be specified relative to either test section 200206 (alternative 1) or test section 200207 (alternative 2). In alternative 1, the station number of core C3 is 5+95 since it is 95 feet past the end of section 200206. Core C4 is at station 6+00. In alternative 2, the station number of core C3 is -1+05 and C4 is -1+00 since they occur in advance of test section 200207. Thus, when specifying the sampling locations on the field data form, the station number written on the form must correspond to the test section indicated on the form.

Figure 1. Illustration of Location Referencing System

SHEET NUMBER. Since several data sheets will be required to record the samples and test data from each sampling area on the project, room is provided on all data forms to sequentially number the data sheets. The first field is the sequential number of the data sheet and the second field is the total number of data sheets completed.

SHRP REGION. Indicate the SHRP-LTPP region in which the state or province is located, i.e. North Atlantic, North Central, Southern, or Western.

STATE. Indicate the name of the state, District of Columbia, Puerto Rico, or the Canadian Province in which the project is located. Alternatively, use the two letter abbreviation shown in Table A.1 of the LTPP Data Collection Guide.

STATE CODE. Enter the two-digit numeric code corresponding to the state or province as shown in Table A.1 of the LTPP Data Collection Guide.

SPS PROJECT CODE. The two digit SPS project code. The first digit (from the left) of this code should either be a 0 (zero), for the first SPS-2 project constructed in a state, or a letter starting with A, B, etc. for the second, third, etc. project of the same SPS experiment constructed in the same state. The second digit corresponds to the SPS experiment number.

TEST SECTION NO. The two digit number assigned to the test section (refer to Operational Memorandum No. SHRP-LTPP-OM-018).

SPS EXPERIMENT NO. The SPS experiment number for the project. This should be "2" for projects in the SPS-2 experiment, "Strategic Study of Structural Factors for Rigid Pavements".

ROUTE/HIGHWAY. Record the designation for the route or highway on which the project is located.

LANE. Record a "1" if sampling occurs on the outside lane and a "2" if sampling occurs on the inside lane. Drilling and sampling shall always occur on the outside lane for the SPS experiments.

DIRECTION. Record the direction of travel at the project site. Use the following abbreviations:

- E for eastbound traffic direction
- W for westbound traffic direction
- N for northbound traffic direction
- S for southbound traffic direction

SAMPLE/TEST LOCATION. Check "Before Section" if the sampling area is located before the beginning of the test section indicated under TEST SECTION NUMBER on the form (station 0-). Check "After Section" if the sampling area is located after the end of the test section indicated on the form (station 5+). Check "Within Section" for testing locations within the test sections, such as density testing and auger probes in the shoulder.

FIELD SET NO. The field set number is a sequentially assigned number to indicate the different time periods in which material sampling and field testing were conducted on the project. These time periods usually refer to different stages in the pavement life, such as prior to construction, after major rehabilitation, end of test, etc. A field set number can apply to more than one day since sampling of the test site usually requires more than one day. As a general rule, the same field set number should be applied to all material sampling and field testing conducted in a continuous 30-day period, unless a construction event occurs between the two sampling sessions. Enter 1 for the first material sampling and field testing activity conducted on the test site. Enter 2, 3, etc. for the second, third and subsequent sampling and field testing activities conducted on the site. For SPS-2 projects, the first sampling should occur prior to any subgrade preparation activity.

SPS-2 Data Collection Guidelines, February 1992

The following Sampling Data Sheets must be completed for SPS-2 test sections:

SAMPLING DATA SHEET 2.	PAVEMENT CORE LOG AT C-TYPE CORE LOCATIONS
SAMPLING DATA SHEET 4-1.	A-TYPE BORE HOLE LOG
SAMPLING DATA SHEET 8-1.	IN SITU DENSITY AND MOISTURE TESTS
SAMPLING DATA SHEET 9.	SHOULDER PROBE LOG
SAMPLING DATA SHEET 10-1.	SAMPLING UNCOMPACTED BITUMINOUS PAVING MIXTURES
SAMPLING DATA SHEET 11-1.	SAMPLING FRESH PORTLAND CEMENT CONCRETE
SAMPLING DATA SHEET 12.	BULK SAMPLING OF SUBGRADE AND UNBOUND GRANULAR MATERIALS
SAMPLING DATA SHEET 13.	PLATE BEARING TEST RESULTS

Also, the following Field Operation Information Forms must be completed:

FIELD OPERATIONS INFORMATION FORM 1.	LABORATORY SHIPMENT SAMPLES INVENTORY
FIELD OPERATIONS INFORMATION FORM 2-2.	SUMMARY OF MATERIAL SAMPLES SENT TO EACH LABORATORY
FIELD OPERATIONS INFORMATION FORM 3-1.	LABORATORY SHIPMENT SAMPLES INVENTORY - MOLDED CONCRETE

A description of items to be entered in each sampling data sheet and information form follows.

**SAMPLING DATA SHEET 2. PAVEMENT CORE LOG AT C-TYPE CORE LOCATIONS**

This form is similar to Form S01A used for GPS test sections. It is used to log data from the 4-inch diameter pavement cores extracted from C-Type core locations. Each sheet can be used to record data for cores taken from six different core hole locations in one sampling area. A separate sheet should be used to record core data from each sampling area. Space is provided in each column to record cores for up to 4 layers from one core hole. The pavement

surface layer core should be recorded first, followed by other layers in the column. The first column from the left should always start with the lowest numbered core hole in the sampling area.

OPERATOR. Record the coring equipment operator's name.

EQUIPMENT USED. Indicate the generic type of the core equipment used.

CORING DATE. Record the month, date, and year on which the core was taken.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

CORE BARREL. Record the rated inside diameter of the core barrel to the nearest tenth of an inch.

COOLING MEDIUM. Record the material used for cooling during the coring operation.

CORE HOLE NO. Enter the core hole sample code number following the sampling coding system as specified in the materials sampling plan developed for the project.

LOCATION: STATION. This is the station number of the core, relative to the test section specified under TEST SECTION NO. on the form. This number should be greater than 5+00 for sampling locations that occur after the test section and less than 0+00 for sampling locations which occur before the test section (see discussion under Sample Location Reference System in this report).

LOCATION: OFFSET. This is the distance from the interface of the pavement lane and the outside shoulder to the core location (generally measured from the

outside edge of the pavement slab). This distance should be indicated to the nearest tenth of a foot.

CORE RECOVERED. Circle the appropriate response to indicate if an intact and suitable core was recovered from the indicated core hole.

REPLACEMENT CORE HOLE NO. Record the sample number of the core that will replace a core which was deemed unacceptable during field sampling operations. This entry should only be used when a "No" was recorded in the "Core Recovered" data entry space of this form.

CORE SIZE. Circle the appropriate response to indicate the diameter of recovered core.

CORE SAMPLE NO. Record the core sample number for the recovered core. Separate sample numbers should be assigned to PCC and bound base layers from the same core hole, even if the bound base adheres to the PCC surface layer.

DEPTH. Depth should be measured from the pavement surface to the bottom of the material interface in the core and expressed to the nearest tenth of an inch.

MATERIAL DESCRIPTION. Enter the appropriate material description based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Material Sampling, Handling and Testing.

MATERIAL CODE. Enter the appropriate material code number from Table C.2 in the SHRP-LTPP Guide for Field Material Sampling, Testing and Handling corresponding to the described type of material.

**SAMPLING DATA SHEET 4-1. A-TYPE BORE HOLE LOG**

This form is similar to Form S02A used for GPS test sections and is designed to record logs of A-Type Shelby tube and splitspoon sampling. The following data is recorded on this form.

OPERATOR. Record the boring equipment operator's name.

EQUIPMENT USED. Indicate the generic type of the drilling equipment used.

BORING DATE. Record the month, date, and year on which the operation was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project. A-Type sampling performed within the test section monitoring length will not require a sampling number.

LOCATION: STATION. This is the station number of the bore, relative to the test section specified under TEST SECTION NO. on the form. This number should be greater than 5+00 for sampling locations that occur after the test section, less than 0+00 for sampling locations which occur before the test section, and between 0+00 and 5+00 for sampling locations that occur within the monitoring length. (See discussion under Sample Location Reference System in this document.)

LOCATION: OFFSET. This is the distance from the interface of the pavement lane and the outside shoulder to the bore location (generally measured from the outside edge of the pavement slab). This distance should be indicated to the nearest tenth of a foot.

BORE HOLE NO. Enter the core hole sample code number following the sample coding system specified in the material sampling plan developed for the project.

BORE HOLE SIZE. Record the borehole size (diameter) in inches to the nearest 0.1 inch, if applicable.

STRATA CHANGE. Record the depth of strata changes to the nearest tenth of an inch. The depth of strata changes should always be measured from the top of the pavement surface. Draw a horizontal line across the form which indicates the depth of each strata change, if applicable.

Also, record the depth of sampling for each sample taken. For example, if a thin-walled tube sample was obtained at a depth from 18 inches to 36 inches, lines should be drawn at each of the 18 inch and 36 inch marks along with the appropriate sample code number, material description, etc. See example data sheets in the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling for further clarification.

SAMPLE NUMBER. Record the sample number for thin-walled tube samples or splitspoon samples (if thin-walled tube samples cannot be obtained from the subgrade).

# BLOWS. The next four columns (*# Blows, Refusal?, DLR (Driving Length to refusal, IOP (Inches of Penetration)*) shall be used only if a splitspoon sample recovery was attempted. Standard practice for recording the blow count for splitspoon samples requires the following format: A - B - C, where:

- A = number of blows for first 6 inches of penetration by the splitspoon sampler. This is considered a seating drive.
- B = number of blows for second 6 inches of penetration by the splitspoon sampler.
- C = number of blows for third 6 inches of penetration by the splitspoon sampler.

Record the blow count from the first 6 inches of seating penetration by the splitspoon sampler in the left most column under number of blows. ("A" from above example of blow count record). Record the blow count from the second 6 inches of penetration by the splitspoon sampler in the middle column under number of blows ("B" from above example of blow count record). Record the blow count from the third 6 inches of penetration by the splitspoon sampler in the right most column under number of blows. ("C" from above example of blow count record).

Refusal of the splitspoon sampler is defined as having advanced less than one inch with 100 blows (or no observed advance of the sampler during the application of 10 blows) or the test is aborted at the discretion of the SHRP Representative to avoid damage to the splitspoon sampler.

If refusal of the splitspoon sampler occurs in the first 6 inches of penetration, indicate the blow count to refusal in the left most column, place a "Y" in the *Refusal?* column and indicate in the *DLR* (Driving Length to Refusal) column, the distance, measured to the nearest tenth of an inch, from the top of the pavement surface to refusal. Also, record the penetration depth of the splitspoon sampler in the *IOP* column (distance penetrated in "A").

If refusal of the splitspoon occurs during the second 6 inches of penetration, indicate the blow count to refusal in the middle column, place a "Y" in the *Refusal?* column and indicate in the *DLR* column the distance, measured to the nearest tenth of an inch, from the top of the pavement surface to refusal. Also, record the penetration depth of the splitspoon sampler in the *IOP* column (distance penetrated in "A" + "B").

If the total blow count ("A" + "B") reaches 100 before penetrating deeper than 12 inches, the splitspoon sampling procedure should be stopped and the blow count for the second 6 inch increment should be recorded in the middle column and the total depth of penetration recorded under the *IOP* column (the depth of penetration shall be measured from the beginning of penetration of the splitspoon sampler).

In the case of refusal during the third 6 inch increment, the same instructions outlined previously for the left and middle columns will be followed. The penetration depth of the splitspoon sampler will be recorded in the *IOP* column (distance penetrated in "B" + "C").

If the second and third 6 inch increment blow count ("B" + "C" only) reaches 100 before prior to penetrating 18 inches, the splitspoon sampling procedure should be stopped and the blow count for the third 6 inch increment recorded in under number of blows. The total depth of penetration ("B" + "C" only) should be recorded under the *IOP* column (measured from the beginning of penetration of the splitspoon sampler minus the 6 inch seating drive).

(REF)USAL. Record a "Y" if splitspoon sampler is refused (see explanation under # *Blows* above). Record a "N" if the full 18 inch sample is recovered and the splitspoon is not refused. This column is only used if a splitspoon sampler is utilized.

Refusal is defined as occurring when the splitspoon sampler advances less than one inch in 100 blows (or no observed advance of the sampler during the application of 10 blows) or when the test is aborted at the discretion of the SHRP Representative to avoid damage to the splitspoon sampler.

DLR. Driving Length to Refusal - Record the penetration of the splitspoon sampler to refusal to the nearest tenth of an inch. This value is measured from the top of the pavement surface. This column is only used if a splitspoon sampler is utilized and refused. In the case of refusal, an entry is made in the *DLR* and *IOP* columns.

IOP. Inches of Penetration - Record the distance of penetration of the splitspoon sampler after 100 blows is reached in the first 6 inches ("A"), the first and second 6 inches of penetration ("A" and "B") or the second and third 6 inches of penetration ("B" and "C") (See explanation under # *Blows* above). This column is only used if a splitspoon sampler is utilized.

MATERIAL DESCRIPTION. Enter the appropriate material description for each strata based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

MATERIAL CODE. Enter the appropriate material code number for each strata from Table C.2 in the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling corresponding to the described type of material.

**SAMPLING DATA SHEET 8-1. IN SITU DENSITY AND MOISTURE TESTS**

This sheet is similar to Form S04 used for GPS test sections and is designed to record data from the in situ density and moisture tests performed on all unbound layers with a nuclear density and moisture gauge. The following data is recorded on this form.

OPERATOR. Record nuclear density gauge operator's name.

NUCLEAR DENSITY GAUGE I.D.. Record the identification number of the nuclear density gauge.

TEST DATE. Record the month, date, and year on which the test was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. This number is developed as part of the materials sampling plan for the project and has the form SA-##. Test locations within the monitoring length will not require a sample area number.

LOCATION: STATION. This is the station number of the sampling area, relative to the test section specified under TEST SECTION NO. on the form. This number should be greater than 5+00 for sampling locations that occur after the test section, and less than 0+00 for sampling locations which occur before the

test section (see discussion under Sample Location Reference System in this document).

LOCATION: OFFSET. This is the distance from the edge of the pavement lane and the outside shoulder to the location at which the test was performed (generally measured from the edge of the pavement slab). This distance should be indicated to the nearest tenth of a foot.

SAMPLING LOCATION NUMBER. Enter the sampling location number shown in the material sampling plan developed for the project.

DATE OF LAST MAJOR CALIBRATION. Record the date of the last major calibration of the nuclear density gauge. All dates should be recorded as mm-dd-yy. A major calibration is defined as that calibration/verification performed as directed in Section 4 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling. Daily calibrations performed in the field do not constitute a major calibration.

DEPTH FROM SURFACE TO THE TOP OF THE LAYER. This information is obtained from construction plans and measurements taken during pavement construction. Record to the nearest tenth of an inch and measure from the top of the pavement surface for each test performed.

LAYER NUMBER. Write in the project specified layer number for the layer being tested.

MATERIAL TYPE. Report a "G" if the material is unbound (granular) and a "T" if the material is other than unbound (treated). In practice, all entries should be a "G" since nuclear density testing is not required on bound materials.

IN SITU DENSITY. For each unbound layer, record four nuclear density gauge results. These measurements should be taken at the top of each unbound layer using the direct transmission test method if possible. Record to one decimal place in pounds per cubic foot (pcf).

AVERAGE. Calculate and record the average in situ densities for each unbound layer. Record to one decimal place.

METHOD (A,B,or C). Record the test method used to perform the in situ density test as per AASHTO T238, "A" - Backscatter, "B" - Direct Transmission, or "C" - Air Gap. The direct transmission method ("B") should almost always be used. However, there may be some extenuating circumstances necessitating the use of methods "A" or "C".

ROD DEPTH. Record the depth of the nuclear density gauge probe to the nearest tenth of an inch.

IN SITU MOISTURE CONTENT. For each unbound layer, record four in situ moisture content test results. These tests should be conducted at the top of each layer. Record the moisture content as a percentage to one decimal place. The backscatter method should always be used for this measurement.

AVERAGE. Calculate and record the average of the four in situ moisture content test results for each unbound layer. Record to one decimal place.

#### SAMPLING DATA SHEET 9. SHOULDER PROBE LOG

This data sheet is similar to Form S05 used for the GPS test sections and is used to record the results of the shoulder auger probe performed to determine the depth to a rigid layer.

OPERATOR. Record the auger equipment operator's name.

EQUIPMENT USED. Indicate the generic type of the augering equipment used.

AUGERING DATE. Record the month, date, and year on which the operation was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. This number is developed as part of the materials sampling plan for the project and has the form SA-##. No sampling area number is required for probes conducted within the monitoring length.

LOCATION: STATION. This is the station number of the bore relative to the test section specified under TEST SECTION NO. on the form. This number should be greater than 5+00 for probes located after the test section, less than 0+00 for probes located before the test section, and between 0+00 and 5+00 for probe locations within the monitoring length (see discussion under Sample Location Reference System in this document).

LOCATION: OFFSET. This is the distance from the edge of the pavement lane and the outside shoulder to the auger location (generally measured from the outside edge of the pavement slab). For shoulder probes, this distance will be measured toward the outside edge of the shoulder. This distance should be indicated to the nearest tenth of a foot.

AUGER PROBE NUMBER. Record the auger probe number; an S1 for the first auger and increasing numbers for subsequent auger probes.

TOP OF ROCK BASED ON. Enter "Auger Refusal" if auger is refused. If the top of rock is based on some other observation, indicate the type of observation.

DEPTH FROM SURFACE. Record the depths of strata changes to the nearest tenth of a foot.

MATERIAL DESCRIPTION. Enter the appropriate material description for each stratum based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

MATERIAL CODE. Enter the appropriate material code number for each strata from Table C.2 in the SHRP-LTPP Guide for Field Material Sampling, Testing and Handling corresponding to described type of material.

REFUSAL WITHIN 20 FEET (Y/N). Record a "yes" or a "no" as appropriate to indicate if refusal occurred within 20 feet from the pavement surface.

DEPTH TO REFUSAL. Record the depth to refusal to the nearest tenth of a foot if the auger is refused.

#### **SAMPLING DATA SHEET 10-1. SAMPLING UNCOMPACTED BITUMINOUS PAVING MIXTURES**

This data sheet is used to record information concerning sampling of uncompacted bituminous paving mixtures (only permeable asphalt treated material is used for SPS-2 test sections) for material testing purposes. Sampling shall be performed according to AASHTO T-168, except that a 100-lb sample should be used.

If the plant-sampled material is known to be of the same batch used on a specific test section, the number of this test section should be entered on the form. However, if specific test sections corresponding to the plant sampled material cannot be identified, enter "00" as the test section number to indicate "project level data."

PERSON PERFORMING SAMPLING. Record the name, title and affiliation of the person performing the sampling.

PLANT NAME. Record the common name or operator of the mix plant facility which produced the sampled material.

PLANT LOCATION. Record the location of the mix plant, including street address, town, and state.

PLANT TYPE. Indicate the general type of mix plant used to produce the mix. If a plant other than a batch or drum plant was used, indicate other and provide a description of the plant on the next line.

DESCRIPTION OF MIX PLANT. Provide a brief description of the type of mix plant noting any special features of traditional types of batch or drum plants, or a description of other mix plant types.

MANUFACTURER OF MIX PLANT. Enter the name of the mix plant manufacturer.

MODEL NUMBER. Enter the model number or model designation of the mix plant.

BATCH SIZE. Record the size of the batch from which the sample was obtained.

SAMPLING LOCATION. Enter the code number shown on the data form corresponding to the location from which the sample was taken. If the sample was taken from the roadway prior to compaction, indicate the station and offset of the sample and the respective test section number.

MIX TYPE. Enter the code number corresponding to the generic type of material (permeable asphalt treated).

LAYER NUMBER. Enter the layer number for which the plant-sampled material will be used (see discussion on layering structure in this report).

LAYER TYPE. Enter the code number, as shown on the form, which corresponds to the type of layer in which the material is used.

SAMPLE TYPE DESIGNATOR. Enter the sample type designation for the sample. This is a 4 digit code which identifies the generic type of material, virgin, recycled, or treated and a sequential number for each sample of each material type obtained. For materials incorporating all virgin materials, the sample type designation shall begin with the letters BV (Bulk Virgin). For materials

incorporating recycled materials, the designator shall begin with the letters BR (Bulk Recycled). For treated materials, the designator shall begin with the letters BT (Bulk Treated). These letter designations are followed by a two digit number sequentially assigned to each sample, for each type of material.

SAMPLE NUMBER. This is a 4 digit code starting with the two-letter Sample Type Designator and followed with a sequentially assigned two digit number, which uniquely designates each bulk asphalt concrete sample, e.g. BT01 and BT02 for the first 2 samples of permeable asphalt treated base obtained during the construction.

APPROXIMATE SAMPLE SIZE. Enter the approximate weight of the sample obtained, to the nearest pound.

DATE SAMPLED. Enter the date on which the material sample was obtained.

LOCATION SAMPLE SHIPPED TO. Record the location to which the sample was shipped. In many cases this location should be the laboratory which will perform the testing.

DATE SHIPPED. Enter the date on which the material was shipped to the location indicated on the form.

GENERAL REMARKS. Provide any general remarks concerning the obtained sample, comments concerning the quality or uniformity of the mix, or any other pertinent miscellaneous comments.

#### **SAMPLING DATA SHEET 11-1. SAMPLING FRESH PORTLAND CEMENT CONCRETE**

This data sheet is used to record information concerning sampling of fresh portland cement concrete for material testing purposes. Sampling shall be performed according to AASHTO T-141, "Sampling Fresh Concrete".

PERSON PERFORMING SAMPLING. Record the name, title and affiliation of the person performing the sampling.

SAMPLING LOCATION. Enter the code number from the sampling and testing plan corresponding to the location from which the sample was taken.

SAMPLE NUMBER. This is a 4 digit code starting with the letters FC (bulk PCC) or BL (bulk lean concrete) and followed with a sequentially assigned two digit number, which uniquely designates each bulk portland cement concrete sample.

PCC MIX TEMPERATURE WHEN SAMPLED. Enter the PCC mix temperature in degrees Fahrenheit at the time the sample was obtained.

AMBIENT TEMPERATURE WHEN SAMPLED. Enter the ambient temperature in degrees Fahrenheit at the time the sample was obtained.

SPECIMEN NUMBER. This is a 4 digit code starting with the letters "F" (formed beams), "G" (formed cylinders of PCC), or "L" (formed cylinders of lean concrete) followed by a designator for curing interval prior to testing, "X", "Y", or "Z" for 14 day, 28 day and 365 day curing, respectively. This two letter combination is followed by a sequentially assigned two digit number, which uniquely designates each concrete beam or cylinder specimen.

TIME. Enter the time of day at which the specimen was formed.

TEMPERATURE. Enter the temperature of the PCC mix when the specimen was formed.

SLUMP. Enter the slump test results of the sampled material, if tested.

AIR CONTENT. Enter the air content of the sampled material, if tested.

DATE SHIPPED. Enter the date on which the material was shipped to the laboratory indicated on the form.

GENERAL REMARKS. Provide any general remarks concerning the obtained sample (is it representative), comments concerning the quality or uniformity of the mix, or any other pertinent miscellaneous comments.

**SAMPLING DATA SHEET 12. BULK SAMPLING OF SUBGRADE AND UNBOUND GRANULAR MATERIALS**

This form is similar to Form S03 used for GPS test sections and is designed to record data from the field sampling of materials from shallow excavations made in prepared subgrade and uncompacted graded aggregate layers during construction. The following data is recorded on this form.

TECHNICIAN. Record the name of the technician who retrieved the samples and recorded the information on the data form.

EQUIPMENT USED. Indicate the generic type of the equipment used to excavate the material.

EXPLORATION DATE. Record the month, date, and year on which the operation was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

LOCATION: STATION. This is the station number of the sampling area, relative to the test section specified under TEST SECTION NO. on the form. This number should be greater than 5+00 for sampling locations that occur after the test section and less than 0+00 for sampling locations which occur before the

test section (see discussion under Sample Location Reference System in this document).

LOCATION: OFFSET. This is the distance from the edge of the pavement lane and the outside shoulder to the outside edge of the sampling area (generally measured from the outside edge of the pavement slab). This distance should be indicated to the nearest tenth of a foot.

SAMPLING LOCATION NUMBER. Enter the sampling location number shown in the material sampling plan developed for the project.

EXCAVATION SIZE. Record the length and width of excavation to the nearest half foot.

LAYER NUMBER. Enter the layer number for which the sample was obtained.

STRATA CHANGE. Record the depth of strata changes to the nearest tenth of an inch. The depth of strata changes should always be measured from the top of the pavement surface. Draw a line across the form to indicate strata changes.

MOISTURE SAMPLE NUMBER. Record sample numbers for samples taken from unbound base, subbase and subgrade for moisture content testing.

BULK SAMPLE NUMBER. Record the sample number for bulk samples taken from the subgrade and uncompacted graded aggregate layers.

MATERIAL DESCRIPTION. Enter the appropriate material description for each strata based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Material Sampling, Testing and Handling.

MATERIAL CODE. Enter the appropriate material code number for each strata from Table C.2 in the SHRP-LTPP Guide for Field Material Sampling, Testing and Handling corresponding to the described type of material.

**SAMPLING DATA SHEET 13. PLATE BEARING TEST RESULTS**

This form is designed to record data from the field plate bearing tests made on prepared subgrade, compacted graded layers, and compacted permeable asphalt treated layers at locations within the monitoring length of test sections during construction. The following data is recorded on this form:

TECHNICIAN. Record the name of the technician who performed the testing and recorded the information on the data form.

TEST DATE. Record the month, date, and year on which the operation was performed.

LOCATION: STATION. This is the station number of the test location, relative to the test section specified under TEST SECTION NO. on the form. This number should be between 0+00 and 5+00.

LOCATION: OFFSET. This is the distance from the edge of the pavement lane (at the outside shoulder) to the test location. This distance should be indicated to the nearest tenth of a foot.

SAMPLING LOCATION NUMBER. Enter the sampling location number shown in the material sampling plan developed for the project.

MATERIAL DESCRIPTION. Enter the appropriate material description for surface on which the test is performed based on the material type. These material descriptions are contained in Table 7 of Operational Memorandum No. SHRP-LTPP-OM-022.

MATERIAL CODE. Enter the appropriate material code number for each strata from Table C.2 in the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling corresponding to the described type of material.

LAYER NUMBER. Enter the layer number of the material on which the test was performed.

AVERAGE DEFLECTION. Enter the average total movement resulting from the incremental pressure change.

UNCORRECTED MODULUS OF SOIL REACTION. Enter the quotient of the pressure increment divided by average deflection, in pounds per square inch per inch.

CORRECTED MODULUS OF SOIL REACTION. Enter the modulus of soil reaction corrected for plate bending in accordance with protocol P58.

#### FIELD OPERATIONS INFORMATION FORM 1. LABORATORY SHIPMENT SAMPLES INVENTORY

This form is intended to provide a record of field activity and no information from this form will be included in the data base. This form is similar to Form S06 used for GPS test sections and provides the necessary information on where each sample was shipped for testing. Also, it provides a detailed inventory of material samples shipped to each materials testing laboratory. At least one form should be completed for each sampling area on the project. The inventory should be made in the following sequence of sample location numbers, starting from the pavement surface layer in each case:

1. Samples from C-Type core locations, starting from cores of pavement surface layers.
2. Samples from A-Type bore hole locations and any additional similar bore holes.
3. Samples from shallow excavations.

Sample location numbers, sample numbers and sampling area numbers should be obtained from the appropriate Sampling Data Sheets. "Sample size" should be used to record the number of bags of bulk samples or the number of jar samples bearing a single sample number in each case. The bulk sample from one layer can be placed in more than one bag, if necessary. However, the sample number should

be the same on all of these bags with an indication of the number of bags on the labels and in the column of the "Sample size." For core samples, record only diameter of the core in the "Sample size" column in inches.

Enter core, bulk, moisture, tube or splitspoon in the "Sample type" column as appropriate. Enter PCC, AC, Base, Subbase or Subgrade in the "Sample material" column as appropriate. The "Sample condition" should indicate a brief description of the overall quality of the sample, e.g. cores: good, poor, fractured; bulk samples: satisfactory, wet, insufficient quantity, contaminated.

Since more than one laboratory may be used to test samples in the SPS program, room is provided on this form to indicate up to three laboratories to receive samples from each sampling area. Enter the laboratory number, as noted at the bottom of the form, each sample is sent to under the LAB column.

Typically, samples will include:

- All PCC cores from C-Type locations.
- Bulk samples and jar samples of granular (untreated) layers and subgrade from B-Type locations and test pits.
- Thin-walled tube samples and splitspoon samples from the subgrade.

**FIELD OPERATION INFORMATION FORM 2-2. SUMMARY OF MATERIAL SAMPLES SENT TO EACH LABORATORY**

This form provides a summary of the information provided on Field Operations Information Form 1 by testing laboratory. It is similar to Form S06A used for GPS test sections. A separate form should be completed for each set of samples sent to each separate laboratory.

This form requires the samples to be aggregated into layers designated with a layer number. The layer number assigned to each layer (1 for subgrade, 2 for

subbase, 3 for unbound base, etc.) is shown in the left hand column. A description of the pavement layer material and sample type is provided in the next column on the right, followed by the total number of samples by sample type.

**FIELD OPERATION INFORMATION FORM 3-1. LABORATORY SHIPMENT SAMPLES INVENTORY  
- MOLDED CONCRETE**

No information from this form will be included in the data base, it is intended to provide a record of fresh PCC sampling and molded PCC test specimens. It is used to provide a detailed inventory of material samples shipped to the materials testing laboratory. One form should be completed for all fresh PCC sampling areas within the experiment

Sample location numbers, sample numbers and sampling area numbers should be obtained from Sampling Data Sheet 11-1.

The bottom portion of this form "MOLDED PCC SPECIMENS SENT TO LABORATORY" provides for the total number of molded cylinders and beams. This form requires the samples to be summarized according the layer number of their source. The layer number is assigned from the subgrade to the surface. A description of the specimen type is provided in the next column on the right, followed by the total number of samples by sample type.

CONSTRUCTION DATA

Construction data for the SPS-2 experiment primarily includes items related to project and section "as-built" construction inventory, and preparation and placement of the subgrade, unbound aggregate materials, asphalt bound aggregate materials, lean concrete base, and portland cement concrete. In addition, this data includes material properties determined as part of the asphalt and concrete mix designs and construction control operations.

A number of data sheets must be completed to report data obtained during construction. A set of 27 Construction Data Sheets were developed specifically for the SPS-2 experiment. These Construction Data Sheets should also be completed for tests sections of the supplementary experiments (SPS-2A and SPS-2B) and other supplemental sections constructed at each SPS-2 project site. Tables 1, 2, and 3 list the construction related data sheets that are to be completed for the different test sections of the primary experiment (SPS-2) and the supplementary experiments (SPS-2A and SPS-2B).

The following Construction Data Sheets shall be completed, as appropriate, for the SPS-2 experiment following the guidelines contained later in this report.

CONSTRUCTION DATA SHEET 1:	PROJECT IDENTIFICATION
CONSTRUCTION DATA SHEET 2:	GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION
CONSTRUCTION DATA SHEET 3:	REFERENCE PROJECT STATION TABLE
CONSTRUCTION DATA SHEET 4:	LAYER DESCRIPTIONS
CONSTRUCTION DATA SHEET 5:	LAYER THICKNESS MEASUREMENTS
CONSTRUCTION DATA SHEET 6:	SUBGRADE PREPARATION
CONSTRUCTION DATA SHEET 7:	CUT-FILL SECTION LOCATIONS
CONSTRUCTION DATA SHEET 8:	SUBGRADE EXCAVATION AND BACKFILLING SKETCH
CONSTRUCTION DATA SHEET 9:	UNBOUND AGGREGATE BASE MATERIAL PLACEMENT
CONSTRUCTION DATA SHEET 10:	PLANT-MIXED ASPHALT BOUND LAYERS - AGGREGATE PROPERTIES

SPS-2 Data Collection Guidelines, February 1992

Table 1. Guide to completion of Construction Data Sheets for Primary Experiment SPS-2

SPS-2 CONSTRUCTION DATA SHEET	SECTION												
	PROJECT	1 (13)	2 (14)	3 (15)	4 (16)	5 (17)	6 (18)	7 (19)	8 (20)	9 (21)	10 (22)	11 (23)	12 (24)
1	✓												
2		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓												
4		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9		✓	✓	✓	✓					✓	✓	✓	✓
10										✓	✓	✓	✓
11										✓	✓	✓	✓
12										✓	✓	✓	✓
13										✓	✓	✓	✓
14										✓	✓	✓	✓
15		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
16		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
18		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
19		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
20		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
21		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
22		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
23		*	*	*	*	*	*	*	*	*	*	*	*
24		*	*	*	*	*	*	*	*	*	*	*	*
25		*	*	*	*	*	*	*	*	*	*	*	*
26		*	*	*	*	*	*	*	*	*	*	*	*
27	*	*	*	*	*	*	*	*	*	*	*	*	*

✓ - Data sheet must be completed for this test section

\* - Data sheet must be completed as necessary

SPS-2 Data Collection Guidelines, February 1992

Table 2. Guide to completion of Construction Data Sheets for Supplemental Experiment SPS-2A

SPS-2 CONSTRUCTION DATA SHEET	SECTION						
	PROJECT	25 (31)	26 (32)	27 (33)	28 (34)	29 (35)	30 (36)
1	✓						
2		✓	✓	✓	✓	✓	✓
3	✓						
4		✓	✓	✓	✓	✓	✓
5		✓	✓	✓	✓	✓	✓
6		✓	✓	✓	✓	✓	✓
7		✓	✓	✓	✓	✓	✓
8		✓	✓	✓	✓	✓	✓
9		✓	✓				✓
10						✓	✓
11						✓	✓
12						✓	✓
13						✓	✓
14						✓	✓
15		✓	✓	✓	✓	✓	✓
16		✓	✓	✓	✓	✓	✓
18		✓	✓	✓	✓	✓	✓
19		✓	✓	✓	✓	✓	✓
20		✓	✓	✓	✓	✓	✓
21		✓	✓	✓	✓	✓	✓
22		✓	✓	✓	✓	✓	✓
23		*	*	*	*	*	*
24		*	*	*	*	*	*
25		*	*	*	*	*	*
26		*	*	*	*	*	*
27	*	*	*	*	*	*	*

✓ - Data sheet must be completed for this test section

\* - Data sheet must be completed as necessary

Table 3. Guide to completion of Construction Data Sheets for Supplemental Experiment SPS-2B

SPS-2 CONSTRUCTION DATA SHEET	SECTION								
	PROJECT	37 (45)	38 (46)	39 (47)	40 (48)	41 (49)	42 (50)	43 (51)	44 (52)
1	✓								
2		✓	✓	✓	✓	✓	✓	✓	✓
3	✓								
4		✓	✓	✓	✓	✓	✓	✓	✓
5		✓	✓	✓	✓	✓	✓	✓	✓
6		✓	✓	✓	✓	✓	✓	✓	✓
7		✓	✓	✓	✓	✓	✓	✓	✓
8		✓	✓	✓	✓	✓	✓	✓	✓
9		✓	✓	✓	✓	✓	✓	✓	✓
10						✓	✓	✓	✓
11						✓	✓	✓	✓
12						✓	✓	✓	✓
13						✓	✓	✓	✓
14						✓	✓	✓	✓
15		✓	✓	✓	✓	✓	✓	✓	✓
16		✓	✓	✓	✓	✓	✓	✓	✓
17		✓	✓	✓	✓	✓	✓	✓	✓
18		✓	✓	✓	✓	✓	✓	✓	✓
19		✓	✓	✓	✓	✓	✓	✓	✓
20		✓	✓	✓	✓	✓	✓	✓	✓
21		✓	✓	✓	✓	✓	✓	✓	✓
22		✓	✓	✓	✓	✓	✓	✓	✓
23		*	*	*	*	*	*	*	*
24		*	*	*	*	*	*	*	*
25		*	*	*	*	*	*	*	*
26		*	*	*	*	*	*	*	*
27	*	*	*	*	*	*	*	*	*

✓ - Data sheet must be completed for this test section

\* - Data sheet must be completed as necessary

SPS-2 Data Collection Guidelines, February 1992

CONSTRUCTION DATA SHEET 11:	PLANT-MIXED ASPHALT BOUND LAYERS - ASPHALT CEMENT PROPERTIES
CONSTRUCTION DATA SHEET 12:	PLANT-MIXED ASPHALT BOUND LAYERS - MIXTURE PROPERTIES
CONSTRUCTION DATA SHEET 13:	PLANT-MIXED ASPHALT BOUND LAYERS - PLACEMENT DATA
CONSTRUCTION DATA SHEET 14:	PLANT-MIXED ASPHALT BOUND LAYERS - COMPACTION DATA
CONSTRUCTION DATA SHEET 15:	PORTLAND CEMENT CONCRETE LAYERS - JOINT DATA
CONSTRUCTION DATA SHEET 16:	PORTLAND CEMENT CONCRETE LAYERS - JOINT DATA (CONTINUED)
CONSTRUCTION DATA SHEET 17:	PORTLAND CEMENT CONCRETE LAYERS - REINFORCING STEEL DATA
CONSTRUCTION DATA SHEET 18:	PORTLAND CEMENT CONCRETE LAYERS - MIXTURE DATA
CONSTRUCTION DATA SHEET 19:	PORTLAND CEMENT CONCRETE LAYERS - MIXTURE DATA (CONTINUED)
CONSTRUCTION DATA SHEET 20:	PORTLAND CEMENT CONCRETE LAYERS - PLACEMENT DATA
CONSTRUCTION DATA SHEET 21:	PORTLAND CEMENT CONCRETE LAYERS - PLACEMENT DATA (CONTINUED)
CONSTRUCTION DATA SHEET 22:	PORTLAND CEMENT CONCRETE SURFACE LAYER - PROFILE DATA
CONSTRUCTION DATA SHEET 23:	FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES
CONSTRUCTION DATA SHEET 24:	FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES (CONTINUED)
CONSTRUCTION DATA SHEET 25:	FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES (CONTINUED)
CONSTRUCTION DATA SHEET 26:	FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES (CONTINUED)
CONSTRUCTION DATA SHEET 27:	MISCELLANEOUS CONSTRUCTION NOTES AND COMMENTS

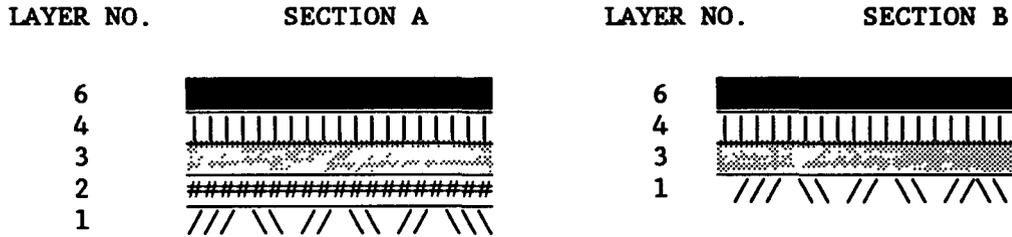
A layer description table should be completed for each test section to note any differences in the layer structure and thicknesses. A project level layering structure should be developed in which a unique layer number is assigned to every layer present on the project. The layer number for each material must be kept the same across all test sections. This is needed since the detailed inventory and materials information is keyed to layer number. On test sections uniformly on cut or fill, the same layer structure should exist for all test sections, with differences between test sections due to embankment thicknesses or layer thicknesses. For test sites in which some sections are on cut and others on fill (embankment), the project layer structure should include an embankment (fill) layer. The thickness of this layer would be coded as zero on test sections which are located in cut.

The project layering concept is illustrated in Figure 2 for two hypothetical test sections (Sections A and B) located on the same project. Section A is located on a 4-foot deep fill (embankment) and Section B is located in a cut. To keep the layer number for each material the same across all test sections, the embankment layer is shown in the layer structure for Section JB with a zero thickness. In this manner, all data sheets can be completed for each section on the test site in a consistent manner.

The data sheets stipulate the entry of numerous data elements. Available data should be entered and every effort should be made to obtain those data indicated by an asterisk (\*). Many items will require codes to be entered. These codes are generally listed in the data sheets.

#### DATA COMMON FOR ALL SPS-2 CONSTRUCTION DATA SHEETS

A common set of project identification data appears in the upper right hand corner of each SPS-2 Construction Data Sheet. These data items are described below.



EXAMPLE LAYER STRUCTURE CODING FOR SECTION A

LAYER NO.	LAYER-DESCRIPTION	MATERIAL TYPE CLASS	THICKNESS
1	SUBGRADE (7)	52 - SANDY CLAY	N A
2	11 - EMBANKMENT	26 - SOIL-AGG MIX	48.0
3	05 - BASE LAYER	23 - CRUSHED STONE	4.0
4	05 - BASE LAYER	31 - PATB	4.0
5	05 - BASE LAYER	38 - LCB	0.0
6	03 - SURFACE	17 - PCC	11.0

EXAMPLE LAYER STRUCTURE CODING FOR SECTION B

LAYER NO.	LAYER DESCRIPTION	MATERIAL TYPE CLASS	THICKNESS
1	SUBGRADE (7)	52 - SANDY CLAY	N A
2	11- EMBANKMENT	26 - SOIL - AGG MIX	0.0
3	05 - BASE LAYER	23 - CRUSHED STONE	4.0
4	05 - BASE LAYER	31 - PATB	4.0
5	05 - BASE LAYER	38 - LCB	0.0
6	03 - SURFACE	17 - PCC	11.0

Figure 2. Example of project layering scheme for coding test section layer tables.

STATE CODE. Enter the two digit state code which is a number used to identify the state or Canadian province in which the pavement section is located (see Table A.1, Appendix A of the LTPP Data Collection Guide or Appendix B of this report).

SPS PROJECT CODE. Enter the two digit SPS project code. The structure of this number is described in the section entitled "SPS Test Section Numbering Scheme" of this report.

TEST SECTION NUMBER. Enter the two digit SPS test section number. The structure of this number is described in the section entitled "SPS Test Section Number Scheme" of this report.

**CONSTRUCTION DATA SHEET 1: PROJECT IDENTIFICATION**

1. DATE OF DATA COLLECTION OR UPDATE. Enter the month and year in which the "as-built" construction inventory data was collected. The number to identify the month is in numerical sequence of the months as they occur during the year (enter 02 for February, etc.). The two digits identifying the year are the last two digits of the year (92 for 1992, etc.).
2. STATE HIGHWAY AGENCY (SHA) DISTRICT NUMBER. Enter the number used to identify the SHA district in which the test section is located.
3. COUNTY OR PARISH. Enter the number used to identify the county or parish where the pavement section is located. County codes may be found in Federal Information Processing Standards Publications 6, "Counties of the States of the United States."
4. FUNCTIONAL CLASS. Enter the number used to identify the functional classification of the highway for which the pavement section is a sample (see Table A.2, Appendix A of the LTPP Data Collection Guide or Appendix B of this report).

5. ROUTE SIGNING. Enter the code to identify the letter designation that precedes the number of the highway where the SHA project is located.
6. ROUTE NUMBER. Enter the number assigned to the highway where the SHA project is located (e.g., I-280).
7. TYPE OF PAVEMENT. Enter the code identifying the general type of pavement structure (such as jointed portland cement concrete with granular base). The valid pavement type codes for SPS-2 test sections are contained on the form. These are 17, 20, and 23 for jointed plain concrete pavements on unbound, bituminous, and lean concrete base, respectively; and 18, 21, and 24 for jointed reinforced concrete pavements on unbound, bituminous, and lean concrete base, respectively.
8. NUMBER OF THROUGH LANES. Enter the number indicating the total number of through lanes (exclusive of ramps and access roads) in the direction of travel.
9. DATE OF CONSTRUCTION COMPLETION. Enter the month and year in which the test section construction was completed.
10. DATE OPENED TO TRAFFIC. Enter the month and year in which the test section was opened to traffic.
11. CONSTRUCTION COSTS PER LANE MILE. Enter the total average construction cost in thousands of dollars per lane mile for the test section, exclusive of non-pavement costs such as bridges, culverts, lighting, and guard rails.
12. DIRECTION OF TRAVEL. Enter the number indicating the general direction of traffic flow along the entire route which includes the test section.

- 13-17. PROJECT STARTING POINT LOCATION. The location of the starting point of the project is to be identified by milepoint, elevation, latitude, and longitude.
13. MILEPOINT. The milepoint is to be determined by adjusting the value posted on the nearest milepost to the starting point. For example, if the direction of travel (preceding data element) is in the same direction as increasing mileposts for a given roadway, and the starting point was 0.29 miles from the preceding milepost (Mile 114), the milepoint for the starting point of the test section would be 114.29. Milepoints are to be given to the nearest 0.01 mile.
14. ELEVATION. The elevation is to be entered to the nearest foot. Survey measurements are not required since only a reasonable estimate is required. In many cases, the elevation can be taken off the construction plans.
- 15&16. LATITUDE AND LONGITUDE (North and West, respectively) are to be given in degrees, minutes, and seconds to the nearest 0.01 second when this type of accuracy is possible. This value may be determined at a later date through the use of advanced photogrammetric methods.
17. ADDITIONAL LOCATION INFORMATION (SIGNIFICANT LANDMARKS). Enter additional information regarding the location of the section's starting point location. This type of information will be useful for field crews locating the project during monitoring activities.
18. HPMS SAMPLE NUMBER. Enter the twelve-digit "Section/Grouped Data Identification" assigned to any section of highway in the Highway Performance Monitoring System (HPMS). It provides a unique identification for a test section and may be obtained from those SHA personnel servicing the HPMS.

19. HPMS SECTION SUBDIVISION. Enter the single digit code used to identify a further subdivision of an original HPMS section, generally included as a thirteenth digit to the HPMS sample number.

**CONSTRUCTION DATA SHEET 2: GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION**

1. LANE WIDTH. Enter the width of the lane to be monitored, to the nearest whole number of feet.
2. MONITORING SITE LANE NUMBER. Enter the number that identifies which lane is to be monitored. Lanes are identified as indicated on the data sheet. Although a highway agency may wish to monitor more than one lane, each lane should be considered as a separate "test section," with its own data (although several data items may actually be common such as environmental, materials, and thickness design data). For the LTPP Studies, only the outside lane will be studied, so the code "1" should be entered.

SHOULDER DATA. Spaces are provided to enter data pertaining to both the outside and inside shoulder. If there are no inside shoulders, enter "N" for those spaces pertaining to inside shoulders.

3. SHOULDER SURFACE TYPE. Enter the codes indicating the type of shoulder surfaces for the outside and inside shoulders. For SPS-2 test sites, the inside and outside shoulder surfaces should be asphalt concrete or untied portland cement concrete.
4. TOTAL SHOULDER WIDTH. Enter the total (paved and unpaved) widths of the outside and inside shoulders to the nearest whole number of feet.
5. PAVED SHOULDER WIDTH. Enter the paved widths of the outside and inside shoulders to the nearest whole number of feet.

6. SHOULDER BASE TYPE. Enter the codes identifying the types of base material used in the shoulders (see Table A.6, Appendix A of the Data Collection Guide or Appendix B of this report for codes).
7. SHOULDER SURFACE THICKNESS. Enter the average thicknesses of the inside and outside shoulder surfaces to the nearest 0.1 inch.
8. SHOULDER BASE THICKNESS. Enter the average base thicknesses along the shoulders to the nearest 0.1 inch.
9. SUBSURFACE DRAINAGE TYPE. Enter the code indicating the type of subsurface drainage provided. A space is provided for describing another type of subsurface drainage if different from those for which codes are provided. Where present, drainage features for SPS-2 projects will be limited to drainage blanket with longitudinal drains.
10. SUBSURFACE DRAINAGE LOCATION. Enter the code indicating whether the subsurface drainage is continuous along the section or was provided at intermittent locations. Leave blank if no subsurface drainage is provided.
11. DIAMETER OF LONGITUDINAL DRAINPIPES. Enter the inside diameter to the nearest tenth of an inch, of the longitudinal drainpipes used for subsurface drainage. If there is no longitudinal drainage, leave blank.
12. SPACING OF LATERALS. Enter the average spacing in feet for subdrainage laterals. Leave blank if there are no subdrainage laterals.

**CONSTRUCTION DATA SHEET 3: REFERENCE PROJECT STATION TABLE**

A reference project station system must be established for each project. This station referencing system starts with station 0+00 assigned to the starting point of the first test section encountered on the project. The station number of the beginning and end of all test sections on the project will be referenced

to this point to provide a relative distance measure of the beginning, end, and distance between test sections on the site. This continuous system is used to avoid compounding measurement error within test sections since test sections are not precisely marked to 500 feet when laid out. This information will be used to process profile data collected from continuous measurements over the test sites and to identify the locations of the materials sampling and testing operations on the test sections for the entire site. In addition, this information will indicate the ordering and distance between test sections.

Field measurements should be used to locate the start and end point of each test section with an accuracy of  $\pm 1$  foot. A manual rolling wheel distance measurement device or a calibrated vehicle mounted DMI of the required accuracy may be used for this purpose. These measurements should be made prior to construction, e.g. during initial construction layout. This data can then be used as a check against the repositioning of the start and end of the test sections during construction.

The relative SPS project station location information is recorded on Construction Data Sheet 3. The starting point of the first test section encountered on the project in the direction of traffic is assigned station 0+00. Station numbers for the start and end of all test sections on each SPS test site should run continuous from this point with no equations and measured to the nearest one foot. This station numbering system is independent from the station numbering used on the construction plans to avoid complications due to mid-project station equations. A space is provided for the station number of the end of the first test section since it may not always occur precisely at station 5+00.

The test section ID numbers and relative station numbers of the beginning and end of each section should be entered on Sheet 3, in the order in which the test sections are encountered in the direction of traffic.

1. TEST SECTION ID NUMBER. The six digit test section ID number, consisting of the STATE CODE, SPS PROJECT CODE, and TEST SECTION NUMBER, should be entered for each SPS test section. If a GPS test section is located on the project, then the six digit GPS test section identification number, consisting of the STATE CODE and SHRP SECTION NUMBER, should be entered in the test section ID column.
2. START STATION NUMBER. The station number of the starting point of the test section relative to the starting point of the first test section on the project, to the nearest one foot.
3. END STATION NUMBER. The station number of the ending point of the test section relative to the starting point of the first test section on the project, to the nearest one foot.
4. SUBGRADE STRUCTURE TYPE. Enter the code number shown under note 1 on the form to indicate if the test section is located entirely on fill, cut, at-grade or is located on both cut and fill. If the test section is located on both cut and fill, the approximate location of the cut-fill transition within the test section should be entered using a test section relative station number (0+00 to 5+00).
5. INTERSECTIONS BETWEEN TEST SECTIONS ON THE PROJECT. If any intersections occur between any of the test sections on the project, indicate the number or name of the intersecting route, the reference project station number (referenced to the start of the first test section on the project), and check whether it is an entrance or exit ramp, or an intersection with a stop sign, traffic signal, or is unsignalized.

**CONSTRUCTION DATA SHEET 4: LAYER DESCRIPTIONS**

This data sheet should be completed for each test section to describe the newly constructed pavement layers. The layer numbers shown on this form provide a key reference to the other detailed information sheets concerning the

properties of the layer. In order to provide future analysts with information on the test section pavement structure and to avoid confusion with layer numbers, the complete layer structure of the test section must be described. This pavement layer structure should be the same as that provided on the Laboratory Material Handling and Testing Form L05.

1. LAYER NUMBER. Enter the printed layer number on the form which is used to reference the pavement layers on other data sheets. The first layer is assigned to subgrade and all other layers assigned increasing numbers. The surface will be the highest numbered layer.
2. LAYER DESCRIPTION. Enter the layer description code, as shown in note 2 on the form. This code, which describes the general type of layer, should be entered corresponding to its order within the layer structure.
3. MATERIAL TYPE CLASS. Enter the classification code that identifies the type of material in each layer. These codes are listed in Tables A.5, A.6, A.7, and A.9, of Appendix A of the LTPP Data Collection Guide for surfacing materials, base and subbase materials, subgrade soils, and thin seals and interlayers, respectively. These tables are reproduced in Appendix B of this report.
4. LAYER THICKNESS. Enter the average thickness of each material layer. If sufficient measurements are available, enter the maximum, minimum, and standard deviation of the thickness measurements.
5. DEPTH BELOW SURFACE TO "RIGID" LAYER. Enter the depth below the surface where rigid layer is encountered, in feet.

**CONSTRUCTION DATA SHEET 5: LAYER THICKNESS MEASUREMENTS**

This form is used to record the results of the layer thickness measurements within the test section as determined from before and after elevation measurements. Results of these measurements should be provided for

5 offset points at every station along the project which was measured. The station number should be entered as the test section relative station number. Offset distance should be entered in inches and measured from the outside shoulder lane edge joint. Space is provided to enter thickness for up to four types of layers within the test section. If individual layer thicknesses are not measured, enter the layer thicknesses in the column corresponding to the layer whose after placement surface elevation was measured. For example, if base course elevation was only measured for the PATB and not the underlying DGAB, then the layer thickness should be entered on Construction Data Sheet 5 under the Permeable Asphalt Treated Base column. Enter the layer number of any layer for which layer thickness is shown. Use more than one sheet as required.

**CONSTRUCTION DATA SHEET 6: SUBGRADE PREPARATION**

1. SUBGRADE PREPARATION BEGAN. Enter the date on which subgrade preparation on the test section began.
2. SUBGRADE PREPARATION COMPLETED. Enter the date on which subgrade preparation on the test section was completed.

PRIMARY COMPACTION EQUIPMENT

3. CODE TYPE. Enter the code for the primary compaction equipment used in subgrade preparation. The codes are provided on the data sheet.
4. GROSS WEIGHT. Enter the gross weight (in tons) of the primary compaction equipment used to compact the subgrade.
- 5-6. TYPE AND PERCENT STABILIZING AGENT. Enter the type code and average percent based on dry weight of the subgrade soil for each type of stabilizing agent used. If only one stabilizing agent is used, leave the spaces for "Stabilizing Agent 2" blank. Stabilizing agents can be added to the subgrade to provide a stable working platform as part of the

construction process but shall not be used as an additive to increase the strength of the subgrade in the pavement structure.

7. TYPICAL LIFT THICKNESS. Enter the nominal placement thickness of the subgrade fill material, to the nearest 0.1 inch. The lift thickness is the thickness prior to compaction and should be based on field observations or measurements.
8. SIGNIFICANT EVENTS DURING SUBGRADE PREPARATION. Describe any significant events which occurred during construction and may influence the performance of the test section, e.g. disruptions due to equipment break downs or the weather. Use Construction Data Sheet 27, Miscellaneous Construction Notes and Comments, if more room is required.

**CONSTRUCTION DATA SHEET 7: CUT-FILL SECTION LOCATIONS**

This data sheet provides information regarding the locations of the cut and fill sections throughout the entire project length.

1. CUT-FILL. Enter the code shown under note 1 on the form to indicate if the subgrade structure is cut or fill.
2. START STATION NUMBER. Enter the station number of the starting point of the indicated subgrade structure relative to the starting point of the first test section on the project, to the nearest foot.
3. END STATION NUMBER. Enter the station number of the ending point of the indicated subgrade structure relative to the starting point of the first test section on the project, to the nearest foot.
4. TEST SECTION NO.. Enter the six digit test section ID number, consisting of the STATE CODE, SPS PROJECT CODE, and TEST SECTION NUMBER, in which the indicated subgrade structure is located. This number will be repeated for each subgrade structure occurring within the test section.

**CONSTRUCTION DATA SHEET 8: SUBGRADE EXCAVATION AND BACKFILLING SKETCH**

This form is used to sketch the approximate locations where excavation and backfilling of the subgrade was performed in the test section. It should also be used to indicate the average depth of excavation and backfilling performed at each location, and to describe the type of backfill material.

**CONSTRUCTION DATA SHEET 9: UNBOUND AGGREGATE BASE MATERIAL PLACEMENT**

1. UNBOUND BASE MATERIAL PLACEMENT BEGAN. Enter the date on which the unbound base material placement on the test section began.
2. UNBOUND BASE MATERIAL PLACEMENT COMPLETED. Enter the date on which the unbound base material placement on the test section completed.
3. LAYER NUMBER. Enter the unbound aggregate base course layer number to be described on this sheet (from Construction Data Sheet 4, Layer Descriptions).

PRIMARY COMPACTION EQUIPMENT

4. CODE TYPE. Enter the code for primary compaction equipment used to compact the unbound aggregate base course material. The codes for the various types of equipment are given on the data sheet.
5. GROSS WEIGHT. Enter the gross weight (in tons) of the primary compaction equipment used to compact the unbound aggregate base course material.
6. LIFT THICKNESSES. Enter the nominal placement thickness of each lift of the dense graded base course material, to the nearest 0.1 inch. The lift thickness is the thickness prior to compaction and should be based on field observations or measurements.

7. SIGNIFICANT EVENTS DURING CONSTRUCTION. Describe any significant events which occurred during construction and may influence the performance of the test section, e.g., disruptions due to equipment break down or the weather. Use Construction Data Sheet 27, Miscellaneous Construction Notes and Comments, if more room is required.

**CONSTRUCTION DATA SHEET 10: PLANT MIXED ASPHALT BOUND LAYERS - AGGREGATE PROPERTIES**

This sheet should be completed for the test sections requiring PATB drainage layers. Although various SHAs differentiate between fine and coarse aggregates on the basis of different sieve sizes, for the SHRP studies all aggregate retained on the No. 8 sieve is classified as coarse aggregate and all aggregate passing the No. 8 sieve is classified as fine aggregate. "Mineral filler" is defined (per ASTM D242) as that portion passing the No. 30 sieve (at least 95 percent must pass the No. 50 sieve and at least 70 percent must also pass the No. 200 sieve).

1. LAYER NUMBER. Enter the asphalt concrete layer number for which a description is being provided (from Construction Data Sheet 4, Layer Descriptions).
- 2-4. COMPOSITION OF COARSE AGGREGATE. Enter the type and percentage by weight of materials in the coarse aggregate used in the asphalt concrete mix. Space is provided for identifying a type of coarse aggregate other than those with codes. Where only one type of material is used, enter the type code and 100 in the top set of data spaces, leaving the others blank.
- 5-7. COMPOSITION OF FINE AGGREGATE. Enter the type and percentage by weight of materials in the fine aggregate (passing the No. 8 sieve and retained on the No. 200 sieve). Space is provided for identifying another type if none of those for which codes are provided was used. Where only one type of material was used, enter its type code and 100 in the top set of data spaces, leaving the others blank.

8. TYPE OF MINERAL FILLER. Enter the type of mineral filler used. The codes appear on the data sheet, including space for entering types other than those for which codes have been provided.
- 9-12. BULK SPECIFIC GRAVITIES. Enter the mean bulk specific gravities (to the nearest thousandth) for coarse aggregate, fine aggregate, mineral filler, and the aggregate combination. The bulk specific gravities for the aggregate fractions are measured using the laboratory procedures indicated below:
- a. Coarse Aggregate - AASHTO T85 or ASTM C127
  - b. Fine Aggregate - AASHTO T84 or ASTM C128
  - c. Mineral Filler - AASHTO T100 or ASTM D854

The bulk specific gravity for the aggregate combination (usually called "bulk specific gravity of aggregate") is calculated as follows:

$$G_{ab} = \frac{P_1 + P_2 + P_3}{\frac{P_1}{G_1} + \frac{P_2}{G_2} + \frac{P_3}{G_3}} \quad (2.1)$$

where:

- $G_{sb}$  = Bulk specific gravity for the total aggregate
- $P_1, P_2, P_3$  = Percentages by weight of coarse aggregate, fine aggregate, and mineral filler, respectively
- $G_1, G_2, G_3$  = Specific gravities of coarse aggregates, fine aggregates, and mineral filler, respectively

13. EFFECTIVE SPECIFIC GRAVITY OF AGGREGATE COMBINATIONS. Enter the mean calculated effective specific gravity to the nearest 0.001. This calculation requires the maximum specific gravity (no air voids) of the paving mixture, which is obtained by Test Method AASHTO T209 or ASTM D2041. The effective specific gravity of the aggregate is calculated as follows:

$$G_{se} = \frac{100 - P_b}{\frac{100}{G_{mm}} - \frac{P_b}{G_b}} \quad (2.2)$$

where:

- $G_{se}$  = Effective specific gravity of aggregate
- $P_b$  = Asphalt cement, percent by total weight of mixture
- $G_b$  = Specific gravity of asphalt
- $G_{mm}$  = Maximum specific gravity of paving mixtures (no air voids)

- 14-17. AGGREGATE DURABILITY TEST RESULTS. Enter the type of durability tests used and the results in tenths recorded in units specified for the test. Three of these sets are for coarse and one for the combination of coarse and fine aggregates. The durability test type codes appear in Table A.13 of Appendix A of the LTPP Data Collection Guide and is reproduced in Appendix B of this report.
18. POLISH VALUE OF COARSE AGGREGATES. Enter the accelerated polish value of the coarse aggregates used in the surface layer, as determined by AASHTO T279 (ASTM D3319).

**CONSTRUCTION DATA SHEET 11: PLANT MIXED ASPHALT BOUND LAYERS - ASPHALT CEMENT PROPERTIES**

This data sheet should be completed for all test sections requiring PATB drainage layers.

1. LAYER NUMBER. Enter the asphalt concrete layer to be described on this sheet (from Construction Data Sheet 4, Layer Descriptions).
2. ASPHALT GRADE. Enter the grade of asphalt cement used (see Table A.16 of the LTPP Data Collection Guide or Appendix B of this report. Space

is provided on the data sheet for identifying a grade of asphalt cement other than those listed in Table A.16.

3. SOURCE. Enter the name of the source for the asphalt cement. A list of asphalt refiners and processors is provided in Table A.14 of the LTPP Data Collection Guide and Appendix B of this report (as taken from the Oil and Gas Journal, March 24, 1986). Space is provided to specify other sources which may not be included in this table.
  
4. SPECIFIC GRAVITY OF ASPHALT CEMENT. Enter the mean specific gravity of the asphalt cement (to the nearest 0.001) when it is available. If unavailable, a typical specific gravity for asphalt cements produced at the source refinery may be entered. If source is unknown, enter 1.010 as a reasonable estimate. This specific gravity is measured as specified by AASHTO T228 (or ASTM D70).

ORIGINAL ASPHALT CEMENT PROPERTIES. The following data items should be provided when available from the supplier for the original asphalt cement, tested prior to its use in the construction.

5. VISCOSITY OF ASPHALT AT 140°F. Enter the results in poises from kinematic viscosity testing using Test Method AASHTO T202 (or ASTM D2171) on samples of the original asphalt cement prior to its use in construction of the pavement section.
  
6. VISCOSITY OF ASPHALT AT 275°F. Enter the results in centistokes (to the nearest 0.01) from absolute viscosity testing using Test Method AASHTO T201 (or ASTM D2170) on samples of the original asphalt cement.
  
7. PENETRATION AT 77°F. Enter the penetration value (in tenths of a millimeter) from testing samples of the original asphalt cement in the mixture at 77°, using a 100 gram load and a five-second load duration with Test Method AASHTO T49 (or ASTM D5).

- 8-9. TYPE OF ASPHALT MODIFIERS. Enter the codes to identify up to two modifiers added to the asphalt cement for whatever purpose. A list of possible asphalt cement modifiers and codes for data entry are provided on Table A.15 of the LTPP Data Collection Guide and Appendix B of this report. If a material other than those listed in Table A.15 is used, space is provided to record the pertinent information. If no modifier was used, enter "N".
- 8-9. QUANTITY OF ASPHALT MODIFIER. Enter the quantities of modifier in percent of asphalt cement weight. Some modifiers (such as lime) may be specified in terms of "percent of aggregate weight," but they must be converted to percent of asphalt cement weight for uniformity. Space is provided for up to two types of modifiers. If no modifier was used, enter "N".
10. DUCTILITY AT 77°F. Enter the ductility in centimeters as measured by Test Method AASHTO T51 at 77°F (or ASTM D113).
11. DUCTILITY AT 39.2°F. Enter the ductility in centimeters of the original asphalt cement material at 39.2°F, using the procedures of Test Method AASHTO T51 (or ASTM D113).
12. TEST RATE FOR DUCTILITY MEASUREMENT AT 39.2°F. Enter the test speed in centimeters per minute for the ductility measurement taken at 39.2°F.
13. PENETRATION AT 39.2°F. Enter the penetration value (in tenths of a millimeter) determined using a 200 gram weight and 60 second loading duration and tested in accordance with Test Method AASHTO T49 (or ASTM D5) on samples of the original asphalt cement, prior to its use as a construction material.
14. RING AND BALL SOFTENING POINT. Enter the softening point of the asphalt cement in degrees Fahrenheit as measured with the ring-and-ball apparatus used in Test Method AASHTO T53, on samples of the original asphalt cement, prior to its use as a construction material.

**CONSTRUCTION DATA SHEET 12: PLANT MIXED ASPHALT BOUND LAYERS - MIXTURE PROPERTIES**

This data sheet should be completed for test sections requiring PATB drainage layers.

The following data items are to be derived from tests conducted on the mixture during construction as part of the contractor/participating agency Quality Control program. Calculations for calculated values (e.g. percent air voids) should be made separately for individual samples using data applicable to those samples.

The test samples can be compacted in the laboratory after sampling in the field, or obtained by coring, cutting, or sawing after the mixture is compacted in place. In the event that both types of samples are tested, separate data sheets should be filled out for those compacted in the laboratory and those compacted in the field. Although tests are to be conducted on core samples from the field for SHRP LTPP-SPS (and reported on other data sheets), data from project files should be entered when available.

1. LAYER NUMBER. Enter the asphalt concrete layer to be described on the sheet (from Construction Data Sheet 4, Layer Descriptions).
2. TYPE OF SAMPLES. Enter the code to indicate whether the test samples were sampled in the field and compacted in the laboratory, or removed from the compacted pavement. The codes appear on the data sheet.
3. MAXIMUM SPECIFIC GRAVITY. Enter the maximum specific gravity of a mixture sampled during or soon after construction, as an average from testing of several samples according to AASHTO 209 or ASTM D2041. When possible, several samples should be tested and the average entered. The resulting maximum specific gravity and the design asphalt content for the mixture should be used to calculate the effective specific gravity of aggregate using Equation 2.3 below. Once the effective specific gravity of the aggregate is established, it may be used to calculate other maximum

specific gravities for the mixture at other measured asphalt contents using Equation 2.4 below:

$$G_{se} = \frac{100 - P_b}{\frac{100}{G_{mm}} - \frac{P_b}{G_b}} \quad (2.3)$$

$$G_{mm} = \frac{100}{\frac{P_s}{G_{se}} + \frac{P_b}{G_b}} \quad (2.4)$$

where:

$G_{mm}$	=	Maximum specific gravity of paving mixture (no air voids)
$P_s$	=	Aggregate, percent by total weight of mixture
$P_b$	=	Asphalt, percent by total weight of mixture
$G_{se}$	=	Effective specific gravity of aggregate
$G_b$	=	Specific gravity of asphalt

These calculated values of maximum specific gravity are not to be entered into the data base, but will be needed to calculate the percent air voids for measured asphalt contents for individual extractions on cores.

4-6. BULK SPECIFIC GRAVITY. Enter the number of tests and the minimum, maximum, mean, and standard deviation of bulk specific gravities (to the nearest thousandth) of compacted mixtures measured on cores removed from the pavement during or right after construction. The test method specified in ASTM D1188 is preferred. See Appendix B of the LTPP Data Collection Guide for standard deviation equation.

7-9. ASPHALT CONTENT. Enter the number of samples and the minimum, maximum, mean, and standard deviation of percents by weight of the total asphalt cement (including that absorbed by the aggregate) in the asphalt concrete mixture to the nearest 0.1 percent. Asphalt contents measured by extraction tests (AASHTO T164 or ASTM D2172) on field samples are preferred, but results from nuclear test methods may also be used. If no such test results are available, enter the specified asphalt content

as the mean and leave the other spaces blank. See Appendix B of the LTPP Data Collection Guide for standard deviation equation.

- 10-12. PERCENT AIR VOIDS. Enter the number of samples and the minimum, maximum, mean, and standard deviation of calculated air voids (to the nearest 0.1 percent) as a percent of the material volume. This data is frequently not available, but can be calculated using data from reports on mix design and density measurements on samples from the pavement. Percent air voids is calculated as follows:

$$P_a = 100 \frac{G_{mm} - G_{mb}}{G_{mm}} \quad (2.5)$$

where:

- $P_a$  = Air voids in compacted mixture, percent of total volume  
 $G_{mm}$  = Maximum specific gravity of paving mixture (zero air voids) as determined by ASTM Method D2041  
 $G_{mb}$  = Bulk specific gravity of compacted mixture

See Appendix B of the LTPP Data Collection Guide for standard deviation equation.

13. VOIDS IN MINERAL AGGREGATE. Enter the mean void space between the aggregate particles of a compacted asphalt concrete mixture, which includes air voids and the effective asphalt content, to the nearest one-tenth of one percent. Percent of voids in mineral aggregate (VMA) is calculated as follows:

$$VMA = 100 - \frac{G_{mb} P_s}{G_{sb}} \quad (2.6)$$

where:

- VMA = Voids in mineral aggregate (percent of bulk volume)  
 $G_{sb}$  = Bulk specific gravity of aggregate

- $G_{mb}$  = Bulk specific gravity of compacted mixture (ASTM D2726)
- $P_s$  = Aggregate, percent by total weight of mixture
- = 100 - (percent of asphalt cement by total weight of mixture)

14. EFFECTIVE ASPHALT CONTENT. Enter the mean effective asphalt content (total asphalt content of the paving mixture minus the mean portion of asphalt that is lost by absorption into the aggregate particles), expressed by weight of total mixture to the nearest one-tenth of one percent. The asphalt absorption may be calculated as a percent of total weight of mixture as follows:

$$P_{sb} - P_{ba}P_s = \frac{G_{so} - G_{sb}}{G_{sb}G_{so}} G_b P_s \quad (2.7)$$

where:

- $P_{sb}$  = Absorbed asphalt, percent by weight of total mixture
- $P_{ba}$  = Absorbed asphalt, percent by weight of aggregate
- $P_s$  = aggregate, percent by total weight of mixture
- $G_{so}$  = effective specific gravity of aggregate
- $G_{sb}$  = bulk specific gravity of aggregate
- $G_b$  = specific gravity of asphalt

15. MARSHALL STABILITY. Enter the mean Marshall Stability (Test Method AASHTO T245 or ASTM D1559) in pounds for the mixture during laboratory mix design.

16. NUMBER OF BLOWS. Enter the number of blows of the compaction hammer that were applied to each end of the specimen during laboratory compaction.

17. MARSHALL FLOW. Enter the mean Marshall Flow (average of measured results) as the whole number of hundredths of an inch measured by Test Method AASHTO T245 (or ASTM D1559) for the mixture during the laboratory mix design (e.g. 0.15 inch is measured, enter "15").

18. HVEEM STABILITY. Enter the mean Hveem Stability or "stabilometer value" as measured with the Hveem apparatus using Test Method AASHTO T246 (or ASTM D1561).
19. HVEEM COHESIOMETER VALUE. Enter the cohesiometer value, in grams per 25 mm width (or diameter) of specimen, obtained by Test Method AASHTO T246 (or ASTM D1561).
20. TYPE OF ANTISTRIPPING AGENT USED. Enter the type of antistripping agent used in the mixture. The codes are provided in Table A.21 of the LTPP Data Collection Guide and Appendix B of this report.
21. ANTISTRIPPING AGENT USED. Enter whether the antistripping agent used in the mixture is solid or liquid.
22. AMOUNT OF ANTISTRIPPING AGENT USED. Enter the code indicating whether the antistripping agent is liquid or solid. Also, enter the amount of antistripping agent used in the mixture by weight to the nearest 0.1 percent of weight of asphalt if the agent is liquid or weight of aggregate if it is solid.

**CONSTRUCTION DATA SHEET 13: PLANT MIXED ASPHALT BOUND LAYERS - PLACEMENT DATA**

This data sheet should be completed for all test sections requiring PATB drainage layers.

1. DATE PAVING OPERATIONS BEGAN. Enter the date on which paving operations on the test section began.
2. DATE PAVING OPERATIONS COMPLETED. Enter the date on which paving operations on the test section were completed.

3. ASPHALT CONCRETE PLANT AND HAUL. Enter the type of asphalt concrete mix plant, a reference mix plant name, the haul distance and approximate haul time from the plant to the construction project, and the layer numbers of the material. Space is provided for up to three different mix plants in the instance that more than one mix plant was used to produce the asphalt concrete used in the different paving courses.
4. MANUFACTURER OF ASPHALT CONCRETE PAVER. Enter the name of the manufacturer of the asphalt concrete paver.
5. MODEL DESIGNATION OF ASPHALT CONCRETE PAVER. Enter the model number designation of the asphalt concrete paver used on the test section.
6. SINGLE PASS LAYDOWN WIDTH. Enter the single pass laydown width of the paver used on the test section to the nearest 0.1 a foot.
7. PATB PLACEMENT LIFT. Enter the layer number of the open graded, permeable asphalt treated base course (PATB) specified in Construction Data Sheet 4, Layer Descriptions. Enter the nominal placement thickness of each lift of the open graded material. The placement thickness is the thickness prior to compaction and should be based on field observations and measurements. Provide only one entry if only one lift is placed.
8. SIGNIFICANT EVENTS DURING CONSTRUCTION. Describe any significant events which occurred during construction and may influence the performance of the test section, e.g. disruptions to the paving operations due to rain, equipment break downs or unusual periods of sustained high or low temperatures. Use Construction Data Sheet 27, Miscellaneous Construction Notes and Comments, if more space is required.

**CONSTRUCTION DATA SHEET 14: PLANTS MIXED ASPHALT BOUND LAYERS - COMPACTION DATA**

This data sheet should be completed for test sections requiring PATB drainage layers.

1. DATE PAVING OPERATIONS BEGAN. Enter the date on which paving operations on the test section began.
2. DATE PAVING OPERATIONS COMPLETED. Enter the date on which paving operations on the test section were completed.
3. LAYER NUMBER. Enter the layer number from Construction Data Sheet 4, Layer Descriptions, which corresponds to the compaction information provided on this form. A separate sheet must be completed for each layer compacted.
4. MIXING TEMPERATURE. Enter the temperature of the mixture during mixing at the plant in °F.
5. LAYDOWN TEMPERATURES. Enter the mean, minimum, maximum, standard deviation, and number of measurements of the asphalt concrete laydown temperatures. These measurements should be performed in the field as close to the rear of the paver as practical. Measurements every 100 feet per paver pass are desired.
- 6-22. ROLLER DATA. Codes appear on the data sheet for steel-wheeled tandem, pneumatic-tired, single-drum vibratory, and double-drum vibratory types of rollers. For each type of roller, spaces are provided to describe significant characteristics for up to four different rollers of the same

type. Enter the requested characteristics for each roller used to compact the referenced layer. These roller code numbers are used in the compaction data portion of the form to indicate the number of coverages of each roller.

- 23-28. COMPACTION DATA. For the breakdown, intermediate and final compaction of each lift, indicate the numbers of coverages of each roller used. Enter the roller code number specified under roller data and the corresponding number of coverages for each lift of the material. A coverage is defined as one trip of the roller across the pavement.
29. AIR TEMPERATURE. Enter the air temperature during compaction to the nearest degree fahrenheit. Space is provided to record data for each of up to four lifts.
30. COMPACTED THICKNESS. Enter the compacted thickness to the nearest 0.1 inch. Space is provided to record data for each of up to four lifts.
31. CURING PERIOD. Enter the length of the curing period, to the nearest 0.1 day, before a new lift is placed. Space is provided to record data for each of up to four lifts.

**CONSTRUCTION DATA SHEET 15: PORTLAND CEMENT CONCRETE LAYERS - JOINT DATA**

This data sheet is used for reporting information on joints constructed in each portland cement concrete surface layer identified on Construction Data Sheet 4, Layer Descriptions. Where dowels or other mechanical load transfer devices are not provided at joints, enter "N" in the spaces for describing these devices.

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1. LAYER NUMBER. Enter the portland cement concrete layer for which a description is being provided (from Construction Data Sheet 4, Layer Descriptions).
  
- 2-3. AVERAGE CONTRACTION JOINT SPACING. Enter the average spacing in feet (to the nearest 0.1 foot) between consecutive contraction joints (length of the concrete slab) of the pavement under survey. A space is provided to write in a description of any Random Joint Spacing.
  
4. SKEWNESS OF JOINTS. Enter the average deviation of the contraction joint across the slab from a right angle with the edge, measured in feet per lane. If joints are not skewed, enter "N".
  
5. TRANSVERSE CONTRACTION JOINT LOAD TRANSFER SYSTEM. Indicate the mechanism by which a portion of the moving load is transferred across the transverse contraction joint to the adjacent slab. Applicable codes are provided on the data sheet together with a space for describing a load transfer system for which no code is provided.
  
6. DOWEL DIAMETER. Enter the outer diameter of the round dowel bar used as the load transfer device across a contraction joint of the pavement under survey. This number is to be entered to the nearest 0.01 inch.
  
7. DOWEL SPACING. Enter the average center-to-center distance in inches between mechanical load transfer devices (round or I-beam, star lugs, etc.) across the contraction joint of the portland cement concrete surface layer being described.
  
8. DISTANCE OF NEAREST DOWEL FROM OUTSIDE LANE-SHOULDER EDGE. Enter the distance of the center of the nearest dowel or mechanical load transfer device from the outside lane-shoulder edge to the nearest 0.1 inch.

9. DOWEL LENGTH. Enter the mean length in inches of the round or I-beam dowel bars across contraction joints in the PCC layer being described.
10. DOWEL COATING. Indicate the type of material covering the dowel bar surfaces when installed in the concrete slab. A space is provided to write in a description if some dowel coating was used other than those for which codes are provided.
11. METHOD USED TO INSTALL MECHANICAL LOAD TRANSFER DEVICES. Indicate the method used to install the dowels. Space is provided for describing another method if the method used differs from those for which codes are provided.
12. DOWEL ALIGNMENT CHECKED BEFORE PLACEMENT. Indicate whether the alignment of the dowel bars was checked prior to placement of the portland cement concrete.
13. DOWEL ALIGNMENT CHECKED AFTER PLACEMENT. Indicate whether the alignment of the dowel bars was checked after placement of the portland cement concrete. A space is provided to describe the method used to check the dowel bar alignment.

CONSTRUCTION DATA SHEET 16: PORTLAND CEMENT CONCRETE LAYERS - JOINT DATA  
(CONTINUED)

This sheet is a continuation of Construction Data Sheet 15, Portland Cement Concrete Layers Joint Data, and should be completed for each concrete surface layer identified on Construction Data Sheet 4, Layer Descriptions. These additional data items are described below.

1. LAYER NUMBER. Indicate the portland cement concrete layer for which a description is being provided (from Construction Data Sheet 4).
2. METHOD USED TO FORM TRANSVERSE JOINTS. Indicate whether the contraction joints were constructed by sawing the hardened slab, by placing an insert in the slab surface while the concrete is plastic, or by any other construction method used to form the joint. Space is provided for describing another method if none of those for which codes were provided was used.
3. TYPE OF LONGITUDINAL JOINT. Indicate how the longitudinal joint between the lanes was formed. Space is provided for describing another way of forming the joints if none of those for which codes are provided was used.
4. TYPE OF SHOULDER-TRAFFIC LANE JOINT. Indicate how the joint between the concrete shoulder and the traffic lane was formed. Space is provided for describing another way of forming the joints if none of those for which codes are provided was used.
5. AVERAGE DEPTH OF SAWCUT, FROM MEASUREMENTS. Enter the average depth of sawcut to the nearest 0.01 inch. This value should be obtained from actual field measurements.
6. TIME INTERVAL BETWEEN CONCRETE PLACEMENT AND SAWCUT. Enter the time interval between the time of concrete placement and the time of joint sawcutting to the nearest hour.
7. TRANSVERSE JOINT SEALANT TYPE (AS-BUILT). Indicate the type of joint sealant used in the transverse joints. Space is provided for describing

another type of sealant if none of those for which codes were provided was used.

- 8-9. TRANSVERSE JOINT SEALANT RESERVOIR (AS-BUILT). Enter the mean as-constructed width and depth of the transverse joint sealant reservoir to the nearest 0.01 inch.
- 10-11. LONGITUDINAL JOINT SEALANT RESERVOIR. Enter the average width and depth of the as-built longitudinal joint sealant reservoir to the nearest 0.01 inch.
12. BETWEEN LANE TIE BAR DIAMETER. Enter the nominal diameter of the tie bars used across longitudinal joints between lanes to the nearest 0.01 inch.
13. BETWEEN LANE TIE BAR LENGTH. Enter the mean length of the tie bars used across the longitudinal joint between the lanes to the nearest inch.
14. BETWEEN LANE TIE BAR SPACING. Enter the mean center-to-center spacing between consecutive tie bars across the longitudinal joint between the lanes to the nearest 0.1 inch.
- 15-16. SHOULDER-TRAFFIC LANE JOINT SEALANT RESERVOIR (AS BUILT). Enter the average width and depth of the as-built joint sealant reservoir between the shoulder and traffic lane.

**CONSTRUCTION DATA SHEET 17: PORTLAND CEMENT CONCRETE LAYERS - REINFORCING  
STEEL DATA**

This data sheet is used for reporting information on reinforcing steel provided in each reinforced PCC surface layer identified on Construction Data Sheet 4, Layer Descriptions.

1. LAYER NUMBER. Enter the reinforced portland cement concrete surface layer for which a description is being provided (from Construction Data Sheet 4).
2. TYPE OF REINFORCING. Indicate the type of reinforcing used in the PCC layer being described. A space is provided for entering a written description of a reinforcing type other than deformed bars or welded wire fabric.
3. TRANSVERSE BAR DIAMETER. Enter the nominal diameter of the transverse bars to the nearest 0.01 inch.
4. TRANSVERSE BAR SPACING. Enter the mean center-to-center spacing between transverse bars to the nearest 0.1 inch.
5. LONGITUDINAL BAR DIAMETER. Enter the nominal diameter of the longitudinal bars to the nearest 0.01 inch.
6. DESIGN PERCENTAGE OF LONGITUDINAL STEEL. Enter the amount of reinforcing steel expressed as a percentage of the PCC cross-section required in the design to the nearest 0.01 of one percent.

7. DEPTH TO REINFORCEMENT FROM SLAB SURFACE. Enter the mean design depth (to the nearest 0.1 inch) of the concrete cover over the reinforcing steel.
8. LONGITUDINAL BAR SPACING. Enter the mean center-to-center spacing between longitudinal bars to the nearest 0.1 inch.
9. YIELD STRENGTH OF REINFORCING. Enter the mean yield strength of the reinforcing steel of the bars to the nearest 0.1 kip per square inch. If tests were not conducted for the steel used, enter the minimum yield strength allowed for the grade of steel used.
10. METHOD USED TO PLACE REINFORCEMENT. Indicate the method used to install reinforcing steel bars or wire fabric during pavement construction. These methods include presetting the reinforcement on chairs, placing it mechanically by means of special equipment used for that purpose, or by placing them between layers of concrete. A space is also provided to describe another method of placement if a code was not provided for the method used.

**CONSTRUCTION DATA SHEET 18: PORTLAND CEMENT CONCRETE LAYERS - MIXTURE DATA**

This data should be completed during construction using available project records for each lean concrete base and portland cement concrete surface layer identified on Construction Data Sheet 4, Layer Descriptions.

1. LAYER NUMBER. Enter the lean concrete base or portland cement concrete surface layer number for which a description is being provided (from Construction Data Sheet 4).

- 2-5. MIX DESIGN. Enter the oven dry weights in pounds of coarse aggregate, fine aggregate, cement, and the weight of water provided by the mix design for a cubic yard of concrete.
6. TYPE CEMENT USED. Enter the type of cement used. These cement type codes appear in Table A.11 of the LTPP Data Collection Guide and Appendix B of this report.
7. ALKALI CONTENT OF CEMENT. Enter the alkali content of the cement to the nearest 0.1 percent.
- 8-10. ADMIXTURES. Enter the types and amounts (in percent by weight of cement to the nearest thousandth) of admixtures used in the concrete. The codes for concrete admixtures appear in Table A.12 of the LTPP Data Collection Guide and Appendix B of this report. A space has been provided for identifying an admixture for which a code was not provided.
- 11-14. AGGREGATE DURABILITY TEST RESULTS. Enter the type of durability tests performed and the test results in tenths in the units specified for the test. Three of these sets are for coarse aggregates and one is for the combination of coarse and fine aggregates. The durability test type codes and the units for reporting appear in Table A.13 of the LTPP Data Collection Guide and Appendix B of this report.

**CONSTRUCTION DATA SHEET 19: PORTLAND CEMENT CONCRETE LAYERS - MIXTURE DATA  
(CONTINUED)**

This data sheet is a continuation of Construction Data Sheet 19, Portland Cement Concrete Layers-Mixture Data, and should be completed from project records for each portland cement concrete layer identified on Construction Data Sheet 4, Layer Descriptions.

1. LAYER NUMBER. Indicate the portland cement concrete layer for which a description is being provided (from Construction Data Sheet 4).
  
- 2-4. COMPOSITION OF COARSE AGGREGATE. Enter the types and percentages by weight of up to three separate materials used in the coarse aggregate (the portion of an aggregate retained on the No. 8 sieve) used in the concrete mix. Space is provided for description of another type if none of the types for which codes are provided were used. Where only one type of material was used, enter its type code and 100 in the top set of data spaces, leaving the other blank.
  
5. GEOLOGIC CLASSIFICATION OF COARSE AGGREGATE. Enter the code for the geologic classification of the natural stone used as coarse aggregate in the concrete. These codes appear in Table A.9 of the LTPP Data Collection Guide and Appendix B of this report, and provide identification as to which of the three major classes of rock the coarse aggregate belongs to and the type of rock within those classes. If a "blend" was used, enter the code for the geological classification for the material representing the majority of the coarse aggregate. If a "crushed slag," "manufactured lightweight," or "recycled concrete" was used as coarse aggregate, enter "N".
  
- 6-8. COMPOSITION OF FINE AGGREGATE. Enter the types and percentages by weight of materials in the fine aggregate (passing the No. 8 sieve and retained on the No. 200 sieve). Space is provided for identifying another type if none of those for which codes are provided was used. Where only one type of material was used, enter its type code and 100 in the top set of data spaces, leaving the others blank.
  
9. INSOLUBLE RESIDUE. Enter the percentage of insoluble residue (non-carbonate material) as determined using ASTM D3042.

10. GRADATION OF COARSE AGGREGATE. Enter the percent of coarse aggregate passing various standard sieve sizes to the nearest one percent. It is not expected that values will be available for all sieve sizes shown. The objective is to provide sufficient sieve sizes to accommodate testing and specification practices for most agencies.
  
11. GRADATION OF FINE AGGREGATES. Enter the percent of fine aggregate passing various standard sieve sizes to the nearest one percent. It is not expected that values will be available for all sieve sizes shown. The objective is to provide sufficient sieve sizes to accommodate testing and specification practices for most agencies.
  
- 12-13. BULK SPECIFIC GRAVITIES. Enter the mean bulk specific gravities (to the nearest thousandth) for coarse aggregate and fine aggregate. The bulk specific gravities are measured using AASHTO T85 (or ASTM C127) and AASHTO T84 (or ASTM C128) procedures for the coarse and fine aggregate fractions, respectively.

**CONSTRUCTION DATA SHEET 20: PORTLAND CEMENT CONCRETE LAYERS - PLACEMENT DATA**

This data sheet is used for reporting information on the placement operations of lean concrete base and portland cement concrete surface courses. This data sheet should be completed for all test sections.

1. DATE PAVING OPERATIONS BEGAN. Enter the date on which paving operations on the test section began.
  
2. DATE PAVING OPERATIONS COMPLETED. Enter the date on which paving operations on the test section were completed.

3. LAYER NUMBER. Indicate the layer number from Construction Data Sheet 4, Layer Descriptions, for which the information is provided.
4. CONCRETE MIX PLANT AND HAUL. Enter a reference mix plant name, the haul distance, and approximate haul time from the plant to the construction project. Space is provided for up to three different mix plants in the instance that more than one mix plant is utilized.
5. PAVER TYPE. Indicate whether a slip-form or side-form paver was used to place the concrete. The codes appear on the data sheet along with a space to describe a different type not listed.
6. PAVER MANUFACTURER AND MODEL NUMBER. Indicate the name of the manufacturer and the model number of the paving equipment.
7. SPREADER TYPE. Indicate the generic type of spreader used in the paving operations.
8. SPREADER MANUFACTURER AND MODEL NUMBER. Indicate the name of the manufacturer and the model number of the spreader equipment.
9. WIDTH PAVED IN ONE PASS. Indicate the width of the finished concrete from a single pass of the paving train which includes the monitoring lane, to the nearest tenth of a foot.
10. DOWEL PLACEMENT METHOD. Indicate type of dowel placement, dowel bar inserter (DBI) or dowel baskets.
11. NUMBER OF VIBRATORS. Enter the number of spud vibrators integral with the paver used in consolidating the concrete.

12. VIBRATOR SPACING. Indicate the average spacing between the spud vibrators, to the nearest inch.
13. DEPTH OF VIBRATORS BELOW SURFACE. Indicate the depth below the concrete surface where vibrators are functioning, to the nearest 0.5 inch.
14. ADDITIONAL VIBRATION APPLIED. Indicate the use of vibration in addition to spud vibrators. Pan vibrators attached to the paver and vibration imparted by the dowel bar inserter should be indicated.

CONSTRUCTION DATA SHEET 21: PORTLAND CEMENT CONCRETE LAYERS - PLACEMENT DATA  
(CONTINUED)

This data sheet is a continuation of Construction Data Sheet 20, Portland Cement Concrete Layers - Placement Data.

1. CONSOLIDATION OF MATERIALS. Indicate the method used to consolidate the concrete. The codes appear on the data sheet along with a space to describe a different type not listed.
2. FINISHING. Indicate the method used to finish the concrete. The codes appear on the data sheet along with a space to describe a different type not listed.
3. CURING. Indicate the method used to cure the concrete. The codes appear on the data sheet along with a space to describe a different method not listed.
4. TEXTURING. Indicate the method used to provide a surface texture on the concrete. The codes appear on the data sheet along with a space to describe a different type not listed.

**CONSTRUCTION DATA SHEET 22: PORTLAND CEMENT CONCRETE SURFACE LAYER PROFILE DATA**

This data sheet is used to provide information on the smoothness of the portland cement concrete surface layer identified on Construction Data Sheet 4, Layer Descriptions, and related operations performed during construction.

1. DATE PROFILE MEASURED. Enter the month, date, and year on which profile measurements were made.
2. PROFILOGRAPH TYPE. Indicate the type of profilograph used on the concrete surface. The codes appear on the data sheet.
3. PROFILOGRAPH INDEX. Enter the profilograph index in inches per mile.
4. INTERPRETATION METHOD. Indicate the method used in interpreting the profilograph data. The codes appear on the data sheet.
5. HEIGHT OF BLANKING BAND. Enter the height of the blanking band in inches to the nearest 0.01 inch.
6. CUTOFF HEIGHT. Enter the cutoff height in inches to the nearest 0.01 inch.
7. SURFACE PROFILE USED AS BASIS OF INCENTIVE PAYMENT. Indicate whether the surface profile results were used as a basis of incentive payment.
8. WAS SURFACE PROFILE CORRECTED BY DIAMOND GRINDING. Indicate whether the surface profile was corrected by diamond grinding.

9. DATE DIAMOND GRINDING OPERATIONS BEGAN. Enter the date on which diamond grinding operations began.
10. DATE DIAMOND GRINDING OPERATIONS COMPLETED. Enter the date on which diamond grinding operations were completed.
11. REASON FOR GRINDING. Indicate the reason for performing diamond grinding. The codes appear on the data sheet along with a space to describe a different reason not listed.
12. AVERAGE DEPTH OF CUT. Enter the average depth of cut made during diamond grinding operations to the nearest 0.01 inch.
13. CUTTING HEAD WIDTH. Enter the cutting head width of the diamond grinder to the nearest 0.01 inch.
14. AVERAGE GROOVE WIDTH. Enter the average groove width in the concrete surface to the nearest 0.1 inch.
15. AVERAGE SPACING BETWEEN BLADES. Enter the average blade spacing of the diamond grinder to the nearest 0.1 inch.

**CONSTRUCTION DATA SHEET 23: FULL DEPTH REPAIR FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES**

This data sheet is used for reporting details of full depth repair, including either full depth patches or complete slab replacement, for pavements with PCC surfaces.

1. DATE PATCHING OPERATIONS BEGAN. Enter the date on which patching operations on the test section began.

2. DATE PATCHING OPERATIONS COMPLETE. Enter the date on which patching operations on the test section were completed.
3. PRIMARY DISTRESS OCCURRENCE PATCHED OR REPLACED WITH NEW SLAB. Enter the code for the primary reason for patching or slab replacement. If patching or slab replacement was required for more than one reason, enter the cause resulting in the greatest repair area. Codes appear in Table A.22 of the LTPP Data Collection Guide and Appendix B of this report. A space is provided for describing a reason for which no code is provided.
4. SECONDARY DISTRESS OCCURRENCE PATCHED OR REPLACED WITH NEW SLAB. Enter the code for the second reason for patching or slab replacement.
5. PATCHES. Enter the number and area in square feet of patches placed. Quantities shall be recorded separately for patches of slab replacement only and for patches of both the slab and base replacement.
6. PATCH MATERIAL USED. Enter the code for the type of surface material used to patch the pavement. If a material other than those specified is used, it should be described in the space provided.
7. SLABS REPLACED. Enter the number and area in square feet of slabs replaced. Quantities shall be recorded separately for slab replacement of concrete only and slab replacement of concrete and base layers.
8. METHOD FOR PATCH BOUNDARY DETERMINATION. Enter the code for the means of determining the extent of the area to be patched, or whether slabs should be replaced. Space is provided to describe other methods for which a code was not provided.

9. CUTTING INSTRUMENT. Enter the code for the instrument used to cut the boundaries of the area to be patched.

**CONSTRUCTION DATA SHEET 24: FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES (CONTINUED)**

This data sheet is a continuation of Construction Data Sheet 23, Full Depth Repair Data for Portland Cement Concrete Pavements.

1. SECURING LOAD TRANSFER DEVICES. Enter the code for the material used to grout or epoxy load transfer devices into drilled or preformed holes. Space is provided to enter material other than those specified on the data sheet.
2. REINFORCING STEEL PLACED IN PATCH. Indicate whether the patched area contains reinforcing steel or not.
3. REBAR NUMBER. Enter the rebar number designations of the longitudinal and transverse bars or wire mesh (tied or untied to old reinforcement) for temperature steel, dowel bars, and tie bars in the full-depth repair. If either longitudinal or transverse bars were not used, the appropriate spaces may be left blank for these and the next three items.
4. BAR LENGTHS. Enter the lengths of longitudinal and transverse bars or wire mesh, to the nearest 0.1 inch.
5. BAR SPACINGS. Enter the approximate center-to-center spacings of adjacent longitudinal and transverse bars or wire mesh, to the nearest 0.1 inch.
6. DOWEL COATINGS. Indicate the type of coatings used on longitudinal and transverse dowel bars. If dowel bars were not used, leave this space blank.

7. NUMBER OF SAW CUTS. Enter the number of saw cuts required per patch, if any.
8. DEPTH OF TYPICAL BOUNDARY SAW CUT. Enter the average depth, to the nearest 0.1 inch, of boundary saw cut.
9. CONCRETE BREAKUP. Enter the code to specify the means of breaking up the existing concrete to be removed.
10. REMOVAL OF CONCRETE. Indicate the method of material removal from the area patched.

**CONSTRUCTION DATA SHEET 25: FULL DEPTH REPAIR DATA FOR PORTLAND CEMENT CONCRETE PAVEMENTS (CONTINUED)**

This data sheet is a continuation of Construction Data Sheets 23 and 24, Full Depth Repair Data for Portland Cement Concrete Pavements.

1. METHOD OF REINFORCING STEEL PLACEMENT. Indicate the means of placing the reinforcing steel. If reinforcing steel is not included, this space should be left blank.
2. MIXTURE DESIGN FOR PCC PATCH MATERIAL. Enter the pounds per cubic yard of coarse aggregate, fine aggregate, cement, and water (in gallons per cubic yard) in patch mixture. Coarse aggregate is the portion retained on the No. 4 sieve.
3. CEMENT TYPE USED. Enter the appropriate code to identify the type of cement used in the patch mix. Types of cement and associated codes are provided in Table A.11 of the LTPP Data Collection Guide and Appendix B

of this report. Enter "61 for epoxy cement and "62" for polymer cement. If a cement not otherwise identified was used, enter "63."

4. AIR CONTENT. Enter the mean air content and range of the measured values (in percent by volume) in the portland cement mix, to the nearest 0.1 percent.
5. ADMIXTURES. Indicate the admixtures added to the PCC mix. Spaces are provided to list up to two types of admixtures. A list of admixtures is provided in Table A.12 of the LTPP Data Collection Guide and Appendix B of this report.
6. SLUMP. Enter the mean slump and the range (minimum and maximum measured values) for portland cement concrete patch material, to the nearest 0.1 inch.
7. FLEXURAL STRENGTH (MODULUS OF RUPTURE). Enter the mean flexural strength of the portland cement concrete mix used in the patch in pounds per square inch, based on third point loading (ASTM C78), and the number of days the beam was cured before testing. If third-point beam tests were not performed and another strength test (such as compressive or splitting tensile tests) were performed, space is provided to identify the type of strength testing performed on the concrete mixture, the type of loading, age at testing, and measured strength. Refer to the test by AASHTO, ASTM, or other agency's designation.
8. AMBIENT CONDITIONS AT TIME OF PATCHING. Enter the low and high air temperature observed during patching activities in degrees Fahrenheit, and a code to indicate whether the surface was dry or wet at the time of patching.

9. MAXIMUM SIZE OF COARSE AGGREGATE. Enter the maximum size of the coarse aggregate in the patch material to the nearest 0.1 inch.
10. CONSOLIDATION OF MATERIALS. Indicate the means of consolidating the patch materials into the area patched.
11. FINISHING. Indicate the means of finishing the surface of the patched area or new slab. Where a method other than one of those specified was used, it should be indicated in the space provided.

CONSTRUCTION DATA SHEET 26: FULL DEPTH REPAIR DATA FOR PORTLAND CEMENT CONCRETE PAVEMENTS (CONTINUED)

This data sheet is a continuation of Construction Data Sheets 23, 24, and 25, Full Depth Repair Data for Portland Cement Concrete Pavements.

1. JOINT FORMING METHOD. Indicate the method of forming contraction joints in the shoulder, transverse direction, and longitudinal direction. Space is provided to specify a method other than those listed.
2. WAS BOND BREAKER USED BETWEEN ADJACENT LANES. Indicate whether a bond breaker was used to prevent bonding of the new patch to the adjacent lane.
3. CURING METHOD. Indicate one or two methods used in curing the patch materials. A space is provided to specify a method other than one of those listed. If only one method was used, leave "Method 2".
4. APPROXIMATE TIME BETWEEN PATCHING AND OPENING TO TRAFFIC. Enter the approximate time, in hours, the patch materials were allowed to cure prior to allowing traffic on the surface.

5. TYPE OF TRANSVERSE JOINTS IN PATCHES OR SLABS. Indicate the type of joints adjacent to or in patches or new slabs, respectively, include expansion joints, contraction joints, or a mixture of the two. Leave code for patches blank if no patches were adjacent to or include joints. Leave code for slabs blank if no full slabs were replaced.
  
6. WERE OLD JOINTS MATCHED. Indicate whether joints in the patch were matched with the existing joints in the pavement.

**CONSTRUCTION DATA SHEET 27: MISCELLANEOUS CONSTRUCTION NOTES AND COMMENTS**

This construction data sheet is used for reporting miscellaneous notes and comments, additional descriptions of entries on other forms, or construction-related data that are not covered on other data forms. Comments on this form should address construction operations which may influence the performance of the test sections. For example, comments concerning quality control aspects pertaining to the materials, mixes, and operations may be addressed on this sheet.

Also, this sheet may be used to provide additional comments on items included in other data sheets. In these cases, the items and sheets numbers pertaining to these comments should be indicated on this form.

In addition, this form can be used to report other types of quality control measurements performed on the test sections which are not covered in the construction data sheets. For example, if profile or ride quality acceptance procedures are not based on Profilograph measurements, this information could be provided on this form. In this case, specify the type, manufacture, model number of measurement equipment used, and a reference to the standard test procedure employed (such as ASTM, AASHTO, or Agency's test method). If similar types of data or information are reported for several SPS test sites on this

sheet, then consideration will be given to the development of standard forms for reporting this information to simplify its entry in the data base.

### LABORATORY MATERIAL TESTING DATA

Laboratory material tests should be performed in accordance with the SHRP standard protocols contained in the most recent version of Operational Guide No. SHRP-LTPP-OG-004, "SHRP-LTPP Interim Guide for Laboratory Material Handling and Testing." The Guide contains data forms for reporting test information and results. Procedures and forms for those test methods that are not included in the GPS materials testing program but required for the SPS-2 experiment are listed in the Operational Memorandum No. SHRP-LTPP-OM-019, "Specific Pavement Studies: Materials Sampling and Testing Requirements for Experiment SPS-2, Strategic Study of Structural Factors for Rigid Pavements", April 1991.

### TRAFFIC DATA

Traffic data should be collected and reported using weigh-in-motion equipment. The WIM must be permanently installed and located such that the traffic stream over the project site is properly monitored. Monitoring information must be reported using the same formats and procedures as required for GPS test sections.

In general, traffic data should be recorded as "project level data" and coded with a "00" as the test section number. In instances where an intersection exists within the test site and thus resulting in different traffic levels on the test sections, measurements of the traffic level on the different groups of sections on each side of the intersection should be referenced to the lead test section of the group. The locations of intersections or ramps that exist within the test site should be recorded on Construction Data Sheet 3, Reference Project Station Table.

CLIMATIC DATA

Information on climatic conditions at each SPS-2 test site is needed. In general, the following data elements will be required:

Maximum Daily Temperature, (TMAX);  
Minimum Daily Temperature, (TMIN);  
Mean Daily Temperature, (MNTP);  
Daily Precipitation, (PRCP);  
Daily Snowfall, (SNOW);  
Daily Occurrences of Weather, (DYSW);  
Daily Average Wind Speed, (AWND);  
Peak Gust Wind Speed and Direction, (PKGS);  
Percent of Possible Sunshine, (PSUN);  
Average Sky Coverage Sunrise to Sunset, (SCSS);  
Average Sky Coverage Midnight to Midnight, (SCMM);  
Daily Minimum Relative Humidity, (MNRH); and  
Daily Maximum Relative Humidity, (MXRH)

The procedures used for collection and storage of climate and environmental data for GPS test sections should be followed for SPS-2 projects. Since this data will apply to all test sections on the project, it should be recorded as "project level data" with a "00" entered as the test section number.

DISTRESS, DEFLECTION, PROFILE AND SKID DATA

Guidelines on the timing of deflection, profile, distress, and friction measurements are shown in Table 4. In general, the same procedures and reporting formats used for GPS should be followed for the measurements on SPS test sections. Deflection measurements should be obtained in accordance with the FWD

Table 4. Guidelines on initial monitoring measurements  
on SPS-2 test sites.

MEASUREMENT	AFTER CONSTRUCTION
DEFLECTION MEASUREMENTS	1 - 3 Months
PROFILE MEASUREMENTS	< 2 Months
DISTRESS SURVEY	< 6 Months
FRICTION MEASUREMENTS	3 - 12 Months

Test Plan developed for this experiment. This monitoring data should be obtained and reported for each test section.

#### MAINTENANCE AND REHABILITATION DATA

All maintenance and rehabilitation activities performed on the SPS test sections after completion of construction should be recorded on a test section basis using the data sheets contained in the LTPP Data Collection Guide.

APPENDIX A

SAMPLING DATA SHEETS, FIELD OPERATIONS INFORMATION FORMS  
AND SPS-2 CONSTRUCTION DATA SHEETS

(Exclusively for SPS Experiments)

PAVEMENT CORE LOG AT C-TYPE CORE LOCATIONS

SAMPLING DATA SHEET 2

HRP REGION \_\_\_\_\_ STATE \_\_\_\_\_ STATE CODE \_\_\_\_\_  
 SPS EXPERIMENT NO \_\_\_\_\_ SPS PROJECT CODE \_\_\_\_\_  
 ROUTE/HIGHWAY \_\_\_\_\_ Lane \_\_\_\_\_ Direction \_\_\_\_\_ TEST SECTION NO. \_\_\_\_\_  
 SAMPLE/TEST LOCATION:  Before Section  After Section FIELD SET NO. \_\_\_\_\_

OPERATOR \_\_\_\_\_ EQUIPMENT USED \_\_\_\_\_ CORING DATE \_\_\_\_-\_\_\_\_-\_\_\_\_

SAMPLING AREA NO SA- \_\_\_\_\_ CORE BARREL: Tip Type \_\_\_\_\_ Cooling Medium \_\_\_\_\_

Note: Record information for all cores extracted from each core hole in one column in the table below. Use a separate sheet for each sampling area. "Depth" should be measured from the pavement surface to the bottom of the core and recorded to the nearest tenth of an inch.

CORE HOLE NUMBER						
LOCATION: (a) STATION						
(b) OFFSET (Feet, O/S)						
Core Recovered?	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO
Replacement Core Hole No.						
Core Size (inch Diam.)	4/6	4/6	4/6	4/6	4/6	4/6
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam)	4/6	4/6	4/6	4/6	4/6	4/6
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	4/6	4/6	4/6	4/6	4/6	4/6
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	4/6	4/6	4/6	4/6	4/6	4/6
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Remarks						

GENERAL REMARKS: \_\_\_\_\_

CERTIFIED \_\_\_\_\_ VERIFIED AND APPROVED \_\_\_\_\_ DATE \_\_\_\_\_

Field Crew Chief \_\_\_\_\_ SHRP Representative \_\_\_\_\_ - \_\_\_\_ -19 \_\_\_\_  
 Affiliation: \_\_\_\_\_ Affiliation: \_\_\_\_\_ Month- Day- Year

A-TYPE BORE HOLE LOG

SAMPLING DATA SHEET 4-1

RP REGION \_\_\_\_\_ STATE \_\_\_\_\_  
 SPS EXPERIMENT NO \_\_\_\_\_  
 ROUTE/HIGHWAY \_\_\_\_\_ Lane \_\_\_\_\_ Direction \_\_\_\_\_  
 SAMPLE/TEST LOCATION:  Before Section  After Section  
 Within Section

STATE CODE \_\_\_\_\_  
 SPS PROJECT CODE \_\_\_\_\_  
 TEST SECTION NO. \_\_\_\_\_  
 FIELD SET NO. 1

OPERATOR \_\_\_\_\_ EQUIPMENT USED \_\_\_\_\_ BORING DATE \_\_\_\_-\_\_\_\_-\_\_\_\_

SAMPLING AREA NO: SA- \_\_\_\_\_ LOCATION: STATION \_\_\_\_\_ OFFSET \_\_\_\_\_ feet from °/s

BORE HOLE NUMBER: \_\_\_\_\_ BORE HOLE SIZE: \_\_\_\_\_ (inch Diam.)

Scale (Inches)	Strata Change (Inches)	Sample Number (1)	#Blows(2)			Ref? Y/N (3)	DLR (Inches) (4)	IOP (5)	Material Description	Material Code
			6"	6"	6"					
10.0										
20.0										
30.0										
40.0										
50.0										

- Record sample numbers for splitspoon/thin-walled tube samples taken from the subgrade.
- For splitspoon samples, record the number of blows for the first, second and third 6 inches of penetration.
- Refused** - If the splitspoon is refused, place a Y in the **REFUSAL** column and complete **Driving Length To Refusal** column. Refusal is defined as less than 1 inch of penetration with 100 blows.
- Driving Length To Refusal** - Record penetration to refusal of splitspoon from the top of the pavement surface.
- Inches Of Penetration** - Record from start of splitspoon sampling procedure if 100 blows is reached before one foot of penetration. If penetration exceeds 12 inches before 100 blows is reached, enter middle 6 inches plus depth of penetration into the last 6 inches when 100 blows was reached (not including seating drive); record to nearest tenth of an inch.

GENERAL REMARKS: \_\_\_\_\_  
 CERTIFIED \_\_\_\_\_ VERIFIED AND APPROVED \_\_\_\_\_ DATE \_\_\_\_-\_\_\_\_-19\_\_\_\_  
 Field Crew Chief \_\_\_\_\_ SHRP Representative \_\_\_\_\_  
 Affiliation: \_\_\_\_\_ Affiliation: \_\_\_\_\_  
 Month- Day- Year

**IN SITU DENSITY AND MOISTURE TESTS**

**SAMPLING DATA SHEET 8-1**

SHRP REGION \_\_\_\_\_ STATE \_\_\_\_\_ STATE CODE \_\_\_\_\_  
 SPS EXPERIMENT NO \_\_\_\_\_ SPS PROJECT CODE \_\_\_\_\_  
 ROUTE/HIGHWAY \_\_\_\_\_ Lane \_\_\_\_\_ Direction \_\_\_\_\_ TEST SECTION NO. \_\_\_\_\_  
 SAMPLE/TEST LOCATION: 9 Before Section 9 After Section FIELD SET NO. \_\_\_\_\_  
 9 Within Section  
 OPERATOR \_\_\_\_\_ NUCLEAR DENSITY GAUGE I.D. \_\_\_\_\_ TEST DATE \_\_\_\_-\_\_\_\_-\_\_\_\_  
 SAMPLING AREA NO: SA-\_\_\_\_\_ LOCATION: STATION \_\_\_\_\_ OFFSET \_\_\_\_\_ feet from E/s  
 LOCATION NO: \_\_\_\_\_ DATE OF LAST MAJOR CALIBRATION \_\_\_\_-\_\_\_\_-\_\_\_\_

Note: Use additional sheets if necessary

<b>DEPTH FROM SURFACE TO THE TOP OF THE LAYER, INCHES (From Plans)</b>						
<b>LAYER NUMBER</b>						
<b>MATERIAL TYPE: (Unbound=G Other=T)</b>						
<b>IN SITU DENSITY, pcf (AASHTO T238-86)</b>	1					
	2					
	3					
	4					
<b>AVERAGE</b>						
Method (A,B,or C)						
Rod Depth, inches						
<b>IN SITU MOISTURE CONTENT, % (AASHTO T239-86)</b>	1					
	2					
	3					
	4					
<b>AVERAGE</b>						

GENERAL REMARKS: \_\_\_\_\_

CERTIFIED \_\_\_\_\_ VERIFIED AND APPROVED \_\_\_\_\_ DATE \_\_\_\_ - \_\_\_\_ -19 \_\_  
 Field Crew Chief \_\_\_\_\_ SHRP Representative \_\_\_\_\_ Month - Day - Year  
 Affiliation: \_\_\_\_\_ Affiliation: \_\_\_\_\_

SHOULDER PROBE LOG  
SAMPLING DATA SHEET 9

RP REGION \_\_\_\_\_ STATE \_\_\_\_\_ STATE CODE \_\_\_\_\_  
 S EXPERIMENT NO \_\_\_\_\_ SPS PROJECT CODE \_\_\_\_\_  
 ROUTE/HIGHWAY \_\_\_\_\_ Lane \_\_\_\_\_ Direction \_\_\_\_\_ TEST SECTION NO. \_\_\_\_\_  
 SAMPLE/TEST LOCATION:  Before Section  After Section FIELD SET NO. \_\_\_\_\_  
 Within Section  
 OPERATOR \_\_\_\_\_ EQUIPMENT USED \_\_\_\_\_ AUGERING DATE \_\_\_\_ - \_\_\_\_ - \_\_\_\_  
 AUGER PROBE NUMBER \_\_\_\_\_ LOCATION STATION: \_\_\_\_\_ OFFSET: \_\_\_\_\_ feet from °/s  
 TOP OF ROCK BASED ON: \_\_\_\_\_

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

REFUSAL WITHIN 20 FEET (Y/N): \_\_\_\_\_ DEPTH TO REFUSAL: \_\_\_\_\_ (FEET)

GENERAL REMARKS: \_\_\_\_\_  
 CERTIFIED \_\_\_\_\_ VERIFIED AND APPROVED \_\_\_\_\_ DATE \_\_\_\_\_ - \_\_\_\_ - 19\_\_\_\_  
 Field Crew Chief \_\_\_\_\_ SHRP Representative \_\_\_\_\_ Month- Day- Year  
 Affiliation: \_\_\_\_\_ Affiliation: \_\_\_\_\_

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING  
SAMPLING UNCOMPACTED BITUMINOUS PAVING MIXTURES  
SAMPLING DATA SHEET 10-1

SHEET NUMBER \_\_\_\_\_ OF \_\_\_\_\_

HRP REGION \_\_\_\_\_ STATE \_\_\_\_\_  
SPS EXPERIMENT NUMBER \_\_\_\_\_  
ROUTE/HIGHWAY \_\_\_\_\_ Lane \_\_\_\_\_ Direction \_\_\_\_\_

STATE CODE \_\_\_\_\_  
SPS PROJECT CODE \_\_\_\_\_  
TEST SECTION NO. \_\_\_\_\_  
FIELD SET NO. 1

PERSON PERFORMING SAMPLING

NAME \_\_\_\_\_ EMPLOYER \_\_\_\_\_  
TITLE \_\_\_\_\_

MIX PLANT

PLANT NAME \_\_\_\_\_  
PLANT LOCATION \_\_\_\_\_  
PLANT TYPE Batch..... 1 Drum..... 2 Other (Specify)..... 3 [ ]  
DESCRIPTION OF MIX PLANT \_\_\_\_\_  
MANUFACTURER OF ASPHALT PLANT \_\_\_\_\_  
MODEL NUMBER \_\_\_\_\_  
BATCH SIZE \_\_\_\_\_

SAMPLING LOCATION [ ]

Conveyor Belt..... 1 Stockpile..... 2 Haul Truck..... 3 Funnel Device..... 4  
Roadway Prior to Compaction ..... 5 Station \_\_ + \_\_ \_\_ Offset \_\_\_\_ (feet from O/S)  
Other..... 6 (specify) \_\_\_\_\_

MIX TYPE "Virgin" Asphalt Concrete ..... 1 Recycled Asphalt Concrete..... 2 [ ]  
Asphalt Treated Dense Graded ..... 3 Permeable Asphalt Treated..... 4 [ ]

LAYER NUMBER [ ]

LAYER TYPE BINDER COURSE ...3 SURFACE COURSE... 4 [ ]  
SURFACE FRICTION LAYER ... 5 BASE COURSE ... 6

SAMPLE TYPE DESIGNATION [ ]

SAMPLE NUMBER [ ]

APPROXIMATE SAMPLE SIZE (lbs) \_\_\_\_\_

DATE SAMPLED (Month - Day - Year) [ ] - [ ] - [ ]

LOCATION SAMPLE SHIPPED TO \_\_\_\_\_

DATE SHIPPED (Month-Day-Year) [ ] - [ ] - [ ]

GENERAL REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CERTIFIED \_\_\_\_\_ VERIFIED AND APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
field Crew Chief \_\_\_\_\_ SHRP Representative \_\_\_\_\_ -19  
Affiliation: \_\_\_\_\_ Affiliation: \_\_\_\_\_ Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING  
SAMPLING FRESH PORTLAND CEMENT CONCRETE MIXTURES

SHEET NUMBER \_\_\_\_\_ OF \_\_\_\_\_

SAMPLING DATA SHEET 11-1

HRP REGION \_\_\_\_\_ STATE \_\_\_\_\_  
SPS EXPERIMENT NUMBER \_\_\_\_\_  
ROUTE/HIGHWAY \_\_\_\_\_ Lane \_\_\_\_\_ Direction \_\_\_\_\_

STATE CODE \_\_\_\_\_  
SPS PROJECT CODE \_\_\_\_\_  
TEST SECTION NO. \_\_\_\_\_  
FIELD SET NO. \_\_\_\_\_

PERSON PERFORMING SAMPLING  
NAME \_\_\_\_\_ EMPLOYER \_\_\_\_\_  
TITLE \_\_\_\_\_

SAMPLING LOCATION \_\_\_\_\_ [\_\_]  
Batch Plant ..... 1 Hauling Truck before Paving ..... 2  
Hauling Truck during Paving ..... 3 Paver ..... 4  
Other ..... 5 (specify) \_\_\_\_\_

SAMPLE NUMBER (FC-- for PCC, BL-- for LCB) [\_\_ \_\_ \_\_]

TIME SAMPLED (Military Time) [\_\_ \_\_ \_\_]

DATE SAMPLED (Month - Day - Year) [\_\_ - \_\_ - \_\_]

PCC MIX TEMPERATURE WHEN SAMPLED (°F) [\_\_ \_\_]

AMBIENT TEMPERATURE WHEN SAMPLED (°F) [\_\_ \_\_]

AIR CONTENT (PERCENT) [\_\_ . \_\_]

SLUMP (INCHES) [\_\_ . \_\_]

PECIMENS FORMED FROM SAMPLE	SPECIMEN NUMBER	
CYLINDERS	[ G __ __ ]	[ G __ __ ]
	[ G __ __ ]	[ G __ __ ]
	[ G __ __ ]	[ G __ __ ]
	[ L __ __ ]	[ L __ __ ]
	[ L __ __ ]	[ L __ __ ]
	[ L __ __ ]	[ L __ __ ]

BEAMS	[ F __ __ ]	[ F __ __ ]
-------	-------------	-------------

LABORATORY ID CODE [\_\_ \_\_ \_\_]

DATE SHIPPED [\_\_ - \_\_ - \_\_]

NOTES : X denotes 14 day cure      Y denotes 28 day cure      Z denotes 365 day cure

GENERAL REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CERTIFIED \_\_\_\_\_ VERIFIED AND APPROVED \_\_\_\_\_ DATE \_\_\_\_\_ - \_\_\_\_ - 19\_\_\_\_

Field Crew Chief \_\_\_\_\_ SHRP Representative \_\_\_\_\_ Month- Day- Year  
Affiliation: \_\_\_\_\_ Affiliation: \_\_\_\_\_

BULK SAMPLING OF SUBGRADE AND UNBOUND GRANULAR MATERIALS

SAMPLING DATA SHEET 12

RP REGION \_\_\_\_\_ STATE \_\_\_\_\_  
 SPS EXPERIMENT NO \_\_\_\_\_  
 ROUTE/HIGHWAY \_\_\_\_\_ Lane \_\_\_\_\_ Direction \_\_\_\_\_  
 SAMPLE/TEST LOCATION:  Before Section  After Section

STATE CODE \_\_\_\_\_  
 SPS PROJECT CODE \_\_\_\_\_  
 TEST SECTION NO. \_\_\_\_\_  
 FIELD SET NO. 1

TECHNICIAN \_\_\_\_\_ EQUIPMENT \_\_\_\_\_ EXPLORATION DATE \_\_\_\_-\_\_\_\_-\_\_\_\_

SAMPLING AREA NO: SA- \_\_\_\_\_ LOCATION: STATION \_\_\_\_\_ OFFSET \_\_\_\_\_ feet from °/s

SAMPLING LOCATION NUMBER \_\_\_\_\_

PIT SIZE: (a) Length \_\_\_\_\_ feet (b) Width \_\_\_\_\_ feet

LAYER NUMBER: \_\_\_\_\_ (SUBGRADE \_\_\_\_\_ GRADED AGGREGATE BASE \_\_\_\_\_)

Scale (Inches)	Strata Change (Inches)	Moisture Sample No.	Bulk Sample No.	Material Description	Material Code
4					
3					
12					
16					

GENERAL REMARKS: \_\_\_\_\_

CERTIFIED  
 \_\_\_\_\_  
 Field Crew Chief  
 Affiliation: \_\_\_\_\_

VERIFIED AND APPROVED  
 \_\_\_\_\_  
 SHRP Representative  
 Affiliation: \_\_\_\_\_

DATE  
 \_\_\_\_-\_\_\_\_-19\_\_\_\_  
 Month- Day- Year

PLATE BEARING TEST RESULTS

SAMPLING DATA SHEET 13

IRP REGION \_\_\_\_\_ STATE \_\_\_\_\_  
SPS EXPERIMENT NO 2  
ROUTE/HIGHWAY \_\_\_\_\_ Lane \_\_\_\_\_ Direction \_\_\_\_\_  
SAMPLE/TEST LOCATION:  Within Section

STATE CODE \_\_\_\_\_  
SPS PROJECT CODE \_\_\_\_\_  
TEST SECTION NO. \_\_\_\_\_  
FIELD SET NO. 1

TECHNICIAN \_\_\_\_\_

TEST DATE \_\_\_\_ - \_\_\_\_ - \_\_\_\_

LOCATION: STATION \_\_\_\_\_ OFFSET \_\_\_\_\_ feet from °/s

SAMPLING LOCATION NUMBER \_\_\_\_\_

LAYER NUMBER: \_\_\_\_\_ (SUBGRADE \_\_\_\_\_ GRADED AGGREGATE BASE \_\_\_\_\_)  
\_\_\_\_\_ PERMEABLE ASPHALT TREATED BASE \_\_\_\_\_)

- 1. AVERAGE TOTAL DEFLECTION (INCHES) \_\_\_\_\_
- 2. UNCORRECTED MODULUS OF SOIL REACTION (PSI/INCH) \_\_\_\_\_
- 3. CORRECTED MODULUS OF SOIL REACTION (PSI/INCH) [ \_\_\_\_\_ ]

NOTE: DATA SHEETS FOR THIS TEST PROTOCOL MUST BE COMPLETED AND ATTACHED TO THIS FORM.

GENERAL REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CERTIFIED  
Field Crew Chief  
Affiliation: \_\_\_\_\_

VERIFIED AND APPROVED  
SHRP Representative  
Affiliation: \_\_\_\_\_

DATE  
\_\_\_\_ - \_\_\_\_ - 19\_\_\_\_  
Month- Day- Year



SUMMARY OF MATERIAL SAMPLES SENT TO EACH LABORATORY

FIELD OPERATIONS INFORMATION FORM 2-2

SHRP REGION \_\_\_\_\_ STATE \_\_\_\_\_  
SPS EXPERIMENT NO 2  
ROUTE/HIGHWAY \_\_\_\_\_ Lane \_\_\_\_\_ Direction \_\_\_\_\_

STATE CODE \_\_\_\_\_  
SPS PROJECT CODE \_\_\_\_\_  
TEST SECTION NO. \_\_\_\_\_  
FIELD SET NO. \_\_\_\_\_

LABORATORY \_\_\_\_\_ WORK COMPLETED ON \_\_\_\_ - \_\_\_\_ - \_\_\_\_

NOTE: This is a summary of material samples sent to each laboratory based on the information from Field Operations Information Form 1. Complete one form for each laboratory that material samples were sent.

LAYER NO. (From Subgrade)	MATERIAL/SAMPLE TYPE	TOTAL NUMBER OF SAMPLES
6	PCC CORES:	4" Diameter _____
6	PCC Molded Cylinders	_____
6	PCC Molded Beams	_____
5	LCB CORES:	4" Diameter _____
5	LCB Molded Cylinders:	_____
4	AC Treated BULK SAMPLES: 100 Pound Samples -PATB	_____
4	PATB CORES:	4" Diameter _____
3	UNBOUND BASE SAMPLES: (a) BAGS (BULK) _____ (b) JARS (MOISTURE) _____	
1	SUBGRADE SAMPLES: (a) BAGS (BULK) _____ (b) JARS (MOISTURE) _____	
	(c) THIN-WALLED TUBES _____ (d) SPLITSPoon _____ JARS	

GENERAL REMARKS: \_\_\_\_\_

CERTIFIED	VERIFIED AND APPROVED	DATE
_____ Field Crew Chief Affiliation: _____	_____ SHRP Representative Affiliation: _____	____ - ____ - 19____ Month- Day- Year





SPS-2 CONSTRUCTION DATA SHEET 2 GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION	* STATE CODE [ _ _ ] * SPS PROJECT CODE [ _ _ ] * TEST SECTION NO. [ _ _ ]
--	--

- \* 1. LANE WIDTH (Feet) [ \_ \_ . ]
- 2. MONITORING SITE LANE NUMBER [ \_ . ]  
 (LANE 1 IS OUTSIDE LANE, NEXT TO SHOULDER  
 LANE 2 IS NEXT TO LANE 1, ETC.)
  

SHOULDER DATA	<u>INSIDE SHOULDER</u>	<u>OUTSIDE SHOULDER</u>
* 3. SHOULDER SURFACE TYPE Turf... 1    Granular.... 2    Asphalt Concrete... 3 Concrete... 4    Surface Treatment... 5 Other (Specify)... 6 _____	[ _ . ]	[ _ . ]
* 4. TOTAL SHOULDER WIDTH (Feet)	[ _ _ . ]	[ _ _ . ]
* 5. PAVED SHOULDER WIDTH (Feet)	[ _ _ . ]	[ _ _ . ]
6. SHOULDER BASE TYPE (CODES-TABLE A.6)	[ _ _ . ]	[ _ _ . ]
7. SHOULDER SURFACE THICKNESS (Inches)	[ _ _ . _ ]	[ _ _ . _ ]
8. SHOULDER BASE THICKNESS (Inches)	[ _ _ . _ ]	[ _ _ . _ ]
* 9. SUBSURFACE DRAINAGE TYPE No Subsurface Drainage... 1    Longitudinal Drains... 2 Transverse Drains... 3    Drainage Blanket... 4    Well System... 5 Drainage Blanket with Longitudinal Drains... 6 Other (Specify)... 7 _____		[ _ . ]
*10. SUBSURFACE DRAINAGE LOCATION Continuous Along Test Section... 1    Intermittent... 2		[ _ . ]
11. DIAMETER OF LONGITUDINAL DRAINPIPES (Inches)		[ _ _ . _ ]
12. SPACING OF LATERALS (Feet)		[ _ _ _ . ]

SPS-2 CONSTRUCTION DATA SHEET 3 REFERENCE PROJECT STATION TABLE	* STATE CODE [ ] * SPS PROJECT CODE [ ] * TEST SECTION NO. [ ]
---	--

ORDER	*1 TEST SECTION ID NO	REFERENCE PROJECT STATION NUMBER		*4 CUT-FILL <sup>1</sup>	
		*2 START	*3 END	TYPE	STATION
1	-----	0 + 0 0	----- + -----	---	+ -----
2	-----	----- + -----	----- + -----	---	+ -----
3	-----	----- + -----	----- + -----	---	+ -----
4	-----	----- + -----	----- + -----	---	+ -----
5	-----	----- + -----	----- + -----	---	+ -----
6	-----	----- + -----	----- + -----	---	+ -----
7	-----	----- + -----	----- + -----	---	+ -----
8	-----	----- + -----	----- + -----	---	+ -----
9	-----	----- + -----	----- + -----	---	+ -----
10	-----	----- + -----	----- + -----	---	+ -----
11	-----	----- + -----	----- + -----	---	+ -----
12	-----	----- + -----	----- + -----	---	+ -----
13	-----	----- + -----	----- + -----	---	+ -----
14	-----	----- + -----	----- + -----	---	+ -----
15	-----	----- + -----	----- + -----	---	+ -----
16	-----	----- + -----	----- + -----	---	+ -----
17	-----	----- + -----	----- + -----	---	+ -----
18	-----	----- + -----	----- + -----	---	+ -----
19	-----	----- + -----	----- + -----	---	+ -----
20	-----	----- + -----	----- + -----	---	+ -----

\*5 INTERSECTIONS BETWEEN TEST SECTION ON THE PROJECT ROUTE |---INTERSECTION---|  
 PROJECT STATION NO. EXIT ENT STOP SIGNAL UNSIG  
 ----- + -----  
 ----- + -----  
 ----- + -----

Note 1. Indicate the type of subgrade section the test section is located on:

Cut.... 1      Fill..... 2      At-Grade..... 3      Cut and Fill..... 4

If cut-fill transition is located in a test section, enter test section station of the cut-fill transition location.

SPS-2 CONSTRUCTION DATA SHEET 4 LAYER DESCRIPTIONS	* STATE CODE [ _ _ ] * SPS PROJECT CODE [ _ _ ] * TEST SECTION NO. [ _ _ ]
--	--

*1 LAYER NUMBER	*2 LAYER DESCRIPTION	*3 MATERIAL TYPE CLASS	*4 LAYER THICKNESSES (Inches)			
			AVERAGE	MINIMUM	MAXIMUM	STD. DEV.
1	SUBGRADE(7)	[ _ _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]
2	[ _ _ ]	[ _ _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]
3	[ _ _ ]	[ _ _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]
4	[ _ _ ]	[ _ _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]
5	[ _ _ ]	[ _ _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]
6	[ _ _ ]	[ _ _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]
7	[ _ _ ]	[ _ _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]
8	[ _ _ ]	[ _ _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]
9	[ _ _ ]	[ _ _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]
10	[ _ _ ]	[ _ _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]	[ _ _ . _ ]

\*5 DEPTH BELOW SURFACE TO "RIGID" LAYER (Feet) [ \_ \_ . \_ ]  
 (Rock, Stone, Dense Shale)

NOTES:

1. Layer 1 is the subgrade soil, the highest numbered layer is the pavement surface.
2. Layer description codes:  
 Overlay.....01    Base Layer.....05    Porous Friction Course..09  
 Seal/Tack Coat.....02    Subbase Layer.....06    Surface Treatment.....10  
 Original Surface.....03    Subgrade.....07    Embankment (Fill).....11  
 HMAC Layer (Subsurface).04    Interlayer.....08
3. The material type classification codes are presented in Tables A.5, A.6, A.7 and A.8 of the Data Collection Guide for Long Term Pavement Performance Studies, dated January 17, 1990 (Appendix B of SPS-2 Data Collection Guide).
4. Enter the average thickness of each layer and the minimum, maximum and standard deviation of the thickness measurements, if known.

SPS-2 CONSTRUCTION DATA SHEET 5 LAYER THICKNESS MEASUREMENTS	* STATE CODE [    ] * SPS PROJECT CODE [    ] * TEST SECTION NO. [    ]
--	---

LAYER THICKNESS MEASUREMENTS (Inches)

SHEET \_\_\_\_\_ OF \_\_\_\_\_

STATION NUMBER	OFFSET (Inches)	LAYER THICKNESS (INCHES)			
		DENSE GRADED AGGREGATE BASE	PERMEABLE ASPHALT TREATED BASE	LEAN CONCRETE BASE	PCC SURFACE
— + — —	— — — —	— — — . —	— — — . —	— — — . —	— — — . —
— + — —	— — — —	— — — . —	— — — . —	— — — . —	— — — . —
— + — —	— — — —	— — — . —	— — — . —	— — — . —	— — — . —
— + — —	— — — —	— — — . —	— — — . —	— — — . —	— — — . —
— + — —	— — — —	— — — . —	— — — . —	— — — . —	— — — . —
— + — —	— — — —	— — — . —	— — — . —	— — — . —	— — — . —
— + — —	— — — —	— — — . —	— — — . —	— — — . —	— — — . —
— + — —	— — — —	— — — . —	— — — . —	— — — . —	— — — . —
LAYER NUMBER <sup>1</sup>		— — —	— — —	— — —	— — —

<sup>1</sup> from Construction Data Sheet 4

PREPARER \_\_\_\_\_ EMPLOYER \_\_\_\_\_ DATE \_\_\_\_\_

SPS-2 CONSTRUCTION DATA SHEET 6 SUBGRADE PREPARATION	* STATE CODE [    ] * SPS PROJECT CODE [    ] * TEST SECTION NO. [    ]
--	---

\*1. SUBGRADE PREPARATION BEGAN (Month-Day-Year) [    -    -    ]

\*2. SUBGRADE PREPARATION COMPLETED (Month-Day-Year) [    -    -    ]

PRIMARY COMPACTION EQUIPMENT

\*3. CODE TYPE [    ]

COMPACTION EQUIPMENT TYPE CODES

Sheepsfoot... 1    Pneumatic Tired... 2    Steel Wheel Tandem... 3  
 Single Drum Vibr.... 4    Double Drum Vibr.... 5  
 Other (Specify)... 6 \_\_\_\_\_

\*4. GROSS WEIGHT (Tons) [    .    ]

TYPE      PERCENT

\*5. STABILIZING AGENT 1 [    ] [    .    ]

\*6. STABILIZING AGENT 2 [    ] [    .    ]

STABILIZING AGENT TYPE CODES

Portland Cement... 1    Lime... 2    Fly Ash, Class C... 3  
 Fly Ash, Class N... 4  
 Other (Specify)... 5 \_\_\_\_\_

\*7. TYPICAL LIFT THICKNESS (Inches) [    .    ]  
 (For Fill Sections Only)

NOTE: Density Data is recorded on Sampling Data Sheet 8-1

8. SIGNIFICANT EVENTS DURING CONSTRUCTION (DISRUPTIONS, RAIN, EQUIPMENT PROBLEMS, ETC.) \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

SPS-2 CONSTRUCTION DATA SHEET 7 CUT-FILL SECTION LOCATIONS	* STATE CODE            [__ __] * SPS PROJECT CODE    [__ __] * TEST SECTION NO.    [__ __]
--	---

ORDER	*1 CUT-FILL <sup>1</sup>	REFERENCE PROJECT STATION NUMBER				*4 TEST SECTION NUMBER <sup>2</sup>		
		*2 START		*3 END				
1	_____	0	+	0	0	+	_____	_____
2	_____	_____	+	_____	_____	+	_____	_____
3	_____	_____	+	_____	_____	+	_____	_____
4	_____	_____	+	_____	_____	+	_____	_____
5	_____	_____	+	_____	_____	+	_____	_____
6	_____	_____	+	_____	_____	+	_____	_____
7	_____	_____	+	_____	_____	+	_____	_____
8	_____	_____	+	_____	_____	+	_____	_____
9	_____	_____	+	_____	_____	+	_____	_____
10	_____	_____	+	_____	_____	+	_____	_____
11	_____	_____	+	_____	_____	+	_____	_____
12	_____	_____	+	_____	_____	+	_____	_____
13	_____	_____	+	_____	_____	+	_____	_____
14	_____	_____	+	_____	_____	+	_____	_____
15	_____	_____	+	_____	_____	+	_____	_____
16	_____	_____	+	_____	_____	+	_____	_____
17	_____	_____	+	_____	_____	+	_____	_____
18	_____	_____	+	_____	_____	+	_____	_____
19	_____	_____	+	_____	_____	+	_____	_____
20	_____	_____	+	_____	_____	+	_____	_____
21	_____	_____	+	_____	_____	+	_____	_____
22	_____	_____	+	_____	_____	+	_____	_____
23	_____	_____	+	_____	_____	+	_____	_____
24	_____	_____	+	_____	_____	+	_____	_____
25	_____	_____	+	_____	_____	+	_____	_____

- NOTES:
1. Indicate the type of subgrade section with one of the following:  
     Cut... 1      Fill... 2
  2. A given Test Section No. will be repeated if both cut and fill sections exist within the test section.

PREPARER \_\_\_\_\_ EMPLOYER \_\_\_\_\_ DATE \_\_\_\_\_

SPS-2 CONSTRUCTION DATA SHEET 8 SUBGRADE EXCAVATION AND BACKFILLING SKETCH	* STATE CODE [ _ _ ] * SPS PROJECT CODE [ _ _ ] * TEST SECTION NO. [ _ _ ]
--	--

PREPARER \_\_\_\_\_

EMPLOYER \_\_\_\_\_

DATE \_\_\_\_\_

SPS-2 CONSTRUCTION DATA SHEET 9 UNBOUND AGGREGATE BASE MATERIAL PLACEMENT	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
---	--

- \*1. UNBOUND BASE MATERIAL PLACEMENT BEGAN (Month-Day-Year) [\_\_ \_\_-\_\_ \_\_-\_\_ \_\_]
- \*2. UNBOUND BASE MATERIAL PLACEMENT COMPLETED (Month-Day-Year) [\_\_ \_\_-\_\_ \_\_-\_\_ \_\_]
- \*3. LAYER NUMBER (From Sheet 4) [\_\_]
- PRIMARY COMPACTION EQUIPMENT
- \*4. CODE TYPE [\_\_]
- COMPACTION TYPE CODES  
 Pneumatic - Tired... 1      Steel Wheel Tandem... 2      Single Drum Vibr.... 3  
 Double Drum Vibr.... 4  
 Other (Specify)... 5 \_\_\_\_\_
- \*5. GROSS WEIGHT (Tons) [\_\_ \_\_. \_\_]
- \*6. LIFT THICKNESSES
- Nominal First Lift Placement Thickness (Inches) [\_\_ \_\_. \_\_]
- Nominal Second Lift Placement Thickness (Inches) [\_\_ \_\_. \_\_]
- Nominal Third Lift Placement Thickness (Inches) [\_\_ \_\_. \_\_]
- Nominal Fourth Lift Placement Thickness (Inches) [\_\_ \_\_. \_\_]

NOTE: Density Data is recorded on Sampling Data Sheet 8-1

7. SIGNIFICANT EVENTS DURING CONSTRUCTION (DISRUPTIONS, RAIN, EQUIPMENT PROBLEMS, ETC.) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

SPS-2 CONSTRUCTION DATA SHEET 10 PLANT-MIXED ASPHALT BOUND LAYERS AGGREGATE PROPERTIES	* STATE CODE [ ] [ ] * SPS PROJECT CODE [ ] [ ] * TEST SECTION NO. [ ] [ ]
---	--

\* 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [ ]

COMPOSITION OF COARSE AGGREGATE	<u>TYPE</u>	<u>PERCENT</u>
* 2.	[ ]	[ ] [ ] [ ] .
* 3.	[ ]	[ ] [ ] [ ] .
* 4.	[ ]	[ ] [ ] [ ] .
Crushed Stone... 1	Manufactured gravel... 2	Crushed Gravel... 3
Crushed Slag..... 4	Manufactured Lightweight..... 5	
Other (Specify) _____ 6		

COMPOSITION OF FINE AGGREGATE	<u>TYPE</u>	<u>PERCENT</u>
* 5.	[ ]	[ ] [ ] [ ] .
* 6.	[ ]	[ ] [ ] [ ] .
* 7.	[ ]	[ ] [ ] [ ] .
Natural Sand... 1		
Crushed or Manufactured Sand (From Crushed Gravel or Stone)... 2		
Recycled Concrete... 3	Other (Specify) _____ 4	

\* 8. TYPE OF MINERAL FILLER [ ]

Stone Dust... 1	Hydrated Lime... 2	Portland Cement... 3
Fly Ash... 4	Other (Specify)... 5 _____	

**BULK SPECIFIC GRAVITIES:**

- \* 9. COARSE AGGREGATE (AASHTO T85 or ASTM C127) [ ] [ ] [ ] [ ]
- \* 10. FINE AGGREGATE (AASHTO T84 or ASTM C128) [ ] [ ] [ ] [ ]
- \* 11. MINERAL FILLER (AASHTO T100 or ASTM D854) [ ] [ ] [ ] [ ]
- \* 12. AGGREGATE COMBINATION (CALCULATED) [ ] [ ] [ ] [ ]
- 13. EFFECTIVE SPECIFIC GRAVITY OF AGGREGATE COMBINATION (CALCULATED) [ ] [ ] [ ] [ ]

**AGGREGATE DURABILITY TEST RESULTS (CODES, TABLE A.13)**

<u>TYPE OF AGGREGATE</u>	<u>TYPE OF TEST</u>	<u>RESULTS</u>
14. Coarse	[ ] [ ]	[ ] [ ] [ ] .
15. Coarse	[ ] [ ]	[ ] [ ] [ ] .
16. Coarse	[ ] [ ]	[ ] [ ] [ ] .
17. Coarse and Fine - Combined	[ ] [ ]	[ ] [ ] [ ] .

18. POLISH VALUE OF COARSE AGGREGATES [ ] [ ]  
 SURFACE LAYER ONLY (AASHTO T279, ASTM D3319)

SPS-2 CONSTRUCTION DATA SHEET 11 PLANT-MIXED ASPHALT BOUND LAYERS ASPHALT CEMENT PROPERTIES	* STATE CODE            [__ __] * SPS PROJECT CODE    [__ __] * TEST SECTION NO.    [__ __]
--	---

- \*1. LAYER NUMBER (FROM CONSTRUCTION SHEET 4) [\_\_]
- \*2. ASPHALT GRADE (SEE ASPHALT CODE SHEET, TABLE A.16) [\_\_ \_\_]  
 (IF OTHER, SPECIFY) \_\_\_\_\_
- \*3. SOURCE (SEE SUPPLY CODE SHEET, TABLE A.14) [\_\_ \_\_]  
 (IF OTHER, SPECIFY) \_\_\_\_\_
- 4. SPECIFIC GRAVITY OF ASPHALT CEMENT [\_\_. \_\_ \_\_]  
 (AASHTO T228)
- ORIGINAL ASPHALT CEMENT PROPERTIES    (If available from supplier)
- 5. VISCOSITY OF ASPHALT AT 140°F (Poises) [\_\_ \_\_ \_\_ \_\_ \_\_.]  
 (AASHTO T202)
- 6. VISCOSITY OF ASPHALT AT 275°F (Centistokes) [\_\_ \_\_ \_\_ \_\_.]  
 (AASHTO T202)
- 7. PENETRATION AT 77°F (AASHTO T49) (Tenths of a mm) [\_\_ \_\_ \_\_.]  
 (100 g., 5 sec.)
- ASPHALT MODIFIERS (SEE TYPE CODE, A.15)

	<u>TYPE</u>	<u>QUANTITY (%)</u>
8. MODIFIER #1	[__ __]	[__ __.]
9. MODIFIER #2 (IF OTHER, SPECIFY) _____	[__ __]	[__ __.]

- 10. DUCTILITY AT 77°F (cm) [\_\_ \_\_ \_\_.]  
 (AASHTO T51)
- 11. DUCTILITY AT 39.2°F (cm) [\_\_ \_\_ \_\_.]  
 (AASHTO T51)
- 12. TEST RATE FOR DUCTILITY MEASUREMENT [\_\_ \_\_ \_\_.]  
 AT 39.2°F (cm/Min)
- 13. PENETRATION AT 39.2°F (AASHTO T49) (Tenths of a mm) [\_\_ \_\_ \_\_.]  
 (200 g., 60 sec.)
- 14. RING AND BALL SOFTENING POINT (AASHTO T53) (°F) [\_\_ \_\_ \_\_.]

NOTE: If emulsified or cutback asphalt was used, enter "N" in the spaces for "Original Asphalt Cement Properties".

SPS-2 CONSTRUCTION DATA SHEET 12 PLANT-MIXED ASPHALT BOUND LAYERS MIXTURE PROPERTIES	* STATE CODE [ ____ ] * SPS PROJECT CODE [ ____ ] * TEST SECTION NO. [ ____ ]
---	---

- \*1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [ \_\_\_\_ ]
- \*2. TYPE OF SAMPLES [ \_\_\_\_ ]  
 COMPACTED IN LABORATORY ..... 1 TAKEN FROM TEST SECTION ..... 2
- \*3. MAXIMUM SPECIFIC GRAVITY (NO AIR VOIDS) [ \_\_\_\_ . \_\_\_\_ ]  
 (AASHTO T209 OR ASTM D2041)  
  
 BULK SPECIFIC GRAVITY (ASTM D1188)
- \*4. MEAN [ \_\_\_\_ . \_\_\_\_ ] NUMBER OF TESTS [ \_\_\_\_ . ]
- 5. MINIMUM [ \_\_\_\_ . \_\_\_\_ ] MAXIMUM [ \_\_\_\_ . \_\_\_\_ ]
- 6. STD. DEV. [ \_\_\_\_ . \_\_\_\_ ]
- ASPHALT CONTENT (PERCENT WEIGHT OF TOTAL MIX - AASHTO T164 OR ASTM D2172)
- \*7. MEAN [ \_\_\_\_ . \_\_\_\_ ] NUMBER OF SAMPLES [ \_\_\_\_ . ]
- 8. MINIMUM [ \_\_\_\_ . \_\_\_\_ ] MAXIMUM [ \_\_\_\_ . \_\_\_\_ ]
- 9. STD. DEV. [ \_\_\_\_ . \_\_\_\_ ]
- PERCENT AIR VOIDS
- \*10. MEAN [ \_\_\_\_ . \_\_\_\_ ] NUMBER OF SAMPLES [ \_\_\_\_ . ]
- 11. MINIMUM [ \_\_\_\_ . \_\_\_\_ ] MAXIMUM [ \_\_\_\_ . \_\_\_\_ ]
- 12. STD. DEV. [ \_\_\_\_ . \_\_\_\_ ]
- \*13. VOIDS IN MINERAL AGGREGATE (PERCENT) [ \_\_\_\_ . \_\_\_\_ ]
- \*14. EFFECTIVE ASPHALT CONTENT (PERCENT) [ \_\_\_\_ . \_\_\_\_ ]
- \*15. MARSHALL STABILITY (LBS) (AASHTO T245 OR ASTM D1559) [ \_\_\_\_ . \_\_\_\_ ]
- \*16. NUMBER OF BLOWS [ \_\_\_\_ ]
- \*17. MARSHALL FLOW (HUNDREDTHS OF AN INCH) [ \_\_\_\_ . \_\_\_\_ ]  
 (AASHTO T245 OR ASTM D1559)
- \*18. HVEEM STABILITY (AASHTO T246 OR ASTM D1561) [ \_\_\_\_ . \_\_\_\_ ]
- \*19. HVEEM COHESIOMETER VALUE (GRAMS/25 MM OF WIDTH) [ \_\_\_\_ . \_\_\_\_ ]  
 (AASHTO T246 OR ASTM 1561)
- \*20. TYPE OF ANTISTRIPPING AGENT USED [ \_\_\_\_ ]  
 (SEE TYPE CODES, TABLE A.21) OTHER (SPECIFY) \_\_\_\_\_
- \*21. ANTISTRIPPING AGENT USED: LIQUID ..... 1 SOLID ..... 2 [ \_\_\_\_ ]
- \*22. AMOUNT OF ANTISTRIPPING AGENT USED (PERCENT) [ \_\_\_\_ . \_\_\_\_ ]  
 (LIQUID: enter percent of asphalt cement weight SOLID: enter percent of aggregate weight)

PREPARER \_\_\_\_\_ EMPLOYER \_\_\_\_\_ DATE \_\_\_\_\_



SPS-2 CONSTRUCTION DATA SHEET 14 PLANT-MIXED ASPHALT BOUND LAYERS COMPACTION DATA	* STATE CODE [    ] * SPS PROJECT CODE [    ] * TEST SECTION NO. [    ]
--	---

- \*1. DATE PAVING OPERATIONS BEGAN (Month-Day-Year) [   -   -   - ]
- \*2. DATE PAVING OPERATIONS COMPLETED (Month-Day-Year) [   -   -   - ]
- \*3. LAYER NUMBER [    ]
  
- \*4. MIXING TEMPERATURE (°F) [    . ]
  
- 5. LAYDOWN TEMPERATURES (°F)
  - Mean..... [    . ]                      Number of Tests ..... [    . ]
  - Minimum..... [    . ]                     Maximum..... [    . ]
  - Standard Deviation... [    . ]

ROLLER DATA

	Roller Code #	Roller Description	Gross Wt (Tons)	Tire Press. (psi)	Frequency (Vibr./Min)	Amplitude (Inches)	Speed (mph)	
6	A	Steel-Whl Tandem	— — . —					
7	B	Steel-Whl Tandem	— — . —					
8	C	Steel-Whl Tandem	— — . —					
9	D	Steel-Whl Tandem	— — . —					
10	E	Pneumatic-Tired	— — . —	— — — .				
11	F	Pneumatic-Tired	— — . —	— — — .				
12	G	Pneumatic-Tired	— — . —	— — — .				
13	H	Pneumatic-Tired	— — . —	— — — .				
14	I	Single-Drum Vibr.	— — . —		— — — .	— — — .	— — . —	
15	J	Single-Drum Vibr.	— — . —		— — — .	— — — .	— — . —	
16	K	Single-Drum Vibr.	— — . —		— — — .	— — — .	— — . —	
17	L	Single-Drum Vibr.	— — . —		— — — .	— — — .	— — . —	
18	M	Double-Drum Vibr.	— — . —		— — — .	— — — .	— — . —	
19	N	Double-Drum Vibr.	— — . —		— — — .	— — — .	— — . —	
20	O	Double-Drum Vibr.	— — . —		— — — .	— — — .	— — . —	
21	P	Double-Drum Vibr.	— — . —		— — — .	— — — .	— — . —	
22	Q	Other						
COMPACTION DATA			First Lift	Second Lift	Third Lift	Fourth Lift		
23 BREAKDOWN Roller Code (A-Q)			—	—	—	—		
24 Coverages			— — .	— — .	— — .	— — .		
25 INTERMEDIATE Roller Code (A-Q)			—	—	—	—		
26 Coverages			— — .	— — .	— — .	— — .		
27 FINAL Roller Code (A-Q)			—	—	—	—		
28 Coverages			— — .	— — .	— — .	— — .		
29	Air Temperature (°F)		— — — .	— — — .	— — — .	— — — .		
30	Compacted Thickness (In)		— . —	— . —	— . —	— . —		
31	Curing Period (Days)		— — . —	— — . —	— — . —	— — . —		

PREPARER \_\_\_\_\_ EMPLOYER \_\_\_\_\_ DATE \_\_\_\_\_

SPS-2 CONSTRUCTION DATA SHEET 15 PORTLAND CEMENT CONCRETE LAYERS-JOINT DATA	* STATE CODE [ ] [ ] * SPS PROJECT CODE [ ] [ ] * TEST SECTION NO. [ ] [ ]
---	--

- \* 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [ ]
  - \* 2. AVERAGE CONTRACTION JOINT SPACING (Feet) [ ] [ ] [ ] [ ]
  - 3. (RANDOM JOINT SPACING, IF ANY: \_\_\_\_\_)
  - \* 4. SKEWNESS OF JOINTS (ft/lane) [ ] [ ] [ ]
  - \* 5. TRANSVERSE CONTRACTION JOINT LOAD TRANSFER SYSTEM [ ]
    - Round Dowels..... 1
    - Aggregate Interlock..... 2
    - Other (Specify) \_\_\_\_\_ 3
  - \* 6. ROUND DOWEL DIAMETER (Inches) [ ] [ ] [ ] [ ]
  - \* 7. DOWEL SPACING (Inches) [ ] [ ] [ ] [ ]
  - 8. DISTANCE OF NEAREST DOWEL FROM OUTSIDE LANE-SHOULDER EDGE (Inches) [ ] [ ] [ ] [ ]
  - 9. DOWEL LENGTH (Inches) [ ] [ ] [ ] [ ]
  - 10. DOWEL COATING [ ]
    - Paint and/or Grease..... 1
    - Plastic..... 2
    - Monel..... 3
    - Stainless Steel..... 4
    - Epoxy..... 5
    - Other (Specify) \_\_\_\_\_ 6
  - 11. METHOD USED TO INSTALL MECHANICAL LOAD TRANSFER DEVICES [ ]
    - Preplaced on Baskets..... 1
    - Mechanically Installed..... 2
    - Other (Specify) \_\_\_\_\_ 3
  - 12. DOWEL ALIGNMENT CHECKED BEFORE PLACEMENT (Y/N) [ ]
  - 13. DOWEL ALIGNMENT CHECKED AFTER PLACEMENT (Y/N) [ ]
- If Yes, describe method used \_\_\_\_\_  
 (e.g. Pachometer, Ground Penetrating Radar)

SPS-2 CONSTRUCTION DATA SHEET 16 PORTLAND CEMENT CONCRETE LAYERS-JOINT DATA CONT'D	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
--	--

- \* 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [\_\_]
- \* 2. METHOD USED TO FORM TRANSVERSE JOINTS [\_\_]
  - Sawed..... 1 Metal Insert.....3
  - Plastic Insert..... 2
  - Other (Specify) \_\_\_\_\_ 4
- \* 3. TYPE OF LONGITUDINAL JOINT (BETWEEN LANES) [\_\_]
  - Butt..... 1 Insert Weakened Plane..... 3
  - Sawed Weakened Plane..... 2
  - Other (Specify) \_\_\_\_\_ 4
- \* 4. TYPE OF SHOULDER-TRAFFIC LANE JOINT [\_\_]
  - Butt..... 1 Insert Weakened Plane..... 3
  - Sawed Weakened Plane..... 2
  - Other (Specify) \_\_\_\_\_ 4
- \*5. AVERAGE DEPTH OF SAWCUT, FROM MEASUREMENTS (Inches)..... [\_\_. \_\_]
- \*6. TIME INTERVAL BETWEEN CONCRETE PLACEMENT AND SAWCUT (HOURS)..... [\_\_ \_\_.]
- 7. TRANSVERSE JOINT SEALANT TYPE (AS BUILT) [\_\_]
  - Preformed (Open Web)..... 1 Rubberized Asphalt..... 3
  - Asphalt..... 2 Low-Modulus Silicone..... 4
  - Other (Specify) \_\_\_\_\_ 5

TRANSVERSE JOINT SEALANT RESERVOIR (AS BUILT)

- 8. WIDTH, (Inches)..... [\_\_. \_\_]
- 9. DEPTH, (Inches)..... [\_\_. \_\_]

LONGITUDINAL JOINT SEALANT RESERVOIR (AS BUILT)

- 10. WIDTH, (Inches)..... [\_\_. \_\_]
- 11. DEPTH, (Inches)..... [\_\_. \_\_]
- 12. BETWEEN LANE TIE BAR DIAMETER (Inches) [\_\_. \_\_]
- 13. BETWEEN LANE TIE BAR LENGTH (Inches) [\_\_ \_\_.]
- 14. BETWEEN LANE TIE BAR SPACING (Inches) [\_\_ \_\_.]

SHOULDER-TRAFFIC LANE JOINT SEALANT RESERVOIR (AS BUILT)

- 15. WIDTH, (Inches)..... [\_\_. \_\_]
- 16. DEPTH, (Inches)..... [\_\_. \_\_]

SPS-2 CONSTRUCTION DATA SHEET 17 PORTLAND CEMENT CONCRETE LAYERS REINFORCING STEEL DATA	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
--	--

- \* 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [\_\_]
- \* 2. TYPE OF REINFORCING [\_\_]
  - Deformed Bars..... 1
  - Welded Wire Fabric..... 2
  - Other (Specify)\_\_\_\_\_ 3
- \* 3. TRANSVERSE BAR DIAMETER (Inches) [\_\_. \_\_]
- \* 4. TRANSVERSE BAR SPACING (Inches) [\_\_ \_\_.]
- \* 5. LONGITUDINAL BAR DIAMETER (Inches) [\_\_. \_\_]
- \* 6. DESIGN PERCENTAGE OF LONGITUDINAL STEEL (%) [\_\_. \_\_]
- \* 7. DEPTH TO REINFORCEMENT FROM SLAB SURFACE (Inches) [\_\_. \_\_]
- 8. LONGITUDINAL BAR SPACING (Inches) [\_\_ \_\_.]
- 9. YIELD STRENGTH OF REINFORCING (ksi) [\_\_ \_\_.]
- 10. METHOD USED TO PLACE REINFORCEMENT [\_\_]
  - Preset on Chairs..... 1
  - Mechanically..... 2
  - Between Layers of Concrete..... 3
  - Other (Specify)\_\_\_\_\_ 4

SPS-2 CONSTRUCTION DATA SHEET 18 PORTLAND CEMENT CONCRETE LAYERS - MIXTURE DATA	* STATE CODE [ ___ ] * SPS PROJECT CODE [ ___ ] * TEST SECTION NO. [ ___ ]
---	--

- \*1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [ \_\_\_ ]  
 MIX DESIGN (OVEN DRIED WEIGHT - PER CUBIC YARD)
- \*2. Coarse Aggregate (Pounds) ..... [ \_\_\_\_\_ ]
- \*3. Fine Aggregate (Pounds) ..... [ \_\_\_\_\_ ]
- \*4. Cement (Pounds) ..... [ \_\_\_\_\_ ]
- \*5. Water (Pounds) ..... [ \_\_\_\_\_ ]
- \*6. TYPE CEMENT USED (See Cement Type Codes, Table A.11) [ \_\_\_ ]  
 (If Other, Specify \_\_\_\_\_ )
- \*7. ALKALI CONTENT OF CEMENT (PERCENT WEIGHT OF CEMENT) [ \_\_\_ . \_\_\_ ]

ADMIXTURES (PERCENT BY WEIGHT OF CEMENT)

	<u>TYPE CODE</u>	<u>AMOUNT</u>
*8. ADMIXTURE #1	[ ___ ]	[ ___ . ___ ]
*9. ADMIXTURE #2	[ ___ ]	[ ___ . ___ ]
*10. ADMIXTURE #3	[ ___ ]	[ ___ . ___ ]

(See Cement Admixture Codes, Table A.12)  
 (If Other, Specify \_\_\_\_\_ )

AGGREGATE DURABILITY TEST RESULTS  
 (SEE DURABILITY TEST TYPE CODES, TABLE A.13)

	<u>TYPE OF AGGREGATE</u>	<u>TYPE OF TEST</u>	<u>RESULTS</u>
11.	Coarse	[ ___ ]	[ _____ . ___ ]
12.	Coarse	[ ___ ]	[ _____ . ___ ]
13.	Coarse	[ ___ ]	[ _____ . ___ ]
14.	Coarse and Fine	[ ___ ]	[ _____ . ___ ]

PREPARER \_\_\_\_\_ EMPLOYER \_\_\_\_\_ DATE \_\_\_\_\_

SPS-2 CONSTRUCTION DATA SHEET 19 PORTLAND CEMENT CONCRETE LAYERS MIXTURE DATA (CONTINUED)	* STATE CODE            [__ __] * SPS PROJECT CODE    [__ __] * TEST SECTION NO.    [__ __]
--	---

\* 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [\_\_]

COMPOSITION OF COARSE AGGREGATE

TYPE            PERCENT

\* 2. [\_\_] [\_\_ \_\_ \_\_.]

\* 3. [\_\_] [\_\_ \_\_ \_\_.]

\* 4. [\_\_] [\_\_ \_\_ \_\_.]

Crushed Stone.... 1    Manufactured gravel..... 2    Crushed Gravel..... 3  
 Crushed Slag..... 4    Lightweight..... 5    Recycled Concrete... 6  
 Other (Specify)\_\_\_\_\_ 7

\* 5. GEOLOGIC CLASSIFICATION OF COARSE AGGREGATE [\_\_ \_\_.]  
 (SEE GEOLOGIC CLASSIFICATION CODES, TABLE A.9)

COMPOSITION OF FINE AGGREGATE

TYPE            PERCENT

\* 6. [\_\_] [\_\_ \_\_ \_\_.]

\* 7. [\_\_] [\_\_ \_\_ \_\_.]

\* 8. [\_\_] [\_\_ \_\_ \_\_.]

Natural Sand... 1  
 Crushed, Manufactured Sand (From Crushed Gravel or Stone)...2  
 Recycled Concrete... 3    Other (Specify)\_\_\_\_\_ 4

9. INSOLUBLE RESIDUE, PERCENT (ASTM D3042) [\_\_ \_\_ \_\_.]

10. GRADATION OF COARSE AGGREGATE

11. GRADATION OF FINE AGGREGATE

<u>Sieve Size</u>	<u>% Passing</u>
2".....	___ __ __
1 1/2"....	___ __ __
1".....	___ __ __
7/8".....	___ __ __
3/4".....	___ __ __
5/8".....	___ __ __
1/2".....	___ __ __
3/8".....	___ __ __
No. 4.....	___ __ __

<u>Sieve Size</u>	<u>% Passing</u>
No. 8.....	___ __ __
No. 10....	___ __ __
No. 16....	___ __ __
No. 30....	___ __ __
No. 40....	___ __ __
No. 50....	___ __ __
No. 80....	___ __ __
No. 100...	___ __ __
No. 200...	___ __ __

BULK SPECIFIC GRAVITIES:

12. Coarse Aggregate (AASHTO T85 or ASTM C127) [\_\_ . \_\_ \_\_ \_\_]

13. Fine Aggregate (AASHTO T84 or ASTM C128) [\_\_ . \_\_ \_\_ \_\_]

PREPARER \_\_\_\_\_ EMPLOYER \_\_\_\_\_ DATE \_\_\_\_\_



SPS-2 CONSTRUCTION DATA SHEET 21 PORTLAND CEMENT CONCRETE LAYERS PLACEMENT DATA (CONTINUED)	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
--	--

1. CONSOLIDATION OF MATERIALS [\_\_]  
 Internal Vibrators... 1    Vibrating Screeds... 2    Troweling... 3  
 Rolling... 4    Tamping... 5  
 Other (Specify)... 6 \_\_\_\_\_
2. FINISHING [\_\_]  
 Screeding... 1    Hand-Troweling... 2    Machine-Troweling... 3  
 Other (Specify)... 4 \_\_\_\_\_
3. CURING [\_\_]  
 Membrane Curing Compound..... 1    Burlap-Polyethylene Blanket... 5  
 Burlap Curing Blankets..... 2    Cotton Mat Curing..... 6  
 Waterproof Paper Blankets..... 3    Hay..... 7  
 White Polyethylene Sheeting... 4  
 Other (Specify)\_\_\_\_\_ 8
4. TEXTURING [\_\_]  
 Tine..... 1    Grooved Float..... 4  
 Broom..... 2    Astro Turf..... 5  
 Burlap Drag..... 3    None..... 6  
 Other (Specify)\_\_\_\_\_ 7



SPS-2 CONSTRUCTION DATA SHEET 23 FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
---	--

1. DATE PATCHING OPERATIONS BEGAN (Month-Day-Year) [\_\_ \_\_-\_\_ \_\_-\_\_ \_\_]
2. DATE PATCHING OPERATIONS COMPLETED (Month-Day-Year) [\_\_ \_\_-\_\_ \_\_-\_\_ \_\_]
3. PRIMARY DISTRESS OCCURRENCE PATCHED OR REPLACED WITH NEW SLAB [\_\_ \_\_]  
 (See Table A.22 for Type Codes)  
 Other (Specify) \_\_\_\_\_
4. SECONDARY DISTRESS OCCURRENCE PATCHED OR REPLACED WITH NEW SLAB [\_\_ \_\_]  
 (See Table A.22 for Type Codes)  
 Other (Specify) \_\_\_\_\_
5. PATCHES
 

	NUMBER	SQ. FEET
SLAB ONLY	[__ __]	[__ __ __. ]
SLAB AND BASE	[__ __]	[__ __ __. ]
6. PATCH MATERIAL USED [\_\_]  
 Portland Cement Concrete... 1    Polymer Concrete... 2    Epoxy Mortar... 3  
 Other (Specify)... 4 \_\_\_\_\_
7. SLABS REPLACED
 

	NUMBER	SQ. FEET
SLAB ONLY	[__ __]	[__ __ __. ]
SLAB AND BASE	[__ __]	[__ __ __. ]
8. METHOD FOR PATCH BOUNDARY DETERMINATION [\_\_]  
 Visual... 1    Coring... 2    Deflection... 3  
 State Standard or Specification... 4  
 Other (Specify)... 5 \_\_\_\_\_
9. CUTTING INSTRUMENT [\_\_]  
 Diamond Blade Saw... 1    Carbide Blade Saw... 2    Wheel Saw... 3  
 Air Hammer... 4  
 Other (Specify)... 5 \_\_\_\_\_

<p style="text-align: center;">SPS-2 CONSTRUCTION DATA SHEET 24 FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES, CONTINUED</p>	<p>* STATE CODE            [__ __] * SPS PROJECT CODE    [__ __] * TEST SECTION NO.    [__ __]</p>
--	--

1. SECURING LOAD TRANSFER DEVICES [\_\_]  
 None... 1    Grout Filler... 2    Epoxy filler... 3  
 Other... 4 \_\_\_\_\_

2. REINFORCING STEEL PLACED IN PATCH [\_\_]  
 No... 1    Yes... 2

	<u>Temperature Steel</u>		<u>Dowel Bars</u>	<u>Tie Bars</u>
	<u>Transverse</u>	<u>Longitudinal</u>		
3. REBAR NUMBER DESIGNATION	[__ __]	[__ __]	[__ __]	[__ __]
4. BAR LENGTHS, Inches	[__ __ .__]	[__ __ .__]	[__ __ .__]	[__ __ .__]
5. BAR SPACING, Inches	[__ __ .__]	[__ __ .__]	[__ __ .__]	[__ __ .__]

6. DOWEL COATINGS [\_\_]  
 None... 1    Paint and/or Grease... 2    Plastic... 3  
 Monel... 4    Stainless Steel... 5    Epoxy... 6  
 Other (Specify)... 7 \_\_\_\_\_

7. NUMBER OF SAW CUTS PER PATCH (If Sawed) [\_\_]

8. DEPTH OF TYPICAL BOUNDARY SAW CUT, Inches [\_\_ \_\_ .\_\_]

9. CONCRETE BREAKUP [\_\_]  
 None... 1    Pneumatic Air Hammer... 2    Gravity Drop Hammer... 3  
 Sawing... 4  
 Other (Specify)... 5 \_\_\_\_\_

10. REMOVAL OF CONCRETE [\_\_]  
 Concrete Breakup and Cleanout... 1    Lift Out Intact Slab Section... 2  
 Other (Specify)... 3 \_\_\_\_\_

SPS-2 CONSTRUCTION DATA SHEET 25 FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES, CONTINUED	* STATE CODE [ _ _ ] * SPS PROJECT CODE [ _ _ ] * TEST SECTION NO. [ _ _ ]
--	--

1. METHOD OF REINFORCING STEEL PLACEMENT [ \_ ]  
 Chairs... 1      Between Layers of Concrete... 2
  
2. MIXTURE DESIGN FOR PCC PATCH MATERIAL (lb./Cubic Yard)
 

Coarse Aggregate	[ _ _ _ . ]
Fine Aggregate	[ _ _ _ . ]
Cement	[ _ _ _ . ]
Water (Gallons/Cubic Yard)	[ _ _ _ . ]
  
3. CEMENT TYPE USED [ \_ ]  
 (See Type Codes, Table A.11)
  
4. AIR CONTENT (Percent by Volume)
 

Mean	[ _ _ . ]
Range	[ _ _ . ] to [ _ _ . ]
  
5. ADMIXTURES [ \_ ]  
 (See Cement Additive Codes, Table A.12)
  
6. SLUMP (Inches)
 

Mean	[ _ _ . ]
Range	[ _ _ . ] to [ _ _ . ]
  
7. FLEXURAL STRENGTH (MODULUS OF RUPTURE) (psi) [ \_ \_ \_ . ]  
 (Based on 3rd Point Loading) Curing Time, Days [ \_ ]  
 If Unavailable, and Other Strength Test Conducted,  
 Enter Alternate Test [ \_\_\_\_\_ ]  
 Type of Loading [ \_\_\_\_\_ ]  
 Age, Days [ \_ ];      Strength, psi [ \_ \_ \_ . ]
  
8. AMBIENT CONDITIONS AT TIME OF PATCHING
 

Air Temperature °F	LOW [ _ _ . ]	HIGH [ _ _ . ]
Surface Moisture - Dry = 1, Wet = 2		[ _ ]
  
9. MAXIMUM SIZE OF COARSE AGGREGATE (Inches) [ \_ . ]
  
10. CONSOLIDATION OF MATERIALS [ \_ ]  
 Internal Vibrators... 1      Vibrating Screeds... 2      Troweling... 3  
 Rolling... 4      Tamping... 5  
 Other (Specify)... 6 \_\_\_\_\_
  
12. FINISHING [ \_ ]  
 Screeding... 1      Hand-Troweling... 2      Machine-Troweling... 3  
 Other (Specify)... 4 \_\_\_\_\_





APPENDIX B

SHRP-LTPP DATA COLLECTION STANDARD CODES

(Reproduced from Appendix A of the SHRP-LTPP Data Collection Guide)

APPENDIX A. STANDARD CODES

This appendix provides standard codes to simplify entry of data during collection and the subsequent storage and processing of this data. These codes are tabulated as follows:

Table A.1	Standard Codes for States, District of Columbia, Puerto Rico, American Protectorates, and Canadian Provinces
Table A.2	Functional Class Codes
Table A.3	Experiment Type Definitions for LTPP
Table A.4	Pavement Type Codes
Table A.5	Pavement Surface Material Type Classification Codes
Table A.6	Base and Subbase Material Type Classification Codes
Table A.7	Subgrade Soil Description Codes
Table A.8	Material Type Codes for Thin Seals and Interlayers
Table A.9	Geologic Classification Codes
Table A.10	Soil Type Codes, AASHTO Soil Classification
Table A.11	Portland Cement Type Codes
Table A.12	Portland Cement Concrete Admixture Codes
Table A.13	Aggregate Durability Test Type Codes
Table A.14	Asphalt Refiners and Processors in the United States
Table A.15	Asphalt Cement Modifier Codes
Table A.16	Grades of Asphalt, Emulsified Asphalt, and Cutback Asphalt Codes
Table A.17	Maintenance and Rehabilitation Work Type Codes
Table A.18	Maintenance Location Codes
Table A.19	Maintenance Materials Type Codes
Table A.20	Recycling Agent Type Codes
Table A.21	Anti-Stripping Agent Type Codes
Table A.22	Distress Types

Revised June 13, 1988

Table A.1. Table of Standard Codes for States, District of Columbia, Puerto Rico, American Protectorates and Canadian Provinces.

<u>State</u>	<u>Code</u>	<u>State</u>	<u>Code</u>
Alabama	01	New York	36
Alaska	02	North Carolina	37
Arizona	04	North Dakota	38
Arkansas	05	Ohio	39
California	06	Oklahoma	40
Colorado	08	Oregon	41
Connecticut	09	Pennsylvania	42
Delaware	10	Rhode Island	44
District of Columbia	11	South Carolina	45
Florida	12	South Dakota	46
Georgia	13	Tennessee	47
Hawaii	15	Texas	48
Idaho	16	Utah	49
Illinois	17	Vermont	50
Indiana	18	Virginia	51
Iowa	19	Washington	53
Kansas	20	West Virginia	54
Kentucky	21	Wisconsin	55
Louisiana	22	Wyoming	56
Maine	23	American Samoa	60
Maryland	24	Guam	66
Massachusetts	25	Puerto Rico	72
Michigan	26	Virgin Islands	78
Minnesota	27	Alberta	81
Mississippi	28	British Columbia	82
Missouri	29	Manitoba	83
Montana	30	New Brunswick	84
Nebraska	31	Newfoundland	85
Nevada	32	Nova Scotia	86
New Hampshire	33	Ontario	87
New Jersey	34	Prince Edward Island	88
New Mexico	35	Quebec	89
		Saskatchewan	90

Note: The U.S. codes are consistent with the Federal Information Processing Standards (FIPS) and HPMS

Table A.2. Functional class codes.

<u>Functional Class</u>	<u>Code</u>
Rural:	
Principal Arterial - Interstate.....	01
Principal Arterial - Other.....	02
Minor Arterial.....	06
Major Collector.....	07
Minor Collector.....	08
Local Collector.....	09
Urban:	
Principal Arterial - Interstate.....	11
Principal Arterial - Other Freeways or Expressways.....	12
Other Principal Arterial.....	14
Minor Arterial.....	16
Collector.....	17
Local.....	19

Note: These codes are consistent with the HPMS system.

Table A.3. Detailed Descriptions of Pavements for Each LTPP  
General Pavement Studies Experiment.

(01) ASPHALT CONCRETE PAVEMENT WITH GRANULAR BASE

Acceptable pavements for this study include a dense-graded hot mix asphalt concrete (HMAC) surface layer (1), with or without other HMAC layers (28), placed over untreated granular base (22 or 23). One or more subbase layers (22, 23, 24, 25, 26, 42, or 43) may also be present, but are not required. Two or more consecutive lifts of the same mixture design are to be treated as one layer. "Full depth" asphalt concrete pavements are also included in this study. They include an HMAC surface layer (1) and usually one or more HMAC layers (28) beneath the surface, with a minimum total HMAC thickness of 8 inches placed directly upon treated or untreated subgrade. For "full depth" asphalt concrete pavements, a base layer (Layer Description 5) of zero thickness and material code 21 should be indicated. If a treated subgrade (42 or 43) is present, it should be shown as a subbase (Layer Description 6). Seal coats or porous friction courses are allowed on the surface, but not in combination, i.e., a porous friction course placed over a seal coat is not acceptable. Seal coats are also permissible on top of granular base layers. At least one layer of dense graded HMAC is required, regardless of the existence of seal coats or porous friction courses.

(02) ASPHALT CONCRETE PAVEMENT WITH BOUND BASE

Acceptable pavements for this study include a dense-graded HMAC surface layer (1) with or without other HMAC layers (28), placed over a bound base layer (27-39, 42-44, 46). To properly account for a variety of bound base types in the sampling design, two classifications of binder types, bituminous and non-bituminous, are defined as the factor levels. Bituminous binders include asphalt cements, cutbacks, emulsions, and road tars. Non-bituminous binders include all hydraulic cements (those which harden by a chemical reaction with water and are capable of hardening under water), lime, fly ashes and natural pozzolans, or combinations thereof. Stabilized bases with lower quality materials such as sand asphalt or soil cement are also allowed. Stabilization practices of primary concern for this study are those in which the structural characteristics of the material are improved due to the cementing action of the stabilizing agent. Thus, the description of the study actually refers to treatments improving the structural properties of the base materials. Two or more consecutive lifts of the same mixture design are to be treated as one layer. One or more subbase layers (22, 23, 24, 25, 26, 42, or 43) may be present but are not required. Seal coats or porous friction courses are permitted on the surface but not in combination, i.e., a porous friction course placed over a seal coat is not acceptable. Project selection is often to those constructed on both fine and coarse subgrades (51-65).

Table A.3. Detailed Descriptions of Pavements for Each LTPP  
General Pavement Studies Experiment (Continued).

(03) JOINTED PLAIN CONCRETE PAVEMENT - JPCP

Acceptable jointed, unreinforced portland cement concrete slab (4) placed over untreated granular base (22 or 23), HMAC (28 or 31), or stabilized base (29, 30, 37, or 38). One or more subbase layers (22, 23, 24, 25, 26, 42, or 43) may also be present, but are not required. The joints may have either no load transfer devices or smooth dowel bars. A seal coat is also permissible above a granular base layer. Jointed slabs with load transfer devices other than dowel bars and pavements placed directly upon a treated or untreated subgrade are also not acceptable.

(04) JOINTED REINFORCED CONCRETE PAVEMENT - JRCP

Acceptable projects include jointed reinforced portland cement concrete pavements (5) with doweled joints spaced between 20 and 65 feet. The slab may rest directly upon a layer of any material listed in Table A.6 (except 25 and 45) or upon unstabilized coarse-grained subgrade (57-65). A base layer and one or more subbase layers may exist, but are not required. These layers may consist of any of the material types indicated in Table A.6. A seal coat is also permissible above a granular base layer. JRCP placed directly upon a fine-grained soil/aggregate layer (25) or a fine-grained subgrade (51-56) will not be considered for this study. JRCP's without load transfer devices or using devices other than smooth dowel bars at the joints are not acceptable.

(05) CONTINUOUSLY REINFORCED CONCRETE PAVEMENT - CRCP

Acceptable projects include continuously reinforced portland cement concrete pavements (6) placed directly upon a layer of any material listed in Table A.6 (except 25 or 45), or upon unstabilized coarse-grained subgrade (57-65). CRCP's placed directly upon a fine-grained soil/aggregate layer (25) or a fine-grained subgrade (51-56) are not acceptable for this study.

(06) AC OVERLAY OF AC PAVEMENT

Acceptable pavements for this study include a dense-graded HMAC surface layer (1) with or without other HMAC layers (28) placed over a previously existing asphalt concrete pavement meeting the requirements of GPS-1 or GPS-2. Seal coats or porous friction courses are allowed, but not in combination. Fabric interlayers (75 and 76) and Stress Absorbing Membrane Interlayers (SAMIs) (77) are permitted between the original surface and the overlay. The total pavements which have been overlaid more than once since they were originally constructed are not acceptable. Pavements in both bad and good condition as measured by levels of specific distress types present prior to the overlay are needed.

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Table A.3. Detailed Descriptions of Pavements for Each LTPP  
General Pavement Studies Experiment (Continued).

(07) AC OVERLAY OF JOINTED CONCRETE PAVEMENT

Acceptable pavements for this study include a dense-graded HMAC surface layer (1) with or without other HMAC layers (28) placed on either a JPCP (4), JRCP (5), or CRCP (6). The slab may rest on any combination of base and/or subbase layers indicated in Table A.6 (except 45). The previously existing concrete slab may also have been placed directly on lime or cement treated fine or coarse-grained subgrade (27, 42, and 43), or on untreated coarse-grained subgrade (57-65). Slabs placed directly on untreated fine-grained subgrade (51-56) are not acceptable. Seal coats or porous friction courses are permissible, but not in combination. Fabric interlayers (75 or 76) and SAMIs (77) are acceptable when placed between the original surface (concrete) and the overlay. Overlaid pavements with aggregate interlayers (79) and open-graded asphalt concrete (80) will not be considered in this study. The total thickness of HMAC used in the overlay must be at least 1.5 inches. Pavements which have been overlaid more than once since they were originally constructed are not acceptable. Pavements in both bad and good condition as measured by levels of specific distress types present prior to the overlay are needed.

(09) UNBONDED JCP OVERLAYS OF CONCRETE PAVEMENT

Acceptable projects for this study include unbonded JPCP (4), JRCP (5), or CRCP (6) overlay with a thickness of 5 inches or more placed over an existing JPCP (4), JRCP (5), or CRCP (6) pavement. The overlaid concrete pavement may rest on any of the base and subbase types listed in Table A.6 or directly upon subgrade.

Table A.4 Pavement Type Codes

<u>Type of Pavement</u>	<u>Code</u>
<u>Asphalt Concrete (AC) Surfaced Pavements:</u>	
AC With Granular Base.....	01
AC With Bituminous Treated Base.....	02
AC With Non-Bituminous Treated Base.....	07
AC Overlay on AC Pavement.....	03
AC Overlay on JPCP Pavement.....	28
AC Overlay on JRCP Pavement.....	29
AC Overlay on CRCP Pavement.....	30
Other.....	10
<u>Portland Cement Concrete Surfaced Pavements:</u>	
JPCP - Placed Directly On Untreated Subgrade.....	11
JRCP - Placed Directly On Untreated Subgrade.....	12
CRCP - Placed Directly On Untreated Subgrade.....	13
JPCP - Placed Directly On Treated Subgrade.....	14
JRCP - Placed Directly On Treated Subgrade.....	15
CRCP - Placed Directly On Treated Subgrade.....	16
JPCP - Over Unbound Base.....	17
JRCP - Over Unbound Base.....	18
CRCP - Over Unbound Base.....	19
JPCP Over Bituminous Treated Base.....	20
JRCP Over Bituminous Treated Base.....	21
CRCP Over Bituminous Treated Base.....	22
JPCP Over Non-Bituminous Treated Base.....	23
JRCP Over Non-Bituminous Treated Base.....	24
CRCP Over Non-Bituminous Treated Base.....	25
JPCP Overlay on JPCP Pavement.....	31
JPCP Overlay on JRCP Pavement.....	33
JPCP Overlay on CRCP Pavement.....	35
JRCP Overlay on JPCP Pavement.....	32
JRCP Overlay on JRCP Pavement.....	34
JRCP Overlay on CRCP Pavement.....	36
CRCP Overlay on JPCP Pavement.....	38
CRCP Overlay on JRCP Pavement.....	39
CRCP Overlay on CRCP Pavement.....	37
JPCP Overlay on AC Pavement.....	04
JRCP Overlay on AC Pavement.....	05
CRCP Overlay on AC Pavement.....	06
Prestressed Concrete Pavement.....	40
Other.....	49

Table A.4 Pavement Type Codes  
(Continued)

\*Composite Pavements (Wearing Surface Included in Initial Construction):

JPCP With Asphalt Concrete Wearing Surface.....	51
JRCP With Asphalt Concrete Wearing Surface.....	52
CRCP With Asphalt Concrete Wearing Surface.....	53
Other.....	59

Definitions:

- JPCP - Jointed Plain Concrete Pavement
- JRCP - Jointed Reinforced Concrete Pavement
- CRCP - Continuously Reinforced Concrete Pavement

\* "Composite Pavements" are pavements originally constructed with an asphalt concrete wearing surface over a portland cement concrete slab (1986 "AASHTO Guide for Design of Pavement Structures").

Table A.5 Pavement Surface Material Type Classification Codes

<u>Material Type</u>	<u>Code</u>
Hot Mixed, Hot Laid Asphalt Concrete, Dense Graded.....	01
Hot Mixed, Hot Laid Asphalt Concrete, Open Graded (Porous Friction Course) .....	02
Sand Asphalt.....	03
Portland Cement Concrete (JPCP).....	04
Portland Cement Concrete (JRCP).....	05
Portland Cement Concrete (CRCP).....	06
Portland Cement Concrete (Prestressed).....	07
Portland Cement Concrete (Fiber Reinforced).....	08
Plant Mix (Emulsified Asphalt) Material, Cold Laid.....	09
Plant Mix (Cutback Asphalt) Material, Cold Laid.....	10
Single Surface Treatment.....	11
Double Surface Treatment.....	12
Recycled Asphalt Concrete	
Hot, Central Plant Mix.....	13
Cold Laid Central Plant Mix.....	14
Cold Laid Mixed-In-Place.....	15
Heater Scarification/Recompaction.....	16
Recycled Portland Cement Concrete	
JPCP.....	17
JRCP.....	18
CRCP.....	19
Other.....	20

Table A.6. Base and subbase material type classification codes.

	<u>Code</u>
No Base (Pavement Placed Directly on Subgrade).....	21
Gravel (Uncrushed).....	22
Crushed Stone, Gravel or Slag.....	23
Sand.....	24
Soil-Aggregate Mixture (Predominantly Fine-Grained Soil).	25
Soil-Aggregate Mixture (Predominantly Coarse-Grained Soil).....	26
Soil Cement.....	27
Asphalt Bound Base or subbase Materials	
Dense Graded, Hot Laid, Central Plant Mix.....	28
Dense Graded, Cold Laid, Central Plant Mix.....	29
Dense Graded, Cold Laid, Mixed In-Place.....	30
Open Graded, Hot Laid, Central Plant Mix.....	31
Open Graded, Cold Laid, Central Plant Mix.....	32
Open Graded, Cold Laid, Mixed In-Place.....	33
Recycled Asphalt Concrete, Plant Mix, Hot Laid.....	34
Recycled Asphalt Concrete, Plant Mix, Cold Laid.....	35
Recycled Asphalt Concrete, Mixed In-Place.....	36
Sand Asphalt.....	46
Cement-Aggregate Mixture.....	37
Lean Concrete (<3 sacks cement/cy).....	38
Recycled Portland Cement Concrete.....	39
Sand-Shell Mixture.....	40
Limerock, Caliche (Soft Carbonate Rock).....	41
Lime-Treated Subgrade Soil.....	42
Cement-Treated Subgrade Soil.....	43
Pozzolanic-Aggregate Mixture.....	44
Cracked and Seated PCC Layer.....	45
Other.....	49

Table A.7. Subgrade soil description codes.

<u>Soil Description</u>	<u>Code</u>
<b>Fine-Grained Subgrade Soils:</b>	
Clay (Liquid Limit >50).....	51
Sandy Clay.....	52
Silty Clay.....	53
Silt.....	54
Sandy Silt.....	55
Clayey Silt.....	56
<b>Coarse-Grained Subgrade Soils:</b>	
Sand.....	57
Poorly Graded Sand.....	58
Silty Sand.....	59
Clayey Sand.....	60
Gravel.....	61
Poorly Graded Gravel.....	62
Clayey Gravel.....	63
Shale.....	64
Rock.....	65

Table A.8. Material type codes for thin seals and interlayers.

	<u>Code</u>
Chip Seal Coat.....	71
Slurry Seal Coat.....	72
Fog Seal Coat.....	73
Woven Geotextile.....	74
Nonwoven Geotextile.....	75
Stress Absorbing Membrane Interlayer.....	77
Dense Graded Asphalt Concrete Interlayer.....	78
Aggregate Interlayer.....	79
Open Graded Asphalt Concrete Interlayer.....	80
Chip Seal With Modified Binder (Does Not Include Crumb Rubber).....	81
Sand Seal.....	82
Asphalt-Rubber Seal Coat (Stress Absorbing Membrane).....	83
Sand Asphalt.....	84
Other.....	85

Table A.9. Geologic classification codes.

<u>Igneous:</u>	<u>Code</u>
Granite.....	01
Syenite.....	02
Diorite.....	03
Gabbro.....	04
Peridotite.....	05
Felsite.....	06
Basalt.....	07
Diabase.....	08
<u>Sedimentary:</u>	
Limestone.....	09
Dolomite.....	10
Shale.....	11
Sandstone.....	12
Chert.....	13
Conglomerate.....	14
Breccia.....	15
<u>Metamorphic:</u>	
Gneiss.....	16
Schist.....	17
Amphibolite.....	18
Slate.....	19
Quartzite.....	20
Marble.....	21
Serpentine .....	22

Table A.10. Soil and soil-aggregate mixture type codes,  
AASHTO classification.

	<u>Code</u>
A-1-a.....	.01
A-1-b.....	.02
A-3.....	.03
A-2-4.....	.04
A-2-5.....	.05
A-2-6.....	.06
A-2-7.....	.07
A-4.....	.08
A-5.....	.09
A-6.....	.10
A-7-5.....	.11
A-7-6.....	.12

Table A.11 Portland Cement Type Codes

	<u>Code</u>
Type I .....	41
Type II .....	42
Type III .....	43
Type IV .....	44
Type V .....	45
Type IS .....	46
Type ISA .....	47
Type IA .....	48
Type IIA .....	49
Type IIIA .....	50
Type IP .....	51
Type IPA .....	52
Type N .....	53
Type NA .....	54
Other .....	55

Table A.12 Portland Cement Concrete Admixture Codes

	<u>Code</u>
Water-Reducing (AASHTO M194, Type A) .....	01
Retarding (AASHTO M194, Type B) .....	02
Accelerating (AASHTO M194, Type C) .....	03
Water-Reducing and Retarding (AASHTO M194, Type D) .....	04
Water-Reducing and Accelerating (AASHTO M194, Type E) .....	05
Water-Reducing, High Range (AASHTO M194, Type F) .....	06
Water-Reducing, High Range and Retarding (AASHTO M194, Type G) ...	07
Air-Entraining Admixture (AASHTO M154) .....	08
Natural Pozzolans (AASHTO M295, Class N) .....	09
Fly Ash, Class F (AASHTO M295) .....	10
Fly Ash, Class C (AASHTO M295) .....	11
Other (Chemical) .....	12
Other (Mineral) .....	13

Table A.13. Aggregate durability test type codes.

<u>Description</u>	<u>AASHTO</u>	<u>ASTM</u>	<u>Code</u>
Resistance to Abrasion of Small Size Coarse Aggregate by Use of Los Angeles Machine (Percent Weight Loss)	T96	C131	..... 01
Soundness of Aggregate by Freezing and Thawing (Percent Weight Loss)	T103	--	..... 02
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate (Percent Weight Loss)	T104	C88	..... 03
Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine (Percent Weight Loss)	--	C535	..... 04
Potential Volume Change of Cement-Aggregate Combinations (Percent Expansion)	--	C342	..... 05
Evaluation of Frost Resistance of Coarse Aggregates in Air-Entrained Concrete by Critical Dilution Procedures (Number of Weeks of Frost Immunity)		C682	..... 06
Potential Alkali Reactivity of Cement Aggregate Combinations (Average Percent Expansion)	--	C227	..... 07
Potential Reactivity of Aggregates (Reduction in Alkalinity-mmol/L)	--	C289	..... 08
Test for Clay Lumps and Friable Particles in Aggregates (Percent by Weight)	T112	C142	..... 09
Test for Potential Alkali Reactivity of Carbonate Rocks for Concrete Aggregates (Percent Change in Speciment Length)	--	C586	.....11

Table A.14. Codes for Asphalt Refiners and Processors in the United States.\*

	<u>Code</u>
Belcher Refining Co.--Mobile Bay, Alabama .....	78
Hunt Refining Company--Tuscaloosa, Alabama .....	01
Chevron USA, Inc.--Kenai, Alaska .....	02
Mapco Alaska Petroleum--North Pole, Alaska .....	03
Intermountain Refining Cl.--Fredonia, Arizona.....	04
Berry Petroleum Company--Stevens, Arkansas .....	05
Cross Oil and Refining Company--Smackover, Arkansas .....	06
Lion Oil Company--El Dorado, Arkansas .....	07
McMillan Ring, Free Oil Cl.--Norphlet, Arkansas .....	08
Chevron USA, Inc.--Richmond, California .....	09
Conoco, Inc.--Santa Maria, California .....	10
Edgington Oil Co., Inc.--Long Beach, California .....	11
Golden Bear Division, Witco Chemical Corp.--Oildale, California .....	12
Golden West Refining, Co.--Santa Fe Springs, California .....	13
Huntway Refining Co.--Benicia, California .....	14
Huntway Refining Co.--Wilmington, California .....	15
Lunday-Thagard Co.--South Gate, California .....	79
Newhall Refining Co., Inc.--Newhall, California .....	16
Oxnard Refining--Oxnard, California .....	17
Paramount Petroleum Corp.--Paramount, California .....	80
Powerline Oil Co.--Santa Fe Springs, California .....	81
San Joaquin Refining Cl.--Bakersfield, California .....	18
Shell Oil Co.--Martinez, California .....	19
Superior Processing Co.--Santa Fe Springs, California .....	20
Colorado Refining Co.--Commerce City, Colorado .....	82
Conoco, Inc.--Commerce City, Colorado .....	21
Amoco Oil Co.--Savannah, Georgia .....	22
Young Refining Corp.--Douglasville, Georgia .....	23
Chevron USA--Barber's Point, Hawaii .....	24
Clark Oil and Refining Corp.--Blue Island, Illinois .....	25
Shell Oil Co.--Wood River, Illinois .....	26
Unacol Corp.--Lemont, Illinois .....	27
Amoco Oil Co.--Whiting, Indiana .....	28
Laketon Refining Corp.--Laketon, Indiana .....	83
Young Refining Corp.--Laketon, Indiana .....	29
Derby Refining Co.--El Dorado, Kansas .....	84
Farmland Industries, Inc.--Phillipsburg, Kansas .....	30
Total Petroleum, Inc.--Arkansas City, Kansas .....	31
Ashland Petroleum Co.--Catlettsburg, Kentucky .....	32
Atlas Processing Co.--Shreveport, Louisiana .....	33
Calumet Refining Co.--Princeton, Louisiana .....	34
Exxon Co.--Baton Rouge, Louisiana .....	35
Marathon Petroleum Co.--Garyville, Louisiana .....	36
Marathon Petroleum Co.--Detroit, Michigan .....	37
Ashland Petroleum Co.--St. Paul, Minnesota .....	38
Koch Refining Co.--Rosemount, Minnesota .....	39
Chevron USA, Inc.--Pascagoula, Mississippi .....	40
Ergon Refining Inc.--Vicksburg, Mississippi .....	41
Southland Oil Co.--Lumberton, Mississippi .....	42
Southland Oil Co.--Sanderson, Mississippi .....	43

Table A.14. Codes for Asphalt Refiners and Processors in the United States  
(Continued).\*

	<u>Code</u>
Genex--Laurel, Montana .....	44
Conoco, Inc.--Billings, Montana .....	45
Exxon Co.--Billings, Montana .....	46
Chevron USA, Inc.--Perth Amboy, New Jersey .....	47
Exxon Co., Linden, New Jersey .....	48
Giant Industries, Inc.--Gallup, New Mexico .....	85
Navahoe Refining Co.--Artesia, New Mexico .....	49
Cibro Petroleum Products Co.--Albany, New York .....	86
Ashland Petroleum Co.--Canton, Ohio .....	50
Standard Oil Co.--Toledo, Ohio .....	51
Sohio Oil Co (BP America)--Toledo, Ohio .....	87
Kerr-McGee Refining Co.--Wynnewood, Oklahoma .....	52
Sinclair Oil Corp.--Tulsa, Oklahoma .....	53
Sun Co. Inc.--Tulsa, Oklahoma .....	54
Total Petroleum Inc.--Ardmore, Oklahoma .....	55
Chevron USA, Inc.--Portland, Oregon .....	56
Atlantic Refining & Marketing Corp.--Philadelphia, PA .....	57
United Refining Co.--Warren, Pennsylvania .....	58
Mapco Petroleum Inc.--Memphis, Tennessee .....	59
Charter International Oil Co.--Houston, Texas .....	60
Chevron USA, Inc.--El Paso, Texas .....	61
Coastal Refining & Marketing, Inc.--Corpus Christi, Texas ....	88
Coastal States Petroleum Co.--Corpus Christi, Texas .....	62
Diamond Shamrock Corp.--Sunray, Texas .....	63
Exxon Co. USA--Baytown, Texas .....	64
Fina Oil and Chemical Co.--Big Spring, Texas .....	65
Fina Oil and Chemical Co.--Port Arthur, Texas .....	89
Hill Petroleum Co.--Houston, Texas .....	90
Shell Oil Co.--Deer Park, Texas .....	66
Star Enterprise--Port Arthur & Port Neches, Texas .....	91
Texaco Refining & Marketing Inc.--Port Arthur & Port Neches, Texas .....	67
Trifinery--Corpus Christi, Texas .....	92
Unocal Corp.--Nederland, Texas .....	68
Valero Refining Co.--Corpus Christi, Texas .....	69
Phillips 66 Co.--Woods Cross, Utah .....	70
Chevron USA Inc.--Seattle, Washington .....	71
Sound Refining, Inc.--Tacoma, Washington .....	72
US Oil and Refining Co.--Tacoma, Washington .....	73
Murphy Oil USA, Inc.--Superior, Wisconsin .....	74
Big West Oil Co.--Cheyenne, Wyoming .....	75
Little America Refining Co.--Casper, Wyoming .....	93
Sinclair Oil Corp.--Sinclair, Wyoming .....	76
Other .....	77

\* Taken from Oil and Gas Journal, March 20, 1989, pp. 72-89.

Table A.15 Asphalt Cement Modifier Codes

	<u>Code</u>
Stone Dust.....	01
Lime.....	02
Portland Cement.....	03
Carbon Black.....	04
Sulfur.....	05
Lignin.....	06
Natural Latex.....	07
Synthetic Latex.....	08
Block Copolymer.....	09
Reclaimed Rubber.....	10
Polyethylene.....	11
Polypropylene.....	12
Ethylene-Vinyl Acetate.....	13
Polyvinyl Chloride.....	14
Asbestos.....	15
Rock Wool.....	16
Polyester.....	17
Manganese.....	18
Other Mineral Salts.....	19
Lead Compounds.....	20
Carbon.....	21
Calcium Salts.....	22
Recycling Agents.....	23
Rejuvenating Oils.....	24
Amines.....	25
Fly Ash.....	26
Other.....	27

Table A.16 Grades of Asphalt, Emulsified Asphalt, and  
Cutback Asphalt Codes

	<u>Code</u>
<b>Asphalt Cements</b>	
AC-2.5 .....	01
AC-5 .....	02
AC-10 .....	03
AC-20 .....	04
AC-30 .....	05
AC-40 .....	06
AR-1000 (AR-10 by AASHTO Designation) .....	07
AR-2000 (AR-20 by AASHTO Designation) .....	08
AR-4000 (AR-40 by AASHTO Designation) .....	09
AR-8000 (AR-80 by AASHTO Designation) .....	10
AR-16000 (AR-160 by AASHTO Designation) .....	11
200-300 pen .....	12
120-150 pen .....	13
85-100 pen .....	14
60-70 pen .....	15
40-50 pen .....	16
Other Asphalt Cement Grade .....	17
<b>Emulsified Asphalts</b>	
RS-1 .....	18
RS-2 .....	19
MS-1 .....	20
MS-2 .....	21
MS-2h .....	22
HFMS-1 .....	23
HFMS-2 .....	24
HFMS-2h .....	25
HFMS-2s .....	26
SS-1 .....	27
SS-1h .....	28
CRS-1 .....	29
CRS-2 .....	30
CMS-2 .....	31
CMS-2h .....	32
CSS-1 .....	33
CSS-1h .....	34
Other Emulsified Asphalt Grade .....	35
<b>Cutback Asphalts (RC, MC, SC)</b>	
30 (MC only) .....	36
70 .....	37
250 .....	38
800 .....	39
3000 .....	40
Other Cutback Asphalt Grade .....	99

Taken from MS-5, "A Brief Introduction to Asphalt," and Specification Series No. 2 (SS-2), "Specifications for Paving and Industrial Asphalts," both publications by the Asphalt Institute.

Table A.17 Maintenance and Rehabilitation Work Type Codes

	<u>Code</u>
Crack Sealing (linear ft.) .....	01
Transverse Joint Sealing (linear ft.) .....	02
Lane-Shoulder, Longitudinal Joint Sealing (linear ft.) .....	03
Full Depth Joint Repair Patching of PCC (sq. yards) .....	04
Full Depth Patching of PCC Pavement Other than at Joint (sq. yards) .....	05
Partial Depth Patching of PCC Pavement Other than at Joint (sq. yards) .....	06
PCC Slab Replacement (sq. yards) .....	07
PCC Shoulder Restoration (sq. yards) .....	08
PCC Shoulder Replacement (sq. yards) .....	09
AC Shoulder Restoration (sq. yards) .....	10
AC Shoulder Replacement (sq. yards) .....	11
Grinding/Milling Surface (sq. yards) .....	12
Grooving Surface (sq. yards) .....	13
Pressure Grout Subsealing (no. of holes) .....	14
Slab Jacking Depressions (no. of depressions) .....	15
Asphalt Subsealing (no. of holes) .....	16
Spreading of Sand or Aggregate (sq. yards) .....	17
Reconstruction (Removal and Replacement) (sq. yards) .....	18
Asphalt Concrete Overlay (sq. yards) .....	19
Portland Cement Concrete Overlay (sq. yards) .....	20
Mechanical Premix Patch (using motor grader and roller) (sq. yards) .....	21
Manual Premix Spot Patch (hand spreading and compacting with roller) (sq. yards) .....	22
Machine Premix Patch (placing premix with paver, compacting with roller) (sq. yards) .....	23
Full Depth Patch of AC Pavement (removing damaged material, repairing supporting material, and repairing) (sq. yards) ...	24
Patch Pot Holes - Hand Spread, Compacted with Truck (no. of holes) .....	25
Skin Patching (hand tools/hot pot to apply liquid asphalt and aggregate) (sq. yards) .....	26
Strip Patching (using spreader and distributor to apply hot liquid asphalt and aggregate) (sq. yards) .....	27
Surface Treatment, single layer (sq. yards) .....	28
Surface Treatment, double layer (sq. yards) .....	29
Surface Treatment, three or more layers (sq. yards) .....	30
Aggregate Seal Coat (sq. yards) .....	31
Sand Seal Coat (sq. yards) .....	32
Slurry Seal Coat (sq. yards) .....	33
Fog Seal Coat (sq. yards) .....	34
Prime Coat (sq. yards) .....	35
Tack Coat (sq. yards) .....	36
Dust Layering (sq. yards) .....	37
Longitudinal Subdrains (linear feet) .....	38
Transverse Subdrainage (linear feet) .....	39

Table A.17 Maintenance and Rehabilitation Work Type Codes  
(continued)

	<u>Code</u>
Drainage Blankets (sq. yards) .....	40
Well System .....	41
Drainage Blankets with Longitudinal Drains .....	42
Hot-Mix Recycled Asphalt Concrete (sq. yards) .....	43
Cold-Mix Recycled Asphalt Concrete (sq. yards) .....	44
Heater Scarification, Surface Recycled Asphalt Concrete (sq. yards) .....	45
Crack and Seat PCC Pavement as Base for New AC Surface (sq. yards) .....	46
Crack and Seat PCC Pavement as Base for New PCC Surface (sq. yards) .....	47
Recycled Portland Cement Concrete (sq. yards) .....	48
Pressure Relief Joints in PCC Pavements (linear feet) .....	49
Joint Load Transfer Restoration in PCC Pavements (linear feet) ...	50
Mill Off Existing Pavement and Overlay with AC (sq. yards) .....	51
Mill Off Existing Pavement and Overlay with PCC (sq. yards) .....	52
Other .....	53
Partial Depth Patching of PCC Pavement at Joints (sq. yards) .....	54

Table A.18. Maintenance location codes.

	<u>Code</u>
Outside Lane (Number 1) .....	01
Inside Lane (Number 2) .....	02
Inside Lane (Number 3) .....	03
All Lanes .....	09
Shoulder .....	04
All Lanes Plus Shoulder .....	10
Curb and Gutter .....	05
Side Ditch .....	06
Culvert .....	07
Other .....	08

Note: SHRP LTPP only studies outside lanes.

Table A.19 Maintenance Materials Type Codes

	<u>Code</u>
Preformed Joint Fillers .....	01
Hot-Poured Joint and Crack Sealer .....	02
Cold-Poured Joint and Crack Sealer .....	03
Open Graded Asphalt Concrete .....	04
Hot Mix Asphalt Concrete Laid Hot .....	05
Hot Mix Asphalt Concrete Laid Cold .....	06
Sand Asphalt .....	07
Portland Cement Concrete (overlay or replacement)	
Joint Plain (JPCP) .....	08
Joint Reinforced (JRCP) .....	09
Continuously Reinforced (CRCP) .....	10
Portland Cement Concrete (Patches) .....	11
Hot Liquid Asphalt and Aggregate (Seal Coat) .....	12
Hot Liquid Asphalt and Mineral Aggregate .....	13
Hot Liquid Asphalt and Sand .....	14
Emulsified Asphalt and Aggregate (Seal Coat) .....	15
Emulsified Asphalt and Mineral Aggregate .....	16
Emulsified Asphalt and Sand .....	17
Hot Liquid Asphalt .....	18
Emulsified Asphalt .....	19
Sand Cement (Using Portland Cement) .....	20
Lime Treated or Stabilized Materials .....	21
Cement Treated or Stabilized Materials .....	22
Cement Grout .....	23
Aggregate (Gravel, Crushed Stone or Slag) .....	24
Sand .....	25
Mineral Dust .....	26
Mineral Filler .....	27
Other .....	28

Table A.20. Recycling agent type codes.

	<u>Code</u>
RA 1.....	.42
RA 5.....	.43
RA 25.....	.44
RA 75.....	.45
RA 250.....	.46
RA 500.....	.47
Other.....	.48

Note: The recycling agent groups shown in this table are defined in ASTM D4552.

Table A.21. Anti-stripping agent type codes.

	<u>Code</u>
Permatac .....	01
Permatac Plus .....	02
Betascan Roads .....	03
Pavebond .....	04
Pavebond Special .....	05
Pavebond Plus .....	06
BA 2000 .....	07
BA 2001 .....	08
Unichem "A" .....	09
Unichem "B" .....	10
Unichem "C" .....	11
AquaShield AS4115 .....	12
AquaShield AS4112 .....	13
AquaShield AS4113 .....	14
Portland Cement .....	15
Hydrated Lime:	
Mixed Dry With Asphalt Cement .....	16
Mixed Dry with Dry Aggregate .....	17
Mixed Dry with Wet Aggregate .....	18
Slurried Lime Mixed with Aggregate .....	19
Hot Lime Slurry (Quick Lime Slaked and Slurried at Job Site) .....	20
Nostrip Chemicals A-500 .....	21
No Strip Chemical Works ACRA RP-A .....	22
No Strip Chemical Works ACRA Super Conc. ....	23
No Strip Chemical Works ACRA 200 .....	24
No Strip Chemical Works ACRA 300 .....	25
No Strip Chemical Works ACRA 400 .....	26
No Strip Chemical Works ACRA 500 .....	27
No Strip Chemical Works ACRA 512 .....	28
No Strip Chemical Works ACRA 600 .....	29
Darakote .....	30
De Hydro H86C .....	31
Emery 17065 .....	32
Emery 17319 .....	33
Emery 17319 - 6880 .....	34
Emery 17320 .....	35
Emery 17321 .....	36
Emery 17322 .....	37
Emery 17339 .....	38
Emery 1765-6860 .....	39
Emery 6886B .....	40
Husky Anti-Strip .....	41
Indulin AS-Special .....	42

Table A.21. Anti-stripping agent type codes (continued).

	<u>Code</u>
Indulin AS-1 .....	43
Jetco AD-8 .....	44
Kling .....	45
Kling Beta ZP-251 .....	46
Kling Beta L-75 .....	47
Kling Beta LV .....	48
Kling Beta 1000 .....	49
Kling Beta 200 .....	50
Nacco Anti Strip .....	51
No Strip .....	52
No Strip Concentrate .....	53
Redi-Coat 80-S .....	54
Redi-Coat 82-S .....	55
Silicone .....	56
Super AD-50 .....	57
Tap Co 206 .....	58
Techni H1B7175 .....	59
Techni H1B7173 .....	60
Techni H1B7176 .....	61
Techni H1B7177 .....	62
Tretolite DH-8 .....	63
Tretolite H-86 .....	64
Tretolite H-86C .....	65
Tyfo A-45 .....	66
Tyfo A-65 .....	67
Tyfo A-40 .....	68
Edoco 7003 .....	69
Other.....	70

Table A.22 Distress Types

	<u>Code</u>
<b>Asphalt Concrete Pavement</b>	
Alligator Cracking .....	01
Block Cracking .....	02
Edge Cracking .....	03
Longitudinal Cracking .....	04
Reflection Cracking .....	05
Transverse Cracking .....	06
Patch Deterioration .....	07
Potholes .....	08
Rutting .....	09
Shoving .....	10
Bleeding .....	11
Polished Aggregate .....	12
Raveling and Weathering .....	13
Lane Shoulder Dropoff .....	14
Water Bleeding .....	15
Pumping .....	16
Other .....	17
<b>Portland Cement Concrete Pavement</b>	
Corner Breaks .....	20
Durability Cracking .....	21
Longitudinal Cracking .....	22
Transverse Cracking .....	23
Joint Seal Damage .....	24
Spalling .....	25
Map Cracking/Scaling .....	26
Polished Aggregate .....	27
Popouts .....	28
Punchouts .....	29
Blowouts .....	30
Faulting .....	31
Lane/Shoulder Dropoff .....	32
Lane/Shoulder Separation .....	33
Patch Deterioration .....	34
Water Bleeding/Pumping .....	35
Slab Settlement .....	36
Slab Upheavel .....	37
Other .....	38