

Section 3.2

FLEXIBLE PAVEMENT CORING AND EVALUATION

3.2.1 PURPOSE

To provide a uniform standard for the coring and evaluation of flexible pavements in order to obtain information for the design of rehabilitation projects.

3.2.2 AUTHORITY

Section 334.044(2), Florida Statutes

3.2.3 SCOPE

Principal users of this document include District Materials Offices (DMO) and District Design Offices (DDO), as well as the State Materials Office (SMO).

3.2.4 PROCEDURE

3.2.4.1 Data Collection

The DDO and/or Consultant will review the previous construction plans, pavement condition survey, straight line diagrams, design concept drawings and any major repair or maintenance information for the project as determined necessary. This information is normally compiled and made available for review by DDO or Consultant Project Management. The DDO will provide a general scope of the proposed rehabilitation which should be reviewed for items such as widening or work on adjacent streets, so that the best possible data can be used in the rehabilitation design.

3.2.4.2 Field Survey

Following the data collection and review of all pertinent project data, a Field Survey of the project will then be conducted by the DMO, DDO and/or Consultant. During this survey, all pavement changes, distressed areas (pushing, shoving, tearing, cracking, etc.), roughness and patching

should be noted by station or mile / kilo post. Traffic conditions should be noted to determine the type and amount of traffic control required to perform the coring operation. Traffic Operations Office (TOO) should be consulted for lane closure window restrictions.

The DDO will notify representatives from the local utility system maintaining agencies of the review, and the agencies will be required to locate all relevant utilities prior to any coring activities. The DDO will accomplish this prior to submitting a coring scope to the DMO.

3.2.4.3 Coring and Sampling of the Project

The DMO will obtain core samples. Where milling on the project will exceed 5000 tons [4500 metric tons] of RAP material, six inch diameter [150 mm] core specimens representative of the mix to be milled, will be taken at a minimum frequency of one core per lane mile [1.5 lane km]. Avoid locating cores in intersections where cars and trucks frequently leak fuel and oil, which adversely affects the test properties of samples. Also avoid locations in patched areas since the asphalt mix used for the patch will not be representative of the majority of the roadway. The cores will be retained by the DMO for extraction analysis.

Depending on the variability of asphalt thickness within the project, judgment should be used in deciding whether the coring frequency should be increased or decreased.

For long projects where the pavement structure is uniform and milling will be at a constant depth, a reduction in coring frequency may be considered. Any reduction in frequency must be approved in advance by the District Materials and Research Engineer, and State Bituminous Engineer and documented.

For projects less than two miles [3 km] in length, a minimum of two cores per lane are required. This is to ensure that enough material is provided to perform representative tests on the pavement.

Each core should be measured, wrapped with masking tape and properly identified. The following information shall be recorded on a Pavement Evaluation Coring and Condition Data sheet (**Form No. 675-030-09**) and entered into the Pavement Coring and Reporting (PCR) system:

- A) Name of Core Rig Operator, Date, Page Number and Total Number of Pages.
- B) Project Identification: (Item as available)
- 1) Financial Project Number
 - 2) Federal Aid Number
 - 3) County
 - 4) State Road Number
 - 5) Project Description and Limits Local Name, From, To, Begin Mile / Kilo Post, End Mile / Kilo Post, and Total Length.
 - 6) County-Section Number for Roadway.
- C) Typical Section Description: (Optional)
- 1) Number of Lanes
 - 2) Shoulder Inside and Outside Type (Paved, Grassed, Stab., etc.) Conditions (Good, Fair, Poor, Eroded, etc.)
 - 3) Curb & Gutter (Yes or No),
 - 4) Type of Median (Curbed, Paved, Grassed or Other).
- D) Core Information:
- 1) Core Number
 - 2) Mile / Kilo post, station or location by other means
 - 3) Lane (See Fig. 1 and additional instructions below).
- Note:** Examples include: R1 for a North or Eastbound inside lane, L3 for a South or Westbound outside lane on a six lane roadway. Use C for a center lane).
- 4) Identify if taken in wheel path (WP).
 - 5) Pavement layer types and thicknesses in inches * [millimeters], starting with the top layer.
 - 6) Total core length in inches * (in millimeters)
 - 7) Base type and thickness in inches * (in millimeters)

Note: * As applicable

Figure 1	
Southbound or Westbound	Northbound or Eastbound

Lane	L3	L2	L1	C	R1	R2	R3	Increase Mile/Kilo Post Decrease
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Right or left lane should be determined by facing the direction of increasing mile / kilo posts, which run either South to North or West to East. For example, a North or Eastbound lane would be on the right and South or Westbound lane would be on the left. Check the straight line diagrams to verify the correct direction of mile / kilo posts on the section being cored.

Shoulders should be identified as follows:

IL	Inside Shoulder, Left Roadway
OL	Outside Shoulder, Left Roadway
IR	Inside Shoulder, Right Roadway
OR	Outside Shoulder, Right Roadway

Classify the types of asphalt concrete mixes used, and measure the individual layers to the nearest 0.1 inch [1 mm]. If the pavement is cracked, the cores should be taken over cracks and the depth of the cracks measured. Wetting the cores may help in measuring the depth of the cracks.

The depth and type of base should be determined by augering through selected pavement core holes. The boring can be done in conjunction with the pavement coring or by a separate crew. This information should be checked at least once per mile [1.5 kilometers] of roadway (and a minimum of five times per project. Any evidence of groundwater intrusion in the base should be noted and reported to the District Drainage Engineer. When determined appropriate by the District Materials and Research Engineer, the depth of asphalt and base can be determined by alternate means. When this is done, the alternate means must be documented.

Additional borings should be made if there is considerable variation of pavement or base thicknesses or types on the project. The previous construction plans and the straight line diagrams should be reviewed to

identify locations of changes in pavement thickness, base thickness or base type. For significant changes, the boring should be on each side of the change to verify the location.

To potentially minimize coring, additional evaluation techniques may also be considered. These evaluation techniques include: Ground Penetrating Radar (GPR) which can be used to establish the pavement thickness; the Multi-Purpose Survey Vehicle (MPSV) which can be used to determine the pavement cross-slope; and the high speed laser profiler which can be used to measure rutting and the longitudinal profile of the pavement. Contact the Pavements Section of the State Materials Office for further information on these new technologies.

3.2.4.4 Pavement Condition Information

The condition of the pavement at each core location will be observed by DMO and recorded on the Pavement Evaluation Coring and Condition Data Sheet, (**Form No. 675-030-09**) and input into the Pavement Coring Reporting (PCR) system. The following information is to be recorded on all sheets for each location:

- A) Depth of cracking in inches (in millimeters)
- B) Crack type code (A= alligator cracking in wheel path, B= block cracking, C= combination of types)
- C) Predominant class of cracking (I, II, III)
- D) Extent of cracking (L-light, M-moderate, S-severe)
- E) Description of pavement condition (G-good, F-fair, P-poor)
- F) Rut depth measurement in inches [mm] (maximum in the lane at the location evaluated)
- G) Cross slope measurement in hundredths of a foot per six feet [mm/m] and direction of slope, (left (in) or right (out))

Note: When entering direction of cross slope information into PCR, type "I" for left (in), and "O" for right (out)

- H) Comments, such as depth of asphalt in gutter (if applicable) or other types of distress
- I) Remarks: Recommendations to designers, or unusual conditions and other pertinent information.

3.2.4.5 Final Review of the Data

Following the coring of the project, a Final Review of the Data should be conducted by the DMO. The average thickness of each layer (asphalt, base and stabilized subgrade) should be determined. Additional analysis may be needed if there is considerable variability on the project. The DMO will summarize the data and provide a report to DDO. The DMO and DDO will then review the data and set the appropriate milling depth(s).

Based on the cross slope measurements, the DMO will make a recommendation to the DDO if transverse screed control on the asphalt paver will be required. If this is required, a note must then be placed in the plans. On pavements with relatively flat cross slopes, considerable overbuild and/or correction by milling may be required to increase the cross slope. Design Personnel must be aware of deficiencies in the cross slope in order to provide sufficient instructions and quantities of asphalt in the plans.

3.2.4.6 District Materials Laboratory Testing

After the milling depth is established, on projects where milling will result in over 5000 tons [4500 metric tons] of RAP material, all roadway cores should be cut to the appropriate depth by the DMO. These cores will be retained by the DMO and an extraction performed.

The resulting data (core locations, pavement thickness, asphalt binder content, gradation, etc.), will then be summarized by the DMO on a Pavement Composition Data Sheet. English and metric versions of this sheet are available on the SMO website.

Upon completion of the Pavement Composition Data Sheet, forward an electronic version of the file via e-mail to the SMO.

3.2.4.7 State Materials Office

The SMO will finalize the report, attach a cover sheet and ensure that the report is posted on the SMO website.

3.2.5 TRAINING

None required.

3.2.6 FORMS

The following forms may be obtained from the Department's Form Library:

675-030-09 Pavement Evaluation Coring and Condition Data