

Implementation of Testing Equipment for Asphalt Materials

Start Date: 3/1/2006

Duration: 18 months

Completion Date: 8/31/2007

Funding: State

Principal Investigator:

Sam Cooper, Jr., P.E.,

Senior Asphalt Research

Engineer, LTRC

LTRC Contacts

Administrative:

Harold "Skip" Paul, P.E.,

Director, (225) 767-9131

Technical:

Chris Abadie, P.E.,

Materials Research

Administrator

(225) 767-9109

Problem

Current test procedures for determining fine aggregate specific gravity and the specific gravity of compacted mix, as specified by AASHTO T84 and DOTD TR 304-03, require approximately two days of testing time. The calculation of Saturated Surface Dry (SSD), as required in DOTD TR 304-03, is inaccurate for open-graded and permeable coarse-graded hot mix asphalt (HMA) mixtures.

LTRC has completed an initial evaluation of three new devices—CoreDry, SSDetect, and CoreLok—that have

been proven to improve testing time and/or the accuracy of tests for HMA mixtures. The CoreDry device decreases the drying time of roadway cores and speeds up the process of roadway acceptance based on density. SSDetect is an automated system that facilitates the mechanical measurement of fine aggregate specific gravity in a shorter time period, thus removing the human bias inherent in current procedures. CoreLok enables accurate specific gravity of compacted mix measurement of open-graded and coarse-graded HMA mixtures.



LTRC



*Louisiana Transportation
Research Center*

*Sponsored jointly by the
Louisiana Department of
Transportation and
Development
and Louisiana State University*

*4101 Gourrier Avenue
Baton Rouge, LA 70808-4443*



SSDdetect, CoreLok, and CoreDry devices (clockwise, from top left)

Although LTRC has evaluated this equipment, a single-laboratory evaluation is often insufficient for full analysis. This project will distribute the equipment for statewide round robin testing, which will provide the necessary between-lab variation and test evaluation for each of these test devices.

Objectives

The objective of this study is to develop specifications for implementation based on field verification evaluations of test procedures and equipment considered.

Description

The SSDetect, CoreLok, and CoreDry devices will be purchased and sent for one month at a time to each District for collection of field verification data. Test measurements from each device will be compared to values obtained by current specification requirements. The Districts will be provided with test procedures for each device and required minimum test factorials.

A minimum of 15 roadway cores per District will be evaluated at an asphalt plant in accordance with DOTD TR 304-03 and AASHTO TP69-04. In addition, dry weight measurements of the same 15 roadway cores will be collected using the CoreDry device for comparison with Louisiana's current test method. This will enable the evaluation of the CoreDry weight vs. oven

dry weight and standard SSD measurement vs. CoreLok SSD measurements.

In each district, a minimum of three fine aggregates will be evaluated for specific gravity as measured by the SSDetect device and AASHTO T 84. The same aggregates will be used in both test methods. In addition, LTRC will send two fine aggregates that have been split into triplicate samples to each District. Each District will then use both test methods to re-test the same triplicate samples for specific gravity. Once the District has tested the fine aggregate samples for the bulk specific gravity, the samples will be retained and dried for testing by the next District. LTRC will have determined the bulk specific gravity of each fine aggregate sample before sending them to the Districts for round robin testing.

LTRC will analyze all results as each District finishes data collection. Upon completion of the study, specifications will be developed for implementation based on field verification data evaluations of test procedures and equipment considered.

Implementation Potential

It is anticipated that the findings of this research will demonstrate accurate determination of test properties in less time than current procedures. Subsequently, specifications will be developed and recommended for implementation and inclusion into the current Louisiana Standard Specifications for Roads and Bridges.