



RESEARCH PROJECT CAPSULE [11-3B]

June 2011

TECHNOLOGY TRANSFER PROGRAM

Testing and Analysis of LWT and SCB Properties of Asphaltic Concrete Mixtures

JUST THE FACTS:

Start Date:

April 1, 2011

Duration:

24 months

End Date:

March 31, 2013

Funding:

SPR: TT-Fed/TT-Reg

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Sponsored jointly by the Louisiana

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University

POINTS OF INTEREST:

Problem Addressed / Objective of Research / Methodology Used / Implementation Potential

PROBLEM

Currently, Louisiana's Quality Control and Quality Assurance (QC/QA) practice for asphalt mixtures in pavement construction is mainly based on controlling properties of plant-produced mixtures that include gradation and asphalt content, air voids, moisture susceptibility tests (Modified Lottman) and roadway parameters, such as pavement density. These controlling properties have served Louisiana well, yet with growing interest in considering alternative paving materials such as rubber modified asphalts, reclaimed asphalt pavement (RAP), recycled shingles, and the warm-mix asphalt (WMA) technologies, there is a pressing need to implement mechanical tests on samples representing plant produced mixtures or roadway core samples that will screen materials prone to rutting, cracking, and alternative moisture damage indicators.

The Louisiana Transportation Research Center (LTRC) has been conducting loaded wheel tracker (LWT) and semi-circular bend (SCB) tests for several years for forensic investigation and research purposes only. Furthermore, Texas has adopted the LWT for design approval and plant produced mixtures. Louisiana has recommended a 6-mm maximum rut depth for design of asphalt mixtures and Texas has adopted a 12-mm maximum rut depth requirement for 10,000, 15,000, and 20,000 passes depending on PG grade of asphalt binder. Testing of cores and plant produced mixtures using local materials is needed to verify these LWT parameters in Louisiana.

Recently, the Louisiana Department of Transportation and Development (DOTD) has planned to introduce LWT (rutting) and SCB (cracking) specification limits that are reasonable and practical, considering the commonly used construction materials and projected traffic in the state of Louisiana. Consequently, a statewide testing scheme is planned to generate a wide spread LWT and SCB database.

OBJECTIVE

The objective of this research is to implement the loaded wheel tracker and to evaluate a simplified semi-circular bend test as an end result parameter for testing asphaltic concrete mixtures. The research will focus on testing both plant produced loose mixtures and roadway cores.

METHODOLOGY

The proposed research study will be conducted according to the following tasks:

- **Task 1** – Conducting Literature Review
- **Task 2** – Developing a Simplified SCB Test Apparatus (Modify Marshall Load Frame)
- **Task 3** – Identifying Field Projects and Field Sampling
- **Task 4** – Laboratory Testing
- **Task 5** – Data Analyses
- **Task 6** – Developing of End Result Specifications
- **Task 7** – Preparing a Project Report

IMPLEMENTATION POTENTIAL

A system to conduct mechanical property test to determine the predicted performance of asphalt mixtures has been a need for more than 100 years. It is believed that the LWT and SCB tests will provide end results that can be used to predict this performance. LTRC began using the LWT device as a research tool before 2000. The device has also been used in Louisiana as a forensics investigative tool, providing a good predictor of pavement performance. Texas DOT adopted the use of the LWT device in their mix designs and mixture production in 2004. The outcome of this study will allow Louisiana to require the use of the LWT for quality acceptance as part of the Standard Specifications.

LTRC has been using the SCB test device as a research tool since 2004. It too has been used in several research projects as a predictor of pavement performance of asphalt mixtures. The ability to adapt this device to a commonly used Marshall Load frame device will provide another tool for quality acceptance. However, minor training will be necessary for the entire asphalt materials community.



SCB testing apparatus



SCB test setup



LWT test