JUNE 2009

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R E S E A R C H PROJECT CAPSULE

TECHNOLOGY TRANSFER PROGRAM

JUST THE FACTS

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Start Date: March 1, 2007

Duration: 24 months

End Date: June 30, 2009

Funding: State

Principal Investigator:

Louay Mohammad, Ph.D. Associate Professor Louisiana Transportation Research Center Louisiana State University 225-767-9126

Co-Principal Investigator: Munir Nazzal, Ph.D.

Administrative Contact: Mark Morvant, P.E. Associate Director, Research 225-767-9124

Technical Contact: William "Bill" King, P.E. Asphalt Research Manager 225-767-9129

SPECIAL POINTS OF INTEREST:

- Problem Addressed
- Objectives of Research
- Methodology Used
- Implementation Potential

Development of a Design Methodology for Asphalt Treated Base Mixtures

PROBLEM

Asphalt treated base (ATB) is a dense-graded asphalt mixture with a wide gradation band and lower asphalt content intended for use as a base course layer. ATB costs less than typical asphalt base course mixtures because it can be produced with less expensive aggregates and lower percentages of asphalt cement binder. The use of ATB can provide a waterproof layer to prevent fines infiltration into the subgrade and other pavement structures. The use of ATB mixtures can be advantageous in limiting problems associated with untreated granular base materials, such as segregation, and improve the roadway smoothness and the speed of construction.

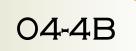
Currently, the Louisiana Department of Transportation and Development (LADOTD) considers the ATB mixture as one alternative of five types of class I and II base course layers. However, the specifications for ATB mixtures are similar to those required for binder and wearing asphalt mixtures. It is noted that there is no well-defined procedure available for the design of low cost ATB mixtures, other than those based on recipe type approaches. Thus, the use of ATB mixtures as base course layers is limited at the present time. This project will evaluate the mechanical and physical properties of ATB mixtures using fundamental engineering tests.

OBJECTIVES

The primary objective of this research is to develop a simplified design methodology for ATB mixtures that are durable, stable, and cost effective through the examination of the performance of mixtures that have a different aggregate gradation from typically available sources.

A secondary objective of this research is to compare the performance of ATB mixtures to untreated granular base materials currently used in the construction of base layers in Louisiana, and evaluate the cost effectiveness of using ATB as an alternative to those materials.

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METHODOLOGY

The research objectives will be accomplished in two parallel phases. Phase I will develop a simplified design methodology for ATB mixtures through a comprehensive laboratory program. The fundamental tests that are used to evaluate the performance of ATB mixtures include: load wheel tracking, semi-circular bend, indirect tensile strength, dissipated creep strain energy, dynamic modulus, flow number, and flow time tests. In addition, the mechanistic tests selected to evaluate the performance of untreated granular base materials are: resilient modulus test and single stage repeated load triaxial (SSRLT) test. It is worth mentioning that the SSRLT test is similar to the flow number test that will be conducted on ATB mixtures.

Phase II of the project will demonstrate the production and constructability of the proposed ATB mixtures from ongoing field projects as compared to conventional base course materials. In addition, the performance of field projects containing ATB mixtures will be examined through in-situ as well as laboratory mechanistic tests from field cores and plant mixed laboratory compacted samples.

IMPLEMENTATION

A simplified design methodology will be recommended for obtaining a low-cost, structurally stable, and durable ATB mixture, potentially leading to improved pavement performance and cost savings. This study provides a unique opportunity to examine the laboratory limits of durability in hot mix asphalt (HMA) materials in addition to potential cost savings.



Figure 1 Semi circular bend test setup



Figure 2 Dynamic modulus test set up

Louisiana Transportation Research Center sponsored jointly by the Louisiana Department of Transportation & Development & Louisiana State University 4101 Gourrier Avenue Baton Rouge, LA 70808-4443

For more information about LTRC's research program, please visit our Web site. www.ltrc.lsu.edu