Research Project

04-2B

Capsule

Technology Transfer Program

LTRC

April 2004

Evaluation of HMAC Longitudinal Joint Construction in Louisiana

Start Date: 1/1/2004
Duration: 24 months
Completion: 12/31/2005
Funding: SP&R

Principal Investigator:
Samuel B. Cooper, Jr., P.E.
Bituminous Materials Research Engineer, LTRC

Co-Principal Investigator:
Louay N. Mohammad, Ph.D.
LTRC
Civil & Environmental Engineering Department, LSU

LTRC Contacts

Administrative:
Harold "Skip" Paul, P.E.
Assoc. Director, Research
(225) 767-9102

Technical:
Chris Abadie, P.E.
Materials Research Administrator
(225) 767-9109

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

Problem

A longitudinal joint is formed when two pavement lanes are constructed adjacent to each other. For hot-mix asphaltic concrete (HMAC) pavements, low density at the interface between adjacent lanes can result in distresses such as separation, cracking, and raveling.

The density of a HMAC longitudinal joint area has been found to be two to three percent lower than the adjacent paving lanes. Lower density indicates higher void content, and longitudinal cracks often develop in the joint area, permitting moisture and air infiltration of the pavement structure. Such infiltration accelerates aging of the hot mix materials.

Poor bonding at the interface between adjacent lanes can also aggravate and accelerate pavement distresses. To address the bonding issue, LADOTD specifications require coating HMAC longitudinal joints with an approved tack coat material.

Objective

The primary objective of this study is to evaluate the influence of different tack coat materials on

Asphalt pavement construction

longitudinal joint density and permeability.

A secondary objective of this study is to ascertain the relation between the interlayer bond shear strength and the quality of the longitudinal joint as measured by density and permeability.

Evaluation of various compaction techniques is not an objective of this research, since previous documentation has established recommended compaction procedures.

Description

This research will determine the influence of tack coats with regard to density and permeability. Each of the three construction projects selected for this study will have four one-mile test sections. During construction of the longitudinal joints, two of the test sections for each project will use an un-modified emulsion tack coat, while the other two test sections will have a polymer-modified emulsion tack coat.

Current LADOTD specifications do not require tamping of the longitudinal joint during construction. This study will include tamped and un-tamped longitudinal joints.

Implementation Potential

The specific aim of this study is to recommend revisions to the current specifications for longitudinal joint construction based on field performance data (density, permeability, bond shear strength). The revised specification will provide for a well-constructed and bonded longitudinal joint, minimizing the effects of pavement distresses at the joint interface and resulting in a longer life expectancy for the roadway.