Summary of Final Report, BC354-021
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EVALUATION OF SUPERPAVE AND MODIFIED SUPERPAVE MIXTURES BY MEANS OF ACCELERATED PAVEMENT TESTING (PLANNING & DESIGN PHASE)

PROBLEM STATEMENT

FDOT started the use of Superpave mixtures on its highway pavements in 1996. Modified binders have also been used in some of the Superpave mixtures in an effort to increase the cracking and rutting resistance of these mixtures. Due to the short history of these mixtures, it is still too early to assess their long-term performance or the benefits from the use of modified binders. Research into these issues is needed so that the Superpave technology and the selection of modified binders can be effectively applied.

OBJECTIVES

The purpose of this study was to evaluate the long-term rutting performance of Superpave mixtures and SBS-modified Superpave mixtures using the recently acquired Heavy Vehicle Simulator (HVS), now functional at the State Materials Office, Accelerated Pavement Testing facility.

FINDINGS AND CONCLUSIONS

Three different pavement designs were respectively incorporated in the test tracks constructed for this study: (1) two 2-inch lifts of unmodified Superpave mixture, (2) two 2-inch lifts of SBS-modified Superpave mixture, and (3) one 2-inch lift of SBS-modified Superpave mixture placed over a 2-inch lift of unmodified Superpave mixture. All mixtures were compacted to 93±1% of maximum theoretical density.

The test tracks consisted of seven test lanes. Each test lane was divided into three test sections. One test lane was used for trial runs to evaluate the performance characteristics of the HVS and to determine the most effective test configuration to be used in the testing program. Another test lane was set aside for additional testing deemed necessary or desirable at the end of the main testing program. The main testing program was run on five test lanes with a total of fifteen test sections. Five of the fifteen sections are being loaded exposed to the environment while the remaining sections will be tested under controlled temperature conditions.

Type K thermocouples were installed at various locations in the test pavements to monitor the temperature distribution in the test pavements. For each test section, three thermocouples were placed on top of the base course, three were placed on top of the first lift of asphalt mixture, and

two were placed on the surface. These thermocouples were connected to a PC data acquisition system. Temperature readings were taken every 15 minutes and recorded by the PC during each test.

The placement of the asphalt mixtures on the test track began on October 17, 2000 and ended on October 18, 2000. Density measurements from nuclear density gauges and cores taken from the completed test pavements indicated that the density of the compacted mixture was within the target range for all lanes and lifts.

BENEFITS

This project addressed the construction phase of the test tracks related to a recently initiated study on the effects of polymer modification on the performance of a Superpave mixture using accelerated pavement testing. This phase of study will contribute to the overall effort to create better performing, longer-lasting asphalt pavement.

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