A STUDY OF FACTORS AFFECTNG THE PERMEABILITY OF SUPERPAVE MIXES IN KANSAS

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By: Aneel K. Gogula, Mustaque Hossain, Ph.D., P.E., and Stefan A. Romanoschi, Ph.D., P.E., all with Kansas State University

RESEARCH

Introduction

Development of a new system for specifying asphalt materials began in 1987 by the Strategic Highway Research Program (SHRP). The primary objective of the research was to improve the performance and durability of asphalt pavements in the United States. The final product of the SHRP asphalt research is a new system called Superpave, which is the short for **Su**perior **Per**forming Asphalt **Pave**ments. Superpave represents an improved system for specifying asphalt binders and mineral aggregates, developing an asphalt mixture design and analyzing and establishing pavement performance prediction [Superpave, 1995].

Project Objective

To study various factors that affect the permeability of Superpave pavements and to establish acceptable permeability limits for the Superpave mixtures in Kansas. Permeability evaluation of various coarse (with gradation passing below the maximum density line and restricted zone) and fine graded (with gradation passing above the maximum density line and above the restricted zone) Superpave mixes was conducted on Superpave gyratory compactor-compacted specimens.

Project Description

Twelve different Superpave mixtures were obtained from different paving projects, and laboratory permeability tests were conducted on the samples compacted using a Superpave gyratory compactor. Multiple regression analysis was used to identify different mixture parameters that influence permeability. Multiple Property Optimization was used to find the optimum permeability limits for the different mixtures used in this study. A field permeability study on a number of Superpave mixes was conducted in an attempt to correlate permeability values measured in the field, laboratory and the percent air voids of samples compacted in the laboratory.

Project Results

In general, for any given nominal maximum size Superpave mixture, the fine-graded mix was found to be less permeable than the coarse-graded mix. Percent material passing 600-micron sieve, asphalt film thickness and air voids play significant roles in determining permeability of 12.5 mm nominal maximum aggregate size Superpave mixtures. For 19 mm nominal maximum size Superpave mixtures, decreasing air voids in the mixture decreases water permeability.

Report Information

For technical information on this report, please contact: Mustaque Hossain, Ph.D., P.E, Associate Professor, Kansas State University, Department of Civil Engineering, 2118 Fiedler Hall, Manhattan, Kansas 66506-5000; Phone: 785-532-1576; Fax: 785-532-7717; e-mail: mustak@ksu.edu.

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