

# Durable Superpave Mixes in Kansas

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**Ananna Ahmed**  
**Syeda R. Aziz**  
**Nassim Sabahfar**  
**Mustaque Hossain, Ph.D., P.E.**

*Kansas State University Transportation Center*

## Introduction

Approximately 89% of 11,000 miles of Kansas roads are surfaced with asphalt. Hundreds of thousands of tons of reclaimed asphalt pavement (RAP) are produced annually in the United States, including in Kansas. This bulk volume of RAP must be economically managed in order to achieve environmental friendliness. Recycling of RAP conserves natural resources and reduces landfill usage. However, many agencies have reported that increased RAP content produces drier hot-mix asphalt (HMA) mixtures than virgin mixtures that are susceptible to premature cracking.



*Reclaimed Asphalt Pavement from Different Sources and with Various Gradations*

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## Project Description

In this research, laboratory-produced Superpave HMA mixtures containing increased percentages (20, 30, and 40%) of RAP materials from three RAP sources (Shilling Construction Co., Konza Construction Co., and the Kansas Department of Transportation project, US-73) were studied for cracking performance. Mix designs were produced using Superpave design criteria for 12.5-mm nominal maximum aggregate size mixture. The static and repetitive Semicircular Bending (SCB) test, the Texas Overlay Tester test, the dynamic modulus test, and Simplified Viscoelastic Continuum Damage (S-VECD) tests were performed on laboratory-prepared samples.

## Project Results

In general, cracking performance decreased with increased RAP content. The RAP from the US-73 project performed most consistently compared to other two sources of RAP. Test results were analyzed using two-way Analysis of Variance (ANOVA), proving that mixtures containing 4.5% to 4.9% binder performed the best against cracking. The RAP source was found to have more effect on cracking propensity than RAP content. Mixtures with RAP content up to 40% performed satisfactorily. Tukey's pairwise comparison method was used to compare results from all tests; S-VECD was determined to be the most appropriate test to evaluate cracking propensity of HMA mixtures.

## Project Information

For information on this report, please contact Mustaque Hossain, Ph.D., P.E.; Kansas State University, 2124 Fiedler Hall, Manhattan, KS 66506; (785) 532-1576 phone; [mustak@ksu.edu](mailto:mustak@ksu.edu).

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