Research Project: SP708B4E
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RESEARCH SUMMARY

Increasing Durability of Hot Mix Asphalt Pavements Designed with the Superpave System

Problem

Maryland SHA's concern with the lower asphalt levels in HMA mixes has led to efforts to explore strategies to increase the asphalt content in Superpave mixes.

Objectives

The first objective of this project was to examine the applicability of methods to SHA conditions identified in national studies on adjusting binder content without compromising rutting performance of asphalt mixtures. The second objective was to address the differences in HMA properties that have been observed over the years between samples taken at the plant versus behind the paver, and finally, to evaluate the potential risks to both SHA and contractors through pay factor analysis.

Description

The findings of national studies on adjusting binder content without compromising rutting performance of asphalt mixtures were examined and used in the recommendations of this project. The analysis included a review of the quality control (contractor) and quality acceptance (agency) data for HMA materials and an assessment of the risks and pay factor implications using the SHA data from 2002 to 2007. Statistical analysis was performed to compare contractor and agency data at the plant and from the roadway ("behind the paver"). The research team then developed the Operating Characteristic (OC) curves based on the QA data and for estimating the risks to SHA and contractors (Type I and II risks). With the aid of a new simulation tool the associated pay factors were analyzed using the population characteristics and considering potential correlations between the HMA mix parameters.

Results

It was concluded from this study that a simple reduction in N_{design} is not necessarily the most effective way of achieving increased mix durability. Thus specific follow up actions were identified to assess the effectiveness of the specification. The statistical analysis has shown that the QA and QC data represent different populations. The simulation analysis has shown that the revised specifications provide acceptable pay factors for material of acceptable quality levels. Recommendations were provided for fine tuning the specification and monitoring its response as HMA production goes on year after year in Maryland.

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