

Research Summary

Support for Balanced Asphalt Mixture Design Specification Development in Missouri

The primary objective of the study conducted herein was to assist MoDOT in the development of a balanced mix design asphalt specification in Missouri. At the onset of the study, a detailed climatic study was conducted. This research task produced data that can be used in the future to tailor the performance-based specification developed herein for the various climatic regions that exist in Missouri.

Next, asphalt performance testing was carried out across a range of temperatures to establish property-temperature relationships. Eleven mixtures were tested using the Disk-Shaped Compact Tension Test (DCT) across a range of low temperatures, while the Hamburg Wheel Tracking Test (HWTT) was conducted across a range of high temperatures. Mixture testing was carried out on both plant-produced mixtures and field cores. Two additional cracking tests were investigated in this portion of the study: the Illinois Flexibility Index Test, or I-FIT, and the IDEAL cracking test. Field performance data from MoDOT's pavement management database was extracted to assist with the development of specification thresholds for the cracking and rutting tests investigated.

For BMD specification development, a novel approach was taken herein whereby



recommended specification thresholds were introduced for all three cracking tests currently under investigation in Missouri and across the Midwest (DC(T), I-FIT and IDEAL). While the current study focused on mainline, high-type mixes, preliminary recommendations for shoulder mixes and other low traffic paving applications are provided, which may be of interest in larger urban areas and for municipal projects where closer control of asphalt performance via testing and materials investment is of concern. To this end, the recently developed Illinois Tollway asphalt mix design specification was used to establish initial specification thresholds for non-surface and non-mainline (shoulder) paving lifts in Missouri. Stone-Matrix Asphalt mixes were not considered in this study.

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The recommended tests and thresholds provided herein should be viewed as preliminary and can be adjusted based on practical considerations and stakeholder discussions in a consensus process. Further validation of the proposed BMD tests and limits via long term field monitoring or



testing on a controlled test road or test track facility is highly recommended. Additional work to apply the recommended BMD to quality control specifications and performance-related quality assurance specifications in a practical manner is also recommended. Attention to sample procurement and reheating should be included, as well as testing standardization, repeatability, and balancing of specification risk between the contractor and the owner agency.



Figure 1: Field coring sample taken in Madison, Monroe County, Missouri

Project Information

PROJECT NAME: TR201811—Support for Balanced Asphalt Mixture Design Specification Development in Missouri

PROJECT START/END DATE: May 2017-June 2020

PROJECT COST: \$283,609

LEAD CONTRACTOR: University of Missouri-Columbia

PRINCIPAL INVESTIGATOR: Bill Buttlar

REPORT NAME: Support for Balanced Asphalt Mixture Design Specification Development in Missouri

REPORT NUMBER: cmr 20-010

REPORT DATE: September 2020

Project Manager



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