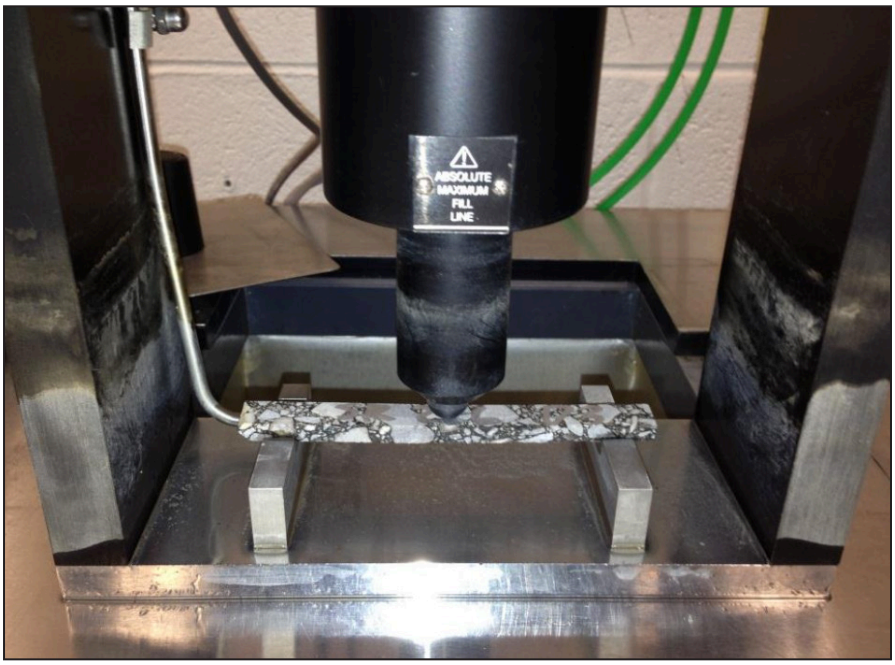
MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 22-465 (project 546) | July 2022

Field Performance of Asphalt Pavements at Low and Intermediate Temperatures



the **ISSUE**

Highway agencies have been seeking practical tests to provide a performance balance and increase mix durability. Asphalt mixes now contain recycled asphalt pavement and less asphalt binder in an attempt to resist rutting and save on materials; however, these mixes have resulted in increases in cracking and raveling in pavements. Development of performance-related specifications for asphalt mixtures requires knowledge regarding the range of properties of the materials being produced. Furthermore, changes due to short-term aging must be quantified for accurate predictions.

the **RESEARCH**

This research evaluates selected asphalt mixtures for low-temperature cracking and intermediate temperature fracture energy to ensure that the addition of a low-temperature test will not affect the high temperature performance or the durability of pavements. Asphalt mixtures were collected at seven different plants from the slats after mixing and at laydown from the windrow. The mixtures were considered representative of the material produced in the state of Utah. The mixtures were compacted in three different labs and tested at low and intermediate temperatures using the bending beam rheometer (AASHTO TP125-16) and the semi-circular bend test configuration (AASHTO TP124-16). The creep modulus and relaxation capacity were determined at low temperatures and the flexibility index was measured at intermediate temperatures. Both tests provided insight as to the potential performance of the mixtures.

MOUNTAIN-PLAINS CONSORTIUM REGION 8

A University Transportation Center sponsored by the U.S. Department of Transportation serving the Mountain-Plains Region. Consortium members:

Colorado State University
North Dakota State University
South Dakota State University
University of Colorado Denver
University of Denver
University of Utah
Utah State University
University of Wyoming

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Project Title

Field Performance of Asphalt Pavements at Low and Intermediate Temperatures

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the **FINDINGS**

The low-temperature performance of asphalt mixtures can be determined by using the bending beam rheometer based on established limits. Similarly, the flexibility index of asphalt mixtures can be used to measure differences in expected performance at intermediate temperatures once the material is placed in the field, although the variability in the results still needs to be addressed. For both of these tests, it is important that the aging process that occurs during mixing and compaction be accounted for.

the **IMPACT**

Adoption of performance-related tests will allow highway agencies to select asphalt mixtures for optimal performance, thus significantly reducing maintenance costs.

For more information on this project, download the Main report at https://www.ugpti.org/resources/reports/details.php?id=1086

For more information or additional copies, visit the Web site at www.mountain-plains.org, call (701) 231-7767 or write to Mountain-Plains Consortium, Upper Great Plains Transportation Institute, North Dakota State University, Dept. 2880, PO Box 6050, Fargo, ND 58108-6050.