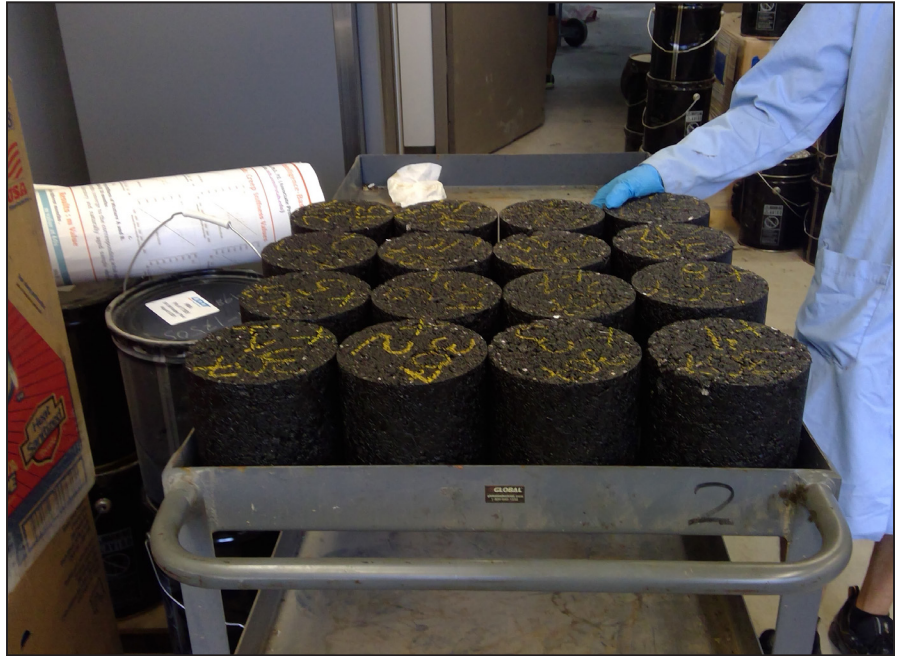


MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 23-492 (project 589) | February 2023

Variability of the IDEAL-CT Test for Pavement Cracking to Achieve a Balanced Asphalt Mix Design



the ISSUE

Many transportation agencies have adopted the IDEAL CT as a test to help prevent fatigue cracking in asphalt concrete pavements. However, the within- and between-lab variability has not been assessed. Knowing the variability of the results is necessary to develop a specification.

the RESEARCH

Asphalt mix was collected from three different plants and distributed to three different labs. Standard protocols were used to handle the material as well as the sample compaction. Samples were compacted to target air voids of $7\% \pm 0.5\%$ and heights of 62 mm and 75 mm. Testing was done within 20 hours of compaction and all three laboratories used the same brand of servo-hydraulic equipment. The CT index of each sample was determined and used for analysis to determine the within-lab and between-lab variabilities. Given the results, an assessment of the suitability of the test for practical applications was done.



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University of Utah

Utah State University
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Project Title

Use of the IDEAL-CT Test
for Pavement Cracking to
Achieve a Balanced Asphalt
Mix Design

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the FINDINGS

The within- and between-lab variabilities were studied as well as a number of factors likely to cause variability. It was found that the test could be repeated within laboratory within a coefficient of variation (CV) of 15% and between laboratories within a CV value of 20% using properly trimmed results. Preparation and testing of four replicate samples are recommended, with the result farthest from the mean discarded if the variability exceeds the 15%. It was found that if the number of gyrations exceeded the Ndes (number of design gyrations – a measure of compaction) of the mixtures, some aggregates could be broken, causing the variability to increase. In those cases, preparation of thicker samples is recommended. Finally, it was found that the IDEAL-CT test meets many requirements for a quality control test; however, no correlation between higher CT index and greater durability was identified in this study.

the IMPACT

Millions of dollars are spent every year in maintenance due to premature cracking observed in asphalt concrete road surfaces. Having a test with known repeatability that can easily and reliably evaluate the potential of asphalt mixtures for cracking will result in significant savings. This research is a step toward development and implementation of such a test.

For more information on this project, download the Main report at <https://www.ugpti.org/resources/reports/details.php?id=1117>

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.



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