



# FACT SHEET

## NETC 15-3: Moisture Susceptibility Testing for Hot Mix Asphalt Pavements in New England

### RESEARCH PROJECT TITLE

*NETC 15-3: Moisture Susceptibility Testing for Hot Mix Asphalt Pavements in New England*

### STUDY TIMELINE

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### PRINCIPAL INVESTIGATOR

Eshan V. Dave

Associate Professor  
University of New Hampshire  
33 Academic Way, Durham NH 03824  
603-862-5268  
[Eshan.Dave@unh.edu](mailto:Eshan.Dave@unh.edu)

### NETC CONTACT

Hannah Ullman  
NETC Coordinator  
University of Vermont  
Transportation Research Center  
210 Colchester Avenue  
Burlington, VT 05405  
802-656-1306  
[netc@uvm.edu](mailto:netc@uvm.edu)

### MORE INFORMATION

<https://www.newenglandtransportationconsortium.org/wp-content/uploads/NETC-15-3-Final-Report.pdf>

The New England Transportation Consortium, a cooperative effort of the transportation agencies of the six New England States, funded this research. Through the Consortium, the states pool professional, academic and financial resources for transportation research leading to the development of improved methods for dealing with common problems associated with the administration, planning, design, construction, rehabilitation, reconstruction, operation and maintenance of the region's transportation system.

The NETC is hosted by the University of Vermont Transportation Research Center



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### Introduction or What was the Problem?

Moisture damage in asphalt mixtures is a common and challenging distress for pavements in wet climates such as New England. When exposed to external moisture through rainfall or flooding, the moisture will work its way into the permeable voids of the asphalt where it can weaken the internal bonds of the material, leading to the formation of damage in the pavement, requiring costly repair or maintenance.

Moisture damage is typically addressed with laboratory tests as a part of the mixture design process where the main point of the test is to determine the potential for the material to experience moisture related damage, known as moisture susceptibility. The long established standard moisture susceptibility test method, AASHTO T-283, has been widely criticized concerning its ability to accurately and reliably predict field results. The primary objective of this research is to evaluate multiple different moisture susceptibility test methods to determine the most reliable and accurate replacement for current test methods in New England.



### Methodology or What was done?

A total of ten asphalt mixtures with varying historical performance in terms of moisture damage (poor, moderate, and good) were sampled and tested using various existing moisture susceptibility test methods including AASHTO T-283 with standard vacuum and Moisture induced Stress Tester (MiST) conditioning, Dynamic Modulus (AASHTO T-342) with MiST conditioning, the Hamburg Wheel Tracker (AASHTO T-324) and other non-destructive and destructive mechanical tests. Results from these tests were analyzed and evaluated to determine which test is best able to predict the mixtures field performance in comparison to historic field performance and data.

### Conclusion or What are the next steps?

The main conclusions and takeaways from the results of this study are as follows:

- Traditional moisture susceptibility testing using AASHTO T-283 (regardless of conditioning method) did not show good connection between field and laboratory results, making this an unideal test for mixture design. These findings reflected the experience of New England agencies
- Both Dynamic Modulus and the Hamburg wheel tracker showed much clearer and consistent relations between field and lab results. While Dynamic modulus hold promise as it can be paired with pavement design to mechanistically predict performance and life cycle costs, the Hamburg is the preferred option of the two for mixture design considering it is more practical, simpler, and more readily available for agency usage in New England.
- The ultra-sonic pulse velocity (UPV) non-destructive test showed very promising result to serve as a low cost test procedure as a screening test to identify poor performing materials during mix design.



### What are potential impacts?

The recommendations from this study provide suitable replacements for current moisture susceptibility tests method in New England. Ideally, using the Hamburg wheel tracker as the primary moisture evaluation test, agencies will lower potential for premature roadway failures and will have more reliable way to identify moisture susceptible materials. Furthermore, this test will also provide performance inputs for future performance engineered mix design initiatives.