MATC
MOBILE ASPHALT TECHNOLOGY CENTER

U.S. Department of Transportation
Federal Highway Administration

MATC Motivating Innovation Around the Nation: Vermont

Introduction

The Vermont Agency of Transportation (VTrans) wanted to explore stone matrix asphalt (SMA) as a pavement treatment to improve durability of highways in cold climates, including to withstand rutting from studded tires and high volumes of heavy trucks. A segment of a Sharon-Bethel I-89 project in 2021 provided an opportunity for first placement.

Discussions with the Federal Highway Administration (FHWA) in March 2021 to help develop specifications for the placement led to a plan for the FHWA Mobile Asphalt Technology Center (MATC) and technical support team to come to Vermont that June. The visit's primary goal was to assist VTrans in evaluating the state's first SMA mixture and comparing it with the state's standard dense-graded surface mixture.

Source: FHWA

MATC Visit Details

- VTrans Maintenance Garage, Royalton, VT
- June 11 to July 2, 2021
- Project: I-89, on test sections, in both directions
- Evaluation of a new stone matrix asphalt mixture, compared to a standard VTrans surface mix

MATC Activities in Vermont

In advance of the visit, MATC staff conducted an independent review of draft specifications for the properties and in-place compaction of the new "stone matrix bituminous concrete pavement" (SMBCP) mix. SMBCP is the term used by VTrans for SMA mixtures.

The MATC then set up at a VTrans District 4 facility in Royalton, about a mile from the I-89 project site. While on site, the MATC team applied various pavement tests to field-produced samples of the SMA and the state's standard asphalt surface mix, working alongside VTrans staff and paving crews. Sample cores pulled from the pavement test sections were brought to the nearby mobile lab for analysis. Testing activities included:

- Ignition, gradation, and volumetric tests to analyze mixture properties.
- Dynamic modulus to collect data on mixture stiffness and temperatures.
- Indirect tensile cracking (IDEAL-CT) and I-FIT tests for cracking susceptibility as well as the IDEAL-RT, Stress Sweep Rutting, and Hamburg Wheel Track Test for rutting susceptibility.
- Pulse induction device for lift thickness, laser texture scanner for pavement macrotexture, and paver-mounted thermal profiler (PMTP) for mat temperatures behind the paver.

Other MATC support included:

- A one-hour virtual open house presentation.
- Daily tours and demonstrations of the MATC laboratory facilities and equipment.

Outcomes of the MATC Visit

After the visit, VTrans researchers described these results from hosting the MATC team:

- Received direct technical support and experience of MATC team during the SMBCP placement. This included help resolving issues when the paving contractor needed modifications to the requirements and reassurance about how the placed material should look.
- The PMTP helped VTrans to immediately identify low placement temperatures as a result of the two-hour haul time and to make real-time operational adjustments. The paving contractor switched to using more live-bottom than end dump trucks to help keep the material warmer.
- Received substantial information on the SMBCP to proceed with future trials of SMA. VTrans continues to monitor long-term performance of the I-89 segments treated with the piloted mix and to prepare to implement SMA into its pavement program.
- Received assistance in achieving balanced mix design goals, including improved cracking and rutting performance. The convenience of the laboratory and MATC technical support enabled additional balanced mix design tests at greater frequency.
- Opened the door for Vermont participation in FHWA research on macrotexture, a characteristic of pavement surfaces that enhances skid resistance. VTrans followed up with FHWA on continuous friction measurement type testing and joined a pooled study on friction.
- Three follow-up events with VTrans that were conducted by MATC staff:
    - Workshop on balanced mix design implementation
    - Workshop on Quality in the Asphalt Paving Process in Berlin, VT, January 25–27, 2022
    - Virtual meeting to discuss recommendations from the MATC specifications review

Using the PMTP. Source: VTrans

It was "highly valuable for the MATC team to be available for consultation as we were drafting the specification for the SMA mixture, revising the specification, and then piloting construction.

We gained more information and are more ready to use SMA again because of the support."

Ian Anderson, Construction and Materials Bureau, VTrans

The VTrans Construction and Materials team also developed a presentation and other materials based on site visit, including these publications:

- Presentation for the 2021 VTrans Vermont Research and Innovation Symposium and annual State Transportation Innovation Council (STIC) stakeholder meeting. https://vtrans.vermont.gov/planning/research/2021-symposium/cm3
- VTrans fact sheet: "Stone Matrix Asphalt and Advancement of Pavement Testing." https://vtrans.vermont.gov/sites/aot/files/2021%20FACT%20SHEET%20-%20508%20compliant_SMA.pdf

How can the MATC help in your state? Learn more at www.fhwa.dot.gov/matc