massDOT
Massachusetts Department of Transportation

Transportation Research Quarterly

Providing highlights of MassDOT's transportation research activities and other helpful information **2025 Q4**

Focus on Research

"There's a reason the rearview mirror is so small, and the windshield is so big"

- Unknown

INSIDE THIS ISSUE

2025 Year in Review

Accomplishments in prior year for the Research Section:

- Engaged in scoping and contracting coordination efforts between research project principal investigators (PI) and project champions (PC).
- Procured and/or administered all SPRII-funded research agreements (and/or contracts) with research entities.
- Performed project development and management for all SPRII-funded research projects.
- Coordinated the review and prioritization of statements for new FFY25 projects.
- Coordinated initial scope discussion and PI identification approach with agency technical leads for the FFY25 research projects.
- Produced FFY24 Research & Tech Transfer Annual Report.
- Produced four MassDOT Research Quarterly Newsletters.
- Updated MassDOT research website with new contents regularly.
- Conducted web-based project completion survey with project champions, principal investigators and project managers for thirteen projects completed in 2024 to collect feedback and information on how the research process can be improved and research results have been/are to be utilized and implemented.
- Prepared quarterly reports on the status of research and training programs.

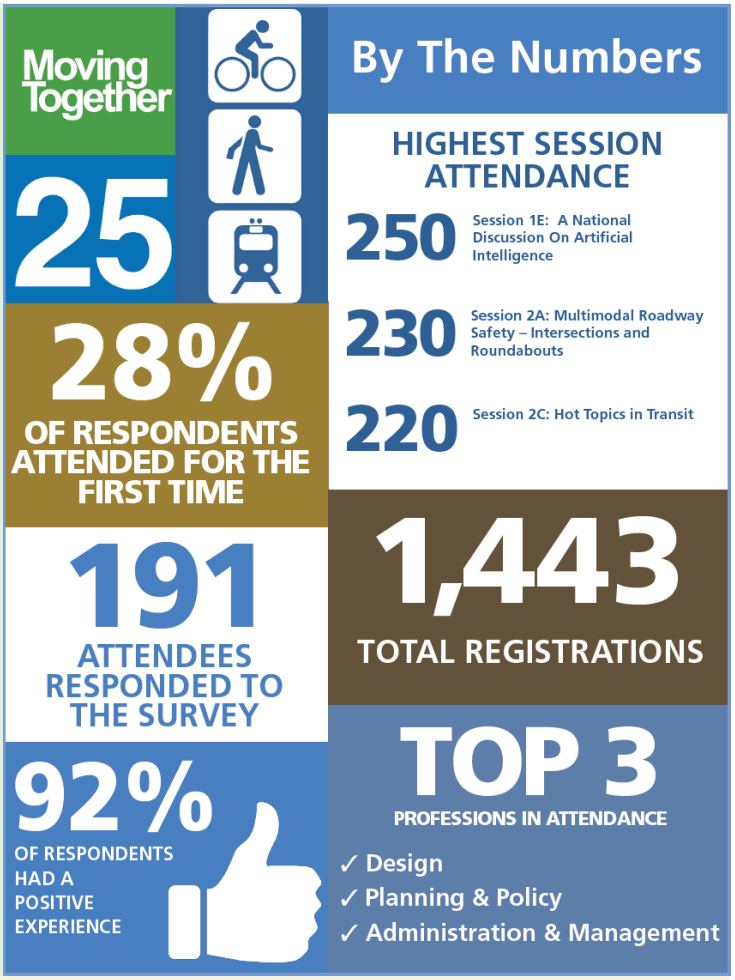
Annual MassDOT Moving Together Conference 2025

Annual MassDOT Moving Together Conference Report

Every year, the Moving Together Conference brings together transportation leaders and individuals involved in the areas of transportation safety, planning, public health, bicycling, walking, transit, advocacy, education, law enforcement, and elected office. The conference sessions and speakers cover numerous related topics, sharing successful initiatives and programs, along with new tools and resources, and discussing strategies for addressing continuing challenges.

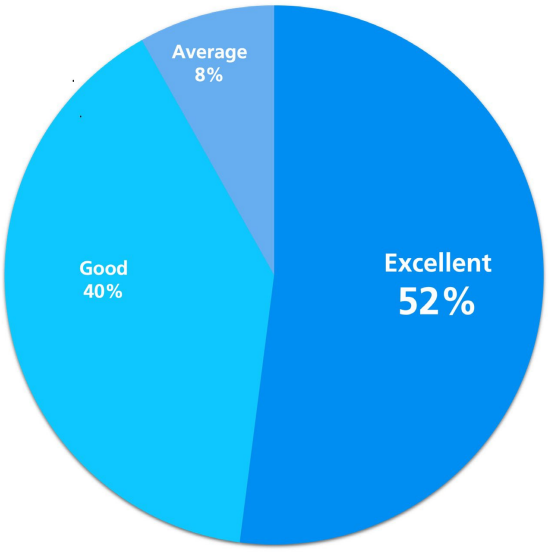
This year, Richard Davey, Chief Executive Officer for the Massachusetts Port Authority, and former Massachusetts Secretary of Transportation (2011-2014), gave the opening plenary. The lunchtime keynote was given by Jonathan Gulliver, Undersecretary of Transportation and State Highway Administrator for MassDOT. The lunch session also included the showing of the finalist entries in the annual Safe Streets Smart Trips High School Video Contest and presentation of awards to the winning students.

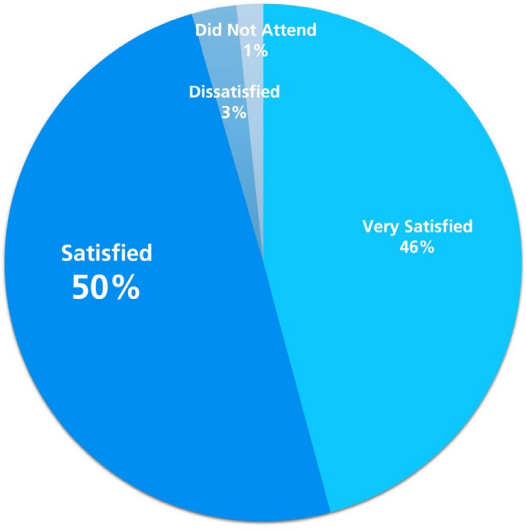
The conference included 18 panel sessions, two site visit sessions to view nearby pedestrian, bicycle, and transit infrastructure and projects, and 64 exhibitors/sponsors. The panel sessions with the highest attendance were the following: A National Discussion on Artificial Intelligence, Multimodal Road Safety – Intersections and Roundabouts, and Hot Topics in Transit.



Overall Conference Experience: 92% of respondents had a positive experience

Satisfaction with Sessions: 95% of respondents were very satisfied or satisfied





Completed Research Project Highlights

Effect of Asphalt Binder Source on Asphalt Mixture Performance

Recent research has shown that transportation agencies are increasingly experiencing premature failures of some of their asphalt mixtures that did not fail previously. Some reasons that might attribute to these failures include: variability in the source of the base binder used to produce the mixture, switching to a different binder supplier during production as compared to the mixture design phase, and suppliers using different modifiers and/or additives with a base binder to meet the target Performance Grade.

The main objective is to assess the implications of changes in asphalt binder formulation and source during mix design and production. The following research objectives were established:

1. Determine which binder properties display significant variations between different production lots and sources.
2. Determine which changes in binder properties alter a mixture's laboratory performance.
3. Perform life cycle cost analysis.
4. Establish specifications for allowable binder property tolerances.

The study successfully identified point and shape rheological parameters, the effectiveness of the selected rheological parameters was validated through the Indirect Tensile Asphalt Cracking Test (IDEAL-CT). The combination of G-R at 15°C and 10 rad/s and the phase angle at a modulus of 10 MPa parameters, along with the development of a simplified testing method, offers a practical and efficient framework for evaluating asphalt binder's performance in terms of their resistance to intermediate-temperature cracking. Integrating these tandem parameters with the simplified DSR method into Balanced Mix Design (BMD) and quality assurance can improve binder selection and reduce cracking, particularly when binder sources or formulations change without altering the Performance Grade (PG).

A Look at Who We are – Team Highlights

Each MassDOT research project team is comprised of a Project Champion(s), a Principal Investigator(s) and a Project Manager. The Project Champion serves as the MassDOT technical representative, the Principal Investigator conducts research investigation and produces deliverables per project scope and schedule, and the Project Manager takes charge of the overall project administrative management and coordination. Highlighted below are the key members of "Effect of Asphalt Binder Source on Asphalt Mixture Performance" project team. This project was managed by project manager Patrick McMahon from our research team.

Principal Investigator – Walaa Mogawer, PhD

Dr. Walaa Mogawer is a Professor of Civil Engineering and the Director of the Highway Sustainability Research Center at the University of Massachusetts Dartmouth. He has over 32 years of research and practical experience with all aspects of asphalt pavements including pavement materials, design, preservation, and management. His current research efforts include balanced mixture design of pavements, increased environmental stewardship in pavements through increased use of recycled materials and innovative technologies, high performance thin lifts, pavement asset management, and improving the resiliency of roads against extreme weather events like flooding and rising sea levels. Dr. Mogawer is a member of the Association of Asphalt Pavement Technologists (AAPT) and Transportation Research Board Committee AKM 10 "Production and Use of Asphalt." Dr. Mogawer is a fellow of ASCE and a registered professional engineer in Massachusetts and Rhode Island.

Co-Principal Investigator – Geoffrey Rove

Dr. Rowe is the president and CEO of Abatech Inc which conducted pavement engineering projects around the world from its headquarters location in Pennsylvania, USA. Abatech has developed software packages for pavement engineering which are used around the world. The technology includes pavement structural design, analysis of FWD data, materials property analysis and rheology. Dr. Rowe leads several research efforts in rheology and the fracture of asphalt with funding from industry and government sources. Dr. Rowe is a licensed Professional Engineer in New Jersey, Pennsylvania and Florida. In addition, he is a Chartered Materials Engineer in the United Kingdom.

Project Champion – Edmund Naras

Edmund Naras is the Pavement Management Engineer at the Highway Division. He obtained his B.S. in Civil Engineering from Wentworth Institute of Technology and a JD from UMass-School of Law in Dartmouth. Ed has been with MassDOT for 32 years, 31 of which have been in the Pavement Section and one year as a litigator in the General Counsel's office. He is a strong advocate for the increased use of Recycled Asphalt Pavement (RAP) and other recycling initiatives such as the use of ground tire rubber in asphalt, pavement reclamation and in-place pavement recycling. MassDOT is among the nation's leaders of Warm Mix Asphalt technologies, first using this technology on Interstate highway pavements in 2005.

News and Events

105th TRB Annual Meeting
Registration now Open
Washington, D.C.
happening January 11–15, 2026.

massDOT Innovation Webinar Series

Speed Management Guidance on Massachusetts Roadways
December 4, 2025
Effective speed management is a critical component of creating safer and more livable streets. This presentation will explore why managing vehicle speeds is essential for reducing crashes, improving safety outcomes, and supporting multimodal transportation goals across Massachusetts.
Click here for the webinar recording

Measuring Access to Improve Public Health – Phase II
October 22, 2025
This study advances transportation access metrics that support public health planning across Massachusetts. Building on Measuring Access to Improve Public Health Phase I, which focused on food access, Phase II expands the scope to include healthcare, higher education, and parks. This research improves methods to account for walkability, bikeability, and the role of microtransit alongside fixed-route transit.
Click here for the webinar recording

3D Printing Applications for Transportation Infrastructure Construction & Maintenance
September 18, 2025
This webinar showcases 3D printing applications in the transportation sector. With the Phase I report of this research completed in 2022; the Phase II report completed in 2024, and the Phase III research underway, the MassDOT 3D Printing Applications for Transportation Infrastructure Construction & Maintenance reports provide innovative, technology transfer results the Commonwealth could utilize.
Click here for the webinar recording

Research Resources

In Progress MassDOT Research

	Start Date
Evaluating the Effectiveness of Drivers' Education Modules on Safety	April 2023
3D-Printed Lattice-Based Structures for Next Generation Bridge Bearings and Bridge Isolation Bearings	April 2023
Cracks of Low-P Rapid Set Concrete in Deck Repairs: Analysis, Prevention, and Alternatives	December 2024
MassDOT Speed Regulation Editing Support	January 2025
Environmental Scan of Community Transit Needs Among Older Adults in Massachusetts	February 2025
Development of a Salt Spreader Controller Program Using Machine-Sensed Roadway Weather Parameters II	February 2025
Advanced Technologies and Data Analytics for Safe, Smart, and Efficient Transportation (ASSET)	April 2025

Recently Completed MassDOT Research

	Completion Date
Artificial Intelligence Framework for Midblock Crosswalk Detection Across Massachusetts	February 2024
Using Traffic Signals to Reduce Speeding Opportunities	February 2024
Smart Work Zone Safety Control and Performance Evaluation	May 2024
LIMMS Development Planning	July 2024
Development of a Salt Spreader Controller Program	July 2024
3D Printing Applications for Bridge Element Repair	August 2024
Data-Driven Approaches for Transit Capital Planning	August 2024
Cross-Modal Assessment of Sustainable Transportation Networks	August 2024
Evaluating Safety Impacts of Two-stage Bike Boxes	August 2024
Development of Improved Inspection Techniques Using LIDAR for Deteriorated Steel Beam Ends	August 2024
Evaluation & Mitigation Methods for the Prevention of Cement Concrete Deterioration due to Pyrrhotite	September 2024
Accessible Bus Stop Design in the Presence of Bike Lanes	September 2024
Speed Management and Emergency Response – A Synthesis Study	September 2024
Post-Fire Inspection of Concrete Structure Phase III- In-Situ Experiments	December 2024
Methods to Identify Problematic Carriers and Prevent Infrastructure Damage	December 2024
Tree Preservation and Planting for Complete Streets Development	June 2024
Fare Payment Compliance on MBTA Buses and Light Rail	October 2024
A Pavement marking Inventory and Retroreflectivity Condition Assessment Method Phase II	February 2025
Measuring Food Access to Improve Public Health Phase II	July 2025
Recycled Ground-Glass Pozzolan (RGGP) for Use in Cement Concrete	July 2025
Implementing AASHTO Mechanistic-Empirical Pavement Design Guide Phase III	September 2025
Field Study to Determine Salt Usage Efficiency on Two Pavement Types	September 2025
Effect of Asphalt Binder Source on Asphalt Mixture Performance	October 2025

Additional Resources

Transportation Research and Information Database (TRID) is a comprehensive bibliographic database containing more than 1.2 million records of transportation research.

Research in Progress (RiP) Database contains information on more than 13,000 current or recently completed federally-funded transportation research projects.

AASHTO Publications include the most accepted technical guides, specifications, and manuals of the industry.

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