

Transportation Research Quarterly

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

2026 Spring

Focus on Research

The MassDOT Research and Technology Transfer Program supports the transportation research needs of MassDOT, the MBTA, and the broader Commonwealth community by advancing applied research that improves the safety, performance, and efficiency of the transportation system.

INSIDE THIS ISSUE

MassDOT Research

Look ahead 1

News 2026 2

TRB Annual Meeting
FHWA Technology Transfer Awards

Research Project Highlights 3

Recycled Ground-Glass Pozzolan (RGGP) for Use in Cement Concrete- and Comparison with Other Alternative Constituent Materials

Project Team Highlights 4

News and Events 5

MassDOT Innovation Webinars

Research Resources 6

In-Progress MassDOT Research
Recently Completed MassDOT Research
Additional Resources

Contact Us 6

2026 Year a look ahead

In FFY 2026, the Research Development and Technology Transfer (RD&T) Program will continue to focus on research and technology transfer efforts that deliver clear value to MassDOT and the traveling public. Key priorities include completing ongoing research projects and initiating new studies that respond to emerging needs related to safety, resilience and system performance. RD&T will place increased emphasis on implementation by working closely with project champions to ensure research findings are accessible, understandable and ready for use in practice. Technology transfer activities will continue to expand through conferences and targeted training courses, with a focus on reaching a broad audience across the agency and its partners. The program will also continue to strengthen data-driven decision-making by supporting research that improves the use of data, analytics and performance measures. Through management of SPR II funds and continued collaboration with FHWA and stakeholders, RD&T will remain a key resource in helping MassDOT meet its mission and adapt to future transportation challenges across the Commonwealth.

Research team prepared and published the [2025 Annual Report](#)

MassDOT research in 2025 at a glance

- Projects delivered: 6 projects were completed
- Projects underway: 7 projects were started or continuing
- SPR II dollars invested: \$7.1 million
- MassDOT and municipal staff trained: 4,103 participants
- Municipalities reached statewide: 212 communities

News 2026



TRB Annual Meeting

The TRB Annual Meeting attracts thousands of transportation professionals from around the world. The program covers all transportation modes, with sessions and workshops addressing topics of interest to policy makers, administrators, practitioners, researchers, and representatives of government, industry, and academic institutions.

The meeting program, including abstracts of papers, is available via the [Online Program](#). Full-meeting registrants can log into the Online Program to view the visual aids of many of the workshops, lectern sessions, and poster sessions from the event.



FHWA Technology Transfer (T2) Award



The funds provided by Federal Highway Administration (FHWA) for this program are directed toward the implementation of technologies, technology and innovation transfer, and appropriate outreach and communications activities. MassDOT Research Section received five awards from this program Awards

- o Asphalt Pavement Friction and Safety Through Integrated Friction Measurements and Crowd Sourced Data Enhancing - \$25,000
The objective of this five-month long study is to quantify the relationship between DFT friction measurements, crowd-sourced friction data, and MassDOT's locked wheel friction tester results across different asphalt mixture surface types in Massachusetts.
- o Valmont Industries Traffic Dampers equipment purchase - \$25,000
This equipment will be purchased to be used in the project: Performance Evaluation of Valmont Dampers for Traffic Signal and Sign Structures
- o Continuous Concrete Mix Station equipment purchase- \$25,000
- o Fourier Transform Infrared Spectrometer equipment purchase - \$25,000
- o Portable Raman Spectrometer - \$25,000
These equipment will be purchased to be used in the project: 3D Printing of Ultra-High-Performance Concrete for Automated Construction and Repair of Resilient Transportation Infrastructure

Completed Research Project Highlights

Recycled Ground-Glass Pozzolan (RGGP) for Use in Cement Concrete- and Comparison with Other Alternative Constituent Materials

To improve the sustainability of concrete in a practical and cost-competitive way, there is an increasing need to reduce the use of cement in concrete. Commonly used cement replacement materials, such as fly ash and slag, are industrial byproducts that still contribute to the carbon footprint. Recycling waste glass as a pozzolan in concrete is promising; however, there remain knowledge gaps in cement hydration, mix design, quality, and the longterm durability of concrete.

Key Findings

The high pozzolanic activity of RGGP was confirmed by its calcium hydroxide consumption, while its activity was strongly influenced by particle size, chemical composition, and temperature.- The experimental tests and thermodynamic modeling highlighted the pozzolanic role of RGGP in enhancing cement hydration and modifying reaction products, supporting its use in high-volume cement replacement strategies.- The incorporation of RGGP can result in decreased flowability of fresh mortar, making it necessary to add water reducers or superplasticizers to maintain workability.- Significant strength increases were obtained from mortar and concrete at 30% and 25% cement replacement levels, respectively.- Substantial reductions in permeability, chloride penetration, and early-age autogenous shrinkage were obtained in the presence of cement alternative materials.- The results from both the mortar bar test and accelerated concrete cylinder test confirmed the promising roles of RGGP, other SCMs, and early age carbonation in ASR mitigation.

Use of findings

- The laboratory-tested concrete mix with 25% RGGP ordered from a MassDOT approved ready-mix plant was cast into sidewalk slabs.
- The outcomes of this project have been used to confirm that MassDOT's current adoption of recycled ground-glass pozzolan and other alternative constituent materials in standard specifications is acceptable.



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 “Recycled Ground-Glass Pozzolan (RGGP) for Use in Cement Concrete- and Comparison with Other Alternative Constituent Materials” project team. This project is managed by project manager Austin Sanders from our research team.

Principal Investigator –Jianqiang Wei Ph.D.

Dr. Jianqiang Wei is an Assistant Professor in the Department of Civil and Environmental Engineering at the University of Maryland. He is a material scientist with a research focus on sustainable cementitious materials, durable concrete, and novel composites for next-generation civil infrastructure. Dr. Wei is leading an active research group to solve critical long-standing challenges in civil engineering and transportation infrastructure via innovations in materials and manufacturing technologies, including the development of ultra-high performance concrete, low-carbon cement, low-energy cement production, carbon-storing binders, upcycling solid wastes into low-carbon concrete, self-healing cement composites, concrete deterioration analysis and mitigation, service-life extension of structures, cement chemistry, and additive manufacturing (3D printing) of functional and carbon-sink concrete.



Principal Investigator – Sergio Breña Ph.D.

Sergio F. Breña is a Professor and Department Head at the University of Massachusetts Amherst. He has over 26 years of experience in laboratory and field-testing of structures and structural systems. Additionally, he has over six years of structural design experience in projects involving seismic rehabilitation of existing buildings and structural design of underground structures and tunnel liners, among others. His research interests include design and behavior of reinforced and prestressed concrete structures, use of fiber-reinforced materials in civil infrastructure applications, field performance of bridges, structural testing of bridge and building structural components, and sustainability and performance of concrete in infrastructure applications. He is a Fellow of the American Concrete Institute (ACI) and the Precast/prestressed Concrete Institute (PCI).



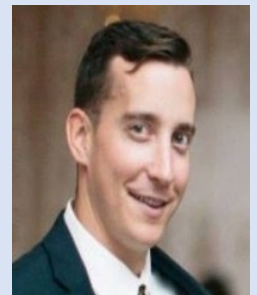
Principal Investigator – Kara D. Peterman Ph.D.

Professor Peterman is an associate professor and undergraduate program director in the Civil and Environmental Engineering department at University of Massachusetts, Amherst. Her expertise is in experimental and analytical behavior of cold-formed and hot-rolled steel structures; Full-scale experimentation; Seismic behavior of cold-formed steel structures; Creating and implementing sustainable design methods; Multi-hazard design. Professor Peterman earned her Ph.D. in civil engineering from John Hopkins University.



Project Champion – Richard Mulcahy

With a B.S. in Civil Engineering from Northeastern University, a Professional Engineer (P.E.) Civil License, and over 14 years of engineering experience, Richard brings a wide range of skills, expertise, certifications, awards, and hundreds of professional connections to the table. With a passion for cement concrete and related materials, his research interests include cementitious materials, alternative materials for use in concrete, low carbon concrete, concrete mix design optimization, concrete durability, ultra-high performance concrete, fiber reinforced concrete, alkali silica reaction, iron sulfide reaction, and concrete workmanship best practices.



Project Champion – Jason Robertson

Jason Robertson is the Director of Research and Materials for the Massachusetts Department of Transportation. Jason joined the department in 2018, after 14 years of materials consulting across 14 states along the east coast. Jason obtained his Bachelor of Science degree in Civil Engineering from Bluefield State College in West Virginia. With a passion for strict adherence to quality, Jason has worked on several large multimillion-dollar and even billion-dollar projects such as, Encore Casino, Green Line Extension, Amtrak Rail Redevelopment from Hartford to New Haven, Lowes Corporation HQ, and various multistory buildings and public facilities.



News and Events



MassDOT Annual Transportation Innovation Conference May 5 & 6, 2026 • Worcester, MA

The annual MassDOT Transportation Innovation Conference provides a forum for innovative transportation systems, management ideas, and initiatives. Each year, the conference provides an important opportunity for transportation practitioners to share knowledge, sponsor peer-to-peer learning, and collaborate on issues of mutual interest. Conference participants will have the opportunity to discuss the advantages and challenges associated with the innovative methods and technologies being presented.

The MassDOT Transportation Innovation Conference is open to all transportation practitioners from federal, state, and local transportation agencies, Metropolitan Planning Organizations, transit agencies, academia, and private industry. Click [here](#) to see the conference agenda

— massDOT — Innovation Webinar Series

Railroad Grade Crossing Profile Data Collection and Modeling

April 23, 2026

This webinar will discuss the accuracy and practicality of multiple LiDAR-based approaches for generating accurate vertical profiles at grade crossings to support railroad safety analysis. Datasets produced by different methods are compared using an automated slope measurement algorithm. Using the clearance results, along with AASHTO standards, this project examined all grade crossings along a railroad in Western Massachusetts and identified high-risk locations

Effect of Asphalt Binder Source on Asphalt Mixture Performance

March 19, 2026

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 be attributed 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. As discussed in this webinar, a main objective of this research is to assess the implications of changes in asphalt binder formulation and source during mix design and production.

[Click here for the webinar recording](#)

Evaluating the Effectiveness of Drivers' Education Modules on Safety

February 19, 2026

This webinar examined how differences in drivers' education program delivery affects novice drivers' behavior, crashes, and citations within 12 months of licensure. It also examined how differences in novice drivers' pre-license behaviors affect crashes and citations within 12 months of licensure. Lastly, it addressed how driver education and training programs can help improve novice drivers' use and understanding of ADAS.

[Click here for the webinar recording](#)



Research Resources

MassDOT Research set to start

Anticipated Start Date

- | | |
|---|----------|
| • Alternative Constituent Materials for Use in Low-Carbon Cement Concrete – Part II | May 2026 |
| • Evaluation of Transit Signal Options | May 2026 |
| • Performance Evaluation of Valmont Dampers for Traffic Signal and Sign Structures | May 2026 |
| • 3D Printing of Ultra-High-Performance Concrete for Automated Construction and Repair of Resilient Transportation Infrastructure | May 2026 |
| • Drone-in-a-Box: Enhancing Public Safety and Environmental Monitoring on Cape Cod | May 2026 |
| • Speed Management Research | May 2026 |

In Progress MassDOT Research

Start Date

- | | |
|---|---------------|
| • 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 |
| • 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

- | | |
|---|----------------|
| • 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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