massDOT
Massachusetts Department of Transportation

Transportation Research Quarterly

Providing highlight of MassDOT's transportation research activities and other helpful information. **Fall 2020**

Focused on Research

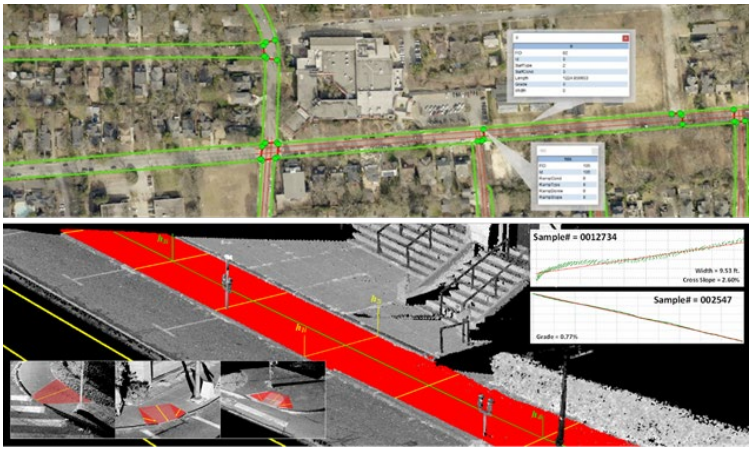
I am pleased to announce the launch of the MassDOT Transportation Research Quarterly newsletter. Funded primarily with FHWA State Planning & Research (Part B) funds, the MassDOT Research Program focuses on applied research to provide practical solutions to crucial problems confronting the agency. The quarterly newsletter provides an update on our recent research activities, project and staff highlights, noteworthy upcoming events, and key resource links. I hope you find it informative and enjoyable.

David Mohler, Executive Director, Office of Transportation Planning

INSIDE THIS ISSUE

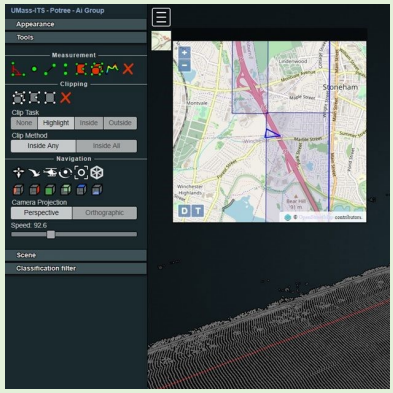
MassDOT Project *Improving Pedestrian Infrastructure Inventory Using Mobil LiDAR* Won the AASHTO 2020 "Sweet Sixteen" High Value Research Award

Pedestrian infrastructure is the most vital infra-structure for pedestrians and wheelchair users to facilitate safe and uninterrupted trips in their daily lives. To make informed investment decisions in the timely maintenance of inadequate sidewalks, MassDOT needs to identify a cost-effective approach to updating its pedestrian infrastructure inventory regularly. This project demonstrated that mobile LiDAR is a viable technology to support cost-effective inventory updates and condition assessments at the network level. With embedded geolocation and measurement information, the sidewalk and ramp databases derived from the mobile LiDAR were seamlessly integrated with the existing Road Inventory File. Jack Moran, the Highway Division Deputy Chief of Performance and Asset Management, and the MassDOT GIS Group provided project vision and guidance; and Dr. Chengbo Ai and his team at UMass Amherst delivered the results. Read the project final report and poster for further information.



Ongoing Research Highlights

Using Mobile LiDAR to Inventory Pavement Marking Retro-reflectivity Condition



This research uses mobile LiDAR to accurately locate and assess the retro-reflectivity of pavement markings. The objectives include: 1) inform MassDOT of the deterioration trends of specific pavement marking materials, 2) guide the selection of marking materials and repair frequency, 3) to define the benefit-to-cost ratio for each of the marking materials, and help refine MassDOT's pavement marking standards, and 4) establish an important data layer to support MassDOT's decisions on connected and autonomous vehicles (CAV) testing, implementation, and operation. Read the project cut sheet for further information.

Principal Investigator: Chengbo Ai, UMass Amherst
Project Champion: Neil Boudreau, MassDOT Highway
Project Manager: Nicholas Zavolas, MassDOT OTP

Energy Consumption, Cost and Emissions of MBTA Rapid Transit Vehicles

The Massachusetts Bay Transportation Authority (MBTA) spends a significant amount on electricity for traction power annually. This project will identify sustainable strategies to reduce energy consumption, costs and environmental impacts, and analyze electricity consumption data to quantify the energy use, costs, and subsequent emissions of an electric rail vehicle. This research will be used to develop energy use metrics to assist the MBTA with planning for future energy demand and Operations & Maintenance (O&M) budgets. Read the project cut sheet for further information.

Principal Investigators: Jimi B. Oke, Eleni Christofa & Eric J. Gonzales, UMass Amherst
Project Champion: Sean Donaghy, MBTA
Project Manager: Michael Flanary, MassDOT OTP

Post-Fire Damage Inspection of Concrete Structures

This research will help MassDOT to establish methods to assess damage to a tunnel after a fire. The methods involve post-event visual observation charts and a detailed checklists based on physical testing, non-destructive tools such as recording surface temperatures immediately after an event with an infrared temperature gauge, and comparative non-destructive compressive strength readings of an affected area. These new methods will help inspectors to make an informed decision on whether a tunnel is safe for operation. Read the project cut sheet for further information.

Principal Investigators: Simos Gerasimidis & Scott Civjan, UMass Amherst
Project Champion: John Czach, MassDOT Highway
Project Manager: Michael Flanary, MassDOT OTP

Exploring Short-Sea Shipping as an Alternative to Non-Bulk Freight Trucking

Coastal areas in southeastern Massachusetts are heavily reliant on trucking for freight distribution, which has a large environmental footprint and contributes to heavy traffic and congested choke points. The project will review existing waterborne freight practices and capacity in Massachusetts, analyze the feasibility of shifting some of the volume of non-bulk freight from roadways to waterborne modes, and will estimate the traffic, congestion, emissions, and economic impacts associated with a shift to new waterborne options. Read the project cut sheet for further information.

Principal Investigator(s): Kristin Uiterwyk & Jack Wiggin, UMass Boston
Project Champion: Benjamin Muller, MassDOT OTP
Project Manager: Drew Pflaumer, MassDOT OTP

A Look at Who We are -- Team Highlights

Each MassDOT research project is supported by a team comprised of a Project Champion, a Principal Investigator and a Project Manager. Often, the research project team will also include staff from the UMass Transportation Center (UMTC) who provide general support services to the Principal Investigator. Highlighted below are the key team members of the "Post-fire Damage Inspection for Concrete Structures" project.

Project Manager - Mike Flanary

A MassDOT Research Project Manager (PM) is responsible for the administrative management and overall coordination of an assigned research project.

Mike Flanary is a transportation planner with the Research Section at the Office of Transportation Planning. He joined MassDOT in September 2019 after graduating from Tufts University with a Master's in Urban and Environmental Policy and Planning. Prior to working at MassDOT, Mike worked at Tufts University and had internships with Conservation Law Foundation, the Martha's Vineyard Commission, and the City of Cambridge, MA. He is an avid cyclist and greatly enjoys riding his e-bike around Boston. You may contact him at Michael.Flanary@dot.state.ma.us.

Project Champion - John Czach

A Project Champion (PC) is a MassDOT subject matter expert, the proponent of a funded research project, and the technical advisor for project development, completion and implementation.

John Czach (P.E.) is a native of western Mass and trained as a civil engineer at UMass Amherst. He currently serves as the Tunnel Maintenance Engineer at MassDOT's Highway Division. Before joining MassDOT, John worked as a consulting engineer to various New England agencies including the Massachusetts Turnpike Authority, Maine Turnpike, New Hampshire Turnpike, Massachusetts Bay Transportation Authority, and the University of Massachusetts. Outside work, he enjoys returning to western Mass to spend time with family and friends.

Principal Investigator - Simos Gerasimidis

The Principal Investigator (PI) is responsible for submitting an interest statement, developing a detailed research scope if selected, and conducting research activities per project scope.

Simos Gerasimidis is an Assistant Professor of Civil and Environmental Engineering at UMass Amherst. He has received his Ph.D. from the Aristotle University of Thessaloniki and his MEng from MIT. Dr. Gerasimidis's expertise spans various areas of structural and bridge engineering, such as structural stability, new architected metamaterials and novice structure systems. He is the recipient of the Greek Diaspora Fellowship from the Stavros Niarchos Foundation as one of 21 Greek-born scholars across the USA. In addition, he has 5 years of professional experience working as a structural engineer at Santiago Calatrava SA and Thornton Tomasetti.

UMASS Transportation Center – Matt Mann

UMass Transportation Center (UMTC) provides general research and technology transfer support to MassDOT under an Interdepartmental Service Agreement, including assisting the Principal Investigators with timely progress reporting, invoicing and maintaining compliance with contractual terms.

Matt Mann is a transportation specialist with 15 years of prior regional transportation planning experience. At UMTC, Matt works to foster collaboration and communication of research activities between researchers, agencies and organizations. Additional outreach activities include coordination of multidisciplinary and cross state "Research Roundtables," developing the UMTC Research Affiliate Network, and promoting diversity and equality.

News and Events

For over 20 years, the MassDOT Moving Together Conference has continued to grow. It brings together transportation leaders and individuals involved in the areas of planning, public health, bicyclist and pedestrian safety, transit, advocacy, elected office, law enforcement and education to discuss and promote healthy and environmentally friendly transportation options such as walking, biking, and use of public transportation services, while ensuring safety and equality to all travelers.

We are going VIRTUAL this year!

November 17-19, 2020
7:45 am – noon

Please visit the 2020 Moving Together Conference Website to register and for additional information.

Spotlight Theme: Launching a New Century of Mobility and Quality of Life

The Transportation Research Board 100th Annual Meeting will be conducted as a virtual event over a series of days throughout January 2021. TRB waives annual meeting (and webinar) registration fees for its sponsor agency employees. Since the event will be virtual and there are no registration fees for MassDOT employees, we encourage you to talk to your supervisor about attending some parts of the virtual event that are relevant to your job responsibilities at MassDOT.

2021 Event Dates
Committee Meetings: January 5–8 and 11–15
Sessions & Exhibits: January 21–22 and 25–29

Visit TRB 2021 Annual Meeting Website
View the Meeting Program
Create a free MyTRB Account to access TRB resources

NCHRP NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Problem Statement Submittals for FY2022 NCHRP are due by the midnight on November 2, 2020.

View online submission instructions.
Visit NCHRP website for information and research reports.

State DOTs are the sole sponsors of the AASHTO National Cooperative Highway Research Program (NCHRP) and continue to be the driving force behind NCHRP research. The program is operated in partnership with AASHTO under a cooperative agreement with FHWA and is administered by TRB. MassDOT contributes 5.5% of its available FHWA SPR funds to NCHRP; and our subject matter experts (SMEs) presently serve on over 40 NCHRP project panels. Each year, the AASHTO Research and Innovation Committee (R&I) invites state DOTs, AASHTO committee and council chairs, and FHWA to submit problem statements that are of regional or national interest. The Research Section coordinates and submits our agency's review of candidate problem statements, and the results from 50 states serve as the basis for AASHTO R&I funding decisions.

massDOT Massachusetts Department of Transportation
TRB TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMIES
NCHRP NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM
U.S. Department of Transportation Federal Highway Administration
AASHTO

Research Resources

Recently Completed MassDOT Research

Project Title	Completion Date
Characterization of Reclaimed Asphalt Pavement for HMA Surface Courses in Massachusetts	August 2020
Compost Blankets for Erosion Control and Vegetation Establishment	May 2020
Public Health Assessment for Transportation Projects	March 2020
Unmanned Aerial Systems in Surface Transportation	December 2019
Commuter Bus Demand, Incentives for Modal Shift, and Impact on GHG Emissions (Part II)	December 2019
Estimating Future Changes in 100-year Floods on the Connecticut and Merrimack Rivers	November 2019
Improving Pedestrian Infrastructure Inventory in Massachusetts Using Mobile LiDAR	September 2019
Risk Factors for Older Pedestrian Injuries and Fatalities in MA	August 2019
Optimizing ADA Paratransit Operations with Taxi and Ride Share Programs	May 2019
Traffic Flow Improvements: Quantifying the Influential Regions and Long-Term Benefits	March 2019
Evaluation and Enhancement of MassDOT Traveler Information Programs	March 2019

Transportation Pooled Fund Research

The Transportation Pooled Fund (TPF) Program has existed for more than 20 years and overseen by FHWA's Office of Research, Development, and Technology (RD&T). It is a popular means for state DOTs, commercial entities, and FHWA's program offices to combine resources and achieve common research goals. Pooling resources reduces marginal costs and provides efficient use of taxpayer dollars. It also provides greater benefits through collaboration as compared to individual entities conducting or contracting for research on their own.

TPF-5(373) New England Transportation Consortium (NETC)

NETC is a research cooperative between the state transportation agencies of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Resources and expertise are pooled for projects of regional concern to address the needs of the six New England states. The annual problem statement solicitation is exclusive to member state employees. The funded projects are jointly selected, and the research investigations are guided collectively by the six state DOT representatives.

Information on NETC's research program, services, upcoming and ongoing research projects, and the final reports of completed projects, can be found on the NETC web site. Please be on the lookout for the FY22 problem statement solicitation announcement in December 2020.

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.

University of Massachusetts Transportation Center (UMTC) provides research and training services to MassDOT under an Interdepartmental Service Agreement.

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

Contact Us

Research & Technology Transfer Section
Email for General Questions

Research Program Manager
Hongyan (Lily) Oliver Email Lily

Research Project Managers
Drew Pflaumer Email Drew
Michael Flanary Email Mike
Nicholas Zavolas Email Nicholas
Patrick McMahon Email Patrick