VTRC Highlights from the 2025 Transportation Research Board (TRB) Annual Meeting

Virginia Transportation Research Council
January 2025

VTRC
Virginia Transportation
Research Council

Introduction

In January, the Virginia Transportation Research Council (VTRC) participated in the 104th Annual Transportation Research Board (TRB) Meeting held in Washington, D.C. The TRB Annual Meeting provides an opportunity to exchange knowledge with industry partners and share collaborative research efforts. The VTRC team was engaged in various seminars, sessions, meetings, and presentations on numerous topics throughout the 2025 TRB Annual Meeting.

The featured engagements are broken down by VTRC research team: Pavements; Environment, Planning and Economics; Safety, Operations and Traffic Engineering; Structures; and Committees, Appointments and Other.

Bringing Innovation to Transportation.

VTRC
Virginia Transportation
Research Council

LECTERN SESSIONS

Presentation: Assessing the Impact of Test Conditions on Indirect Tensile Test Results for Evaluating Rutting Potential in Asphalt Mixtures
The presentation detailed the outcomes of a study evaluating various factors affecting indirect tensile test at high temperature (IDT-HT) test results, a method used to assess the rutting performance of asphalt mixtures. With VDOT implementing this test, evaluating these factors was crucial to establish robust quality control and acceptance practices, ensuring the accuracy, consistency, and reliability of the test methods and the properties of the materials tested.
Researchers/presenters: Ilker Boz, Ph.D., P.E., Aksel Seitllari, Ph.D., Jhony Habbouche, Ph.D., P.E., and Stacey Diefenderfer, Ph.D., P.E.
Associated research project: *Inter-Laboratory Study for the Indirect Tensile Test at High Temperature and Rapid Rutting Test*

Presentation: Cross-Scale Aging Dynamics of Recycled Asphalt Binder Blends and Mixtures Containing Recycling Agents
This presentation explored the performance of recycled asphalt binders and mixtures with recycling agents (RAs) with a focus on the effects of aging. It highlighted the critical role of binder properties in influencing mixture performance, particularly in cracking resistance under different aging severities. The presentation underscored the potential of using binder parameters to distinguish mixture behavior under appropriate aging protocols.
Researchers/presenters: Saqib Gulzar, Jaime Preciado, Andrew Fried, Cassie Castorena, Ph.D., Benjamin Underwood, Ph.D., Jhony Habbouche, Ph.D., P.E., and Ilker Boz, Ph.D., P.E. **Associated Research Project:** *Engineered Frameworks for Evaluating the Use of Recycling Agents in Surface Asphalt Mixtures for Virginia*

Presentation: Machine Learning-Based Prediction and Optimization of Balanced Mixture Design (BMD) Performance Indices
This presentation focused on leveraging machine learning techniques to optimize the BMD performance characteristics of asphalt mixtures during both the design and production phases.
Researchers/presenters: Bilin Tong, Wenjiang Huang, Jhony Habbouche, Ph.D., P.E., Ilker Boz, Ph.D., P.E., Qing Guo, Stacey Diefenderfer, Ph.D., P.E., and Gerardo Flintsch, Ph.D., P.E.
Associated research project: *Evaluation of Balanced Mix Design (BMD) Surface Mixtures with Conventional and High RAP Contents under Laboratory-Scale and Full-Scale Accelerated Pavement Testing (APT)*

Presentation: Current Practices and Guidelines for FDR: Virginia Case Study
The presentation gave an overview of VDOT's use of full-depth reclamation (FDR) and included a discussion about VDOT specifications. The session was related to National Cooperative Highway Research Program (NCHRP) Synthesis, "*Current Practices and Guidelines for FDR*." Three agencies were interviewed for the synthesis to provide more in-depth information. This presentation was a follow-up to share the expanded information with a wider audience.
Researchers/presenters: Brian Diefenderfer, Ph.D., P.E.
Associated research project: N/A

Presentation: Evaluating the Use of Traffic Speed Deflectometer-Based Pavement Structural Data in VDOT's Pavement Management Processes for Flexible Pavements
This presentation described the evaluation of a proposed approach to incorporate structural condition data obtained from a Traffic Speed Deflection Device (TSDD) into VDOT's pavement management treatment selection process. The approach consisted of calculating parameters that are used to determine the remaining structural life. Thresholds were developed and used to determine a structural modified recommended treatment category.
Researchers/presenters: Angello Murekye, Samer Katicha, Ph.D., Eugene Amarh, Ph.D., Gerardo Flintsch, Ph.D., P.E., and Brian Diefenderfer, Ph.D., P.E.
Associated research project: *Evaluating the Potential Use of Traffic Speed Deflection Devices-Based Pavement Structural Data for Asphalt Pavements in VDOT's Pavement Management Processes*

Presentation: Current and Future Agency Research and Application of CCPR
As part of a larger session on reducing the global warming potential of asphalt paving, this presentation focused on VDOT's research and use of cold central plant recycling (CCPR). The presentation delivered an overview of the recycling work on I-81 (2011), National Center for Asphalt Technology (NCAT) Test Track (2012), and I-64 Segment II and III projects (2017 and 2019). The current performance from I-81 were also highlighted as it is one of the few pavement recycling projects in the U.S. where long-term performance data has been gathered. The presentation also discussed VDOT's ongoing testing at the NCAT Test Track with re-recycled CCPR.
Researchers/presenters: Brian Diefenderfer, Ph.D., P.E.
Associated research project: N/A

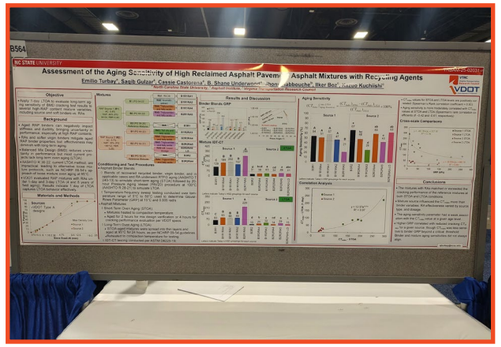
Pavements

POSTERS

Poster title: Quality Assurance of Chip Seals Using Macrotexture Metric
Researchers/presenters: Norovbanzad Tsogt-Ochir, Gerardo Flintsch, Ph.D., P.E., Edgar de León Izeppi, Ph.D., and Ilker Boz, Ph.D., P.E.
Associated research project: *Evaluation of Virginia Department of Transportation Chip Seal Practices: Materials and Design*

Poster title: Mechanistic-Based Evaluation of Performance Thresholds for Balanced Mix Design Asphalt Surface Mixtures
Researchers/presenters: Omar Othman, Benjamin Underwood, Ph.D., Jhony Habbouche, Ph.D., P.E., Ilker Boz, Ph.D., P.E., and Stacey Diefenderfer, Ph.D., P.E.
Associated research project: *Mechanistic-Based Evaluation of Performance Thresholds for Engineered Surface Asphalt Mixtures*

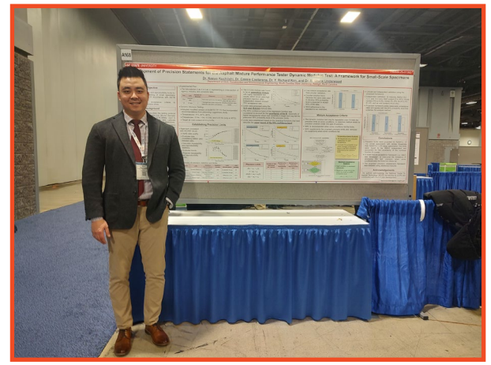
Poster title: Assessment of the Aging Sensitivity of High Reclaimed Asphalt Pavement Asphalt Mixtures with Recycling Agents
Researchers/presenters: Emilio Turbay, Saqib Gulzar, Cassie Castorena, Ph.D., Shane Underwood, Ph.D., Jhony Habbouche, Ph.D., P.E., Ilker Boz, Ph.D., P.E., and Kazuo Kuchiishi, Ph.D.
Associated research project: *Characterizing and Improving Binder Availability and Activity in Asphalt Mixtures with Reclaimed Asphalt Pavement (RAP) (in progress)*



Display for the poster, "Assessment of the Aging Sensitivity of High Reclaimed Asphalt Pavement Asphalt Mixtures with Recycling Agents."

Pavements

Poster title: Development of Precision Statements for the Asphalt Mixture Performance Tester Dynamic Modulus Test: A Framework for Small-Scale Specimens
Researchers/presenters: Kazuo Kuchiishi, Ph.D., Cassie Castorena, Ph.D., Shane Underwood, Ph.D., Youngsoo Richard Kim, Ph.D., P.E.
Associated research project: N/A



Kazuo Kuchiishi in front of the display for, "Development of Precision Statements for the Asphalt Mixture Performance Tester Dynamic Modulus Test: A Framework for Small-Scale Specimens."

AWARDS

Shabbir Hossain, Research Scientist, Ph.D., P.E., accepted the Design and Rehabilitation of Concrete Pavements TRB Standing Committee Award for Best Poster during the 2024 TRB Annual Meeting for the poster titled, "*Concrete Overlay Performance on US 58 in Virginia.*" Authors of the research are Shabbir Hossain, Research Scientist, Ph.D., P.E., VTRC and Girum Merine, P.E., Pavement Program Manager, VDOT Materials Division.

From left to right: Gonzalo Rada, PhD., P.E., Vice President, WSP; Shabbir Hossain, Research Scientist, Ph.D., P.E., VTRC; Kurt Smith, P.E., Vice President, Applied Pavement Technology; and Hamzeh Haghshenas Fatmehsari, Ph.D., Senior Program Officer, TRB

LECTERN SESSIONS

Presentation: Intersection Sight Distance Standards: A Comprehensive Study of State and Local Practices
Intersection Sight Distance (ISD) requirements are intended to enhance safety by ensuring adequate visibility at intersections. However, these requirements can preclude the elements of urban streetscape like street trees, on-street parking, transit infrastructure, and inadvertently raise vehicle speeds. There is limited understanding of how ISD guidelines are applied in practice across different jurisdictions and the extent to which they accommodate diverse contexts and allow flexibilities in design. This presentation summarized the current practices of ISD and establishes the foundation for future research on ISD and safety across various environments, particularly in dense urban areas such as Traditional Neighborhood Developments (TNDs).
Researchers/presenters: Sharad Lamsal, Lance Dougald, and T. Donna Chen, P.E., Ph.D.
Associated research project: *An Analysis of VDOT's Sight Distance Requirements Relative to Context-Sensitive Designs*

Presentation: Virginia's Use of Accessibility in SMART SCALE
As part of a TRB workshop sponsored by TRB's Performance Management committee (Measuring Access to Destinations: Exploring Applications of Accessibility Measures to Support Performance-Based Decision Making), VTRC research scientist Peter Ohlms gave a brief overview of Virginia's use of accessibility in SMART SCALE and some other processes. Ohlms' presentation was part of the panel, Accessibility Measures at State DOTs and a Research Application, and discussed the role of accessibility as one of six SMART SCALE factor areas for project scoring, VDOT's role in completing SMART SCALE accessibility calculations, and other uses of accessibility in processes managed by the Department of Rail and Public Transportation and the Office of Intermodal Planning and Investment.
Researchers/presenters: Peter Ohlms, AICP
Associated research project: This lectern is not affiliated with a VTRC research project, however, it is related to a pooled fund study in which for which Ohlms is the Virginia representative. This is TPF-5(455), *National Accessibility Evaluation Phase II Access Across America*.

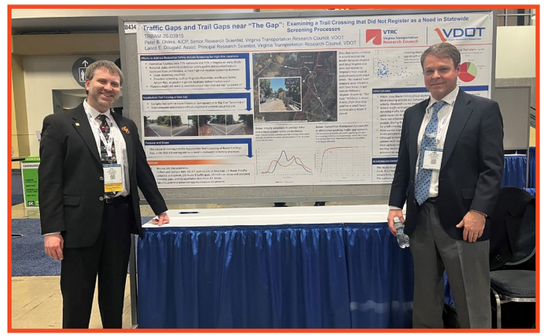
Environment, Planning, and Economics

POSTERS

Poster Title: The Effect of In-Stream Construction Activities on Aquatic Species: Monitoring Turbidity and Suspended Sediment Associated with the Use of Cofferdams
Researchers/presenters: Bridget Donaldson and Lewis Lloyd, P.E.
Associated research project: *The Effect of In-stream Construction Activities on Turbidity and Suspended Sediments (in progress)*

Bridget Donaldson (L) and Lewis Lloyd (R)

Poster Title: Implementing Multimodal Innovations Traffic Gaps and Trail Gaps Near the Gap: Examining a Trail Crossing that Did Not Register as A Need in Statewide Screening Processes
Researchers/presenters: Peter Ohlms, AICP, and Lance Dougald
Associated research project: This explored findings from a technical assistance project, *Implementing Multimodal Innovations. (*Further information about multimodal projects which led to this study can be found in VDOT's library. What the current study is aiming to do can be found in within the Technical Assistance database.)



Peter Ohlms (L) and Lance Dougald (R)

Poster Title: Estimating Disadvantaged Populations Based on Public Data: A Method for Transportation Programming
Researchers/presenters: Yiqing Xu, Ph.D., and Lance Dougald
Associated research project: *Estimating Disadvantaged Populations Based on Public Data (in progress)*

Yiqing Xu (L) and Lance Dougald (R)

LECTERN SESSIONS

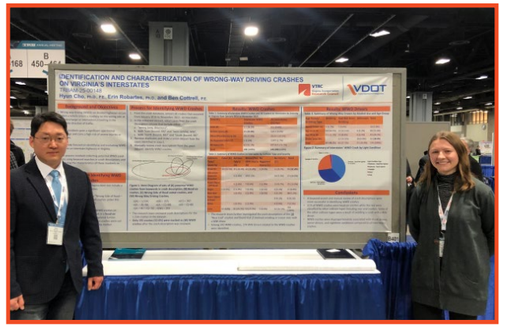
Presentation: Using Crowdsourced Data to Improve Analytics and Reliability Prediction
This presentation provided an overview of a number of recent VDOT projects that have used crowdsourced data in innovative ways. The presentation discussed VTRC's work on travel time reliability prediction, as well as an ongoing effort to test traffic signal analytics derived from probe data sources.
Researchers/presenters: Michael D. Fontaine, Ph.D., P.E.
Associated research project: This presentation discusses findings from *Methods to Analyze and Predict Interstate Travel Time Reliability* and *Prediction of Interstate Travel Time Reliability: Phase II.*

Presentation: Strategies to Improve Morale and Retention in Transportation Management Centers
This study examines strategies to improve morale and retention for operators in transportation management centers (TMCs) via on-site observations and staff interviews. Recommendations include formalizing software issue reporting, enhancing performance awards, improving compensation through better wages and strategic raise timing and limiting conference room use overlooking the TMC floor.
Researchers/presenters: Noah Goodall, Ph.D., P.E.
Associated research project: *Transportation Operations Center Operator Retention and Workload Mitigation Strategies (in progress)*

Safety, Operations, and Traffic Engineering

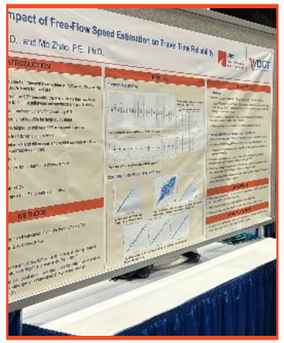
POSTERS

Poster title: Identification and Characterization of Wrong Way Driving Crashes on Virginia's Interstate Highways
Researchers/presenters: Hyun Cho, Ph.D., P.E., Erin Robartes, Ph.D., and Ben Cottrell, P.E.
Associated research: *A Systemic Evaluation of Wrong-way Driving Crashes and Countermeasures on Virginia's Roads*



Hyun Cho (L) and Erin Robartes (R)

Poster title: Exploring the Impact of Free-Flow Speed Estimation on Travel Time Reliability
Researchers/presenters: Chien-Lun Lan, Ph.D., Mo Zhao, Ph.D., P.E.
Associated research project: *Free Flow Speed Estimation Methodology for Performance Measures*



Poster display for, "Exploring the Impact of Free-Flow Speed Estimation on Travel Time Reliability."

Poster title: Cost of Congestion Due to Incidents on Freeways
Researchers/presenters: Chien-Lun Lan, Ph.D., and Mo Zhao, Ph.D., P.E.
Associated research project: *Cost of Congestion Due to Incidents on Freeways and a Technical Assistance Project: Cost of Congestion Due to Incidents on Freeways - Phase 2: Non-Interstate Limited Access Facilities*

Poster display for, "Cost of Congestion Due to Incidents on Freeways."

Structures

LECTERN SESSIONS

Presentation: A Comparative Study on the Utilization of Calcined Clay, Reclaimed Fly Ash, and Slag as Supplementary Cementitious Materials
Supplementary cementitious materials (SCMs) are critical for durable transportation infrastructure, but the scarcity of fly ash (FA) has created challenges for state DOTs. While reclaimed FA offers a temporary solution, calcined clay (CC) provides a promising long-term alternative, particularly in systems like limestone calcined clay cement (LC3) or LC2, which blends Portland limestone cement with CC. This study evaluates two US-sourced calcined clays (CC-1 and CC-2) for particle size, composition, reactivity and performance. Mortars with six binder systems were tested for strength, hydration, and environmental impact. Results highlight LC2 and LC3 systems as viable solutions to the FA shortage.
Researchers/presenters: Gabriel Arce, Ph.D., P.E., Amir Behravan, Ph.D., P.E., Osman Ozbulut, Ph.D., Lisa Colosi Peterson, Ph.D., Zhangfan Jiang, Ph.D., Michelle Cooper, Concrete Materials Research Engineer, FHWA TFHRC, Erin Stewartson, Pathways Intern, FHWA TFHRC.
Associated research project: *Addressing Fly Ash Shortage with Limestone Calcined Clay Cement*

Gabriel Arce (L) and Zhangfan Jiang (R) present, "A Comparative Study on the Utilization of Calcined Clay, Reclaimed Fly Ash, and Slag as Supplementary Cementitious Materials."

Presentation: Engineered Cementitious Composite in Metal Culvert Repairs
This presentation discussed invert repairs of corrugated metal culverts to extend the service lives without interrupting traffic flow. Engineered cementitious composite (ECC) that has high tensile and flexural strength and ductility in thicknesses of 1 in or less above the crests of the corrugations of the barrels was used. Such a thickness is not expected to have a large adverse effect on water flow characteristics. Eight barrels have been repaired since 2017 and all are performing well even in the presence of heavy flooding. The various phases of the repairs done by the state maintenance bridge crews was also presented.
Researchers/presenters: Celik Ozyildirim, Ph.D., P.E., and Mary Sharifi
Associated research project: *Corrugated Metal Pipe Culvert Invert Repair Using Engineered Cementitious Composite*

Committees, Appointments and Other

Pavements
- 5 members of TRB standing committees
- Presided over 1 lectern session

Environment, Planning, and Economics
- 1 TRB Committee Chair
- 5 members of TRB standing committees
- Presided over 1 poster session

Safety, Operations, and Traffic Engineering
- 1 TRB Committee Chair
- 1 TRB Subcommittee Chair
- 4 members of TRB standing committees
- Presided over 4 poster sessions
- Presided over 2 lectern sessions
- Co-presided over 1 workshop

Structures
- 5 members of TRB standing committees
- Presided over 1 lectern session

Virginia Transportation Research Council
January 2025
https://vtrc.virginia.gov