June 2025

TRAC e-News: Delivering Research Results!

The Washington State Transportation Center (*TRAC*), conducts transportation research through collaborative partnerships among WSDOT, the University of Washington (UW), and Washington State University (WSU).

In this issue

Transportation Workforce Development

WSDOT graduate fellowships relaunched for UW civil engineering program

The **Washington State Department of Transportation (WSDOT) Fellowship Program** will support civil engineering graduate students for the 2025-2026 academic year, helping WSDOT employees earn master's degrees, addressing workforce shortages, and supporting Washington state's infrastructure needs. Because the field of civil engineering is facing a significant workforce shortage, the program is particularly relevant.

Through the partnership of WSDOT, the University of Washington's Department of Civil and Environmental Engineering, the Pacific Northwest Transportation Consortium (PacTrans), and TRAC, and with funding from the Washington State Legislature, the program was relaunched in 2024 after being on hold since 2009. The 2024-2025 program provided five WSDOT employees with the opportunity to earn a fully funded master's degree in transportation engineering, helping them advance their careers and contribute to Washington's transportation workforce. Read more….

Workshop on transportation workforce development highlights challenges, solutions

To share the findings of a comprehensive study on engineering workforce pathways and to gather feedback from leaders across the transportation sector—including government agencies, private industry, and academic institutions—PacTrans hosted a **Transportation Workforce Development Workshop** on May 19, 2025.

The study identified critical workforce challenges facing the state's transportation sector and proposed both short-term and long-term solutions to address them. The study was conducted by the PacTrans Workforce Development Institute (WDI) and TRAC, with support from the Washington State Legislature and in

partnership with the Washington State Board of Registration for Professional Engineers and Land Surveyors and the Washington State Association of County Engineers.

The workshop brought together approximately 40 participants who contributed their diverse perspectives on the state of the transportation workforce pipeline and collaborated on strategies for building a resilient and future-ready workforce. The event featured two panels: Current Challenges and Short-Term Solutions, and How to Move Forward and Long-Term Solutions. Read more….

Bridges

Impacts of Cascadia Subduction Zone M9 Earthquakes on Bridges in Washington State: Three-Dimensional Bridge Models

Research team: Marc Eberhard (UW) | Jeffrey Berman (UW) | Brett Maurer (UW) | Bijan Khaleghi (WSDOT) | Mustafa Mohamedali (WSDOT)
Sponsor: WSDOT
Report: WA-RD 908.2

Completed: The performance of bridges during large-magnitude earthquakes generated by the Cascadia Subduction Zone is an essential feature of the resilience of communities along the U.S. West Coast because bridges will be needed for pre-tsunami evacuation, emergency response, and economic recovery. This project developed a three-dimensional, nonlinear model of a typical bridge in Washington state and subjected it to sets of simulated magnitude 9.0 earthquake ground motions. Analyses evaluated the effects on bridge performance of six bridge locations, four site classes, abutment characteristics, and the properties of the columns at the intermediate supports. The results suggested that, for typical bridges, WSDOT should prioritize retrofitting bridges where the abutments do not effectively constrain the column displacements of the bridge, either because the bridge has no shear key or because the superstructure is curved or discontinuous. These findings provide WSDOT an opportunity to develop and prioritize cost- and time-efficient bridge retrofit plans. Read more…

Maintenance

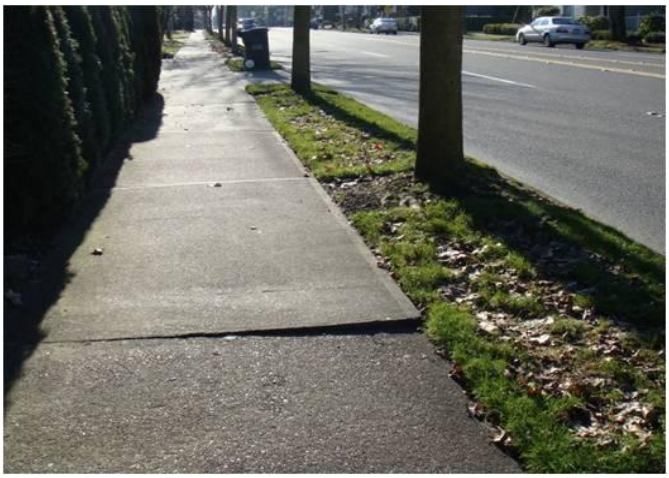
Standard Test Procedures for Determining the Ice Melting Capacity of Deicers

Research team: Xianming Shi (WSU)
Sponsors: Clear Roads Pooled Fund | Minnesota Department of Transportation
Report

Completed: Winter road maintenance often includes the use of deicing chemicals. However, many roadway deicing products are available, and their ice melting capacity can vary significantly. In addition, the processes that states use to procure and test deicing materials are subjective in measuring performance and are becoming increasingly burdensome for lab, procurement, and management staff. For this project, researchers evaluated the Mechanical Rocker Test Procedure for use as a national standard. They conducted a round robin test to examine the effects of rotational speed, test duration, tilt angle, and operating laboratory on the ice melting capacity (IMC) of ten liquid deicers measured with the Mechanical Rocker Ice Melting Test. To minimize the inter-laboratory variability introduced into the IMC test, the researchers proposed two data acceptance checks to be included. With these the Mechanical Rocker Ice Melting Test should be able to realistically and robustly assess the performance of deicers and allow transportation agencies to make data-driven procurement decisions. Read more…

Multimodal Transportation

Identification of the Optimal Approach to Maintaining Complete Statewide Sidewalk Data



Research team: Anat Caspi (UW) | Thomas Craig (WSDOT) | Jon Peterson (WSDOT)
Sponsor: WSDOT

Ongoing: This project aims to facilitate the integration of sidewalk infrastructure data into all Washington State Department of Transportation (WSDOT) processes involving road network data. The focus is on analyses of active transportation and Complete Streets. The scope encompasses assessing inter-agency use needs; establishing requirements for Complete Streets sidewalk data; and developing data stewardship and governance protocols, mechanisms, and standards. The project is also defining the requirements for statewide, decision-supporting data tools that will allow the display and analysis of walkability based on sidewalk data. The researchers are working with stakeholders and evaluating their needs. They are inventorying software tools and sidewalk data sets currently available. They will also propose methodologies and workflows for consistently displaying walksheds and other common outputs of sidewalk data systems.

Technology Transfer

2023 and 2024 WSDOT-PacTrans Summer High School Transportation Engineering Camps

Research team: Yinhai Wang (UW) | Jia Li (WSU) | Lingzi Wu (UW) | Haifang Wen (WSU) | Jackie Bayne (WSDOT) | Pamela Vasudeva (WSDOT) | Ami Moseley (WSDOT) | Doug Brodin (WSDOT)
Sponsors: PacTrans, WSDOT
2023 Report
2024 Report

Completed. The 2023 and 2024 WSDOT-PacTrans Summer High School Transportation camps were developed to ignite passion in high school students and empower them to consider advanced degrees and careers in science, technology, engineering, and mathematics (STEM) fields associated with transportation. The camps were designed as a comprehensive, six-day, five-night residential program, with students housed on the University of Washington and Washington State University campuses. The planning and development teams comprised experts in civil engineering, transportation engineering, urban design and planning, and construction management. The breadth of their expertise supported the creation of a curriculum that incorporated a wide range of perspectives and experiences. The resulting programs included guest speakers; interactive, participatory lectures; tours of transportation-related management centers, test sites, and laboratories; and a thought-provoking, student-led team project. The success of the camps in both years was evidenced by the overwhelmingly positive feedback received from both students and their parents. Planning for 2025 camps is under way. Read more…

Transportation Planning

Transportation Scenario Visualization

Research team: Cecilia Aragon (UW) | Bart Treece (UW) | Ryan Avery (UW) | Ron Pate (WSDOT) | Jon Peterson (WSDOT)
Sponsors: WSDOT | King County |Challenge Seattle | Alaska Airlines | Microsoft, Boeing

Ongoing. This project is evaluating several scenarios to illustrate how decisions about major transportation infrastructure investments and land use related to housing could affect the region by 2050. The researchers are looking at the potential effects on the Puget Sound regional transportation system of several major infrastructure investments that have either been identified or are in the early development stages. They are also looking at the effects of existing and potential housing zoning densities in Washington counties along the I-5 corridor. The researchers will evaluate the travel times and costs for households and freight, as well as passenger air travel demand,

cost, and availability. A holistic picture is needed for decision-makers to understand the tradeoffs and considerations for the future of Cascadia mobility. The results will provide decision makers and the public with a high-level understanding of major transportation needs and choices for the area's 2050 population. Read more…

Webinar Wednesdays

WSDOT's Research & Library Services Office hosts Webinar Wednesdays, its continuing series of one-hour webinars to promote research technology transfer, encourage implementation, and foster innovation. Generally held every other month, the sessions cover a wide range of transportation topics. Each webinar showcases research results or innovative practices presented by researchers and subject matter experts, and each features a Q&A segment for attendees to pose questions.

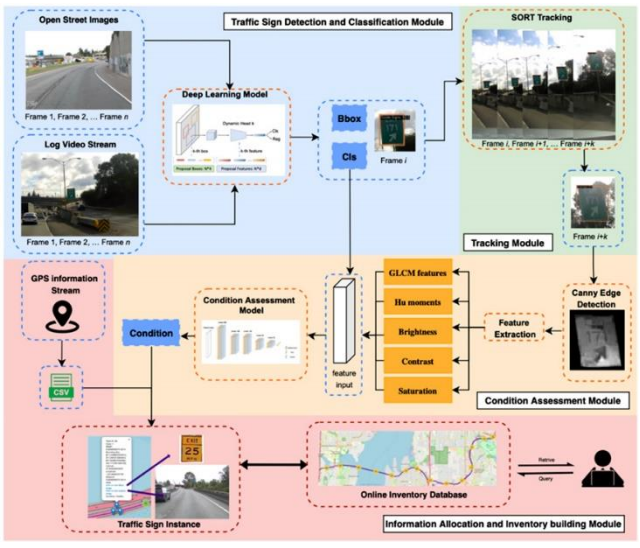
Sign up here for webinar announcements and registration information. Previous webinars are available for access here.

Below is information about WSDOT's most recent research webinars:

AI-Empowered Computer Vision Tool for Locating and Recognizing Traffic Signs (June 18, 2025, 10:30 – 11:30 PT)

Presenters: Dr. Yinhai Wang, Professor, UW | Shucheng Zhang, Ph.D. Student, UW | Trevor McCain, Traffic Signing Specialist, WSDOT

Access the recording



Maintaining an accurate traffic sign inventory is essential for roadway safety, yet traditional methods are labor-intensive and inefficient. This research developed an AI-powered system that leverages deep learning and computer vision to automatically locate and recognize traffic signs from log videos and open street images. The system comprises four integrated modules—detection, tracking, assessment, and inventory building—with geospatial visualization of results. This automated process is a novel application of AI within transportation and offers a scalable, cost-effective solution that agencies can use to manage traffic assets more efficiently and enhance roadway safety.

Incorporating Organic Materials to Promote Stream Stability: A Flume Study Approach (May 2025)

Presenters: Tyler Fouty, Water Resources Engineer, Jacobs | Julie Heilman, State Hydraulics Engineer, WSDOT

Access the recording

The goal of this research was to address the decline of fish populations in the Pacific Northwest as a result of culverts creating barriers. Washington state's 1999 design policies introduced "stream simulation culverts" with sediment linings to improve fish movement. The study investigated incorporating organic materials into simulated streambeds to increase stability in channels and fish passage during low flows. Various designs were tested under different flood events, revealing that organic materials effectively reduce sediment transport and stabilize channels. Key findings include optimal wood-sediment ratios and configurations for different channel types and slopes.

TRAC e-News will be delivered about three times a year. For more information about TRAC and the ground-breaking work we are doing, please visit our Current Projects and Research News pages. A downloadable, pdf version of this newsletter is also available.

For contact information, follow these links:

- WSDOT Contacts
- UW Contacts
- WSU Contacts

The Washington State Transportation Center (TRAC) is a cooperative, interdisciplinary transportation research agency. Its members, the Washington State Department of Transportation (WSDOT), Washington State University (WSU), and the University of Washington (UW), formed TRAC in 1983 to coordinate transportation research efforts—both state and commercial, public and private—and to develop research opportunities both nationally and locally. TRAC acts as a link among government agencies, university researchers, and the private sector.

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