FHWA R&T NOW

A newsletter about research, development, and technology at the U.S. Department of Transportation's (USDOT) Federal Highway Administration (FHWA).

Federal Lands Highway

Innovative Designs and Environmental Considerations for Hawaii Project Garner Civil Engineering Award

By Central Federal Lands Highway Division (CFL), Office of Federal Lands Highway.

In Hawaii, the intersection of Kuhio Highway and Mailihuna Road had been historically vulnerable to flooding and perceived as unsafe for cars, pedestrians, and bicyclists. Additionally, the nearby Kapaa Stream Bridge had been labeled as "poor condition" in a 2013 bridge inspection report.[1] To address these problems, FHWA CFL and a lead designer firm spearheaded a multiyear major infrastructure improvement project. In the process, they had to handle an array of issues, such as high volumes of vehicle and pedestrian traffic during construction, controversial right-of-way challenges, relocation of multiple utilities, and unique environmental constraints (such as biological and archaeological monitoring).

Source: FHWA.

This innovative T-intersection and roundabout design addresses high traffic volumes while mitigating speeding.

Innovative design addressed the major issues of the intersection and the nearby bridge. For example, the design team replaced the T-intersection with a roundabout to address high traffic volume and vehicle speeding. The two-span Kapaa Stream Bridge was replaced with a longer, wider, and more resilient single span bridge that could handle rising water levels during a flood. To ensure the bridge and intersection redesign fit into its surrounding environment, the construction team used geosynthetic reinforced slope walls along Mailihuna Road. They also constructed bike lanes, sidewalks, and beach-access crossings at the roundabout to keep pedestrians safe. To address right-of-way challenges, the community was actively consulted

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and involved during project planning, including private residents whose property were directly impacted.

The project required coordination with multiple utility operators to resolve complex utility conflicts. This effort resulted in phased temporary and permanent relocations of high-voltage power lines and three different telecommunication lines. Careful high-voltage utility relocation planning preserved uninterrupted solar power generation from the neighboring plant for the local community.

The results of the project were highly lauded. After its completion, the project was awarded the American Society of Civil Engineers Hawaii Section's 2023 Outstanding Civil Engineering Achievement.[2] This accomplishment reflects the effective guidance and leadership that FHWA CFL displayed to make the challenging project a reality.

For more information on this project, please reach out to Andrew Coit, CFL construction operations engineer, at andrew.coit@dot.gov and Russell Carlson, project engineer, at russell.carlson@dot.gov.

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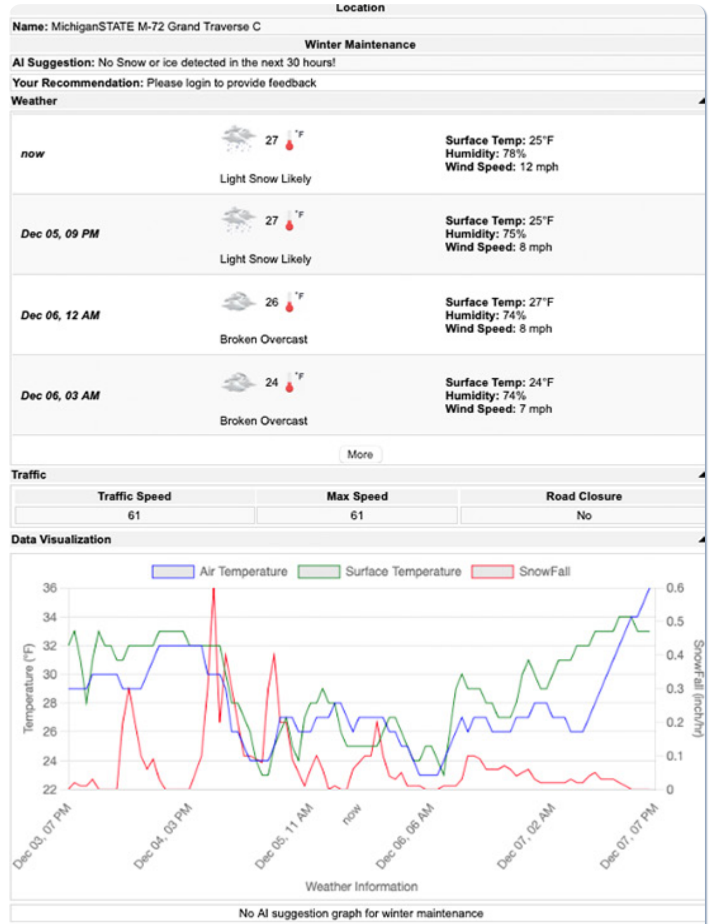
Infrastructure

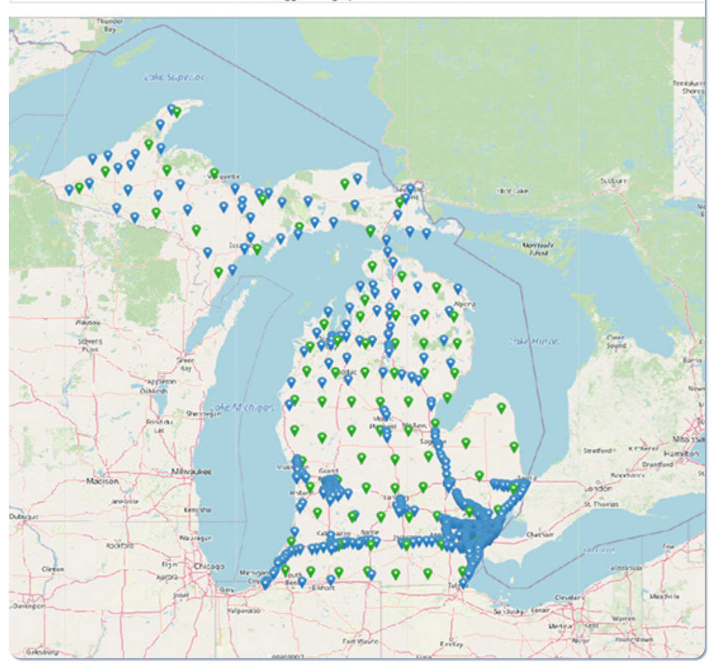
Harnessing the Power of Artificial Intelligence (AI) to Improve Winter Maintenance Practices

By Amir Golalipour, Highway Research Engineer, Office of Infrastructure Research and Development, TFHRC.

Snow on roads can create a host of operational problems for the traveling public and transportation agencies' road maintenance crew—not to mention damage to infrastructure. Twenty-four percent of weather-related vehicle crashes occur on snowy, slushy, or icy pavement, and 15 percent happen during snowfall or sleet.[1]

Winter road maintenance accounts for roughly 20 percent of State departments of transportation budgets;[1] State and local agencies spend more than $2.3 billion on winter maintenance.[1]





All images: © Leo Liu.
A series of screenshots of SmartMDSS.

Exploratory Advanced Research (or EAR) Program-sponsored research examined how to make winter maintenance operations more efficient and effective. This research, led by Zhen (Leo) Liu, an associate professor at the University of Virginia (UVA), in collaboration with UVA and Michigan Technological University, developed into a “Smart” Maintenance Decision Support System (SmartMDSS) web-based application that enhances winter maintenance with big data and AI.

The research addressed three critical gaps in current winter maintenance practices. First, it harnessed the power of historical data—which are underutilized in conventional Maintenance Decision Support Systems for winter maintenance and other road operations—to better understand, predict, and interact with road conditions. Second, the research employed AI models that can continuously learn and adapt, enabling the models to improve as more data becomes available. Third, the research automated data analysis and decisionmaking, helping to reduce the need for manual input, minimize human error, and enable another way for knowledge transfer.

The target SmartMDSS uses deep- and reinforcement learning techniques to predict and sense changing road conditions and recommend maintenance actions. SmartMDSS leverages data from various sources like road weather information systems, traffic sensors, and surveillance cameras. Researchers used such data to train, support, and validate the AI models, which have been holistically deployed to better inform, advise, and train the winter road maintenance workforce. Training and validation are needed to ensure that the AI models come to accurate conclusions about the data and analysis undertaken by the AI entity.

The primary research deliverables, including various data, AI models, and cloud computing infrastructure, were incorporated into the development of an online portal (SmartMDSS.org), providing real-time decision support for winter road maintenance in Michigan and other States. The project’s details, including the website, have been shared with broad audiences at local and national conferences and training events. With feedback from such audiences and users, the research team continuously improves, expands, and validates SmartMDSS for higher technical maturity and broader impacts.

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Infrastructure

Enhancing Inspection of Steel Bridges with Artificial Intelligence (AI) and Augmented Reality (AR)

By Hoda Azari, Nondestructive Evaluation Research Program Manager, Office of Infrastructure Research and Development, TFHRC, and David Behzadpour, Technology Transfer Engineer, Kansas Department of Transportation.

The steel bridges of the United States face the twin problems of fatigue cracking from heavy traffic loads and rusting over time. Trained bridge inspectors perform visual evaluations of these bridges in a labor-intensive process subject to human error. State departments of transportation (DOTs) depend on these naked-eye bridge inspections as a matter of necessity.

Source: FHWA.
Videos taken by uncrewed vehicle systems are later analyzed by computer vision to detect what the human eye cannot see.

Now, a Transportation Pooled Fund (TPF) project named Human-centered Steel Bridge Inspection enabled by Augmented Reality and Artificial Intelligence, TPF-5(535), aims to empower bridge inspectors through new inspection technology.[1] The TPF Program allows its partners, such as State DOTs, to pool funding, expertise, and other resources to conduct high-priority research in overcoming common transportation challenges. The Human-centered Steel Bridge Inspection enabled by Augmented Reality and Artificial Intelligence study offers the promise of automating much of the bridge inspection process with a tool that incorporates computer vision, AI, and AR.

The study is a product of the National Cooperative Highway Research Program, IDEA 20-30/IDEA 223.[2]

The research team performing this study intends to provide participating TPF Program partners with AR software packages. These software packages will use AI algorithms to automate damage detection for steel bridges. The software will be compatible with both existing AR headsets and tablet devices, potentially adding another tool to the bridge inspector's toolkit.

The algorithms developed by the research team will rely on two distinct methods. One method will use image-based deep learning to find and segment bridge areas with probable cracking and corrosion. The other will use video-based algorithms for a more indepth analysis of those problematic bridge areas.

On the ground, bridge inspectors will first be able to acquire images or record a brief video of the bridge area they're inspecting with their headsets; however, caution must be used when using headsets in the field due to diminished situational awareness, leading to safety concerns. The images or video will then be uploaded to a server and analyzed by computer vision algorithms. These computer vision algorithms can detect signs of damage that may be difficult for the naked eye to detect. The computer vision algorithms will detect bridge areas in need of closer examination. Those bridge areas will then be denoted by holograms projected into the bridge inspector's field of vision as they reexamine the bridge areas through their headsets. Additionally, researchers will incorporate unmanned aerial vehicles for image and video acquisition, supporting AR-based inspections via tablet devices.

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Safety and Operations
Testing Human Subjects with Simulated Reality Improves Roadway Safety

By Jesse Eisert, Research Psychologist, Human Factors Team, Office of Research, Development and Technology, TFHRC.

The National Highway Traffic Safety Administration (NHTSA) estimates that 40,990 people were killed on the Nation's roadways in 2023.(1) Given that at the core of the Safe System Approach is the acknowledgment that road users will inevitably make mistakes, and those mistakes can lead to crashes, it is imperative that FHWA understand the variables.(2)

Understanding the interwoven variables and human behaviors that lead to a crash is complex. Incidents are often the product of an unusual set of roadway circumstances, and sometimes, not enough data is compiled to draw relevant conclusions from them. Recreating motor vehicle accidents with real motor vehicles and human subjects to gather more data also isn't possible, reliable, or ethical.

Instead, to gather more data and better understand the human behaviors that lead to a crash, the FHWA Human Factors Laboratory team uses advanced research tools to simulate the accidents that happen on U.S. roadways.

"Simulation is an essential tool for research as it allows us to test complex, rare, and dangerous roadway scenarios in a safe, controlled, and repeatable manner," says Technical Director James Pol of the FHWA Office of Safety and Operations Research and Development.

To conduct research in a safe and controlled manner with live humans, the Human Factors team uses the Highway Driving Simulator (HDS). HDS uses seven high resolution 4K projector screens, which provide a 220-degree field of view of a virtual roadway. The machine simulates roadway sounds, such as engine, wind, and tire noises.(3)

HDS provides a fully immersive roadway experience and utilizes an eye tracker to follow individual eye movements and gaze patterns as roadway scenarios unfold. The system allows for the continuous monitoring of a driver's decisionmaking, including speed, lane shifts, reactions to signs and roadway hazards, and other variables. Physiological phenomena such as the driver's heart rate are also monitored by the simulator.(3)

Source: FHWA.
HDS allows the Human Factors team to better understand driver behavior.

Terms	Definition
Automated driving systems	Automated driving systems are any combination of hardware and software that make the automation of driving possible.
Cooperative driving automation	Cooperative driving automation enables communication and cooperation between vehicles equipped with driving automation features, other road users, and transportation infrastructure.(5)

Emerging automated system technologies have also been tested with HDS. Following a drive using an automated driving system integrated into the simulator, the Human Factors team provides the driver with questionnaires to better understand their perceptions of the automated system in use. These questionnaires ask critical questions concerning user trust, distrust, misuse, and abuse of the automated system. Through a comprehensive view of these user behaviors, the team can gain a better understanding of how motor vehicle drivers on our roads would use an automated vehicle system.(3)

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Federal Lands Highway
Building on Not-So-Solid Ground

By Evan Garich, Geotechnical Engineer Team Lead, Office of Western Federal Lands Highway Division (WFL); Eric Lim, Senior Geotechnical Engineer, WFL; and Nicholas Farny, Engineering Geologist, WFL.

Source: FHWA Office of Federal Lands Highway.
Building continues on the Pretty Rocks bridge.

Constructing roads, bridges, and other elements of infrastructure presents extraordinary challenges in landslide-prone regions. For example, beneath the surface, almost 85 percent of the State of Alaska is covered in permafrost; rising temperatures from global warming have accelerated the melting of this permafrost.[1] Roadways, bridges, and other structures built on top of the permafrost have foundations that are now prone to slipping, buckling, and sliding away, rendering many of them structurally unfit and vulnerable to collapse without intervention.

Designing and constructing roads with these types of limitations and challenges in mind ensures that any transportation investments are not prematurely damaged by physical events such as water, ice, and mud. The FHWA Office of Federal Lands Highway (FLH) frequently overcomes these environmental challenges of building on not-so-solid ground with creative geotechnical engineering solutions.

In Denali, AK, FLH is confronting the melting permafrost issue head-on as building continues on a new bridge over the Pretty Rocks landslide. The new Pretty Rocks bridge will incorporate thermosiphons to stave off the destabilizing threat of melting permafrost. Thermosiphons deliver warmth from the melting permafrost to the surface, operating on the principle that warm air is lighter and less dense than cold air. The goal of using thermosiphons is to stabilize the road or bridge foundation by stopping the permafrost from melting. The thermosiphons can transfer enough heat to the surface to prevent the melting of the permafrost, stabilizing the foundation under the infrastructure. Construction on the new Pretty Rocks bridge started in the summer of 2023, with a completion date scheduled for 2026.[2]

More than 1,600 miles away, FHWA confronted another geotechnical engineering challenge. In Tillamook, OR, a landslide disrupted service on the Cape Meares Loop Road and resulted in the closing of a section on the Three Capes Scenic Route. To avoid active landslide areas while still providing access to the Cape Meares National Wildlife Refuge and Cape Meares State Scenic Viewpoint and Lighthouse, FLH built a 1.7-mile bypass road linking Oceanside and Bay Ocean Roads. Since this bypass road required a large embankment fill over older inactive landslide materials, the FLH team used a lightweight material called geofoam to fill heights up to 40 ft. high.[3]

Geofoam makes for a useful geotechnical engineering technology and is often used as a fill material due to its lightweight. The light weight of the geofoam reduces high stresses on the materials below it, mitigating the risk of settlement, displacement, and reactivation of the older landslides.

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Safety and Operations

Cooperative Driving Automation (CDA) Preparing for a Future with Less Congestion

By Pavle Bujanovic, CDA Technical Manager, Transportation Enabling Technologies Team, Office of Safety and Operations Research and Development, TFHRC.

A 2024 report found that the average U.S. driver lost 42 hours to traffic congestion the previous year, costing the Nation more than $70.4 billion.[1] Until now, transportation users could only imagine a system where congestion is dramatically reduced. Research at Turner-Fairbank Highway Research Center (TFHRC) recently focused on technology that could help scale down traffic and its associated costs.

Such research involved the testing of an integrated highway prototype using CDA technologies. CDA technologies can potentially increase traffic volume (the number of vehicles traveling through a system per unit of time) by up to 28 percent overall and up to 80 percent in a bottleneck area, yet reduce travel times by 35 percent.[2]

© Lunamarina/stock.adobe.com
Heavy traffic moves across the Brooklyn Bridge each day.

A research team tested the integrated highway prototype with up to five SAE International® Level 2+ vehicles on a closed track.[2] First tested on a limited basis at TFHRC in McLean, VA, then at a test facility in Auburndale, FL, the vehicles performed platooning (vehicles traveling closely together in a coordinated, automated convoy), cooperative merging (vehicles working together to merge onto highways or into traffic lanes), and speed harmonization (vehicles adjusting their speed dynamically based on real-time traffic conditions received from infrastructure). Testing used the following CDA infrastructure and equipment:

- CARMA Platform℠: enables vehicles to platoon and cooperatively merge on a roadway using a vehicle-based platform to interact with other road elements.
- Vehicle-to-Everything Hub: serves as the roadside interface between the infrastructure and the vehicles.
- CARMA Cloud℠: runs the speed harmonization algorithm and provides speed guidance to vehicles based on traffic volume data.

Although the research team conducted a number of different tests, the pinnacle of the testing events involved a single scenario that combined all three capabilities—platooning, cooperative merging, and speed harmonization in a highway environment.

The validation testing conducted by the study showed that the vehicles could execute front-join, rear-join, and speed harmonization operations on a closed test track—all significant for merging into the automated convoy. The team identified potential areas of improvement, such as advanced lane-keeping abilities (driver assistance systems that keep a vehicle in its lane) and sensing capability integration (the combination of sensing capabilities with communication networks to detect and identify objects in the environment) to enable improved object detection and avoidance functions.

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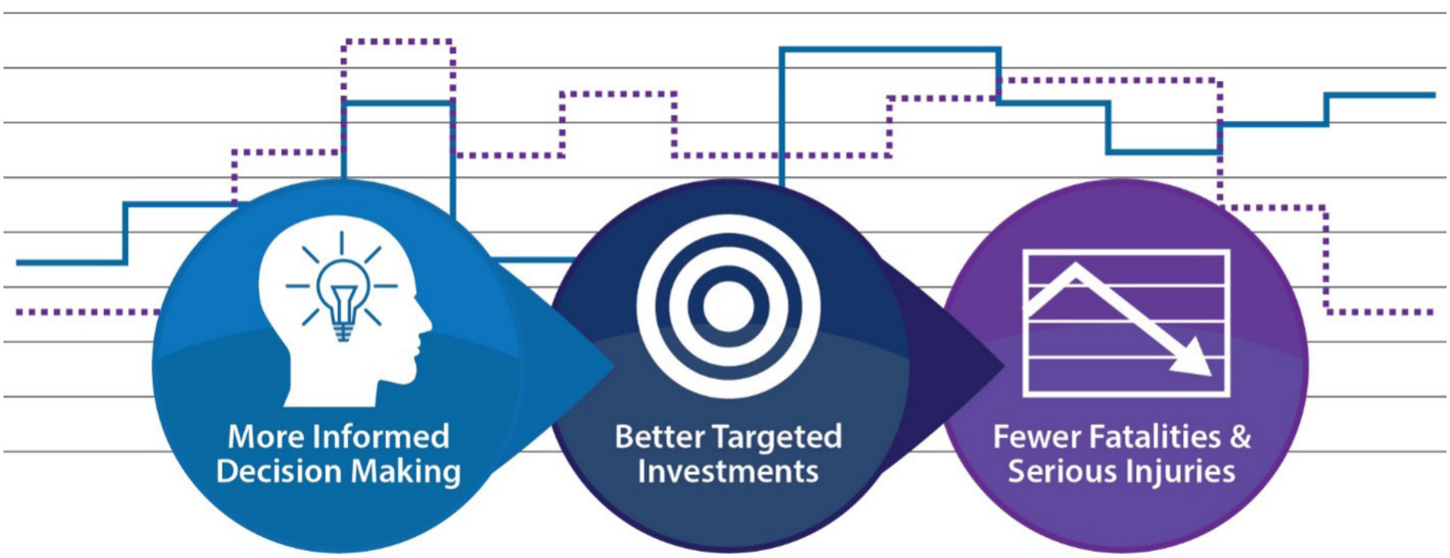
Safety and Operations

Data-Driven Safety Analysis (DDSA) Makes Calculating Safety Impacts Easier

By Matt Hinshaw, DDSA Program Manager, Office of Safety.

Traditionally, transportation safety analysts performing crash and roadway analyses have had to rely on subjective or limited quantitative measures of safety performance to guide their decisionmaking; more objective quantitative safety performance metrics were lacking. Objective metrics can help reduce bias in transportation decisionmaking—and hold the key to easier estimation of the impacts of safety improvements. Ultimately, using evidence-based, objective metrics to measure safety performance increases the quality of transportation decisionmaking, leading to safer roads. Crash prediction models have unlocked more of the potential found in creating metrics, transforming transportation decisionmaking nationwide. Using these new models is one way to apply DDSA.[1,2] DDSA is an approach to roadway design that says, to the greatest extent possible, practitioners should incorporate data in their decisionmaking. The overarching concept for DDSA is that a standardized, consistent, data and evidence-driven approach will lead to design decisions that prioritize safety.



Source: FHWA.
Benefits of DDSA applications.

Predictive analysis is one DDSA approach used to identify places on our roads with high potential for improvement. Predictive analysis also quantifies expectations of safety performance for different safety improvements. This form of analysis combines traffic volume data, crash data, and roadway inventory data to predict safety performance.(2) Practitioners use safety performance functions with their agency's data to calibrate and evaluate these newer transportation safety models.(1) Currently, at least 75 percent of U.S. State departments of transportation use of some DDSA in the project development lifecycle.

Systemic analysis is another DDSA approach used to identify high-risk roadway features correlating to certain crash types. One benefit of systemic analysis is its ability to identify high-risk roadway features even when the frequency of crashes at roadway locations with these high-risk features is low. People applying systemic analysis can then target those high-risk locations with countermeasures to mitigate the safety risk. Traditionally, agencies have had to rely on historical crash data to determine high-risk locations on the Nation's roads.(2) FHWA recently published the *Systemic Safety User Guide*, which is a substantial update to this approach.(3)

DDSA originally promoted the use of predictive and systemic safety analysis; however, the DDSA field has now grown to include more methods of evidence-based data analysis, allowing transportation analysts the flexibility to do more with their own datasets. For example, macro-level or areawide safety analysis predicts crashes for areas instead of road segments or intersections. This form of analysis is an innovative tool for long-range planning and development over a large area.(2) Besides predictive models, the systemic safety and risk-based approaches, DDSA is expanding toward including surrogate measures of safety, design flag assessments, Safe System Approach frameworks such as intersection conflict point analysis, transportation system management and operations strategies, and video analytics with machine learning.(4)

Now, with such growth, FHWA is considering developing resources that assist practitioners with evaluating this expanded "menu of options" of DDSA methods within their safety performance assessments. FHWA encourages practitioners to select the DDSA method they best see fit for their use case and incorporate these assessments into every stage of the project development lifecycle.(1)

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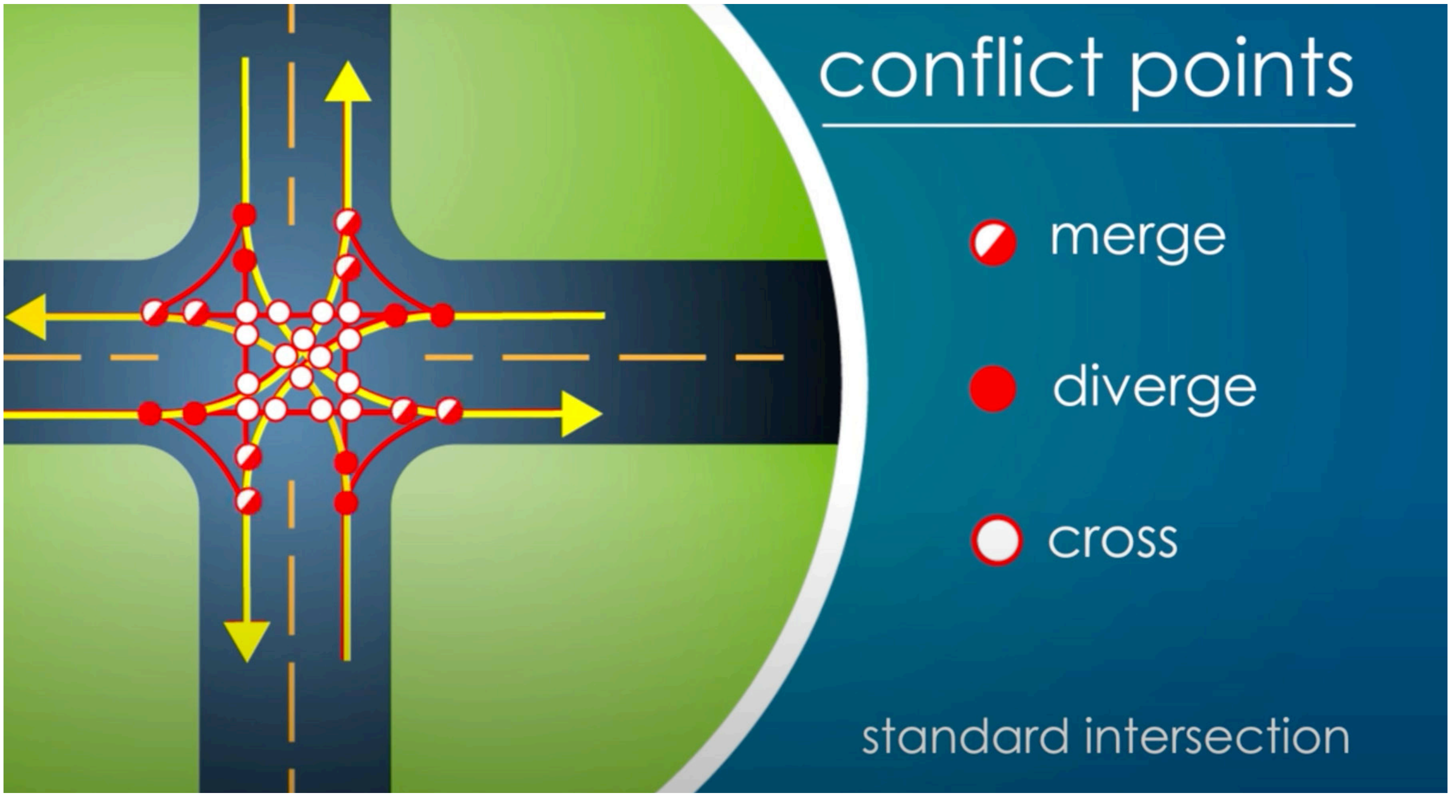
Safety and Operations

Cooperative Driving Automation (CDA) Can Enhance Safety at Traffic Intersections

By Pavle Bujanovic, CDA Technical Manager, Transportation Enabling Technologies Team, Office of Safety and Operations Research and Development, TFHRC.

Intersection safety remains a pressing concern throughout the United States. Each year, nearly one-quarter of traffic fatalities and about one-half of all traffic injuries in the Nation occur at intersections.(1) CDA, the coordination of road infrastructure with multiple automated vehicles (AVs) to improve safety, efficiency, and traffic throughput, has the potential to significantly reduce intersection safety issues. Through a recent use case, an FHWA research team tested CDA technologies with advanced traffic signal controller algorithms to help AVs navigate signalized intersections. These algorithms help to ensure that the roadside unit communicating with AVs facilitates smooth, continuous traffic flow through an intersection.(2)



Source: FHWA.
A screenshot of the *Principles of Roadway Safety* video.

The use case involved two stages: simulation and proof-of-concept (PoC) testing. The team conducted simulation experiments to evaluate and fine-tune the algorithms for four SAE International® cooperation classes, where each cooperation class executes CDA using different types of shared information, comparing them to human-driven vehicles at a fixed-time traffic signal.(2) The results of the simulation testing found that the algorithms eliminated stop-and-go traffic patterns and backward shockwave propagation—a disruption in traffic flow that forces vehicles to brake or slow down. For the PoC testing, the research team studied the traffic signal controller algorithms with full-sized FHWA vehicles and CDA-equipped infrastructure on controlled test tracks at the Turner-Fairbank Highway Research Center. The testing evaluated the algorithms under three different groups of scenarios where the number of FHWA vehicles, traffic signal configuration, vehicle placement, maximum vehicle speed, and other factors varied. The subsequent PoC results confirmed that the framework used by the testing meets a set of needs for message processing, communication rates, and algorithmic logic, including having correct:

- Vehicle prioritization.
- Vehicle trajectory sequencing.
- Vehicle adherence to allowable deceleration and acceleration boundaries.

This use case demonstrated the benefits of using advanced traffic signal control capabilities at signalized intersections with CDA technologies. The developed framework has laid the groundwork for future research in large-scale testing, mixed-traffic environments, and more dynamic situations (e.g., urban and rural roadway environments).

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Infrastructure

Using Artificial Intelligence (AI) to Help Analyze Bridge Deck Inspection Data

By Hoda Azari, Nondestructive Evaluation Research Program Manager, Office of Infrastructure Research and Development, TFHRC.

Bridges withstand significant stress from heavy traffic and face accelerated deterioration from weather and aging. According to InfoBridge™, in 2024, 45 percent of bridges in the United States were more than 50 years old, and about 6.75 percent of U.S. bridges were considered to be in poor condition.[1] State departments of transportation (DOTs) provide stewardship over the Nation's bridges and bridge inspectors and asset managers continue to look for new or improved methods that will enhance condition assessment and provide accurate data for asset management decisionmaking. The initial effects of deterioration and aging occurring at the subsurface may not be readily identifiable using traditional inspection techniques and under typical access limitations. Similarly, the advanced effects of deterioration and aging may have a different severity, more or less, than identified using traditional techniques.

Using NDE technology in tandem with neural networks could make for a more efficient bridge inspection process.

Accurate condition assessment can offer multiple advantages: preventive mitigation of early identified deterioration; reliable data for asset management planning, including relative prioritization of bridges and their required maintenance or capital work; and accurate estimation of remaining service life. These advantages lead to life-cycle cost efficiencies including for bridges at an older age and deteriorated conditions requiring more frequent and costly maintenance or interventions.

In McLean, VA, the researchers at FHWA's Turner-Fairbank Highway Research Center are exploring and evaluating advanced technologies to assess the condition of bridge components. NDE technologies show great promise in providing bridge inspectors with critical information on the condition of bridge components. Without causing damage, NDE technologies such as ground penetrating radar, infrared thermography, and impact echo enable inspectors to detect hidden damage beneath the surface that is not visible to the human eye during standard inspections.

One challenge of adopting NDE technologies has been the need for NDE experts to interpret the data—sometimes massive amounts of data. However, recent advances in AI allow experts to analyze and integrate multiple datasets. Research published by the FHWA's NDE Program demonstrated the potential of combining NDE technology with neural networks to investigate AI applications for bridge inspections.[2]

In this study, the research team employed the impact echo technique. This technique involved the use of steel sphere impactors to create seismic waves that traveled through various concrete specimens. The specimens contained artificial subsurface defects.[2]

The seismic waves reflected off the defects in these specimens, creating echoes. The researchers recorded the amplitude of these echoes using an accelerometer. This data was then used to develop, train, and test a one-dimensional (1D) and a two-dimensional convolutional neural network (CNN). The researchers compared defect maps produced by the 1D CNN with those generated using conventional data analysis methods. They found that the 1D CNN created more accurate defect maps.[2]

In another study, the NDE Program leveraged spatial-temporal data obtained from three NDE techniques to predict bridge conditions using the Temporal Graph Convolution Network (TGCN). This advanced AI framework combines graph convolutional networks with recurrent neural networks, enabling it to analyze spatial relationships among structural elements while accounting for changes over time. By integrating data from multiple NDE methods, TGCN provides a comprehensive understanding of a bridge deck's condition. This approach not only improves the accuracy of condition assessments but also aids in identifying patterns of deterioration and predicting future performance, making it a powerful tool for proactive preservation planning.[3]

Extending a bridge's lifespan requires proactive planning, including early detection of subsurface conditions and preventive preservation to reduce costly reactive repairs and rehabilitation. With AI emerging as a viable tool to support human experts with the interpretation of data from NDE instruments, bridge inspectors will soon be able to use a broader range of NDE methods. This would add another tool to their bridge inspection toolkit and help State DOTs and other agencies manage bridge assets more effectively and cost-efficiently.

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Recent Publications

December 2024

Exploratory Advanced Research (EAR) Program Highlights

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Publication No.: FHWA-HRT-25-040

Pocket Lidar for Trench Measurement

Date: December 18, 2024
Publication No.: FHWA-HRT-25-015

Selection and Characterization of the Foundation Materials for the Third-Generation FHWA Pavement Test Facility

Date: December 18, 2024
Publication No.: FHWA-HRT-25-023

Incorporating Nondestructive Evaluation Methods Into Bridge Deck Preservation Strategies

Date: December 18, 2024
Publication No.: FHWA-HRT-25-009

Exploring the Effects of Vehicle Automation and Cooperative Messaging on Mixed Fleet Eco-Drive Interactions

Date: December 18, 2024
Publication No.: FHWA-HRT-24-169

Exploratory Advanced Research (EAR) Program Compendium of Papers from Funded Research Projects - Updated for 2024

Date: December 16, 2024
Publication No.: FHWA-HRT-25-018

FHWA InfoHighway - Data, Knowledge, and Analytical Tools that Improve the Performance of Highway Infrastructure Assets

Date: December 16, 2024
Publication No.: FHWA-HRT-25-036

Turner-Fairbank Highway Research Center Office of Safety and Operations Research and Development (R&D)

Date: December 16, 2024
Publication No.: FHWA-HRT-25-030

Turner-Fairbank Highway Research Center - Innovating the Future of Transportation - Resources

Date: December 16, 2024
Publication No.: FHWA-HRT-25-032

The Role of Artificial Intelligence and Machine Learning in Federally Supported Surface Transportation - 2024 Updates

Date: December 13, 2024
Publication No.: FHWA-HRT-25-020

Fast Lane - Exploring Human Behavior - Volume 20

Date: December 13, 2024
Publication No.: FHWA-HRT-25-026

Geometric Design Laboratory Bridging Safety, Design, and Innovation for Safer Roads

Date: December 13, 2024
Publication No.: FHWA-HRT-25-005

Excellence in Highway Safety Data Awards

Date: December 12, 2024
Publication No.: FHWA-HRT-25-024

Inventorying, Documenting, and Configuring Traffic Management System (TMS) Assets and Resources

Date: December 12, 2024
Publication No.: FHWA-HRT-25-031

Linking NDE Data and Bridge Deck Performance

Date: December 12, 2024
Publication No.: FHWA-HRT-24-173

HSIS - The Essential Analysis Resource for Making Informed Safety Decisions

Date: December 12, 2024
Publication No.: FHWA-HRT-25-027

Real-Time Data Analysis and Trust Building with the Connected and Automated Vehicle (CAV) Telematics Tool

Date: December 10, 2024
Publication No.: FHWA-HRT-25-021

Distributed Testing and the Virtual Open Innovation Collaborative Environment for Safety (VOICES™)

Date: December 9, 2024
Publication No.: FHWA-HRT-25-010

CDASim An Open-source Cosimulation Tool to Support Cooperative Driving Automation (CDA) Research

Date: December 9, 2024
Publication No.: FHWA-HRT-25-008

Emerging Data Cleaning and Fusion for Traffic Model Calibration–Data Fusion for Microsimulation Model Calibration

Date: December 6, 2024
Publication No.: FHWA-HRT-24-142

November 2024

Interactive Highway Safety Design Model (IHSDM)-Related Safety Data Case Studies

Date: November 18, 2024
Publication No.: FHWA-HRT-24-181

Cooperative Automated Driving (CDA) Program Annual Report: 2023 Edition

Date: November 18, 2024
Publication No.: FHWA-HRT-24-163

Incorporating Nondestructive Evaluation Methods into Bridge Deck Preservation Strategies

Date: November 14, 2024
Publication No.: FHWA-HRT-24-186

The System Dynamics of Flooded Pavements

Date: November 14, 2024
Publication No.: FHWA-HRT-24-096

Evaluating The Load Capacities of Flooded Pavements: Improving Practices and Developing Data-Driven Evaluation

Date: November 14, 2024
Publication No.: FHWA-HRT-24-095

Annual Performance Expenditure Report (APER)

Date: November 14, 2024
Publication No.: FHWA-HRT-24-160

FHWA's Future Plans for IHSDM

Date: November 12, 2024
Publication No.: FHWA-HRT-24-182

Enhancing Vulnerable Road User Safety at Signalized Intersections Through Cooperative Perception and Driving Automation

Date: November 7, 2024
Publication No.: FHWA-HRT-24-171

Quantification of the Correlation Between Bridge Skew Angle and Concrete Deck Deterioration Rate in New Jersey

Date: November 7, 2024
Publication No.: FHWA-HRT-24-109

Office of Research Services (HRRS)

Date: November 4, 2024
Publication No.: FHWA-HRT-24-177

A Systematic Approach to Selection of CMS Messaging During Nonrecurring Events

Date: November 4, 2024
Publication No.: FHWA-HRT-24-161

IHSDM Resource List - December 2024

Date: November 4, 2024
Publication No.: FHWA-HRT-24-180

October 2024

Turner-Fairbank Highway Research Center (TFHRC) Long-Range Plan

Date: October 30, 2024
Publication No.: FHWA-HRT-24-190

Complete Streets Transportation Pooled Fund (TPF) Study

Date: October 24, 2024
Publication No.: FHWA-HRT-24-176

Spectrum Needs for CDA Use Cases

Date: October 24, 2024
Publication No.: FHWA-HRT-24-165

Cooperative Driving Automation Alerts During Rainy Weather Conditions

Date: October 24, 2024
Publication No.: FHWA-HRT-24-162

Guidebook for the Maine Data Files

Date: October 15, 2024
Publication No.: FHWA-HRT-24-107

Guidebook for the North Carolina Data Files

Date: October 15, 2024
Publication No.: FHWA-HRT-24-108

Traffic Management Systems (TMSs) Supporting the Use of Part-Time Shoulders

Date: October 15, 2024
Publication No.: FHWA-HRT-24-172

Advanced Traffic Signal Control Optimization in a Cooperative Driving Automation Environment

Date: October 15, 2024
Publication No.: FHWA-HRT-24-151

Field Evaluation of At-Grade Alternative Intersection Designs, Volume II—Safety Report

Date: October 10, 2024
Publication No.: FHWA-HRT-24-155

Virtual Open Innovation Collaborative Environment for Safety (VOICES) Distributed Testing Pilot Test 1

Date: October 8, 2024
Publication No.: FHWA-HRT-24-159

Transportation Pooled Fund (TPF) - Quarterly Update - September 2024

Date: October 8, 2024
Publication No.: FHWA-HRT-24-170

September 2024

Laboratory Evaluation of Five Metallic Strand Materials for Corrosion Control of Post-Tensioned Tendons: Summary of Preliminary Findings

Date: September 19, 2024
Publication No.: FHWA-HRT-24-158

Measuring Decarbonization in the Pavement Cycle

Date: September 16, 2024
Publication No.: FHWA-HRT-24-056

Development of Next-Generation Pavement Performance Measures and Asset Management Methodologies to Support MAP-21 Performance Management Objectives

Date: September 13, 2024
Publication No.: FHWA-HRT-23-102

Using Artificial Intelligence to Evaluate Pavement Condition and Safety

Date: September 13, 2024
Publication No.: FHWA-HRT-24-058

Exploratory Testing of Stress Corrosion Cracking in Stainless Steels at Low Temperature

Date: September 11, 2024
Publication No.: FHWA-HRT-24-132

A Systematic Approach on CMS Messaging Selection During Nonrecurring Events: Decision Tree

Date: September 5, 2024
Publication No.: FHWA-HRT-24-139

Corrosion-Induced Major Tendon Failures in Post-Tension (PT) Concrete Bridges

Date: September 3, 2024
Publication No.: FHWA-HRT-24-148

Traffic Management Systems Managing the Use of Variable Speed Limits During Adverse Weather Conditions

Date: September 3, 2024
Publication No.: FHWA-HRT-24-157

The Transportation Pooled Fund (TPF) Excellence Awards Debut

Date: September 3, 2024
Publication No.: FHWA-HRT-24-119

Field Evaluation of At-Grade Alternative Intersection Designs, Volume II- Safety Report

Date: September 3, 2024
Publication No.: FHWA-HRT-24-156

Multidisciplinary Data Management Support - 101 Overview

Date: September 3, 2024
Publication No.: FHWA-HRT-24-164

Assessment of Data Sources for First Responder Struck-By Crashes

Date: September 3, 2024
Publication No.: FHWA-HOP-23-069

Guidebook for the Minnesota Data Files

Date: September 3, 2024
Publication No.: FHWA-HRT-24-120

August 2024

Guidebook for the Illinois Data Files

Date: August 28, 2024
Publication No.: FHWA-HRT-24-114

Highway Safety Information System Guidebook for the California Data Files

Date: August 27, 2024
Publication No.: FHWA-HRT-24-115

Highway Safety Information System Guidebook for the City of Charlotte Data Files

Date: August 26, 2024
Publication No.: FHWA-HRT-24-092

The Next Generation of Traffic Management Systems and Centers
Date: August 26, 2024
Publication No.: FHWA-HRT-24-153

Validating a Density-Profiling System for Asphalt Compaction Assessment
Date: August 15, 2024
Publication No.: FHWA-HRT-24-143

Field Evaluation of At-Grade Alternative Intersection Designs, Volume I—Operations Report
Date: August 12, 2024
Publication No.: FHWA-HRT-24-126

Inventorying, Documenting, and Configuring Traffic Management System Assets and Resources—Current Practices
Date: August 12, 2024
Publication No.: FHWA-HRT-24-145

2022 CDA Annual Report
Date: August 12, 2024
Publication No.: FHWA-HRT-24-089

Redesign of the Third-Generation FHWA Pavement Testing Facility
Date: August 9, 2024
Publication No.: FHWA-HRT-24-124

Novel Alternative Cementitious Materials for Development of the Next Generation of Sustainable Transportation Infrastructure
Date: August 2, 2024
Publication No.: FHWA-HRT-24-012

Fast Lane - Exploring Human Behavior - Volume 19
Date: August 2, 2024
Publication No.: FHWA-HRT-24-152

July 2024

Multidisciplinary Data Management Support - 101 Overview
Date: July 31, 2024
Publication No.: FHWA-HRT-24-150

TPF Excellence Awards - Member-level Redundancy in Built-up Steel Members—TPF-5(253)
Date: July 30, 2024
Publication No.: N/A

TPF Excellence Awards - Clear Roads Winter Maintenance Research—TPF-5(353) Poster
Date: July 30, 2024
Publication No.: N/A

Employing Artificial Intelligence (AI) to Enhance Infrastructure Inspections
Date: July 29, 2024
Publication No.: FHWA-HRT-24-055

LTPP Analysis-Ready Datasets: New Features and Exciting Opportunities
Date: July 26, 2024
Publication No.: FHWA-HRT-24-134

State Planning and Research (SPR) Guide for SPR-B Peer Exchanges
Date: July 23, 2024
Publication No.: FHWA-HRT-23-101

TPF-5(385) Pavement Structural Evaluation with Traffic Speed Deflection Devices (TSDDs)
Date: July 23, 2024
Publication No.: FHWA-HRT-24-059

Evaluating the Relationship Between the Driver and the Roadway to Address Rural Intersection Safety by Using SHRP2 Naturalistic Driving Study Data and the Roadway Information Database
Date: July 16, 2024
Publication No.: FHWA-HRT-24-140

Evaluation of Advisory Exit and Ramp Speed Signs
Date: July 16, 2024
Publication No.: FHWA-HRT-24-138

Using Artificial Intelligence to Improve Safety for Vulnerable Road Users
Date: July 15, 2024
Publication No.: FHWA-HRT-24-080

Development of Balanced Mixture Design Index Parameters and the Flex Suite of Performance Analysis Tools for Asphalt Pavements
Date: July 15, 2024
Publication No.: FHWA-HRT-24-113

Development of Balanced Mixture Design Index Parameters and the Flex Suite of Performance Analysis Tools for Asphalt Pavements—Volume II
Date: July 15, 2024
Publication No.: FHWA-HRT-24-111

Development of Balanced Mixture Design Index Parameters and the Flex Suite of Performance Analysis Tools for Asphalt Pavements—Volume I
Date: July 15, 2024
Publication No.: FHWA-HRT-24-112

Asphalt Binder and Mixture Laboratory Look-In
Date: July 15, 2024
Publication No.: FHWA-HRT-24-136

Highway Safety Information System Guidebook for the Washington State Data Files
Date: July 15, 2024
Publication No.: FHWA-HRT-24-077

Freeway Guide Sign Performance at Complex Interchanges: Reducing Information Overload
Date: July 15, 2024
Publication No.: FHWA-HRT-24-070

TPF Quarterly Update - June 2024
Date: July 9, 2024
Publication No.: FHWA-HRT-24-149

Innovative Methods to Detect and Measure Flooded Roadways
Date: July 8, 2024
Publication No.: FHWA-HRT-24-006

Development of Speed Crash Modification Factors (CMFs) Using SHRP2 Roadway Information Database (RID), Volume I: Final Report
Date: July 1, 2024
Publication No.: FHWA-HRT-24-129

Development of Speed Crash Modification Factors (CMFs) Using SHRP2 Roadway Information Database (RID), Volume II: Appendices
Date: July 1, 2024
Publication No.: FHWA-HRT-24-130

TRB

FHWA Presenters at the Transportation Research Board (TRB) 104th Annual Meeting

January 5–9, 2025

Please refer to the official TRB program for any changes and the most recent information.

Exploring Sustainability and Resilience from TRB's Transportation Infrastructure Group Perspective

January 5, 9 a.m.–12 p.m.
Convention Center, 202A

Session presented by Amir Golalipour (amir.golalipour@dot.gov) as part of a workshop titled Resilience and Sustainability from a Materials Perspective

Explore sustainability and resilience from the perspectives of committees in the TRB Transportation Infrastructure Group.

Data That Extends the Life Cycle of Highway Infrastructure Assets

January 5, 9 a.m.–12 p.m.
Convention Center, 207A

Deborah Walker (deborah.walker@dot.gov) and Shri Bhidé (shri.bhide@dot.gov) presiding.

Learn about and discuss how to use available data and emerging technologies to develop practical tools to extend the life-cycle of highway infrastructure assets.

The following are FHWA sessions within this workshop:

- FHWA InfoHighway™ Web Portal: Jane Jiang (jane.jiang@dot.gov).
- Breakout Group 1 - Life cycle Extension Through Preservation: Jason Dietz (jason.dietz@dot.gov).
- Breakout Group 2 – Effect of Climate and Traffic: Larry Wiser (larry.wiser@dot.gov).
- Breakout Group 3 - Resilient and Sustainable Highway Infrastructure: Amir Golalipour (amir.golalipour@dot.gov).
- Breakout Group 4 - Emerging Data Sources and Data Science: David Mensching (david.mensching@dot.gov).
- Breakout Groups' Reports: Jason Dietz, Larry Wiser, Amir Golalipour, and David Mensching.
- Closing Remarks: Jean Nehme (jean.nehme@dot.gov).

MAP Creation Tool Updates

January 5, 9:45 a.m.

Marisa Migliore (marisa.migliore@dot.gov).

Integrating Future Climate Projections into Pavement Design: What Would It Take?

January 5, 1:30–4:30 p.m.
Convention Center, 202A

Session presented by Amir Golalipour (amir.golalipour@dot.gov) as part of a workshop titled Moderator-Led Discussions.

Identify barriers to implementing future climate projections in mechanistic-empirical pavement design in the context of structural design analysis and pavement foundations.

Integrating Nondestructive Evaluation (NDE) Technologies into Bridge Preservation and Management

January 5, 1:30–4:30 p.m.
Convention Center, 204AB

Hoda Azari (hoda.azari@dot.gov) presiding.

Discuss the integration of NDE methodologies into preservation practices.

Transportation Earthworks: Design, Installation, Evaluation, and Sustainability of Lightweight Fills

January 5, 1:30–4:30 p.m.
Convention Center, Hall A

Jennifer Nicks (jennifer.nicks@dot.gov) presiding.

Examine the design, construction, evaluation, and sustainability of lightweight fills, which can replace traditionally compacted backfills to reduce or eliminate soil improvement requirements.

Long-Term Pavement Performance (LTPP) Program and Long-Term Bridge Performance (LTBP) Program

January 5-7
Convention Center, Exhibit Hall #937 and #938

Jane Jiang (jane.jiang@dot.gov).

Come to chat with the experts in highway infrastructure performances, LTPP, LTBP programs, and learn more about the available data, data analytics, and engineering tools on the FHWA InfoHighway™ web portals.

TRB TCD Committee

January 6, 8 a.m.
Convention Center, Hall A

Laura Mero (laura.mero@dot.gov) speaking.

Sharing an FHWA research update at the TRB Traffic Control Device (TCD) Committee meeting.

Advancements in Aggregate Characteristics, Functionality, and Longevity in Pavements

January 6, 8–9:45 a.m.

Session presented by Jose F. Munoz Campos (Paco) (jose.munoz.campos@dot.gov) as part of a workshop titled Long-Term Performance of Alkali-Silica Reactive Aggregates in a 63-Year-Old Bridge in Alaska.

Find out the lessons learned about the influence of aggregate mineralogy on the composition of the alkali-silica reaction products and how this information can be used to predict the long-term performance of a 65-yr-old bridge.

Pavement Structural Testing and Evaluation: Falling Weight Deflectometer, Traffic Speed Deflection Devices, Ground Penetrating Radar, Structural Modeling, and More

January 6, 8–9:45 a.m.
Convention Center, Hall A

The following are FHWA sessions within this workshop:

- A Numerical Investigation on the Role of Surface Macrotexture in Surface Reflection Method for Dielectric Measurement of Asphalt Pavement: Hoda Azari (hoda.azari@dot.gov).
- Efficient Approaches for Estimating Pavement Structural Numbers from Falling Weight Deflectometer and Traffic Speed Deflectometer Measurements for Network Level Pavement Management Applications: Nadarajah Sivaneswaran (nadarajah.sivaneswaran@dot.gov).

Federal Highway Administration Long-Term Bridge Performance (LTBP) Program

January 6, 10:15 a.m.–12 p.m.
Convention Center, 206

Shri Bhidé (shri.bhide@dot.gov) presiding.

Discover the latest activities and accomplishments of the LTBP Program, as well as the latest on the FHWA InfoBridge™. The following are FHWA sessions within this workshop:

- FHWA Long-Term Bridge Preservation Program Updates: Jane Jiang (jane.jiang@dot.gov).
- Accelerated Bridge Performance Testing - Update on Phase II: Robert Zobel (robert.zobel@dot.gov).
- InfoBridge™ – What's New: Shri Bhidé (shri.bhide@dot.gov).
- Presentation of the 2024 Long-Term Infrastructure Performance Student Data Analysis Contest Awards: Jean Nehme (jean.nehme@dot.gov).

Testing and Evaluation of Transportation Structures Committee

January 6, 10:15 a.m.–12 p.m.
Cherry Blossom (Mezz), Marriott Marquis

Hoda Azari (hoda.azari@dot.gov) presiding.

The committee addresses the use of laboratory testing, field testing, monitoring, and nondestructive evaluation methods to assess the load carrying capacity of structures, detect and quantify defects, and assess condition.

FEHRL-FHWA TRB Workshop

January 6, 2 p.m.

Abdul Zineddin (abdul.zineddin@dot.gov), Amir Golalipour (amir.golalipour@dot.gov), Pavle Bujanovic (pavle.bujanovic@dot.gov), LaToya Johnson (latoya.johnson@dot.gov), and David Mensching (david.mensching@dot.gov).

Discuss and exchange research ideas between FHWA and the Forum of European National Highway Research Laboratories (FEHRL).

Concrete Bridge Safety, Inspection, and Durability

January 6, 3:45–5:30 p.m.
Convention Center, 102A

Session presented by Hoda Azari (hoda.azari@dot.gov) as part of a workshop titled Introducing the Collaborative Highway Asset Research: Integrated Senor-Model Application (or CHARISMA) for Automated Ground Penetrating Radar Data Interpretation in Concrete Bridge Deck Inspection and Beyond.

Advanced Inspection and Structural Assessment Technologies

January 6, 3:45–5:30 p.m.
Conference Center, Hall A

Hoda Azari (hoda.azari@dot.gov) presiding.

Explore advancements in remote sensing, mixed-reality tools, and numerical modeling to improve the safety, reliability, and maintenance of highway infrastructure.

TRB

Asphalt Materials Doctoral Student Research Forum

January 6, 6–7:30 p.m.
Convention Center, Salon B

Amir Golalipour (amir.golalipour@dot.gov) presiding.

Explore doctoral student research on asphalt materials.

Traffic Simulation

January 6, 6–7:30 p.m.

Session presented by In-Kyu Lim (in-kyu.lim@dot.gov) and Rachel James (rachel.james@dot.gov) as part of a workshop titled State of the Practice Assessment and Gap Analysis of Safety-Focused Simulation and Performance.

Learn about the state of the practice in the safety analysis of traffic simulation models and existing gaps.

Automated Defect Detection and Assessment Technologies for Highway Infrastructure

January 7, 8–9:45 a.m.
Convention Center, 204AB

Hoda Azari (hoda.azari@dot.gov) presiding.

Discover the latest advancements in automated technologies for bridge and infrastructure inspection.

Structural Monitoring and Nondestructive Testing Technologies for Improved Bridge Condition Assessment

January 7, 10:15 a.m.–12 p.m.
Conference Center, 207B

Hoda Azari (hoda.azari@dot.gov) presiding.

Delve into the advanced methods for evaluating structural assets through nondestructive evaluation and structural monitoring.

Shaping the Future of Transportation: Career Insights and Strategies from Emerging Leaders

January 7, 10:15 a.m.–12 p.m.
Convention Center, Salon B

Session presented by Hoda Azari (hoda.azari@dot.gov) as part of a workshop titled Young Member Panel Modal-focused Topics.

Decision Making in Pavement Management

January 7, 10:15 a.m.–12 p.m.
Convention Center, 206

Session presented by Amir Golalipour (amir.golalipour@dot.gov) as part of a workshop titled Impact of Wildfires on Pavement Systems.

Review the use of pavement management data in making decisions related to the pavement system.

Bridge Condition Forecasting and Effective Preservation Treatments

January 7, 1:30–3:15 p.m.
Convention Center, 209C

Session presented by Mozhgan Momtaz (mozhgan.momtaz.ctr@dot.gov) and Hoda Azari (hoda.azari@dot.gov) as part of a workshop titled Bridge Condition Forecasting via Temporal Graph Convolution Networks and Nondestructive Evaluation.

Long-Term Pavement Performance (LTPP) Program

January 7, 1:30–3:15 p.m.
Convention Center, 102B

Deborah Walker (deborah.walker@dot.gov), presiding.

Discover the latest activities and accomplishments of the LTPP Program, as well as the latest development on the LTPP InfoPave™. The following are FHWA sessions within this workshop:

- Welcome from Federal Highway Administration: Jean Nehme (jean.nehme@dot.gov).
- LTPP Program Highlights: Jane Jiang (jane.jiang@dot.gov).
- LTPP Program Recent Accomplishments: Mohammed Elias (mohammed.elias@dot.gov).
- InfoHighway™ Update – Introducing FHWA InfoPTF™: Jennifer Aponte Rivera (jennifer.aponterivera@dot.gov).
- Presentation of 2024 Long-Term Infrastructure Performance Student Data Analysis Contest Awards: Jean Nehme (jean.nehme@dot.gov) and Jane Jiang (jane.jiang@dot.gov).
- Closing Remarks: Nadarajah Sivaneswaran (nadarajah.sivaneswaran@dot.gov).

Asphalt Pavement Construction Compaction and Longitudinal Joints

January 8, 8–9:45 a.m.

Tianhao Yan (tianhao.yan.ctr@dot.gov) presenting.

Soil Properties and Subsurface Investigation Techniques

January 8, 8–9:45 a.m.

Convention Center, Hall A

Session presented by Hoda Azari (hoda.azari@dot.gov) as part of a workshop titled Predicting Subsurface Abnormalities Growth using Physics-Informed Neural Networks.

Fabrication and Inspection of Metal Structures Committee

January 8, 8 a.m.–12 p.m.

Marriott Marquis, Georgetown University (M1)

Hoda Azari (hoda.azari@dot.gov).

Digital Delivery Stakeholder Meeting

January 8, 3–5 p.m.

Meeting of FHWA, AASHTO, industry, and software vendors to coordinate ongoing national digital delivery, digital construction, and openBIM efforts in the U.S. highway transportation industry. The meeting includes updates from the groups ongoing efforts, and discussion on how we can improve the alignment and collaboration of digital delivery at the national level.

Antioxidants in Asphalt

January 8, 3:45–5:30 p.m.

Convention Center, Hall A

The following are FHWA sessions within this workshop:

- Investigating the Impact of Antioxidant Dosage and Class on Asphalt Binders: A Chemo-Rheological Testing and Characterization: David Mensching (david.mensching@dot.gov).
- A Probabilistic Machine-Learning Approach for Asphalt Binder Formulation – Case Study on Antioxidant Dosage Optimization: Tianhao Yan (tianhao.yan.ctr@dot.gov), Maryam Sakhaeifar (maryam.sakhaeifar@dot.gov), and David Mensching (david.mensching@dot.gov).

Asphalt Pavement Construction Compaction and Longitudinal Joints

January 8, 8–9:45 a.m.

Session presented by Tianhao Yan (tianhao.yan.ctr@dot.gov) and Maryam Sakhaeifar (maryam.sakhaeifar@dot.gov) as part of a workshop titled A Mechanistic-Informed Data-Driven Model for Compaction of Asphalt Pavements Incorporating Gyratory and Intelligent Compaction.

Explore laboratory and field compaction as well as joint density while integrating the application of intelligent compaction and thermal profiling.

ADDITIONAL EVENTS

Research Updates at the National Committee on Uniform Traffic Control Devices (NCUTCD) Annual Meeting

January 8–10, 2025

NCUTCD Annual Meeting, Arlington, VA

Laura Mero (laura.mero@dot.gov).

Discussing FHWA research updates at multiple sessions during the 2025 NCUTCD annual meeting.

Implementing the Safe System Approach Workshop

January 15–16, 2025

Orange County and MetroPlan (Florida), Orlando, FL

Douglas Cobb (douglas.cobb@dot.gov).

Roadside Safety Design Workshop

January 21–23, 2025

Huntington, WV

James Pol (james.pol@dot.gov).

Explore the American Association of State Highway and Transportation Officials Roadside Design Guide.

More Than a Box of Rocks: Scaling Up Direct Shear Devices

January 30, 2025

ASTM Symposium on Shear Testing of Soils, Houston, TX

Jennifer Nicks (jennifer.nicks@dot.gov).

Traffic Management Systems Emerging Topics Series: Traffic Management Centers Actively Managing the Use of Queue Warning Messages on Freeways Webinar

February 19, 2025, 11 a.m.–12:30 p.m.

Jon Obenberger (jon.obenberger@dot.gov).

FHWA R&T NOW

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McLean, VA 22101-2296

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ABOUT FHWA R&T NOW

FHWA R&T Now is a quarterly electronic newsletter that contains information and updates about research, technology, and development at FHWA. Send your comments, questions, suggestions, and feedback to fhwa_now@dot.gov.

FHWA R&T Now is available online at: https://highways.dot.gov/research/publications/RTNow.

Please forward this newsletter to others who might find it interesting or useful.

LINKS

TFHRC:
https://highways.dot.gov/research

FHWA Resource Center:
https://www.fhwa.dot.gov/resourcecenter

National Highway Institute:
https://www.nhi.fhwa.dot.gov/home.aspx

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