# Research Digest

**Research and Technology Implementation Division**

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## Recent TxDOT Research Overview Webinars

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## Item 1. Web Series #1: Develop Enhanced Protection of Median Openings Between Parallel Bridge Structures

*TEXAS DEPARTMENT OF TRANSPORTATION*
*TTI 7021-01 WS | 2024*

A few years ago, there was a high-profile accident involving a coach-style bus in another state where the driver became incapacitated and crashed the bus through standard roadside safety barriers between two bridges. This prompted the Texas Department of Transportation (TxDOT) to develop a solution that would provide additional redundancy along with existing safety hardware, such as guard fences and cable barriers, in high-risk areas. The focus was on creating a MASH-compliant product that could effectively protect both small cars and large coach-style buses, in high-risk situations, including instances of wrong-way drivers on freeways.--Summary of introduction by Kenneth (Ken) Mora, starting at 4 minutes and 48 seconds.

CONTENTS


- Task 2. Identification of Crash Location Characteristics
- Task 3. Evaluation of Available Vehicle Arresting Systems
- Task 4. Development of a Median Opening Vehicle Arresting System
- Task 5. Construction, Installation, and Full-Scale Testing


This video is available for free online (running time: 01:00:00):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws001.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

## Item 2. Web Series #2: Develop Guidelines for the Use of Unmanned Aerial Systems (UASs) and Smartphones for Construction and Utility Inspections

*TEXAS DEPARTMENT OF TRANSPORTATION*
*TTI 7159 WS | 2024*

"Unmanned aircraft systems (UASs) equipped with miniaturized cameras enable the collection of high resolution, three-dimensional (3D) geospatial data at lower costs than traditional techniques. New technologies also make it possible to gather pictures and video using smartphones, which can be fed to Structure from Motion (SfM) software to develop highly accurate 3D products. Operating UASs requires trained pilots and observers, but smartphones do not. There is a need to test whether construction contractor crews in the field can gather data using either of these technologies and upload the imagery and video to a server to enable inspectors to conduct inspections remotely. The

research teams will conduct a literature review of UAS-SfM and smartphone technologies; prepare a list of use cases and case studies to test relevant technologies; conduct field tests to document advantages, disadvantages, complementary capabilities, and potential implementation scenarios and costs; prepare recommended settings, procedures, use cases, and operational workflows to ensure repeatable data collection and processing; and prepare guidelines for quality assurance and control of inspections conducted with UAS- and smartphone-based SfM photogrammetry, as well as identify project suitability for the adoption of these technologies to support construction and utility inspection activities at TxDOT."--Project Summary, from publisher

This video is available for free online (running time: 01:00:23):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws002.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

## Item 3. Web Series #3: Assess Driver Distraction in an Era of Rapid Technological Change for Digital Advertising Billboards

*TEXAS DEPARTMENT OF TRANSPORTATION*
*TTI 7138 WS | 2024*

"Outdoor advertising signs are designed to attract driver attention. Driver inattention and distraction are critical factors for road safety. Regulation of outdoor advertising signs must deal with changing technologies including digital billboards which allow for modifications to sign illumination, color, content, and motion. Regulations need to be updated to better address the changing technologies and their impact on roadway safety."--Project Overview slide, starting at 8 minutes and 58 seconds

CONTENTS

- Project Team -- Project Objective -- Project Overview -- State of Practice -- Crash Investigation -- Site Identification -- Human Factors Evaluation (Task Objective; Test Locations [San Antonio; Arlington; Amarillo; Killeen]; Signs Evaluated; Eye Tracking Data; Signs Evaluated; Sign Luminance Data) -- Develop Guidance and Recommendations -- Preliminary Findings Summary -- Discussion/Questions

This video is available for free online (running time: 01:00:56):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws003.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

## Item 4. Web Series #4: Design, Construction, and Performance Monitoring of Stabilization of Expansive Soils and Cement

*TEXAS DEPARTMENT OF TRANSPORTATION*
*TTI 7006 WS | 2024*

"This project aims to develop appropriate laboratory test methods to evaluate mix designs for (1) fiber reinforced cement treated base, (2) fiber reinforced clay, and (3) fiber reinforced sandy soil. In addition, researchers will provide assistance to TxDOT Districts to develop optimum fiber application rates and establish specifications and construction QC/QA plans for uniform mixing. They will conduct laboratory tests to determine optimum fiber application rates for cement treated base and 6 different subgrade soils. Over the last few years, TxDOT has successfully constructed several Full Depth Recycling (FDR) sections with foamed asphalt using innovative reclaiming equipment. One key issue that Researchers will address in this study is an evaluation of the mix technologies that ensure fibers are mixed uniformly in the field. Researchers will use the Wirtgen Reclaimer as the initial device for mixing fibers into the material being stabilized. Researchers will progress to other common construction equipment and processes to achieve the optimum mixing results. This study will investigate innovative Nondestructive Testing (NDT) tools to (1) assist site characterization, (2) select candidate test sections, (3) identify sampling locations, (4) provide input on mix design process, (5) provide Input during QC/QA process, and (6) monitor field performance of the test section. Researchers will document the optimal construction techniques and identify time and cost savings."--library.ctr.utexas.edu website, project summary page (viewed April 17, 2025).

This video is available for free online (running time: 00:56:33):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws004.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

## Item 5. Web Series #5: Weather Responsive Management Strategies

*TEXAS DEPARTMENT OF TRANSPORTATION*
*CTR 7007 WS | 2025*

"This project will demonstrate a strategy to improve safety and reliability to reduce costs and improve dissemination of information to travellers via roadway ice maintenance and traffic operations integrations. The demonstrated strategy leverages mobile and connected vehicle data, as well as weather-related data sources, to closely track TxDOT ice prevention and response activities, public driving patterns, and regional precipitation. The outcome is to optimize the application of anti-icing agent and ice removal activities, as well as to inform travellers of road

conditions and treatment progress. With this demonstration, this project enhances the value of current and future strategy implementation by showcasing data archiving and analysis processes that fit within TxDOT information technology (IT) architecture and cybersecurity model, actionable choices presented through decision support systems, better public awareness through relevant information dissemination strategies, system robustness through data quality checking, and better understanding through performance metrics. All of these elements are critical for any well-developed weather-responsive management and maintenance strategy."--project summary page (viewed April 17, 2025).

This video is available for free online (running time: 00:57:16):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws005.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

## Item 6. Web Series #6: Implementation of Electrical Resistivity Imaging for Geotechnical Analysis

*TEXAS DEPARTMENT OF TRANSPORTATION*
*UTA 5-7008-01 WS | 2025*

"The overall objective of this project is to implement the electrical resistivity imaging manual developed in TxDOT Project 0-7008 on 10-15 projects in the Fort Worth and Dallas districts. Five case studies will be developed to illustrate the successful implementation of electrical resistivity imaging for different types of projects and distributed to all 25 TxDOT's districts in order to achieve TRL 9. The research team will also prepare and present a cost analysis for implementing the electrical resistivity imaging manual beyond the Fort Worth and Dallas districts. The research team will validate and refine the electrical resistivity imaging manual, if needed."--library.ctr.utexas.edu website, project summary page (viewed April 17, 2025).

This video is available for free online (running time: 00:59:17):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws006.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

## Item 7. Web Series #7: Project 0-7041: Develop NextGen Texas Bridge Decks

*TEXAS DEPARTMENT OF TRANSPORTATION*
*CTR 7041 WS | 2025*

"The research team will conduct a comprehensive experimental and analytical investigation to develop appropriate design criteria for using partial-depth precast panels that can span the full width of bridge superstructure. The research team will develop and validate a precast deck panel system with wire trusses that will integrate with precast panel practices in Texas. The research team will study the behavior of full-scale bridge superstructure models under design loads, typical overloads, and at ultimate conditions. The research team will develop and test standard details for partial-depth deck panels in the laboratory for use in the TxDOT's standards for bridges constructed in Texas. The research team will provide design guidelines that reflect the knowledge developed during the course of the project's experimental and analytical investigations."--library.ctr.utexas.edu website, project summary page (viewed November 7, 2025).

This video is available for free online (running time: 00:56:50):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws007.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

## Item 8. Web Series #8: Quantify the Real Impact of Transportation Activity on Regional Ozone and Near-Road PM Concentrations

*TEXAS DEPARTMENT OF TRANSPORTATION*
*TTI 7132 WS | 2025*

"TxDOT and its partner agencies are required to comply with the requirements of the transportation conformity requirement. Transportation conformity is an emissions control-centric process built on the assumption that reducing emissions from transportation activities would lead to better air quality. However, the air quality observations collected since the onset of the COVID-19 pandemic shows ambient ozone and particulate matter of less than 2.5 micrometer in aerodynamic diameter (PM2.5), concentrations have a mixed response to the significant changes in traffic activities and emissions. This trend has raised questions regarding the extent of the transportation's impacts on air quality. This study will bridge the gap in the understanding of the actual extent of transportation activities' impacts on regional and near-road air quality. The research team will study three major activities for selected case study areas: 1) Analysis of before- and during-pandemic traffic activity and air quality monitoring data. 2) Evaluate the performance of air dispersion modeling in capturing the changes of near-road PM2.5 concentrations in near-

road environment resulting from traffic activity variations. 3) Evaluate the performance of photochemical modeling in capturing the changes of regional ozone in response to changes of traffic activities. The study will also result in a characterization of COVID-19 restrictions' impacts on traffic activities and air quality."--library.ctr.utexas.edu website, project summary page (viewed September 8, 2025).

This video is available for free online (running time: 00:58:48):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws008.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

## Item 9. Web Series #9: Post-NEVI Electric Vehicle Infrastructure Research (Freight, Fleet, and Multi-Family Housing)

*TEXAS DEPARTMENT OF TRANSPORTATION*
*TTI 7169 WS | 2025*

"The research team will review the existing EV charging infrastructure state of practice to understand needs and challenges in EV infrastructure, including deployment models, grid connectivity and upgrades, and evolving technologies such as in-road charging, swappable batteries, and future-proofing existing technology; assess tools available to guide statewide EV planning analysis, such as EVI-Pro and other platforms; develop an analysis of projected EV charging demand based on adoption trends and projections; develop a policy analysis of the local, state, and federal statutory landscape to identify barriers and opportunities in comparison to peer states; analyze funding opportunities and develop frameworks for funding models, including private-public partnerships, that will consider the state of practice, federal funding opportunities, and alternative funding sources; and develop strategies to improve the EV charging infrastructure system in Texas over the course of 5 to 10 years, including an evaluation of variables that affect the placement of new EV charging locations and the necessity and viability of battery storage and off-grid capabilities. These efforts will result in an assessment of EV planning analysis tools, a policy analysis framework, and long-term statewide EV infrastructure strategies."--library.ctr.utexas.edu website, project summary page (viewed January 21, 2026).

This video is available for free online (running time: 00:58:10):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws009.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

## Item 10. Web Series #10: Improving Testing Requirements in Item 300 of TxDOT Standard Specifications

*TEXAS DEPARTMENT OF TRANSPORTATION*
*CTR 7073 WS | 2026*

"Researchers will review the different test methods and specifications for different classes of materials within Item 300, compare these methods to practices elsewhere and then develop a plan that identifies methods and specifications that are (i.) obsolete and add little to no value, (ii) not currently included in the specifications but can potentially improve the quality of the product, and (iii) methods and metrics that are more efficient to perform and can replace the test methods currently in Item 300. The plan will include up-to-date findings from state- and national-level projects and will include a pathway and plan for validating the proposed changes. The final deliverable will be recommendations including new test methods and specifications as necessary for incorporation into Item 300."--library.ctr.utexas.edu website, project summary page (viewed August 25, 2026).

This video is available for free online (running time: 01:00:57):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws010.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

## Item 11. Web Series #11: TxDOT Project 0-7171 Barrier Striping for the Reduction of Accidents

*TEXAS DEPARTMENT OF TRANSPORTATION*
*TTI 7171 WS | 2026*

"The Traffic Safety Division (TRF) of TxDOT drafted a special specification (SS) for the vertical application of a retroreflective solid stripe on concrete barriers, approximately six (6) inches below the barrier's top. During the phase of new product approval, this SS describes an application similar to three (3) locations already installed on Texas roadways in previous years. Barrier striping increases motorist awareness of the roadway's edge and the barrier itself, particularly in low-visibility conditions (i.e., heavy rain and snow). These existing implementation sites have not been formally evaluated. Furthermore, the short-term effectiveness of the treatments has not been investigated; therefore, there is a need for long-term and short-term safety effectiveness evaluation of these treatments. The research teams will collect before-and-after collision data from Crash Record Information System (CRIS) and near-collision data from connected vehicle data vendor (e.g., Wejo) to evaluate the effectiveness of vertical application of a retroreflective solid stripe on concrete barriers. Furthermore, the research teams will install these treatments at six (6) high crash

locations with different barrier types including, but not limited to concrete barriers and metal beam guard fences to evaluate their short-term effectiveness using non-traditional safety evaluation approaches. The research teams will utilize the findings to update the drafted SS for the future use across the state and beyond."--library.ctr.utexas.edu website, project summary page (viewed August 25, 2026).

This video is available for free online (running time: 00:58:20):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws011.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

## Item 12. Web Series #12: 0-7106 "Quantify Maximum Accumulated Seal Coat Layers for Stability"

*TEXAS DEPARTMENT OF TRANSPORTATION*
*TTI 7106 WS | 2026*

"TxDOT invests over $250 million annually on seal coats, it is therefore critical to apply the right treatment to the right road at the right time. Projects are typically selected based on the time since the last seal coat (an average of 7 years) with little to no testing performed to ensure that the section is a good candidate for seal coat and how many seal coats to apply. The objective of this research is to determine the maximum number of seal coats that can be applied to a pavement surface before the accumulated layers of seal coats become unstable. The research teams will evaluate the stability of existing accumulated seal coat substrate layers through a series of laboratory and field testing and develop tests and procedures to determine when an additional seal coat may not perform well. The research teams will develop guidelines to select candidate seal coat projects with multiple seal coat layers ensuring that a new seal coat is used on a good candidate pavement will lower risk to TxDOT, improve life cycle costs and lead to better performing sections of pavement."--library.ctr.utexas.edu website, project summary page (viewed October 9, 2026).

This video is available for free online (running time: 00:53:34):
https://library.ctr.utexas.edu/hostedpdfs/txdot/webinar/ws012.mp4

More information about this publication is available in the TxDOT Research Library Catalog.

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