Adding Years to Our Roads by Enhancing Asphalt Durability with Antioxidant

By Presenter, A. Bhasin, A. Filonzi, D. Adwani, Z. Wei, & U. Aditi

Oxidative aging, exacerbated by high temperatures, makes asphalt binders brittle and prone to cracking, significantly reducing pavement service life. To address this challenge, this project evaluates promising selected antioxidant additives designed to mitigate oxidation and enhance cracking resistance. The research methodology includes a comprehensive literature review coupled with rigorous laboratory testing on modified asphalt binders and mixtures. Furthermore, the research team will conduct cost analyses and deploy pilot test sections in collaboration with industry partners. Ultimately, this study will deliver actionable metrics for specification, facilitating the practical implementation of antioxidant modifiers to successfully extend the longevity of asphalt pavements.

PI: Dr. Amit Bhasin

Presenter: **Inbae Yoon**

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Assessing Approaches to Training and Developing Hydrology and Hydraulics (H&H) Staff at TxDOT and Other Organizations

By Presenter & M. Dalton

This study seeks to analyze the current state of hydrology and hydraulics (H&H) training programs at the Texas Department of Transportation (TxDOT) and other agencies/DOTs throughout the U.S. to find potential opportunities for improving them. To do this, a survey was deployed with the aim of collecting responses from a representative range of people working in H&H in the transportation industry. Survey questions were designed to capture information about the landscape of current training programs as well as staff perspectives toward these programs. The survey was split into eight sections: (1) Where Do You Work and What is Your Role, (2) Experience with H&H Trainings, (3) Evaluating H&H Training Priorities and Efficacy, (4) Supervisor Perspectives, (5) Technology and Innovation, (6) Final Thoughts, (7) Contact Information, and (8) Demographics. This poster presents preliminary results from this study, which is still ongoing and in the data collection/analysis phase.

PI: Dr. Blair Johnson

Presenter: **Isabel Gonzalez-Garcia**

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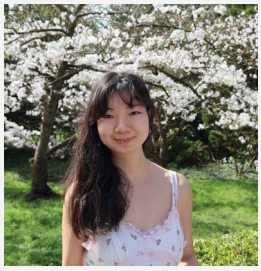
Capacity of Hanger Reinforcement in Inverted T-Beams

By Presenter, H.C. Wang, H. Jang, E. M. Carvajal, & J. Hays

This study investigates the role of hanger reinforcement in the behavior and design of inverted T-beams, with particular focus on its function within the load transfer mechanism at the ledge. Current design provisions, such as those in AASHTO, present ambiguity regarding the required amount of hanger reinforcement, leading to inconsistencies in interpretation and potential overdesign. Through analytical evaluation and numerical modeling, this research examines the three-dimensional flow of forces in the ledge region and quantifies the contribution of hanger reinforcement to structural performance. Results highlight the interaction between ledge loads, shear transfer, and reinforcement detailing, providing insight into whether existing provisions appropriately reflect the underlying mechanics. The findings aim to clarify the role of hanger reinforcement and support more rational, efficient design approaches for inverted T-beams.

PI: Dr. Oguzhan Bayrak and Dr. Anca Ferche

Presenter: **Tiffany Tran**



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Condition Monitoring for Scour-Critical Bridge

By Presenter, J. Sohn, S. B. Kim, & S. Salamone

Scour-induced bridge failures pose a significant threat to infrastructure maintenance, especially during extreme precipitation events. This study presents a multi-sensor ambient monitoring system deployed on the scour-critical SH123 Bridge over Big Cottonwood Creek in San Marcos, TX. The bridge, built in the 1920s and scheduled for decommissioning in 2027, exhibits structural deficiencies requiring continuous assessment. The system integrates laser displacement sensors, crackmeters, accelerometers, water-level sensors, and tiltmeters to capture real-time structural and environmental data. Sensor nodes are strategically installed at various locations, with data transmitted via a cellular module to enable remote monitoring. Initial results show mild displacement and tilt variations primarily influenced by temperature changes. No abnormal structural behavior has been observed to date. This monitoring framework establishes baseline conditions and supports early warning capabilities for scour-related risks. Future work will enhance predictive maintenance strategies and inform risk-based decision-making for aging bridge infrastructure.

PI: Dr. Salvatore Salamone

Presenter: **Joonseob Kim**

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Container Terminal Resource and Performance Comparison of Self-Propelled Autonomous Railcars and Conventional Intermodal Trains

By Presenter & C. T. Dick

As intermodal freight demand grows in the United States, improving rail terminal capacity and efficiency becomes increasingly important. This study evaluates Self-Propelled Autonomous Railcars (SPARCs) as an alternative to conventional trains (CTs), focusing on terminal layout, resource use, performance, and energy consumption. An integrated framework combining layout optimization and operational simulation is developed to assess container processing time and congestion effects. Results show that SPARCs consistently outperform CTs in both spatial and temporal efficiency. CTs require significantly larger yard footprints—up to three times that of SPARCs—for equivalent throughput. Operationally, SPARCs achieve shorter inbound and outbound container processing times, lower delays, and reduced resource requirements. In contrast, CT performance is more sensitive to train frequency and resource constraints, leading to earlier congestion. Overall, SPARCs provide greater flexibility and energy efficiency, particularly for low-volume, short-haul corridors, making them a promising option for expanding intermodal rail networks.

PI: Dr. C. Tyler Dick

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Develop Multi-Modal Maritime-Rail-Roadway Transportation Model for the Texas Inland and Intercoastal Waterways

By Presenter, D. Bagchi, E. Chavez, Q. Tong, M. Friar, C. T. Dick, & S. Boyles

This poster presents an update on an ongoing TxDOT project that develops new tools for modeling multi-modal freight flows in Texas. A state-wide network model representing truck, rail, and maritime freight flows is developed, and trip assignment is used to determine the travel times and costs for moving freight on different freight corridors. Shortest path algorithms determine the optimal routing of freight along multiple potential modes. The model will be used to derive risk profiles for different commodities with a focus on HazMat routing. The simulation will be developed with a decision support tool that can be used to determine the optimal routing for different cargo commodities while accounting for multimodal network resilience to extreme weather or other hazardous events.

PI: Dr. Stephen Boyles

Presenter: **Kyle Bathgate**

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Development of Assessment and Mitigation Guidance of Ancillary Highway Structures with Existing Cracks

By Presenter & Shouchen Zhang

Ancillary highway structures are critical components in transportation infrastructure systems. Because these structures are subjected to continuous wind-induced vibrations — primarily galloping and vortex shedding — they are susceptible to fatigue cracking at welded connections, potentially leading to catastrophic failure. This study introduces an integrated methodology for early fatigue crack detection and repair, validated through full-scale laboratory testing. Specimens were subjected to cyclic loading simulating wind-induced vibrations to evaluate fatigue performance and induce representative crack propagation. Phased array ultrasonic testing (PAUT) was employed to scan weld regions and reconstruct crack geometry using time-of-flight data, enabling quantitative characterization of crack size and location. Based on the detected crack geometry, a repair procedure consisting of groove excavation followed by rewelding was implemented to restore the structural cross-section. The proposed methodology supports the development of practical assessment and mitigation guidance for ancillary highway structures with existing cracks.

PI: Dr. Salvatore Salmone & Dr. Todd Helwig

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Development and Experimental Evaluation of the Skewed NextGen Texas Bridge Deck

By Presenter

The NextGen Texas Bridge Deck was developed to improve bridge deck constructability by prefabricating the overhang into a partial-depth precast panel system. While the concept has shown promise for standard bridges, its application to skewed geometry had not been investigated. This study presents the development and experimental evaluation of a 45° skewed NextGen bridge deck specimen. A full-scale specimen was designed, fabricated, and tested in a 4 test experimental program to evaluate its structural capacity. Structural behavior was evaluated through deflection, strain, crack mapping, and observed failure response. The results showed that the skewed specimen maintained the primary constructability advantage of the original system while demonstrating acceptable structural performance under various loading conditions. The study provides insight into the behavior of skewed prefabricated overhang systems and supports the continued development of skew-compatible NextGen bridge deck details.

PI: Dr. Oguzhan Bayrak

Presenter: **Austin Krueger**

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Development and Validation of a Precast Column Solution for Texas Bridges

By Presenter

After analyzing the current TxDOT standards for circular columns, a precast column solution is proposed using a precast prestressed concrete pile working as a precast shell with concrete cast in place inside the hollow section. This solution is aimed to be similar or better than the actual standards and some variables are analyzed in order to understand its performance, such as the internal roughness and the length of the connectors. Once the tests are completed, a finite element analysis is completed to corroborate the laboratory results and to compare with the hand calculations prepared following current design codes, such as ACI 318-25 and AASHTO LRFD BDS 10th edition. Finally, the solution proposed brings a new methodology that can be used in Texas bridges, improving the Accelerated Bridge Construction method.

PI: Dr. Oguzhan Bayrak

Presenter: **Emmanuel Montero Carvajal**

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Dynamic Smart Charging for Fleet and Personal EVs through Integrated Agent-based and Optimization Modeling

By Presenter & K. M. Gurumurthy

As electric vehicle (EV) adoption accelerates, smart strategies offer advantages over unmanaged charging (V0G) by enhancing grid stability, reducing fleet operation costs, and supporting integration of variable generation resources. This research develops an integrated simulation-optimization framework coupled day-ahead optimization with large-scale agent-based simulations to evaluate coordinated V2G participation by fleet and personal EVs under 5 energy-pricing settings in Austin, Texas. Alternative charging strategies (V0G, V1G, fleet-only V2G, and fleet-personal joint V2G) are examined, considering real-time price and demand-to-supply signals, health-damage costs, and operational constraints for both fleet and personal EVs. Results show how coordinated charging strategies shift fleet EV charging to lower-cost periods while enabling strategic battery-discharge during evening peaks, mitigating grid stress, and lowering EV energy costs. Joint V2G amplifies system-level benefits by complementing fleet discharge, but smart-charging equipment costs can offset those benefits.

PI: Dr. Kara Kockelman

Presenter: **Lin Su**

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Evaluating Options for Electrifying Commuter Rail DMU Vehicles on a Shortline Freight Corridor

By Presenter & R. Walthall

This study evaluates alternative propulsion technologies for short-haul commuter rail using the CapMetro Red Line in Austin, Texas as a case study. A unified framework is developed to compare diesel, battery-electric, hydrogen fuel cell, and hydrogen internal combustion options through train performance simulation, real service frequency, layover patterns, and varying passenger loads. Results show that electrified traction, including battery-electric and hydrogen fuel cell systems, offers a structural efficiency advantage due to electric drive and regenerative braking, while combustion-based options achieve only limited efficiency gains. Life-cycle environmental performance depends strongly on upstream carbon intensity, with gray hydrogen potentially offsetting emissions benefits and low-carbon hydrogen enabling meaningful CO_2 reductions. Operational factors such as grade, travel direction, and passenger loading further influence technology performance. Economic feasibility remains uncertain because of high fleet and infrastructure costs, suggesting that policy support may be essential for near-term deployment.

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Presenter: **Heyang Zhang**

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Evaluating Transit Signal Priority Efficiency and Safety Using High-Resolution AVL Data and Trajectory Reconstruction

By Presenter, S. Munira, D. Lee, N. Ruiz-Juri, & S. Boyles

Transit signal priority (TSP) systems have demonstrated significant benefits for transit operations, but evaluating long-established systems presents methodological challenges when before-after data is unavailable and system downtime is impractical. This study analyzes over 2 million automatic vehicle location (AVL) derived bus passages through intersections in Austin, Texas, introducing an evaluation framework utilizing interpolated AVL data for continuous monitoring of operational TSP effectiveness. Performance metrics reveal that Austin's TSP system achieves 60-64% effectiveness rates, and 87-94% effectiveness for stops exceeding 30 seconds. Regression models demonstrate that TSP grants reduce intersection (300 ft upstream) travel times by 2.8 seconds (12.98%), delays by 2.9 seconds (21.24%). TSP also improves safety, reducing speed volatility by 0.106 (19.27%) and average deceleration by 0.145 ft/sec^2 (9.86%) near intersections. This AVL-based evaluation framework enables continuous assessment of deployed TSP systems using operational data, providing transit agencies with practical tools for optimizing long-established systems without service disruption.

PI: Dr. Stephen Boyles

Presenter: **Jake Robbennolt**

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Influence of Supplementary Cementitious Materials on the Potential Corrosion of Steel Reinforcement in Low Carbon Concrete

By Presenter & M. Juenger

The performance of low-carbon concrete is heavily contingent upon the integration of supplementary cementitious materials (SCMs). The interaction between SCMs and the cementitious matrix fundamentally alters the alkalinity and chemical composition of the pore solution, which may affect the corrosion risk of embedded reinforcement steel. It is essential to comprehend the extent of these effects to determine how it will impact long-term durability of low carbon concrete. This study will examine how steel reinforcement potentially corrodes in low-carbon concrete and the process of designing corrosion-resistant low-carbon concrete structures using low-carbon materials. Selected materials will be characterized using isothermal calorimetry, quantitative x-ray diffraction, thermogravimetry analysis, and rapid, reliable, and relevant testing to aid in predicting their pore solution reactivity. Paste will be tested to determine fresh state properties by using mini-slump and isothermal calorimetry. As testing progresses further testing will be conducted on mortar samples to evaluate the potential effect of low-carbon materials on reinforcement.

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Presenter: **Paola Huynh**

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Maintaining and Operating Tolled Managed Lanes During Corridor Reconstruction

By Presenter, K. Pruner, & N. Khwaja

During corridor reconstruction where existing preferential use or managed lanes are present, these facilities are often closed to help enable construction. For the IH 35E Phase 2 Project, the reversible tolled express lanes are remaining operational during the entirety of construction, which introduced challenges and offered invaluable lessons.

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Presenter: **Mengyu Fu**

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Measuring Capacities in Multimodal Maritime Port Systems with Anchorage Queues

By Presenter & K. Bathgate

We present a framework for estimating the capacity of a multimodal maritime port system handling vessels of multiple classes. Port system capacity can be categorized into two distinct types: operating capacity, defined as the maximum number of vessels that can be processed over an extended period under stable operating conditions, and ultimate capacity, defined as the absolute maximum vessel throughput achievable irrespective of stability. Distinguishing between these two capacity measures is critical for long-term planning and resilience analysis, as ports may temporarily operate above sustainable levels following demand surges. We introduce methods to estimate both capacity measures for seaport systems. For the Port of Houston, we estimate an operating capacity of approximately 0.9 vph and an ultimate capacity of approximately 1.4 vph. Sensitivity analysis of key port resources indicates that liquid-bulk terminals constitute the primary bottlenecks under stable operating conditions, whereas pilot availability becomes the dominant bottleneck following disruptions.

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Presenter: **Debojjal Bagchi**

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Mixed-Reality Vision-Based Structural Health Assessment of Reinforced Concrete Structures

By Presenter & M. M. Shamszadeh

This study presents a mixed-reality (MR) and vision-based framework for structural health assessment of reinforced concrete (RC) structures. The system integrates HoloLens-based field data acquisition with AI-driven damage characterization to enable rapid and objective inspection. A curated dataset of RC crack images is used to train a TopFormer model for accurate crack segmentation, while YOLOv11 detects multiple damage types, including rebar exposure. Crack geometry is quantified through pixel-level analysis with camera-based scaling for precise width estimation. The extracted features are linked to structural performance using an Explainable Boosting Machine (EBM), enabling interpretable predictions of residual shear capacity. Validation with experimental datasets demonstrates reliable crack measurement and consistent performance assessment. The framework supports scalable, in-situ infrastructure monitoring and informed maintenance decision-making.

PI: Dr. Salvatore Salamone

Presenter: **Byunghyun Kim**

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Operationalizing High-Resolution Weather Data for Crash Analysis

By Presenter, Y. Li, & A. Kosicki

Precipitation is a key factor in crash records that is not inconsistently reported. To address this gap, CTR has developed and operationalized a scalable workflow that integrates high resolution NOAA Multi Radar/Multi Sensor (MRMS) precipitation data with TxDOT's Crash Records Information System (CRIS). Building on earlier proof of concept efforts, the current phase deploys an automated data ingestion and processing pipeline within TxDOT's Enterprise Data Platform (EDP), enabling the nightly calculation and fusion of derived weather variables with crash events. The workflow computes precipitation metrics (including rain status, timing, and intensity) at the time and location of each crash, and produces standardized outputs for downstream use, including AASHTOWare Safety ingestion. By leveraging asynchronous I/O, parallel processing, and vectorized spatial mapping, the system processes thousands of crashes per minute. This deployment establishes a foundation for the systematic validation of weather conditions in crash reporting and could provide inputs for future roadway weather management applications.

PI: Dr. Natalia Ruiz-Juri

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Pedestrian Travel Distances and Fatality Rates Across U.S. Settings

By Presenter

This paper examines the demographic and land-use factors that influence trip frequency and trip distances of pedestrians in the U.S. Using hurdle regression models to predict walk-mile traveled (WMT) per person per day, the results show that older individuals, males, those with higher education, and residents of smaller households without vehicles are more likely to walk and to walk longer distances within their home tracts. Findings show that Americans walk an average of 0.31 miles per person per day, roughly half the distances reported in European countries. However, exposure-based death rates for VRUs are 5 to 20 times higher than in these countries.

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Presenter: **Keya Li**

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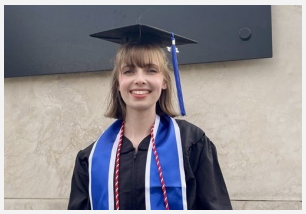
Prestressed Box Beam Girder: Shear Key Retrofit

By Presenter, B. Li, D. Wang, A. Ferche, & O. Bayrak

Prestressed box beam girder systems have been used widely because of their constructability and efficiency. However, through time issues have arrived and persisted such as longitudinal cracking over shear keys. Often, longitudinal cracking over shear keys has led to water leakage and infiltration, deterioration and cracking of the shear keys, corrosion, and overall reduced performance and service life. With many methods for repair, there has been no universally successful retrofit approach, and needs vary depending on crack severity, beam and shear condition, structural demands, and weather conditions.

PI: Dr. Oguzhan Bayrak

Presenter: **Tabitha Laney**



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Pullout Test for Bond Characterization of Corroded PT Systems

By Presenter & J. A. Vazquez

This study investigates the residual bond strength of corroded PT strands embedded in grouted systems, with emphasis on localized corrosion mechanisms representative of field conditions. Controlled corrosion levels are introduced using electrochemical techniques, followed by experimental evaluation through pull-out testing. Key parameters include corrosion level, strands and duct layout, and grout condition.

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Presenter: **Maha Assad**

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Roadway Safety Performance Index (RSPI) Framework

By Presenter & Z. Han

The Roadway Safety Performance Index (RSPI) is a network-level framework developed to quantify relative crash risk across roadway segments, including those with limited or no crash history. Traditional safety analysis relies heavily on observed crash frequency, which may not accurately reflect underlying risk. RSPI integrates crash records, traffic exposure, and roadway characteristics using a combination of Poisson regression, Empirical Bayes refinement, and a Zero-Inflated Negative Binomial model to estimate expected crash frequency. Predicted crashes are normalized by exposure and allocated by severity to produce a relative risk scale from 1 to 10. Two indices are generated: RSPI Individual, which incorporates segment-specific crash history, and RSPI Universal, which applies systemwide severity proportions. The framework supports proactive identification of high-risk segments and provides a data-driven tool for network-level safety screening and investment prioritization.

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Presenter: **Curtis Shaw**

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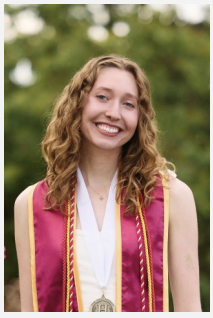
Simulating Changes in Shared Rail Corridor Capacity Under Evolving Operating Practices

By Presenter & C. Tyler Dick

The US rail network utilizes shared corridors to operate freight and passenger train traffic. Although sharing infrastructure provides economies, interactions between these train types can lead to poor network performance. Prior research has quantified the train delay and capacity impacts of interactions between freight and passenger trains on shared corridors; however, in the 15 years since this research was conducted, different freight operating practices have been adopted that may change both baseline mainline capacity, and its consumption by passenger trains. Operating practices common 15 years ago include shorter trains, shorter and more frequent sidings, and assigning more locomotive horsepower per ton of train. Under current practices, railways are utilizing longer trains, longer but less frequent sidings, and lower horsepower-per-ton ratios. The objective of this study is to use Rail Traffic Controller simulation software to quantify how these changes have impacted baseline line capacity and the incremental impact of passenger trains.

PI: Dr. C. Tyler Dick

Presenter: **Juliana Johnson**



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Structural Performance of 1970s Inverted-T Bent Caps: Full-Scale Tests and Analytical Investigation

By Presenter, E. Montero-Carvajal, M. S. Afzal, H. Jang, H. Wang, G. Hunsicker, E. Saqan, A. Ferche, & O. Bayrak

This research experimentally investigated the structural performance of five full-scale reinforced concrete inverted-T (IT) beams under complex loading conditions creating shear, bending moment and torsional moments at varying proportions. The objective of testing was to provide insights into the primary failure modes of the IT beams, which were fabricated to replicate existing bent caps designed in the 1970s, and compare the resulting behavior to predictions made using the current AASHTO LRFD Bridge Design Specifications (BDS), 10th Edition. The primary test variables were the loading arrangements and transverse reinforcement quantity and detailing of the specimens. The resulting primary failure modes were governed by the yielding of the hanger reinforcement and concrete failure in the tension chord region. The presence of sufficient development length in the detailing of the older structural designs was crucial to the tensile capacity of the longitudinal reinforcement for the tested cantilevered (i.e. hammerhead) IT bent caps.

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Presenter: **Jenna Hays**

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SVBRD-LLM: Self-Verifying Behavioral Rule Discovery for Autonomous Vehicle Identification

By Presenter & Z. Guo

Autonomous vehicles (AVs) are increasingly deployed on public roads, yet existing data driven methods often lack interpretability and verifiable explanations of AV behavior in mixed traffic. We propose SVBRD-LLM, a self verifying behavioral rule discovery framework that extracts interpretable rules from real world roadside videos via zero shot large language model reasoning. Vehicle trajectories are obtained using YOLOv26 based detection and ByteTrack tracking, followed by kinematic and contextual feature extraction. GPT-5 performs comparative analysis between AVs and human driven vehicles across lane changing and normal driving to generate structured rule hypotheses, which are validated and refined through failure case analysis to reduce spurious correlations. The resulting rule library contains 20 high confidence rules with semantic descriptions, quantitative thresholds or patterns, applicable contexts, and validation confidence. Experiments on over 1,500 hours of Waymo area videos achieve 90.0% accuracy, 93.3% F1 score, and 98.0% recall for AV identification.

PI: Dr. Zhaomiao Guo

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Temporal Trends in the Geospatial Location and Nearby Railroad Track Topography of Freight Train Handling Derailments

By Presenter & C. T. Dick

Freight trains in North America have become longer in recent years, particularly starting in 2018. While operators can benefit from the economies of scale of longer trains, there can also be safety risks. From 2012 to 2017 there were 101 train handling accidents recorded by the Federal Railroad Administration (FRA) on the mainlines of US Class I railroads in the United States; from 2018 to 2023 there were 177 such train handling accidents, an increase of 75%. One possible explanation for the increase in train handling accidents could be the railroad track topography near accident locations. The methodology uses ArcGIS to overlay the North American Class I freight rail network onto elevation source data to estimate the grade and curvature of track segments using sinuosity. With this information, the effect of track grade and curvature did not reveal any statistical significance towards the increase in train handling derailments.

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Time Impact Analysis — Recommended Practices

By Presenter, O. Soliz, J. Thomson, & E. Acosta

Time Impact Analysis (TIA) is TxDOT's primary method for evaluating contractor's requests for time extensions and schedule delay claims. However, TxDOT Districts and Area Offices often encounter TIA submittals that lack required detail, proper methodology, or adequate documentation. These deficiencies make it difficult to verify schedule impacts and delay decision□making. This poster outlines practical practices to help TxDOT staff improve review efficiency in time□related change order and claim evaluations.

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Presenter: **Junghye Son**

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Traffic Control Innovations on Dallas Construction Projects

By Presenter, M. Fu, & N. Khwaja

Highway reconstruction projects, particularly in urban areas, often have right-of-way limitations. This creates challenges in providing space for construction activities while maintaining traffic operations. Effective traffic control allows for contractors and the traveling public to safely coexist. CTR assists the Texas Department of Transportation's Dallas District with developing and assessing traffic control concepts on some of its projects. This poster highlights some of the interesting configurations seen recently in the TxDOT Dallas District.

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Presenter: **Kristopher Pruner**

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TxDOT Austin District Pedestrian Safety Soft Launch

By Presenter & J. Rubio

Work continues on the Pedestrian Safety Soft Launch, a connected vehicle technology deployment on FM 1395/Burnet Road just north of the CTR Symposium to supplement TxDOT SMARTTrack. All travelers see pedestrian alerts through a black-out sign, and signal phase and timing (SPaT) information is perpetually broadcast.

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Presenter: **Kenneth Perrine**

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Understanding Public Perceptions of Congestion Pricing – A U.S. Perspective

By Presenter, I. Batur, F. Yu, D. Robbennolt, & R. M. Pendyala

This study addresses a critical gap in understanding public opposition to congestion pricing in the U.S. by systematically examining the difference in perceived fairness through demographic, spatial, and attitudinal dimensions. Using nationwide survey data collected from October 2024 through January 2025, this research reveals that fairness perceptions are shaped by sociodemographic characteristics not only directly but also through lifestyle attitudes such as congestion burden perception, positive travel engagement, and suburban lifestyle preference. These insights are directly relevant for policymakers designing congestion pricing schemes, suggesting that successful implementation requires targeted communication strategies and policy designs that address the specific concerns of different demographic and attitudinal groups.

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Presenter: **Hyunjun Hwang**

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Virtual Reality of IH-35W in Downtown Fort Worth

By Presenter

The NEPA cleared interchange of IH35W/SH121/US287 adjacent to downtown Fort Worth is a complete reconstruction and redesign that will improve mobility and connectivity. A virtual reality experience aims to inform the many stakeholders about how it functions and the large scale of the project.

PI: Dr. Nabeel Khwaja

Presenter: **Cameron Schmeits**

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Weather Responsive Management Strategies

By Presenter, D. Wong, L. Macias, J. Rubio, S. Boswell, & C. A. Starks

This project continues to pilot tracking of winter weather operations, this time with focus on the Fort Worth District using very low-cost, passive truck hardware. Results from the January 23-26 winter storm are viewed in a dashboard, with ability for future playback and data analysis.

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Presenter: **Kenneth Perrine**

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What Drives Preferences for Urban Air Mobility? An Analysis of Attitudinal, Demographic, and Service-Based Determinants

By Presenter, D. Robbennolt, & C. Bhat

Recent advances in Urban Air Mobility (UAM) technology highlight the potential of air based modes to revolutionize how travelers move through urban areas. However, adoption patterns for human UAM services are not fully understood. Accordingly, this study examines individual level adoption preferences for UAM using a stated preference survey with a comprehensive set of service attributes. Respondents ranked air taxi and air metro modes alongside ground based alternatives. A two stage modeling approach integrates structural equation modeling of latent attitudes with a panel rank ordered probit choice model. Results indicate that safety, cost, time savings, and accessibility drive UAM adoption, with preferences increasing for environmentally friendly, comfortable, and human piloted services. Adoption is higher among tech-savvy individuals, but lowered by noise sensitivity, air travel anxieties, and positive travel associations. Preferences also vary by income, gender, and residential context. UAM time savings are most valued for medical trips, while short trips and errands show weaker preferences

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Presenter: **Anna Beliveau**

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Who is Willing to Pay for Travel Time Savings and How Much? An Iterative Bidding Contingent Valuation Study in Mumbai

By Presenter, H. Hwang, A. Jaiswal, S. Verma, & S. Chakrabarti

The value of travel time savings (VTTS) is one of the most widely used concepts in the transportation sector, serving as a critical component of project evaluation, policy formulation, and transportation investment decisions. We examine the VTTS as measured using an iterative bidding contingent valuation approach in Mumbai, India. By directly measuring the VTTS, rather than imputing it, we are able to efficiently consider variations across individual characteristics and trip contexts. As importantly, we account for the possibility that some individuals may not be willing to pay at all for travel time savings, jointly modeling a binary outcome for willingness to pay (WTP) alongside the continuous VTTS among those who are willing to pay. The findings reveal differences in WTP and VTTS across population subgroups and trip characteristics. The results have implications for the evaluation of transportation policies, prioritization of transportation infrastructure improvements, and development of priced congestion reduction strategies.

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Presenter: **Dale Robbennolt**

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Yard Design and Capacity Handbook for Efficiency and Safety at the Shortline – Class 1 Railway Interface

By Presenter

This study analyzes rail yard derailments in the United States between 2014 and 2022 using data from the Federal Railroad Administration (FRA) REA Form 54 database. The dataset was filtered to include only yard derailments involving Class I, II, and III railroads and analyzed across three operational periods: pre–Precision Scheduled Railroading (2014–2016), post-PSR implementation (2017–2019), and the post-COVID period (2020–2022). Accident data were combined with operational exposure metrics such as Yard Switching Miles and Total Train Miles to estimate derailment rates by railroad class. The study investigates whether derailments are concentrated among a small number of railroads or distributed across the industry, identifies the most common causes based on FRA cause codes, examines external factors such as weather, visibility, and time of occurrence, and evaluates the impact of PSR on yard derailment rates.

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