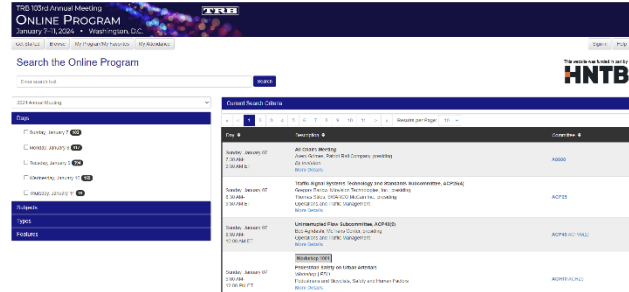




Maintenance Research at the 2024 TRB Annual Meeting

Resource Spotlight: Transportation Research Board Annual Meeting Online Portal

If you're searching for the latest research on a transportation topic, be sure to visit the [TRB Annual Meeting Online Program](#). The program includes papers, posters and presentation materials from the 2024 Annual Meeting.



The [No Boundaries Transportation Maintenance Innovations pooled fund](#) has compiled links to selected posters, presentations and papers related to maintenance presented at the 2024 Annual Meeting. **Registration, attendance, and access to materials is free for employees of state DOTs and other TRB Sponsor organizations.** If you have trouble accessing the presentations, check with your DOT or other transportation library.

Contents

- Asset Management 2**
 - Maintenance Prioritization 2
 - Pavement Management 3
 - Bridge Management 5
 - Managing Other Assets..... 6
- Bridge Preservation and Rehabilitation..... 7**
 - Repair Methods 7
 - Preservation Practices 7
 - Bridge Inspection 8
- Culvert and Drainage Systems Maintenance 9**
- Equipment and Facilities..... 9**
- Work Zones and Maintenance Worker Safety 10**

Pavement Monitoring and Evaluation.....	10
Detecting, Evaluating and Monitoring Pavement Distress.....	10
Performance Management.....	19
Pavement Repair and Rehabilitation Methods	20
Crack Sealing	20
Chip Seals, Slurry Seals and Surface Treatments.....	21
Roadside Maintenance	22

Asset Management

This section includes pavement management, bridge management and managing other assets.

Maintenance Prioritization

24-01861 Capital-Constrained Road Network Maintenance Scheduling Considering Traffic Dynamics

[Poster Session](#) with abstract

Yifan Yue, Xinhua Mao, Jun Chen

Chang'an University, Southeast University

24-05360 The Development of a ME-Based Highway Cost Allocation Model for Flexible Pavements

[Poster Session](#) with abstract

Seyed Farhad Abdollahi, Poornachandra Vaddy, Muhammed Emin Kutay

Michigan State University

24-03888 Equity in Transportation Asset Management: Proposed Framework

[Lectern Session](#) with abstract

Sara Arezoumand, Omar Smadi

Iowa State University

24-06081 Inclusive Application of Euclidean Distance Optimization for Life-Cycle Cost Analysis and Life-Cycle Assessment: Comparative Assessment of Pavement Alternatives

[Poster Session](#) with abstract

Subhajit Banerjee, Gourab Saha,

National Institute of Technology, Calicut; National Institute of Technology, Rourkela

24-00296 Incorporating Bike/Ped Criteria in Project Ranking and Selection

[Poster Session](#) with abstract

Dasha Korostina, Nikiforos Stamatiadis, Teng Wang, Reginald Souleyrette

Kentucky Transportation Cabinet

24-20560 Maintenance Data Integration Discussion Panel

[Lectern Session](#) with abstract

Charles Pilson, Omidreza Shoghli

Mott MacDonald, LLC, University of North Carolina, Charlotte

24-00777 Moving to Risk-Based Highway Asset Maintenance Using Elicited Data

[Poster Session](#) with abstract

Gergely Raccuja, Simon Cumming, Gary Short, Tom Graham, Stephen Morgan

National Highways UK, Darach AI Limited, Amey plc

24-00874 Next-Generation Transportation Asset Management Methodology for Cross-Asset Decisions

[Poster Session](#) with abstract

Paul Thompson, Sandhya Pai, Prashant Ram, Abhik Borthakur, Kelly Smith, Nadarajah

Sivaneswaran

Consultant, Applied Pavement Technology, Inc., Federal Highway Administration (FHWA)

24-02852 Research on Targeted Maintenance Decision Optimization of Long-Span Road Network

[Poster Session](#) with abstract

Liping Cao, Ting Tan, Xiangchen Hou, Zejiao Dong

Harbin Institute of Technology

24-06206 Risk-Based Transportation Infrastructure Management: An Integrated Framework and Case Study in the U.S. Virgin Islands Against Coastal Flood and Sea Level Rise

[Poster Session](#) with abstract

Junyan Dai, Ruohui Zhang, Yun Bai, Daniel Barone, Lauren Hill-Beaton

Rutgers University; Hong Kong University of Science and Technology (Guangzhou); Rutgers University, New Brunswick

Pavement Management

24-02480 Application of the Machine Learning Method to Determine Spring Load Limits and Winter Weight Premium

[Poster Session](#) with abstract

Yunyan Huang, Taher Baghaee Moghaddam, Leila Hashemian, Alireza Bayat

University of Alberta

24-00455 Bayesian Method for Integrating Spatial Dependencies into Flexible Pavement Performance Modeling

[Poster Session](#) with abstract

Gnana Deepika Karanam, Shane Underwood

North Carolina State University

24-02417 Development of Airfield Pavement Management Framework Considering Structural and Functional Condition Indices Using Advanced Modeling Techniques

[Poster Session](#) with [presentation](#)

Elise Mansour, Heena Dhasmana, Momen Mousa, Marwa Hassan

Louisiana State University, Sam Houston State University

24-01987 An Improved Two-Stage, Bottom-Up Optimization Approach for Pavement Maintenance and Rehabilitation Decision Making

[Poster Session](#) with abstract

Qingwei Zeng, Feng Xiao, Xiaorui Sun, Shunxin Yang, Yinxiao Chen

Southeast University, East China JiaoTong University, Southeast University School of Transportation, Nanjing Lulian Transportation Technology Co.

24-05054 Leveraging Deep Reinforcement Learning to Identify Environmentally Benign Management Strategies for Pavement Networks

[Poster Session](#) with abstract

SiYuan Song, Juan del Campo Yañez, Ali Kazemeini, Omar Swei

University of British Columbia

24-02721 Linking Life-Cycle Assessment and Environmental Product Declaration for Jointed Reinforced Internally Cured Concrete Pavements

[Poster Session](#) with abstract

Fariborz Tehrani

Expanded Shale, Clay and Slate Institute

24-04381 Network Pavement Friction Management with Deep Reinforcement Learning

[Poster Session](#) with abstract

Hongbin Xu, FENG HONG, Jorge Prozzi

University of Texas, Austin; Texas State University

24-02077 Next-Generation Performance Measures for Pavement Management Decision Support

[Poster Session](#) with abstract

Abhik Borthakur, Sandhya Pai, Prashant Ram, Kelly Smith, Nadarajah Sivanesarwan

Applied Pavement Technology, Inc., Federal Highway Administration (FHWA)

24-01086 Optimization of Network Pavement Life-Cycle Cost: A Piecewise Linearized Approach

[Poster Session](#) with abstract

Watheq Sayeh, Imad Al-Qadi

University of Illinois, Urbana-Champaign

24-04766 Optimization of Preservation Versus Rehabilitation (Budget) Ratio Using Pavement Management Systems: A California Department of Transportation Case Study

[Poster Session](#) with abstract

Venkata Lakshman Mandapaka, Robert Hogan, Jeremy Lea

California Department of Transportation; University of California, Davis

24-04823 A Pilot Study to Incorporate Network-Level Structural Condition into Agency Pavement Management Practices

[Lectern Session](#) with abstract

Angello Murekye, Samer Katicha, Ernesto Urbaez, Gerardo Flintsch, Brian Diefenderfer

Virginia Polytechnic Institute, Virginia Transportation Research Council

24-20047 Quality Improvement and Application of Pavement Management System Data: Tennessee Department of Transportation

[Poster Session](#) with [presentation](#)

Jamie Waller, Xiaoyang Jia

Tennessee Department of Transportation

24-05573 Quantifying Equitable Roads: Metrics to Understand Pavement Condition Disparities for Better Asset Management

[Poster Session](#) with abstract

Oscar Daniel Galvis Arce, Lisa Losada Rojas

WDM USA, University of New Mexico

24-02508 Radio Frequency Identification and Wireless Internet of Things System Development for Transportation Maintenance Operations and Asset Management

[Poster Session](#) with abstract

Jay Jung, Wenzhe Chen, Byung Lee, Tian Xia

University of Vermont

24-06194 Reliability-Based Pavement Roughness Progression Modeling Using Bayesian Approach

[Poster Session](#) with abstract

Soumyarup Biswas, Kranthi Kuna

Indian Institute of Technology, Kharagpur

24-02604 A Stochastic Framework for Life-Cycle Cost Analysis of Porous Asphalt Life-Extension Maintenance Methods

[Poster Session](#) with abstract

Avishreshth Singh, Aikaterini Varveri

Delft University of Technology

Bridge Management

24-20743 Agency Experience with Bridge Preservation Action Decision Making

[Lectern Session](#) with abstract

Morgan Kessler

Federal Highway Administration (FHWA)

24-20512 Determining a Relationship Between Real Section Loss and Surface Delamination of Corroded Beam Ends

[Lectern Session](#) with abstract

Aidan Provost

University of Massachusetts, Amherst

24-00076 Developing an Optical Sensing Method for Structure Deformation Measurement Considering Camera Motion

[Poster Session](#) with abstract

xiangyan wu, Haoyuan Luo, Leyi Zhu, Bangyin Liu, Xiangling Chen, Xiaoming Huang

Southeast University School of Transportation, Materials Technology Ltd

24-01445 Inspection, Condition Assessment, Performance Evaluation, and Level of Service Reporting for Bridge Asset Management Systems: Current State and Directions for Future Research
[Poster Session](#) with abstract
Wang Chen, Xian-Xun Yuan
Toronto Metropolitan University

24-20741 Long-Term Bridge Performance Program Updates
[Lectern Session](#) with abstract
Jane Jiang
Federal Highway Administration (FHWA)

Managing Other Assets

24-06414 An Artificial Intelligence–Driven Approach for Real-Time Detection of Traffic Signs Deficiencies
[Lectern Session](#) with [presentation](#)
Mohammad Karasneh, Dmitry Manasreh, Chris Berner, Younis Matouq, Munir Nazzal
University of Cincinnati

24-04091 An Asset Management Approach for New Mobility Devices
[Poster Session](#) with abstract
Jason Bittner, Neil Janes, Hannah Silber
Applied Research Associates, Inc.

24-06139 A Data-Driven Approach for Predicting the Deterioration of Highway Ancillary Structures: A Case Study on High Mast Light Pole
[Poster Session](#) with abstract
Xin Wang, Yun Bai
Rutgers University; Rutgers University, New Brunswick

24-03314 Development of Asset Management of Bicycle Paths in Finland
[Poster Session](#) with abstract
Vesa Mannisto, Susanna Suomela, Konsta Sirvio
Finnish Transport Infrastructure Agency, sirway ltd

24-20054 LiDAR for Maintenance of Pavement Reflective Pavement Markings and Signs: Oregon Department of Transportation
[Poster Session](#) with abstract
Michael Bufalino
Oregon Department of Transportation

24-06474 Machine Learning–Based Correlation Between LiDAR Intensity and Retroreflectivity for Road Marking Condition Assessment
[Poster Session](#) with abstract
Dmitry Manasreh, Munir Nazzal, Ala Abbas
University of Cincinnati, University of Akron

24-00395 Port Authority of New York and New Jersey Enterprise Asset Condition Rating Development and Implementation

[Poster Session](#) with abstract

Robert Kumapley, Larissa James, Lisbeth Concho
Port Authority of New York and New Jersey, WSP

24-04032 Practical Application of Digital Twins for Transportation Asset Data Management: Case Example of a Safety Hardware Asset

[Lectern Session](#) with abstract

Ashtarout Ammar, Francesca Maier, William Pratt, Elaine Richard, Gabriel Dadi,
Virginia Polytechnic Institute, Fair Cape Consulting LLC, Connecticut Department of Transportation, Kentucky Transportation Center

24-20615 Tools and Technology for Roadside Landscape Asset Management Project Update

[Lectern Session](#) with abstract

Cheryl Daniels, Angela Burdell
Davey Resource Group

24-00970 Automated Change Detection of Traffic Sign Damage Using Low-Cost LiDAR Data

[Poster Session](#) with abstract

ahmed khataan, Suliman Gargoum
UBC School of Engineering, University of British Columbia

Bridge Preservation and Rehabilitation

This section includes repair methods, preservation practices and bridge inspection.

Repair Methods

24-05549 Experimental Evaluation of the “Sandwich Panel” Repair Method for Corrosion-Damaged Bridge Girders

[Lectern Session](#) with abstract

Anna Tarasova, Deven Kanakamedala, Jungil Seo, Amit Varma, Robert Connor
HNTB Corporation, Purdue University

24-20055 Polyester Polymer Concrete for Bridge Deck Overlays: Utah Department of Transportation

[Poster Session](#)

James Corney
Utah Department of Transportation

Preservation Practices

24-04684 Assessment of the Adhesion Performance of Coating Materials on Different Prepared Surfaces of Bridge Substructure

Anol Mukhopdhyay, Abhijit Mistri, Pranav Pradeep Kumar
Texas A&M Transportation Institute, Texas A&M University

24-02016 Data Supporting the Effectiveness of Bridge Washing on Bridge Performance

[Lectern Session](#) with abstract

Jennifer McConnell, Harry Shenton, Tian Bai
University of Delaware

24-05622 The Evaluation of Concrete Sealants and Surface Coatings for Controlling Moisture in Concrete

[Poster Session](#) with abstract

Harsha Amunugama, Upul Attanayake
Western Michigan University

Bridge Inspection

24-05410 3D Scanning Technology Framework: From Bridge Inspection to Evaluation

[Lectern Session](#) with abstract

Deven Kanakamedala, Jinwu Xiao, Ha Kyun Ju, Jungil Seo, Kyubung Kang, Amit Varma
Purdue University

24-00010 Computational Fluid Dynamics Visualization for Unmanned Aerial Systems in Bridge Inspections

[Lectern Session](#) with abstract

Kristoffer Borgen, John Mott
Purdue University

24-01076 Condition Survey and Data Analysis of Field Pavement Distress Development of Epoxy Asphalt Pavement on Steel Bridge Deck

[Poster Session](#) with abstract

Zhu Zhang, Jiaqi Huang, Jiwang Jiang, Yajin Han, Shuheng Yu, Fujian Ni
Southeast University School of Transportation, Southeast University

24-04945 Experimental Evaluation of 3D Imaging Technologies for Structural Assessment of Masonry Retaining Walls

[Lectern Session](#) with abstract

Maxwell Wondolowski, Alexandra Hain
University of Connecticut

24-02825 A General Method for Pre-Flight Preparation in Data Collection for Uncrewed Aerial Vehicle-Based Bridge Inspection

[Lectern Session](#) with abstract

Pouya Almasi, Yangjian Xiao, Hao Yin, Jonathan Boyle, David Jauregui, Zhe Wan, Qianyun Zhang

New Mexico State University, Massachusetts Department of Transportation, New Hampshire Department of Transportation

Culvert and Drainage Systems Maintenance

24-20368 Applying New York State Department of Transportation Culvert Liner Specifications to Design High-Density Polyethylene Liners for Deteriorate Corrugated Steel Pipes

[Lectern Session](#) with abstract

Jeremy Bowers

SGH

24-20458 European Examples of Innovative Rehabilitation of Bridges and Culverts with the Use of Corrugated Steel Structural Plates

[Lectern Session](#) with abstract

Paulina Andersz

ViaCon Polska

24-20370 Machine Learning and Data Analytics for Highway Culvert Management

[Lectern Session](#) with abstract

Xiong Yu

Case Western Reserve University

24-03340 Resilience and Risk Based Framework for Managing Culverts in Changing Climates: A Case Study of Colorado Culverts

[Poster Session](#) with abstract

Bukola Oni, Maria Rojas, Yazan Alatoom, Rosy Adhikari, Ahmed Albughdadi, Omar Smadi

Iowa State University

24-20369 Structural Design of Cementitious Sprayed Liners for Reinforced Concrete Culverts and Sewers Considering Host Pipe Condition

[Lectern Session](#) with abstract

Ian Moore

Queen's University

Equipment and Facilities

24-05481 Environmental Considerations in University Fleet Operations and Management Strategies Amid the COVID-19 Pandemic

[Poster Session](#) with abstract

Hamid Mozafari, Amirafi Soltanpour, Farish Jazian, Mehrnaz Ghamami, Ali Zockaie

Michigan State University

24-20250 NCHRP 13-08: Guideline for Decision Making for Repair Versus Replacement of Highway Maintenance Equipment

[Lectern Session](#) with abstract

Geoffrey Morrison, John Hildreth

Cadmus Group, Western Carolina University

24-05069 Leveraging Alternative Fuel Vehicles in Operation and Asset Management Strategies to Reduce Fleet Economic and Societal Impacts

[Poster Session](#) with abstract

Hamid Mozafari, Amirafi Soltanpour, Farish Jazian, Mehrnaz Ghamami, Ali Zockaie
Michigan State University

24-04376 Long-Range Plans for Replacement of Highway Operations Equipment

Leila Hajibabai, Ali Hajbabaie, Henry Canipe,
North Carolina State University, Mott MacDonald, LLC

24-20050 The Use of Emerging Internet of Things Technologies for Optimizing Maintenance Equipment Tracking: Ohio Department of Transportation

[Poster Session](#) with abstract

Munir Nazzal
University of Cincinnati

Work Zones and Maintenance Worker Safety

24-20365 Challenges and Solutions for the Use of Autonomous Truck Mounted Attenuators in Highway Applications

[Lectern Session](#) with abstract

Shima Nazari
University of California, Davis

24-20367 Evaluating Applications of Mobile Work Zone Protection System (California Department of Transportation Balsi Beam) for Worker Protection in Highway Work Zones

[Lectern Session](#) with abstract

Bahram Ravani
University of California, Davis

24-20364 Warning Lights and Vehicle Markings: AIMing for Improved Safety

[Lectern Session](#) with abstract

John Bullough
Icahn School of Medicine at Mount Sinai

Pavement Monitoring and Evaluation

This section includes detecting, evaluating and monitoring pavement distress; and performance management.

Detecting, Evaluating and Monitoring Pavement Distress

24-04745 Achieving Quality Assurance in Receiving Automated Pavement Condition Data: Threshold Development and Error Pattern Analysis

[Poster Session](#) with abstract

Jueqiang Tao, Xiaohua Luo, Feng Wang, Ajmain Faieq, Haitao Gong, Xin Qiu
Texas State University; Texas State University, San Marcos; Zhejiang Normal University

- 24-05669 Active Mode Traffic Road Cracks Detection and Analysis System**
[Poster Session](#) with abstract
Sicong Zhu, Li Yong, Jiayao Li, Cheng Zhang
Beijing Jiaotong University, Cangzhou Transportation Bureau
- 24-04763 Advancing Subsurface Distress Detection: Field Validation of Deep Learning–Based Ground-Penetrating Radar Image Analysis**
[Lectern Session](#) with abstract
Ahmad Abdelmawla, Jidong Yang, Sung-Hee Kim
University of Georgia
- 24-00939 Analysis of 3D Reconstruction of Road Structural Defects Combining Ground-Penetrating Radar and Reverse Time Migration Imaging**
[Poster Session](#) with abstract
Lutai Wang, Zhen Liu, Xingyu Gu, Danyu Wang
Southeast University
- 24-03081 Analysis of Pore Water Pressure Effect in Asphalt Patch Failure: An Integrated Modeling and Experiment Study**
[Lectern Session](#) with abstract
Xiao Chen, Hao Wang
Rutgers University
- 24-01771 Application of the YOLOv8s Algorithm in Distress Detection of Concrete Pavement: Performance Assessment Using Economic Training Process**
[Poster Session](#) with abstract
Mrityunjay Midya, Mahabir Panda, Gourab Saha,
National Institute of Technology, Calicut; National Institute of Technology, Rourkela
- 24-06416 An Artificial Intelligence–Driven Approach for Automated Real-Time Potholes Detection, Localization, and Area Estimation**
[Poster Session](#) with abstract
Younis Matouq, Dmitry Manasreh, Munir Nazzal
University of Cincinnati
- 24-03036 An Attention-Based Improved YOLOv8 Method for Pavement Distress Detection**
[Poster Session](#) with abstract
Zhen Wang, Montasir Abbas, Linbing Wang
Virginia Polytechnic Institute, University of Georgia
- 24-01095 Automatic Detection of Road Subsurface Distress via Curriculum Learning: Learn Like an Expert**
[Lectern Session](#) with abstract
guanghua yue, Chenglong Liu, Yishun Li, Yuchuan Du, Qian Gao
Tongji University

24-04118 Combining 3D Scanning and 3D Printing Technologies for Pavement Management Practices: Preliminary Results

[Poster Session](#) with abstract

Mehdi Haghghatjoo, Parisa Sanaei, Baris Salman, Erick Lojano-Quispe
Syracuse University

24-00568 A Comprehensive Model Optimization for YOLOv5-Based Recognition of Pavement Structural Damage in Radar Images

[Poster Session](#) with abstract

Xiaogang Guo, Ning Wang, Yan Li, Ruixin Zhai, Bowei Sun
Middle Tennessee State University, Nanyang Normal University, Taiyuan University, Civil Aviation University of China

24-02336 Consistency Between Traffic Speed Deflection Devices and Falling Weight Deflectometer

[Poster Session](#) with abstract

Arman Hamidi,
Ali Foroutan Mirhosseini, Inge Hoff, Helge Mork, Kim Rune Grannes, Per Aursand
Norwegian University of Science and Technology (NTNU), Statens vegvesen, Norwegian Public Roads Administration

24-02917 Concrete Surface Defect Detection and Classification from Uncrewed Aerial Vehicle Imagery Using Ensemble Learning

[Poster Session](#) with abstract

Emmanuel Marfo, Tesfamichael Getahun, Ali Karimodini
North Carolina A&T State University

24-04570 Construction of Remote Data-Acquisition System for Jointed Plain Concrete Pavement and Performance Monitoring

[Poster Session](#) with abstract

Ernesto Urbaez, Gerardo Flintsch, Samer Katicha, Brian Diefenderfer, Reza Jafari,
Virginia Polytechnic Institute, Virginia Transportation Research Council, Virginia Polytechnic Institute and State University

24-02010 Conversions of Viscoelastic Deflections of Asphalt Pavement Under the Traffic Speed Deflectometer Load to Elastic Ones Under the Falling Weight Deflectometer Load for Pavement Condition Assessments

[Poster Session](#) with abstract

Zhang Chen, Xiaoying Tong, Huailei Cheng, Yuanlu Liang, Di Zhao, Lulu Yang, Tianxu Li, Zihan Wang
Tongji University, Hong Kong Polytechnic University

24-04868 Crack Segmentation by Severity in 3D Asphalt Pavement Images Using Deep Learning Models

[Poster Session](#) with abstract

Francisco Contreras-Correa, Alelí Osorio-Lird, Héctor Allende-Cid
Universidad Tecnica Federico Santa Maria, Pontificia Universidad Catolica de Chile

- 24-01135 Deep Learning–Enhanced Numerical Simulation of Ground Penetrating Radar and Image Detection of Cracks Inside Pavement Structures**
[Poster Session](#) with abstract
Zhen Liu, Lutai Wang, Danyu Wang, Yihan Chen, Xingyu Gu
Southeast University; University of Illinois, Urbana-Champaign
- 24-02830 Defect Location Detection in Asphalt Materials Using Coplanar Capacitance Measurement**
[Poster Session](#) with abstract
Bin Shi, Qiao Dong, Xueqin Chen, Yao Kang, Shiao Yan, Xing Hu,
Southeast University; Nanjing University
- 24-06229 Deformable Registration on Pavement Images for Topological Crack Propagation Analysis**
[Poster Session](#) with abstract
Haolin Wang, Zhongyu Yang, Mohsen Mohammadi, Yi-Chang Tsai
Georgia Institute of Technology
- 24-04287 Developing a Model to Predict Bleeding Areas in Asphalt Pavements Using Artificial Neural Network**
[Poster Session](#) with abstract
Rami Khalifah, Mena Souliman, Pratik Lama, Omar Elbagalati
University of Texas, Tyler; Mansoura University
- 24-04824 Edge Computing–Enabled Road Condition Monitoring: System Development and Evaluation**
[Poster Session](#) with abstract
Abdulateef Daud, Mark Amo-Boateng, Neema Jakisa Owor, Armstrong Aboah, Yaw Adu-Gyamfi
University of Missouri; University of Missouri, Columbia; University of Arizona
- 24-02428 Effects of Temperature Variations on Falling Weight Deflectometer Deflection Data from Full-Depth Asphalt Pavements**
[Poster Session](#) with abstract
Andrea Graziani, Andrea Grilli, Chiara Mignini
Università Politecnica delle Marche
- 24-03862 Efficient Data Selection Based on Difficulty-Aware Module for Pavement Distress Segmentation**
[Poster Session](#) with abstract
Jiang Chen, Ye Yuan, Hong Lang, Shuo Ding, Jian Lu
Tongji University
- 24-02332 An Encoder-Decoder Model for Pavement Subsurface Crack Detection and Size Estimation Using Ground-Penetrating Radar Data**
[Lectern Session](#) with abstract
Yuxi Zhang, Zirui Hong, Yeji Hong, Hubo Cai
Purdue University

- 24-04195 Enhancing Pavement Performance Assessment: Kingdom of Saudi Arabia Case Study**
[Poster Session](#) with abstract
Khaled Galal, Mario Manosalvas-Paredes, Syed Mubashirhussain, Zaid Alyami, Waleed Aldurgham
Engineering and Research International, Inc. (ERI); Ministry of Transport and Logistic Services, Kingdom of Saudi Arabia
- 24-06148 Ensemble Machine Learning Classification Models for Predicting Pavement Condition**
[Poster Session](#) with abstract
Frederick Chung, Andy Doyle, Ernay Robinson, Yejee Paik, Mingshu Li, Minsoo Baek, Brian Moore, Baabak Ashuri
Georgia Institute of Technology, Georgia Department of Transportation, Kennesaw State University
- 24-02829 The Evaluation of the Effect of Structural Condition on Surface Deterioration for Flexible Pavements Using Traffic Speed Deflection Device**
[Lectern Session](#) with abstract
Xiaoyang Jia, Di Zhu
Tennessee Department of Transportation
- 24-04302 Evaluation of Multiple Light Weight Deflectometer Configurations for Thin Asphalt Pavement Testing**
[Poster Session](#) with abstract
Margarita Ordaz, Jesse Doyle
U.S. Army Corps of Engineers (USACE)
- 24-02325 Extracting Features of Falling Weight Deflectometer Time History Data to Estimate Temperature Adjustment Factors for Pavement Deflections**
[Poster Session](#) with abstract
Nima Kargah-Ostadi, Kostiantyn Vasylevskyi, Andrei Ablets, Andrew Drach
Callentis Consulting Group
- 24-04679 Feature-Based Pavement Image Registration: Performance Evaluation and Model Comparison**
[Poster Session](#) with abstract
Zhongyu Yang, Mohsen Mohammadi, Haolin Wang, Yi-Chang Tsai
Georgia Institute of Technology
- 24-00665 Field and Laboratory Investigation on Superpave 9.5 mm (SP-9.5) Mixtures in Florida**
[Poster Session](#) with abstract
Ohhoon Kwon, Gregory Sholar, Charles Holzschuher
Florida Department of Transportation
- 24-01098 Fine-Grained Semantic Segmentation of Asphalt Pavement Cracks**
[Poster Session](#) with abstract
Jinhuan Shan, Wei Jiang, Yue Huang
Chang'an University, University of Leeds

- 24-04927 Full-Section Detection of Pavement Rutting via Area Array Structured Light**
[Poster Session](#) with abstract
Yuchuan Du, Ziyue Gao, Yishun Li, Chenglong Liu, Difei Wu
Tongji University
- 24-04308 Hybrid Transfer Learning and Support Vector Machines Models for Asphalt Pavements Distress Classification**
[Poster Session](#) with abstract
Alex Apeageyi, Toyosi Ademolake, Joseph Anochie-Boateng
University of East London; University of East London, Dockland; University of Pretoria
- 24-02586 An Improved Collection Method of High-Resolution Pavement Images and Deep Learning Models for Pavement Distress Detection**
[Poster Session](#) with abstract
Zachary Todd, Jacobus Van der Walt, Mofreh Saleh, Heyang Li
University of Canterbury
- 24-04821 Innovative Workflow of Falling Weight Deflectometer Data Processing, Analysis, and Visualization**
[Poster Session](#) with abstract
Wen Tang, Boonam Shin, Shreyam Kumar, Mohammad Jahanshahi, Tommy Nantung
Purdue University, Indiana Department of Transportation
- 24-00005 Intelligent Assessment of Pavement Structural Conditions: A Novel FeMViT Classification Network for Ground-Penetrating Radar Images**
[Poster Session](#) with abstract
Zhen Liu, Xingyu Gu, Danyu Wang, Lutai Wang, Bingyan Cui
Southeast University, Rutgers University
- 24-00939 Intelligent Reconstruction of Road Structural Defects: A Method Combining Ground-Penetrating Radar and Back Projection Algorithm**
[Poster Session](#) with abstract
Lutai Wang, Zhen Liu, Xingyu Gu, Danyu Wang
Southeast University
- 24-01561 Machine Learning–Based Ensemble Techniques for Optimal Prediction of Pavement Condition**
[Poster Session](#) with abstract
Sachin Gowda M K, M A Jayaram, Aakash Gupta, Sampath Pasupunuri, Jaya Shinganmakki
Central Road Research Institute CSIR, RASTA Center for Road Technology, University of Nottingham
- 24-02853 Multi-Dimensional Index Detection of Pothole Based on Stereoscopic Vision**
[Lectern Session](#) with abstract
Bingjin Ren, Zhao Du, Xingyi Zhu
Tongji University

24-01664 A Multi-Label Convolutional Neural Network Model for Asphalt Distress Classification

[Poster Session](#) with abstract

Mai Sirhan, Technion, Shlomo Bekhor, Technion, Arie Sidess, Technion
Israel Institute of Technology

24-03523 Multi-Object Detection for Daily Road Maintenance Inspection with Uncrewed Aerial Vehicle Based on Improved YOLOv8

[Poster Session](#) with abstract

Yuxuan Wu, Junqing Zhu, Tao Ma
Southeast University

24-06372 Multi-Year Raveling Deterioration Analysis Using Macrotecture and Aggregate Loss Indicators from 3D Pavement Surface Data

[Lectern Session](#) with abstract

Ryan Salameh, Pingzhou (Lucas) Yu, Haolin Wang, Yi-Chang Tsai
Georgia Institute of Technology

24-03505 Non-Destructive Techniques for Evaluating Pavements with Unusual Surface Distresses: Two Case Studies in Louisiana

[Lectern Session](#) with abstract

Moses Akentuna, Qiming Chen, Zhongjie Zhang, Tyson Rupnow
Louisiana Department of Transportation and Development

24-05128 A Novel Approach Leveraging Augmented Data and State-of-the-Art Detection Models for Efficient Real-Time Road Surveillance

[Lectern Session](#) with abstract

Avnish Panwar, Kaliprasana Muduli, Faiz Ali, Indrajit Ghosh
Indian Institute of Technology, Roorkee

24-01818 A Novel Pavement Layer Modulus Back-Calculation Method Considering Centralized Extended Kalman Filter–Based Information Fusion

[Poster Session](#) with abstract

Yebo Cen, Mu Guo, Xiang Li, HongDuo Zhao, Chen Jin
Key Laboratory of Road and Traffic Engineering of the Ministry of Education, Tongji University, Jiading, Tongji University, Shanghai Urban Construction Design and Research Institute

24-02364 Optimized Asphalt Overlay Configuration to Control Reflective Cracking Using a New Innovative Full-Scale Testing

[Poster Session](#) with abstract

Zehui Zhu, Imad Al-Qadi, Aravind Ramakrishnan, Ramadan Salim, Hasan Ozer, John Senger, Laura Heckel
University of Illinois, Urbana-Champaign, Arizona State University, Arizona State University, Tempe, Illinois Department of Transportation

- 24-02991 Parameter Correction of Traffic Velocity Deflectometer Considering Vehicle Pavement Environment Factors Using Multi-Condition Simulation and Machine Learning**
[Poster Session](#) with abstract
Xiang Wang, Qiao Dong, Xueqin Chen, Genyu Li, Xintong Li
Southeast University, Nanjing University, Qufu Normal University
- 24-03175 Pavement Periodic Maintenance Using Machine Learning to Predict International Roughness Index and Remaining Service Life in Thailand**
[Poster Session](#) with abstract
Theerada Rungruangjarensuk, Ponlathep Lertworawanich
Department of Highways Thailand, Bureau of Road Research and Development
- 24-04899 Pavement Responses and Performance Evaluation from an Instrumented Pavement Section**
[Poster Session](#) with abstract
Zafrul Khan, Rafi Tarefder, Saiqa Susmita
University of New Mexico
- 24-03181 Prediction of Critical Strains from Traffic Speed Deflectometer Measurement on Flexible Pavement**
[Poster Session](#) with abstract
Kairen Shen, Hao Wang
Rutgers University, New Brunswick
- 24-01685 Prediction of Modified Structural Number for Asphalt Pavements Using Machine Learning Algorithms**
[Poster Session](#) with abstract
Aakash Gupta, Sachin Gowda M K, Sampath Pasupunuri
Central Road Research Institute CSIR, University of Nottingham
- 24-00798 Real-Time Asphalt Pavement Layer Thickness Prediction Using Ground-Penetrating Radar Based on a Modified Extended Common Mid-Point Approach**
[Lectern Session](#) with abstract
Siqi Wang, Zhen Leng, Xin Sui, Tao Ma, Weiguang Zhang, Zehui Zhu
Southeast University, Jiulonghu; Hong Kong Polytechnic University; Southeast University; ExxonMobil Corp
- 24-04638 Rigid Layer Depth Setting Method Based on the Uniformity of the Backcalculated Subgrade Modulus**
[Poster Session](#) with abstract
Yue Hu, Guoshuai Zang, Lijun Sun
Tongji University, Jiangsu Sinoroad Engineering Technology Research Institute Co.,Ltd
- 24-00932 Rutting Characterization of Steel Bridge Asphalt Pavement Based on Layer Thickness Profiling Using Ground-Penetrating Radar Based on Simulation and Accelerated Pavement Testing Data**
[Poster Session](#) with abstract
Siqi Wang, Zhen Leng, Xin Sui, Jiwang Jiang, zijian he
Southeast University, Jiulonghu; Southeast University, Hong Kong Polytechnic University

24-01683 Scene-Adaptive Pavement Maintenance Optimization Model: A Reinforcement Learning Approach from Expert Feedback

[Lectern Session](#) with abstract

Wenyuan Cai, Chenglong Liu, Qian Gao, Yishun Li, Yuchuan Du
Tongji University

24-00760 Segment to Track for Pavement Crack on Unmanned Wheeled Robot with Light-Weight Neural Network

[Poster Session](#) with abstract

Jianqi Zhang, Xu Yang, Wei Wang, Hainian Wang, Ling Ding, Jayantha Kodikara
Chang'an University, Monash University

24-02478 A Spatial Statistical Model to Analyze Historical Rutting Data

[Poster Session](#) with abstract

Natoya Olita Amantha Stephen Jourdain, Ingelin Steinsland, Mamoona Birkhez-Shami, Dagfin Gryteselv, Doreen Siebert, Alex Klein-Paste
Norwegian University of Science and Technology (NTNU), Norwegian Public Roads Administration

24-04641 Study of Key Factors in Pavement Distress Segmentation Using Deep Learning Techniques

[Poster Session](#) with abstract

Haitao Gong, Xiaohua Luo, Jueqiang Tao, Feng Wang
Texas State University; Texas State University, San Marcos

24-00432 Temperature Normalization of Traffic Speed Deflectometer Measurements

[Poster Session](#) with abstract

Dirk Jansen, Mehdi Kalantari
Federal Highway Research Institute

24-02642 A Temporal Homogenization Modeling of Viscoelastic Asphalt Materials and Pavement Structures Under Large Numbers of Cyclic Loading

[Poster Session](#) with abstract

Hanyu Zhang, Gordon Airey, Yuqing Zhang
University of Nottingham, Southeast University

24-00526 Traffic Speed Deflectometer Data Interpretation Using the Falling Weight Deflectometer-Based Structural Indicators to Assess Full-Depth Asphalt Pavements

[Poster Session](#) with abstract

Bongsuk Park, Seonghwan Cho, Tommy Nantung, John Haddock
Montana Technological University, Indiana Department of Transportation, Purdue University

24-05747 Traffic Speed Ground-Coupled 3D Ground-Penetrating Radar

[Lectern Session](#) with abstract

Wayne Muller, Bryan Reeves
Coded Radar

24-06430 TransUNet: A Hybrid Model for Block Pavement Segmentation and Distress Detection

[Poster Session](#) with abstract

Eskindir Getachew Denu, Yoon-Ho Cho,
Chung-Ang University, Seoul; Chung-Ang University

24-02687 The Two-Step Method of Pavement Pothole and Raveling Detection and Segmentation Based on Deep Learning

[Poster Session](#) with abstract

Aidi Wang, Zhen Chen, Hong Lang, Yichuan Peng, Jian Lu
Tongji University

24-04968 Uncrewed Aircraft System–Based, Multi-Layered, Data-Collection Methods and Defect Detection Algorithms for Predictive Analytics and Bridge Asset Management

[Poster Session](#) with abstract

Harsh Rathod, Clara Owen, Paul Thompson, Eric Arscott
Arcadis, Niricson

Performance Management

24-05127 A Comparative Analysis of Three Modeling Approaches for Predicting Pavement Conditions

[Poster Session](#) with abstract

Jing Wang, Gurcan Comert, Negash Begashaw, Nathan Huynh, Amara Kouyate, Robert Mullen, Sarah Gassman, Charles Pierce
University of Nebraska, Lincoln; Benedict College; Benedictine College; University of Nebraska, Lincoln; U.S. Department of Defense; University of South Carolina

24-04095 Evaluation of the Long-Term Raveling Performance of Open-Graded Friction Course Pavements in South Carolina

[Poster Session](#) with abstract

Bradley Putman, Rishiraj Brahmbhatt,
Bucknell University, Clemson University

24-03171 Impact of Wide Base Tire on Flexible Pavement Responses: Coupling Effects of Multi-Axle and Dynamic Loading

[Poster Session](#) with abstract

Kairen Shen, Hao Wang
Rutgers University

24-01171 Improved Model for Pavement Performance Prediction Based on Recurrent Neural Network Using the Long-Term Pavement Performance Database

[Poster Session](#) with abstract

Shuo Wang, Zong Zheng, Fei Shan, Zhongren Wang, Hui Li, Kelei Li,
Tongji University, Southeast University, California Department of Transportation, Ningxia Highway Survey and Design Institute Co Ltd

24-04135 An Investigation of the Data Variability of Network-Level Pavement Condition Data

[Lectern Session](#) with abstract

Raja Shekharan, Aishwarya Baranikumar, Kalyan Asam, Zhaohua Wang, Douglas Frith
Virginia Department of Transportation, Quality Engineering Solutions, Inc.

24-00072 A Novel Hybrid Technique for Predicting Pavement Conditions and Dynamic Multi-Objective Decisions for Pavement Maintenance and Rehabilitation

[Poster Session](#) with [presentation](#) and [full paper](#)

Hamed Naseri, Amirreza AliakbariMahdie Asl Javadian, Alireza Aliakbari, E.O.D Waygood
Polytechnique Montreal Departement des Genies Civil Geologique et des Mines; Islamic Azad University, Science and Research Branch, Tehran; University of Laval; Amirkabir University of Technology

24-00578 Pavement Condition Prediction for Communities: A Low-Cost, Ubiquitous, and Network-Wide Approach

[Poster Session](#) with abstract

Tao Tao, Sean Qian
Carnegie Mellon University

24-02346 Pavement Monitoring and Maintenance Decision Making Using Satellite Data: Assessing Its Value in Partially Observable Stochastic Environments

[Poster Session](#) with [presentation](#)

Mahyar Shahri, Sung-Hee Kim
University of Georgia

24-03311 Performance Prediction for Network-Level Flexible Pavements Using an Optimized Artificial Neural Network Approach

[Poster Session](#) with abstract

Zengyi Wang, Jianming Ling, Jiake Zhang, Xiang Li
Tongji University

24-02511 Using Thermocouple Data at MnROAD as a Surrogate for Performance of Flexible Pavement

[Poster Session](#) with abstract

Joseph Podolsky, Raul Velasquez, Emil Bautista
Minnesota Department of Transportation

Pavement Repair and Rehabilitation Methods

This section includes papers on crack sealing; and chip seals, slurry seals and surface treatments.

Crack Sealing

24-01110 Development of Crack Sealing Method Using 3D Printing Technology in Asphalt Pavement

[Poster Session](#) with abstract

Tam Phan, Anh Nguyen, Jae-Hyeong Yoon, Dae-Wook Park
Kunsan National University

Chip Seals, Slurry Seals and Surface Treatments

24-05861 Assessing the Performance of Bio-Based Rejuvenator as a Topical Treatment for Asphalt Pavement: Field Trial Study

[Lectern Session](#) with abstract

Ana Luiza Rodrigues, R. Williams, Caio Falcao, Eric Cochran, Nacu Hernandez, Andrew Becker, Baker Kuehl, Michael Forrester, Ashley Buss, Austin Hohmann, Maxwell Staver, Irvin Pinto
Iowa State University, Iowa Department of Transportation, New Hampshire Department of Transportation

24-20975 Case History of a Chip Seal with a Paving Fabric

[Lectern Session](#) with abstract

Brian Collins
BGC Engineering Inc

24-20048 High Friction Surface Treatments Before and After Safety Analysis: Missouri Department of Transportation

[Poster Session](#) with [presentation](#)

Hyung Suk Lee
Applied Research Associates, Inc.

24-05186 Laboratory Performance and Field Demonstration of Asphalt Overlay with Rubber and Tire Fabric Fiber

[Lectern Session](#) with abstract

Dongzhao Jin, Sepehr Mohammadi, Kai Xin, Lei Yin, Zhanping You
Michigan Technological University

24-02269 Massachusetts Route 3: A SHRP 2 Product R26 Case Study in Preservation Approaches for High-Traffic Volume Roadways Along with High-Speed Shoulder Preservation Treatments

[Poster Session](#) with abstract

Alexander Austerman, Walaa Mogawer, Kevin Stuart, Siavash Fakhretaha Aval
University of Massachusetts; University of Massachusetts, Dartmouth; Consultant

24-03283 Material Optimization and Performance Evaluation of Anti-Freezing Micro-Surfacing

[Poster Session](#) with abstract

Yunze Pang, Liyan Shan, Guohua Liu
Harbin Institute of Technology, Shanghai Municipal Engineering Design Institute (Group) CO., LTD.

24-03561 Performance Prediction Model of an Engineered Cementitious Composite Ultra-Thin Whitetopping

[Poster Session](#) with abstract

Ricardo Hungria, Hassan Noorvand, Gabriel Arce, Marwa Hassan, Mahdi Moinul
Louisiana State University, Virginia Department of Transportation, Louisiana Transportation Research Center (LTRC)

24-04589 Quantifying Pavement Preservation Effectiveness for Enhanced Decision Making

[Lectern Session](#) with abstract

Sara Arezoumand, Alireza Sassani, Omar Smadi
Iowa State University

24-01709 Research on the Durability of the Polyurethane Ultra-Thin Wear Layer for Pavement

[Poster Session](#) with abstract

Miao Yu, Junsen Zeng, Chengliang Long, Zhanping You, Liming Yang, Jue Li, Yi Peng
Chongqing Jiaotong University, China Merchants Chongqing Communications Technology Research&Design Institute Co.,Ltd, Michigan Technological University, Guangxi Cummunications Design Group Co., Ltd

24-01275 Short- and Long-Term Mechanical Performances of Damaged Porous Asphalt Mixture Treated with Asphalt Emulsion

[Poster Session](#) with abstract

Bin Yang, Zhen Leng, Jiwang Jiang, Rui Li, Meizhao Han, Guoyang Lu,
Hong Kong Polytechnic University, Southeast University, Chongqing Jiaotong University, Harbin Institute of Technology, City University of Hong Kong

Roadside Maintenance

24-20613 Buzzworthy: An Update on the Nationwide Conservation Agreement for At-Risk Bumblebees

[Lectern Session](#) with abstract

Dan Salas, Caroline Hernandez
Stantec, University of Illinois, Chicago

24-20618 Integration of Weed-Suppressive Bacteria with Herbicides to Reduce Exotic Annual Grasses and Wildfires on Roadsides

Cathy Ford
Idaho Transportation Department

24-20930 Pollinator Communities on the Roadside and Using Soil Bacteria to Control Invasive Grasses in the Idaho Department of Transportation

[Poster Session](#) with abstract

Cathy Ford
Idaho Transportation Department

24-20014 Unclear Territory: Clear Zones, Roadside Trees, and Collaboration in State Highway Agencies

[Lectern Session](#) with abstract

Ellen White
State University of New York, ESF