University of Illinois at Urbana - Champaign (UIUC) Rail Transportation and Engineering Center (RailTEC)

Guide to RailTEC Student, Faculty, Staff and Alumni Presentations TRB 97th Annual Meeting Washington, D.C. January 7-11, 2018
Overview of Sessions with RailTEC Session Chairs or Presentations

SUNDAY

Understanding and Managing the Complex World of Wheel–Rail Interaction, Part 1
(Part 2, Session 186)
Sunday 9:00 AM-12:00 PM
Workshop 141 | Convention Center, 144B

MONDAY

Rail Transit Infrastructure Committee, AR055
Monday 8:00 AM – 9:45 AM
Marriott Marquis, Capitol (M4)

Commuter Rail Research Subcommittee, AP070(2)
Monday 8:00 AM – 9:45 AM
Marriott Marquis, Woodley Park (M3)

Railroad Track Substructure and Superstructure Interaction
Monday 8:00 AM – 9:45 AM
Lectern Session 234 | Convention Center, 144A

Train Energy Efficiency: Optimal Operating Strategies
Monday 8:00 AM – 9:45 AM
Lectern Session 232 | Convention Center, 143A

Technology to Improve the Effectiveness of Railroad Track Inspection and Maintenance
Monday 10:15 AM – 12:00 PM
Lectern Session 296 | Convention Center, 143A

Human Factors Rail Research Topics in Accidents and Derailments
Monday 10:15 AM – 12:00 PM
Lectern Session 297 | Convention Center, 144A

Analysis of Safety Concerns at Highway-Rail Grade Crossings
Monday 10:15 AM – 12:00 PM
Poster Session 324 | Convention Center, Hall E

How and When to Use Private Money for Transportation Infrastructure Projects
Monday 1:30 PM – 3:15 PM
Lectern Session 367 | Convention Center, 147B

Hazardous Materials Transportation Research
Monday 1:30 PM – 3:15 PM
Lectern Session 371 | Convention Center, 149

Innovations and Advances in Transportation Geotechnics
Monday 3:45 PM – 5:30 PM
Lectern Session 419 | Convention Center, 207A
Railway Capacity and Delay Modeling—Hybrid Session
Monday 3:45 PM – 5:30 PM
Lectern Session 435 | Convention Center, 150A

Rail Group Executive Board
Monday 6:00 PM – 7:30 PM
Marriott Marquis, Capitol Hill (M3)

TUESDAY

Innovative Track Standards and Specifications to Meet the Challenges of the 21st-Century Economy
Tuesday 8:00 AM – 9:45 AM
Lectern Session 503 | Convention Center, 143B

TRB's Rail Safety IDEA Program: Sponsoring Innovation to Improve Railroad Safety and Performance
Tuesday 10:15 AM – 12:00 PM
Poster Session 579 | Convention Center, Hall E

Research Trends in Railway Operating Technologies
Tuesday 10:15 AM – 12:00 PM
Poster Session 581 | Convention Center, Hall E

Current Research in Railroad Track Structure System Design
Tuesday 10:15 AM – 12:00 PM
Poster Session 583 | Convention Center, Hall E

Current Research in Railway Track Maintenance
Tuesday 10:15 AM – 12:00 PM
Poster Session 584 | Convention Center, Hall E

Railroad Track Structure System Design Committee, AR050
Tuesday 1:30 PM – 3:15 PM
Lectern Session 607 | Marriott Marquis, Capitol (M4)

Freight Rail Propulsion: Where Does the Energy Come From?
Tuesday 1:30 PM – 3:15 PM
Lectern Session 624 | Convention Center, 143A

Rail and Public Transportation Caucus (sponsored by BNSF)
Tuesday 6:00 PM – 7:30 PM
Convention Center, Ballroom south Pre-Function C

Geological and Geoenvironmental Engineering Section Executive Board
Tuesday 6:00 PM – 9:30 PM
Marriott Marquis, Catholic University (M1)

Rail Capacity, AR040(1), Joint Subcommittee of AR040, AR030, AP070, AT010, AR010
Tuesday 7:30 PM – 9:30 PM
Marriott Marquis, Treasury (M4)
SUNDAY

Understanding and Managing the Complex World of Wheel–Rail Interaction, Part 1 (Part 2, Session 186)

Sunday 9:00 AM- 12:00 PM
Workshop 141 | Convention Center, 144B
J. Riley Edwards, University of Illinois, Urbana Champaign, presiding

This workshop addresses challenges associated with one of the most complex rail issues: the prediction and management of wheel–rail interaction. Rail industry experts deliver technical presentations on new methods of managing the wheel–rail interface, analytical models, friction management, and other methods to reduce costs and risks. Participants will have the opportunity to engage in timely discussion on research needs and potential solutions.

A New Type of Rail Corrugation? Investigation into Rail Corrugation on Light Rail Transit Systems
William Moorhead, TRAMMCO, LLC

Automated VAMPIRE for Various Purposes Including Derailment Risk Identification and Derailment Investigation
Cory Hogan, ENSCO, Inc.

Track Models and Coupling Procedures for Vehicle-Track-Soil Interaction Simulations
Dimitris Rizos, University of South Carolina

Investigation of the Relationship between Train Speed and Bolted Rail Joint Fatigue Life Using Finite Element Analysis
Yu Qian, University of Illinois, Urbana Champaign

MONDAY

Rail Transit Infrastructure Committee, AR055

Monday 8:00 AM – 9:45 AM
Marriott Marquis, Capitol (M4)
Anthony Bohara, HDR, presiding

A Rolling-Horizon Optimization Approach for Catenary Maintenance Identification and Assignment
Yung-Cheng Lai, National Taiwan University
Ren-Hong Xu, National Taiwan University
Tzu-Hao Yan, National Taiwan University
Quantification of Loading Environment and Flexural Demand Variability of Prestressed Concrete Crossties under Shared Corridor Operating Conditions
Ricardo Quiros-Orozco, University of Illinois, Urbana Champaign
J. Riley Edwards, University of Illinois, Urbana Champaign
Marcus Dersch, University of Illinois, Urbana Champaign
Yu Qian, University of Illinois, Urbana Champaign

Commuter Rail Research Subcommittee, AP070(2)
Monday 8:00 AM - 9:45 AM
Marriott Marquis, Woodley Park (M3)
Thomas Cornillie, Capitol Corridor Joint Powers Authority, presiding

Railroad Track Substructure and Superstructure Interaction
Monday 8:00 AM – 9:45 AM
Lectern Session 234 | Convention Center, 144A
J. Riley Edwards, University of Illinois, Urbana Champaign, presiding

Application of a New Concept and a Method to Estimate the Vertical Impact Forces on Railway Tracks due to Variation of Track Stiffness
N. Özgür Bezgin, Istanbul University

Evaluation of Ballast Behavior under Different Tie Support Conditions Using Discrete Element Modeling
Wenting Hou, University of Illinois, Urbana Champaign
Bin Feng, University of Illinois, Urbana Champaign
Wei Li, Zhejiang University
Erol Tutumluer, University of Illinois, Urbana Champaign

Seeing the Effects of Track Substructure on Ride Quality
James Hyslip, LORAM-HyGround Division
Hamed Kashani, LORAM-HyGround Division

Use of Track Geometry Car Data to Identify Problems in the Track Substructure
Phil Sharpe, AECOM

Train Energy Efficiency: Optimal Operating Strategies
Monday 8:00 AM - 9:45 AM
Lectern Session 232 | Convention Center, 143A
Adrian Hellman, OST-R/Volpe Center, presiding
Feedforward Tactical Optimization for Energy-Efficient Operation of Freight Trains: Swiss Case
Valerio De Martinis, ETHZ - Swiss Federal Institute of Technology
Ambra Toletti, ETHZ - Swiss Federal Institute of Technology
Francesco Corman, ETH Zurich
Ulrich Weidmann, IVT ETH Zürich
Andrew Nash, Emch+Berger AG Bern

An Integrated Micro–Macro Approach for High-Speed Railway Energy-Efficient Timetabling Problem
Yan Xu, Beijing Jiaotong University
Bin Jia, Beijing Jiaotong University
Amir Ghiasi, University of South Florida
Xiaopeng (Shaw) Li, University of South Florida
Minghua Li, Beijing Urban Construction Design & Development Group Co., Limited

A Stochastic Simulation Model Developed to Determine Threshold of Railway Electrification Based on Critical Load Criteria Using a Case Study at Tehran–Mashhad Route
Masoud Shakibayi, Iran University of Science and Technology
Yosef Shafahi, Sharif University of Technology
Mohammadadel Khodakarami, Texas A&M Transportation Institute
Naiman Nikoo, Iran University of Science and Technology

Technology to Improve the Effectiveness of Railroad Track Inspection and Maintenance

Monday 10:15 AM – 12:00 PM
Lectern Session 296 | Convention Center, 143A

Joseph Smak, National Railroad Passenger Corporation (Amtrak), presiding

A Case Study of Using Advanced Measurement Technologies to Inspect Railway Track Condition
Alireza Roghani, National Research Council Canada
Robert Caldwell, National Research Council Canada
Michael Hendry, University of Alberta

Modeling Progressive Settlement of a Railway Bridge Transition Zone
Stephen Wilk, University of Illinois, Urbana Champaign
Timothy Stark, University of Illinois, Urbana Champaign

Evaluation of Railway Ballast Permeability Using Machine Vision Based Degradation Analysis
Haohang Huang, University of Illinois, Urbana Champaign
Maziar Moaveni, University of Illinois, Urbana Champaign
Scott Schmidt, University of Illinois, Urbana Champaign
Erol Tutumluer, University of Illinois, Urbana Champaign
John Hart, University of Illinois, Urbana Champaign

Measurement of Track Stiffness Irregularities – Correlation Between Stiffness Gradients and Track Geometry Defects
Eric Berggren
Human Factors Rail Research Topics in Accidents and Derailments

**Monday 10:15 AM – 12:00 PM**

**Lectern Session 297 | Convention Center, 144A**

Ann Mills, Rail Safety and Standards Board (RSSB), presiding

**The Train Driver’s Attention and Accident Involvement**
Bahareh Hani Tabai, Iran University of Science and Technology
Morteza Bagheri
Vahid Sadeghi-Firoozabadi, Iran University of Science and Technology
Vahideh Shahidi, Wilfried Luier University

**Major Factors Affecting Passenger Train Accident Occurrence and Severity in the United States: 1996 – 2015**
Chen-Yu Lin, University of Illinois, Urbana Champaign
Rapik Saat, Association of American Railroads (AAR)
Christopher Barkan, University of Illinois, Urbana Champaign

**Comparison of Loaded and Empty Unit Train Derailment Characteristics**
Weixi Li, University of Illinois, Urbana Champaign
Geordie Roscoe, UIUC Railroad Engineering Program
Zhipeng Zhang, University of Illinois, Urbana Champaign
Rapik Saat, Association of American Railroads (AAR)
Christopher Barkan, University of Illinois, Urbana Champaign

Analysis of Safety Concerns at Highway-Rail Grade Crossings

**Monday 10:15 AM – 12:00 PM**

**Poster Session 324 | Convention Center, Hall E**

Aemal Khattak, University of Nebraska, Lincoln, presiding

**Injury Severity Analysis of Pedestrian and Bicyclist Trespassing Crashes at Non-Crossings: Application of Predictive Text Analytics**
Behram Wali, University of Tennessee, Knoxville
Asad Khattak, University of Tennessee, Knoxville
Meng Zhang, University of Tennessee, Knoxville

**Modeling Hazardous Materials Release in Crashes at Highway-Rail Grade Crossings**
Amirfarrokh Iranitalab, University of Nebraska, Lincoln
Yashu Kang, University of Nebraska, Lincoln
Aemal Khattak, University of Nebraska, Lincoln

**A Method for Better Estimation of Motor Vehicle Crash Exposure at Highway-Rail Grade Crossings**
Huiyuan Liu, University of Nebraska, Lincoln
Aemal Khattak, University of Nebraska, Lincoln
Predicting Highway-Rail Grade Crossing (HRGC) Gate Violations Using Tree-Based Ensemble Techniques
Li Zhao, University of Nebraska, Lincoln
Laurence Rilett, University of Nebraska, Lincoln
Cliff Spiegelman, Texas A&M Transportation Institute

Injury Severity of Truck Drivers in Crashes at Highway-Rail Grade Crossings in the United States
Waleed Khan
Aemal Khattak, University of Nebraska, Lincoln

Highway-Rail Grade Crossing Incident Consequence Analysis
Lijun Zhang, University of Illinois, Urbana Champaign
Samantha Chadwick, WSP
Christopher Barkan, University of Illinois, Urbana Champaign

How and When to Use Private Money for Transportation Infrastructure Projects

Monday 1:30 PM – 3:15 PM
Lectern Session 367 | Convention Center, 147B

George Grimes, Patriot Rail Company, presiding

PPP’s have great promise to help finance our infrastructure needs for different modes of transportation. Many PPP projects—such as the Denver Eagle P3 (DBFOM) commuter rail project—have been highly successful. But the history of PPP “… is littered with examples where privatization did not live up to its promises. Problems fall into three categories; the behavioral barriers that turn off consumers; political interests that often turn projects sour; and the difficulty of finding financial and incentive structures that align with the interests of all parties” (The Economist, 4/22-28, 2017). This session will examine how/where/why PPP has worked—or not worked—for different modes of transportation and the insights learned as a result.

Assessing Financial Viability: An Engineering Perspective
Steve Clark, ARUP

Concession Opportunities and Regulatory Issues
Dean Radeloff, Parsons

Private Financing Structuring Issues
Peter O'Neill, Rubicon Infrastructure Advisors, Inc.

California Public–Private Partnership Projects
Malcolm Dougherty, California Department of Transportation (CALTRANS)

P3 Panel Discussion
George Grimes, Patriot Rail Company
Steve Clark, ARUP
Malcolm Dougherty, California Department of Transportation (CALTRANS)
Peter O'Neill, Rubicon Infrastructure Advisors, Inc.
Dean Radeloff, Parsons
Hazardous Materials Transportation Research

Monday 1:30 PM – 3:15 PM

Lectern Session 371 | Convention Center, 149

David Willauer, Cambridge Systematics, Inc., presiding

Train-Level and Tank Car-Level Modeling of Hazardous Materials Release in Railroad Incidents
Amirfarrokh Iranitalab, University of Nebraska, Lincoln
Aemal Khattak, University of Nebraska, Lincoln

Developing an Empirical Pipeline and Rail Crude Oil Freight Demand Model
Adam Morrison, University of Waterloo
Chris Bachmann, University of Waterloo
Frank Saccomanno, University of Waterloo

Investigation of United States Rail-Based Crude Oil Incidents-Types and Consequences of Crude Oil Release
Amirfarrokh Iranitalab, University of Nebraska, Lincoln
Aemal Khattak, University of Nebraska, Lincoln

Comparative Risks of Transporting Hazardous Materials by Unit Train and Manifest Train
Weixi Li, University of Illinois, Urbana Champaign
Christopher Barkan, University of Illinois, Urbana Champaign

Innovations and Advances in Transportation Geotechnics

Monday 3:45 PM – 5:30 PM

Lectern Session 419 | Convention Center, 207A

Anand Puppala, University of Texas, Arlington, presiding

This session covers four innovative areas and topics in the pavement geotechnics field. These topics include both pavement- and rail track-related technologies using bioinspired material improvements to unmanned aerial vehicle-based photogrammetry studies for enhancing and addressing the performance of geotechnical infrastructure assets.

Railway Geotechnics for High Speed Train Infrastructure
Erol Tutumluer, University of Illinois, Urbana Champaign

Applications of UAVs in Transportation Geotechnics
Anand Puppala, University of Texas, Arlington
Surya Sarat Chandra Congress, University of Texas, Arlington

Bio-Inspired Ground Improvement for Transportation Infrastructure
J. David Frost, Georgia Institute of Technology (Georgia Tech)

Remote Sensing Technologies for Highway Infrastructure Monitoring
Thomas Oommen, Michigan Technological University
Railway Capacity and Delay Modeling—Hybrid Session

Monday 3:45 PM – 5:30 PM

Lectern Session 435 | Convention Center, 143B

Tyler Dick, University of Illinois, Urbana Champaign, presiding
Rapik Saat, Association of American Railroads (AAR), presiding

Simulation-based Method of Capacity Utilization Evaluation to Account for Uncertainty in Recovery Time
Yung-Cheng Lai, National Taiwan University
Kuan-Ting Chen, National Taiwan University
Tzu-Hao Yan, National Taiwan University
Ming-Hua Li, National Taiwan University

Simultaneous Optimization of Railcar Itinerary and Train Formation Plan
Boliang Lin, Beijing Jiaotong University
Jiaxi Wang, Beijing Jiaotong University
Ruixi Lin, CloudMinds
Chang Liu, Beijing Jiaotong University
Jie Xiao, Beijing Jiaotong University
Siqi Liu, Beijing Jiaotong University
Jianping Wu, Beijing Jiaotong University

A Data Driven Method for Delay Duration Estimation of High Speed Train
Meng-Cheng (Jason) Ni, City University of Hong Kong
K. L. Tsui, City University of Hong Kong
Yang Zhao, City University of Hong Kong

Operational Schedule Flexibility, Train Velocity and the Performance Reliability of Single-Track Railways
Taskin Sehitoglu, University of Illinois, Urbana Champaign
Darkhan Mussanov, University of Illinois, Urbana Champaign
Tyler Dick, University of Illinois, Urbana Champaign

Analysis of Causes and Effects of Primary Delays in a High-Speed Rail System
Chao Wen, University of Waterloo
ZhongCan Li, Southwest Jiaotong University
Javad Lessan, University of Waterloo
Liping Fu, University of Waterloo
Ping Huang, Southwest Jiaotong University
Chaozhe Jiang, Southwest Jiaotong University
Matthew Muresan, University of Waterloo

Statistical Analysis of High-Speed Railway Capacity Utilization and Passenger Distribution in China: A Case Study of Wuhan-Guangzhou High-Speed Rail
Jie Li, Southwest Jiaotong University
Yuxiang Yang, Southwest Jiaotong University
Jing Gan, Southwest Jiaotong University
Chao Wen, University of Waterloo
Ping Huang, Southwest Jiaotong University
Qiyuan Peng, Southwest Jiaotong University
Aleksandr Prodan, CPCS Transcom Ltd.  
Paulo Teixeira, Instituto Superior Tecnico

A Markov Chain Model for Measuring Robustness of Train Schedules  
Ismail Sahin, Yildiz Technical University

Simultaneous Rerouting and Rescheduling on Rail Networks under Weather Impact  
Ying Wang,  
Ronghui Liu  
Raymond S. K. Kwan, University of Leeds

Predicting Delay Occurrence at Freight Rail Sidings  
Juan Martinez Mori, University of Illinois, Urbana Champaign  
William Barbour, University of Illinois, Urbana Champaign  
Shankara Kuppa, CSX Corporation, Inc.  
Daniel Work, University of Illinois, Urbana Champaign

Rail Group Executive Board  
Monday 6:00 PM – 7:30 PM  
Marriott Marquis, Capitol Hill (M3)  
George Grimes, Patriot Rail Company, presiding

TUESDAY…………………………………………………………………………………………………………………………………………………..

Innovative Track Standards and Specifications to Meet the Challenges of the 21st-Century Economy  
Tuesday 8:00 AM – 9:45 AM  
Lectern Session 503 | Convention Center, 143B  
David Staplin, HNTB Corporation, presiding

Introductions  
David Staplin, HNTB Corporation

Current Developments in the Rail Industry Relating to Standards and Specifications  
Conrad Ruppert, University of Illinois, Urbana Champaign

Successes and Challenges with Standards and Specifications: Freight Railroad Perspective  
Semih Kalay, Transportation Technology Center, Inc.

Successes and Challenges with Standards and Specifications: Commuter Railroad Perspective  
Yifeng Mao, Long Island Railroad Company

Successes and Challenges with Standards and Specifications: Intercity Railroad Perspective  
Brian Marquis, OST-R/Volpe Center

Successes and Challenges with Standards and Specifications: Rail Transit Perspective  
William Moorhead, TRAMMCO, LLC
TRB’s Rail Safety IDEA Program: Sponsoring Innovation to Improve Railroad Safety and Performance

Tuesday 10:15 AM – 12:00 PM

Poster Session 579 | Convention Center, Hall E

Velvet Basemera-Fitzpatrick, Transportation Research Board, presiding

This session presents status and findings from eight Rail Safety IDEA projects. The principal researchers for each project will be available to discuss their research in an informal setting.

TRB’s Rail Safety IDEA Program: Sponsoring Innovation to Improve Railroad Safety and Performance
Velvet Basemera-Fitzpatrick, Transportation Research Board

Rail Safety IDEA Project 27: Field Evaluation of Ballast Fouling Conditions Using Machine Vision
Erol Tutumluer, University of Illinois, Urbana Champaign

Rail Safety IDEA Project 29: Self-Deicing LED Signals for Railroads and Highway Intersections
Hongyi Cai, University of Kansas

Rail Safety IDEA Project 30: Development of Ballast Real Time Information System Based on “Smartrock”
Hai Huang, Pennsylvania State University

Rail Safety IDEA Project 31: Modeling and Validation of Standards for a Sleeper Compartment on Accessible Passenger Rail Vehicles
Katharine Hunter-Zaworski, Oregon State University

Rail Safety IDEA Project 32: Railroad Bridge Inspections for Maintenance and Replacement Prioritization Using Unmanned Aerial Vehicles (UAVs) with Laser Scanning Capabilities
Fernando Moreu, University of New Mexico

Rail Safety IDEA Project 33: Adaptive Prestressing System for Concrete Crossties
Bassem Andrawes, University of Illinois, Urbana Champaign

Rail Safety IDEA Project 34: Prototype System for Managing Enterprise Rail Transport Risk for Hazmat
Ravi Palakodeti, FACTOR, Inc.

Rail Safety IDEA Project 35: Non-Contact Deflection Monitoring System for Timber Railroad Bridges
Sudhagar Nagarajan, Florida Atlantic University

Research Trends in Railway Operating Technologies

Tuesday 10:15 AM – 12:00 PM

Poster Session 581 | Convention Center, Hall E

Adrian Hellman, OST-R/Volpe Center, presiding
Estimating Passenger Train Energy and Emissions Activity Data: Rail Grade and Horizontal Curvature
Nikhil Rastogi, North Carolina State University
H. Christopher Frey, North Carolina State University

An Integrated Optimization Model for Energy-Saving in Metro Operations
Jiaxiao Feng, Southeast University
Zhirui Ye, Southeast University
Chao Wang, Southeast University
Mingtao Xu, Southeast University
Cheng Chang, Chang'an University

Scheduling a High-speed Railway Model with Explicit Consideration of Passenger Choices
Jiemin Xie, University of Hong Kong
Shuguang Zhan, Southwest Jiaotong University
S.C. Wong, University of Hong Kong
S. M. Lo, City University of Hong Kong

Support Vector Regression Models for Influenced Time Prediction in High-Speed Rail System
Yixiong Tang, Southwest Jiaotong University
Chao Wen, University of Waterloo
Ping Huang, Southwest Jiaotong University
Jie Li, Southwest Jiaotong University
Yuxiang Yang, Southwest Jiaotong University

Real-Time Monitoring and Management System of Intelligent Iron Shoes for Railway Rolling Stock
Chaozhe Jiang, Southwest Jiaotong University
Yibo Xu, Cloud-Guizhou Big Data Science Application Research Center
Dilin Chen, University of Illinois, Urbana Champaign
Chao Wen, University of Waterloo

Optimizing the Train Dispatcher Desk Districting Problem in High-speed Railway Network
Jun Zhao, Southwest Jiaotong University
Dian Wang, Southwest Jiaotong University
Qiyuan Peng, Southwest Jiaotong University

Current Research in Railroad Track Structure System Design
Tuesday 10:15 AM – 12:00 PM
Poster Session 583 | Convention Center, Hall E
J. Riley Edwards, University of Illinois, Urbana Champaign, presiding

Development of a Laboratory Test Method for Measuring Trackbed Pressures at the Tie/Ballast Interface
Jerry Rose, University of Kentucky
David Clarke, University of Tennessee, Knoxville
Qingjie Liu, East China JiaoTong University
Travis Watts, University of Kentucky
Analysis of Track Responses to Train Braking
Tulika Bose, Technical University of Denmark
Eyal Levenberg, Technical University of Denmark
Varvara Zania, Technical University of Denmark

Effects of Pier Deformation on Train Operations within High Speed Railway Ballastless Track-Bridge Systems
De Zhang, Tongji University
Junhua Xiao, Tongji University
Xiao Zhang, Tongji University

Reserved Design, Implementation, and Evaluation of a High-Speed Railway Ballastless Track Embankment with Shied Tunnel Undercrossing: A Case Study
Junhua Xiao, Tongji University
Shengyu Ye, Tongji University
Shunhua Zhou, Tongji University
Binglong Wang, Tongji University
Huiji Guo, Tongji University

Comparative Study of Pretensioned Concrete Crosstie Performance using the Finite Element Method
Hailing Yu, OST-R/Volpe Center
Daniel Mortarelli, Worcester Polytechnic Institute

Splitting/Bursting Performance of Prestressed Concrete Prisms
Moochul Shin, Western New England University
Hailing Yu, OST-R/Volpe Center

Application Of Granular Material Pressure Cells To Measure Railroad Track Tie/Ballast Interfacial Pressures
Jerry Rose, University of Kentucky
David Clarke, University of Tennessee, Knoxville
Qingjie Liu, East China JiaoTong University
Travis Watts, University of Kentucky

Application of a New Concept and a Method to Estimate the Vertical Impact Forces on Railway Tracks due to Vertical Variation of Track Horizontal Alignment
N. Özgür Bezgin, Istanbul University

Numerical Study on Application of Full Cross-Section Asphalt Waterproof Layer in CRTSIII Slab Track
Song Liu, Southeast University
Valeri Markine, Delft University of Technology
Xianhua Chen, Southeast University
Jun Yang, Southeast University

Decision-Making of Railway Maximum Design Gradient in Mountainous Terrain Using Deep Learning Algorithms
Hao Pu, Central South University
Hong Zhang, Central South University
Wei Li, Central South University
Lei Wang, Central South University
Characterization of Ballast Particle Movement at Mud Spot
Shushu Liu, Pennsylvania State University
Hai Huang, Pennsylvania State University
Tong Qiu, Pennsylvania State University
Brad Kerchof, Norfolk Southern Corporation

Dynamic Response Modeling of High-speed Railroad Ballastless Track Over Piled Raft Foundation
Yuanjie Xiao, Central South University
Liuxin Chen, Central South University
Keyang Zheng, Central South University

Current Research in Railway Track Maintenance

Tuesday 10:15 AM – 12:00 PM
Poster Session 584 | Convention Center, Hall E

Hai Huang, Pennsylvania State University, presiding

Support Condition and Traffic Loading Patterns Influencing Laboratory Determination of Under Ballast Mat Bedding Modulus and Insertion Loss
Arthur de Oliveira Lima, University of Illinois, Urbana Champaign
Marcus Dersch, University of Illinois, Urbana Champaign
Erol Tutumluer, University of Illinois, Urbana Champaign
J. Riley Edwards, University of Illinois, Urbana Champaign
Yu Qian, University of Illinois, Urbana Champaign

Full-Scale Model Testing on Ballasted High-Speed Railway: Dynamic Responses and Accumulated Settlements
Wei Li, Zhejiang University
Xuecheng Bian, Zhejiang University
Xiang Duan
Erol Tutumluer, University of Illinois, Urbana Champaign

Stone Blowing as a Remedial Measure to Mitigate Differential Movement Problems at Railroad Bridge Approaches
Huseyin Boler, University of Illinois, Urbana Champaign
Debakanta Mishra, Boise State University
Erol Tutumluer, University of Illinois, Urbana Champaign
Steven Chrismer, ENSCO, Inc.
James Hyslip, LORAM-HyGround Division

Measurement of Track Deflection and Associated Track Performance Effects
Theodore Sussmann, OST-R/Volpe Center
Gary Carr, Federal Railroad Administration (FRA)
Yu-Jiang Zhang, Federal Railroad Administration (FRA)
Hugh Thompson, Federal Railroad Administration (FRA)

A Comparison of Railroad Ballast Elastic Modulus as Estimated from Lightweight Deflectometer (LWD) and Dynamic Cone Penetrometer (DCP)
Aaron Rubin, University of Massachusetts, Amherst
Carlton Ho, University of Massachusetts, Amherst
Charles Oden, Earth Science Systems, LLC
Evolution of Longitudinal Resistance Performance of Granular Ballast Track with Durable Dynamic Reciprocated Changes
Jieling Xiao, Southwest Jiaotong University
Hao Liu, Southwest Jiaotong University
Ping Wang, Southwest Jiaotong University
Ganzhong Liu, Southwest Jiaotong University
Mingyuan Gao, Southwest Jiaotong University
Yuan Wang, Southwest Jiaotong University

Investigation of Lateral Track Panel Stiffness Through Four-Point Bending Tests
Manuel Zimmermann, ETHZ - Swiss Federal Institute of Technology
Heinrich Patrick Braess, ETH Zürich, IVT - Institute for Transport Planning and Systems
Sébastien Guillaume, ETH Zürich

Investigation of Relationship between Train Speed and Bolted Rail Joint Fatigue Life Using Finite Element Analysis
Hao Yin, University of Illinois, Urbana Champaign
Yu Qian, University of Illinois, Urbana Champaign
J. Riley Edwards, University of Illinois, Urbana Champaign
Kaijun Zhu, University of Illinois, Urbana Champaign

Laboratory Characterization of Structural Capacity of North American Heavy Haul Concrete Crossties
Josué César Bastos, University of Illinois, Urbana Champaign
J. Riley Edwards, University of Illinois, Urbana Champaign
Marcus Dersch, University of Illinois, Urbana Champaign
Alejandro Alvarez, University of Illinois, Urbana Champaign
Christopher Barkan, University of Illinois, Urbana Champaign

Railroad Track Structure System Design Committee, AR050
Tuesday 1:30 PM – 3:15 PM
Marriott Marquis, Capitol (M4)
J. Riley Edwards, University of Illinois, Urbana Champaign, presiding

Freight Rail Propulsion: Where Does the Energy Come From?
Tuesday 1:30 PM – 3:15 PM
Lectern Session 624 | Convention Center, 143A
Pasi Lautala, Michigan Tech Transportation Institute, presiding

The U.S. rail system (excluding transit systems) accounts for over 2% of the U.S. transportation energy consumption, with over 90% of this impact from freight rail. U.S. freight rail currently runs almost entirely on diesel fuel, with exceptions including very short, isolated lines. In 2015, the energy required by the Class I freight railroads translated into a consumption of over 3.5 billion gallons of diesel and accounted for 27.5% of Class I operating costs. There are both economic and environmental reasons to explore alternatives to diesel. This session provides historical background to the energy sources used by U.S. freight railroads and discusses the opportunities for alternative fuels in the future.
The Life and Death of North American Rail Freight Electrification
John Allen
Gregory Newmark, Kansas State University

Operational Considerations in Transitioning to Alternative and Emerging Locomotive Technologies for Line-Haul Freight Rail Applications
Tyler Dick, University of Illinois, Urbana Champaign

Rail and Public Transportation Caucus (sponsored by BNSF)
Tuesday 6:00 PM – 7:30 PM
Convention Center, Ballroom south Pre-Function C
Dennis Hinebaugh, USF Center for Urban Transportation Research, presiding
George Grimes, Patriot Rail Company, presiding

Geological and Geoenvironmental Engineering Section Executive Board
Tuesday 6:00 PM – 9:30 PM
Marriott Marquis, Catholic University (M1)
Erol Tutumluer, University of Illinois, Urbana Champaign, presiding

Rail Capacity, AR040(1), Joint Subcommittee of AR040, AR030, AP070, AT010, AR010
Tuesday 7:30 PM – 9:30 PM
Marriott Marquis, Treasury (M4)
Tyler Dick, University of Illinois, Urbana Champaign, presiding
RailTEC Faculty, Staff, Students and Alumni extend our sincerest thanks to the people, partners and organizations supporting rail transportation engineering research and education at Urbana-Champaign.

We are deeply grateful and appreciate the opportunity to work with you!