Transportation Research Record: Journal of the Transportation Research Board

Volume 2679, Issue 9

Part 1 of 2

ISBN: 979-8-3313-2638-8

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Published by Sage Publications USA

Copyright© (2025) by Transportation Research Board of the National Academies All rights reserved.

ISBN (Print) 979-8-3313-2638-8

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact sagepub.com/journals-permissions

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400

Phone: 845-758-0400 Fax: 845-758-2633

Email: curran@proceedings.com Web: www.proceedings.com



Contents

Research Articles

The Market Potential of Autonomous Trucks in the United States: An Industry Review Ryan Jones, Pan Lu, and Denver Tolliver	I
Assessing Injury-Severity Outcomes in Wet-Pavement Conditions: Exploring the Impact of Pavement Skid Resistance through Temporal Analysis with Random Parameters and Heterogeneity in Means and Variances Nawaf Alnawmasi, Mohammed Alamri, and Hisham Jashami	50
Evaluating Lane Departure Warning Systems Considering Characteristics of Truck Drivers' Response Behaviors Yanli Bao, Xuesong Wang, Kun Xie, Rongjie Yu, and Xiaolei Zhu	78
Analysis of Evolution Trends of Rail Corrugation in Slope Sections of Metro Lines Zhiqiang Wang, Zhenyu Lei, and Jianyue Zhu	102
Evaluation of a Tram Line with Ground-Level Energy Supply System in Energy Efficiency Perspective and Optimization Solution Ayhan Koyun, and Recep Yumurtaci	119
Fixed Fire Fighting and Emergency Ventilation Systems for Highway Tunnels Matthew Bilson, Hasan Raza, and William Connell	139
Urban Intersections and the Analysis of Pedestrian Injuries with Built-Environment and Equity Considerations Jason C. Anderson, Josh Roll, and Nathan McNeil	152
Evaluation of Tack Coat Bonding Performance in Flexible Pavements Rita I. Nasr, Adam J.T. Hand, Elie Y. Hajj, Peter E. Sebaaly, Gaylon L. Baumgardner, Codrin Daranga, Shelly Cowley, and Geverson De Jesus Moura	172
Routing and Scheduling of Fresh Product Distribution for Hybrid Truck–Drone Delivery with Temporary Drone Stations Xujin Pu, Yiyin Zhang, and Yaping Fu	184
Vulnerability Study of Urban River-Crossing Passages Considering the Impact of Disruption on Travel Keyuan Ding, Ran Peng, Yan Zhang, Xu Zhou, Feiyang Liu, Yanru Zhu, and Yehao Liu	212
Stiffness-Based Field-Testing Framework for Design and Evaluation of Pavement Subsurface Layers Margarita Ordaz, Victor M. Garcia, and Ernest S. Berney IV	232
Data-Driven Left-Turn Restriction Decision Framework for Urban Networks: A Case Study of Downtown Pittsburgh Tanveer Ahmed, and Vikash V. Gayah	246
Evaluation of Carrying Capacity Reliability for Regional Rail Transit System Yixuan Chen, Yanni Ju, Jiacheng Yin, and Donghui Jiang	261
Global Warming Potential Benchmarking of Asphalt Mixtures to Support Low-Carbon Procurement and Cradle-to-Gate Life Cycle Assessment-Based Strategies to Reduce Mix Global Warming Potential Adeoluwa Gbolade, and Debakanta Mishra	281

In-Train Force Orientated Trajectory Optimization for Heavy-Haul Trains with Electronically Controlled Pneumatic Braking Systems Chao Wang, Jingyuan Zhan, and Liguo Zhang	294
Next-Generation Transit Signal Priority with Advanced Arrival Time Prediction and Custom Traffic Signal Control Logic Burak Cesme, Jorge A. Barrios, Peter Koonce, Mark Haines, Peter Furth, Christopher Bame, and Nemanja Dobrota	308
Predicting Traffic Crash Severity in Jeddah Using Machine Learning Techniques: A Data-Driven Approach to Road Safety	324
Fayez Alanazi, and Mohamed Ahmed Okail	
Research on the Experimental Control of Abnormal Vibration on High-Speed Lines Dongyu Li, Yayun Qi, Yingnan Liu, Maorui Hou, and Wenhui Mao	344
Safety Performance Functions and Crash Modification Factors for Skid Resistance on Interstate and Non-Interstate Highways Atul Subedi, Sailesh Acharya, Patrick Singleton, and Michelle Mekker	360
Spatial Heterogeneities in Healthcare Visits and their Socioeconomic Determinants: A Comprehensive Analysis Using Traffic Flow Data Armita Kar, and Yasuyuki Motoyama	376
Study on Failure Characteristics and Treatment of Tunnel Lining Crossing Active Faults Hui Hu, Yun Liu, Youdi Lan, Heng Zhang, and Wenge Qiu	389
The Impact of Demographic Lifecycle States on Time to Vehicle Purchase: Insights from the Panel Study of Income Dynamics Mohammad Mehdi Oshanreh, Nazmul Arefin Khan, and Don MacKenzie	406
Tire-Derived Aggregate Modified Using Postconsumer Recycled Plastics for Subsurface Pavement Applications: A Study of Absorption and Swelling Effects Neetu Gopakumar, and Krishna Prapoorna Biligiri	420
Addressing the Gap: Examining the Role of Multiple Executive Function Constructs and Associated Factors in Risky Driving Performance in Young Drivers Elizabeth A. Walshe, Keith S. Baxelbaum, Chelsea Ward McIntosh, Luke Miller, Shukai Cheng, Nicole Wen, Flaura K. Winston, and Dan Romer	439
Capacity of U-Turning Traffic at Uncontrolled Median Openings on Four-Lane Divided Roads: A Gap Acceptance Based Approach Tathagatha Khan, Faijan Ali Ansari, and Smruti Sourava Mohapatra	450
Does Recycling Compromise Long-Term Performance and Life-Cycle Costs? A Comparative Analysis of Full-Depth Reclamation and Overlay Pavements Anneliese Crayton, Jonathan Schmidt, and Cristina Torres-Machi	466
Dynamic Mechanical Characteristics of Swivel Bridge during Rotation Process Wei Guo, Haiyang Xu, Jiangyi Zhang, Wei Tian, and Liye Zhang	481
Fundamental Diagram Model of Superhighway Mixed Traffic Flow Considering Intelligent Networked Vehicles Yongming He, Jiaxuan Wu, Wanyu Xing, Fan Wang, Jinyang Wang, and Liyuan Zhao	502
How Do Leading Pedestrian Intervals (LPIs) Affect Turning Vehicle-Pedestrian Conflict Frequencies and Severities? An Observational Study Before and After LPI Implementation Faria Raha, Brendan J. Russo, Anthony M. Eschen, Ava J. Elia, Steven R. Gehrke, and Edward J. Smaglik	518
Psychological Factors Associated with Helmet Use While Riding an Electric Two-Wheeler Among Older Chinese Adults Tangyi Guo, Lihua Liu, Jianrong Liu, and Ping Zhang	533

Route Optimization for Ships Using Ammonia-Based Fuel: A Hybrid Genetic Algorithm—Particle Swarm Optimization Approach Jing Wang, Nathan Huynh, Roger A. Dougal, and William E. Mustain	546
Understanding the Effects of Point Cloud Density on Automated Traffic Sign Change Detection Using Lidar Technology Ahmed Khataan, and Suliman Gargoum	564
Novel Test to Assess Moisture-Induced Durability of Stabilized Soils Under Cyclic Loading Ayazhan Bazarbekova, Yong-Rak Kim, Dallas N. Little, and John F. Rushing	579
Aquaplaning Thresholds Based on Key Vehicle and Freeway Geometric Factors Stergios Mavromatis, Antonis Kontizas, Vassilios Matragos, Kiriakos Amiridis, Antonios Trakakis, and Niki Bardis	591
Evaluation of Resilient Modulus Prediction Models for Saturated Pavement Base Aggregates Don Guy V. V. Biessan, Benjamin F. Bowers, and J. Brian Anderson	602
Exploring Relationships between Summary Resilient Modulus, California Bearing Ratio, and Light Weight Deflectometer Modulus for Unbound Coarse Materials in Idaho S. M. Robinur Mohshin Chowdhury, and Emad Kassem	615
Failure Analysis of Prestressed Concrete Girder Bridges Under Over-Height Truck Impacts Mohamed T. Elshazli, Mohamed ElGawady, Tao Xing, and Ahmed Ibrahim	630
Laboratory Characterizations of Tire-Derived Aggregate–Fine-Grained Soil Mixtures for Highway Applications Belay Nerea, Sandra Metz, Ehsan Dabbaghi, and Kam Ng	655
Laboratory Investigation of Internal Curing Potential in Stiff Mortar Mixtures Using Expanded Clay Aggregates Anusha Toshikhani, and Solomon Debbarma	666
Modeling and Simulation of Mixed Traffic Flow in Maintenance Operation Zone Considering the Impact of Trucks in an Intelligent Connected Environment Liang Chen, Nannan Jia, Qiaoru Li, and Yuxuan Zhao	683
Real-Time Adjustment Method with Train Delays for Metro Systems based on the Double Dueling Deep Q-Network Algorithm Wei Li, Yushen Hu, Qin Luo, and Yihong Mo	706
Sustainable and Resilient Schedule Coordination for Connecting Flights at Airport Hubs Mei Xiao, Steven Chien, Ching-Jung Ting, Liang Zhang, and Lei Zhang	726
Using Statistical Analysis to Assess the Default Structural Properties of Alabama Department of Transportation Base and Subgrade Materials Used for Flexible Pavement Design Don Guy V. V. Biessan, Benjamin F. Bowers, David H. Timm, Scott W. George, Frank Bell, and John P. Jennings	739
Vulnerability Reduction of an Urban Rail Transit Network by Allocating Protective Resources: A Scenario Model Approach Jinqu Chen, Xiaowei Liu, Bo Du, Yong Yin, and Baowen Li	751
Adaptive Filtering Algorithm for Estimating Signalized Arterial Travel Times Pengyao Ye, and Enpei Pan	769
Barriers, Adoption, and Use of a Bike-Sharing System: A Market-Segment Approach to Current and Potential Users in Montréal, Canada Panagiotis Goudis, Rodrigo Victoriano-Habit, Thiago Carvalho, and Ahmed El-Geneidy	788
Evaluation of the Risk Zoning of Collapse Disasters Based on Expert Systems Liqing Li, Shiyang He, and Zhifu Shen	802

Illinois Tollway Specification Management and Resource Tool Jose J. Rivera Perez, Mahesh Anandan, John Richard, Raj Rajasekhar, Rick Young, and Laura Thompson	819
Modeling Pedestrian Behavior in Metro Stations with Commercial Facilities: An Attractiveness-Based Approach Xiao Sun, Ling Hong, and Mario Cools	834
Passive Sensing Communication to Vehicles in Construction Work Zones through Signage Coded on Pavement Surface Apidej Sakulneya, and Jeffery Raphael Roesler	847
Regional Corridor-Level Approach to Predict Wrong-Way Driving Crashes and Identify Wrong-Way Driving Hotspots on Florida Arterials Shahad Ibrahim, Adrian Sandt, Haitham Al-Deek, John McCombs, and Nizam Uddin	858
A Safety Service Patrol Case Study in the Use of Vehicle-Mounted Message Boards to Promote Move-Over Behavior Grady Carrick, Sivaramakrishnan Srinivasan, Nithin Agarwal, Abiral Aashish, Shraddha Sagar, and Charles Brown	874
Overview of the Current State of Practice of Ancillary Asset Data within State Departments of Transportation Amin Khoshkenar, Hala Nassereddine, Bassam Ramadan, Rachel Catchings, and Gabriel Dadi	885
Analyzing Bicycle Riding Characteristics Based on Naturalistic Urban Drone Observations: Free Riding, Following Behavior, and Overtaking Maneuvers Alexander Kutsch, Lisa Kessler, and Klaus Bogenberger	900
Asset Investment Planning and Optimization Methodology in Consideration of Asset Lifecycles: Port Authority of New York and New Jersey Case Study Maurizio Morgese, Mahmoud Halfawy, Nick Hutton, Robert Kumapley, and Ali Maher	915
Balanced Mix Design as an Equalizer to Assess the Environmental Performance of Asphalt Mixtures Rohith Reddy Vangala, Surendra Chowdari Gatiganti, Benjamin F. Bowers, and Tiana Y. Lynn Wright	935
Comprehensive Investigation of Roundabout Safety Challenges in the Southeast United States: Findings and Recommendations from Kentucky's Survey Analysis Justin Szczepanski, Jeremy Jordan, Kirolos Haleem, and Mike Vaughn	948
COVID-19 Era Crash Fatality/Severe Injury and Proven Speed—Crash Relations Mohamadreza Banihashemi, Subasish Das, Seyedehsan Dadvar, and Jinli Liu	967
Decarbonization Strategy Optimization for Liner Fleet under Emission Trading Policy Qiang Fu, Jiajie Wu, Huan Xu, Ruijia Zhao, and Fangqing Zhao	981
Development of a Consumption-Weighted Benchmarking Methodology for Asphalt Cradle-to-Gate Global Warming Potential in Colorado Daniel Donado-Quintero, and Christopher Senseney	1008
Development of a Systematic Approach to Estimating Mix-Specific Dryer Burner Fuel Consumption at Asphalt Plants Surendra Chowdari Gatiganti, and Benjamin F. Bowers	1023
Development of Precision Statements for the Asphalt Mixture Performance Tester Dynamic Modulus Test: A Framework for Small-Scale Specimens A. Kazuo Kuchiishi, Cassie Castorena, Y. Richard Kim, and B. Shane Underwood	1033