Transportation Research Record: Journal of the Transportation Research Board

Volume 2678, Issue 8

August 2024

Part 1 of 2

ISBN: 979-8-3313-0363-1

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© (2024) by Transportation Research Board of the National Academies All rights reserved.

ISBN (Print) 979-8-3313-0363-1

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 Fax: 845-758-2633 Email: curran@proceedings.com Web: www.proceedings.com



Contents

Research Articles

Real-Time Unmanned Aerial Vehicle-Based Traffic State Estimation for Multi-Regional Traffic Networks Kyriacos Theocharides, Charalambos Menelaou, Yiolanda Englezou, and Stelios Timotheou	I
Rules Versus Risk: Why Perceptions of Pedestrian Comfort and Safety Differ for Interactions with Self-Driving versus Human-Driven Vehicles Emily Bardutz, Alexander Bigazzi, Jordi Honey-Rosés, and Gurdiljot Gill	13
Safety Evaluation of the Combined Effect of Offset Left-Turn Lanes and Flashing-Yellow-Arrow Signals at Signalized Intersections on Multilane Divided Highways in Alabama Using the Empirical Bayes Method Pranesh Biswas, Min-Wook Kang, and Moynur Rahman	31
Ultrafine Particles on Electric, Gas, and Diesel Buses in the Mass Transit Buses of Bogotá, Colombia Diego Armando Vargas Romero, and Cristina Vanesa Durán Grados	46
Exploration of Factors That Influence Willingness to Consider Pooled Rideshare Haotian Su, Rakesh Gangadharaiah, Elenah B. Rosopa, Johnell O. Brooks, Lisa Boor, Kristin Kolodge, Patrick J. Rosopa, and Yunyi Jia	57
Spatio-Temporal Pattern of China's Urban Network Under the Substitution Effect of High-Speed Rail on Aviation Xueguang Ma, Ce Jiang, and Zhao Zhang	74
Alliance or Independence? Optimal Operation of Commuter Buses by Suburban Employers Based on Cooperative Game Theory Dongxu Chen, Shuai Tang, Yu Lin, Xudong Li, and Zhongzhen Yang	93
Examining the Effects of Gateway Width on Motorist Yielding to Pedestrians Jonathan Hochmuth, Erik Newton, and Ron Van Houten	108
Spatio-Temporal Heterogeneous Graph-Based Convolutional Networks for Traffic Flow Forecasting Zhaobin Ma, Zhiqiang Lv, Xiaoyang Xin, Zesheng Cheng, Fengqian Xia, and Jianbo Li	120
Traffic Congestion Cause Identification Method for Urban Main Roads Cai Xiaoxi, Xiao Yanping, and Zhang Lei	134
Safety Evaluation of the First Bus Rapid Transit System in Tanzania Angela E. Kitali, Cecilia Fabian Kadeha, Boniphace Kutela, Emmanuel Kidando, Derick D. Semu, Norris Novat, and Janeroza W. Matyenyi	155
How Are E-Scooter Speed-Limiter Settings Associated with User Behavior? Observed Speeds and Road, Sidewalk, and Bike Lane Use in Austin, TX, and Washington, D.C. Jessica B. Cicchino, Neil K. Chaudhary, and Mark G. Solomon	171
Measuring the Macrotexture of Pavement Surface Using an Image Processing Technique Nabanita Roy, Anil Kumar Baditha, Soumyarup Biswas, and Kranthi Kumar Kuna	184

Problem of Patient Transport Route Planning for Battery Electric Vehicles Considering a Flexible Charging Strategy Pengcheng Yuan, Mingliang Luo, Ge Miao, and Jilin Li	198
Spatiotemporal Heterogeneity of Carbon Dioxide Emissions: Evidence from High-Speed Railway Operations in China Wenming Shi, Fuyong Yang, Xuehao Feng, Yiyang Liu, and Mengjie Jin	226
Applicability of Transfer Function to Disturbance Growth Estimation and Traffic Stability Jiazu Zhou, Tianyu Dong, and Feng Zhu	245
Deformation Mechanism and Control Measures of Large-Span Tunnels in Steep Layered Surrounding Rock Yonghui Zhang, Zhiping Hu, Yuchao Fan, Feng Deng, and Zhiyuan Sun	256
Changing Regularity of the Interaction Effects of Multi-Scale Factors on Drivers' Merging Behaviors in the Highway Work Zone Lan Huang, Zhibin Ren, and Xianghai Meng	277
Dynamic Analysis and Optimization of Vehicle-Bridge Interaction System under Road Roughness and Time Variability of Element Interpolation Function Shuai Mo, Keren Chen, Zurui Huang, and Wei Zhang	294
Effect of Tire Chips on the Shear Behavior of Steel Slag and Granite Ballast Mixture Atif Hussain, and Syed Khaja Karimullah Hussaini	310
Traffic Performance of Successive Freeway Merge Segments Alexander Brandenburg, Julian Sauer, and Justin Geistefeldt	325
Uncertainty, Efficiency, and Stability of Mixed Traffic Flow: Stochastic Model-Based Analyses Liang Lu, Fangfang Zheng, and Xiaobo Liu	336
Unsupervised Learning for Public Transport Delay Pattern Analysis Yuxing Cheng, and Panchamy Krishnakumari	358
Bibliometric Analysis of Environmental Management Literature in Aviation Mustafa Uzgör, Savaş Selahattin Ateş, and Haşim Kafalı	374
Effects of Intersections on the Safety of Horizontal Curves Xingjing Xu, Ilir Bejleri, Karla Rodrigues Silva, and Sivaramakrishnan Srinivasan	396
Evaluating Signal Preemption Requests in Utah Using Vehicle-to-Everything Dedicated Short-Range Communication Equipped Snowplows Samantha K. Lau, Grant G. Schultz, Mason Shoaf, David Bassett, and Dennis L. Eggett	417
Feasibility of Modernizing the Acceptable International Roughness Index Value Yoojung Yoon, and Shirin Hassan	431
Fleet and Vertiport Sizing for an Urban Air Mobility Commuting Service Mark T. Kotwicz Herniczek, Brian J. German, and Lukas Preis	443
Long-Term Performance of Soybean-Based Concrete Surface Protectant under Laboratory Accelerated Aging Conditions Mohammad Houshmand Khaneghahi, Angela Mutua, Jialuo He, Geetika Mishra, and Yaghoob (Amir) Farnam	470
Economic Effect and Disparity of Airport Economic Zones Utilizing the Synthetic Control Method Yiying Chao, Gexin Tian, Xuefeng Wang, and Yin Gu	482

Motorized Two-Wheeler Overtaking: An Analysis of Strategies and Factors Affecting Overtaking Duration on Undivided Highways in Heterogeneous Traffic Conditions Sagar Keshari, Anurag Thombre, and Indrajit Ghosh	499
Speed Tracking and Anti-Slip Control for Heavy Freight Trains Considering the Conicity of the Wheel LingZhi Yi, Yu Yi, JianLing Li, Chen Xie, DaKe Zhang, and WenBo Jiang	518
Feature Engineering and Decision Trees for Predicting High Crash-Risk Locations Using Roadway Indicators Dimitrios Sarigiannis, Maria Atzemi, Jimi Oke, Eleni Christofa, and Simos Gerasimidis	535
Hub Node Identification in Urban Rail Transit Network Evolution Using a Ridership-Weighted Network Tian Tian, Yanqiu Cheng, Yichen Liang, Chen Ma, Kuanmin Chen, and Xianbiao Hu	549
Incorporating Road Network Connectivity in Neighboring Structures for Crash Prediction Models at the Area Level	570
Jonathan Aguero-Valverde, and Dario Vargas-Aguilar	
Mathematical Model to Quantify the Impact of Accommodating Pedestrian Timings in Coordinated Signal Systems Ali Gholami, Daobin Wang, and Zong Tian	581
Delineating Sight Occlusions of Head-On Traffic Signboards under Varying Available Sight Distances Using LiDAR Point Clouds	596
Jin Wang, Ziang Song, Ziyi Zhang, Yanyan Chen, and Niuqi Xu	
Development of a Mechanistic-Empirical-Based Highway Cost Allocation Model for Flexible Pavements Seyed Farhad Abdollahi, Poornachandra Vaddy, and M. Emin Kutay	610
Two-Echelon Location–Routing Problem of Perishable Products Based on the Integrated Mode of In-Store Pick-Up And Delivery Xiqiong Chen, Yanni Jiu, and Dawei Hu	622
Innovative Approach to Convert Geographic Information System-Based Highway Models into Multidimensional Building Information Modeling Platforms Using Dynamo Xiaoqiang Hu, Yi Jiang, and Shuo Li	637
Bridge Approach Settlement and its Mitigation Schemes: A Review Bhaskar Prakash, Anoop Kumar Tiwari, and Suresh R. Dash	660
Estimation of the Smallest Acceptable Sample Size in Bilateral Approaches to Coefficient Estimation and Accuracy Prediction Bowen Cai, and Xuesong Wang	690
Exploring the Factors Influencing Electric Bicycle Adoption: A Survey Among Future Adopters in India Mohammad Zabiulla, Prasanta K. Sahu, and Bandhan Bandhu Majumdar	700
Faster Convergence of Integrated Activity-Based Models in Dynamic Multimodal Transit Assignment Using Macroscopic Road Congestion Estimation Yuhan Zhou, and Hani S. Mahmassani	716
Improving Traffic Accident Severity Prediction Using Convoluted Features and Decision-Level Fusion of Models Nihal Abuzinadah, Turki Aljrees, Xiaoyuan Chen, Muhammad Umer, Omar Ibrahim Aboulola, Saba Tahir, Ala' Abdulmajid Eshmawi, Khaled Alnowaiser, and Imran Ashraf	731
Integrated Overtaking Model and Safety Analysis for Truck Platooning Requirements on Two-Lane Undivided Highways Yu (Fred) Song	745

Yu (Fred) Song

Train Timetable Optimization for Suppressing Traction Power Fluctuations, Especially on Mountainous Railway Lines with Long, Steep Grades <i>Mi Li, Chaohua Dai, and Weirong Chen</i>	761
Driving Safety Evaluation of Mixed Car-Following Situations by Autonomous and Manual Vehicles at Urban Interrupted Road Facilities Sangjae Lee, Young Jo, Hojae Kim, Juneyoung Park, and Cheol Oh	772
Energy-Efficient Speed Planning for Autonomous Driving in Dynamic Traffic Scenarios Yuze Shang, Fei Liu, Ping Qin, Zhizhong Guo, and Zhe Li	785
Modeling Telecommuting and Teleshopping Preferences in the Post-Pandemic Era Shivam Khaddar, and Mahmudur Rahman Fatmi	803
Multilevel Discrete Outcome Modeling for Crash Severity: A Novel Approach for Crash Severity Models Md Julfiker Hossain, Namitha Pais, John N. Ivan, Shanshan Zhao, Kai Wang, and Nalini Ravishanker	821
Psychological Factors Affecting Drive-by-Lane Behavior at Lane Offset Intersections: Analysis Based on Extended Theory of Planned Behavior in a Chinese Sample Xiangmin Liu, Xiaohua Zhao, Yang Bian, Chengyu Wu, and Wenhui Dong	837
Traffic Performance Score: Measuring Urban Mobility and Online Predicting of Near-Term Traffic, like Weather Forecasting Zhiyong Cui, Meng-Ju Tsai, Meixin Zhu, Hao Yang, Chenxi Liu, Shuyi Yin, and Yinhai Wang	856
Heuristic for Railway Crew Scheduling With Connectivity of Schedules Akshat Bansal, Kezhe Perumpadappu Anoop, and Narayan Rangaraj	873
Corridor-Level Auto Occupancy in Mobility Monitoring Efforts: A Crash-Based Approach Yiqing Xu, Lance E. Dougald, and John S. Miller	888
Route Optimization of Hazardous Material (Hazmat) Transportation with Risk Equity and Time-Varying Risk Liping Liu, Xiaofeng Gan, Qing Wu, and Zhengwei Sun	901
Severity Analysis of Secondary Crashes on High-Speed Roadways: Pattern Recognition Using Association Rule Mining	919
Md Mahmud Hossain, Mohammad Reza Abbaszadeh Lima, and Huaguo Zhou Automatic Classification of Pavement Type and Service Age Benchmarked with Standard Texture Databases Using the Machine Learning Method: A Pilot Study Jiale Lu, Baofeng Pan, Quan Liu, Pengfei Liu, and Markus Oeser	932
Multi-Level Prediction Framework of Driving Risk Based on the Matter-Element Extension Model Xiaoxia Xiong, Yu He, Yingfeng Cai, Qingchao Liu, Hai Wang, and Long Chen	950
Estimation of Environmental Rebound Effect Induced by Shared Automated Passenger Transport Service in a Mid-Size European City via Microsimulation Ada Garus, Borja Alonso Oreña, María Alonso Raposo, Andromachi Mourtzouchou, Ruben Cordera Piñera, Carlos Lima Azevedo, Luigi dell'Olio, Ravi Seshadri, Mayara Moraes Monteiro, and Biagio Ciuffo	966
Impact of Pandemic on Commuters' Mode Choice Behavior: A Case Study of Dalian City, China Krishna Bhattarai, Shengchuan Zhao, Dezao Hou, and Manmohan Joshi	979
Effect of Curing Temperature on the Shrinkage of Concrete Containing Reclaimed Asphalt Pavement: Experimental and Numerical Study Sahnoune Bensahnoune, Farid Bouziadi, Bensaid Boulekbache, Mostefa Hamrat, Abdelkader Haddi, and Sofiane Amziane	992

Effects of Adaptive Cruise Control System on Traffic Flow and Safety Considering Various Combinations of Front Truck and Rear Passenger Car Situations Jun Bai, Jaeyoung Lee, and Suyi Mao	1009
Influences of Geocell Reinforcement on Shear Strength of Railway Roadbeds Bowen Cheng, Junhong Huang, Huiyan Wang, and Xinping Li	1029
Covid-19 Pandemic's Enduring Impact on Urban Mobility: The Case of Free-Floating Bike Sharing in Padova, Italy Margherita Cavattoni, Matteo Comin, and Francesco Silvestri	1046
Case Study on Instrumenting and Monitoring Geosynthetic-Reinforced Pile-Supported Mechanically Stabilized Earth Wall Built over Soft Soil MohammadAli Izadifar, Murad Y. Abu-Farsakh, and Shengli Chen	1059
Collision-Free Merging Control Via Trajectory Optimization for Connected and Autonomous Vehicles Cheng Zhang, Junjie Qi, Yinglong He, Muhammad Awais Shafique, and Jing Zhao	1077
Driving Distraction Evaluation Model of In-Vehicle Infotainment Systems Based on Driving Performance and Visual Characteristics Binjue Wang, Qing Xue, Xiaonan Yang, Xuanzhu Wan, Yahui Wang, and Cheng Qian	1088
Experimental Study on the Stress and Failure Mode of a Shield Tunnel Lining Under Asymmetric Thrust Yang Song, Ang Li, Xiaofeng Xu, Xin Wang, and Chuntao Li	1104
Laboratory Characterization of Additive-Modified Asphalt Concrete Mixtures Matthew Kmetz, David Timm, Carolina Rodezno, Nam Tran, and Fan Yin	9
Effects of Wars on Merchant Seafarers: Study on Experiences and Concerns in the Russia-Ukraine War Şaban Emre Kartal, Orkun Burak Öztürk, and Şengül Şanlier Uçak	3