Transportation Research Record: Journal of the Transportation Research Board

Volume 2674, Issue 7

July 2020

ISBN: 978-1-7138-1825-0

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© (2020) by Transportation Research Board of the National Academies All rights reserved.

ISBN (Print) 978-1-7138-1825-0

Printed with permission by Curran Associates, Inc. (2020)

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

Lane Detection and Lane-Changing Identification with High-Resolution Data from a Swarm of Drones Emmanouil Barmpounakis, Guillaume M. Sauvin, and Nikolaos Geroliminis	I
Prevention of End-of-Track Collisions in Passenger Terminals via Positive Train Control: Benefit-Cost Analysis and Operational Impact Assessment Zhipeng Zhang, Xiang Liu, and Keith Holt	16
Comprehensive Approach to Measure the Mobility Energy Productivity of Freight Transport Kyungsoo Jeong, Venu Garikapati, Yi Hou, Alicia Birky, and Kevin Walkowicz	29
Conceptualization of Three-Stage Fatigue Failure in Asphalt-Rubber Gap-Graded Mixtures using Dynamic Semi-Circular Bending Test Veena Venudharan and Krishna Prapoorna Biligiri	44
Contribution of MnROAD Research to Improvements in Concrete Pavement Technology from 1994–2019 Thomas Burnham, Benjamin Worel, and Bernard Izevbekhai	56
Durable High Early Strength Concrete via Internal Curing Approach using Saturated Lightweight and Recycled Concrete Aggregates Faisal Qadri and Christopher Jones	67
Estimate of the Safety Effect of All-Way Stop Control Conversion in Washington, DC Zuxuan Deng, Sergiy Kyrychenko, Taylor Lee, and Richard Retting	77
Evidence from Urban Roads without Bicycle Lanes on the Impact of Bicycle Traffic on Passenger Car Travel Speeds Jaclyn S. Schaefer, Miguel A. Figliozzi, and Avinash Unnikrishnan	87
Households' Intended Evacuation Transportation Behavior in Response to Earthquake and Tsunami Hazard in a Cascadia Subduction Zone City Chen Chen, Alexandra Buylova, Cadell Chand, Haizhong Wang, Lori A. Cramer, and Daniel T. Cox	99
New Pavement Performance Indicators using Crack Fundamental Elements and 3D Pavement Surface Data with Multiple-Timestamp Registration for Crack Deterioration Analysis and Optimal Treatment Determination Yichang (James) Tsai and Zhongyu Yang	115
Reliability-Based Design for Passing Maneuvers Based on Observational Data Udai Hassein	127
Multi-Period Optimization Model for Siting Capacitated Intermodal Facilities Vishal Badyal, William G. Ferrell, Jr, Nathan Huynh, and Bhavya Padmanabhan	135
Analysis of Overtaking Maneuvers to Cycling Groups on Two-Lane Rural Roads using Objective and Subjective Risk Griselda Lóbez, Ana María Pérez-Zuriaga, Sara Moll, and Alfredo García	148

Crash Testing and Evaluation of Culvert-Mounted Midwest Guardrail System Mojdeh Asadollahi Pajouh, Robert W. Bielenberg, Jennifer D. Schmidt-Rasmussen, and Ronald K. Faller	161
Field Evaluation of Connected Vehicle-Based Transit Signal Priority Control under Two Different Signal Plans Qinzheng Wang, Xianfeng (Terry) Yang, Blaine D. Leonard, and Jamie Mackey	172
Integrating Supply and Demand Perspectives for a Large-Scale Simulation of Shared Autonomous Vehicles Krishna Murthy Gurumurthy, Felipe de Souza, Annesha Enam, and Joshua Auld	181
Reducing Delays on High-Density Railway Lines: London–Shenfield Case Study Giorgio Medeossi and Andrew Nash	193
Safety Evaluation of Median U-Turn Crossover-Based Intersections Ma'en Mohammad Ali Al-Omari, Mohamed Abdel-Aty, Jaeyoung Lee, Lishengsa Yue, and Ahmed Abdelrahman	206
City-to-City and Temporal Assessment of Peer City Scooter Policy Caroline Janssen, William Barbour, Erin Hafkenschiel, Mark Abkowitz, Craig Philip, and Daniel B. Work	219
Comparative Study of Cyclic and Shake Table Tests for Simple for Dead Load and Continuous for Live Load Steel Bridge System in Seismic Area Amir Sadeghnejad, Sheharyar Rehmat, Islam M. Mantawy, and Atorod Azizinamini	233
Comparison of Cycling Behavior between Keyboard-Controlled and Instrumented Bicycle Experiments in Virtual Reality Martyna Bogacz, Stephane Hess, Chiara Calastri, Charisma F. Choudhury, Alexander Erath, Michael A. B. van Eggermond, Faisal Mushtaq, Mohsen Nazemi, and Muhammad Awais	244
Natural Experiment to Assess the Impacts of Street-Level Urban Design Interventions on Walkability and Business Activity Maher Said, Georges Geha, and Maya Abou-Zeid	258
Comprehensive Evaluation of Rutting of Warm-Mix Asphalt Utilizing Long-Term Pavement Performance Specific Pavement Studies Biswajit K. Bairgi, A.S.M. Asifur Rahman, Rafiqul A. Tarefder, and Matias M. Mendez Larrain	272
Development of a Computer Program for Calculation of the Alpha Parameter in the Linear Amplitude Sweep Test and Comparison with Rheological Parameters Seyed Farhad Abdollahi, Mehdi Farrokhi, and Nader Tabatabaee	284
Lessons from a Large-Scale Experiment on the Use of Smartphone Apps to Collect Travel Diary Data: The "City Logger" for the Greater Golden Horseshoe Area Ahmadreza Faghih Imani, Chris Harding, Siva Srikukenthiran, Eric J. Miller, and Khandker Nurul Habib	299
A Correlated Random Parameters Model with Heterogeneity in Means to Account for Unobserved Heterogeneity in Crash Frequency Analysis Xiaoyan Huo, Junqiang Leng, Qinzhong Hou, and Hao Yang	312
Laboratory Investigation of the Performance Evaluation of Fiber-Modified Asphalt Mixes in Cold Regions Luis Alberto Perca Callomamani, Leila Hashemian, and Katrina Sha	323
Prediction of Lane-Changing Maneuvers with Automatic Labeling and Deep Learning Vishal Mahajan, Christos Katrakazas, and Constantinos Antoniou	336
Incorporating Autonomous Vehicles in the Traditional Four-Step Model Felipe F. Dias, Gopindra S. Nair, Natalia Ru_ız-Juri, Chandra R. Bhat, and Arash Mirzaei	348
Multiple Regression Model for Load Rating of Reinforced Concrete Bridges Edgardo Ruiz and Seamus Freyne	361

Demonstrative Case of a Pedestrian Network Design Model Considering Effects on Motorized Traffic Christina Iliopoulou, Maria Tseliou, Konstantinos Kepaptsoglou, and Stratos Papadimitriou	373
Evolution of Transportation Network Companies and Taxis through 2013–2018 in Chicago Sneha Roy, Anurag Komanduri, and Kimon Proussaloglou	385
Delineator for Separated Bicycle Lanes at Sidewalk Level Billie Louise (Beezy) Bentzen, Alan C. Scott, and Linda Myers	398
Effect of Tactile Walking Surface Indicators on Travelers with Mobility Disabilities Billie Louise (Beezy) Bentzen, Alan C. Scott, Robert Wall Emerson, and Janet M. Barlow	410
Macroscopic Fundamental Diagram Approach to Evaluating the Performance of Regional Traffic Controls Weike Lu, Jun Liu, Jiannan Mao, Guojing Hu, Chuqiao Gao, and Lan Liu	420
Performance-Based Approach for Deciding Concrete Age for Healer Sealer Application on New Concrete Abul Fazal Mazumder, Upul Attanayake, and Neal S. Berke	431
Personalized Choice Model for Managed Lane Travel Behavior Yifei Xie, Yundi Zhang, Arun Prakash Akkinepally, and Moshe Ben-Akiva	442
Analyzing Characteristics of the Unreliable Segments of the National Highway System across South Eastern States of the United States Chowdhury Siddiqui	456
Induced Vehicle Travel in the Environmental Review Process Jamey M. B. Volker, Amy E. Lee, and Susan Handy	468
Modeling Lane-Changing Behaviors in Merging Areas of Urban Expressways in Nanjing, China Quan Chen, Hao Wang, and Changyin Dong	480
How Much of Which Mode? Using Revealed Preference Data to Design Mobility As a Service Plans Daniel J. Reck and Kay W. Axhausen	494
Impact of Cognitive Distractions on Drivers' Hazardous Event Anticipation and Mitigation Behavior in Vehicle–Bicycle Conflict Situations Yalda Ebadi, Ganesh Pai, Siby Samuel, and Donald L. Fisher	504
Investigation of Highway Stormwater Management Pond Capacity for Flood Detention and Water Quality Treatment Retention via Remote Sensing Data and Conventional Topographic Survey Houng Li	514
Replicating Advanced Detection using Low Ping Frequency Probe Vehicle Trajectory Data to Optimize Signal Progression Jonathan M. Waddell, Stephen M. Remias, Jenna N. Kirsch, and Mohsen Kamyab	528
Shifting from Private to Public Transport using Duration-Based Modeling of a School-Based Intervention Mariza Motta Queiroz, Carlos Roque, and Filipe Moura	540
Option Value of Contingent Finance Support in Transportation Public–Private Partnership Projects Yunping Liang and Baabak Ashuri	555
Evaluation of the Precision and Accuracy of Cycle-Average Light Duty Gasoline Vehicles Tailpipe Emission Rates Predicted by Modal Models Tongchuan Wei and H. Christopher Frey	566
Investigation on Identifying Road Anomalies using In-Vehicle Sensors for Cooperative Applications and Road Asset Management Moksheeth Padarthy, Mohammed Sami, and Emiliano Heyns	585

Long-Term Stability of High-Speed Railway Geosynthetic Reinforced Pile-Supported Embankment	596
Subjected to Traffic Loading Considering Arching Effect	
Zongqi Bi, Quanmei Gong, and Jiandan Huang	
Multiple-Case Study of U.S. General Aviation Airports for Operational Sustainability	608
Yue Gu and Mary E. Johnson	