Transportation Research Record: Journal of the Transportation Research Board

Volume 2674, Issue 4

April 2020

ISBN: 978-1-7138-1331-6

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) 978-1-7138-1331-6

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

Volume 2674 Number 4 April 2020

TRR
JOURNAL OF THE TRANSPORTATION RESEARCH BOARD

Contents

Research Articles

Analyzing the Relationship between Road Safety Pillars and the World Health Organization Member States' Mortality Rate using Structural Equation Modeling Approach 1
Caio Assunção Torres, Vanessa Jamille Mesquita Xavier, and Flávio José Craveiro Cunto

Exploring Artificial Neural Network to Evaluate the Undrained Shear Strength of Soil from Cone Penetration Test Data 11
Murad Y. Abu-Farsakh and Md Ariful Hassan Mojumder

Reliability of Miniature Concrete Prism Test in Assessing Alkali-Silica Reactivity of Moderately Reactive Aggregates 23
Harish Konduru, Prasad Rangaraju, and Omar Amer

Multi-Vehicle Trajectory Design During Cooperative Adaptive Cruise Control Platoon Formation 30
Qinzheng Wang, Xianfeng (Terry) Yang, Zhitong Huang, and Yun Yuan

Novel Assessment Method for Support Conditions of Concrete Pavement under Traffic Loads using Distributed Optical Sensing Technology 42
Mengyuan Zeng, Difei Wu, Hongduo Zhao, Hui Chen, and Zeying Bian

Prediction of Pedestrian Crossing Intentions at Intersections Based on Long Short-Term Memory Recurrent Neural Network 57
Shile Zhang, Mohamed Abdel-Aty, Jinghui Yuan, and Pei Li

Testing an Automated Collision Avoidance and Emergency Braking System for Buses 66
Heidi H. Soule, Skip Huck, Andrew Krum, Yinhai Wang, Ruimin Ke, Dave Valadez, Dan Sellers, and Jerome M. Lutin

Incorporating Calibrated Numerical Models in Estimating Moduli of Compacted Geomaterials from Integrated Intelligent Compaction Measurements and Laboratory Testing 75
Aria Fathi, Cesar Tirado, Sergio Rocha, Mehran Mazari, and Soheil Nazarian

Public Transit Service Reliability Assessment using Two-Fluid Model 89
Seungho Yang, Afnan Ahmad, Peter Y Park, Gunho Sohn, and Jeremy Krygsman

Statewide Analysis of Individuals' Exposure to Business Establishments and Active Travel Behavior 101
Yicong Yang and Carolyn McAndrews

Vehicle Counting System using Deep Learning and Multi-Object Tracking Methods 114
Haoxiang Liang, Huansheng Song, Huaiyu Li, and Zhe Dai

Efficient Algorithm for the Traffic Assignment Problem with Side Constraints 129
Liyang Feng, Jun Xie, Yu (Marco) Nie, and Xiaobo Liu

Driver Takeover Performance and Monitoring Behavior with Driving Automation at System-Limit versus System- Malfunction Failures 140
Chelsea A. DeGuzman, Samantha A. Hopkins, and Birsen Donmez

Joint Model of Application-Based Ride Hailing Adoption, Intensity of Use, and Intermediate Public Transport Consideration among Workers in Chennai City 152
Aravinda Devaraj, Ganesh Ambi Ramakrishnan, Gopindra Sivakumar Nair, Karthik K. Srinivasan, Chandra R. Bhat, Abdul R. Pinjari, Gitakrishnan Ramadurai, and Ram M. Pendyala

Laboratory Investigation of an Alternative Permeability Indicator to Determine Optimal Maintenance Timing for Open- Graded Friction Course 165
Shenghua Wu, Li Liu, Gang Yao, Juan Zhang, and Omar Tahri

Using Resilience in Risk-Based Asset Management Plans 178
YuanChi Liu and Sue McNeil

Evaluating Advancements in Bluetooth Technology for Travel Time and Segment Speed Studies 193
Drew Cotten, Julius Codjoe, and Matthew Loker

Field Characterization of Pavement Materials using Falling Weight Deflectometer and Sensor Data from an Instrumented Pavement Section 205
Zafrul H. Khan, Rafiqul A. Tarefder, and Md Amanul Hasan

Importance of Automobile Mode Share in Understanding the Full Impact of Urban Form on Work-Based Vehicle Distance Traveled 222
Yang (Luna) Xi, Jeff Allen, Eric J. Miller, Steven Farber, and Robert Keel

Mechanistic Identification of Freight Activity Stops from Global Positioning System Data 235
José Holguín-Veras, Trilce Encarnación, Sofía Pérez-Guzmán, and Xia (Sarah) Yang

Uncertainty Quantification of Simplified Viscoelastic Continuum Damage Fatigue Model using the Bayesian Inference- Based Markov Chain Monte Carlo Method 247
Jing Ding, Yizhuang David Wang, Saqib Gulzar, Youngsoo Richard Kim, and B. Shane Underwood

Data-Driven Method to Study the Impact of Utilizing Electric Ground Power Systems on Airport Electricity Demand Profile 261
S.M. Sajed Sadati and Kristen S. Cetin

Determination and Utilization of Dilemma Zone Length and Location for Safety Assessment of Rural High-Speed Signalized Intersections 272
Min-Wook Kang, Moynur Rahman, and Joyoung Lee

Determining the Relationship Among Hamburg Wheel-Tracking Test Parameters and Correlation to Field Performance of Asphalt Pavements 281
Fan Yin, Chen Chen, Randy West, Amy Epps Martin, and Edith Arambula-Mercado

Extended Fundamental Diagrams 292
Peter Wagner, Ronald Nippold, and Johannes Grötsch

Impact of Detector Configuration on Performance Measurement and Signal Operations 300
A. M. Tahsin Emtenan and Christopher M. Day

Interfacial Shear Bond Strength between Steel H-Piles and Polymer Concrete Jackets 314
Mohanad M. Abdulazeez, Kyle Brown, and Mohamed A. ElGawady

Optimal Relocation Strategy for Public Bike System with Selective Pick-Up and Delivery 325
Euntak Lee, Bongsoo Son, and Youngjun Han

Assessment of the Impact of Fiber Types on the Performance of Fiber-Reinforced Hot Mix Asphalt 337
Ahmad Alfalah, Daniel Offenbacker, Ayman Ali, Christopher Decarlo, Wade Lein, Yusuf Mehta, and Mohamed Elshaer

Asymmetric Exchange Rate Effects on Cross-Border Freight Flows between the United States and Canada 348
Junwook Chi

Impact of Transit-Oriented Development on Residential Property Values around Urban Rail Stations 362
Yang Jiang, Peiqin Gu, Zhejing Cao, and Yulin Chen

Predictive Group Maintenance Model for Networks of Bridges 373
Georgios M. Hadjidemetriou, Xiang Xie, and Ajith K. Parlikad

Temperature Measurements with Depth and Physical Evidence for the Effect of High Temperature Gradients on Top- Down Fatigue Cracking 384
Adrian Ricardo Archilla

Validation of Bicycle Level of Traffic Stress and Perceived Safety for Children 397
Nicholas N. Ferenchak and Wesley E. Marshall

Application Tool for Two-Variable Cost Allocation for Small Urban, Rural, and Tribal Transit Agencies 407
Todd Hansen, Michael Walk, and Shuman Tan

Before-and-After Empirical Bayes Evaluation of Citywide Installation of Driver Feedback Signs 419
Mingjian Wu, Karim El-Basyouny, and Tae J. Kwon

Effects of Elastomeric Bearing Stiffness on the Structural Behavior of Bonded Link-Slabs 428
Antoine N. Gergess and Elie Zakhia Douaihy

Smooth-Switching Control-Based Cooperative Adaptive Cruise Control by Considering Dynamic Information Flow Topology 444
Anye Zhou, Siyuan Gong, Chaojie Wang, and Srinivas Peeta

Two-Stream Multi-Channel Convolutional Neural Network for Multi-Lane Traffic Speed Prediction Considering Traffic Volume Impact 459
Ruimin Ke, Wan Li, Zhiyong Cui, and Yinhai Wang

Empirical Study on the Properties of Adaptive Cruise Control Systems and Their Impact on Traffic Flow and String Stability 471
Michail Makridis, Konstantinos Mattas, Biagio Ciuffo, Fabrizio Re, Akos Kriston, Fabrizio Minarini, and Greger Rognelund