# **Highway Design 2018**

Transportation Research Record: Journal of the Transportation Research Board Volume 2672, Issue 39

ISBN: 978-1-5108-8247-8

#### 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© (2018) by Transportation Research Board of the National Academies All rights reserved.

ISBN (Print) 978-1-5108-8247-8 ISBN 2018 Printed Set (All Issues) 978-1-5108-7735-1

Printed by Curran Associates, Inc. (2019)

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**

### Highway Design 2018

### Article

Identification and Calculation of Horizontal Curves for Low-Volume Roadways Using Smartphone Sensors Jonathan S. Wood and Shaohu Zhang	I
2018 K. B. WOODS AWARD: Outstanding Paper in Design and Construction	
Safety Evaluation of Geometric Design Criteria: Intersection Sight Distance at Unsignalized Intersections Scott Himes, Richard J. Porter, and Kimberly Eccles	П
Articles	
Enhanced Design Guidelines for Interchange Loop Ramps  Darren J. Torbic and Marcus A. Brewer	20
A Model of the Probability of a Cross-Median Crash When a Vehicle Fully Crosses the Median Christine E. Carrigan and Malcolm H. Ray	34
Development of a Standardized Buttress for Approach Guardrail Transitions Scott K. Rosenbaugh, Jennifer D. Schmidt, and Ronald K. Faller	41
Human Personality Based Investigation on Distance Threshold for Freeway Landscape Pattern Zhonghua Wei, Sheng Liu, Shi Qiu, Tongyang Zhang, and Shaofan Wang	52
Mitigation of Impacts to Groundwater Quality from Highway Runoff in a Karst Terrain  Michael E. Barrett	61
Full-Scale Performance Evaluations of Various Wire-Backed Nonwoven Silt Fence Installation Configurations J. Blake Whitman, Wesley C. Zech, Wesley N. Donald, and Jeffrey J. LaMondia	68
Assessing Roadway Contributions to Stormwater Flows, Concentrations, and Loads with the StreamStats Application  Adam J. Stonewall, Gregory E. Granato, and Tana L. Haluska	79
Highway Cross-Slope Measurement using Mobile LiDAR Alireza Shams, Wayne A. Sarasua, Afshin Famili, William J. Davis, Jennifer H. Ogle, Leonildo Cassule, and Adika Mammadrahimli	88
Automated Extraction of Horizontal Curve Attributes using LiDAR Data Suliman Gargoum, Karim El-Basyouny, and Joseph Sabbagh	98
CFD-DEM Two-Way Coupled Numerical Simulation of Bridge Local Scour Behavior under Clear-Water Conditions  Junhong Li and Junliang Tao	107

Development of Transition between Free-Standing and Reduced-Deflection Portable Concrete Barriers Mojdeh Asadollahi Pajouh, Robert W. Bielenberg, John D. Reid, Jennifer D. Schmidt, Ronald K. Faller, and Erik Emerson	118
Safety Impact of Weaving Distance on Freeway Facilities with Managed Lanes using Both Microscopic Traffic and Driving Simulations  Qing Cai, Moatz Saad, Mohamed Abdel-Aty, Jinghui Yuan, and Jaeyoung Lee	130
A Framework for Prioritizing Urban Arterial/Freeway Interchange Types using Multi-Criteria Analysis  Karim Jamaleddin and Isam Kaysi	142
Enhanced MASH TL-3 Short-Radius System: Promising Design to Accommodate Flat Terrain and Ditches Akram Y. Abu-Odeh, Roger P. Bligh, Christopher Lindsey, and Wade Odell	155
American Complete Streets and Australian SmartRoads: What Can We Learn from Each Other?  Alexa Delbosc, James Reynolds, Wesley Marshall, and Andrew Wall	166