## TRANSPORTATION RESEARCH RECORD

Journal of the Transportation Research Board, No. 2160

## **Contents**

Foreword	vii
Project-Level Life-Cycle Benefit-Cost Analysis Approach for Evaluating Highway Segment Safety Hardware Improvements Zongzhi Li, Samuel Labi, Matthew Karlaftis, Konstantinos Kepaptsoglou, Montasir Abbas, Bei Zhou, and Sunil Madanu	1
Transportation Asset Management Systems and Climate Change: Adaptive Systems Management Approach Michael D. Meyer, Adjo Amekudzi, and John Patrick O'Har	12
Developing an Asset Management Tool to Collect and Track Commitments on Environmental Mitigation Features Stacy Cook, Jason Bittner, and Teresa Adams	21
Development of Data Collection and Integration Framework for Road Inventory Data Ghazan Khan, Kelvin R. Santiago-Chaparro, Madhav Chiturri, and David A. Noyce	29
Combined-Cost and Bi-Objective Approaches to Multipurpose Location-Based Services Using Genetic Algorithms Seungmo Kang and Tschangho John Kim	40
Empirical Evaluation of New Robust Travel Time Estimation Algorithms J. W. C. (Hans) Van Lint	50
Data Collection of Freeway Travel Time Ground Truth with Bluetooth Sensors Ali Haghani, Masoud Hamedi, Kaveh Farokhi Sadabadi, Stanley Young, and Philip Tarnoff	60