

International Conference on Transportation and Development 2024

Pavements and Infrastructure Systems

Selected Papers from the International Conference on
Transportation and Development 2024

Atlanta, Georgia, USA
15 – 18 June 2024

Editor:

Heng Wei

ISBN: 979-8-3313-0040-1

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.

Copyright© (2024) by American Society of Civil Engineers
All rights reserved.

Printed with permission by Curran Associates, Inc. (2024)

For permission requests, please contact American Society of Civil Engineers
at the address below.

American Society of Civil Engineers
1801 Alexander Bell Drive
Reston, VA 20191
USA

Phone: (800) 548-2723
Fax: (703) 295-6333

www.asce.org

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

Airport Pavements

Airport Pavement Roughness Evaluation: A New Approach.....	1
Michael Gerardi, Tony Gerardi, and Matthew T. Brynick	
Testing Rapid-Setting Cementitious Products for Repairing PCC Pavement Spalls	10
Charles E. Williams Jr. and Jeb S. Tingle	
Overlay Procedure by Corps of Engineers Reconsidered.....	19
Anastasios M. Ioannides and Jeb S. Tingle	
Optimized Strategies for Reducing Greenhouse Gas Emissions during Flexible Pavement Life Cycle.....	32
Athar Saeed, Jeb Tingle, and Charles E. Williams Jr.	
Using Advanced Modeling Techniques for Improving the Existing Airfield Pavement Management System Considering Structural and Functional Condition Indices.....	45
Elise Mansour, Heena Dhasmana, and Marwa Hassan	
Remaining Pavement Life Computation Using Cumulative Damage Factor	59
Injun Song	
Transient Analysis of Multilayered Poroelastic Flexible Pavements	69
Jeremiah M. Stache	

Highway Construction

Comprehensive Design of Interchanges and Connector Roads in Rural Areas: Kentucky Case Study.....	81
Jaci Rone, Riley Stevens, and Kirolos Haleem	
A Case Study on Steel Slag as an Alternative Sustainable Material for Subbase Layer	93
Md. Obaidur Rahaman, Ausmita Sarker, Annesha Das Hasi, and Md. Abdullah Al Mamun	
An Investigation into the Factors Influencing Construction Schedule Overruns during COVID-19.....	107
Nikhitha Adepu, Sharareh Kermanshachi, Apurva Pamidimukkala, and Mostafa Namian	

Identification of Safety Hazards in Highway Construction Projects	118
Deema Almaskati, Sharareh Kermanshachi, and Apurva Pamidimukkala	
Quick Build Approach to Roundabouts and Other Roadway Infrastructure	130
Adam B. Lanik and Jerome P. Fanucci	
Reducing Soil Strength Degradation through Engineering Water Repellency	142
Emmanuel D. Adeyanju, Yunesh Saulick, Tobi Ogunro, John L. Daniels, and Bora Cetin	
Influence of Density on Engineered Water Repellent Soil	152
Emmanuel D. Adeyanju, Micheal A. Uduebor, Yunesh Saulick, John L. Daniels, and Bora Cetin	
An Award-Winning Multi-Purpose Bridge in the Red Sea: Construction Challenges and Engineering Solutions.....	162
Dimitrios Kolios, Argyris Alexandris, and Konstantinos Loukakis	
Dielectric-Based Index for Quality Evaluation of HMA Centerline Longitudinal Joint.....	175
Hamad B. Muslim, Syed W. Haider, and Lev Khazanovich	
Mitigating Swelling Potential of Oklahoma Soil through Potassium Chemical Injection	188
Luis Urbina Barrios, Syed A. Ali, Matias Mendez Larrain, Musharraf Zaman, and Roy Khalife	
Effect of Coal Bottom Ash and Coal Bottom Slag on Fresh, Mechanical, and Durability Properties of Concrete	197
Lidya E. Guteta, Samrawit Menda, Sandip Poudel, Joe Useldinger-Hoefs, Daba S. Gedafa, and Bruce Dockter	

Highway Pavements

Pavement Mechanistic-Empirical Design Climate Data Input for the State of Tennessee	209
Mbakisya A. Onyango, Kelvin J. Msechu, Sampson Udeh, Raga Ahmed, Pascale Haug, and Juney Shoher	
Effects of Polymer Modified Binder on Asphalt Mixes of Flexible Pavement Used in Western Australia and Its Impacts on Dynamic Modulus	221
Ainalem Nega, Daba Gedafa, and David Williams	
Impact of Laboratory Air Voids Using AASHTO T 166 versus AASHTO T 275 for HMA Specimens Compacted under AASHTO T 312.....	233
Biplab B. Bhattacharya, Shweta Jayant, Thomas Carter, Paul Curren, Aemero Hailemichael, Peter E. Sebaaly, and Baron Colbert	

HMA Sample Splitting Variability Using Mechanical Quartering Device per California Test 125.....	245
Biplab B. Bhattacharya, Shweta Jayant, Paul Curren, Thomas Carter, Peter E. Sabaaly, Aemero Hailemichael, Avinash Ralla, and Baron Colbert	
Combined Use of High RAP Asphalt Mixtures with Rubber and Polymer Modifications for Pavement Maintenance Applications	257
Salih Kocak	
Use of Creep Compliance and Dynamic Modulus Interconversion for Pavement ME Implementation in North Dakota.....	270
Oteki Duncan, Yeneneh Andebut, Daba Gedafa, and Nabil Suleiman	
Investigation on Effect of Laboratory Ageing of Reclaimed Asphalt Binder Modified with Pyro Oil	282
Pranoti Deepak Dare and Namdeo A. Hedao	
Enhancing Concrete Pavement Durability with Recycled Steel Fiber Extracted from Waste Tire	293
I. Ahmad and M. Shokouhian	
Prediction of Thermal Cracks in Pavements Using Artificial Neural Network Modeling	306
Mohammad I. Hossain and Reema Sweidan	
Use of Artificial Neural Network Model to Predict Rut in Asphalt Concrete Pavements.....	316
Mohammad I. Hossain and Eric Winkelman	
Effect of the Stress Dependency and Anisotropy of Unbound Granular Base and Subgrade Materials on TSD Deflection Slopes	327
Nariman Kazemi, Mofreh Saleh, and Chin-Long Lee	
Reusing Waste Plastics in Asphalt Binders for Road Construction.....	338
Javed Bari, Faria Tabassum, Arfaa Feezanul Islam, Salemun Bahar, Nahid Hasan Sharif, and Abdullah Al Mamun	
Aging Mechanisms of Polymer- and Non-Polymer-Modified Asphalt Binders	349
Debbbrata Datta, Naqeebullah Khattak, and Rouzbeh Ghabchi	
Comparison of Performance Models' Local Calibration Approaches—MLE vs. Least Square.....	359
Rahul Raj Singh and Syed W. Haider	

Investigation of Deicing Salt Solution in Process of Calcium Oxchloride Formation in Cement Paste.....	369
Amirali Babavalian, Dan Zollinger, and Anol K. Mukhopadhyay	
Numerical Modeling of Link Slab Jointed Rigid Pavements.....	381
Haider M. Al-Jelawy, Alialrida Alzamily, and Hisham Jashami	
Evaluation of the Effect of Specimen Height on the AASHTO T 283 Method for Improved Screening of Moisture-Induced Damage.....	392
Syed A. Ali, David Vivanco, Kenneth R. Hobson, Musharraf Zaman, and Sagar Ghos	
Influence of Reclaimed Asphalt Pavement in Hot Mix Asphalt.....	404
Ausmita Sarker, Md. Obaidur Rahaman, and Md. Abdullah Al Mamun	
Laboratory Proficiency Testing with Caltrans Reference Sample Program	416
Biplab B. Bhattacharya, Paul Curren, Thomas Carter, Shweta Jayant, and Aemero Hailemichael	
Relating Unbound Pavement Layers' Moduli—Laboratory vs. Field Tests.....	426
Hamad B. Muslim, Syed W. Haider, Bora Cetin, and Celso Santos	
Effect of Coarse Reclaimed Asphalt Pavement on the Performance of Rubberized Hot Mix Asphalt: A Binder Level Study.....	440
Mohammad A. Rahman, John T. Harvey, Julian Brotschi, and David J. Jones	
Effects of Heat Capacity of Paving Concrete on Longevity and Performance of Jointed Plain Concrete Pavements	452
Tasfia Tafannum, Gauhar Sabih, Clarke Summers, Md. Mirajul Islam, Tara L. Cavalline, and Brett Q. Tempest	
Optimum Tack Coat Application Rate and Curing Time from Direct Shear Test	462
Md. Amanul Hasan, Muhammad T. Alam, and Rafiqul A. Tarefder	
Influence of Compaction Temperature on Full Depth Reclamation Strength and Fracture	471
Moatasem H. Algburi and Rafiqul A. Tarefder	
Assessment of the Permanent Strain Responses of Subgrade Materials	487
C. Santos, Q. Zulfiqar, B. Cetin, S. Haider, and E. Kutay	
Forecasting Highway Maintenance Cost at the Early Stage Using Machine Learning	500
Yejee Paik, Frederick Chung, and Baabak Ashuri	

Enhancing Pavement Performance through Balanced Mix Design: A Comprehensive Field Study in Oklahoma	511
Kaustav Chatterjee, David Vivanco, Xue (Helen) Yang, and Joshua Q. Li	
Pioneering the Evaluation of Balanced Asphalt Mix Design in Oklahoma.....	523
Xue (Helen) Yang, David Vivanco, Joshua Q. Li, and Stephen A. Cross	
A Self-Supervised Learning Approach to Road Anomaly Detection Using Masked Autoencoders.....	536
Proma Dutta, Kanchon Kanti Podder, Jian Zhang, Christian Hecht, Surya Swarna, and Parth Bhavsar	
Evaluation of Skid Resistance of New Mexico Pavements	548
B. S. Pushpendue Biswas and Rafiqul A. Tarefder	
Tribological Investigation of Asphalt Binder Using DSR	562
V. G. Gayathri, Mrinali Rochlani, and J. Murali Krishnan	
Effect of Low-Density Polyethylene Waste on Volumetric Parameters and Moisture Susceptibility of Asphalt Mixtures.....	574
Bhavesh Bhambhani, Ambika Behl, and Ashish Dhamaniya	
Sustainability Approach toward the Construction of Pavement Base Layer Using RAP and Chemical Additives.....	583
Robel Tewelde Mesfun and G. D. Ransinchung R. N.	
<i>Infrastructure Systems</i>	
Assessing Qualitative Factors of Pedestrian Bridges over Major Arterials in a Developing Country	590
Talha Ahmed, Ying Huang, Hafsa Lateef, and Asad Ali	
Finite Element Analysis of Submerged Arc Welding Process for Surface Repair of Heavy Rails.....	602
Arman Ali Mohammai, Zhiyong Wang, and Hualiang Teng	
Culvert Asset Management Data Error Analysis	613
Luke Fletcher, Wesley Cook, Isabel Morris, Claudia Mara D. Wilson, and Clinton P. Richardson	
Predicting Ohio Bridges' Conditions Using Multi-Target Machine Learning Algorithms	624
Rashidi Nasab Armin and Elzarka Hazem	
Examining Design, Construction, and Maintenance Procedures for Texas Off-System Bridges Managed by Local Governments	634
Pooya Darghiasi and Mohsen Shahandashti	

**Satellite and Street Imagery-Informed Calibration of Physics-Based
Rainfall-Induced Slope Susceptibility Maps647**

Sushil Bhatta, Ahmad Bani-Hani, David Munoz, Ben Mebarkia,
and Mohsen Shahandashti

**Network Robustness Analysis of Electric Vehicle Charging
Infrastructure during Extreme Weather Conditions:
A Case Study of Hurricane Ian657**

Mohammad Movahedi, Razieh Khayamim, Juyeong Choi, and Eren Erman Ozguven