

# Journal of Testing and Evaluation

## Contents:

*Special Issue on Sustainable Construction Materials and Frontiers of Road and Airport Engineering*

Guest Editors: Feipeng Xiao and Shaopeng Wu

### iv Overview

- 1777 A Comparative Study on the Influence of Supplementary Cementitious Materials on Marine Concrete**—Xiaosheng Li, Zhonghe Shui, Yun Huang, Xu Gao, and Jie Chen
- 1788 A Metakaolin-Based Slurry Additive for Marine Concrete: Preparation and Properties Evaluation**—Yu Sun, Rui Yu, Zhonghe Shui, Xu Gao, Li Zheng, Diao Qian, and Jie Huang
- 1799 A Vibration-Based Traffic Monitoring System Using Distributed Optical Sensing Technology**—Mengyuan Zeng, Hongduo Zhao, Difei Wu, Hui Chen, and Juewei Cai
- 1814 Chloride Absorption Behavior of Layered Double Hydroxides in Chloride Environment**—Juntao Ma, Daguang Wang, Hao Chen, Ping Duan, and Yanke Shi
- 1823 Comparative Evaluation of Asphalt Pavement Dynamic Response with Different Bases under Moving Vehicular Loading**—Dongya Ren, Hui Song, Chao Huang, Chuan Xiao, and Changfa Ai
- 1837 Comparison of Hydration of Thermally Activated Water-Washed Kaolins in Cement Mortar**—Guiming Wang, Keyu Ge, Tao Sun, Zhonghe Shui, Teng Hu, He Jiang, and Ziyang Wang
- 1850 Covalent Functionalization of Multi-Walled Carbon Nanotubes for Dispersion in Cement Pastes**—Hui Liu, Jianfeng Wang, Suping Cui, and Jiachen Wang
- 1861 Discrete Element Methods for Characterizing the Elastic Behavior of the Granular Particles**—Xunhao Ding, Tao Ma, Linhao Gu, Deyu Zhang, and Xiaoming Huang
- 1876 Dynamic Response Analysis of Airport Asphalt Pavement Subjected to High-Temperature Jet Wake Based on Finite Element Simulation**—Zejiao Dong, Tongxu Wang, Xianying Ma, Cheng Cao, Fandong Kong, and Zhen Leng
- 1893 Effects of Waste Polyethylene on the Rheological Properties of Asphalt Binder**—Qunshan Ye, Serji Amirkhanian, Jin Li, and Zixuan Chen
- 1905 Examination of Significant Binder Aging Due to the Use of Different Anti-Stripping Additives in Polymer and CRM Asphalt Mixtures Using GPC**—Sungun Kim, Yeongsam Kim, and Kwang W. Kim
- 1917 Fly Ash and Sinking Beads Modification on the Rheological Properties of Cement Paste with Metakaolin**—Yunyao Wang, Zhonghe Shui, and Yun Huang
- 1932 Influence of Biot's Compressibility Parameters on Transient Response of Saturated Poroelastic Media**—Dan Hu, Kaiyin Zhang, and Fen Li
- 1950 Influence of Clinker and SCMs on Soluble Chemicals and Expansion of Phosphogypsum-Based Cementitious Materials**—Tao Sun, Teng Hu, Guiming Wang, Zhonghe Shui, Keyu Ge, Qiantian Dai, and Yifan Xie

- 1962 Low-Temperature Characteristic Evaluations of Base and Hybrid Asphalt Binders**—*Zixuan Chen, Jianzhong Pei, and Serji Amirkhanian*
- 1975 Modeling Lane-Change Risk in Urban Expressway Off-Ramp Area Based on Naturalistic Driving Data**—*Lanfang Zhang, Shuli Wang, Cheng Chen, Minhao Yang, and Xin She*
- 1990 Self-Sensing Carbon Nanotube-Cement Composite Material for Structural Health Monitoring of Pavements**—*Qilin Yang, Pengfei Liu, Zhi Ge, and Dawei Wang*
- 2003 Simulation and Detection Leakage of Underground Water Pipeline by Ground Penetrating Radar**—*Yupeng Shen, Yuanrong Lin, Ping Li, Yujie Fu, and Yaqiong Wang*
- 2028 Solar Heat Reflective Coating for Sidewalks Considering Cooling Effect, Anti-Skid Performance, and Human Comfort**—*Xingyi Zhu, Yue Yu, Long Chen, and Dawei Zhang*
- 2040 Study of the Effect of Aggregate Geometry Characteristics on the Rheology of Asphalt Mortar Using Newly Developed Material Rheological Property Test Analyzer and Aggregate Image Measurement System**—*Hechuan Li, Yaqi Wu, Jianying Yu, Shaopeng Wu, and Yuanyuan Li*
- 2056 Study of Low-Temperature Performance of Short Fiber-Reinforced Asphalt Seal Band**—*Zhigang He, Yimin Wang, Feng Li, Fengbo Ren, and Fei Li*
- 2072 Study on Workability and Skid Resistance of Bio-Oil-Modified Fog Seal with Sand**—*Ponan Feng, Hainian Wang, Xiang Zhang, Mohd Rosli Mohd Hasan, Zhanping You, and Junfeng Gao*
- 2093 Synthesis and Utilization of Mesoporous Hollow Silica Particles for Bitumen**—*Shaopeng Wu, Yong Ye, Benan Shu, Yuanyuan Li, Chao Li, Dezhi Kong, Quantao Liu, and Jun Xie*
- 2104 Testing of Contact Stress at Ballast Bed-Soil Subgrade Interface under Cyclic Loading Using the Thin-Film Pressure Sensor**—*Junhua Xiao, Yanhai Wang, De Zhang, Xiao Zhang, and Jiaqi Guo*
- 2118 The Effect of Shrinkage-Reducing Polycarboxylate Superplasticizers in Cement-Based Materials**—*Qianjin Mao, Jianfeng Ma, Ziming Wang, Wenwen Wu, and Suping Cui*
- 2129 Wide-Area Dynamic Sensing Method of Water Film Thickness on Asphalt Runway**—*Juewei Cai, Hongduo Zhao, Xingyi Zhu, and Jianfeng Cao*

#### REVIEW PAPER

- 2144 Developments of Conductive Materials and Characteristics on Asphalt Concrete: A Review**—*Zheng Chen, Ruonan Liu, Peiwen Hao, Guoxin Li, and Jian Su*
- 
- 2162 An Experimental Study of the Effects of Different Reinforcement Ratios on the Impact Resistance Behaviors of Reinforced Concrete Beams**—*Xiwu Zhou, Xiangyu Wang, Runcheng Zhang, Guoxue Zhang, and Ruisheng Xiong*
- 2185 Analysis of Helmet Damage and Associated Head Injuries Arising from Real-World Equestrian Fall Accidents**—*J. Michio Clark, Thomas A. Connor, Claire Williams, Jonathan Clissold, Adrian McGoldrick, Jerry Hill, Aisling Ni Annaidh, and Michael D. Gilchrist*
- 2196 Calibration of Advanced Constitutive Model Using Optimization Techniques**—*Fu-Hsuan Yeh, Tsan-Shen Chuang, Fang-Jung Tsai, and Louis Ge*
- 2213 Carbonation Effect on Behavior of Ecological High Ductility Cementitious Composites**—*Lijuan Chai, Liping Guo, Bo Chen, and Yuanzhang Cao*



ASTM INTERNATIONAL  
Helping our world work better

ISSN: 0090-3973  
Stock #: JTE2005

[www.astm.org](http://www.astm.org)

(Contents continued on page i)

# Table of Contents (continued)

---

- 2225 Cylindrical Chamber: A New In Situ Method for Measuring Permeability of Concrete with and without Admixtures—***Mahmood Naderi and Alireza Kaboudan*
- 2242 Eco-Friendly Usage of Aviation Gasoline; Benzene and Toluene Concentration Effect—***Cemil Koyunoğlu*
- 2256 Effect of Evotherm-M1 on Properties of Asphaltic Materials Used at NAPMRC Testing Facility—***Mohammad Bazzaz, Masoud K. Darabi, Dallas N. Little, and Navneet Garg*
- 2270 Experimental Study of the Mechanism of TBM Disk Cutter Penetration in Mixed-Faced Grounds under Confining Pressure—***X. P. Zhou, S. F. Zhai, Q. M. Gong, and F. Berto*
- 2295 Ground Penetrating Radar Sensitivity to Marginal Changes in Asphalt Mixture Composition—***Eyoab Zegeye Teshale, Kyle Hoegh, Shongtao Dai, Richard Giessel, and Curt Turgeon*
- 2311 Influence of a Stepped Heat Curing on the Performance of High-Strength Portland Pozzolana Cement-Based Mortars—***Sarad Mishra and Kizhakkumodam Venkatanarayanan Harish*
- 2331 Investigation of Ultrasonic Reflection Properties Based on Rough Interface in Compression—***Donglin Tang, Weiping Wu, Zhen Song, Yanjin Tang, Lin Hu, and Bo Yuan*
- 2345 Investigation on Indirect Tensile Test of Asphalt Mixture Based on the Discrete Element Method—***Shuyin Wu, Gang Xu, Jun Yang, Ruochong Yang, and Jipeng Zhu*
- 2362 Mechanical Interlock Made by Electromagnetic Crimping for Axial Load Resistance Using Aluminum Tube and Steel Rod—***Getu Tilahun Areda and Sachin D. Kore*
- 2377 Mechanistic-Empirical Compatible Traffic Data Generation: Portable Weigh-in-Motion versus Cluster Analysis—***Lubinda F. Walubita, Luis Fuentes, Abu N. M. Faruk, Julius J. Komba, Adrianus Prakoso, and Bhaven Naik*
- 2393 Performance Enhancement of MR Brake Using Flake-Shaped Iron-Particle-Based Magnetorheological Fluid—***S. R. Patel, D. M. Patel, and R. V. Upadhyay*
- 2412 Performance Evaluation of Hybrid Fibers and Nano-zeolite Modified Asphalt Micro-surfacing—***Seyed Ahmad Kheyrkhal Alavi, Javad Tanzadeh, Seyed Amid Tahami, and Ali Foroutan Mirhosseini*
- 2432 Shape-Preserving Planar Quadratic Bézier Interpolation Spline with Minimal Stretch Energy—***Juncheng Li, Chengzhi Liu, and Li Zhang*
- 2441 Statistical Analysis of the Influence of Curing Time and Temperature on Compressive Strength of Sandy Soil Stabilized with Sustainable Binder—***Helena Batista Leon, Mariana da Silva Carretta, Maurício Birkan Azevedo, Matteo Conti, and Nilo Cesar Consoli*
- 2459 Study on Acoustic Emission Characteristics and Failure Prediction of Post-High-Temperature Granite—***Wei Yao, Jin Yu, Xueying Liu, Xianqi Zhou, Yanyan Cai, and Yaoliang Zhu*
- 2474 Study on Binder Film Thickness Distribution of Recycled Asphalt Pavements—***Hengji Zhang, John T. Harvey, Liya Jiao, Hui Li, and Mohamed Elkashef*
- 2494 Study on the Interlocking Mechanism of Barbules of an Eagle Feather and the Corresponding Microstructures to Reconstitute Their Integrity—***Di Tang, Dawei Liu, and Zhongyong Fan*
- 2505 Variable Sampling Interval Control Charts for Monitoring the Ratio of Two Normal Variables—***Huu Du Nguyen, Kim Phuc Tran, and Thong Ngee Goh*
- REVIEW PAPER**
- 2530 Reproducibility of Pop-Ins in Fracture Test of Heterogeneous Welds and Numerical Assessment of Crack Arrest—***Sohei Kanna, Yoichi Yamashita, and Tomoya Kawabata*

## EDITOR-IN-CHIEF

**Dr. M. R. Mitchell**

Mechanics & Materials, LLC  
4447 Acrete Lane  
Flagstaff, AZ 86004, USA

## EDITORIAL OBJECTIVES

The *Journal of Testing and Evaluation* is published in six issues per year by ASTM International, a nonprofit technical organization that develops and publishes voluntary consensus standards and related information for materials, products, systems, and services. Some issues, in whole or in part, may be Special Issues focused on a topic of interest to our readers. Contributions are peer reviewed prior to publication.

## EDITORIAL SERVICES—SUBMISSIONS

**Sara Welliver**

Supervisor, Peer Review Services  
Journal of Testing and Evaluation  
Editorial Offices  
J&J Editorial Services  
201 Shannon Oaks Cir #124  
Cary, NC 27551, USA

tel +1.919.650.1459, ext. 210  
astm@jjeditorial.com

## PURPOSE AND SCOPE

The editorial objectives of the *Journal of Testing and Evaluation* is to serve a broad-based audience by:

- Publishing new technical information derived from the field and laboratory testing, performance, quantitative characterization, and evaluation of these materials, products, systems, and services.
- Presenting new methods and data and critical evaluations of these methods and data.
- Reporting the users' experience with test methods and the results of interlaboratory testing and analysis.
- Providing the scientific basis for both new and improved ASTM International standards.
- Stimulating new ideas in the fields of testing and evaluation.
- Including papers, technical notes, letters to the editor, discussions of previously published papers, and book reviews as contributions.

## POSTMASTER send address change to:

ASTM International—JTE  
100 Barr Harbor Drive  
P.O. Box C700  
West Conshohocken, PA  
19428-2959

www.astm.org

## EDITORIAL BOARD

**Dr. Ali Abolmaali**

University of Texas  
at Arlington  
Arlington, TX, USA

**Dr. Aziz Amoozegar**

North Carolina  
State University  
Raleigh, NC, USA

**Dr. Farhad Aslani**

University of  
Western Australia  
Crawley, WA, Australia

**Dr. Pranesh B. Aswath**

University of Texas  
at Arlington  
Arlington, TX, USA

**Dr. Nemkumar Banthia**

University of  
British Columbia  
Vancouver, BC, Canada

**Dr. Neal S. Berke**

Tourney Consulting  
Group, Ltd.  
Kalamazoo, MI, USA

**Dr. Filippo Berto**

University of Padua, Italy,  
and Norwegian University  
of Science and Technology  
Trondheim, Norway

**Dr. Krishna Prapoorna  
Biligiri**

Indian Institute of Technology  
Kharagpur, West Bengal,  
India

**Dr. Laura Bix**

Michigan State University  
East Lansing, MI, USA

**Dr. Andrew F. Braham**

University of Arkansas  
Fayetteville, AR, USA

**Dr. Andreas Brunner**

Empa, Swiss Federal Labs  
Switzerland

**Prof. Andrea Carpinteri**

University of Parma  
Parma, Italy

**Dr. Wen-Ruey Chang**

Liberty Mutual Research  
Institute for Safety  
Hopkinton, MA, USA

**Dr. Dar Hao Chen**

Texas A&M University  
College Station, TX, USA

**Dr. Haiqiang Chen**

Xiamen University  
Fujian, China

**Dr. Kuen-Suan Chen**

National Chin-Yi University  
of Technology, Taiwan

**Dr. Richard A. Coffman**

University of Arkansas  
Fayetteville, AR, USA

**Dr. Tong Cui**

Qualcomm Packaging  
San Diego, CA, USA

**John S. Dick**

Alpha Technologies  
Akron, OH, USA

**Prof. Ying Fang**

Xiamen University  
Xiamen, China

**Dr. Peter E. Fortini**

Pfizer/Wyeth  
Andover, MA, USA

**Dr. Alessandro Gardi**

RMIT University  
Bundoora, VIC, Australia

**Dr. Piotr Gas**

AGH University of Science  
and Technology  
Krakow, Poland

**Dr. Yu-Ning Louis Ge**

National Taiwan University  
Taipei, Taiwan

**Dr. T. Russell Gentry**

Georgia Institute  
of Technology  
Atlanta, GA, USA

**Dr. Jianfeng Gu**

Jiao Tong University  
Shanghai, China

**Dr. Meng Guo**

Beijing University of  
Technology  
Beijing, China

**Dr. Rajeev Kumar Gupta**

University of Akron  
Akron, OH, USA

**Dr. Rakesh Gupta**

Oregon State University  
Corvallis, OR, USA

**Prof. Jim Hartman**

AZGaitero Engineering  
Tempe, AZ, USA

**Dr. Marcelo Hirschler**

Mill Valley, CA, USA

**Mr. Hui-Min Huang**

NIST  
Gaithersburg, MD, USA

**Dr. Xiaoming Huang**

Southeast University  
Nanjing, China

**Dr. Jiancheng Jiang**

University of North  
Carolina, Charlotte  
Charlotte, NC, USA

**Dr. Tao Jiang**

University of Connecticut  
Health Center  
Farmington, CT, USA

**Dr. Thomas Jones**

Alcoa Howmet Corp.  
Whitehall, MI, USA

**Dr. Sreeramesh Kalluri**

Ohio Aerospace Institute  
Brook Park, OH, USA

**Dr. Sivakumar Kandasami**

Larsen & Toubro  
Construction  
Chennai, India

**Dr. Xin Kang**

TerraSense  
Geotechnical Lab  
Totowa, NJ, USA

**Dr. Vistasp M. Karbhari**

University of Texas  
at Arlington  
Arlington, TX, USA

**Dr. Behnoud Kermani**

The Transtec Group, Inc.  
Enola, PA, USA

**Dr. Yong-Rak Kim**

University of  
Nebraska-Lincoln  
Lincoln, NE, USA

**Dr. Young Hoon Kim**

University of Louisville  
Louisville, KY, USA

**Dr. Govindaraju**

Kondaswamy  
Massey University  
Palmerston,  
North New Zealand

**Dr. Brandon Krick**

Lehigh University  
Bethlehem, PA, USA

**Dr. Chaker Larabi**

University of Poitiers  
Poitiers, France

**Dr. Gang Li**

Xi'an Jiaotong University  
Shaanxi Province, China

**Dr. William Luecke**

NIST  
Gaithersburg, MD, USA

**Douglas C. Meier**

NIST  
Gaithersburg, MD, USA

**Mr. Thomas F. O'Connor**

Milan, MI, USA

**Dr. Božidar V. Popović**

University of Montenegro  
Podgorica, Montenegro

**Dr. William T. Riddell**

Rowan University  
Haddonfield, NJ, USA

**Mr. John Riegel, III**

R3 Technology, Inc.  
Springfield, VA, USA

**Dr. Elena Romeo**

University of Parma  
Parma, Italy

**Dr. Rajarshi Saha**

Bridgelux, Inc.  
Livermore, CA, USA

**Dr. Christopher G. Scott**

Lubrizol Corporation  
Wickliffe, OH, USA

**Dr. Steven J. Shaffer**

Bruker Nano  
Surfaces Division  
San Jose, CA, USA

**Dr. Suraj Sharma**

University of Georgia  
Athens, GA, USA

**Dr. Ranganath K. Shastri**

Plastics Solutions  
Midland, MI, USA

**Dr. Punith Veeralinga**

Shivaprasad  
Clemson University  
Clemson, SC, USA

**Dr. Cy (Chor-yiu) Sin**

National Tsing Hua  
University  
Hsinchu, Taiwan, R.O.C.

**Dr. Stein Sture**

University of Colorado  
Boulder, CO, USA

**Dr. Julian Tao**

University of Akron  
Akron, OH, USA

**Dr. Ingrid Tomac**

University of California,  
San Diego  
San Diego, CA, USA

## EDITORIAL BOARD – CONTINUED

### Dr. Sabrina Vantadori

University of Parma  
Parma, Italy

### Dr. Matthieu Vignes

Massey University Manawatu  
Palmerston North,  
New Zealand

### Dr. Hao Wang

Rutgers University  
Piscataway, NJ, USA

### Dr. Jinfeng Wang

Zhejiang University  
Hangzhou, China

### Dr. Shuying Wang

Central South University  
Hunan, China

### Dr. Xuexin Wang

Xiamen University  
Xiamen, China

### Dr. Shaopeng Wu

Wuhan University  
of Technology  
Wuhan, China

### Dr. Shenghua Wu

University of South Alabama  
Mobile, AL, USA

### Dr. Feipeng Xiao

Clemson University  
Clemson, SC, USA

### Dr. Yang Xiao

Chongqing University  
Chongqing, China

### Dr. Xiong (Bill) Yu

Case Western  
Reserve University  
Cleveland, OH, USA

### Prof. Menglan Zeng

Hunan University  
Changsha, Hunan, China

### Dr. Henglong Zhang

Hunan University  
Changsha, China

### Dr. Xibin (Bill) Zhang

Monash University  
Caulfield East, Victoria,  
Australia

## EXECUTIVE COMMITTEE

Andrew G. Kireta, Jr., **Chair**

John R. Logar, **Vice Chair**

Cesar A. Constantino, **Vice Chair**

Oliver S. Delery, Jr., **Finance and**

**Audit Committee Chair**

Dale F. Bohn, **Past Chair**

Taco van der Maten, **Past Chair**

Katharine E. Morgan, **President**

## DIRECTORS

Amer Bin Ahmed

Klas M. Boivie

Francine S. Bovard

Gregory J. Bowles

Michael J. Brisson

William Ellis

John T. Germaine

William C. Griesse

Alan Kaufman

R. Christopher Mathis

Rebecca S. Mc Daniel

Bonnie McWade-Furtado

David W. Parsonage

Carol Pollack-Nelson

Cassandra Robinson

Rina Singh

Terri O. Woods

Dalia Yarom

## COMMITTEE ON PUBLICATIONS

William J. Likos, **Chair**

K. Russell DePriest, **Vice Chair**

Andrew G. Kireta, Jr., **ex officio**

Jay Bhatt

Donya Germain

John E. Haddock

Jason H. Ideker

Michael R. Mitchell

Richard W. Neu

Majdi A. Othman

Sudarsan Rachuri

George E. Totten

Theresa A. Weston

## INFORMATION FOR AUTHORS

For details regarding paper submission go to <http://mc04.manuscriptcentral.com/astm-jote>.

The subject matter must not be of a speculative nature and the contents must not include materials of an advertising nature. The paper must not be seriously defective as to literary form and structure, continuity of thought, and clarity of expression. The substance of the paper should not have been published previously in the open literature.

Authors preparing papers for submittal should observe the conventions of style explained in the ASTM Style Manual. Since the journal does not request page charges, the author is expected to conform to these standard conventions for style and the inclusion of complete references and high-quality figures. SI units are to be used throughout; if data were not measured in SI units, a note should appear to that effect and the original units should be included in parentheses after the SI units.

## IN APPRECIATION OF THE REVIEWERS

The high quality of the papers that appear in this publication is a tribute not only to the obvious efforts of the authors represented but to the unheralded, though essential, efforts of their reviewers. It is to the reviewers' dedication to upholding the high standards of their profession that this note pays tribute. On behalf of ASTM International and the authors as well, we acknowledge with appreciation.

**Journal of Testing and Evaluation** (Print ISSN 0090-3973; E-ISSN 1945-7553) is published in six issues per year by ASTM International. Some issues, in whole or in part, may be Special Issues focused on a topic of interest to our readers. The views expressed in this journal are not those of ASTM International. The data and opinions appearing in the published material were prepared by and are the responsibility of the contributors, not of ASTM International.

**Copyright** © 2020 ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. All rights reserved. This material may not be reproduced or copied, in whole or in part, in any printed, mechanical, electronic, film, or other distribution and storage media without the written consent of the publisher.

**Subscriptions** are in an online-only format:

**Individual subscriptions**  
1 year online access \$273.00.

**Institutional subscriptions (one geographic site via IP access)**  
1 year online access \$422.00.  
Single copies \$55.00.

**For multi-site subscription and pricing**  
[sales@astm.org](mailto:sales@astm.org)  
tel +1.877.909.ASTM

**To subscribe**  
Please send prepaid order to ASTM International, Customer Service, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 or visit [www.astm.org](http://www.astm.org).

## Photocopy Rights

Authorization to photocopy items for internal, personal, or educational classroom use, or the internal, personal, or educational classroom use of specific clients, is granted by ASTM International provided that the appropriate fee is paid to:

Copyright Clearance Center  
222 Rosewood Drive  
Danvers, MA 01923

tel +1.978.646.2600  
<http://www.copyright.com/>

# Overview

---

The maintenance, rehabilitation, and preservation of transportation infrastructure systems have introduced numerous innovative knowledges and technologies during the last couple of decades, which effectively promote the durability, accelerate the growth, and ensure the sustainability of entire infrastructure systems, especially in highway and airport pavement engineering. Therefore, it is necessary to summarize the recent developments to help transportation engineers and researchers understand this progress. Twenty-seven articles related to the novelty in pavement engineering from two international conferences are published in this special section titled “Sustainable Construction Materials and Frontiers of Road and Airport Engineering.”

The subjects of these papers mainly include sustainability, smart technology, modelling, innovative test techniques, and new materials. The sustainability involved bio-oil material, waste polyethylene, crumb rubber modifiers, and conductive material. The smart technology included self-sensing material and structural health monitoring, as well as solar heat reflective coating for cooling. Finite element simulation, discrete element methods, and naturalistic driving modelling were summarized as the modelling. The innovative test techniques introduced the material rheological property test analyzer, distributed optical sensing technology, wide-area dynamic sensing method, ground penetrating radar, thin film pressure sensor, and moving vehicular loading technique. In addition, the new materials incorporated multi-walled carbon nanotubes, phosphogypsum-based cementitious materials, activated water-washed kaolins, polycarboxylate superplasticizers, mesoporous hollow silica particles, and layered double hydroxides in this special issue.

The guest editors appreciate the authors’ and the reviewers’ contributions to this special section. The support from Editor-in-Chief Dr. M. R. Mitchell is sincerely appreciated, and the editorial office staff are thanked for their hard work in completing this special section on time.

Guest Editors:

Prof. Feipeng Xiao, Ph.D., P.E.  
*Tongji University*  
*Shanghai, China*

Prof. Shaopeng Wu, Ph.D.  
*Wuhan University of Technology*  
*Wuhan, China*