

# Open Journal of Civil Engineering



ISSN: 2164-3164



<https://www.scirp.org/journal/ojce>

# Journal Editorial Board

ISSN Print: 2164-3164      ISSN Online: 2164-3172

<https://www.scirp.org/journal/ojce>

---

## Editor-in-Chief

Prof. Hwai-Chung Wu

Wayne State University, USA

## Associate Editors

Prof. Raja Rizwan Hussain

King Saud University, Saudi Arabia

## Editorial Board

Prof. Alireza Afshari

Aalborg University, Denmark

Prof. Ayman Batisha

Ministry of Water Resources and Irrigation, Egypt

Prof. Fabio Bisegna

Sapienza University of Rome, Italy

Prof. Christopher Chao

The Hong Kong University of Science and Technology, China

Prof. Carlos Chastre

NOVA University of Lisbon, Portugal

Dr. Massimiliano Ferraioli

University of Campania "Luigi Vanvitelli", Italy

Prof. Cristina Gentilini

University of Bologna, Italy

Prof. Jian Kang

University of Sheffield, UK

Prof. Vojko Kilar

University of Ljubljana, Slovenia

Prof. Kiyoshi Kobayashi

Kyoto University, Japan

Prof. Triantafyllos Makarios

Aristotle University of Thessaloniki, Greece

Prof. George C. Manos

Aristotle University of Thessaloniki, Greece

Prof. Ali M. Memari

Pennsylvania State University, USA

Prof. Low Sui Pheng

National University of Singapore, Singapore

Prof. Miroslav Premrov

University of Maribor, Slovenia

Prof. Nicola Pugno

University of Trento, Italy

Dr. Gian A. Rassati

University of Cincinnati, USA

Dr. Rehan Sadiq

University of British Columbia, Canada

Prof. Evangelos J. Sapountzakis

National Technical University of Athens, Greece

Prof. Mehdi Setareh

Virginia Tech University, USA

Prof. Wen-Pei Sung

National Chin-Yi University of Technology, Chinese Taipei

Prof. Chong-Shien Tsai

Feng Chia University, Chinese Taipei

Prof. Francesco Ubertini

University of Bologna, Italy

Dr. Roberto Valentino

University of Parma, Italy

Dr. Heng Wei

The University of Cincinnati, USA

Prof. Ka-Veng Yuen

University of Macau, China

Prof. Vahid Zanjani Zadeh

Bechtel Corporation, USA

Prof. Jun Zhang

Tsinghua University, China

# Table of Contents

**Volume 10    Number 2**

**June 2020**

## **Theoretical Analysis of Simulating the Locked-In Stress in Rock Pore by Thermal Expansion of Hard Rubber**

L. Dong, H. S. Geng, H. F. Xu, Y. H. Yang.....83

## **Impact of Climate Change on Rheological Properties of Bitumen**

I. Abdulkadir, H. M. Alhasssan.....93

## **Von Misses Pure Shear in Kirchhoff's Plate Buckling**

T. N. Johnarry, F. W. Ebitei.....105

## **Research on Effect of Heap Loading on Deformation and Mechanical Properties of Bridge Double Pile Foundation on Steep Slope**

H. Luo.....117

## **Experimental Characterization of Shape of an Aggregate by a Numerical Value—Application to Senegalese Basaltic Aggregates for Rail Transport**

A. Diedhiou, L. Sow, N. M. Diop.....131

## **Characterization of Nano-Silica Local Metakaolin Based-Geopolymer: Microstructure and Mechanical Properties**

Z. Zidi, M. Ltifi, I. Zafar.....143

## **Slotted Hole Effect on Damage Mechanism of Gymnasium Building with RC Frame and Steel Roof**

A. Suzuki, T. Fujita, Y. Kimura.....162

# Open Journal of Civil Engineering (OJCE)

## Journal Information

### SUBSCRIPTIONS

The *Open Journal of Civil Engineering* (Online at Scientific Research Publishing, <https://www.scirp.org/>) is published quarterly by Scientific Research Publishing, Inc., USA.

#### **Subscription rates:**

Print: \$79 per issue.

To subscribe, please contact Journals Subscriptions Department, E-mail: [sub@scirp.org](mailto:sub@scirp.org)

### SERVICES

#### **Advertisements**

Advertisement Sales Department, E-mail: [service@scirp.org](mailto:service@scirp.org)

#### **Reprints (minimum quantity 100 copies)**

Reprints Co-ordinator, Scientific Research Publishing, Inc., USA.

E-mail: [sub@scirp.org](mailto:sub@scirp.org)

### COPYRIGHT

#### **Copyright and reuse rights for the front matter of the journal:**

Copyright © 2020 by Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY).

<http://creativecommons.org/licenses/by/4.0/>

#### **Copyright for individual papers of the journal:**

Copyright © 2020 by author(s) and Scientific Research Publishing Inc.

#### **Reuse rights for individual papers:**

Note: At SCIRP authors can choose between CC BY and CC BY-NC. Please consult each paper for its reuse rights.

#### **Disclaimer of liability**

Statements and opinions expressed in the articles and communications are those of the individual contributors and not the statements and opinion of Scientific Research Publishing, Inc. We assume no responsibility or liability for any damage or injury to persons or property arising out of the use of any materials, instructions, methods or ideas contained herein. We expressly disclaim any implied warranties of merchantability or fitness for a particular purpose. If expert assistance is required, the services of a competent professional person should be sought.

### PRODUCTION INFORMATION

For manuscripts that have been accepted for publication, please contact:

E-mail: [ojce@scirp.org](mailto:ojce@scirp.org)



**Call for Papers**

# Open Journal of Civil Engineering

ISSN Print: 2164-3164 ISSN Online: 2164-3172

<https://www.scirp.org/journal/ojce>

Open Journal of Civil Engineering (OJCE) is an international journal dedicated to the latest advancement of civil engineering. The goal of this journal is to provide a platform for scientists and academicians all over the world to promote, share, and discuss various new issues and developments in different areas of civil engineering.

## Editor-in-Chief

Prof. Hwai-Chung Wu

Wayne State University, USA

## Associate Editors

Prof. Raja Rizwan Hussain

King Saud University, Saudi Arabia

## Editorial Board

Prof. Alireza Afshari  
Prof. Ayman Batisha  
Prof. Fabio Bisegna  
Prof. Christopher Chao  
Prof. Carlos Chastre  
Dr. Massimiliano Ferraioli  
Prof. Cristina Gentilini  
Prof. Jian Kang  
Prof. Vojko Kilar  
Prof. Kiyoshi Kobayashi

Prof. Triantafyllos Makarios  
Prof. George C. Manos  
Prof. Ali M. Memari  
Prof. Low Sui Pheng  
Prof. Miroslav Premrov  
Prof. Nicola Pugno  
Dr. Gian A. Rassati  
Dr. Rehan Sadiq  
Prof. Evangelos J. Sapountzakis  
Prof. Mehdi Setareh

Prof. Wen-Pei Sung  
Prof. Chong-Shien Tsai  
Prof. Francesco Ubertini  
Dr. Roberto Valentino  
Dr. Heng Wei  
Prof. Ka-Veng Yuen  
Prof. Vahid Zanjani Zadeh  
Prof. Jun Zhang

## Subject Coverage

All manuscripts must be prepared in English, and are subject to a rigorous and fair peer-review process. Accepted papers will immediately appear online followed by printed hard copy. The journal publishes original papers including but not limited to the following fields:

- Assemblage and System
- Behavior of Structures
- Behavior of Structures under Seismic Loads
- Building and Environmental Acoustics
- Building Climate Systems
- Building Energy
- Civil and Environmental Engineering
- Coastal Engineering
- Composite Materials
- Concrete Structures
- Construction Economics
- Construction Engineering
- Design and Performance of Green Building
- Design Optimization of Structures
- Earthquake Engineering
- Energy Efficient Building Technology
- Energy Saving Building Materials
- Evaluation of Building Envelope Systems under
- Structural and Environmental Loads
- Evaluation of Glazing Systems for Energy Performance
- Fire Engineering
- Foundations Dynamics
- Geotechnical Engineering
- Health Monitoring and Life Prediction of Structures
- High Performance Concrete
- Hydraulic Engineering
- Life Cycle Engineering
- Materials and Durability
- Materials Engineering
- Mechanics and Materials Aspects of Advanced Construction Materials
- Municipal or Urban Engineering
- Nondestructive Testing and Evaluation
- Numerical Modelling of Structures
- Optimal Design of Structures
- Properties and Mechanics of Concrete
- Residential, Commercial, Industrial and Public Works
- Seismic Evaluation of Building Nonstructural Components
- Simulation Optimization and Risk Management
- Soil-Structure Interaction
- Structural Engineering
- Structural Evaluation of Panelized and Masonry Wall Systems
- Structural Reliability Analysis
- Surveying
- Sustainable Structures
- Transportation Engineering
- Ventilation and Indoor Air Quality
- Water Supply and Drainage

We are also interested in: 1) Short Reports—2-5 page papers where an author can either present an idea with theoretical background but has not yet completed the research needed for a complete paper or preliminary data; 2) Book Reviews—Comments and critiques.

## Notes for Intending Authors

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere. Paper submission will be handled electronically through the website. All papers are refereed through a peer review process. For more details about the submissions, please access the website.

## Website and E-Mail

<https://www.scirp.org/journal/ojce>

E-mail: [ojce@scirp.org](mailto:ojce@scirp.org)