Elham Maghsoudi Nia Lloyd Ling Mokhtar Awang Seyed Sattar Emamian *Editors* 

# Advances in Civil Engineering Materials

Selected Articles from the 6th International Conference on Architecture and Civil Engineering (ICACE 2022), August 2022, Kuala Lumpur, Malaysia



## **Lecture Notes in Civil Engineering**

### Volume 310

### **Series Editors**

Marco di Prisco, Politecnico di Milano, Milano, Italy

Sheng-Hong Chen, School of Water Resources and Hydropower Engineering, Wuhan University, Wuhan, China

Ioannis Vayas, Institute of Steel Structures, National Technical University of Athens, Athens, Greece

Sanjay Kumar Shukla, School of Engineering, Edith Cowan University, Joondalup, WA, Australia

Anuj Sharma, Iowa State University, Ames, IA, USA

Nagesh Kumar, Department of Civil Engineering, Indian Institute of Science Bangalore, Bengaluru, Karnataka, India

Chien Ming Wang, School of Civil Engineering, The University of Queensland, Brisbane, QLD, Australia

**Lecture Notes in Civil Engineering** (LNCE) publishes the latest developments in Civil Engineering—quickly, informally and in top quality. Though original research reported in proceedings and post-proceedings represents the core of LNCE, edited volumes of exceptionally high quality and interest may also be considered for publication. Volumes published in LNCE embrace all aspects and subfields of, as well as new challenges in, Civil Engineering. Topics in the series include:

- Construction and Structural Mechanics
- Building Materials
- Concrete, Steel and Timber Structures
- Geotechnical Engineering
- Earthquake Engineering
- Coastal Engineering
- Ocean and Offshore Engineering; Ships and Floating Structures
- Hydraulics, Hydrology and Water Resources Engineering
- Environmental Engineering and Sustainability
- Structural Health and Monitoring
- Surveying and Geographical Information Systems
- Indoor Environments
- Transportation and Traffic
- Risk Analysis
- Safety and Security

To submit a proposal or request further information, please contact the appropriate Springer Editor:

- Pierpaolo Riva at pierpaolo.riva@springer.com (Europe and Americas);
- Swati Meherishi at swati.meherishi@springer.com (Asia—except China, Australia, and New Zealand);
- Wayne Hu at wayne.hu@springer.com (China).

All books in the series now indexed by Scopus and EI Compendex database!

Elham Maghsoudi Nia · Lloyd Ling · Mokhtar Awang · Seyed Sattar Emamian Editors

# Advances in Civil Engineering Materials

Selected Articles from the 6th International Conference on Architecture and Civil Engineering (ICACE 2022), August 2022, Kuala Lumpur, Malaysia



Editors
Elham Maghsoudi Nia
Faculty of Architecture and Built
Environment
Delft University of Technology
Delft, The Netherlands

Mokhtar Awang Department of Mechanical Engineering Universiti Teknologi PETRONAS Seri Iskandar, Perak, Malaysia Lloyd Ling Universiti Tunku Abdul Rahman Selangor, Malaysia

Seyed Sattar Emamian Faculty of Engineering Technology University of Twente Enschede, The Netherlands

ISSN 2366-2557 ISSN 2366-2565 (electronic) Lecture Notes in Civil Engineering ISBN 978-981-19-8023-7 ISBN 978-981-19-8024-4 (eBook) https://doi.org/10.1007/978-981-19-8024-4

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2023

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd. The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

### **Preface**

This book highlights the recent research works on architecture and civil engineering presented during the 6th International Conference on Architecture and Civil Engineering (ICACE 2022) held on August 18, 2022, in Kuala Lumpur, Malaysia. This book is written by leading researchers and industry professionals. The conference participants submitted papers reflecting recent advances and address current issues in the fields of civil engineering and architecture. The conference was intended to bring together the researchers and technologist/engineers working in four sections including architectural studies, construction, management, and materials. The papers' topics vary from technical aspects such as materials and structural studies, water management, transportation, thermal performance, heritage preservation, to behavioral studies and social aspects. All articles have been blind peerreviewed by highly reputable researchers from different universities around the world.

The organizing committee would like to express sincere appreciation to everybody who has contributed to the conference. Warmest thanks to the authors, reviewers, participants, and to all the team of the organizers for their support and enthusiasm which granted success to the conference.

Delft, The Netherlands Selangor, Malaysia Seri Iskandar, Malaysia Enschede. The Netherlands Elham Maghsoudi Nia Lloyd Ling Mokhtar Awang Seyed Sattar Emamian

# **Contents**

Damping Design Approach Based on the Damping Performance Curve of Structural Additional Viscosity Fangqian He, Ting Zhang, Jun Zhang, Li Tao, and Ying Liu	1
Assessment of Indoor Thermal Condition on Traditional Vernacular Masjid: A Case Study on Masjid Kampung Laut, Malaysia  Nur Athirah binti Khalit, Zuraini binti Denan, Aliyah Nur Zafirah binti Sanusi, and Norwina binti Mohd Nawawi	11
Scopes of Work in Property Management Services: Perspective and Performance of Residential Property Managers  Cheong Peng Au-Yong and Wan Siti Aisha Wan-Shukery	25
Cold-Formed Steel Structure for Mid-Rise Residential Building: A Literature Review Jhun M. Jacinto, Orlean G. Dela Cruz, and Ernesto J. Guades	37
Evaluation of Water Hyacinth Ash, Extract, and Fiber in Concrete: A Literature Review Ernie D. Tombado, Orlean G. Dela Cruz, and Ernesto J. Guades	53
Reinforced Concrete Beam–Column Joint: A Review of Its Cyclic Behavior  Mark Arvin P. Velasco, Orlean G. Dela Cruz, and Ernesto J Guades	63
Challenges Faced by Students in Online Architectural Design Studio During COVID-19 Pandemic: Universities in Sarawak Mervyn Hsin Jyi Wong, Mohd Afzan Bin Mohamed, Raja Nur Syaheeza Bin Raja Mohd Yazit, and Joanne Chui Ying Ho	81

viii Contents

Covered Pedestrian Streets in Kuala Lumpur Heritage Enclaves: Public Perception  Muhamad Fadrul Hisham, Nangkula Utaberta, Nashwan Abdoulkarim Al-Ansi, Yijiao Zhou, and Xin Yan	93
Sponge Town: Addressing Water Crisis for Future Urban Development in Malaysia Wong Wai Kok, Nangkula Utaberta, Nayeem Asif, Yijiao Zhou, and Xin Yan	113
BIM as the New Sustainable Design-Construction Manager: Case Study of ALN Building Project Experience Petrit Pasha, Mohd Tajuddin Mohd Rasdi, Nangkula Utaberta, Xin Yan, and Yijiao Zhou	125
Mosque Institution and Building: Evaluating Sustainable Space, Function, Program, and Activities  Nayeem Asif, Nangkula Utaberta, Sumarni Ismail, Xin Yan, and Yijiao Zhou	139
Integration of Design and Theory Courses in Architecture Learning for Introductory-Level Students  Ida Marlina Mazlan, Intan Liana Samsudin, Adi Irfan bin Che Ani, Afiffuddin Husairi Mat Jusoh Hussain, Nangkula Utaberta, Xin Yan, and Yijiao Zhou	153
Students' Engagement in Virtual Learning of Heritage Building During the Pandemic Noor Fatehah Mat Sood, Nor Syawallina Azman, Nangkula Utaberta, Ida Marlina Mazlan, Ilyana Sujak, Yijiao Zhou, and Xin Yan	163
Towards the Betterment of Workers' Quarters Within Construction Site in Light of Covid-19 Pandemic: Case Study of Workers' Quarters in Kuching City South, Sarawak Joy Natalie Cotter, Mervyn Hsin Jyi Wong, Dona Rose Amer Koesmeri, and Ahmad bin Abdul Jalil	177
An Improved Monthly Oil Palm Yield Predictive Model in Malaysia  Jen Feng Khor, Zulkifli Yusop, and Lloyd Ling	187
Review of Aesthetic Components in 'Sponge City': Toward Sustainable Urban Stormwater Management Fatemeh Alsadat Khoshhal Shaghaji, Poh Im Lim, and Ren Jie Chin	195
Drones and Architectural Visualization: Exploring Building (Re)Presentation Through Thermal Patterns Data  Mohd Shahrudin Abd Manan and Al-Fhaliq Naabil Abd Halin	205

Contents ix

Employment of Foreign Workers at Construction Industry in Malaysia—A Review  Daniel Lode, Jin Chai Lee, Zeety Md. Yusof, and Samuel Lee	213
Application of Jointless Bridges in China  Chenhui Wang, Baochun Chen, Fuyun Huang, Junqing Xue, and Bruno Briseghella	223
The Composite of MPCM and Building Materials and Its Application in Building Walls: A Review  Danqiu He and Mohd Hafizal Mohd Isa	235
The Hospitality Mechanisms of Traditional Indonesian Houses: A Systematic Literature Review  Muhammad Ismail Hasan, Asrul Mahjuddin Ressang Aminuddin, and Hazrina Haja Bava Mohidin	255
Recent Application and Development of Concrete-Filled Steel Tube Arch Bridges in China Jun-ping Liu, Xiao-fang Li, Hua-long Liu, and Bao-chun Chen	263
Application of Melan Arch Bridges in China  Fuyun He, Baochun Chen, Cong Li, Bruno Briseghella, and Junping Liu	273
Finite Element Analysis of Group Studs in Steel-UHPC Composite Slab Wenxu Hu, Baochun Chen, and Cong Li	285
Identifying the Mass Rapid Transit (MRT) Customer's  Demographic and Traveling Pattern  Hayana Dullah, Wong Jee Khai, Norlela Ismail,  Shuhairy Norhisham, Nur Sarah Shaziah Samsudin, Agusril Syamsir,  Ani Munirah Mohamad, and Muhammad Fadhlullah Abu Bakar	299
Assessing the Impact of Quality of Service (QOS) Toward Urban Bus Performance in Perlis  Muhammad Fadhlullah Abu Bakar, Norlela Ismail, Shuhairy Norhisham, Nor Aishah Ahad, Friday Zinzendoff Okwonu, Wan Ahmad Faiz Wan Mohd Fauzi, Nor Najwa Irina Mohd Azlan, Nurul Hani Mardi, and Hayana Dullah	311
Assessing the Passenger Load of Urban Bus Performance in Eastern Region Malaysia Peninsular  Muhammad Fadhlullah Abu Bakar, Norlela Ismail, Shuhairy Norhisham, Nor Aishah Ahad, Friday Zinzendoff Okwonu, Shahril Ezwan Mohamad Nor, Nor Najwa Irina Mohd Azlan, Nur'Atiah Zaini, and Hayana Dullah	323

x Contents

Study on Performance of UHPC with Curvilinear Steel Fibers	333
Properties of Cement-Coated Brick Aggregate Concrete  Chai Teck Jung, Tan Cher Siang, Tang Hing Kwong, and Koh Heng Boon	345
Courtyard' Design as a Sustainable Tool for Classrooms' Lighting and Thermal Performance  Muna Salameh and Basim Touqan	355
Decoding Morphological Evolution of Urban Historical Area Case from Laomendong, Nanjing Ting Zhang, Fangqian He, Jiennan Ye, and Di Wang	367
Characteristics of Cabin Design for Female-Friendly Car Nagwaeen Atef, Julaila Abdul Rahman, Shamzani Affendy Bin Mohd Din, and Zumahiran Kamarudin	377
Study on the Mechanism of Soil–Steel H-pile Interaction in Integral Abutment Jointless Bridges Fuyun Huang, Lan Li, Boxue Ying, Yulin Shan, and Hongjun Zhang	391
Parametric Study on RHS Truss Girder Design to Eurocode 3 with Various Truss Spans and Steel Grades Khea Siang Teoh, Hean Seong Tan, Poi Ngian Shek, Rosli Mohamad Zin, and Siti Asma Abd Latif	403
Compression Resistance of Short Cold-Formed Lipped C Channel Section with Web Stiffening Yong Sheng Goh, Hean Seong Tan, Poi Ngian Shek, Rosli Mohamad Zin, and Siti Asma Abd Latif	413
Compressive Strength of Bio-Fibrous Concrete  Deshvinder Kaur, Samatar Hassan, Rowena Richard, Badraan Abdalla, Saeed Cheema, Sook Kee Chong, Hok Chai Yam, Abideen Ganiyu, Fadilat Ayeronfe, and Muyideen Abdulkareem	423
Challenges of Maintaining National Heritage Anglican Churches in Malaysia—A Perspective from Building Custodians  Wee Fhong Ow, Shirley Jin Lin Chua, and Azlan Shah Ali	435
Impact of Metakaolin, Micro-silica, and Colloidal Nano-silica on Mechanical and Microstructural Properties of Cement Mortar Kaffayatullah Khan and Megat Azmi Megat Johari	443
The Unresolved Design Issues in Malaysian Prefabricated Housing and Their Corrective Steps  Ahmad Bin Abdul Jalil, Fadhilah Binti Md Fazil, Dayang Afiqah binti Abang Mohamad Shibli, and Joy Natalie Cotter	453

Contents xi

Spatial Empirical Analysis on Urban Dwellers' Human	
Development Index in North Sulawesi, Indonesia	465
Joune J. E. Ganda and Lin Yola	
Effects of Microclimate and Public Perceptions on Outdoor	
Thermal Sensation in the Dense Area of Jakarta	473
Muhammad Aris Ashari and Lin Yola	
Advances of Mass Rapid Transit's Facilities in ASEAN Cities:	
A Review	481
Hayana Dullah, Wong Jee Khai, Norlela Ismail,	
Shuhairy Norhisham, Mohd Zakwan Ramli, Ani Munirah Mohamad,	
and Muhammad Fadhlullah Abu Bakar	