

# ***International Journal of Engineering, Construction and Computing (IJECC)***

ISSN: 2209-332X(Print)



**Volume 1 Issue 1**  
**November 2019**

**IJECC**

International Journal of Engineering,  
Construction and Computing



*Published by Science Technology and Management Crescent Australia Ltd, ACN 634 288 083, P O Box  
170, Minto, New South Wales 2565, Sydney, Australia*

*in association with*

*Global Circle for Scientific, Technological and Management Research (GCSTMR), Sydney, Australia  
(<http://www.gcstmr.com.au/Home.aspx>)*

Copyright ©2019, Science, Technology and Management Crescent Australia Ltd, New South Wales, Australia.  
Reproduction for academic, research and non-profit purposes are permitted. Responsibility for the contents of  
the papers in this journal rests upon the authors and not the Editors, Science, Technology and Management  
Crescent Australia Ltd and Global Circle for Scientific, Technological and Management Research (GCSTMR).

---

# Editorial Board

---

**Chief Editor:** Prof Dr Chin Leo, Western Sydney University, Australia

**Editors:**

Prof Dr Ataur Rahman, Australia (Water Engineering and Education)  
Associate Prof Dr Fidelis Mashiri, Australia (Structural Engineering)  
Dr Qinghua Zeng, Australia (Chemical and Metallurgical Engineering, Nanomaterials)  
Prof Dr Henry Wong Kwai Kwan, France (Geomechanics and Geotechnical Engineering)  
Prof Dr Taha B M J Ouarda, Canada (Water and Environmental Engineering)  
Dr Rafiqul Islam, Australia (Computer Engineering)  
Associate Prof Dr Srikanta Bandyopadhyay, Australia (Materials Science and Engineering)  
Prof Dr Phill Kyu Rhee, South Korea (Artificial Intelligence)  
Prof Dr Abdallah Shanableh, United Arab Emirates (Water and Environmental Engineering)  
Associate Prof Dr Swapan Saha, Australia (Construction Project Management and Engineering)  
Prof Dr Vivian Tam, Australia (Construction Project Management and Construction Engineering)  
Associate Prof Dr Samantha Liyanapathirana, Australia (Geotechnical Engineering and Education)

**Associate Editors:**

Dr Vojislav Ilic, Australia  
Associate Prof Dr Ramesh Teegavarapu, USA  
Prof Dr Chi Zhang, China  
Dr Md Rezaul Bashar, Australia  
Dr Hasan Hafizur Rahman, Australia  
Dr M Muhitur Rahman, Saudi Arabia  
Dr Md Kamrul Hassan, Australia  
Dr Md Mahmudul Haque, Australia  
Dr Payam Rahnamayiezekavat, Australia  
Prof Dr Baisakhi Chakraborty, India  
Dr M Ashiqur Rahman, Australia  
Dr Syed Mohammed Shamsul Islam, Australia  
Prof Dr Dipankar Das, Bangladesh

**Editorial Coordinators:**

Dr Md Kamrul Hassan, Australia  
Mrs Jenis Farzana Islam, Australia

## **Preface**

---

This is the inaugural issue of the *International Journal of Engineering, Construction and Computing (IJECC)*, a peer-reviewed journal devoted to the broad disciplines that the title represents. As diverse as these disciplines may seem to be, they are in fact also very much interconnected and overlapping. The solutions of the complex problems in today's world increasingly require an approach that transcends different disciplines: researchers working together drawing on their disciplinary knowledge, integrating their methods and designs. This journal embodies such an approach. Its mission is to enable academia and industry an avenue to publish research not only within a particular discipline, but also across and at the intersections of the different disciplines of Engineering, Construction and Computing.

Moreover, IJECC is intended as a channel for researchers, including but not limited to those in early career, to disseminate new knowledge and developments from theory to practice. It will cover research papers reporting new theoretical developments, advancements in computational methods, recent experimental findings, innovative design and practice in the real world. As the journal grew out of Western Sydney University, it especially welcomes papers with an educational and research focus. Indeed the inaugural issue features papers that span the broad spectrum from the computational to experimental and field investigation in the real world, including one on water education.

This being the inaugural issue, I would especially like to thank the Editorial Board Members, the reviewers and many others who have made this possible. I am indebted to Jenis Farzana Islam and Dr Md Kamrul Hassan for their editorial coordination and to Sumya Rahman for English editing of the manuscripts. Above all, I am very grateful to Prof Dr Ataur Rahman who has worked tirelessly and single-mindedly to push for this journal to come into fruition.

**Prof Chin Leo, PhD**  
**Chief Editor**

*International Journal of Engineering, Construction and Computing (IJECC)*  
School of Engineering, University of Western Sydney, New South Wales, Australia,  
c.leo@westernsydney.edu.au

*The publisher does not take any responsibility for the contents of the papers in this journal. Before using information published in this journal, the contents/materials must be verified by the user at his/her own responsibility. The publisher does not take any liability or loss whatsoever incurred by a user who has used information from this journal.*

## **List of Reviewers**

---

Prof Dr Ataur Rahman  
Associate Prof Ming Zhao  
Associate Prof Haiping Zhu  
Associate Prof Dr Md Humaun Kabir  
Associate Prof Abdul Kadar Muhammad  
Associate Prof Dr Zia Uddin  
Dr Md Mahfuzar Rahman  
Dr Helen Wu  
Dr Rafiqul Islam  
Dr Sameera Wijesiri Pathirana  
Dr Muhithur Rahman  
Dr Hui Xie  
Dr Amimul Ahsan  
Dr Mahmodul Haque  
Dr Md Kamrul Hassan  
Dr Abdullah Al-Mamoon  
Dr Ashiqur Rahman  
Dr Minhaz Ahmed  
Dr Hekang Wang  
Dr Abdul Alim  
Dr Kevin Xiao  
Dr Sayka Jahan  
Engineer Caleb Amos  
Engineer Shafi Noor  
Engineer Anwar Hossain  
Engineer Bulbul Ahmed  
Engineer Laura Rima

**Peer Review Process:** Each of the published papers in International Journal of Engineering, Construction and Computing (IJECC), Vol. 1, Issue 1 has been reviewed by at least two independent reviewers. Papers are revised as per reviewers' comments before being finally accepted for publication by the handling Editor and Chief Editor.

**Table of Contents**

Stability analysis of continuous welded rails using new non-destructive technology <i>Ralph Zhang, Helen Wu, and Chunhui Yang</i>	1
Experimental and numerical studies on SCFs of empty SHS-SHS T-joints under in-plane bending. <i>Feleb N Matti1 and Fidelis R Mashiri</i>	17
Numerical investigation of modified splice plate beam-to-beam connections for prefabricated composite structure. <i>Md Kamrul Hassan and Susma Tajhya</i>	27
Experimental study of bending stiffness variation during a full rotation of cracked shafts. <i>Erfan Taheri, Helen Wu and Ming Zhao</i>	36
Modal analysis of cracked shafts. <i>Erfan Taheri, Helen Wu and Ming Zhao</i>	42
The influence of irrigation area and roof size on the economics of rainwater harvesting use in urban agriculture: a case study in Sydney, Australia. <i>Caleb Christian Amos and Fazlul Karim</i>	48
Energy and exergy analyses of a flat plate solar collector using different nanofluids. <i>Mohammad A. Alim, M.A. Khairul, M. Fazal, R. Saidur, Md Jaynul Abden</i>	59
Morphological assessment of a selected reach of the Jamuna River using the Delft3D Model. <i>Orpita Urmi Laz and Umme Kulsum Navera</i>	72
Impact of urbanization on CO2 and TVOC in an oasis city in Saudi Arabia <i>Muhammad Muhitir Rahman, Ziad Shatnawi, Md Kamrul Islam and Ammar Al-Shayeb</i>	82
Selection of the Best-fit Probability Distribution for Brisbane River Catchment <i>S M Anwar Hossain</i>	90
Water Education: A Case Study in New South Wales Australia <i>Jenis F Islam, Sumya Rahman and Imran Rahman</i>	104
Application of water quality index to identify deteriorated river sections—A case study for the Hawkesbury Nepean River System in Australia <i>Upeka Kuruppu and M Azizur Rahman</i>	124
IoT Based Car Accident Prevention and Detection Using Machine Learning <i>Mohammad Sanaullah Chowdhury and Mubashir Murshed</i>	132