



NATIONAL UNIVERSITY OF CIVIL ENGINEERING

JOURNAL OF
SCIENCE AND TECHNOLOGY IN
C I V I L
ENGINEERING

p-ISSN 1859-2996
e-ISSN 2734-9268

Vol. 14 No. 3
8 - 2020



AIMS AND SCOPE

Journal of Science and Technology in Civil Engineering (STCE) is a specialized scientific journal in the field of construction, which has annually been published with three issues in English under p-ISSN 1859-2996 and e-ISSN 2734-9489 and five issues in Vietnamese under p-ISSN 2615-9058 and e-ISSN 2734-9268 by the National University of Civil Engineering. The Journal has been published since 2007. The STCE Journal provides a forum for announcing and introducing new building and industrial construction; bridge and road engineering; coastal, offshore and hydraulic engineering; materials; mechanical engineering; architecture and planning; economics and management; environmental engineering; natural sciences and information technology. All manuscripts submitted to the Journal are subject to a blind peer-review process by at least two qualified researchers or leading experts in Vietnam and abroad. The process for submission, peer-review and publication of a manuscript is conducted via the online system at <http://stce.nuce.edu.vn/index.pjp/en>

EDITOR-IN-CHIEF **Pham Duy Hoa**

National University of Civil Engineering, Hanoi, Vietnam

DEPUTY EDITOR-IN-CHIEF

Pham Quang Dung

National University of Civil Engineering, Hanoi, Vietnam

MANAGING EDITORS

Phan Quang Minh

National University of Civil Engineering, Hanoi, Vietnam

Tran Van Lien

National University of Civil Engineering, Hanoi, Vietnam

Dinh Van Thuat

National University of Civil Engineering, Hanoi, Vietnam

EDITORIAL BOARD MEMBERS

Shingo Asamoto

Saitama University, Japan

Nguyen Binh Ha

National University of Civil Engineering, Vietnam

Priyan Mendis

University of Melbourne, Australia

Hoang Tung

National University of Civil Engineering, Vietnam

Pham Xuan Anh

National University of Civil Engineering, Vietnam

Ngheiem Manh Hien

Marshall University, USA

Tang Anh Minh

Ecole des Ponts ParisTech, France

Trinh Van Tuyen

Vietnam Academy of Science and Technology

Tran Anh Binh

National University of Civil Engineering, Vietnam

Nguyen Vu Hieu

Université Paris-Est Créteil, France

Tran Thi Viet Nga

National University of Civil Engineering, Vietnam

Luu Duc Thach

National University of Civil Engineering, Vietnam

Stefan Catalin

Technische Universität Dresden, Germany

Nguyen Ngoc Hue

Vietnam Association of Port, Waterway, Offshore Engineering

Tuan Ngo

University of Melbourne, Australia

Bui Tien Thanh

University of Transport and Communications, Vietnam

Bui Trong Cau

University of Transport and Communications, Vietnam

Pham Cao Hung

University of Technology Sydney, Australia

Le Thien Phu

Université d'Évry Val d'Essonne, Paris, France

Le Trung Thanh

Vietnam Institute for Building Materials

Vu Duc Chinh

Institute of Transport Science and Technology, Vietnam

Nguyen Lien Huong

National University of Civil Engineering, Vietnam

Nguyen Viet Phuong

National University of Civil Engineering, Vietnam

Dao Nguyen Thang

University of Alabama, USA

Ha Minh Cuong

Ecole normale supérieure de Paris-Saclay, France

Telychenko Valery Ivanovich

Moscow State University of Civil Engineering, Russia

Christopher Nigel Preece

Abu Dhabi University, Malaysia

Nguyen Dinh Thi

National University of Civil Engineering, Vietnam

Ngo Huu Cuong

Ho Chi Minh City University of Technology, Vietnam

Ikuro Kasuga

University of Tokyo, Japan

Eldon Raj

IHE Delft Institute for Water Education, Netherland

Nguyen Quoc Thong

Vietnam Association of Architects

Pham Hung Cuong

National University of Civil Engineering, Vietnam

Dinh Kien

Consens Inc. Quebec, Canada

Tjandra Setiadi

Bandung Institute of Technology, Indonesia

Nguyen Vinh

University of Technology Sydney, Australia

Dinh Quang Cuong

National University of Civil Engineering, Vietnam

Thai Duc Kien

Sejong University, Korea

Tran Van Tan

National University of Civil Engineering, Vietnam

Keun-Hyeok Yang

Kyonggi University, Korea

Chu Van Dat

Vietnam Military Technical Academy

Nguyen Ngoc Linh

National University of Civil Engineering, Vietnam

Thai Huu Tai

University of Melbourne, Australia

Hidehara Yasui

University of Kitakyushu, Japan

Bui Viet Dong

National University of Civil Engineering, Vietnam

Hoang Vinh Long

National University of Civil Engineering, Vietnam

Somnuk Tangtermsirikul

Thammasat University, Thailand

Ngheiem Trung Dung

Hanoi University of Science and Technology, Vietnam

Ngheiem Duc Long

University of Technology Sydney, Australia

Bui Quoc Tinh

Tokyo Institute of Technology, Japan

Isaac Elishakoff

Florida Atlantic University, USA

Phung Duc Long

Vietnam Society for Soil Mechanics and Geotechnical Engineering

Nguyen Xuan Tinh

Tohoku University, Japan

Grabovui Petr Grigorievich

Moscow State University of Civil Engineering, Russia

Mahen Mahendran

Queensland University of Technology, Australia

Pham Minh Tuan

Hanoi University of Science and Technology, Vietnam

OFFICE SECRETARIES

Nguyen Huong Thao, Phan Thi Thanh Huyen

Table of Contents

1. A hybrid model for predicting missile impact damages based on k-nearest neighbors and Bayesian optimization <i>Quoc Hoan Doan, Duc-Kien Thai, Ngoc Long Tran</i>	1
2. Characterization of strain amplitude-dependent behavior of hardness and indentation size effect of SS400 structural steel <i>Nguyen Ngoc Vinh, Vu Quoc Anh, Hong Tien Thang</i>	15
3. Modeling the flexural behavior of corroded reinforced concrete beams with considering stirrups corrosion <i>Nguyen Trung Kien, Nguyen Ngoc Tan</i>	26
4. Development of a cementless eco-binder as an alternative to traditional Portland cement in construction activities <i>Huynh Trong Phuoc, Vu Viet Hung, Bui Le Anh Tuan, Pham Huu Ha Giang</i>	40
5. Point Foundation (PF) method: Principles and recent research findings <i>Myoung Su Jo, Ki Tae Lee, Ho Deok Kang, Hong Bum Cho, Tien Dung Nguyen</i>	53
6. Numerical investigation on the tunneling and mining induced geo-hazards: Case study in Quang Ninh, Vietnam <i>Nguyen Cong Giang, Nguyen Van Manh, Nguyen Quang Phich</i>	67
7. Two-scale design of porosity-like materials using adaptive geometric components <i>Van-Nam Hoang</i>	75
8. Influence of fiber size on mechanical properties of strain-hardening fiber-reinforced concrete <i>Duy-Liem Nguyen, Thac-Quang Nguyen, Huynh-Tan-Tai Nguyen</i>	84
9. Numerical studies on residual strength of dented tension leg platforms under compressive load <i>Quang Thang Do, Van Nhu Huynh, Dinh Tu Tran</i>	96
10. Effects of bending stiffness and support excitation of the cable on cable rain-wind induced inclined vibration <i>Viet-Hung Truong</i>	110
11. Failure probability analysis of overhead crane bridge girders within uncertain design parameters <i>Trinh Van Hai, Nguyen Huu Thu, Ha Dang Tuan, Pham Van Hiu</i>	125
12. Free vibration of bidirectional functionally graded sandwich beams using a first-order shear deformation finite element formulation <i>Le Thi Ngoc Anh, Vu Thi An Ninh, Tran Van Lang, Nguyen Dinh Kien</i>	136
13. Factors causing design changes in Vietnamese residential construction projects: An evaluation and comparison <i>Ha Duy Khanh</i>	151