

## JOURNAL OF ISSN 1859-2996 SCIENCE AND TECHNOLOGY IN

## C I V I L ENGINERING

**Vol.13 No.3 8 - 2019** 





## **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 ISSN 1859-2996 and five issues in Vietnamese under ISSN 2615-9058 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 researches and application results in the field of construction which have not been previously published or under review elsewhere, including 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.

**EDITOR-IN-CHIEF DEPUTY EDITOR-IN-CHIEF Pham Duy Hoa Pham Quang Dung** 

> National University of Civil Engineering, Hanoi, Vietnam National University of Civil Engineering, Hanoi, Vietnam

**MANAGING EDITORS** 

Tran Van Lien **Dinh Van Thuat** Phan Quang Minh National University of Civil Engineering, Hanoi, Vietnam National University of Civil Engineering, Hanoi, Vietnam National University of Civil Engineering, Hanoi, Vietnam

**EDITORIAL BOARD MEMBERS** 

Shingo Asamoto

Saitama University, Japan

**Pham Xuan Anh** National University of Civil Engineering, Vietnam

**Tran Anh Binh** National University of Civil Engineering, Vietnam

**Stefan Catalin** Technische Universität Dresden, Germany

**Bui Trong Cau** 

University of Transport and Communications,

**Vu Duc Chinh** 

Institute of Transport Science and Technology, Vietnam

**Ha Minh Cuong** 

Ecole normale supérieure de Paris-Saclay, France

Ngo Huu Cuong

Ho Chi Minh City University of Technology, Vietnam

**Pham Hung Cuong** 

National University of Civil Engineering, Vietnam

**Dinh Quang Cuong** 

National University of Civil Engineering, Vietnam

Chu Van Dat

Vietnam Military Technical Academy

**Bui Viet Dong** 

National University of Civil Engineering, Vietnam

**Nghiem Trung Dung** 

Hanoi University of Science and Technology, Vietnam

Grabovui Petr Grigorievich

Moscow State University of Civil Engineering, Russia

Nguyen Binh Ha

National University of Civil Engineering, Vietnam

Nguyen Ngoc Hue

Vietnam Association of Port, Waterway, Offshore Enaineerina

Pham Cao Hung

University of Sydney, Australia

Nguyen Xuan Hung

Ho Chi Minh City University of Technology, Vietnam(HUTECH)

Nguyen Lien Huong

National University of Civil Engineering, Vietnam

Telychenko Valery Ivanovich

Moscow State University of Civil Engineering

Ikuro Kasuga

University of Tokyo, Japan

Nguyen Viet Khoa

National University of Civil Engineering, Vietnam

**Dinh Kien** 

Consen Inc. Ouebeck, Canada

Thai Duc Kien

Sejong University, Korea

**Nguyen Ngoc Linh** 

National University of Civil Engineering, Vietnam

**Hoang Vinh Long** 

National University of Civil Engineering, Vietnam

**Nghiem Duc Long** 

University of Technology Sydney, Australia

**Phung Duc Long** 

Vietnam Society for Soil Mechanics and Geotechnical Engineering

**Privan Mendis** 

University of Melbourne, Australia

**Tang Anh Minh** 

Ecole des Ponts ParisTech, France

Tran Thi Viet Nga

National University of Civil Engineering, Vietnam

Tuan Ngo

University of Melbourne, Australia

Le Thien Phu

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

**Nguyen Viet Phuong** 

National University of Civil Engineering, Vietnam

**Christopher Nigel Preece** 

Abu Dhabi University, Malaysia

**Eldon Rai** 

IHE Delft Institute for Water Education. Eetherland

Tjandra Setiadi

Bandung Institute of Technology, Indonesia

**Tran Van Tan** 

National University of Civil Engineering, Vietnam

Thai Huu Tai

University of Melbourne, Australia

Somnuk Tangtermsirikul Thammasat University, Thailand

**Bui Quoc Tinh** 

Tokyo Institute of Technology, Japan

Nguyen Xuan Tinh

Tohoku University, Japan

Nguyen Pham Quang Tu

Institute of Construction Economics, Vietnam

**Pham Minh Tuan** 

Hanoi University of Science and Technology, Vietnam

**Hoang Tung** 

National University of Civil Engineering, Vietnam

**Trinh Van Tuyen** 

Vietnam Academy of Science and Technology

Luu Duc Thach

National University of Civil Engineering, Vietnam

**Bui Tien Thanh** 

University of Transport and Communications, Vietnam

Le Trung Thanh

Vietnam Institute for Building Materials

**Dao Nguyen Thang** 

University of Alabama, USA

Nguyen Dinh Thi

National University of Civil Engineering, Vietnam

Nguyen Quoc Thong

Vietnam Association of Architects

Le Thi Bich Thuan

Vietnam Federation of Construction

Nguyen Vinh

University of Technology Sydney, Australia Keun-Hyeok Yang

Kyonggi University, Korea

Hidenari Yasui

University of Kitakyushu, Japan

**OFFICE SECRETARIES** 

Phan Thi Thanh Huyen, Nguyen Quynh Le, Nguyen Huong Thao

National University of Civil Engineering, Hanoi, Vietnam

## **Table of Contents**

1.	Operational modal analysis of mechanical systems using transmissibility functions in the	
	presence of harmonics	
	Van Dong Do, Thien Phu Le, Alexis Beakou	1
2.	Prediction of bridge deck condition rating based on artificial neural networks	
	Tu Trung Nguyen, Kien Dinh	5
3.	Effect of fly ash on shrinkage of self-compacting concrete using restrained ring test	
	Tran Van Mien, Nguyen Hoang Phuc, Cu Thi Hong Yen	6
4.	Ritz solution for buckling analysis of thin-walled composite channel beams based on a	
	classical beam theory	
	Nguyen Ngoc Duong, Nguyen Trung Kien, Nguyen Thien Nhan	4
5.	Static analysis of Reissner-Mindlin plates using ES+NS-MITC3 elements	
	Chau Dinh Thanh, Ho Thi Con, Le Phuong Binh	5
6.	Static analysis of piezoelectric functionally graded porous plates reinforced by graphene	
	platelets	
	Nguyen Thi Bich Lieu, Nguyen Xuan Hung5	8
7.	Effects of vertical seismic actions on the responses of single-storey industrial steel building	
	frames	
	Dinh Van Thuat, Nguyen Dinh Hoa, Ho Viet Chuong, Truong Viet Hung7	3
8.	Large displacement elastic analysis of planar steel frames with flexible beam-to-column	
	connections under static loads by corotational beam-column element	
	Nguyen Van Hai, Doan Ngoc Tinh Nghiem, Le Van Binh, Le Nguyen Cong Tin,	
	Ngo Huu Cuong8	5
9.	Investigation of Rayleigh wave interaction with surface defects	
	Phan Hai Dang, Le Duc Tho, Le Quang Hung, Dao Duy Kien9	5
10.	Indentation for investigation of strain rate effect on mechanical properties in structural steel	
	weld zone	
	Pham Thai Hoan, Nguyen Ngoc Vinh, Nguyen Thi Thanh Tung	4
11.	A deep learning-based procedure for estimation of ultimate load carrying capacity of steel	
	trusses using advanced analysis	
	Truong Viet Hung, Vu Quang Viet, Dinh Van Thuat	3
12.	Scaled boundary finite element method with circular defining curve for geo-mechanics	
	applications	
	Nguyen Van Chung	4
13.	Experimental testing of a full-scale of group efficiency in multiple soil layers	
	Le Thiet Trung, Duong Diep Thuy, Pham Viet Anh	5