Geotechnical Engineering Journal of the SEAGS & AGSSEA

Vol. 48 No. 4 December 2017

ISSN 0046-5828

GEOTECHNICAL ENGINEERING

Journal of the

SEAGS Southeast Asian Geotechnical Society

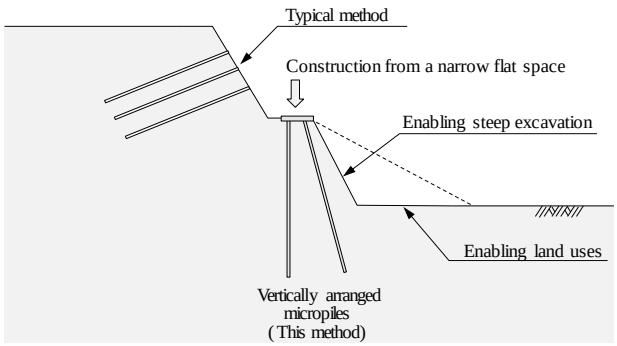
AGSSEA ASSOCIATION OF GEOTECHNICAL SOCIETIES IN SOUTHEAST ASIA

Sponsored by

AIT Asian Institute of Technology

Indexed by EI since 1970 Scopus since 2001

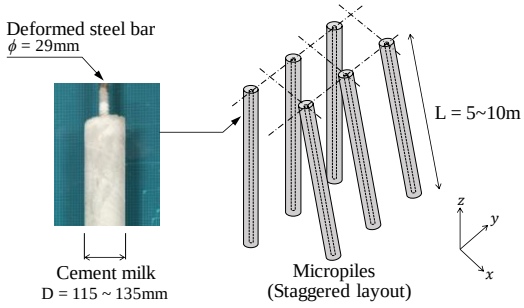
EDITORS: Akira Murakami, San Shyan Lin & Mounir **Bouassida**



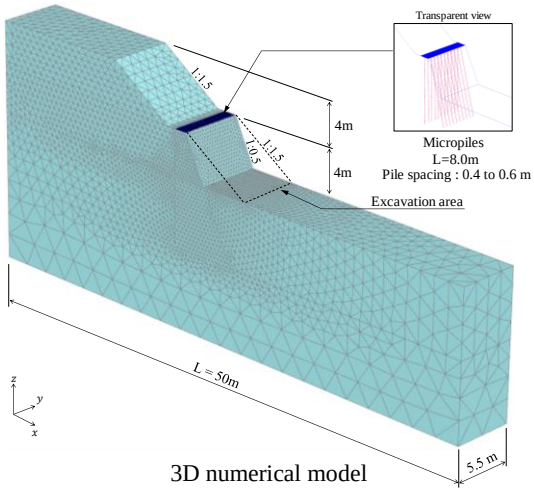
Overview of reinforced soil method by vertically arranged micropiles

Panoramic photographic view of the site

Soft Ground Improvement at the Rampal Coal Based Power Plant Connecting Road Project in Bangladesh
(After Sudipta Chakraborty, Ripon Hore, Fahim Ahmed and M. A. Ansary, 2017)



Overview of micropiles



3D numerical model

Numerical Study on the Design of Reinforced Soil by Vertical Micropiles
(After A. Kamura, J. Kim, T. Kawai, M.Kazama, N. Hikita and S. Konishi, 2017)

ANNOUNCEMENT

Numerical Study
Micropiles: A. I
N.

KINDLY READ THIS NEWS PLEASE on more details of SEAGS-AGSSEA Journals from 1970 - June 2016 in SEAGS WEB and **Free Downloading of Articles** now from 1970 to 2011 Issues; this will be extended to 2012 by end of August and 2013 by end of 2016.

Web sites can be reached at:

1. http://seags.ait.asia/journals/
2. http://seags.ait.asia/category/journals/1970-2011/
3. http://seags.ait.asia/info/journals-2012-43/
4. http://seags.ait.asia/info/journals-2013-44/
5. http://seags.ait.asia/info/journals-2014-45/
6. http://seags.ait.asia/info/journals-2015-46/
7. http://seags.ait.asia/info/journals-2016-47/

All Journal Issues from 1970-2011 can be freely downloaded now. 2013 Issues can be freely downloaded by end of August 2016. 2014 Issues can also be downloaded by end of this year - that is 2016.

YOU ARE KINDLY REQUESTED TO CONTRIBUTE ARTICLES IN FUTURE ISSUES AND ALSO HELP IN REVIEWING AS WELL.

GEOTECHNICAL ENGINEERING

Published by the:
SOUTHEAST ASIAN GEOTECHNICAL SOCIETY &
ASSOCIATION OF GEOTECHNICAL SOCIETIES IN SOUTHEAST ASIA

EDITOR-IN-CHIEF

Chairman: Dr. Teik Aun Ooi

Prof. San Shyan Lin (Taiwan)-Leader

Dr. Erwin Oh (co-Leader)

Prof. Akira Murakami (Japan)

Prof. Jian Hua Yin (Hong Kong)

Prof. Suched Likitlersuang (Thailand)

Dr. Eng Choon Leong (Singapore)

Dr. Phung Duc Long(Vietnam)

Prof. Madhav (India)

Prof. S R Kim (Korea)

Dr. Swee Huat Chan (Malaysia)

Dr. Farrokh Nadim (Europe)

Prof. Hadi Kabbaz (Australia)

Prof. Robert Koerner (USA)

Prof. Jay Meegoda (USA)

Prof. Palmeira Ennio Marcus (South America)

Prof. Abbas Soroush (Iran)

Prof. Mounir Bouassida (Africa)

Prof. A.S. Balasubramaniam (Convenor)

EDITORIAL ADVISERS

A.S. BALASUBRAMANIAM, *Australia*

E.W. BRAND, *U.K.*

WEN HUI TING, *Malaysia*

KWET YEW YONG, Singapore

CHUNG TIEN CHIN, *Taiwan*

DENNES T. BERGADO, Philippines

ZA-CHIEH MOH, *Taiwan*

CHIN-DER OU, *Taiwan*

JOHN CHIEN-CHUNG LI, *Taiwan*

H.G. POULOS, *Australia*

PEDRO SECO E PINTO, Portugal

SEAGS EXECUTIVE COMMITTEE MEMBERS (2016 – 2019)

DR. NOPPADOL PHIENWEJ	President
DR. NOPPADOL PHIENWEJ	Hon. Secretary General
DR. ZA-CHIEH MOH	Founding President
DR. TEIK-AUN OOI	Immediate Past President
DR. CHUNG TIEN CHIN	Past President
PROF. KWET YEW YONG	Past President
DR. JOHN CHIEN-CHUNG LI	Past President
DR WEN HUI TING	Past President

SEAGS GENERAL COMMITTEE 2016 - 2019

DR. NOPPADOL PHIENWEJ *(President)*

DR. NOPPADOL PHIENWEJ *(Hon. Secretary General)*

DR. ZA-CHIEH MOH *(Founding President)*

DR. TEIK AUN OOI *(Immediate Past President)*

DR. CHUNG TIEN CHIN *(Past President)*

PROF. KWET YEW YONG *(Past President)*

DR. JOHN CHIEN-CHUNG LI *(Past President)*

DR. WEN HUI TING *(Past President)*

PROF. A.S. BALASUBRAMANIAM*(Past President)*

DR. CHIN DER OU *(Past President)*

IR. YEW WENG YEE	PROF. JIAN CHU
IR. KENNY K.S. YEE	PROF. T. LIANG
IR. THIEN SENG YEE	PROF. DER-WEN CHANG
PROF. HUNG-JIUN LIAO	DR. SOKTAY LIM
PROF. MEEI-LING LIN	PROF. DENNES T. BERGADO

Geotechnical Engineering is the official journal of the Southeast Asian Geotechnical Society and the Association of Geotechnical Societies in Southeast Asia. It is published four times a year in March, June, September and December and is free to members of the Society. The annual subscription rate for non-members is US$50 to individuals and US$100 to libraries and companies. Back issues are available. Cheques or money orders should be made payable to the Asian Institute of Technology. Membership application forms and other details can be obtained from:

The Secretariat, SEAGS
Room 211, AIT Library
Asian Institute of Technology
P.O. Box 4, Klong Luang
Pathumthani 12120, Thailand
Website: hiip://www.seags.ait.ac.th

Ir. Kenny Yee
Hon. Secretary General
Association of Geotechnical Societies in Southeast Asia
E-mail: kenny.yeeks@gmail.com
Website: http://www.agssea.org

GEOTECHNICAL ENGINEERING

AGSSEA COUNCIL SESSION 2016 – 2019

Chairman		Prof. San Shyan LIN
Hon. Secretary-General		Ir. Kenny YEE
Hon. Treasurer		Ir. Kenny YEE
Immediate Past Chairman		Prof. Kwet-Yew YONG
Hon. Founder Chairman		Dr. Za-Chieh MOH
Founder Chairman		Dr. Teik Aun OOI
Council Members	Southeast Asian Geotechnical Society (SEAGS)	Dr. Noppadol PHIENWEJ Prof. Dennes T. Bergado
	Vietnamese Society for Soil Mechanics and Geotechnical Engineering (VSSMGE)	Dr. PHUNG Duc Long Dr. PHAM Van Long
	Hong Kong Geotechnical Engineering Society (HKGES)	Prof. Charles Wang-Wai NG Dr Johnny CHEUK
	Geotechnical Society of Singapore (GeoSS)	Dr. Kam Weng LEONG Prof. Chun-Fai LEUNG
	Thai Geotechnical Society (TGS)	Prof. Suttisak SORALUMP Dr. Apiniti JOTISANKASA
	Chinese Taipei Geotechnical Society (CTGS)	Prof. Keh-Jian SHOU Prof. Chang-Yu OU
	Indonesian Society for Geotechnical Engineering (HATTI)	Prof. Masyhur IRSYAM Dr. Pinto Tua SIMATUPANG
	Malaysian Geotechnical Society (MGS)	Ir. Yew Weng YEE Prof. Dominic Ong
Nominated Co-opted Members		Prof. Jian CHU Prof. Hung-Jiun LIAO Dr. Swee Huat CHAN
Advisors		Dr. Wen-Hui TING Prof. A S BALASUBRAMANIAM Dr. John Chien-Chung LI Prof. Dennes T. BERGADO Ir. Raymond CHAN Dr. Chung-Tien CHIN Prof. TRINH Minh Thu

Ir. Kenny Yee
Hon. Secretary General
Association of Geotechnical Societies in Southeast Asia
E-mail: **kenny.yeeks@gmail.com**

IEM Training Centre Sdn. Bhd.
No. 33-1A, Jalan SS 52/18
P.O. Box 224 (Jalan Sultan)
46200 Petaling Jaya, SelangorDarul Ehsan, MALAYSIA
Tel: (60) 03 7958 6851
Fax: (60) 03 79582851
E-mail: **iemtrainingcentre@gmail.com**

GEOTECHNICAL ENGINEERING

EDITORIAL PANEL

Prof. D.T. Bergado
Asian Institute of Technology
Bangkok Thailand

Dr. R.P. Brenner
Weinfelden
Switzerland

Prof. D.W. Chang
Tamkang University
Tamsui Taiwan

Prof. Jian Chu
Iowa State University
Iowa U.S.A

Prof. Fuping Gao
Institute of Mechanics
Chinese Academy of Sciences
Beijing China

Dr. Ivan Gratchev
Griffith University Gold Coast Campus
Gold Coast Queensland Australia

Dr. Wei-Dong Guo
University of Wollongong
Wollongong
Australia

Dr. Abuel-Naga Hossam
The University of Manchester
Manchester U.K.

Prof. Dong-Sheng Jeng
Griffith University Gold Coast Campus
Gold Coast
Queensland Australia

Prof. C. H. Juang
Clemson University
U.S.A.

Dr. Eng Choon Leong
Nanyang Technological University
Singapore

Prof. Robert Liang
Akron University
U.S.A.

Prof. A (Malek) Bouazza
Monash University
Melbourne Australia

Prof. Jin-Chun Chai
Saga University
Saga, Japan

Prof. Y.K. Chow
National University of Singapore, NUS
Singapore

Prof. Roger Frank
Université Paris-Est
École des Ponts ParisTech
Laboratoire Navier-geotechnical team (CERMES)
Marne-la-Vallée cedex 2 France

Prof. Christophe Gaudin
University of Western Australia
Perth Australia

Prof. Jürgen Grabe
Karlsruhe University
Germany

Prof. Jie Han
The University of Kansas
Lawrence, Kansas
USA

Prof. B. Indraratna
University of Wollongong
Wollongong Australia

Dr. Apiniti Jotisankasa
Department of Civil Engineering
Kasetsart University
Bangkok Thailand

Prof. Poul V. Lade
The Catholic University of America
Washington, D.C.,
U.S.A.

Prof. Chun-Fai Leung
National University of Singapore
Singapore

Prof. Meei-Ling Lin
Department of Civil Engineering
National Taiwan University Taipei, Taiwan

Prof. San-Shyan Lin
Taiwan Ocean University
Keelung Taiwan

Prof. Tatsunori Matsumoto
Kanazawa University
Kakuma-machi, Kanazawa
Japan

Prof. Fusao Oka
Kyoto University, Kyoto Japan

Prof. Charles W. W. Ng
The Hong Kong University of Science and Technology
Kowloon Hong Kong

Dr. T.A. Ooi
The Institution of Engineers, Malaysia
Kuala Lumpur Malaysia

Prof. C.Y. Ou
National Taiwan University of Science and Technology
Taipei, Taiwan

Prof. Anand J. Puppala
The University of Texas at Arlington
Texas
U.S.A

Professor Paulus P. Rahardjo
Parahyangan Catholic University
Indonesia

Prof. Helmut F. Schweiger
Graz University of Technology
Graz, Austria

Prof. D. N. Singh
Indian Institute of Technology Bombay
Powai, Mumbai, India

Prof. Ikuo Towhata
Univesity of Tokyo
Tokyo Japan

Dr. Dariusz Wanatowski
The University of Nottingham
Ningbo, China

Dr. Albert T. Yeung
University of Hong Kong (HKU)
Hong Kong

Mr. Tom Lunne
Norwegian Geotechnical Institute
Oslo, Norway

Prof. Akira Murakami
Kyoto University
Kyoto Japan

Dr. Farrokh Nadim
Technical Director
Norwegian Geotechnical Institute (NGI)
Oslo, Norway

Dr. Erwin Oh
Griffith University Gold Coast Campus
Gold Coast
Queensland Australia

Prof. Zhen-Yu Yin
Tongji University
China

Dr. N. Phienwej
Asian Institute of Technology
Bangkok Thailand

Prof. Harianto Rahardjo
Nanyang Technology University
Singapore

Dr. Shinji Sassa
Port and AirportResearch Institute
Nagase Yokosuka Japan

Prof. Shui-Long Shen
Shanghai Jiao Tong University
Shanghai China

Prof. Mitsutaka Sugimoto
Nagaoka University of Technology
Nagaoka Japan

Prof. B.V.S. Viswanadham
Indian Institute of Technology Bombay
Powai, Maharashtra, India

Prof. Li-zhong Wang
Zhejiang University
China

Prof. Jian-Hua Yin
The Hong Kong Polytechnic University
Hong

GEOTECHNICAL ENGINEERING

GUEST EDITORS

Prof. Jie Han (March 2011)

Prof. Tatsunori Matsumoto (June 2011)

Prof. Der-Wen Chang

Prof. Chang Yu Ou (September 2011)

Dr. Dariusz Wanatowski (December 2011)

Prof. Charles W W Ng (March 2012)

Dr. Apiniti Jotisankasa

Prof. Ikuo Towhata (June 2012)

Prof. Der-Wen Chang

Dr. Ivan Gratchev

Prof. Abdelmalek Bouazza (September 2012)

Tom Lunne (December 2012)

Prof. Don de Groot

Prof. Der-Wen Chang (March 2013)

Dariusz Wanatowski

Prof Akira Murakami (June 2013)

Dariusz Wanatowski

Prof. Fusao Oka (September, 2013)

Prof. Helmut F. Schweiger

Prof. Muhunthan Balasingham

Prof Jinchun Chai (December, 2013)

Prof Shuilong Shen

Prof Buddhima Indraratna (March, 2014)

A/Prof Cholachat Rujikiatkamjorn

Prof Tatsunori Matsumoto (June, 2014)

Prof Jurgen Grabe

Prof Der Wen Chang

B.V.S. Viswanadham (September, 2014)

Hanh Quang Le

Teik Aun Ooi

Shinji Sassa (December, 2014)

Poul V. Lade,

Li-zhong Wang,

Y.K. Chow,

Dong Sheng Jeng,

Christophe Gaudin,

Fuping Gao

Suched Likitlersuang (March 2015)

Suksun Horpibulsuk

Suttisak Soralump

Tirawat Boonyatee

Suchatvee Suwansawat

Thanakorn Chompoorat

San-Shyan Lin (June 2015)

Charng Hsein Juang

Robert Liang

Zhen-Yu Yin (September 2015)

Jian-Hua Yin

Prof. Jay Meegoda (December 2015)

Prof. Limin Hu

Dr. Phung Duc Long (March 2016)

Prof. San-Shyan Lin

Prof. Meei-Ling Lin (June 2016)

Sing Lok Chiu (Hong Kong Part) (September 2016)

Tiong Guan Ng (Singapore Part) and

San-Shyan Lin (Contributed Papers)

Yee Thien Seng (December 2016)

Chan Swee Huat & Ooi Teik Aun

Kazuya Yasuhara (March 2017)

Farrok Nadim & Dennes Bergado

Kok Hun Goh (June 2017)

Jeyatharan

Richard Hwang

Tarsunori matsumoto, Der Wen Chang

& San Shyan Lin (September 2017)

Akir Murakami, San Shyan Lin (December 2017)

PAST EDITORS

Dr. E.W. Brand (1970 – 1973)

Dr. E.W. Brand, Prof. A.S. Balasubramaniam (1974 – 1976)

Dr. E.W. Brand, Dr. V.K. Campbell (1977 – 1978)

Dr. V.K. Campbell (1978 – 1980)

Mr. J.S. Younger (1980 – 1985)

Mr. D.R. Greenway (1986 – 1987)

Mr. P.G.D. Whiteside (1988 – 1989)

Mr. C.A.M. Franks (1990 – 1995)

Prof. D.T. Bergado (1996 – 2001)

Dr. N. Phienwej (2002 -2010)

Reviewers List: March-June-September-December 2016

Dr. Jay Ameratunga
Golder Associates
Australia
Email: < JAmeratunga@golder.com.au>

Anson Sim
Jurutera Perunding Geoteknik Sdn. Bhd.
Email: <anson.sim@jpgeoteknik.com>

Prof. Arul Arulrajah
Technology, Melbourne
Australia
Email: <aarulrajah@swin.edu.au>

Prof. A.S. Balasubramaniam
Australia
Email: <bala.b.balasubramaniam@griffith.edu.au>

Prof. Dennes Bergado
Thailand
Email: <dbergado@gmail.com>

Prof. Leung C.F.
National University of Singapore
Singapore
Email: <ceelcf@nus.edu.sg>

Srvesh Chandra
Email:< sarviitk @gmail.com>,
<sarv@iitk.ac.in>

Prof. Der Wen Chang
Tamkang University
Taiwan, R.O.C.
Email: <dwchang@mail.tku.edu.tw>

Prof. Wen-Cherng Chan
National Ilan University
R.O.C.
Email: <wencherng@seed.net.tw>

Dr. Swee Huat Chan
Geo-Excel Consultants Sdn. Bhd.
Malaysia
Email: <shchan_21@yahoo.com>

Dr. Muhsiung Chang
National Yunlin University of Science and Technology
R.O.C.
Email:<changmh@yuntech.edu.tw>

Prof. Tien-Chien Chen
National Pint tung University of Science and Technology
Email: <tcchen@mail.npust.edu.tw>

Prof. Deepankar Choudhury
Indian Institute of Technology Bombay
India
E-mail: <dc@ civil.iitb.ac.in>

A/Prof. Soon Hoe Chew
National University of Singapore
Singapore
Email: <ceecsh@nus.edu.sg>

Dr. Peter Day
Technical Director, Jones & Wagener
Africa
Email: <day@jaws.co.za>

Prof. Luiz Guilherme de Mello
Escola Politecnica – Universidade São Paulo
Brasil
Email: <lgmello@vecttor.com.br>; <lgdmello@usp.br>

Prof. Jia-Jung Dong
National Taiwan Central University
Taiwan, R.O.C.
Email: <jjdong@geo.ncu.edu.tw>

Dr. John Endincott
AECOM Asia Ltd,
AECOM Technology Corporation
Hong Kong, China
Email: <john.endicott@aecom.com>

Prof. John McCartney
University of California, San Diego
U.S.A
Email: <mccartney@ucsd.edu>

Prof. Yung-Show Fang
National Chiao Tung University
Taiwan, R.O.C.
Email: <ysfang@mail.nctu.edu.tw>

Prof. Louis Ge
National Taiwan University
R.O.C.
Email: <louisge@ntu.edu.tw>

Prof. Russo Gianpiero
University Napoli Federico II
Italy
Email: <pierusso@unina.it>

Dr. Yi-Min Huang
Feng Chia University
R.O.C.

Dr. Wen-Chao Huang
National Central University
R.O.C.
Email: <wenchaoh@ncu.edu.tw>

Dr. Richard Nanhuei Hwang
Moh and Associates ,Inc.
R.O.C.
Email: <richard.hwang@maaconsultants.com>

Dr. Masayuki Hyodo
Japan
Email: <hyodo@yamaguchi-u.ac.jp>

Associate Professor Hadi Khabbaz
University of Technology Sydney
Australia
Email: <hadi.khabbaz@uts.edu.au>

Dr. A. Murali Krishna
Indian Institute of Technology
India
Email: <amurali@iitg.ernet.in>
<adapamk@gmail.com>

Prof. Cheng-Yu Ku
National Taiwan Ocean University
Taiwan
Email: <chkst26@mail.ntou.edu.tw>

Prof. Lin, Ming-Lang
National Taiwan University
R.O.C.
Email: <mlin@ntu.edu.tw>

Dr. Wei. F. Lee
National Taiwan University of Science and Technology
R.O.C.
Email: <wflee0206@gmail.com>

Prof. Chung-Jung Lee
National Central University
R.O.C.
Email:<cjleeciv@ncu.edu.tw>

Dr. Felix Ling Ngee Leh
Universiti Tun Hussein Onn Malaysia
Email: <felix@uthm.edu.my>

Prof. Meei-Ling Lin
National Taiwan University
R.O.C.
Email: <linml@ntu.edu.tw>

Prof. San-Shyan Lin
National Taiwan Ocean University
R.O.C.
Email: <sslin46@gmail.com>

Prof. Horn-Da Lin
National Taiwan University of Science and Technology
R.O.C.
Email: <hdlin@mail.ntust.edu.tw>

Dr. Jen-Cheng Liao
Taiwan Construction Research Institute
R.O.C.
Email: <jcliao@tcri.org.tw>

Prof. M. R. Madhav
Professor Emeritus, JNT University;
Visiting Professor, IIT, Hyderabad
India
Email: <madhavmr@gmail.com>

Prof. Tatsunori Matsumoto
Kanazawa University
Japan
Email: <matsumoto@se.kanazawa-u.ac.jp>

Dr. Nimal Nilaweera
Golder Associates – Melbourne Office
Australia
Email: <nnilaweera@golder.com.au>

Dr. Tiong Guan Ng
GeoEng Consultants (S) Pte Ltd
Singapore
E-mail: <ngtg@geoeng.com.sg>

Prof. Chang-Yu Ou
National Taiwan University of Science and Technology
Taiwan
E-mail: <ou@mail.ntust.edu.tw>

Assoc. Prof. Ong, D.E.L.
Research Centre for Sustainable Technologies,
Swinburne University of Technology Malaysia
Email: <elong@swinburne.edu.my>

Prof. Harry Poulos
Coffey Geotechnics
Australia
Email: <harry_poulos@coffey.com.au>

Prof. Yii-Wen Pan
National Chiao Tung University
Email: <ywpan@mail.nctu.edu.tw>

Dr. Tien Ho Seah
ALFA GEOTECH CO., LTD., Thailand
Email: <seah@maageo.com>

Er. Chua Tong Seng
Kiso Jiban Singapore Pte Ltd
Singapore
Email: <chuatongseng@hotmail.com>

Prof. Keh-Jian Shou
National Chiao Tung University, Taiwan
R.O.C.
Email: <kjshou@dragon.nchu.edu.tw>

Ir. Dr. Nader Saadatkhah, PhD
University Putra Malaysia (UPM)
Malaysia
E-mail: <n_saadat_khah@hotmail.com>;
<nader_khah@upm.edu.my>

Mr. Satkunaseelan
MMC_GAMUDA KVMRT (T) SDN BHD
Malaysia
E-mail: <seelan@kvmrt-ug.com.my>

Prof. Harry Siew Ann Tan
National University of Singapore
Singapore
Email:<ceetansa@nus.edu.sg>

Dr. Siti Noor Linda Taib
Universiti Malaysia Sarawak
Malaysia
Email: <tlinda@unimas.my>

Prof. Thomas C. Sheahan
Northeastern University
U.S.A.
Email: <t.sheahan@Neu.edu>

Dr. Tai-Tien Wang
National Taipei University of Technology
R.O.C.
Email: <ttwang@ntut.edu.tw>

Dr. Meng-Chia Weng
National University of Kaohsiung
R.O.C.
Email: <mcweng@nuk.edu.tw>

Prof. Siu-Mun Woo
National Taiwan University
Taiwan, R.O.C.
Email: <smwoo@tfec.com.tw>

Prof. Jian-Hong Wu
National Cheng Kung University
R.O.C.
Email:<jhwu@mail.ncku.edu.tw>

Prof. Chien Chih Wang
Cheng Hsiu University, Taiwan
R.O.C.
Email: <ccw@csu.edu.tw>

Mak, Wai Kin
Email: <WaiKin.Mak@aecom.com>
<via aecom.onmicrosoft.com>

Prof. Zoe-Yee Yang
Tamkang University
R.O.C.
Email: <yang@mail.tku.edu.tw>

Prof. Zoe-Yee YANG
Tamkang University
R.O.C.
Email: <yang@mail.tku.edu.tw>

Prof. Jianhua Yin
Hong Kong Polytechnic University
China
Email: <jian-hua.yin@polyu.edu.hk>

Prof. K. Y. Yong
National University of Singapore
Singapore
Email: <uciyky@nus.edu.sg>

Dr. Adnan Zainorabidin
Universiti Tun Hussein Onn Malaysia
Malaysia
Email: <adnanz@uthm.edu.my>

GEOTECHNICAL ENGINEERING

PREFACE

December 2017 Issue

This Issue is in two parts; Part 1 papers edited by Prof Akira Murakami as Guest Editor and Part 2 contributed papers directly edited by In-house Editors and Prof Mounir Bouassida

The first seven papers in the Issue are edited by Prof Akira Murakami as the Guest Editor and the subsequent papers are direct contributed ones; quite a few papers were acquired by Prof Mounir of papers from African continent.

The first paper is on Modelling the Effects of Static Shear on the Undrained Cyclic Torsional Simple Shear Behaviour of Liquefiable Sand by Gabriele Chiaro, L.I. Nalin De Silva and Junichi Koseki: Spanning from purely theoretical standpoint to practical applications, there is a particular interest to enhance understanding of the effects of static shear on the cyclic behavior of soil elements underneath sloped ground. To address this issue, two subsequent steps were undertaken in this study. First, a systematic laboratory investigation was carried out on Toyoura sand specimens subjected to various levels of combined static and cyclic shear stresses. Then, a new state-dependent cyclic model was developed. Since experimental findings have been exhaustively reported elsewhere, in this paper they are only briefly recalled for the benefit of comprehensiveness. Instead, the new model is presented in details and its performance is verified by simulating undrained cyclic torsional simple shear tests carried out on Toyoura sand specimens. Essentially, the model is built on an extended general stress-strain hyperbolic equation approach, in which the void ratio and stress level dependency upon non-linear stress-strain response of sand is incorporated. Besides, a novel empirical stress-dilatancy relationship is used to account for the effect of density on the stress ratio as well as to model the excess pore water pressure generation in undrained shear conditions as the mirror effect of volumetric change in drained shear conditions.

The second paper by A. Kamura, J. Kim, T. Kawai, M. Kazama, N. Hikita and S. Konishi is on Numerical Study on the Design of Reinforced Soil by Vertical Micropiles. The mechanical behaviour of the reinforced soil by vertical micropiles was considered using the three-dimensional finite element analysis. To make effective use of space around the slope, soil needs to be reinforced using micropiles placed in a small area. The main objective of this investigation was to evaluate the mechanical influence of various micropile arrangements and to determine the effects of pile spacing for design purposes. Numerical simulations of three cases using different pile angles indicated the amount of slope displacement and the values of the sectional force of the micropiles differed significantly. Among the three cases, the maximum slope displacement was 1.7 times the minimum value. Finally, numerical simulations of three cases using different pile spacing was carried out to clarify the effects of pile spacing on the amount of slope displacement and the sectional force of the micropiles.

In the third paper Soil-water Coupled Analysis of Pore Water Pressure Dissipation in Performance Design—Examinations of Effectiveness in Reclaimed Ground is studied by Toshihiro Nonaka, Shotaro Yamada, and Toshihiro Noda: Japan has a large number of reclaimed regions unimproved against liquefaction and countermeasures in such regions are necessary to prepare for a great earthquake. A new macro-element method has been proposed that involves applying the soil-water-coupled finite deformation analysis code ***GEOASIA*** with an inertial term, and a numerical-analysis technique has been designed that quantitatively evaluates the improvement effect of the pore water pressure dissipation method (PWPDM). In this study, PWPDM effectiveness was examined for a reclaimed ground using the proposed method. Detailed examinations were conducted with the intention of developing a more advanced performance design, without being limited to the concept of the current design code. The main findings are as follows: 1) the proposed analysis code enables quantitative evaluation of the improved effectiveness of PWPDM in a

reclaimed ground; 2) more advanced PWPDM designs are possible by not only suppressing the maximum excess pore water pressure to the permissible range of the current design code, but also evaluating the ground deformation adequately; and 3) the new macro-element method, capable of reproducing the phenomenon of well resistance, can evaluate the reduction in the improvement effect because of the degradation of drainage capability, thus making it useful for maintenance purposes such as drain clogging.

In their paper (fourth one), Y. Fukumoto and S. Ohtsuka made Comparison of Sheared Granular soils: Same Void Ratio but Considerably Different Fabric: This paper reports a comparison of two types of sheared granular soil specimens, with almost the same void ratios but considerably different fabric, using the discrete element method in two dimensions. The specimens are prepared by applying two different methods of particle generation; one specimen is generated by placing the particles geometrically, while the other specimen is generated by placing the particles randomly. Then, computational direct shear tests are conducted in order to compare the yielding behaviours of the two specimens. The obtained bulk shear responses show different trends, even though the values for the void ratio at the initial state are almost the same. Toward the critical state, however, the initial differences in the stress state and the granular fabric gradually disappear and eventually reach almost the same state. The results reveal that not only macroscopic quantities, but also the contact force distribution and the angular variation in contact forces, have a unique critical state. In particular, the angular distribution of contact angles inside the shear band is also found to have a unique critical state.

The fifth paper is on Coupled Analysis of Navier-Stokes and Darcy Flows by the Brinkman Equations by S. Arimoto, K**.** Fujisawa and A. Murakami: Simultaneous analysis of seepage flows in porous media and regular flows in fluid domains has a variety of applications to practical problems. The objective of this paper is to present a numerical method to simulate these two different flows simultaneously and continuously, and to investigate the influence of the Darcy flows in porous media on the Navier-Stokes flows in the fluid domain. To this end, the authors have employed the Darcy-Brinkman equations, which include the Navier-Stokes equations and can approximately describe Darcy flows by changing the values of porosity and hydraulic conductivity. The solutions of the Darcy-Brinkman equations are affected by two dimensionless quantity, i.e., the Reynolds number, Re and the Darcy number, Da. After the procedures to provide stable solutions of the governing equations are explained, this paper considers the two types of problems involving Navier-Stokes/Darcy coupled flows and the influence of the two dimensionless parameters on the solutions are investigated. One is the backward-facing step flow with a porous step, and the other is the preferential flows in porous media. The numerical results have shown that the permeability of the porous step slightly affects the reattachment of the flow in the former problem, and that the shape of the void or cavity in porous media changes the structure of the flow in it and the Darcy number changes the flux into the fluid domain in the latter problem.

In the sixth paper, Y. Kurimoto, Y. L. Xiong, S. Kageyama and F. Zhang presented Numerical Investigation on Mechanical Behaviour of Natural Barrier in Geological Repository of High-Level Radioactive Waste. It is commonly known that geological repository is regarded as the most practical way of permanent disposal of high-level radioactive waste (HLW). Yet, there are some engineering problems needed to be solved before its practical application. In geological repository, one of the most important factors is the thermo-hydraulic-mechanical (THM) behaviour of natural barrier. The aim of this paper is to investigate the influence of temperature on the deformation and the strength of host rocks, such as the soft sedimentary rock, with some element tests and the numerical simulations with a program of FEM named as ***SOFT*** based on a thermo-elasto-viscoplastic constitutive model.

Trihanyndio Rendy Satrya, Ria Asih Aryani Soemitro, Toshifumi Mukunoki and Indarto are the authors of the seventh paper and the last one assembled by the guest editor on Change of Soil Properties in the Bengawan Solo River Embankment due to Drying–Wetting Cycles. This paper studies the behaviour of Bengawan Solo River embankment soil properties for both in-situ and laboratory conditions. In the laboratory, series of cyclic drying and wetting tests were carried out to clarify the changes of in-situ soil properties over time since the soil had been initially compacted. Maximum dry density from Standard Proctor test was applied as initial compacted condition. Three cycles of drying and wetting were used to represent three cycles of dry and rainy seasons. The in-situ soil investigation was carried out during seasons.

The results show that the investigated in-situ soil properties were in good agreement with the laboratory test results at the 2nd and 3rd cycles. It denotes that these numbers of cycles are required to achieve the similar condition as in-situ soil. In addition, by observing the rate of change in soil properties, it was possible to trace back the construction time of the river embankment.

The eighth paper and the rest are from direct contribution. The eighth paper is on Soft Ground Improvement at the Rampal Coal Based Power Plant Connecting Road Project in Bangladesh by Sudipta Chakraborty, Ripon Hore, Fahim Ahmed and M. A. Ansary. Preloading with vertical sand drain (VSD) is presented as a soil improvement method in this paper. The work is based on a real life road (4 lane and 2 slow moving lanes) construction project carried out in Rampal sub-district of Bagerhat, Khulna, Bangladesh. The construction sequences and the basic design example of VSD for embankment works on very soft clay soil are discussed in this paper. This paper presents soft ground improvement using VSD including VSD installation, preloading techniques, settlement and stability, design calculation, observational method and analysis of monitoring data. No extra load has been used; preloading has been carried out with the self-weight of road in combination with fill embankment. Soil treated with VSD, has resulted in improvement of soil settlement.

The ninth paper by Badee Alshameri , Aziman Madun and Ismail Bakar is entitled Assessment on the Effect of Fine Content and Moisture Content Towards Shear Strength**.** The shear strength τ, shear modulus G, friction angle $\emptyset$, and cohesion c are remarkable design parameters in the geotechnical and civil projects. These design parameters were affected by several factors. In this paper, the fine content and moisture content factors will be evaluated. Numerous compacted sand-kaolin samples were test through the direct shear box test (by using shear rate equals to 1 mm/min, the samples dimension equals to 100 × 100 mm) to assess the effect of these factors. The results show interface between both effects of fine content and moisture content towards the shear strength parameters. According to the results; (1) there is no significant effect on shear strength parameters at low portions of fine content FC and moisture content w, (2) at higher portion of FC and w, bot FC and w show different relationships with shear strength parameters, (3) both relative high shear rate and low applied stress lead to present high value of friction angle (4) compact the soil mixtures with same compaction effort and different fine and moisture content lead to change the soil structure and void ratio thus produce regressive relationship between the friction angle toward density.

Dipendra Gautam, Hemchandra Chaulagain, Hugo Rodrigues and Hem Raj Shahi in the tenth paper worked on Ground Response Based Preliminary Microzonation of Kathmandu Valley. This paper analyzes spatially selected 286 deep borehole logs reaching up to the bedrock are and the results are presented in terms of amplification factor, ground acceleration and predominant period. The peak ground acceleration (PGA) is estimated to be 0.10 and 0.50 g indicating strong influence of nonlinearity in particular areas of Kathmandu valley wherein de-amplification is observed. The peak spectral acceleration is found to be varying between 0.30 to 1.75 g for the study area and soil predominant period is estimated in the range of 0.7 to 5 sec. Preliminary microzonation maps for PGA and soil predominant period are prepared and presented in this paper. Comparisons and interpretations on the basis of 1934 and 2015 earthquakes are presented in terms of damage scenario.

In the eleventh paper, V. Oderah and D. Kalumba investigated on the Use of Sugarcane Bagasse for Soil Reinforcement in Geotechnical Applications. The global initiative of minimizing the generation of waste materials, and the reduction of the environmental footprint of industrial processes has impelled the innovation into their use in geotechnical applications. Use of these materials in this manner, especially as soil reinforcements, could help solve the drudgery and secondary snags of disposing of the materials. This study therefore aimed at investigating the effects of sugarcane bagasse reinforcement on selected South African soils as well as the drawbacks of environmental conditions on the composite formed. Different types of sugarcane bagasse were utilised in evaluating their effect on the shear strength characteristics of the composite. The results indicated a higher improvement in the angle of internal friction in finely grained soil compared to coarsely grained soil. Saturation of the composite in water insignificantly reduced the strength characteristics beyond 2 days. In addition, an increase in shear characteristics depended on fineness of the soil, bagasse type and content, and on the vertical load.

The twelfth paper as described by S. Daoud, I. Said, S. Ennour and M. Bouassida on Quasi-Static Numerical Modelling of an Ore Carrier Hold: The problems associated with ore carriers' incidents, have preoccupied international organizations and many research laboratories which have been mobilised to identify the causes and seek for the solutions. The cargo liquefaction is considered to be the major cause of ore carriers' capsizing. The final aim of this research is to establish a new test procedure for evaluating the shear strength of loaded ore in view of its liquefaction prevention. First, a brief review is presented about the possible origins of cargo instability and examines the stress distribution by means of a quasi-static numerical modelling. Second, an assessment of the shear ratio variation, in terms of the hold inclination is established. According to this analysis, at a 15° hold inclination, the maximum shear ratio is less than 0.2 in all pile areas except under the residual slopes and at the surface that are assumed to be the most vulnerable parts.

The thirteenth paper is on Shear Strength of an Expansive Overconsolidated Clay Treated with Hydraulic Binders by A. Mahamedi and M. Khemissa: This paper presents and analyzes the results of a series of identification, compaction and direct shear tests performed in accordance with the Algerian standards on an expansive overconsolidated clay treated with locally manufactured hydraulic binders (composed Portland cement and extinct lime). This clay comes from the urban site of Sidi-Hadjrès city (wilaya of M'sila, Algeria), where significant damages frequently appear in the road infrastructures, roadway systems and various networks and in civil and industrial light structures. Tests results show that the geotechnical parameters values deduced from these tests are concordant and confirm the shear strength improvement of this natural clay treated with cement or lime and compacted under the optimum Proctor conditions. However, contrary to its mineralogical characteristics which do not seem to be affected by the treatment, this expansive natural clay is characterized by as well drained as undrained shear strength sensitive to stabilizer content; the best performances are obtained for a treatment corresponding to 8% cement or lime content.

The fourteenth paper is on Numerical Modelling of Retaining Wall Resting on Expansive Soil by Bushra Suhale Al-Busoda , Safa Hussain Abid Awn, & Hassan Obaid Abbase : To model the behavior of expansive soil, it seems necessary to move towards elastoplastic models that have been used for different types of clays. Hardening soil model is chosen in this study. Retaining walls rested on expansive soils are subjected to uplift and lateral forces due to soil swelling. More importantly, the swelling in expansive soil tends to cause additional lateral pressure on wall that caused deformations and bending. Various pattern types of helical piles are used to reduce the vertical and lateral movement of retaining wall constructed on expansive soil. The backfill soil beyond retaining wall is affected by swelling of expansive soil that caused additional lateral earth pressure on the wall of retaining wall. This study showed that the use of inclined helical piles beside vertical helical piles under the base of retaining wall decreased vertical movement 94% and lateral movement 70% for ratio of length of helical pile to depth of expansive soil (L/H) equal to 3.2. In general, the presence of helical piles below retaining wall resisted and controlled the vertical movement but do not control lateral movement except the case of using inclined helical piles.

N. M. Alsanabani, T. O. AL-Refeai, and A. O. Alshenawy in the fifteenth paper is on Simplified Method for Designing Piled Raft Foundation in Sandy Soils: The main purpose of this study is to develop a simplified method for computing the load carried by piles, and settlement of piled raft based on the characteristics of an unpiled raft, pile group, and soil. These are important criteria for preliminary piled raft design. Based on the results obtained from finite element analysis, simplified formulas and curves are generated for different conditions of sand and different pile spacing. These formulas and curves contain the stiffness ratio and efficiency factor of the unpiled raft and pile groups. The results of the proposed method were validated using the Poulos–Davis–Randolph method.

The sixteenth paper by Ramkrishnan R., Karthik V., Mukund S. Unnithan, Kiran Balaji R., Athul Vinu M., Anju Venugopalan is on Stabilization of Seepage Induced Soil Mass Movements using Sand Drains: Rising groundwater levels increases the pore water pressure in the soil slopes, acting as a triggering factor for landslides. By installing sand drains (horizontal or vertical) along the slope, the groundwater level can be lowered below the critical level, reducing the pore water pressure and also the probability of slope failure

significantly. In this study, laboratory-scale soil slopes of varying geometry were modelled in a tank and constant inflow was provided to simulate groundwater flow. With and without loading, the critical phreatic levels for the various slopes were determined. Vertical sand drains were then installed along the slope and the tests were repeated for a fixed duration. It was found that the slopes did not fail and remained stable for a longer time period, even with increase of groundwater flow. Hence it was concluded that sand drains are a feasible slope stabilization technique even on slopes subjected to static loading.

The seventeenth paper is on Experimental Study on the Durability of Soil-Cement Columns in Coastal Areas by Pham Van Ngoc, Brett Turner, Jinsong Huang and Richard Kelly: Deep soil mixing is one of the most commonly used ground improvement techniques. With high sulphate content in soil and seawater, stabilized soil in coastal areas can deteriorate in strength due to sulphate attack. In this research, the degradation in strength of cement treated soil exposed to synthetic seawater is measured by uniaxial compression and needle penetration testing. Three exposure conditions, namely 100% seawater, 200% seawater and in sealed condition (control samples), were used to measure the deterioration level due to the effect of sulphate. In addition, the extent of the portlandite consumption was also measured by Thermo-gravimetric Analysis which reflects the calcium distribution in the soil-cement columns. The test results show that the strength deterioration occurs deeper and faster in higher seawater environments. Furthermore, when in contact with increasing sulphate concentration, the strength deterioration shows a close relation with calcium distribution.

The eighteenth paper is by Wei Xiaoming ,Li Changhong ,Zhou Xiaolong ,Hu Baowen & Li Wanling on The Change Laws of Strength and Selection of Cement-sand Ratio of Cemented Backfill: Lilou Iron Mine is the largest domestic underground backfill mining and uses advanced whole tailings cemented filling process system. For the backfill, both the change law of strength development and the cement-sand ratio are important considerations for design. A differentiation analysis was performed of the strength of laboratory test blocks at the age of 28d and in situ cemented backfill samples. When the filling slurry concentration was 72% and cement-sand ratio was 1:4, the in situ coring strength was 2.98 MPa higher than that of laboratory-cured specimens; when the slurry concentration was 68% and cement-sand ratios were 1:4, 1:6 and 1:8, the in situ coring strength was 1.68MPa, 2.33 MPa and 1.44 MPa higher than that of laboratory-cured specimens. With an increase of filling height, the change laws has been explored of downward parabola in conditions that the strength difference is consistent with the bulk density difference of the cemented backfill. The stress of cemented backfill with different ratios were calculated and analyzed on the basis of ANSYS numerical simulation and similar filling mines. According to the position of stress concentration and change law of strength difference, this paper proposes an design scheme for high-stage cemented backfill with ratio parameters at different heights.

The last paper of this issue is nineteenth by T.C. Ekneligoda, L.-T. Yang, D. Wanatowski, A.M. Marshall1, and L.R. Stace on Numerical modelling of Ground Subsidence at an Underground Coal Gasification Site. A detailed numerical modelling study was carried out by the authors to represent geotechnical aspects of the Wieczorek underground coal gasification (UCG) site in Poland. A coupled thermos-mechanical numerical model was created to represent a single coal burning panel. The coal burning process was simulated by modifying the energy balance equation with an additional term related to the calorific value of coal as a source. Temperature dependent material properties were assigned to the coupled thermal-mechanical model according to published data. In the model, the burning zone spread about 7.5m laterally after 20 days of burning. Results from the coupled model were used to gauge a worst-case scenario in terms of the potential size of a formed cavity. This data was used within a less computationally expensive mechanical-only numerical model in order to evaluate the ground subsidence caused by the worst-case scenario for single and multiple UCG burning panels. The single panel burning resulted in 23mm of ground subsidence at the top of the model after long term coal burning. The ground subsidence measured at the top of the model, at the centre point of the gasification arrangement, was approximately 72mm when five panels were burnt with an edge to edge panel distance of 5m; this was increased to 85mm for seven panels.

ACKNOWLEDGEMENT

Nineteen papers are contained in this issue. Twelve of them are assembled by the Guest Editors and another seven contributed papers directly to the in-house editors. No doubt the material contained herein would be most valuable to our profession. The editors have adequately described the contributions in the preface. They are to be congratulated for these contributions.

Dr. Teik Aun Ooi
Prof. San Shyan Lin
Prof. Kwet Yew Yong
Dr. Noppadol Phienwej
Prof. A. S. Balasubramaniam

GEOTECHNICAL ENGINEERING

December 2017: Papers by Guest Editor Akira Murakami & Contributed Papers

Edited by:
Akira Murakami, San Shyan Lin & Mounir Bouassida

Akira Murakami

Prof. Akira Murakami received his BS (1978) at the Agricultural Engineering Department; MS (1980) at the Civil Engineering Department and Dr. Agr. (1991) from Kyoto University (KU), respectively. In 1982, he became an assistant professor at the Agricultural Engineering Department of KU, and was promoted to an associate professor of KU in 1994. He moved to the Graduate School of Environmental Science of Okayama University with a promotion to full professor in 1999. After joining Okayama University for just 10 years, he moved back to a full professor of KU in 2009. He has served as the Vice President of the Japanese Geotechnical Society (JGS), the Board Member of the Japanese Society of Irrigation, Drainage and Rural Engineering (JSIDRE), and the International Association for Computer Methods and Advances in Geomechanics (IACMAG), and also serves as a core member of TC103 of ISSMGE and a member of the Multidisciplinary International Society on Inverse Problems in Science and Engineering. He had acted as the Secretary of TC34 of ISSMGE for two terms and delivered a general report of 'Numerical Methods' at 16ICSMGE held in Osaka. He is the recipient of the Japanese Society of Civil Engineering (JSCE) Paper Award (1996), the JSIDRE Sawada Prize (2007), the JGS Best Accomplishment Award (2008), the JSIDRE Best Paper Award (2010), the JGS Paper Award (2011, 2013) and is a Fellow of JSCE. His research interests include the data assimilation, inverse problem, finite element methods, mesh free methods, and DEM in geomechanics.

San-Shyan Lin

Prof. San-Shyan Lin graduated from Chung Yuan University with a BSCE degree in 1981. He then obtained his master degree from Utah State University, Logan, Utah in 1985 and his PhD from Washington University in St. Louis, Missouri in 1992. Before his teaching career at university, Dr. Lin served as an engineer at Taiwan Area National Expressway Engineering Bureau between1992 to1994. Dr. Lin has been serving at Department of Harbor and River Engineering (DHRE) of National Taiwan Ocean University (NTOU) since 1994. He was promoted as a full professor in 2000. Thereafter, he took some university duties by serving as the secretary-general at office of the secretariat between 2001 and 2003; the chairman of DHRE between 2005 and 2006; the acting dean of college of engineering in 2007 and the vice president of NTOU between 2006 and 2012.

Prof. Lin served as a committee member of committee A2K03-Foundations of Bridges and Other Structures of TRB, USA between 1995 and 2004. Currently, he is still serving as a committee member of TC-212 and ATC-1 of ISSMGE and as an editorial board member of four international journals. In addition, Dr. Lin also served as the president of Taiwan Geotechnical Society (2011-2013); Chairman of International Geosynthetics Society- West Pacific Regional Chapter (2002-2004); CEO of Sino-Geotechnics Foundation (2011-2014) etc. Dr. Lin received the distinguished alumnus award from Chung Yuan University in 2009 and the distinguish Engineering Professor Award from Taiwan Pavement Engineering Society in 2011. Prof. Lin's research and practical experiences have been dealt with deep foundations and geosynthetics.

Mounir Bouassida

Mounir Bouassida is a professor of civil engineering at the National Engineering School of Tunis (ENIT) of the University of Tunis El Manar where he earned his B.S., M.S., Ph.D., and doctorate of sciences diplomas, all in civil engineering. He is the director of the Research Laboratory in Geotechnical Engineering and has supervised 16 Ph.D. and 29 Master of science graduates. His research focuses on soil improvement techniques and behavior of soft clays. Dr. Bouassida is the (co)author of 87 papers in refereed international journals; 130 papers, including 20 keynote lectures; and three books. He is a member of the editorial committees of journals Ground Improvement (ICE), Geotechnical Geological Engineering, Infrastructure Innovative Solutions, and International Journal of Geomechanics (ASCE). He is also an active reviewer in several international journals. As a 2006 Fulbright scholar, Bouassida elaborated a novel methodology for the design of foundations on reinforced soil by columns. He was awarded the 2006 S. Prakash Prize for Excellence in the practice of geotechnical engineering. In 2008, Bouassida launched a Tunisian consulting office in geotechnical engineering, SIMPRO. He is a co-developer of the software Columns 1.01 used for designing column-reinforced foundations. Prof. Bouassida held the office of the vice president of ISSMGE for Africa (2005–2009). He benefited from several grants as a visiting professor in the USA, France, Belgium, Australia, Vietnam, Hong Kong, and Norway.

Geotechnical Engineering Journal of the SEAGS & AGSSEA Vol. **48 No. 4 December 2017** ISSN 0046-5828

GEOTECHNICAL ENGINEERING

December 2017: Papers by Guest Editor Akira Murakami & Contributed Papers

Edited by:
Akira Murakami, San Shyan Lin & Mounir Bouassida

TABLE OF CONTENTS

List of Papers **Page**

1: Modelling the Effects of Static Shear on the Undrained Cyclic Torsional Simple Shear Behaviour of Liquefiable Sand 01-09
By Gabriele Chiaro, L.I. Nalin De Silva and Junichi Koseki
****Please click here to download paper*

2: Numerical Study on the Design of Reinforced Soil by Vertical Micropiles 10-18
By A. Kamura, J. Kim, T. M. Kazama, N. Hikita and S. Konishi
****Please click here to download paper*

3: Soil-water Coupled Analysis of Pore Water Pressure Dissipation in Performance Design - Examinations of Effectiveness in Reclaimed Ground 19-31
By Toshihiro Nonaka, Shotaro Yamada and Toshihiro Noda
****Please click here to download paper*

4: Comparison of Sheared Granular Soils: Same void ratio but Considerably Different Fabric 32-39
By Y. Fukumoto and S. Ohtsuka
****Please click here to download paper*

5: Coupled Analysis of Navier-Stokes and Darcy Flows by the Brinkman Equations 40-49
By S. Arimoto, K. Fujisawa and A. Murakami
****Please click here to download paper*

6: Numerical Investigation on Mechanical Behaviour of Natural Barrier in Geological Repository of High-Level Radioactive Waste 50-57
By Y. Kurimoto, Y. L. Xiong, S. Kageyama and F. Zhang
****Please click here to download paper*

7: Change of Soil Properties in the Bengawan Solo River Embankment due to Drying–Wetting Cycles 58-68
By Trihanyndio Rendy Satrya, Ria Asih Aryani Soemitro, Toshifumi Mukunoki and Indarto
****Please click here to download paper*

8: Soft Ground Improvement at the Rampal Coal Based Power Plant Connecting Road Project in Bangladesh 69-75
By Sudipta Chakraborty, Ripon Hore, Fahim Ahmed and M. A. Ansary
****Please click here to download paper*

9: Assessment on the effect of fine content and moisture content towards shear strength 76-86
By Badee Alshameri , Aziman Madun and Ismail Bakar
****Please click here to download paper*

10: Ground Response Based Preliminary Microzonation of Kathmandu Valley 87-92
By Dipendra Gautam, Hemchandra Chaulagain, Hugo Rodrigues and Hem Raj Shahi
****Please click here to download paper*

List of Papers **Page**

11: Investigation of the Use of Sugarcane Bagasse for Soil Reinforcement in Geotechnical Applications 93-102
By V. Oderah and D. Kalumba
****Please click here to download paper*

12: Quasi-Static Numerical Modelling of an ore Carrier Hold 103-109
By S. Daoud, I. Said, S. Ennour and M. Bouassida
****Please click here to download paper*

13: Shear Strength of an Expansive Overconsolidated Clay Treated with Hydraulic Binders 110-115
By A. Mahamedi and M. Khemissa
****Please click here to download paper*

14: Numerical Modelling of Retaining Wall Resting on Expansive Soil 116-121
By Bushra Suhale Al-Busod, Safa Hussain Abid Awn and Hassan Obaid Abbase
****Please click here to download paper*

15: Simplified Method for Designing Piled Raft Foundation in Sandy Soils 122-128
By N. M. Alsanabani, T. O. AL-Refeai and A. O. Alshenawy
****Please click here to download paper*

16: Stabilization of Seepage Induced Soil Mass Movements using Sand Drains 129-137
By R. Ramkrishnan, Karthik, Mukund S. Unnithan, R. Kiran Balaji, M. Athul Vinu and Anju Venugopalan
****Please click here to download paper*

17: Experimental Study on the Durability of Soil-Cement Columns in Coastal Areas 138-143
By Pham Van Ngoc, Brett Turner, Jinsong Huang and Richard Kelly
****Please click here to download paper*

18: The Change Laws of Strength and Selection of Cement-sand Ratio of Cemented Backfill 144-150
By Xiaoming Wei, Changhong Li, Xiaolong Zhou, Baowen Hu, Wanling Li
****Please click here to download paper*

19: Numerical Modelling of Ground Subsidence at an Underground Coal Gasification Site 151-154
By T.C. Ekneligoda, L.T. Yang, D. Wanatowski, A.M. Marshall, and L.R. Stace
****Please click here to download paper*

Cover Photographs

1. Numerical Study on the Design of Reinforced Soil by Vertical Micropiles: A. Kamura, J. Kim,
(After T. Kawai, M. Kazama, N. Hikita and S. Konishi, 2017)

2. Soft ground improvement at the Rampal Coal Based Power Plant Connecting Road Project in Bangladesh
(After Sudipta Chakraborty, Ripon Hore, Fahim Ahmed and M. A. Ansary, 2017)

GEOTECHNICAL ENGINEERING

Paper Contribution, Technical notes and Discussions

SEAGS & AGSSEA encourage the submission of scholarly and practice-oriented articles to its journal. The journal is published quarterly. Both sponsors of the journal, the Southeast Asian Geotechnical Society and the Association of Geotechnical Societies in Southeast Asia, promote the ideals and goals of the International Society of Soil Mechanics and Geotechhnical Engineering in fostering communications, developing insights and enabling the advancement of the geotechnical engineering discipline. Thus the publishing ethics followed is similar to other leading geotechnical journals.Standard ethical behaviour of the authors, the editor and his editorial panel, the reviewers and the publishers is followed.

Before you submit an article, please review the guidelines stated herein for the manuscript preparation and submission procedures. Paper template is available upon request.

Geotechnical Engineering Journal accepts submissions via electronic. The manuscript file (text, tables and figures) in both words and pdf format together with the submission letter should be submitted to the Secretariat and copied to the Editor-in-Chief, Geotechnical Engineering Journal, c/o School of Engineering and Technology, Asian Institute of Technology, Room no. 211, AIT Library, Asian Institute of Technology, P.O. Box 4, Klong Luang, Pathumthani 12120, Thailand. Email: seags@ait.ac.th. Papers under review, accepted for publication or published elsewhere are not accepted. The guidelines for author are as follows:-

1. The manuscript including abstract of not more than 150 words and references must be typed in Times New Roman 9 on one side of A4 paper with a margin of 25 mm on each side. The abstract should be written clearly stating the purpose, scope of work and procedure adopted together with the major findings including a summary of the conclusions.

2. The paper title must not exceed 70 characters including spaces.

3. The maximum length of papers in the print format of the Journal is 12 two-column pages in single-spaced in Times New Roman 9 including figures and tables. A Journal page contains approximately 1,040 words. Authors can approximate manuscript length by counting the number of words on a typical manuscript page and multiplying that by the number of total pages (except for tables and figures). Add word-equivalents for figures and tables by estimating the portion of the journal page each will occupy when reduced to fit on a 160 mm x 240 mm journal page. A figure reduced to one-quarter of a page would be 260 word-equivalents. When reduced, the figure must be legible and its type size no smaller than 6 point font (after reduction).

4. Figures: Line art should be submitted in black ink or laser printed; halftones and color should be original glossy art. Figures should be submitted at final width i.e. 90 mm for one column and 185 mm for two columns. The font of the legends should be in Times New Roman and should use capital letters for the first letter of the first word only and use lower case for the rest of the words. Background screening and grids are not acceptable.

5. Each table must be typed on one side of a single sheet of paper.

6. All mathematics must be typewritten and special symbols identified. Letter symbols should be defined when they first appear.

7. The paper must have an introduction and end with a set of conclusions.

8. Practical applications should be included, if appropriate.

9. If experimental data and/or relations fitted to measurements are presented, the uncertainty of the results must be stated. The uncertainty must include both systematic (bias) errors and imprecisions.

10. Authors need not be Society members. Each author's full name, Society membership grade (if applicable), present title and affiliation and complete mailing address must appear as a footnote at the bottom of the first page of the paper.

11. Journal papers submitted are subject to peer review before acceptance for publication.

12. Each author must use SI (International System) units and units acceptable in SI. Other units may be given in parentheses or in an appendix.

13. Maximum of five keywords should be given.

14. REFERENCES

American Petroleum Institute (API) (1993). Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms – Working Stress Design, API Recommended Practice 2AWSD (RP 2A-WSD), 20th edition, 1993, p191

Earth, J.B., and Geo, W.P. (2011). "Asian Geotechnical amongst Authors of Conference Publications", Proceedings of Int. Conference on Asian Geotechnical, publisher, city, pp 133-137.

Finn WDL and Fujita N. (2002). "Piles in liquefiable soils: seismic analysis and design issues," Soil Dynamics and Earthquake Engineering, 22, Issues 9-12, pp731-742

15. Discussions on a published paper shall be made in the same format and submitted within six months of its appearance and closing
discussion will be published within twelve months.

For additional information, please write to:

The Secretariat, SEAGS

Room 211, AIT Library
Asian Institute of Technology
P.O. Box 4, Klong Luang
Pathumthani 12120, THAILAND
Email: seags@ait.ac.th
Website: http://www.seags.ait.ac.th

Ir. Kenny Yee

Hon. Secretary General
Association of Geotechnical Societies in Southeast Asia
E-mail: kenny.yeeks@gmail.com
Website: http://www.agssea.org

IEM Training Centre Sdn. Bhd.

No. 33-1A, Jalan SS 52/18
P.O. Box 224 (Jalan Sultan)
46200 Petaling Jaya, SelangorDarul Ehsan, MALAYSIA
Tel: (60) 03 7958 6851
Fax: (60) 03 79582851
E-mail: iemtrainingcentre@gmail.com
Website: http://www.iemtc.com