GEOTECHNICAL

ENGINEERING

Journal of the

SOUTHEAST ASIAN GEOTECHNICAL SOCIETY

&

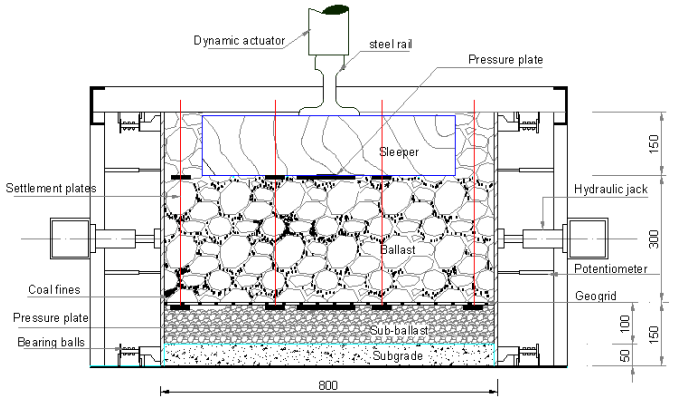
ASSOCIATION OF GEOTECHNICAL SOCIETIES IN SOUTHEAST ASIA

Sponsored by

ASIAN INSTITUTE OF TECHNOLOGY

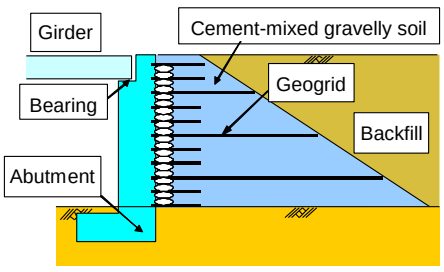
Editors: Prof Buddhima Indraratna

& A/Prof Cholachat Rujikiatkamjorn



1. High Speed Rail Process Simulation Apparatus, (Indraratna *et al*, 2014)

2. Track Displacement Monitoring (Indraratna *et al*, 2014)



a. GRS bridge abutment

b. GRS abutment at Mantaro for Hokkaido Shinkansen

3. Geosynthetic Reinforced Soil Structure (GRS) in High Speed Rail (after Tatsuoka *et al*, 2014)

GEOTECHNICAL ENGINEERING

MARCH 2014 SPECIAL ISSUE ON GEOTECHNICS FOR ADVANCING TRANSPORT INFRASTRUCTURE

Editors: Prof. Buddhima Indraratna & Dr. Cholachat Rujikiatkamjorn

Prof. Buddhima Indraratna

Prof. Buddhima Indraratna is currently Professor of Civil Engineering at the Faculty of Engineering, University of Wollongong. Concurrently, Buddhima is also the Research Director, Centre for Geomechanics and Railway Engineering; Program Leader, ARC Centre of Excellence in Geotechnical Science and Engineering; and Node Coordinator, CRC for Rail Innovation.

Since his PhD from the University of Alberta in 1987, his significant contributions to geotechnical and railway research have been acknowledged through numerous national and international awards, including the 2009 EH Davis Memorial lecture, regarded as one of the highest accolades within the Australian Geomechanics Society. Honoured as a Fellow of the Australian Academy of Technological Sciences and Engineering (FTSE) and as a recipient of the 2011 Engineers Australia Transport Medal and 2009 Business Higher Education Round Table (BHERT) award by Australian Commonwealth for Rail Track Innovations, his contributions to Transportation Geotechnics and Ground Improvement have been further acclaimed. He has published over 500 peer-reviewed articles (200+ Journal papers) and 5 research-based Books, and successfully supervised over 40 PhD graduates. His research income is approx. $1.2 M/year. He is the Founding Director of the Centre for Geomechanics and Railway Engineering (GRE). In this Centre, he is mentoring over a dozen full-time staff and overseeing the progress of over 30 PhD students. GRE is one of the three research centres forming the ARC Centre of Excellence in Geotechnical Sciences and Engineering (ARC-CGSE) funded recently (with Newcastle and UWA), of which he is a Program Leader. He is also the node coordinator of the CRC for Rail Innovation at UOW in charge of several rail track innovation projects including a real track design at Singleton, near Newcastle, NSW.The National Rail Testing Facility will be soon established at the University of Wollongong under his leadership through funding by the Australian Research Council.

Dr. Cholachat Rujikiatkamjorn

Dr Cholachat is an Associate Professor at the Centre for Geomechanics and Railway engineering, School of Civil, Mining and Environmental Engineering, University of Wollongong. He received his B Eng (1st Class Honours) from the Khonkaen University, Thailand in 2000 with a Masters (M Eng) from the Asian Institute of Technology, Thailand in 2002. He obtained his PhD in Geotechnical Engineering from the University of Wollongong in 2006. He received the Australian Geomechanics Society Thesis Award in 2006. In 2009, he received an award twice from the International Association for Computer Methods and Advances in Geomechanics (IACMAG) for an outstanding paper by an early career researcher, and the 2006 Wollongong Trailblazer Award for innovations in soft soil stabilisation for transport infrastructure. Recently he received the 2012 DH Trollope award and the 2013 ISSMGE Young Member award for academic achievements and outstanding contributions to the field of geotechnical engineering. He recently secured an early Career Researcher Award through the ARC Centre of Excellence in Geotechnical Science and Engineering with a grant of $680k for 3 years. His key areas of expertise include ground improvement for transport infrastructure and soft soil engineering. He has published over 140 articles in international journals and conferences. While maintaining a strong focus on quality teaching, to date, he has secured over $2 Million in research funding, mostly from external sources. He is currently a CI of two ARC-DP projects, 3 ARC-LP projects and a CRC-Rail project. He is currently the supervisor/co-supervisor of 10 HDR students and 4 Research Associates.

GEOTECHNICAL ENGINEERING

PREFACE

This Special Issue of *the Geotechnical Engineering Journal of the Southeast Asian Geotechnical Society & Association of Geotechnical Societies in Southeast Asia* on the **Geotechnics for Advancing Transport Infrastructure** is the result of keen discussion among various experts, for highlighting the key geotechnical issues encompassing modern transport infrastructure. This special issue includes a dozen invited papers from around the globe, including numerical and analytical methods, design parameters, field and laboratory testing, and case studies.

The issue begins with an invited paper by Tatsuoka et al titled "Geosynthetic-Reinforced Soil Structures for Railways: Twenty Five Year Experiences in Japan." It draws our attention to the importance of the application of Geosynthetic-reinforced soil retaining walls constructed for high-speed train lines considering for both high seismic loads and subsequent over-topping tsunami current.

The article on the "Enhancement of Rail Track Performance through Utilisation of Geosynthetic Inclusions" by Indraratna et al. proposes the use of artificial inclusions such as polymeric geosynthetics and rubber shock mats with the aim of reducing particle breakage as a cost-effective option. The relative performance of different types of geogrids, geocomposites and shock mats installed in fully instrumented field tracks has been evaluated in the towns of Bulli and Singleton in the State of New South Wales, Australia.

In their study on "Railway Track Transition Dynamics and Reinforcement Using Polyurethane GeoComposites,", Woodward et al. investigate the application of a polyurethane reinforcement technique to control the ballast migration behaviour in the transition zone to reduce dynamic effects from problems like hanging sleepers. The paper demonstrates the effectiveness of the application through numerical simulation and a case study at Tottenham Hale Junction in the United Kingdom.

In the paper "How to Overcome Geotechnical Challenges in Implementing High Speed Rail Systems in Australia," Khabbaz and Fatahi summarise lessons learnt from other countries experienced with high speed rail. The challenges and the effective solutions associated with implementing HSR systems in Australia are explained including selection and design of proper tracks, geographical issues, environmental concerns, economics and project costs and construction procedures.

In their contributions "Maintenance Model for Railway Substructure," by Ebrahimi et al. propose a maintenance model for railway substructure to predict the deformation of railway track and to estimate a schedule for ballast maintenance and tamping. A mechanistic-based maintenance planning software program was developed by incorporating the mechanistic empirical deformation model for railway substructure.

In their study "Dynamic Behaviour of Railway Ballasted Track Structures in Shaking Table Tests and Seismic Resistant Performance Evaluation in Japan," Ishikawa et al. present an experimental and analytical study to explain the dynamic response of ballasted track structures subjected to horizontal seismic motions using small-scale model ballasted tracks with shaking table tests. They show that this technique could roughly assess the seismic performance of ballasted track structures for practical use.

The article "Mechanical Properties of Polyurethane-Stabilized Ballast," by Keene et al. presents the mechanical properties of Polyurethane-Stabilized Ballast (PSB) compared to other materials commonly used in transportation infrastructure. It is found that PSB has mechanical properties similar to cement-stabilized soil (i.e., displays flexural strength), but has much greater compressive strength than ballast, which is critical for stabilization of track substructure.

"Dependency of Cyclic plastic Deformation Characteristics of Unsaturated Recycled Base Course Material on Principal Stress Axis Rotation" is an experimental study by Inam et al. who present the strength-deformation characteristics of unsaturated recycled crusher-run material, under various loading conditions and saturation degrees using multi-ring shear apparatus. The results from the multi-ring shear tests during repeated axial and shear loading tests can produce the real permanent deformation behaviour inside the base course and such results can be incorporated in practical pavement design.

The paper "Quickness Test Approach for Assessment of Flow Slide Potentials" by Thakur and Degago introduces a novel and pragmatic test procedure referred to as the quickness tests to evaluate remoulded shear strength of the sensitive clays. Based on relevant Norwegian landslides data, a quickness based criteria is proposed to assess the potential for occurrence of flow slides.

"Cement Stabilization for Pavement Material in Thailand" presented by Horpibulsuk et al. is a detailed review on the application of lightweight cemented clay and recycled pavement material, which are commonly used in Thailand. The effects of water content, cement content, air content and curing time play a major role in controlling the field strength development.

The study on "Stone Columns Field Test: Monitoring Data and Numerical Analyses" Almeida et al. presents a case study of a field test performed on a set of sixteen stone columns loaded with iron rails for one month. The numerical calculations of vertical and horizontal displacements reproduced the field measurements with satisfactory accuracy up to limit state conditions. The yield of stone columns provided by 3D analysis appears to be more realistic than that provided by 2D analysis.

"Numerical Analysis of Response of Geocell Confined Flexible Pavement," by S. Babu and R. Babu investigates the behaviour of geocell reinforcement in the flexible pavement. The paper elaborates on the effects of secant modulus of geocell material, aspect ratio, thickness of geocell-reinforced layer, and type of subgrade material using a series of numerical analyses.

Our invitation to be Guest Editors of this Special Issue is gratefully appreciated. The 11 articles plus the technical note included in this Special Issue covers an array of issues from theory to practice in transport infrastructure development. We gratefully acknowledge the efforts of all Authors who accepted our invitation to submit high quality articles in a timely manner. All papers have been peer-reviewed according to journal guidelines to maintain high standards, and we acknowledge these efforts by all Reviewers.

It is hoped that this Special Issue on Transport Geotechnics would be of immense benefit to both researchers and practitioners alike.

Prof Buddhima Indraratna,

A/Prof Cholachat Rujikiatkamjorn

GEOTECHNICAL ENGINEERING

ACKNOWLEDGEMENT

We are very fortunate to begin Year 2014 with this excellent Issue on Geotechnics for Advancing Transport Infrastructure. Also no one else can be better Guest Editors than Prof. Buddhima Indraratna and A/Prof Cholachat Rujikiatkamjorn. Prof. Buddhima Indraratna is currently Professor of Civil Engineering at the Faculty of Engineering, University of Wollongong. Concurrently, Buddhima is also the Research Director, Centre for Geomechanics and Railway Engineering; Program Leader, ARC Centre of Excellence in Geotechnical Science and Engineering; and Node Coordinator, CRC for Rail Innovation. Dr Cholachat is an Associate Professor at the Centre for Geomechanics and Railway engineering, School of Civil, Mining and Environmental Engineering, University of Wollongong. In the Preface, the Guest Editors proudly say, " This special issue includes a dozen invited papers from around the globe, including numerical and analytical methods, design parameters, field and laboratory testing, and case studies". Indeed it is truely remarkable to have such an excellent set of papers, so eloquently presented in a systemmatic manner by the authors in an authoritative manner.

Appropriately the Issue begins with a novel contribution by Prof. Tatsuoka and co-authors on twenty five years of experiences in Japan on Geosynthetic reinfotrced soil structures for railways. The subsequent papers by Prof. Indraratna and Dr. Rujikiatkamjorn on enhancement of rail track performance through utilisation of geosynthetic inclusions; Railway Track Transition Dynamics & Reinforcement Using Polyurethane GeoComposites by P. Woodward, O. Laghrouche and A. El-Kacimi; How to Overcome Geotechnical Challenges in Implementing High Speed Rail Systems in Australia by by H. Khabbaz and B. Fatahi; Maintenance Model for Railway Substructure by Ali Ebrahimi, James M. Tinjum, and Tuncer B. Edil; Dynamic Behaviour of Railway Ballasted Track Structures in Shaking Table Tests and Seismic Resistant Performance Evaluation in Japan by T. Ishikawa, S. Miura and E. Sekine; and Mechanical Properties of Polyurethane-Stabilized Ballast and Infrastructure Materials by A. Keene, J.M. Tinjum, and T.B. Edil; all of them are invaluable contributions related to railways and use of geosynthetics.

The following four papers and a Technical note as described makes this Special Issue a special volume by itself on Geotechnics for Advancing Transport Infrastructure;
Dependency of Cyclic Plastic Deformation Characteristics of Unsaturated Recycled Base Course Material on Principal Stress Axis Rotation by A. Inam, T. Ishikawa, and S.A. Miura; Quickness Test Approach for Assessment of Flow Slide Potentials by V. Thakur and S. A. Degago; Cement Stabilization for Pavement Material in Thailand by S. Horpibulsuk, A. Chinkulkijniwat, A. Suddeepong, and A. Neramitkornburee; Stone Columns Field Test: Monitoring Data and Numerical Analyses by Marcio Almeida, Bruno Lima, Mario Riccio, Holger Jud, Maria Cascão, Felipe Roza ; Numerical Analysis of Response of Geocell Confined Flexible Pavement by G. L Sivakumar Babu and Ram Babu.
Grateful thanks are due to all the contributing authors for their dedicated contributions.
A very high standard is maintained in the contributions in this Issue and the subsequent three Issues are also expected to be of great value. They will form a very useful contribution to our profession.

K. Y. Yong
N . Phienwej
T. A. Ooi
A. S. Balasubramaniam

GEOTECHNICAL ENGINEERING

March 2014: Geotechnics for Advancing Transport Infrastructure

Editors: Prof. Buddhima Indraratna & Dr. Cholachat Rujikiatkamjorn

TABLE OF CONTENTS

List of Papers **Page**

Geotechnical Engineering Journal of the SEAGS & AGSSEA Vol. 45 No.2 June 2014 ISSN 0046-5828

GEOTECHNICAL

ENGINEERING

Journal of the

SOUTHEAST ASIAN GEOTECHNICAL SOCIETY

&

ASSOCIATION OF GEOTECHNICAL SOCIETIES IN SOUTHEAST ASIA

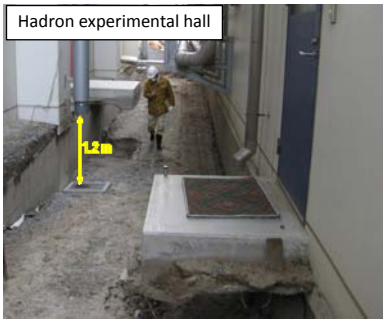
AGSSEA

Sponsored by

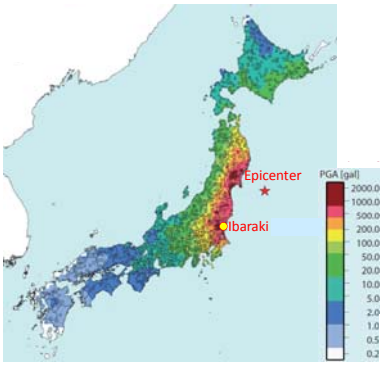
ASIAN INSTITUTE OF TECHNOLOGY

AIT Asian Institute of Technology

Editors: Prof Tatsunori Matsumoto, Prof Jurgen Grabe & Prof Der Wen Chang

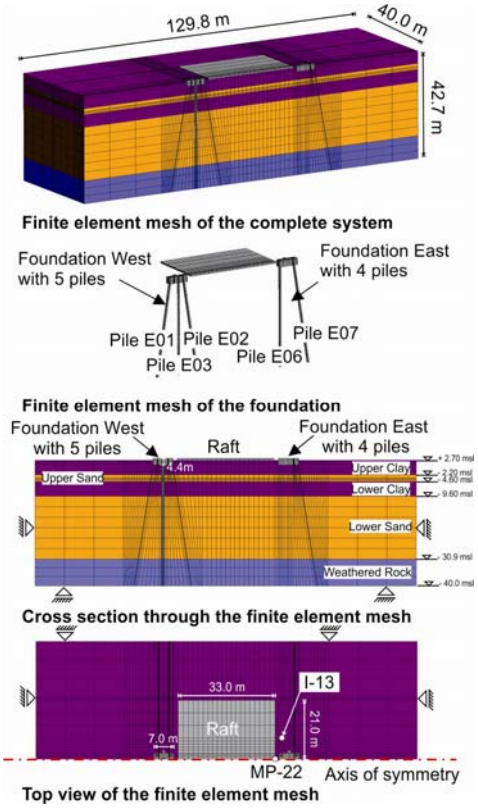


(a) Ground subsidence along building



(b) PGA map derived from strong motion records (Kunugi et al., 2012)

Piled Raft Foundation subjected to Strong Seismic Motion (After K. Yamashita *et al*, 2014)



Numerical study on pile groups subjected to lateral soil movements (After O. Reul *et al, 2014)*

GEOTECHNICAL ENGINEERING

. JUNE 2014 SPECIAL ISSUE ON DEEP FOUNDATION

Editors: Tatsunori Matsumoto, Jurgen Grabe & Der Wen Chang

Prof. Tatsunori Matsumoto

Prof. Matsumoto is now with Kanazawa University in Japan for nearly 34 years. He was educated at the Kanazawa University and received his Doctoral Degree from Kyoto University for his work on steel pipe piles in 1989. He has extensive research and practical experience on piled foundations and piled raft foundations. Prof. Matsumoto has a Shake Table Facility for the study of dynamic and earthquake type of behaviour of piled foundations. He has also worked on the centrifuge with pile groups and piled raft foundations in collaboration with Taisei Corporation. Prof. Matsumoto also has wide experience in the seismic design of raft and piled raft foundations. Prof. Matsumoto is one of the authors of the computer software PRAB—Piled Raft Analysis with Batter Piles. With this software piled raft foundation can be analyzed with vertical and horizontal loads as well as moment.

Univ.-Prof. Dr.-Ing. Jürgen Grabe

Prof. Grabe was educated in civil engineering at Hannover University/Germany and received his Doctoral Degree from Karlsruhe University/Germany for his work “Experimental and theoretical investigation of entire area compaction control using vibratory rollers” in 1992. Afterwards he worked in geotechnical consulting and construction companies for six years. In 1998 he became head of the Institute of Geotechnical Engineering and Construction Management at Hamburg University of Technology in Germany. He has extensive research and practical experience in physical, theoretical and numerical modelling in geotechnical engineering, especially in pile foundations, and marine geotechnics. Prof. Grabe has a complete soil mechanics laboratory and worked also on physical modelling in centrifuge in collaboration with University of Western Australia.

Prof. Grabe’s main research topics are geotechnical engineering in general, and marine geotechnics in particular. His methodical background covers physical modelling (1g model tests and ng model tests in collaboration with UWA), theoretical modelling (single and multiphase models for saturated and unsaturated soils based on continuum approach), numerical modelling (grid and mesh-based methods like FDM, FVM and FEM for continuum approach; meshfree methods like SPH for continuum approach, and DEM for discontinuum approach). Prof. Grabe and his research group produced 257 publications in national and international journals and conferences since 1998. From 2011 Prof. Grabe is vice president of Hamburg University of Technology, and is responsible for research in this function.

Prof. Der-Wen Chang

Prof. Chang has been the Geotechnical faculty member at The Department of Civil Engineering of Tamkang University (TKU), Taipei, Taiwan for over 22 years. He received Ph.D. in Civil Engineering at The University of Texas at Austin in 1991 and MS in Civil Engineering at Michigan State University in 1987. Prof. Chang has supervised the research work of over 60 Master Thesis and 3 Ph.D. Thesis at TKU, and published more than 190 articles as the Journal, Conf. papers and reports. Nearly all his research studies are related to numerical modeling and dynamic analyses for the geotechnical structures. His research experiences include NDT methods on pavements, seismic behaviors of the pile foundation, constitutive modeling of the soils, and recent study on the performance based design for the earth structures. Prof. Chang is also the visiting Professor at University of Washington at Seattle, US in 2008 and LN Gumilyov Eurasian National University at Astana, Kazakhstan for research studies in 2010 and 2011. Other than the research works, Prof. Chang devotes himself a great deal to serve the communities. He involves heavily and indeed shows his good performance in the public works related to education and constructions. Prof. Chang is currently serving as the Int. Secretary General of Chinese Taipei Geotechnical Society, GC member at SEAGS and Editorial Panel for SEAGS/AGSSEA J. of Geotechnical Engineering, and TC212 member at ISSMGE.

GEOTECHNICAL ENGINEERING

FORWARD

The theme of the 2014 June issue is Deep Foundations. Prof. Tatsunori Matsumoto at Kanazawa University, Japan and Prof. Jurgen Grabe at Hamburg University of Technology, Germany are the guest editors while Prof. Der-Wen Chang at Tamkang University, Taiwan is the in-house editor. Prof. Der Wen Chang also undertook all the administrative works related to the review of the articles and co-coordinating with the Guest Editors, Authors and Reviewers. After 18-month of preparations, thirteen papers were finally selected and are published in this Issue.

The content of this issue covers up mainly the task force studies 1~5 of ISSMGE TC212. More than half of the technical papers are based on observations of the experimental works. Axial Bearing Capacity and Static Cyclic Loading Behaviours of the Model Piles and/or Pile Group are respectively examined by Aoyama *et al.,* Hwang *et al.* and Ünsever *et al.* Case studies on Response of Laterally Loaded Nonlinear Piles are shown by Wei Dong Guo. Seismic Performance of the Piles from Field Measurements is discussed by Yamashita *et al.* Seismic Soil-structure-foundation Behaviours with Liquefaction concerns from the Shaking Table Test with Numerical Comparisons are discussed in the study made by Zhang *et al.*. An Overview of the Deep Foundation Systems of the High-rise Buildings can be found by Katzenbach and Dr. Leppla.

On the other hand, a number of numerical studies can be found on simulating the pile foundation behaviors. The topics include: Energy Pile with Feasible Material Modeling by Ma *et al.*, Passive Loading Effects on Piles by Moormann and Aschrafi, Dynamic Load Testing on Pipe Piles Compared to Case Study by Phan Ta *et al.*, Laterally Loaded Nonlinear Piles by Wei Dong Guo, Seismic Performance of the Piles using Reliability Method by Chang *et al.*, and Bearing Behaviours of Pile Group and/or Piles respectively discussed by Wu and Yamamoto, Reul *et al.* and Ünsever *et al.*

It is the sincere wish of the editors that this issue can provide a good record for the advanced works on deep foundation research. Sincere gratitude is expressed by the editors to the delegates and the reviewers who have contributed tremendous time and efforts in making this Remarkable Issue feasible and to complete the work within very strict timelines.

Tatsunori Matsumoto
Jurgen Grabe &
Der Wen Chang

GEOTECHNICAL ENGINEERING

ACKNOWLEDGEMENT

This special Issue on Deep Foundations as edited by Prof. Tatsunori Matsumoto, Prof. Jurgen Grabe and Prof. Der Wen Chang have thirteen excellent papers. Each paper being reviewed by at least two reviewers and some by more than two. The authors of the papers as per the Table of Contents and in that order are: C. Moormann and J. Aschrafi; Xiaolong Ma, Gang Qiu and Jürgen Grabe; L. Phan Ta , T. Matsumoto and H. Nguyen Hoang; K. Yamashita, T. Hashiba, H. Ito and T. Tanikawa; Y.S. Unsever, T. Matsumoto, S. Shimono and M.Y. Özkan; J.H. Hwang, Z.X. Fu, P.Y. Yeh and D.W. Chang; D.W. Chang, Y.H. Lin, H.C. Chao, S.C. Chu and C.H. Liu; Wei Dong Guo; Y. Wu and H. Yamamoto; F. Zhang, R. Oka, Y. Morikawa, Y. Mitsui, T. Osada, M. Kato and Y. Wabiko; S. Aoyama, L. Danardi, L. Bangan, W. Mao, S. Goto and I. Towhata; O. Reul, J. Bauer and C. Niemann; and R. Katzenbach and S. Leppla

Indeed the papers are excellent and deal with: Numerical Investigation of Passive Loads on Piles in Soft Soils; Simulation of an Energy Pile using Thermo-hydro-mechanical Coupling and a Visco-hypoplastic Model; Studies on Dynamic Load Testing of an Open-ended Pipe Pile with a Case Study; Performance of Piled Raft Foundation Subjected to Strong Seismic Motion; Static Cyclic Load Tests on Model Foundations in Dry Sand; Axial Bearing Behaviour of a Model Pile in Sand under Multiple Static Cycles; Seismic PBD of Piles from Monte Carlo Simulation using EQWEAP Analysis with Weighted Intensities; Case Studies on Response of Laterally Loaded Nonlinear Piles; Analysis of the Effect of Pile Tip Shape on Soil Behaviour Around Pile; Shaking Table Test on Superstructure-foundation-ground System in Liquefiable Soil and its Numerical Verification; Model Loading Tests on the Bearing Behaviour of a Group Pile and Ground Deformation; the Bearing Behaviour of Pile Groups Subjected to Lateral Pressure due to Horizontal Soil Movements; Deep Foundation Systems for High-rise Buildings in Difficult Soil Conditions.

Thus this Issue is unique in its own way in covering, theory, and practice via laboratory and field tests on model piles and under full scale conditions. Both static and dynamic loading conditions as well as earthquake type of loading; also the laboratory tests also include shaking table tests.

The authors of the papers and the editors are to be congratulated for this master-piece of work . Both Prof Tatsunori Matsumoto and Prof Der Wen Chang are also the guest editors of our June 2011 Issue of the journal and this Issue have seen the contributions of Prof. Jurgen Grabe as well as a Guest Editor.

We hope this Issue of the Journal will be of immense value to researchers and practitioners.

K. Y. Yong
N . Phienwej
T. A. Ooi
A. S. Balasubramaniam

GEOTECHNICAL ENGINEERING

JUNE 2014: SPECIAL ISSUE ON DEEP FOUNDATION

Editors: Tatsunori Matsumoto, Jurgen Grabe & Der Wen Chang

TABLE OF CONTENTS

GEOTECHNICAL

ENGINEERING

Journal of the

SOUTHEAST ASIAN GEOTECHNICAL SOCIETY

&

ASSOCIATION OF GEOTECHNICAL SOCIETIES IN SOUTHEAST ASIA

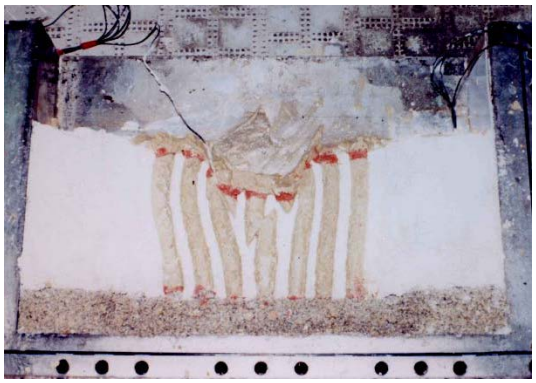
AGSSEA

Sponsored by

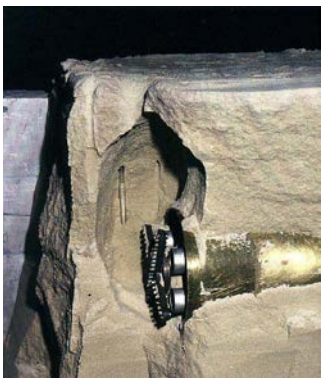
ASIAN INSTITUTE OF TECHNOLOGY

AIT Asian Institute of Technology

Editors: B.V.S. Viswanadham Hanh Quang Le Ooi Teik Aun



Failure mode of compacted sand piles
(After Kitazume et al., 2014)



Unsupported cavity (After König et al., 2014)

View of a soil confined coal ash embankment
(After Viswanadham & Mathur, 2014)

Run-out modelling of Byneset landslide
(After Thakur & Nigussie, 2014)

GEOTECHNICAL ENGINEERING

September-2014 Issue : Centrifuge Modelling of Geotechnical Infrastructures

Edited By Prof. B.V.S. Viswanadham, Prof. Christophe Gaudin & Prof. Tom Schanz

Prof. B.V.S. Viswanadham

Prof. Viswanadham obtained his PhD (Dr.-Ing.) from the Ruhr-University of Bochum, Germany in November 1996. He obtained his Bachelor degree in Civil Engineering from the Andhra University, Visakhapatnam, India in 1987 and thereafter did his Master of Technology in Civil Engineering with Geotechnical Engineering as a specialization from the Indian Institute of Technology Madras (IIT Madras), Chennai, India in 1989. Before joining the Indian Institute of Technology Bombay (IIT Bombay) in December 1998, he worked as a Senior Project Officer, Department of Ocean Engineering, IIT Madras and as a Scientist, Geotechnical Engineering Division, Central Road Research Institute, New Delhi for about eleven years. Currently, Prof. Viswanadham is working as a Professor in the department of Civil Engineering with geotechnical engineering as a specialization. The research interest of Prof. Viswanadham is on: (1) Centrifuge model studies on the behaviour of geotechnical structures; (2) Environmental Geotechnics with a special reference to landfill waste containment systems; (3) Ground improvement using Geosynthetics and studies on the behaviour of geosynthetic reinforced soil structures; (4) Natural hazard mitigation – landslides and slope protection; (5) Bulk utilization of waste materials especially coal ash. He has published 120+ technical papers in peer-reviewed international journals/International conferences/National conferences.

Prof. Viswanadham is a Co-ordinator of the National Geotechnical Centrifuge Facility available at IIT Bombay. He has focused in disseminating knowledge on centrifuge modelling to Students/Professionals through courses (for both undergraduate and post-graduate levels) and continuing education programme courses at IIT Bombay with an aim to establish centrifuge modelling technique as an essential tool for studying problems in geotechnical and Geoenvironmental Engineering. Prof. Viswanadham is the Member of the Technical Committee for Physical Modelling on Geotechnics (TC104) of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE), and the Chair of the Ist Asian regional workshop on the Centrifuge Modelling for Geotechnical Infrastructure to be held in IIT Bombay in November 14-16, 2012.

Prof. Christophe Gaudin

Prof. Gaudin graduated with a Doctorate in Engineering Science from the Ecole Centrale de Nantes in November 2002. He subsequently joined the Centre for Offshore Foundation Systems (COFS) in July 2003 and was appointed as Manager of the UWA centrifuge facilities. He was promoted Research Professorial Fellow in 2009 and hold since the position of Deputy Director of COFS. His research interests cover offshore anchoring systems and shallow foundations, pipeline-soil interaction and similitude principles associated with centrifuge modelling, for which he has authored 90+ referred publications.

As manager of the UWA centrifuge facilities and a team of 8 technicians, Prof Gaudin has focused on establishing centrifuge modelling techniques as an essential tool to assist the offshore industry in developing and designing foundation solutions. He has built a strong relationship with the offshore industry, raising over $3.5M of research funding and producing 50+ consulting reports.

Since 2010, Prof. Gaudin is the Chair of the Technical Committee for Physical Modelling on Geotechnics (TC104) of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE), and the Chair of the 8th International Conference on Physical Modelling in Geotechnics to be held in Perth in 2014. His goals as TC Chair for the current term are notably to increase awareness of centrifuge modelling techniques and capabilities in the geotechnical engineering community, both in academia and industry, and to support the emergence of new centrifuge centres around the world.

Prof. Tom Schanz

Prof. Tom Schanz received his PhD at ETH Zurich on the mechanical behavior of granular mixture. This period followed a PostDoc stay at Kagoshima University (Japan). Thereafter he received his habilitation at University Stuttgart (Germany). After ten years as Professor at Bauhaus-University Weimar (Germany) he is nowadays head of the Laboratory of Foundation Engineering, Soil- and Rock Mechanics at Ruhr-University Bochum, Germany. The laboratory is running currently two geotechnical centrifuges since about 30 years. Research projects involving these equipments cover all subjects from environmental engineering, natural hazard assessment and nowadays problems involving unsaturated soil mechanics. Beside the centrifuge center the laboratory is running an excellent equipped soil dynamics and clay lab. Tom’s research papers cover a wide range of theoretical, experimental and numerical subjects, as unsaturated soil mechanics, physico-chemical clay behavior, constitutive models, earthquake engineering and application of numerical methods to geomechanical problems. Tom is member of international committees as Unsaturated soils and European Numerical methods, he is chairman of the German committee for Numerical Methods in Geotechnics.

GEOTECHNICAL ENGINEERING

FORWARD

By Prof Viswanadham, and Dr.Ooi Teik Aun & Dr. Hanh Quang Le

A growing number of papers were received from time to time by authors who have an active interest in the journal. It is the only journal and SE Asia and we need to cater well for all authors.

As such, this Issue of the Journal is in two parts. The First Part is edited by Prof. Viswanadham and his team on Centrifugal Model Tests. The second part is edited by the in-house editors of the Journal.

Part 1: Centrifuge-based Physical Modeling

It is a pleasure for us to be Guest Editors for this Special Issue on Centrifuge-based Physical Modeling. There are seven excellent papers:

Centrifuge Modelling of Improved Ground; Simulation of Soil Movement in Geotechnical Centrifuge Testing – Deep Excavations, Tunnelling, Deposit; Run-out of sensitive clay debris: significance of the flow behaviour of sensitive clays; Verification of the Generalized Scaling Law for Flat Layered Sand Deposit; Performance of Rail Embankments Constructed with Coal Ash as a Structural Fill Material: Centrifuge study; Centrifuge Model Tests on the Use of Geocomposite as an Internal Drain in Levees; Field scale tests for determination of pullout capacity of suction pile anchors under varying loading conditions.

The authors of these papers are M. Kitazume, Y. Morikawa and S. Nishimura; D. König, O. Detert andT.Schanz; V. Thakur and D. Nigussie; T. Tobita, S. Escoffier, J. L. Chazelas and S. Iai; B.V.S. Viswanadham and V.K. Mathur; Vijaya Ravichandran, R. Ramesh, S. Muthukrishna Babu, G.A.Ramadass, M.V.Ramanamoorthy and M.A. Atmanand

With an aim of disseminating knowledge and expertise about the centrifuge based physical modelling techniques, the Technical committee TC 104 on Physical Modelling in Geotechnics of the *International Society of Soil Mechanics and Geotechnical Engineering* (ISSMGE) is organizing regional workshops first in Europe and Asia. The first Asian workshop on Physical Modelling in Geotechnics (Asiafuge2012) was held in Mumbai, India in November 14-16, 2012 and was organised in association with Indian Institute of Technology Bombay, Mumbai, India, and the Indian Geotechnical Society Delhi with an emphasis on the application of centrifuge-based physical modelling for infrastructure development. Selected themes included *soft ground problems, foundations, deep excavations, slopes and embankments, earthquakes, climate change, ground improvement techniques, tunnels, offshore foundation systems, environmental geotechnics, geosynthetics and novel construction techniques in infrastructure geotechnics*. The above papers were selected by a scientific committee consisting of delegates, who attended Asiafuge 2012.

B.V.S. Viswanadham (Lead Guest Editor)
C. Gaudin
T. Shanz

Part 2: Contributed Papers

In this part there are 7 contributed papers on mobile information system for risk management in urban underground construction; Design methods in Segmental Tunnel Linings; Challenges in constructing urban tunnels; Bulk compression of dredges soils; Energy piles; Bored piles in residual soils and Centrifugal shaking table tests on reinforced earth embankments.

The authors of the papers are: Hanh Quang Le and Bin-Chen Benson Hsiung; N.A. Do, D. Dias, P.P. Oreste, I. Djeran-Maigre; R. Katzenbach and S. Leppla; Hiroshi Shinsha and Takahiro Kumagai; A.M. Tang, J.M. Pereira, G. Hassen, N. Yavari; Mutiasani Dianmarti Kusuma and Eng-Choon Leong; W.Y. Hung , J.H. Hwang, C.J. Lee.

The editorial team of the contributed papers are most grateful to the authors and the reviewers for their excellent job. Most papers in Part 2 were presented in Geotech Hanoi 2013, but were modified significantly and had been subjected to extensive review.

Ooi Teik Aun (Lead Editor Part 2)
Hanh Quang Le
Noppodol Phienwej

GEOTECHNICAL ENGINEERING

ACKNOWLEDGEMENT

A growing number of contributed papers are now received for the journal. As such this Issue is in two parts; Part 1 is on Centrifuge based Physical Modelling with Prof. B.V.S. Viswanadham as lead editor. There are six papers contributed in this part. Part 2 of the Issue is on contributed papers as edited by In-house Editors Dr. Ooi Teik Aun and Dr. Hanh Quang Le. The future Issues of the Journal will also have papers edited by Guest Editors on theme Issues and contributed papers on a wide range of topics which are of great interest to our Geotechnical Community in SE Asia and elsewhere.

The topics and the authors are adequately described in the Foreword. The reviewers are not named here. But most papers had more than two reviewers. Special thanks are extended to the Editors, authors and reviewers for their excellent work.

K. Y. Yong
N . Phienwej
T. A. Ooi
A. S. Balasubramaniam

GEOTECHNICAL ENGINEERING

SEPTEMBER 2014: SPECIAL ISSUE ON CENTRIFUGE MODELLING OF GEOTECHNICAL INFRASTRUCTURE

Editors: B.V.S. Viswanadham, Christophe Gaudin & Tom Schanz

TABLE OF CONTENTS

Geotechnical Engineering Journal of the SEAGS & AGSSEA Vol. 45 No.4 December 2014 ISSN 0046-5828

GEOTECHNICAL

ENGINEERING

Journal of the

SOUTHEAST ASIAN GEOTECHNICAL SOCIETY

&

ASSOCIATION OF GEOTECHNICAL SOCIETIES IN SOUTHEAST ASIA

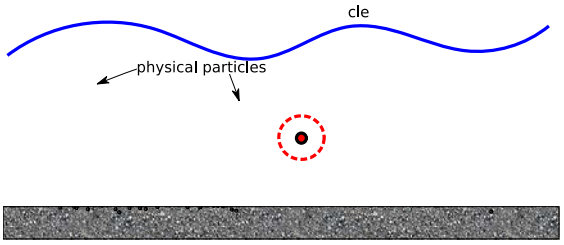
AGSSEA

Sponsored by

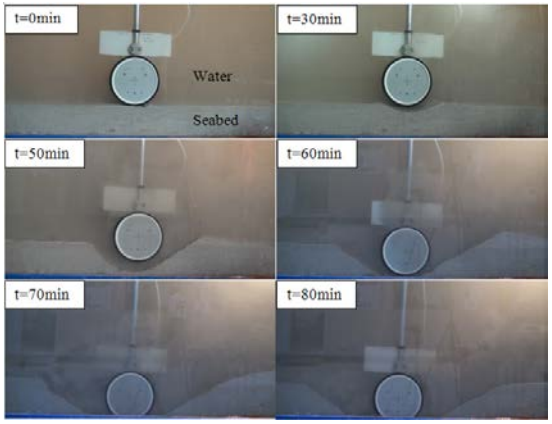
ASIAN INSTITUTE OF TECHNOLOGY

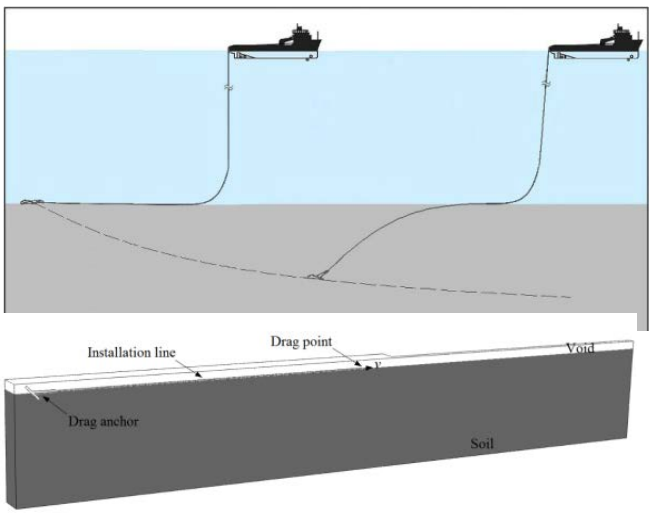
AIT Asian Institute of Technology

Editors: Shinji Sassa, Poul V. Lade, Li-zhong Wang, Y.K. Chow, Dong Sheng Jeng, Christophe Gaudin & Fuping Gao

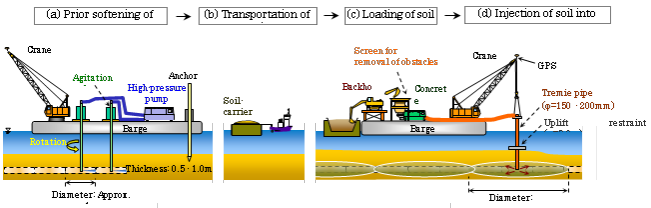


Computational representation of sand particles in the Eulerian -Lagrangian Modeling of coastal sediment transport (After Sun et al., 2014)





Sketch of the drag anchor installation and its FE model (After Liu and Zhao, 2014)



GEOTECHNICAL ENGINEERING

December-2014 Issue: Offshore and Coastal Geotechnics

Edited By Shinji Sassa, Poul V. Lade, Lizhong Wang, Yean K. Chow, Dong S. Jeng, Chiristophe Gaudin & Fuping Gao

Dr. Shinji Sassa

Dr. Shinji Sassa is Head of Soil Dynamics Group and Research Director of Asia-Pacific Center for Coastal Disaster Research (APaC-CDR) at Port and Airport Research Institute, Japan. He obtained his Dr. Eng. from Kyoto University. He is best known for his seminal works on wave-induced seabed liquefaction that have been extensively cited worldwide. His main research areas are Waterfront and Coastal Geotechnics, Subaqueous Sediment Gravity Flows and Ecological Geotechnics. These pioneer and address the multidisciplinary research encompassing Geotechnics, Hydraulic/Coastal Engineering, Geophysics and Ecology. He was an invited panelist, twice, at the 15th and 17th International Conference on Soil Mechanics and Geotechnical Engineering, ISSMGE. He has been a member of the International Geoscience Programme of United Nations Educational, Scientific and Cultural Organization on Submarine Mass Movements and Their Consequences, and served as a panelist leader at the UNESCO SMMTC conference in Kyoto 2011. He is also the Technical-Oversight-Committee nominated member of TC213 on Scour and Erosion of ISSMGE. He is the recipient of several distinguished awards, including the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, the Best Paper Award twice and the Best Technical Development Award from the Japanese Geotechnical Society and the Presidential Award from PARI. His selected papers have been published in the world-leading journals in the diverse fields of geotechnics, geophysics and ecology such as Géotechnique, Journal of Geophysical Research, Geophysical Research Letters and Marine Ecology Progress Series concerning liquefaction, sediment transport and geomorphodynamics, submarine landslides, and benthic ecology in estuarine, coastal and marine area.

Prof. Poul V. Lade

Dr. Poul V. Lade joined The Catholic University of America (CUA) in Washington, D.C. in 2003. He was educated at the Technical University of Denmark in Copenhagen and received his Ph.D. degree at University of California at Berkeley in 1972. Before coming to CUA, he was on the faculty at UCLA for 21 years (1972-1993) before moving to The Johns Hopkins University in Baltimore (1993-1999) and to Aalborg University in Denmark (1999-2003). He was a member of Geotechnical Engineering Technical Group in Los Angeles from 1974 and he served as chairman in 1978-79.

Professor Lade's research interests in Geomechanics include experimental methods, three-dimensional stress-strain and strength behavior of soils during monotonic loading and large three-dimensional stress reversals, stability, instability and liquefaction of granular materials, time effects in soils, constitutive modeling of frictional materials such as soil, rock, and concrete employing elasticity and work-hardening, isotropic and kinematic plasticity theories, and deformation and stability analyses of foundation engineering problems. He has given numerous conference presentations and short courses on stress-strain behavior and constitutive modeling of soils in North America, Europe, Asia, and Australia/New Zealand. He has nearly 300 publications based on research performed with support from the National Science Foundation (NSF) and from the Air Force Office of Scientific Research (AFOSR). His Science Citation Index is approximately 3000 and his H-index is currently 29.

Professor Lade is a member of several geotechnical engineering societies and he currently serves as Editor for the Americas of Geomechanics and Engineering (Techno Press, Korea), and he serves on the Editorial Boards of six other journals dealing with Geomechanics and Geotechnical Engineering. He was awarded "Professor Ostenfeld's Gold Medal for original contributions to engineering science research on behavior and constitutive modeling of soils" from the Technical University of Denmark in 2001, and he was elected member of the Danish Academy of Technical Sciences in 2001.

Prof. Li-zhong Wang

Prof. Lizhong Wang is a vice dean of Civil Engineering and Architecture College, Zhejiang university, China. He earned his Phd in Zhejiang University in 1995 and became a Professor in 2000. He was a visiting scholar in NGI in 2006. Prof. Lizhong Wang has been long engaged in the research on marine soil mechanics and marine geotechnology. His research includes the constitutive behavior of marine soils,offshore pipelines, mooring systems, subsea tunneling,seabed geohazards and offshore wind turbine foundations.

Prof. Lizhong Wang was granted the first prize in Scientific and Technological Progress Award of Chinese Universities in 2011(Rank No.1). His research achievements were successfully applied in more than 20 major projects both at home and abroad. He was granted one national invention patent and four utility patents. Besides, he participated in establishing standards and engineering design guide. He has published 108 Journal papers, including 34 SCI-indexed and 60 EI-indexed papers. His research achievements were recognized by the international peers and he was appointed as an international external evaluator in the joint project of Bangladesh and Norway.He organized International symposium of coastal & offshore geotechnics in 2012.

Prof. Y.K. Chow

Professor CHOW Yean Khow joined the National University of Singapore (NUS) as a in 1982 and became a Professor in 1999. Prior to joining NUS, he practised as an offshore geotechnical engineer with Fugro Limited (UK), mainly involved in the design and installation of offshore foundations in the North Sea. He served as the Head of the Division of Geotechnical and Transportation Engineering from 1995 to 1998. He was the Deputy Head (Administration) of the Department of Civil Engineering from 1998 to 2000. From 2000 to 2003, he was Vice-Dean (Graduate Studies) and from 2003 to May 2008 Vice-Dean (Academic Affairs & Graduate Studies) of the Faculty of Engineering. He is the Executive Director of the Centre for Offshore Research & Engineering (CORE) from July 2008.

Professor Chow's main research interests are in offshore foundation engineering, offshore pipelines/risers, computational geomechanics, soil-structure interaction, piles and piled raft foundations, and effects of construction activities such as deep excavations and tunnelling on pile foundations. He has published extensively, with over 200 technical publications including over 80 in international refereed journals. He is on Editorial Board of the following international journals: International Journal of Geomechanics (ASCE), Computers and Geotechnics (Elsevier), and Geomechanics and Geoengineering (Taylor & Francis). He is a member of the Board of Directors of the International Association for Computer Methods and Advances in Geomechanics. He is a Registered Professional Engineer (Civil) and a Specialist Professional Engineer in Geotechnical Engineering in Singapore. He has served as geotechnical consultant to numerous projects in Singapore and the region.

Prof. Dong Sheng Jeng

Prof. Dong Sheng Jeng is currently at Division of Civil Engineering, the School of Engineering, Physics and Mathematics, University of Dundee. He was educated in National Chung-Hsing University in Taiwan and received his Doctoral Degree from the University of Western Australia. Prof. Jeng was also at the Griffith University and University of Sydney before as a staff member. Prof. Jeng has been working in the area of offshore geotechnics since 1993. His most significant contributions have been in the field of coastal geotechnical engineering, specifically issues associated with wave–seabed–structure interaction (WSSI), which have a major bearing on the understanding and construction of coastal structures. He established the first analytical solutions for the inherent problems of WSSI in 3D short-crested wave systems and revised the conventional consolidation equation for anisotropic seabeds with variable permeability to obtain closed-form solutions. His 3D models allow the determination of wave-induced oscillatory liquefaction in front of breakwaters under obliquely incident wave; this represents the most dangerous condition and one that cannot be dealt with using either 1D or 2D models. My analytical solutions have been widely used for verifying numerical simulations and for determining wave surface profiles using measured pore pressure in marine sediments. These solutions were the basis of a major chapter in 'The mechanics of scour in the marine environment' (Chapter 10, Sumer & Fredsøe, 2002) and have been widely used by coastal engineers for the prediction of wave-induced oscillatory liquefaction around marine structures and the installation of *in situ* facilities.

Currently, Prof. Jeng and his students are working on the development of poro-elastoplastic models for post-liquefaction and densification in marine sediment under dynamic loadings (such as waves, currents and earthquakes etc.). This is also part of his current EU project—MERMAID (2012-2016). They are also establishing new conceptual model for pore pressure accumulations in marine sediment with instant cyclic shear stresses, unlike the existing models based on the maximum cyclic shear stresses.

Prof. Jeng has won a large number of competitive research grants in offshore and coastal geotechnics and has published in most of the leading Geotechnical Engineering and other journals; His journal publications exceed over one hundred.

Prof. Christophe Gaudin

Prof. Gaudin graduated with a Doctorate in Engineering Science from the Ecole Centrale de Nantes in November 2002. He subsequently joined the Centre for Offshore Foundation Systems (COFS) in July 2003 and was appointed as Manager of the UWA centrifuge facilities. He was promoted Research Professorial Fellow in 2009 and hold since the position of Deputy Director of COFS. His research interests cover offshore anchoring systems and shallow foundations, pipeline-soil interaction and similitude principles associated with centrifuge modelling, for which he has authored 90+ referred publications.

As manager of the UWA centrifuge facilities and a team of 8 technicians, Prof Gaudin has focused on establishing centrifuge modelling techniques as an essential tool to assist the offshore industry in developing and designing foundation solutions. He has built a strong relationship with the offshore industry, raising over $3.5M of research funding and producing 50+ consulting reports.

Since 2010, Prof. Gaudin is the Chair of the Technical Committee for Physical Modelling on Geotechnics (TC104) of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE), and the Chair of the 8th International Conference on Physical Modelling in Geotechnics to be held in Perth in 2014. His goals as TC Chair for the current term are notably to increase awareness of centrifuge modelling techniques and capabilities in the geotechnical engineering community, both in academia and industry, and to support the emergence of new centrifuge centres around the world.

Prof. Fuping Gao

Prof. Fuping Gao is a Principal Investigator at the Key Laboratory for Mechanics in Fluid Solid Coupling Systems (LMFS) and serving as the Director of Division of Science-Technology & Finance, Institute of Mechanics, CAS. He obtained his Master degree in Geotechnical Engineering from Beijing Jiaotong University, and PhD in Offshore Engineering Mechanics from Institute of Mechanics CAS. He was a visiting Research Assistant at Hong Kong University of Science and Technology (HKUST) in 2000; a Post-doctoral Research Fellow at the Griffith University, and the University of Western Australia (2001-2002).

His research activities involve offshore seabed/soil dynamics and fluid-structure-soil interaction modeling with applications in the offshore engineering, with recent focuses on stability analyses of submarine pipeline and riser systems, foundations for offshore renewable energy exploitation, etc. He serves as Vice Chair of the Technical Committee of Geotechnics of Soil Erosion, International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE), TPC member of the International Society of Offshore and Polar Engineering (ISOPE); also serves on the editorial board of the Journal of Hydrodynamics, Theoretical and Applied Mechanics Letters, Chinese Journal of Geotechnical Engineering.

SPECIAL FEATURE STORY ON "Challenges in the Design of Tall Building Foundations"
by Prof Harry G Poulos

Prof Harry G. Poulos

Harry Poulos obtained a Civil Engineering degree from the University of Sydney in 1961, and then went on to do a PhD degree in Soil Mechanics, graduating in 1965. He worked with the consulting firm of McDonald Wagner and Priddle for a year before joining joined the Department of Civil Engineering at Sydney University in 1965. He was appointed a Professor in 1982, a position which he held until his retirement in 2001. In 1989, he joined the consulting firm of Coffey Partners International, and is currently a Senior Principal with Coffey Geotechnics. He is also an Emeritus Professor at the University of Sydney, and an Adjunct Professor at the Hong Kong University of Science and Technology.

He has published books and technical papers on foundation settlements, pile foundations, and offshore geotechnics. His main research interests continue to be in deep foundations and their application to high-rise buildings, and to problems relating to ground movements near foundations.

He has been involved in a large number of major projects in Australia and overseas including the Docklands Project in Melbourne, the Crown tower development in Sydney, Egnatia Odos highway project in Greece, high-rise foundation problems in Hong Kong, the Emirates twin Towers in Dubai. the Burj Khalifa tower in Dubai, the Incheon 151 Tower in Korea, and the Dubai tower in Doha, Qatar.

He was elected a Fellow of the Australian Academy of Science in 1988 and a Fellow of The Australian Academy of Technological Sciences and Engineering in 1996, and in 1999 was made an Honorary Fellow of the Institution of Engineers Australia. In 2010, he was elected a Distinguished Member of the American Society of Civil Engineers, the first Australian to receive this honour, and in 2014, he was elected as a Foreign Member of the US National Academy of Engineering.

He has received a number of awards and prizes, including the Kevin Nash Gold Medal of the International Society of Soil Mechanics and Geotechnical Engineering in 2005. He was the Rankine Lecturer in 1989 and the Terzaghi Lecturer in 2004, and was selected as the Australian Civil Engineer of the Year for 2003 by the Institution of Engineers Australia. In 1993, he was made a Member of the Order of Australia for services to engineering.

GEOTECHNICAL ENGINEERING

Preface

The theme of the 2014 December issue is Offshore and Coastal Geotechnics. The guest editors for this special issue are Dr. Shinji Sassa at Port and Airport Research Institute, Japan, Prof. Poul V. Lade at The Catholic University of America, USA, Prof. Li-zhong Wang at Zhejiang University, China, Prof. Yean K. Chow at National University of Singapore, Prof. Dong Sheng Jeng at Griffith University, Australia, Prof. Christophe Gaudin at University of Western Australia and Prof. Fuping Gao at Chinese Academy of Sciences. Dr. Dariusz Wanatowski at The University of Nottingham Ningbo, China contributed to the editorial management. Prof. Bala as the Editor-in-Chief and Dr. Teik A. Ooi as the President of SEAGS strongly supported the launch of this special issue on Offshore and Coastal Geotechnics.

The topics and scope covered in this special issue are comprehensive and interdisciplinary, ranging from Offshore Foundations, Seabed Liquefaction, Scour and Erosion, Marine Slope Stability and Geotechnical Aspects of Dredging and Reclamation Works to Tsunami-Seabed-Structure Interaction. The issue is comprised of twelve papers with a selection of the authors from eight countries involving Asia, Australia, Europe and USA.

Sumer summarizes recent research advances in seabed liquefaction through the use of standard wave-flume tests and centrifuge wave-soil modelling and mathematical approaches together with their implications for the stability of marine structures. Sun et al. develops and validates a new hybrid Eulerian-Lagrangian modelling framework of coastal current-induced sediment transport and sand dune migration. Liu and Zhao presents a numerical study of the penetration mechanism and kinematic behaviour of the drag anchor in soils by performing a large deformation finite element analysis. Wang et al. describes and discusses the results of a series of specially designed water flume tests on the response of silty soils under the action of combined waves and currents. Luo et al. proposes a new pipeline stability analysis method that takes into account the three-dimensional scour and pipe sinkage that were observed in an innovative large experimental facility, named the O-tube. Kohan et al. describes an improved analytical method for accurately predicting the offshore spudcan extraction resistance in soft clay and validates the method against a large database of centrifuge model tests. Jostad et al. develops and validates a new finite element procedure that accounts for 3D cyclic undrained degradation of soils with its application to a foundation design of offshore structures. Monkul et al. proposes volumetric compressibility (m_v) as an indicator of liquefaction potential for sands and silty sands that are ubiquitous in offshore and coastal deposits on the basis of a series of isotropic compression and undrained triaxial tests. Lee et al. investigates the seismic responses of a gently sloped liquefiable sand deposit confined within parallel walls of different geometry using centrifuge modelling and assesses the wall effects in relieving the excess pore pressures and the lateral spreading. Chen et al. numerically investigates the pullout behaviour of circular plate in normally consolidated clay and presents a direct design method for obtaining the uplift capacity of a circular plate anchor embedded in soils with a linearly increasing shear strength. Kumagai et al. presents and validates a new restoration method of artificial tidal flats by use of pressure injection of slurry dredge clay through the combined use of laboratory and field experiments and the finite element analyses. Sassa reports some recent research advances on tsunami-seabed-structure interaction and discusses the stability assessment for the design of tsunami-resistant structures from geotechnical and hydrodynamic perspectives.

We consider that this special issue presents and illustrates the outcome of some of the state-of-the-art research on Offshore and Coastal Geotechnics, and hope that it will make an important contribution to this growing field in the years to come.

Shinji Sassa
Poul V. Lade
Lizhong Wang
Yean K. Chow
Dong S. Jeng
Christophe Gaudin
Fuping Gao

Acknowledgement

The Year 2014 had been very successful in many ways. We were very fortunate to have an excellent Issue in March 2014 as edited by Prof. Buddima Indraratna and A/P Cholachat Rujikiatkamjorn. Prof. Buddhima Indraratna is currently Professor of Civil Engineering at the Faculty of Engineering, University of Wollongong. Concurrently, Buddhima is also the Research Director, Centre for Geomechanics and Railway Engineering; Program Leader, ARC Centre of Excellence in Geotechnical Science and Engineering; and Node Coordinator, CRC for Rail Innovation. This June Issue on Deep Foundations as edited by Prof. Tatsunori Matsumoto, Prof. Jurgen Grabe and Prof. Der Wen Chang have thirteen excellent papers. The authors of the papers and the editors of the June Issue are to be congratulated for that master-piece of work. A growing number of contributed papers were received for the journal. As such the September 2014 Issue was in two parts; Part 1 is on Centrifuge based Physical Modelling with Prof. B. Viswanatham as lead editor. There are six papers contributed in this part. Part 2 of the Issue is on contributed papers as edited by In-house Editors Dr. Ooi Teik Aun and Dr. Hanh Quang Le. We have always been keen to have a Special Issue on Centrifuge based Physical modelling. This December Issue on Offshore and Coastal Geotechnics is edited by Prof Shinji Sassa, Prof Poul V. Lade, Prof Lizhong Wang, Prof Yean K. Chow, Prof Dong S. Jeng, Prof Chiristophe Gaudin and Prof Fuping Gao. A Feature Story on "Challenges in the Design of Tall Building Foundations" by Prof Harry G. Poulos is also included for the first time in the Journal.

The Authors of the March 2014 Issue are from: Tokyo University of Science; University of Tokyo; Hokkaido Shinkansen Construction Bureau in Japan; University of Wollongong; Herriot-Watt University in UK; University of Technology Sydney; Geosyntec Consultants, Kennesaw; University of Wisconsin-Madison; Hokkaido University, Hokubu Consultants in Tokyo; University of Texas at Austin; National Highway Authority in Pakistan; Norwegian Public Roads Administration; Suranaree University of Technology in Thailand; Federal University of Rio de Janeiro, Brazil; Fluminense Federal University in Brazil; Fugro In-situ Geotechnica, Brazil; Smoltczky Partner, Germany; Indian Institute of Science, Bangalore in India;

The authors of the June Issue are from: University of Stuttgart, Germany; DB ProjectBau GmbH, Hannover, Germany; Hamburg University of Technology, Germany; HAMC University of Architecture, Vietnam; Kanazawa Graduate School of natural Science & Technology, Japan; South Vietnam Bridge Road Building Institute in Vietnam; Takanaka Corporation in Japan; Middle-East Technical University in Turkey; National Central University, Taiwan; National Tamkang University Taiwan; Hiroshima University in Japan; Nagoya Institute of Technology in Japan; University of Kassel, Germany; Technical University of Darmstart, Germany;

September 2014 Issue Authors are from: Tokyo University of Technology; Port and Airport Research Institute of Japan; Ruhr University of Bochum, Germany; Husker Geosynthetics GmbH, Gescher, Germany; Kyoto University, Japan; IFSTTAR at Nantes in France; IIT Bombay in India; NTPC Limited, Noida in India; National Institute of Ocean Technology, Chennai, in India; University of Transport & Communication, Vietnam; National Kaohsiung University of Applied Sciences, Taiwan; University of Lyon, France; Grenoble Alpes University, France; Polytecnico di Torino, Italy; Hanoi University of Mining & Geology, Vietnam; Ecole des Ponts Paris Tech, France; Nanyang Technological University, Singapore.

The December 2014 Issues have authors from: 1: Technical University of Denmark, Virginia Tech, Blacksburg, USA; Karlsruhe Institute of Technology Tianjin University, China; Chinese Academy of Sciences, China; University of Western Australia, Perth, Australia, Norwegian Geotechnical Institute, Norwegian University for Science and Technology, NTNU, Trondheim, Norway NGI Inc., Houston, Texas, USA; GS Engineering & Construction Corp., Seoul, South Korea; Yeditepe University, Istanbul, Turkey; The Catholic University of America, USA; Istanbul Technical University, Turkey; National Central University, Jhongli City, Taiwan, National University of Singapore; Fugro Singapore Pte Ltd, Singapore; Hiroshima University, Japan; Port and Airport Research Institute, Yokosuka,Japan

We have had remarkable Guest Editors since 2011. They all have done excellent job and so are the 2014 Issues. The Preface is excellent and Dr. Shinji Sassa and the co-editors are thanked for all their contributions and also summarised contents of the papers. This Issue and others in 2014 will be of great use to our Geotechnical Community in SE Asia and elsewhere.

Additionally, an attempt is made to have Feature Stories in the Issues starting with December 2014 Issue. These feature stories are to be written by invited authors as drawn from our international community with extensive and authoritative experience. Prof. Harry G Poulos accepted our invitation to have an article in the December 2014 Issue. This is to be followed by Prof. Robert Mair of Cambridge University on "Geotechnical Challenges encountered in the London Metropolitan Subway System", followed by Prof. Ikuo Towhata on "Coping with the Natural Hazards, Challenges in Japan and elsewhere". The subsequent one is by Dr. John Endicott of his "Decades of experience in Major Projects in Hong and Singapore". Prof. Harry G Poulos is thanked for helping to start this feature stories in our journal.

K. Y. Yong
N . Phienwej
T. A. Ooi
A. S. Balasubramaniam

Geotechnical Engineering Journal of the SEAGS & AGSSEA Vol. 45 No.4 December 2014 ISSN 0046-5828

GEOTECHNICAL ENGINEERING

DECEMBER 2014: SPECIAL ISSUE ON Offshore and Coastal Geotechnics

Editors: Shinji Sassa, Poul V. Lade, Lizhong Wang, Yean K. Chow, Dong S. Jeng, Chiristophe Gaudin & Fuping Gao

TABLE OF CONTENTS