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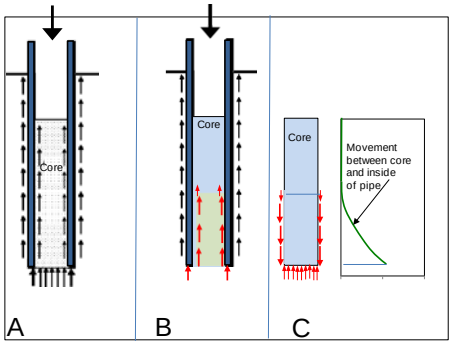
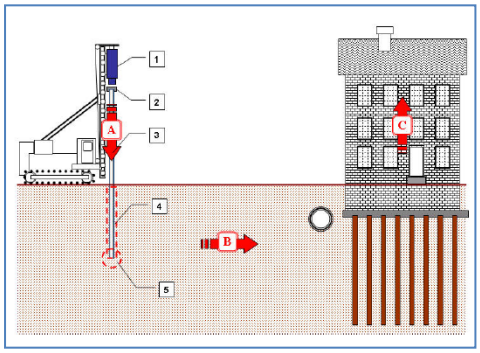
Editors: San-Shyan Lin, Charng Hsein Juang, and Robert Liang

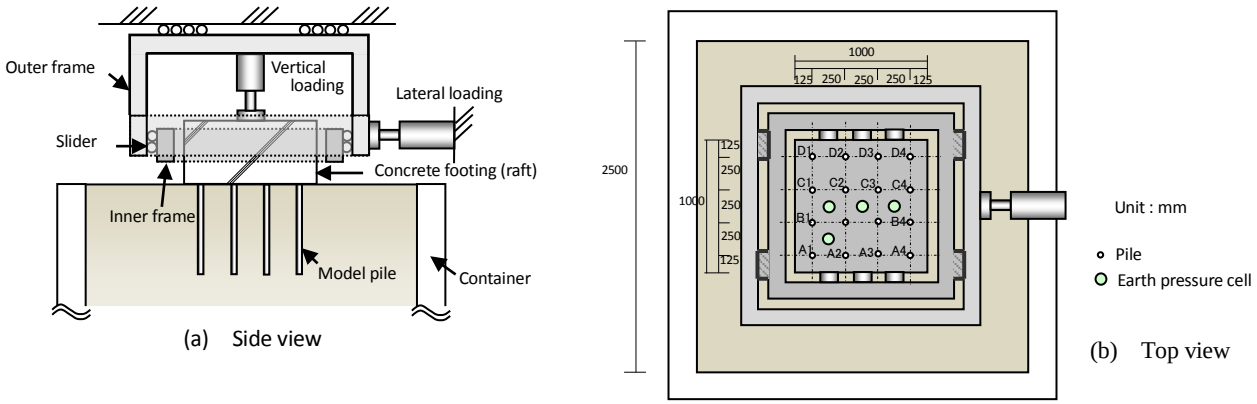


Advancing an open-toe pipe pile
(After Fellenius 2015)



Propagation of stress wave from impact hammer
(After Massarsch and Fellenius 2015)

75 MN pile loading test
(After Lin et al. 2015)



Model Pile Testing Setup (after Hamada et al. 2015)

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June-2015 Issue: Pile Foundation
Edited By San-Shyan Lin, Charng Hsien Juang and Robert Liang

Prof. San-Shyan Lin

Professor Lin is a Professor at Department of Harbor and River Engineering of National Taiwan Ocean University in Taiwan. He received his Ph.D. degree in Civil Engineering from Washington University in St. Louis, Missouri USA in 1992. Dr. Lin was an engineer at Taiwan Area National Expressway Engineering Bureau from 1992 to 1994. Prof. Lin's research and practical experiences have dealt with drilled shaft foundations, earth reinforced structures and effects of scouring on bridge foundations. Prof. Lin has published more than 110 peer-reviewed journal papers and conference papers. In 2012, Prof. Lin served as chairman of organization committee of 5th Taiwan-Japan workshop of earthquake and heavy rainfall held in Tainan, Taiwan; member of international organizing committee of 7th Asian young geotechnical engineer conference held in Tokushima, Japan; and member of both international advisory committee and technical committee of Geosynthetics Asia 2012 in Bangkok, Thailand. Prof. Lin is currently serving as the member of conference advisory committee of 18th Southeast Asian Geotechnical Conference and member of international advisory committee of International Symposium on Advances in Foundation Engineering. In addition, Prof. Lin is serving as the President of Taiwan Geotechnical Society and the CEO of Sino-Geotechnics Research and Development Foundation in Taiwan. Prof. Lin also served TRB A2K03 Committee on Foundations of Bridges and Other Structures between 1995 and 2004 and serves as a member on the editorial boards for four major international journals in geotechnical engineering.

Prof. Charng Hsein Juang

Dr. Juang received his Ph.D. degree in Civil Engineering from Purdue University in 1981. He joined the faculty of Clemson University in 1982 and has been with Clemson University ever since. Dr. Juang has a broad research interest in the field of geotechnical engineering. His past research work dealt with slope stability, soil-buried pipes interaction, soil and rock properties, pile foundations, fuzzy sets and uncertainty modeling in geotechnical engineering. His current research work deals with liquefaction, site characterization, braced excavation, reliability and probabilistic methods in geotechnical engineering, and fuzzy and neural network applications in geotechnical engineering.
Dr. Juang has received a number of awards and honors. He was proud to be selected by his students through Chi Epsilon for Outstanding Teacher Award in 1985. Among his awards and honors are the Outstanding Research Paper Award by the Chinese Institute of Civil and Hydraulic Engineering (1976), the TK Hseih Award by the Institution of Civil Engineers of the United Kingdom (2001), the Clemson University Board of Trustees Award for Faculty Excellence (2002), election to ASCE Fellow (2007), and appointment to Chair Professor at National Central University, Taiwan.
His professional services include:

- Chair, ASCE/GI Committee on Risk Assessment and Management (2009-2012); Secretary, (2003-2009); Member (1993-present)
- Co-Editor in Chief, Engineering Geology (2012-present)
- Associate Editor & Editorial Board Member, ASCE Journal of Geotechnical and Geoenvironmental Engineering (2004-2012)
- Editorial Board, Journal of GeoEngineering (2006-present)
- Editorial Board, Georisk (2009-present)
- Conference Chair, ASCE Geo Institute Specialty Conference, GeoRisk 2011, Geotechnical Risk Assessment and Management, Atlanta, June 26-28, 2011.

Prof. Robert Liang

Dr. Robert Liang holds a title of University Distinguished Professor in the Department of Civil Engineering at the University of Akron. He also serves as the Director for the Center for Infrastructure Materials and Rehabilitation. Since receiving his Ph.D. in 1985 from the University of California in Berkeley, Dr. Liang has been with the University of Akron. From 1994 to 2000, he served as Civil Engineering Department Chair. Dr. Liang has conducted research in areas such as geotechnical engineering, pavement engineering, and infrastructure materials and rehabilitation technologies. His research has resulted in more than 300 journal and conference papers, with practical impacts on design and construction practices. Dr. Liang is active in ASCE (American Society of Civil Engineers), TRB (Transportation Research Board), and DFI (Deep Foundation Institute) committee works. He serves as associate editor for the ASCE's Journal of Engineering Mechanics and Journal of Geotechnical and Geoenvironmental Engineering. Currently, he is on the editorial board for several international journals, such as Georisk, and Journal of GeoEngineering. Dr. Liang received Wendell R. Ladue award from ASCE Akron-Canton Section for his outstanding contributions to the profession. He also received Louis Hill award from College of Engineering in recognition of his exemplary achievements in both research and teaching. He received outstanding service award from the Great Lakes Geotechnical and Geoenvironmental Engineering Organization for his service as the president of the organization. In recognition of his contributions to civil engineering, Dr. Liang was elected to Fellow of ASCE in 2009.

Prof Ikuo Towhata
President, Japanese Geotechnical Society (2014-2016)
Vice President for Asia, International Society for Soil Mechanics and Geotechnical Engineering (2009-2017)

SPECIAL FEATURE STORY ON "Liquefaction Problems in the 21st Century"

by Prof Ikuo Towhata

Prof Ikuo Towhata

Prof Ikuo Towhata obtained his Bachelor of Engineering degree from the University of Tokyo in 1977. He obtained his Master of Engineering and Doctor of Engineering in 1979 and 1982 respectively from the same university. In 1985 he was Assistant Professor at the Asian Institute of Technology in Bangkok and in 1986 as Associate Professor at Chulalongkorn University in Bangkok. He returned to work in Tokyo University as an Associate Professor in 1987. In 1989 he was Associate research fellow at PWRI Ministry of Construction. He was Professor at Tokyo University from 1994 to 2014 and since 2015 he is Visiting Professor at Kanto Gakuin University, Department of Civil Engineering Yokohama Tokyo Japan. Professor Towhata has 32 years of research experience and his special areas of interest are Deformation characteristics of cohesionless soils; Dynamic analysis of earth structures during earthquakes; Permanent displacement of ground caused by seismic liquefaction; Soil improvement by densification and grouting; Stability of seabed in static and dynamic manners; Thermal effects on mechanical behavior of clays; Microscopic Observation of Granular Behavior of Sand Subjected to Shear; Dynamics of landslide and debris flow. Professor Towhata is active in public service and was Board member of Japanese Geotechnical Society for two terms; Board member of Japan Association for Earthquake Engineering for one term; Board member of Japan Landslide Society for two terms; Chairman of Editing Committee of Soils and Foundations Journal, the Japanese Geotechnical Society in 2005-2008; Chairman of Geotechnical Committee, Japan Society for Civil Engineers in 2007-2008; Vice President, Japan Association for Earthquake Engineering in June 2009-May 2011; President, Japanese Geotechnical Society in 2014-2016; Appointed Board Member and then Vice President for Asia, International Society for Soil Mechanics and Geotechnical Engineering in 2009-2017; Associate Member of Science Council Japan in 2014-2020. He is currently Member of the Japanese Geotechnical Society; Member of the Southeast Asian Geotechnical Society; Member of the International Society of Soil Mechanics and Geotechnical Engineering; Fellow member of the Japan Society of Civil Engineers and Member of the Japan Association for Earthquake Engineering. Professor Towhata has been invited to deliver Keynote Lectures and Special Lectures in many international conferences. He has published more than 600 papers and has published many books notably:

Towhata, I. (1999). Air photographs of the Niigata city immediately after the earthquake in 1964, Japanese Geotechnical Society, ISBN4-88644-054-1.

Towhata, I. (2008) Geotechnical Earthquake Engineering, ISBN 978-3-540-35782-7, pringer Verlag-Berlin Heidelberg.

Towhata, I. and Jiang, Y.-J., 2010. Geotechnical Aspects of 2008 Wenchuan earthquake, China, Chapter 8, Advances in Earthquake Geotechnical Engineering, Springer.

Professor Towhata has won many awards and among them the Japanese Geotechnical Society; Technological Development Award in 2015; Japan Society of Civil Engineers; Best book publication award in 2009; Japanese Geotechnical Society, Award for the Best Paper of the Year 2003; 2004 and the best twelve papers out of 600 at GeoEng2000 Conference at Melbourne in 2000

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PREFACE

The theme of the 2015 June issue is Pile Foundations. The guest editors for this special issue are Professor San-Shyan Lin at National Taiwan Ocean University, Taiwan, Prof. Charng Hsein Juang at Clemson University, USA, and Prof. Robert Liang at Akron University, USA contributed to the editorial management. Prof. A.S. Balasubramaniam as the Editor-in-Chief and Dr. Teik Aun Ooi as the President of SEAGS strongly supported the launch of this special issue on Pile Foundations.

The topics and scope covered in this special issue are comprehensive and interdisciplinary, ranging from back-analysis of pile load test, piled-raft analysis, ground vibration caused by impact pile driving, analysis of bi-direction-cell test, effect of aging on barrette pile, comparison on dynamic response of a single pile using different approaches, response of "plug" in open-toe pipe pile, effect of toe grouting of IGM socketed drilled shaft, reliability-based design on foundation and ultimate resistance of drilled shaft by probabilistic approach. The issue is comprised of twelve papers with a selection of the authors from seven countries involving Canada, Japan, Lebanon, Sweden, Taiwan, Thailand and USA.

Niazi and Mayne develops new sets of shear stiffness reduction curves from the back-analyses of 299 static axial pile load tests from 61 sites towards the implementation of a non-linear load-displacement response method for pile foundations. Subsequently, the elastic continuum solution is exploited by them to present a methodology for drawing the stiffness reduction curves as functions of depth. These curves are further utilized in modeling the pile as a stack of smaller shaft segments embedded in multi-layered soils. Hamada et al. presents static cyclic lateral loading tests on large-scale piled raft foundations carried out to investigate the influence of vertical load and pile spacing ratios during earthquakes. Yamashita et al. applies and modifies the simple method proposed by Clancy and Randolph (1996) on piled raft analysis. Four case histories in Japan are examined through comparisons with the field monitoring results. Massarsch and Fellenius describe the application of the Swedish standard which regulates permissible ground vibrations caused by driving of piles, sheet piles, or ground compaction. Fellenius explains how to use the bidirectional-cell test data on a pile to establish the load distribution for the pile, which enabled determining the distribution of the effective-stress beta-coefficients for the pile response Teparaksa presents testing process and discusses the result of different barrette pile static load tests, especially on aging effect on pile capacity. Lu and Chang presents a case study on dynamic behaviors of coal ash soils obtained in a landfilled field in north Taiwan and also the dynamic interaction of a single pile foundation sitting in the landfills. Fellenius recommends how to analyze the response of an open-toe pile. A comparison is also provided between the results of a simulated static loading test on a closed-toe and an open-toe pipe pile. Lin et al. presents the axial performance of two heavily instrumented drilled shafts, with and without toe grouting, socket in intermediate geomaterials in Taipei city. Abdallah et al. presents the results of a comprehensive investigation that is conducted to study the effect of choosing different proof-load test programs on the reliability of piles. Luo et al. evaluates and compares existing probabilistic approaches for determining the ultimate resistance of drilled shafts in sands considering the spatial variability of soil properties.

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

San-Shyan Lin
Charng Hsein Juang
Robert Liang

ACKNOWLEDGEMENT

The lead editor of the June 2015 Issue on Piled Foundation is Prof. San Shyan Lin with team members Prof. Charng Hsein Juang and Prof. Robert Liang. Prof. San Shyan Lin is of immense help to the SEAGS-AGSSEA Journal as a Member of the Team of Editor in Chief. It is worthy to mention that the Taiwan Geotechnical Society is the most active supporter of all SEAGS-AGSSEA activities including the Journal. There were many Issues of the Journal editted by members of CTGS (Chinese Taipei Geotechnical Society). They also contribute many articles and this is a most welcome culture which should be a model example to follow by other AGSSEA member countries. Gradually, we have been very successful in engaging members of AGSSEA to contribute to the journal and take much of the responsibility in contributing articles, engaged in reviewing and other aspects related to the journal. The country issues in 2016 and the Anniversary Issues in 2017 will further enhance the success in the active participation of AGSSEA members in the journal.

In the preface , Prof. San Shyan Lin and his team has already covered adequately the contents of the papers from an international set of prestigious authors and all articles were also reviewed by experts in the field. Details of the reviewers will be assembled in the December Issue for all the articles published in 2015. SEAGS-AGSSEA Journal is always very practice oriented and this well reflected in the contributions contained in this issue as well.

There are twelve excellent papers written by well known authors from : USA, Japan, Sweden, Canada, Thailand, Taiwan and other countries. No doubt, this Issue will be most useful to our Profession and all those who are engaged in Pile Foundation Research and Practice. Sincere thanks to all who have contributed to the success of this issue of our journal under the able leadership of Prof. San Shyan Lin

We are grateful to Professor Ikuo Towhata for his contribution of Special Feature Story on “Liquefaction Problems in the 21st Century” in this issue**.**

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

GEOTECHNICAL ENGINEERING

JUNE 2015: SPECIAL ISSUE ON PILE FOUNDATIONS

Editors: San-Shyan Lin, Charng Hsein Juang, and Robert Liang

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