

Acknowledgements

Conference Papers

Author Index

Search

Sponsors

Exhibitors

Copyright

Technical Support

PBD-III Vancouver 2017

3rd International Conference on Performance-based Design in Earthquake Geotechnical Engineering

The papers in these proceedings were prepared for presentation at the 3rd International Conference on Performance-based Design in Earthquake Geotechnical Engineering (PBD-III Vancouver 2017) in Vancouver, British Columbia, Canada, from July 16-19, 2017. The PBD-III Vancouver 2017 Conference was organized under the auspices of the International Society of Soil Mechanics and Geotechnical Engineering – Technical Committee TC203 on Earthquake Geotechnical Engineering and Associated Problems (ISSMGE-TC203). The PBD-I and PBD-II events in Japan (2009) and Italy (2012), respectively, were highly successful events for the international earthquake geotechnical engineering community. The PBD events have been excellent companions to the International Conference on Earthquake Geotechnical Engineering (ICEGE) series that TC203 has held in Japan (1995), Portugal (1999), USA (2004), Greece (2007), Chile (2011), and New Zealand (2015).

Upon completion of the review process, papers were accepted for the conference technical sessions, and in turn, for publication in the proceedings herein. The proceedings committee received over 442 abstracts leading to the 238 papers accepted for publication in the Proceedings. Technical sessions included keynote presentations, invited lectures, presentations of individual papers, and panel discussions on emerging issues. The accepted papers covered a broad range of themes related to the science and practice of earthquake geotechnical engineering and the advancement of performance-based design principles.

We are grateful to all the authors for their contributions to the proceedings, their responsiveness to reviewer comments, and their patience throughout the review processes. We believe your contributions will prove a valuable resource to practitioners, researchers, and students alike throughout our international community of geoprofessionals.

Mahdi Taiebat, Ph.D., P.Eng. University of British Columbia, Canada Chair, Technical Proceedings Committee

Dharma Wijewickreme, Ph.D., P.Eng. University of British Columbia, Canada

Adda Athanasopoulos-Zekkos, Ph.D. University of Michigan, USA

Ross W. Boulanger, Ph.D., P.E. University of California at Davis, USA













Acknowledgements

Conference Papers

Author Index

Search

Sponsors

Exhibitors

Copyright

Technical Support

Acknowledgements

The PBD-III Conference Steering Committee included:

Conference Co-chairs

Ross W. Boulanger, University of California at Davis Dharma Wijewickreme, University of British Columbia

Technical Program Committee

Ross W. Boulanger, University of California at Davis Jonathan D. Bray, University of California at Berkeley Atilla Ansal, Ozyegin University, Turkey I.M. Idriss, University of California at Davis Takaji Kokusho, formerly Chuo University, Japan Dharma Wijewickreme, University of British Columbia

Technical Proceedings Committee

Mahdi Taiebat, University of British Columbia Dharma Wijewickreme, University of British Columbia Adda Athanasopoulos-Zekkos, University of Michigan Ross W. Boulanger, University of California at Davis

Local Organizing Committee

Ali Amini, Naesgaard-Amini Geotechnical, North Vancouver W.D. Liam Finn, University of British Columbia Adrian Wightman, BGC Engineering, Vancouver Alex Sy, Klohn Crippen Berger, Vancouver

The abstract and paper review process was made possible by the dedicated contributions of numerous individuals:

Stream Coordinators

Ross Boulanger Lijun Deng Ernest Naesgaard
Jonathan Bray Kevin Franke Mahdi Taiebat
Craig Davis Jim Gingery Dan Wilson
Jason DeJong Jack Montgomery Adda Zekkos

Reviewers

Mark Stringer Sam Abbaszadeh Christine Goulet Andrew Makdisi Lee Martin Sean Ahdi Russell Green Mark Styler Abdullah Almutairi Rambod Hadidi Armin Masroor John Sully Ali Amini Manny Hakhamaneshi Brett Maurer Alex Sy Atilla Anasal Junji Hamada Paul Mayne Mahdi Taiebat Donald Anderson Bill Hansmire John McCartney Takefumi Takuma Ron Andrus Youssef Hashash Christopher McGann S. Thevanayagam Richard Armstrong Bipul Hawlader Mike Mehrain **Howard Thomas** Domniki Asimaki Joe Heavin Kami Mohammadi Tetsuo Tobita Georgios Athanasopoulos George Hu Gonzalo Montalva Joe Tom Jr. Ali Azizian Jianping Hu Jack Montgomery Thaleia Travasarou Ariya Balakrishnan Fiona Hughes Robb Moss Kasgin Banab Ramin Motamed Kai-Sing Hui Andres Barrero Daniel Hutabarat Diane Moug Mike Beaty Koji Ichii Sean Munter Christine Beyzaei Frederick Jackson Ernie Naesgaard Michael Boone Chao Kang Charles Ng Ross Boulanger Tadashi Kawai Hamidreza Nouri Scott Brandenberg Amir Kaynia Michael Olsen Richard Kelly Rolando Orense Jon Bray Tom O'Rourke Ronald Brinkgreve Ali Khosravi Ashly Cabas Mohammad Khosravi Farhang Ostadan Arash Khosravifar Bishnu Pandey Phoebe Cheng Brady Cox Peter Kirkwood Gislaine Pardo Ender Parra Behrang Dadfar Tadahiro Kishida Karina Dahl Jonathan Knappett Nick Paull Kate Darby Katsuhiko Koizumi Mick Pender Shideh Dashti Takaji Kokusho Adam Price Craig Davis Mandy Korff Amin Rahmani Ellen Rathje Lijun Deng Rallis Kourkoulis Ashutosh Dhar Chris Krage Deepak Rayamajhi Andrew Dinsick Steve Kramer Mohammad Rayhani Jennifer Donahue Mike Reimer Henrik Kristiansen Hesham El Naggar Adrian Rodriguez-Marek Dong Youp Kwak **Turgut Ersoy** Oh-Sung Kwon Cassandra Rutherford Elnaz Esmaeilzadeh Christian Ledezma Abouzar Sadrekarimi Michael Fraser Anne Lemnitzer James Schneider Sarah Gaib Erin Leung Gaziz Seidalinov Sivapalan Gajan Brian Shams Liyun Li Vahid Galavi Weidong Li Lisheng Shao Estefan Garcia Abbie Liel Keshab Sharma Andreas Gavras Wang Lin Jian Shi Fani Gelagoti **Bret Lingwall** Masahiro Shinoda Mason Ghafghazi Jinyuan Liu Sonny Singha Majid Ghayoomi Tong Liu David Siu Kumar Sriskandakumar Andreas Giannakogiorgos Weian Liu Donald Gillespie Jerry Luo Kevin Stanton Jonathan Stewart Michael Gomez Jorge Macedo

The conference organizers would also like to express appreciation to Wayne Gibson, Lisa McJunkin and Emily Fournier of Gibson Group Management Inc. for their expert support in all aspects of the conference, technical program, and these proceedings.











Chi-Chin Tsai

Kyohei Ueda

Vasiliki Tsaparli

Yoshimichi Tsukamoto

Uthaya Uthayakumar

Ryosuke Uzuoka

Shahriar Vahdani

Mathilde Vernay

Kazue Wakamatsu

Lalinda Weerasekara

Douglas Wallis

James Wetherill

Patrick Wilson

Clinton Wood

Li Yan

Dan Yang

Zia Zafir

Adrian Wightman

Liam Wotherspoon

Susumu Yasuda

Samuel Yniesta

Saman Zarnani

Dimitrios Zekkos

Mustapha Zergoun

Adda Zekkos

Barry Zheng

Yanguo Zhou

Youwei Zhou

Paolo Zimmaro

Vasiliki Zontanou

Katerina Ziotopoulou

Nozomu Yoshida

Doug Wahl

Rui Wang

Joe Weber

ISSMGE Technical Committee TC203 on Earthquake Geotechnical Engineering Copyright @ 2017. All Rights Reserved.



Acknowledgements

Conference Papers

Author Index

Search

Sponsors

Exhibitors

Copyright

Technical Support

Conference Sponsors

We appreciate the generous support of our PBD-III 2017 Vancouver sponsors.

Platinum Sponsors











Gold Sponsors







Silver Sponsor



Bronze Sponsor



Coffee Break Sponsor



Electronic Proceedings on USB



Lanyard Sponsor



Lunch Sponsor













ISSMGE Technical Committee TC203 on Earthquake Geotechnical Engineering Copyright © 2017. All Rights Reserved.

X-CD Technologies Inc.



Acknowledgements

Conference Papers

Author Index

Search

Sponsors

Exhibitors

Copyright

Technical Support

Conference Exhibitors

We would like to recognize the participation our PBD-III 2017 Vancouver exhibitors.

ConeTec Investigations Ltd.

Foundex Explorations Ltd.

General Incorporated Association FLIP Consortium

GEO-SLOPE International

GeoStabilization International

Geotech Drilling Services Ltd. / Gregg Drilling and Testing Canada Ltd.

Itasca Consulting Group Inc.

Keller Canada

Menard Canada Inc.

Mobile Augers and Research Ltd.

Mud Bay Drilling (2015) Ltd.

Plaxis Americas LLC

Poly-Mor Canada Inc.

SPONSORING Organizations









ISSMGE Technical Committee TC203 on Earthquake Geotechnical Engineering Copyright © 2017. All Rights Reserved.

X-CD Technologies Inc.



Acknowledgements

Conference Papers

Author Index

Search

Sponsors

Exhibitors

Copyright

Technical Support

Copyright and Disclaimer

All authors have granted and assigned the right to publish their submission(s) in the electronic conference proceedings of the 3rd International Conference on Performance-based Design in Earthquake Geotechnical Engineering – PBD-III Vancouver 2017. In assigning these rights and permissions to the conference, copyright for the paper remains with the author(s).

These proceedings are derived from contributed content that was prepared using a variety of computer software and operating systems. While care was taken to ensure the accurate processing and assembly of this content, it is possible that errors may have been introduced during processing and assembly and we do not warrant the reliability of these proceedings and regret any inconvenience these errors may cause. We also do not warrant or endorse the technical content of the papers and the opinions expressed by the authors.

This product was produced for PBD-III Vancouver 2017 and the International Society for Soil Mechanics and Geotechnical Engineering's Technical Committee TC203 on Earthquake Geotechnical Engineering (ISSMGE-TC203) by Gibson Group Management Inc. (GGMI) and X-CD Technologies Inc. (X-CD). Duplication of this product and its contents in print or digital form for the purpose of sharing with others is prohibited without permission from ISSMGE-TC203.

In no event will PBD-III Vancouver 2017, ISSMGE-TC2013, GGMI, X-CD or its suppliers be liable for any consequential or incidental damages to your hardware or other software resulting from the installation and/or use of this product.

No part of the product navigation and "Help" files may be reproduced or used without written permission from X-CD.











ISSMGE Technical Committee TC203 on Earthquake Geotechnical Engineering Copyright © 2017. All Rights Reserved.

X-CD Technologies Inc.