



## A GEOTECHNICAL DISCOVERY DOWN UNDER

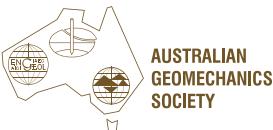
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### Proceedings of 20th International Conference on Soil Mechanics and Geotechnical Engineering

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# Proceedings of 20th International Conference on Soil Mechanics and Geotechnical Engineering

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AUSTRALIAN GEOMECHANICS SOCIETY



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## Preface

It was with great delight that, after having bid to host the International Conference on Soil Mechanics and Geotechnical Engineering (ICSMGE) on six separate occasions, the first being in 1965, that the ISSMGE Council in Seoul in 2017 voted for the Australian Geomechanics Society (AGS) to host the 20th ICSMGE in Sydney in September 2021. Unfortunately, due to the coronavirus (COVID-19) pandemic, that caused enormous global suffering and disruption to economic activities and travel, the Conference Organising Committee (COC), in consultation with the ISSMGE President and Board, made the decision to postpone the 20th ICSMGE to May 2022. In addition, and as a consequence, the Conference pivoted from the traditional, in-person format to a hybrid mode which, for the first time in the ISSMGE's history, involved both in-person and virtual attendees. While international travel was significantly hampered by COVID-19, pivoting to a hybrid conference opened new opportunities for global engagement.

The format of the hybrid conference follows the structure adopted since the 18th ICSMGE in Paris in 2013 and the 19th ICSMGE in Seoul in 2017, where the concurrent sessions are associated with the ISSMGE's Technical Committees (TCs). In 2022, the ISSMGE incorporates 37 TCs and 90 Member Societies (MSs). As per the ISSMGE Statutes, the ICSMGE papers are managed by the MSs, who are each allocated a set number of papers, depending on a formula. The papers were reviewed by several generous volunteers from each of the MSs, and their names are listed later in this volume. The COC and ISSMGE Board are grateful to the MSs, their volunteers, and the TCs for their help in making the 20th ICSMGE a success.

Early on in the planning of the 20th ICSMGE, the COC made the decision to increase the page limit for general papers to 6 pages, which for many decades had been set at 4 pages. This was done to enable authors to provide greater detail in their papers. These proceedings are arranged in three volumes. The first contains all 18 of the keynote and invited papers. This, the second volume, contains 887 general papers from 70 countries. They have each been allocated to their respective TCs, and are arranged in numerical order of the TCs.

The third and final volume incorporates Honour Lectures, and ISSMGE post-conference papers, and will be available a few months after the conference concludes. Consistent with ISSMGE practice, all papers within these proceedings will also be available a few months after the conference concludes, from the ISSMGE's website.

These proceedings would not have been possible but for the extensive work of Robin Lehane, who checked each paper and amended a large number to ensure that each conformed with the conference paper template. Robin's efforts are gratefully acknowledged. The editors would also like to thank Hugo Acosta Martinez for his very helpful advice, and Major Graphics Printers, who assembled the proceedings. Finally, we thank all authors for their patience and efforts in preparing the papers that are contained within this volume.

We are sure that you'll find great value from the wealth of information contained within these proceedings, and we commend them to you.

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Investigation of ground settlement due to dissipation of excess pore water pressure after liquefaction <i>B. Bahari &amp; T.-H. Kim</i>	1813
A numerical analysis of reverse fault rupture-suction caisson interaction <i>V. Papavasileiou, A. Barari &amp; L. Bo Ibsen</i>	1819
Liquefaction risk analysis of reclaimed soil deposits in central Wellington <i>C. Cappellaro, M. Cubrinovski &amp; R. Dhakal</i>	1825
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Sample reconstitution for evaluating the cyclic liquefaction resistance of iron ore tailings <i>P. Coelho, D. Camacho, F. Gobbi &amp; L. Santos</i>	1861
A vector-IM based fragility model for man-made earth slopes subject to seismic shaking <i>W. Du, W. Wang &amp; D.-Q. Li</i>	1867
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Microscale simulations of the seismic response of flexible retaining walls <i>U. El-Shamy &amp; S. Sizkow</i>	1877
Seismic analysis of rock tunnels: a parametric analysis <i>A. Salem O. Ezzeldine &amp; M. Amer</i>	1881

Deterministic assessment and numerical simulations of buckling instability of piles in liquefiable ground <i>M. Fansuri, M. Chang, T. Upomo &amp; R. Kusumawardani</i>	1891
Micromechanics of grain size effects on liquefaction response of sand <i>B. Lakkimsetti &amp; M. Gali</i>	1897
Assessment of liquefaction triggering potential of Sabkha soils in the U.A.E. and development of probabilistic ground motion estimates <i>C. Jung, E. Kang, A. Giannakou &amp; J. Chacko</i>	1903
An updated SPT-based seismic soil liquefaction triggering database <i>M. Ilgac, K. Cetin, R. Kayen</i>	1909
Applicability validation of energy-based liquefaction prediction method by comparison using a centrifugal model test <i>M. Ishimaru &amp; M. Sawatsubashi</i>	1915
Measuring stress conditions in the embankment model during a shaking event of the centrifuge test—towards a validation of effective stress analysis <i>T. Kawai</i>	1921
Impact of retaining walls' structural solution on their stability increase in seismic regions <i>I. Khojagali &amp; V. Khomyakov</i>	1927
Data processing for shear-wave velocity monitoring on geotechnical downhole array <i>T. Kishida, D. Nambiar, C.-C. Tsai &amp; C.-H. Kuo</i>	1933
On the repeated liquefaction during successive shaking table tests <i>Y.-Y. Ko, Y.-T. Li &amp; C.-H. Chen</i>	1939
Energy-based evaluation of liquefaction-induced strain and settlement <i>T. Kokusho</i>	1945
Evaluation of deep liquefaction triggering using in-situ and laboratory test data <i>H. Kristiansen, N. Denby &amp; A. McIntyre</i>	1951
Mitigation of liquefaction-induced differential settlement by stabilised gravel rafts <i>A. Lees</i>	1957
Application of 3D non-linear dynamic soil-structure interaction analysis in practical seismic design <i>A. Hokmabadi, E. Leung, J. Yiu &amp; J. Pappin</i>	1963
Interpreting plant root effects on the failure modes of soil liquefaction <i>A. Leung &amp; A. Karimzadeh</i>	1969
Integrated approach to liquefaction hazard assessment <i>G. Li Destri Nicosia, G. Nicolai &amp; S. Hyldal Sørensen</i>	1975
The effects of cyclic loading and lateral unloading on the undrained behavior of a kaolin clay <i>Z. Liu, J. Xue, M. Yaghoubi &amp; T. Baumgartl</i>	1981
Numerical analysis of a wharf on piles under seismic motion <i>S. Louadj &amp; M. Zidane</i>	1987
Seismic behavior of strip footings on slopes <i>B. Maheshwari</i>	1993
Evaluation of pile-cap embedment effect on the seismic behavior of pile foundation using dynamic centrifuge tests <i>S. Manandhar, S.-R. Lee, G.-C. Cho, D.-S. Kim, J.-G. Ha, M.-T. Yoo &amp; H.-J. Park</i>	1999
Numerical analysis of the seismic response of a cracked soft soil clay deposit <i>G. Auvinet-Guichard, S. Martínez-Galván &amp; M. Juárez-Camarena</i>	2005

Basin boundary seismic effects in Mexico City southern region <i>J. Mayoral, D. De La Rosa &amp; J. Alacaraz</i>	2011
Mitigation of building-tunnel detrimental seismic interaction <i>J. Mayoral &amp; G. Mosqueda</i>	2017
Experimental study on seismic deformation modes of steel-strip reinforced earth wall induced by segmental wall panels <i>Y. Miyazaki, Y. Sawamura, J. Ito &amp; M. Kimura</i>	2023
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Localized/enormous subsurface seismic damage induced by complex propagation and interference of surface waves and body waves <i>K. Nakai &amp; H. Murao</i>	2035
Displacement compatibility analysis of retaining systems subject to liquefaction induced lateral spread with evacuation <i>M. Neves</i>	2041
A pragmatic approach to estimating earthquake design spectra for structures on deep foundations <i>A. Orton, H. Poulos &amp; P. Wong</i>	2047
Liquefaction characteristics of loose sand by cyclic triaxial and simple shear tests <i>S.-S. Park &amp; Z.-Z. Nong</i>	2053
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A solution for evaluating seismic soil pressures acting on a circular reservoir from plane strain analysis <i>C. Chin, P. Robins &amp; S. Sadeghian</i>	2081
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Additional foundation settlements prediction considering the earthquakes repeatability <i>R. Sharafutdinov, O. Isaev, V. Morozov, D. Kuznetsova &amp; L. Stavnitser</i>	2091
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