AGS Sydney
59th Rankine Lecture Repeat 2023

AUSTRALIAN GEOMECHANICS SOCIETY

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Benefits of Unconventional Seismic Foundation Design

SPEAKER:
Professor
George Gazetas

Seismic geotechnical practice influenced from "pseudo-static" way of thinking, has extended to soil–foundation systems the "capacity design" principle, demanding that failure mechanisms ("plastic hinging") should occur only in the above–ground structural members, with over-designed foundations limiting the (below ground surface) soil and footing response to quasi-linear levels. The lecture explains how "pseudo-static" analyses may grossly underestimate the true dynamic seismic behaviour, and presents the benefits of drastically changing this established seismic philosophy. Emphasis is given to "foundation rocking and soil failure" of tall slender structures, the foundations of which are deliberately under-designed to ensure that, during strong shaking, substantially-nonlinear and inelastic soil–foundation interaction takes place: uplifting and sliding of footings from the supporting soil, along with mobilization of bearing-capacity failure mechanisms in the soil. Thanks to the kinematic nature of seismic shaking, such unconventional response limits the accelerations transmitted up into the super-structure, while its cyclic nature generates a significant amount of damping in the soil; exceedance of the ultimate capacity acts (only) momentarily and alternatingly. These phenomena contribute towards decreased response intensity and acceptable levels of residual deformations (displacements and rotations). Deformations are further diminished by the beneficial contribution of gravity to re-centering the foundation.

ABOUT THE SPEAKER

George Gazetas served as Professor of Geotechnical Engineering at the National Technical University of Athens (Greece) for more than 30 years, following an academic career in the US, where he taught at a number of Universities. His research interests have focused on Soil Dynamics and Soil-Structure Interaction. Much of his research has been inspired by observations after destructive earthquakes. An active writer and teacher, he has been a consultant on a variety of geotechnical (mainly seismic) problems. He received a number of wards for his research (from the American Society of Civil Engineers, the Institution of Civil Engineers, the International Society of Soil Mechanics and Geotechnical Engineering, as well as from Institutions in Greece, India, and Japan). He has delivered the prestigious "Coulomb", "Ishihara", "Kenneth Lee", and "Maugeri" Lectures. In 2015 he received the Excellence in University Teaching in Greece Award. He was honored as the 59th Rankine Lecturer, 2019, in London, and as a GeoLegend by ASCE's Geotechnical Institute in the GeoStrata magazine, 2022.

WHEN
Thursday 16 November 2023

TIME
5:30 pm - 7:30 pm

WHERE:
University of Sydney
Farrell Lecture Theatre
Building J02
Faculty of Engineering
Camperdown NSW

RSVP:
Please RSVP via: https://australiangeomechanics.org/meetings/benefits-of-unconventional-seismic-foundation-design/

EVENT CONTACT:
For more information, please contact Prof. David Airey via david.airey@sydney.edu.au

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