ICE Geotechnical Engineering Proceedings Lecture

TELFORD THEATRE, INSTITUTION OF CIVIL ENGINEERS,
ONE GREAT GEORGE STREET, WESTMINSTER, LONDON SW1P 3AA

Wednesday 31st October 2018 at 18:30

Dr Michael Pender

University of Auckland, New Zealand

on

Shallow Foundation Capacity –

Bearing Strength Surface Insights

Summary:

The lecture will show how shallow foundation behaviour under general loading (vertical load, horizontal shear, and moment) is more interesting than the standard bearing capacity equation suggests. In fact, manipulation of the equation reveals that beautiful bearing strength surfaces are implied. These surfaces are the locus of all possible combinations of vertical load, horizontal shear, and moment, which will induce bearing failure of a shallow foundation.

Continued overleaf
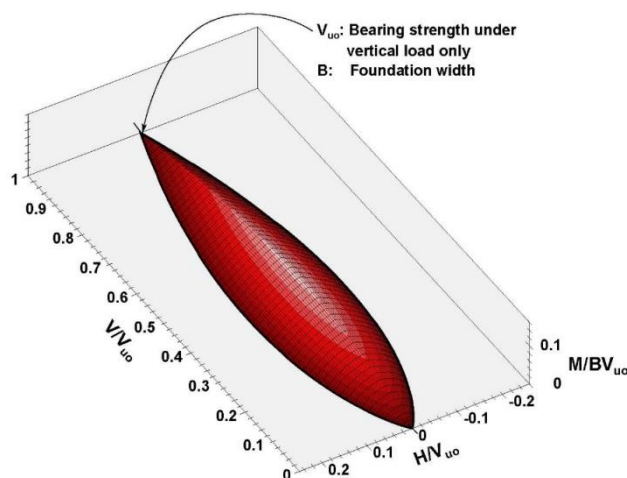
Programme

18:00 Refreshments – Council Room
18:30 Lecture begins followed by Q&A

19:45 Drinks reception sponsored by

in ICE Café Bar

Registration

Book online:
https://www.ice.org.uk/events/shallow-foundation-capacity-london

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V_{uo}: Bearing strength under vertical load only
B: Foundation width

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Shallow Foundation Capacity –

Bearing Strength Surface Insights *(cont'd)*

The background to this statement will be elaborated and the equivalence between conventional bearing strength calculations and those using the BSS will be demonstrated. The proposal will be made that calculations using the conventional equation are likely to be more attractive in a design office setting and, with the visual understanding provided by bearing strength surface thinking, better informed. In this way the "black-box" aspect of the conventional bearing strength equation is illuminated.

Applications to foundations for gravity retaining walls, both under static load and earthquake loading, will be considered. The discussion will be extended to modelling shallow foundations for multi-storey buildings under earthquake loading incorporating data obtained from field testing of near prototype scale rocking foundations and observations from the behaviour of large buildings in Christchurch on shallow foundations in gravels during the events of 2010 and 2011. Finally, the preparation of input data for structural analysis software modelling foundation-soil interaction with a bed of springs will be considered.
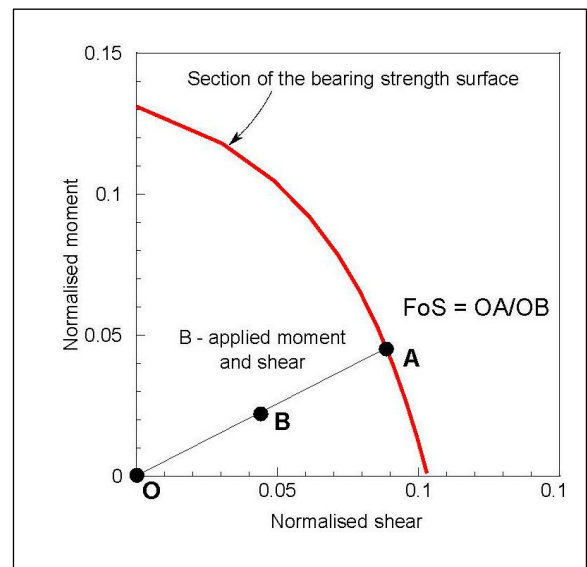
Michael Pender

Michael Pender has been a staff member of the Department of Civil and Environmental Engineering at the University of Auckland since 1977. Prior to that he worked for the New Zealand Ministry of Works and Development and spent 18 months with the soil mechanics group at Cambridge University on a New Zealand University Grants Committee Post-Doctoral Fellowship. He is Professor of Geotechnical Engineering, a position he has held since 1985. In addition he is a Visiting Professor to the European School for Advanced Studies in the Reduction of Seismic Risk, University of Pavia.

He is a Fellow of the Institution of Professional Engineers New Zealand, a Life Member of the New Zealand Geotechnical Society, a Fellow and Life Member of the New Zealand Society for Earthquake Engineering.

His primary areas of interest in teaching, research, and consulting are: the elucidation of the geotechnical properties of NZ materials, particularly soils of residual or volcanic origin; the earthquake resistant design of foundations; limit state design in geotechnical engineering; and the engineering behaviour of closely jointed rock masses. At this stage in his career he finds equal fulfilment in teaching and research; in fact, the reasons he continues working are (i) he is still learning, and (ii) the student feedback he receives for his teaching of foundation engineering.