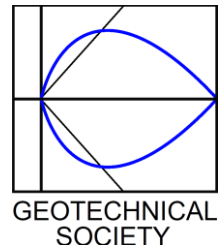




UNIVERSITY OF
CAMBRIDGE

Department of Engineering



Low tech earthquake engineering: Can plant roots protect against liquefaction?

Dr. Andrew Brennan

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University of Dundee

Biography:



Andrew Brennan graduated in Engineering Science from the University of Oxford in 1999. He then crossed the divide to study for a PhD at Cambridge under the supervision of Dr Gopal Madabhushi. During his PhD, and subsequent period as a Junior Research Fellow at Wolfson College, he primarily used physical modelling on the geotechnical centrifuge to explore how ground improvement systems responded to seismic loading. In 2005 he joined University of Dundee via a brief sabbatical at COFS at the University of Western Australia where he worked on stability of on-bottom offshore pipelines, which turned out to be another dynamic problem. On returning to the Northern Hemisphere he was instrumental in obtaining an earthquake shaker for Dundee's 3m radius beam centrifuge and has kept up his interest in seismic ground improvement as well as diversifying into other soil dynamics problems such as pipeline installation mechanisms, offshore decommissioning and novel railway embankments. He currently runs the MSc Geotechnical Engineering at Dundee and was part of the EEFIT field investigation team that visited Palu in Indonesia in 2018.

Seminar overview:

Earthquake induced soil liquefaction is a well known hazard, and many hard-engineering strategies exist to combat its negative effects. However, these are relatively costly to implement and involve specialist contractors, so may prove prohibitive as a measure for developing countries, or even developed countries with only moderate seismic risk.

A low tech soil improvement method is the planting of vegetation, which has been used to good effect to stabilise slopes for many years. This talk explores the potential benefits plant roots can give to liquefiable soil, as well as identifying the challenges. By creating root analogues for use in geotechnical centrifuge cyclic simple shear tests, some interesting new observations on the behaviour of soils containing root-analogues is observed and applied to design scenarios to demonstrate that plant roots may have some benefit to liquefying soils provided certain conditions are met. However, many questions remain unanswered, leaving a range of targets for future research.

When and where:

Thursday, 20 Feb, 19:00

The Old Library, Emmanuel College

Queries:

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