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Title of the Theme Lecture
Analysis of buried oil and gas pipes crossing active faults: Revisiting pipe-ground interaction

**Abstract**

Despite recent developments in computer modelling, the analysis in practice of buried oil and gas steel pipelines crossing active faults usually relies on simplified numerical and analytical beam-on-nonlinear Winkler foundation models. The purpose of this lecture is to present recent experimental measurements and numerical estimates of the developing soil reaction, as function of relative soil-pipe movement, used as input in Winkler analysis models. The presentation will focus on scenarios not covered by existing guidelines, such as deeply buried pipes, oblique faults and pipes laid in trenches excavated in rock. Details will be provided on experimental methods developed to physically model relative soil-pipe movements, while carefully controlling the mechanical properties of the backfill, as well as visualisation techniques applied to shed light on the mechanisms of pipe-backfill interaction. Advanced numerical tools are also employed to analyse cases of complex pipe-backfill-trench geometry, and quantify the resistance provided by native stiff soil on pipes backfilled with loose sand. The presentation will conclude with recommendations for estimating soil spring parameters in practice.

**Bio**

George Kouretzis received his PhD from the National Technical University of Athens (NTUA), Greece in 2005. In the following years he continued his engagement with NTUA as a post-doctoral researcher and as a part-time lecturer. After a 4-year period where he was primarily engaged with engineering consulting activities, George moved to Australia to join the University of Newcastle in 2012, where he now holds an Associate Professor position.

His research interests lie in the fields of pipeline geotechnics, computational geomechanics, earthquake engineering and soft soil testing techniques. His research has attracted substantial funding from governmental and industry sources and he has published over 50 papers on the analysis of buried pipelines affected by geohazards, the seismic design of tunnels, the analysis of dynamic soil-structure interaction problems etc. He serves as an associate editor of the Canadian Geotechnical Journal, sits on the editorial board of Computers and Geotechnics and guest edited special issues published in the Canadian Geotechnical Journal and Australian Geomechanics. Finally, George is the recipient of a number of awards for research and teaching excellence from the International Association for Computer Methods and Advances in Geomechanics IACMAG, the Australian Association of Computational Mechanics ACCM etc.