NEW ZEALAND GEOTECHNICAL SOCIETY INC

A Collaborating Technical Society of The Institution of Professional Engineers New Zealand

Dunedin Presentation
Tuesday 9th July 2024
Beca, Level 5, Gallagher House
229 Moray Place
Dunedin 9016
Refreshments: 5.30pm
Presentation: 6.00pm

Modeling Site Response for the Groningen Gas Field

Presented by
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Gas extraction in the Groningen Gas field has led to the occurrence of small earthquakes over the last couple of decades. While these events have been relatively small (the largest recorded to date is a M_L 3.6 earthquake), they have led to a large effort to evaluate the hazards and risks associated with induced seismicity associated with gas production in the field. As part of these efforts, a site response model was developed to predict amplification factors over the entire 40x50 km extent of the field. The Groningen region has unique characteristics due to the presence of very soft clays and peats and due to the deep extent of sedimentary deposits at the site. Rather than use generic site amplification factors conditioned on proxy parameters such as V_{S30}, a field-wide zonation of frequency-dependent non-linear amplification factors has been developed. Each amplification factor is associated with a measure of site-to-site variability that captures the variation of shear-wave velocity profiles and hence amplification factors across each zone, as well as the influence of uncertainty in the modulus reduction and damping functions for each soil layer.

Professor Adrian Rodriguez-Marek obtained his Ph.D. from U.C. Berkeley in Civil Engineering in 2000. He then joined the faculty at Washington State University and since 2010 is a faculty member in the Civil and Environmental Engineering department at Virginia Tech. Dr. Rodriguez-Marek research and teaching is in the area of geotechnical earthquake engineering with a focus on site response and seismic hazard analysis. Dr. Rodriguez-Marek has participated in various seismic hazard assessment projects for Nuclear Power plants across the globe. His major research contributions are in the areas of ground motion characterization and on the treatment of uncertainty in seismic hazard analysis.