UNIVERSITY OF CAMBRIDGE
Department of Engineering

GEOTECHNICAL SOCIETY

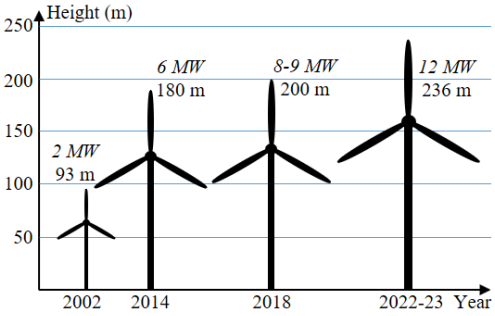
Can we estimate the actual stiffness and mass of soil contributing to vibrations of monopiles for offshore wind turbines?

Dr Luke J Prendergast

Assistant Professor in Civil Engineering, University of Nottingham, UK

Seminar overview:

The offshore wind sector has experienced significant growth in recent years. This has led to the development of super-large wind turbines, which require ever larger foundations. Monopile sizes have been growing, meaning the design approaches used for them are no longer relevant. Estimating soil-structure interaction stiffness (and mass) is becoming more challenging, and is paramount to safe design. This talk presents an overview of a finite-element model updating approach to estimate the stiffness and mass of vibrating piles using frequency response functions. The approach can be used to develop reference damage detection models or to estimate the operating stiffness of these systems in operation, thereby enabling updating of design approaches.



Growth of turbines in recent years

Biography:

Dr Luke J Prendergast obtained his undergraduate degree in Civil Engineering at University College Cork (UCC), Ireland in 2011, followed by a PhD at University College Dublin (UCD) in 2015. He worked as a Postdoctoral Researcher at UCD and Delft University of Technology, the Netherlands, between 2015 and 2018, before taking up his present position as Assistant Professor in Civil Engineering at University of Nottingham. He specialises in dynamic soil-structure interaction and vibration-based damage detection of civil structures, particularly under scour erosion (bridges and offshore structures). He has published 24 journals papers on these topics to date, and works as Assistant Editor at the Elsevier Journal of Sound and Vibration.

When and where:

Wednesday, 10 Feb 2021, 19:00

ONLINE

Queries:

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