

PhD Research Opportunity in Geotechnical Engineering

Title: Investigation into the design axial capacity of driven piles in clay and silt

The Department of Civil, Structural & Environmental Engineering, Trinity College Dublin, invites applications for a PhD Researcher to join the department. Displacement piles are a critically important foundation type for onshore and offshore construction projects worldwide, and are projected to experience strong growth in the next decade. In addition to widespread use for buildings, tanks and embankments, displacement piles are the foundation of choice for a majority of transport & mining infrastructure and wind turbine generators. However, present day methods for evaluating the axial capacity of displacement piles relate shaft friction via an empirical factor to an arbitrary laboratory or in-situ test parameter. These methods consequently have poor reliability and hence lead to expensive foundation designs. This proposed PhD study will aim to contribute to the development of a new methodology which will account for all of the important pile, installation and soil parameters in a scientifically rigorous manner that is consistent with experimental findings in a wide variety of clays and silts. This work will form part of an international research collaborative effort including researchers in Delft University of Technology, Imperial College London, University of Western Australia, University of Southampton, Zhejiang University among others.

The key objectives of this PhD research are to:

1. Develop state-of-the-art instrumented piles for testing in the lab/field
2. Undertake characterisation of samples of the clays and silts including laboratory element, Cone Penetration Testing (CPT) and advanced in-situ testing (e.g. ROBOCONE).
3. Perform long duration tests (up to 3 years) of the instrumented piles in order to address present significant deficiencies in the experimental database
4. Perform numerical effective stress simulation of pile installation, subsequent equalisation of stresses and static loading.

The PhD is funded through iCRAG, the Science Foundation Ireland Research Centre in Applied Geosciences. The successful candidate will join a vibrant research group at Trinity College Dublin and will have access to the wider ICRAAG network, working at the cutting edge of Geotechnical Engineering research. To be eligible for consideration, applicants must possess a 1st class degree (or equivalent) in a relevant subject in Engineering/Science. Where applicants have an MSc degree, a distinction is required. Geotechnical laboratory testing experience, numerical and analytical skills and proficiency in computer coding is desirable.

Applicants are requested to email a cover letter, CV and the names of two referees, at least one of whom should be an academic, to the relevant email address (igoed@tcd.ie). Closing date is 30th September 2022 or until a suitable candidate is found. The position provides a stipend and covers full-time EU tuition fee cost for four years. The position should ideally commence on 1st November 2022 but start date may be flexible.

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