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Announcement: Award-winning papers in 2020

Papers published in *Géotechnique* are eligible for awards from the Institution of Civil Engineers. Papers from any of the ICE journals can be nominated for several awards. In addition, each journal has awards dedicated to their specific subject area.

On Friday 15 October 2021, ICE president Rachel Skinner presented awards to the following papers published in *Géotechnique* in 2020. The editorial panel nominated their best papers and an awards committee chaired by Tim Broyd allocated the awards.

The Telford Gold Medal, presented to the best paper published in all the ICE journals, was awarded to Zhou *et al.* (2020).

ABSTRACT
Steel catenary risers (SCRs) are an efficient solution to transfer hydrocarbons from deep-water seabeds to floating facilities. SCR design requires an assessment of the fatigue life in the touchdown zone, where the riser interacts with the seabed, which relies on reliable estimates of the SCR–seabed stiffness over the design life. Current models for SCR–seabed stiffness consider only undrained conditions, neglecting the development and dissipation of excess pore pressures that occur over the life of the SCR. This consolidation process alters the seabed strength and consequently the SCR–seabed stiffness. This paper summarises experimental data that show that long-term cyclic vertical motion of an SCR at the touchdown zone leads to a reduction in seabed strength due to remoulding and water entrainment, but that this degradation is eclipsed by the regain in soil strength during consolidation. The main focus of this paper is on prediction of the temporal changes in seabed strength and stiffness due to long-term cyclic shearing and consolidation, to support calculations of SCR–seabed interaction. The predictions are obtained using a framework that considers the change in effective stress and hence soil strength using critical state concepts, and that considers the soil domain as a one-dimensional column of elements. The merit of the model is assessed by way of simulations of SCR centrifuge model tests with over 3000 cycles of repeated undrained vertical cycles in normally consolidated kaolin clay. Comparisons of the simulated and measured profiles of SCR penetration resistance reveal that the model can capture accurately the observed changes in SCR–seabed stiffness. Example simulations show the merit of the model as a tool to assess the timescale in field conditions over which this order of magnitude change in seabed stiffness occurs. It is concluded that current design practice may underestimate the seabed stiffness significantly, but the new approach allows rapid checking of this for particular combinations of SCR and soil conditions.

The Geotechnical Research Medal, presented for the best paper on geotechnical research, was awarded to Hueckel *et al.* (2020).

ABSTRACT
Experiments on five-, four-, three- and two-wet-hydrophilic-grain clusters were performed to investigate evolution of adhesion of granular media during drying on the micro-scale. The experiments show that the adhesion-force of a cluster initially grows at most to three times the original value before decreasing to zero by the end of evaporation. The adhesion-force is composed of capillary pressure force acting over the liquid/solid contact surface area, and surface tension forces acting over the three-phase contact perimeter length. This is in contrast with most macro-scale phenomenological models, in which the only desaturation process variables affecting strength are suction and saturation. Both the contact surface area and contact perimeter length are reduced to zero upon complete liquid evaporation. The morphology of an evaporating water body evolves through slow flow controlled by evaporation rate, interrupted by various modes of fast air entry, which are non-equilibrium jumps of liquid/gas interfaces (Haines jumps). The instabilities involve large adhesion force discontinuities and substantial water mass reconfiguration with water flow in an extremely short time, which makes the process transient. The reconfigurations can reduce the original multi-grain water clusters to four-, three- and two-grain clusters by way of three different instability modes: of thin-sheet instability, or meniscus snap-through instability, depending on the sign of the Gauss curvature of the liquid surface, or finally, for two-grain bridges only, a liquid wire pinch-off. For larger meso-scale assemblies, however, the global adhesion-force evolution is little affected by the jumps. The air entries are potential sites for drying cracks. The (approximately) calculated capillary pressure for two- and three-grain clusters, in no cases is seen to reach high values, predicted from water retention curves.

The David Hislop Prize (also known as the Offshore Award), presented to the best paper published on heavy marine design and construction with particular reference to offshore engineering, was awarded to Buckley *et al.* (2020).

ABSTRACT
This paper describes and interprets tests on piles driven through glacial tills and chalk at a Baltic Sea windfarm, covering an advance trial campaign and later production piling. The trials involved six instrumented 1·37 m dia. steel open-ended tubes driven in water depths up to 42 m. Three piles were tested statically, with dynamic re-strike tests on paired piles, at 12–15 week ages. Instrumented dynamic driving and re-strike monitoring followed on up to 3·7 m dia. production piles. During driving, the shaft resistances developed at fixed depths below the seabed fell markedly during driving, with particularly sharp reductions occurring in the chalk. Shaft resistances increased markedly after driving and good agreement was seen between long-term capacities interpreted from parallel static and dynamic tests. Analyses employing the sites' geotechnical profiles show long-term shaft resistances in the chalk that far exceed those indicated by current design recommendations, while newly proposed procedures offer good predictions. The shaft capacities mobilised in the low-plasticity tills also grew significantly over time, within the broad ranges reported for sandy soils. The value of offshore field testing in improving project outcomes and design rules is demonstrated; the approach described may be applied to other difficult seabed conditions.

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