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Announcement: Award-winning papers in 2012

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 18 October 2013, ICE president Barry Clarke presented awards to the following papers published in *Géotechnique* in 2012. The editorial panel nominated their best papers and an awards committee chaired by David Balmforth allocated the awards.

The Geotechnical Research Medal, presented for the best paper on geotechnical research, was awarded to Puzrin *et al.* (2012).

ABSTRACT

An attempt to develop a kinematically based approach to predicting ground settlements due to tunnelling is represented, by using the more reliable data of the commonly observed settlement troughs, rather than imposing the boundary conditions on the tunnel surface, which have a high level of uncertainty. The anisotropic elastic model used in this work is highly simplified, and the resulting analytical solution is of an approximate nature. Nevertheless, it seems to provide good agreement with both the shape and the magnitude of the observed settlement trough. Based on this solution, a modification is proposed for the widely used empirical Gaussian curve, by correlating the trough width parameter K with the ratio between the two anisotropic shear moduli, G_{hh}/G_{vh}.

George Stephenson Medal winners Andreas Schmid and Alexander Puzrin with ICE President Barry Clarke

The George Stephenson Medal, presented to the second best paper published in all the ICE journals, was awarded to Puzrin & Schmid (2012).

ABSTRACT

A simple analytical model is proposed to quantify evolution of a creeping landslide stabilised by a retaining wall, or by a natural barrier at the bottom of the sliding mass. Development in time of both the landslide displacements and the earth pressure acting on the retaining structure is obtained in the closed form, with the latter given by the classical Terzaghi expression for the average degree of consolidation. Depending on the value of the long-term safety factor, the landslide either eventually slows down, asymptotically approaching final displacements, or the soil behind the retaining wall comes to a passive failure, followed by a post-failure evolution of the landslide. The model is capable of quantifying both scenarios, with some of its features successfully validated against the monitoring and geotechnical data from the two case studies: the Combe Chopin and Ganter landslides in Switzerland. For the Combe Chopin landslide, which came to a standstill, the model has demonstrated its ability to predict final downhill displacements and their development in time. For the Ganter landslide, which failed and achieved steady-state velocity, the model correctly predicted the long-term landslide evolution and the effects of drainage and erosion on the displacement rates.

Jamie Standing, John Burland and Alexander Puzrin, winners of the Geotechnical Research Medal, with ICE President Barry Clarke

The T K Hsieh Award, presented to the best paper published in the field of structural and soil vibration caused by mechanical plant, waves or seismic effect, was awarded to Conti *et al.* (2012).

ABSTRACT

This paper describes an experimental investigation of the behaviour of embedded retaining walls under seismic actions. Nine centrifuge tests were carried out on reduced-scale models of pairs of retaining walls in dry sand, either cantilevered or with one level of props near the top. The experimental data indicate that, for maximum accelerations that are

Gopal Madabhushi, Riccardo Conti and Giulia Viggiani, winners of the T K Hsieh Award, with ICE President Barry Clarke

smaller than the critical limit equilibrium value, the retaining walls experience significant permanent displacements under increasing structural loads, whereas for larger accelerations the walls rotate under constant internal forces. The critical acceleration at which the walls start to rotate increases with increasing maximum acceleration. No significant displacements are measured if the current earthquake is less severe than earthquakes previously experienced by the wall. The increase of critical acceleration is explained in terms of redistribution of earth pressures and progressive mobilisation of the passive strength in front of the wall. The experimental data for cantilevered retaining walls indicate that the permanent displacements of the wall can be reasonably predicted adopting a Newmark-type calculation with a critical acceleration that is a fraction of the limit equilibrium value.

The Manby Prize, given annually for papers read at meetings of the Institution, was awarded to Nazem *et al.* (2012).

ABSTRACT

The finite-element analysis of free-falling objects penetrating soil deposits is one of the most sophisticated and challenging problems in geomechanics. A robust numerical method will be described here for dealing with such complex and difficult problems. The approach is based on the arbitrary Lagrangian–Eulerian (ALE) method of analysis, the main features and challenges of which are described briefly in the paper. The ALE method is then employed to perform a parametric study of a perfectly smooth penetrometer free-falling into a uniform layer of clay, which deforms under undrained conditions. The effect of the mechanical properties of the clay soil on the penetration characteristics is presented, and an approximate, closed-form expression is derived for the dynamic penetration factor, N_{dp}. Comparisons are made between the deduced values of N_{dp} and published values of the conventional cone factor, N_c, and comparisons are made with experimental data to validate the approach.

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