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Editorial

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Welcome to the April 2010 issue of *Geotechnical Engineering*. This issue consists of five contrasting papers of varying lengths with four of the paper's authors resident overseas. Being an assessor for the last 2 years, I have noticed a trend towards overseas contributions with fewer papers from the UK being submitted for consideration for publication. In 2009, there were 32 papers of which 21 were from overseas authors and 11 from the UK. Over a third of the papers were from authors in Asia. Papers from Asia tend to be highly theoretical whereas those from other regions often include field results comparing theory with practice. Two of the papers are concerned with numerical analysis while the other three consider how the results of theoretical equations compare with the physical records from site observations. As a practising engineer, and a believer in the observational approach, these latter papers are fundamental to our understanding of the behaviour of soils under load.

The paper by the three authors from Dong-A University in Korea (Dung *et al.*, 2010) is a good example of the application of established theory to actual performance and the verification of design assumptions. These three authors looked at six documented cases of foundation settlements for pile groups where the piles are not founded in end bearing – a common situation for many high-rise buildings. They considered five common methods of analysis and found that the pile-cap stiffness and loading path were influential in arriving at settlements that closely followed the actual building displacements using the equivalent raft method.

Razouki and Al-Zubaidy (2010) looked at the elastic settlement of a square footing on a two-layered deposit and established new design charts. Using Burminster's two-layer elastic approach, Razouki and Al-Zubaidy, through a number of assumptions and simplifications (such as a square footing that can be equated to a round footing of equivalent area) derived equations that require numerical calculation for solutions. Using a bespoke program, they have been able to derive a series of design graphs relating relative layer thickness and the stiffness ratios of the two layers to a surface deflection factor. Comparison with an example where settlement has been measured at the centre line of a foundation gave good agreement with the new design charts.

Zare Naghadehi *et al.* (2010) from Iran investigated the effect of moisture on the properties of sandstone discontinuities from samples taken from cuttings along the Khosh-Yeylagh main road in north-eastern Iran. The samples were cut from rock faces such that they included just a single discontinuity and were tested in direct shear using constant normal loading conditions. Both wet and dry conditions were simulated and specimens were tested through peak strength to residual. Samples were selected based upon their joint roughness coefficient with two types of samples sets either with a roughness lower than 10 or a roughness greater than 10. The conclusions bear out previous studies in that there is a reduction in the dry peak strength of tests undertaken wet. These conclusions indicate that these reductions are greatest at lower normal stresses. The paper, although not studying this in detail, also emphasises that scale effects play a significant part in any testing of rock discontinuities and that site observation and back analysis are valuable tools in evaluating slope instability and shear strength parameters.

The paper on effect of material uncertainty on stochastic response of dams by Hacıefendioğlu (2010) of Ondokuz Mayis University in Turkey is a numerical simulation of earthquake performance on asphaltic lined dam construction materials. The author uses the stochastic finite-element method (SFEM) that combines the finite element method with probability theory to estimate the uncertainties in response variables. This is a complex and specialist subject but one of importance to designers of critical infrastructure in tectonically active regions of the globe.

The final paper is closer to home (and to my heart having worked on the adjacent Castle Mall Development basement) and concerns the design and performance of the Chapelfield basement in Norwich. Bowden and Lees (2010) describe the design, construction and monitoring of a 12 m deep basement in the centre of Norwich, UK and compare the results to that of another deep basement construction at Castle Mall asking the question – were there any tangible benefits to the scheme from prior knowledge of the performance at other sites? The paper describes the site and the information that was available from the nearby Castlemall Development and in particular the chalk quality and the occurrence of solution features. The paper also reports the retaining wall deflections comparing the recorded deflections with the theoretical results from a Wallap analysis and a finite-element model. A comparison of the results shows that the finite-element model gives good correlation although predicting somewhat larger deflections than occurred whereas the Wallap results predict even greater movements indicating

overly conservative assumptions for the soil parameters. The hindsight comments are particularly interesting as the authors suggest that the cost of dealing with solution features as a percentage of the ground works costs was around 6%. However, because solution features were predicted, dealing with them caused no significant delay to the programme although the authors recognise that the a piled solution was more expensive that a pad solution. They conclude by suggesting that a pad solution would have been the most cost effective foundation design over two thirds of the site had the features been better defined. Hindsight is such a wonderful thing!

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