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Editorial

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It is with great pleasure that I welcome you to this, the August 2016 issue of *Ground Improvement*. Infrastructure and the need for its development is central to many discussions about the future of society, and governments across the world are waking up to the challenges this presents. Ground improvement has a critical role to play in meeting these challenges, as ultimately all infrastructure sits on or in the ground. This is a truly global challenge as our infrastructure is placed under ever greater demands, such as through the impact of climate change, so it is vital to ensure that our ground treatments are resilient to whatever the future may hold (Mitchell and Kelly, 2013). Our infrastructure interacts with a complex and challenging array of ground conditions and development issues, and so it is vital to better understand how ground improvement techniques can enhance such interactions. This was captured in a review by Roger (2012) when he stated that ground improvement is a process that has desirable physical and chemical consequences that span a number of aspects, including dealing with the risks associated with different ground conditions. The papers in this issue highlight a number of the aspects associated with ground improvement approaches and hopefully these can be taken forward to meet the challenges faced with our infrastructure base, thus reflecting the true diversity of aspects and knowledge needed to deal with ground improvement and the ground improvement process.

The first paper (Sreelekshmy Pillai and Vinod, 2016) provides a re-examination of the suite of methods currently available to predict compaction characteristics of fine-grained soils, providing a useful overview of some of the key issues associated with the use of such predictive tools. Taking these into account and through the use of different datasets, the authors provide a potentially more rational approach that embeds key broader aspects associated with compact (e.g. compaction energy). Through their work Sreelekshmy Pillai and Vinod (2016) provide a method to predict maximum dry density and optimum moisture (or water) content. Interestingly, separate correlations (valuated using separate datasets) have been presented to deal with fine-grained soils either of low-to-medium plasticity or of high plasticity.

Continuing on a related theme but linked to assessment of stabilised materials, Vahedifard *et al*. (2016) present an evaluation of the use of handheld gauges to determine strength indices of high-moisture soils (i.e. to provide a rapid strength index). Three samples of fine-grained soil (with plasticity indexes between 38 and 58%) mixed with five types of Portland cement (three commercially available and two used for research purposes) were tested using three pocket devices, in this case a penetrometer, a geotester and a vane shear. Some 300 unconfined compressive strength test were conducted, from which strength correlation were developed. Results interestingly show how the pocket geotester (essentially a penetration device) produced the most repeatable results. While these devices will never replace full testing (as the authors acknowledge), handheld devices do provide for a rapid index assessment of the impact of any stabilisation undertaken in the treatment of soil.

The next three papers all focus on the impact of various elements of stabilisation of problematics soils. The first of these presented by Alazigha *et al.* (2016) examines the potential of lignosulfonate (LS) in the treatment of expansive soils, soils that continue to plague the infrastructure base of many countries (see Jones and Jefferson (2012) for further details). Using one dimensional tests, the authors demonstrate how LS compares very favourably with other cement treatments that are traditionally used. Furthermore, because LS is generally more economic and provides greater environmental benefits than traditional cement-based methods, LS has the potential to provide a much more sustainable solution in the treatment of problematic expansive soils found across the world.

Continuing the stabilisation theme, Sharma and Sivapullaiah (2016) examined the effect of joint activation of fly ash and ground granulated blast-furnace slag, continuing a field of study that has been ongoing for a number of years that is now helping to deal with waste products associated with energy production and steel manufacture. In this laboratory study, the authors present results from compaction and unconfined strength tests carried out on ash-slag mixtures of different proportions. This study provides further evidence that through appropriate design ash-slag mixtures can be an effective method in subgrade stabilisation, reducing the need for relatively expansive and potentially much less sustainable additives such as lime.

In the final paper of three in this issue dealing with stabilisation, Kolay and Rahman (2016) assess the physical and geotechnical properties of a tropical peat treated with varying percentages of fly-ash, quicklime and Portland cement. Unconfined compression strength tests were used and various correlations provided. However, a key aspect that can be taken from this study is the demonstration of how the three additives work in the treatment of a well-known problematic soil such as peat (see Farrell (2012)).

The final paper in this issue describes work undertaken to understand the properties of soil after surcharging/vacuum preloading (Gangaputhiran *et al.*, 2016). In their experimentally based study the authors have examined engineering properties, cyclic response and microstructural aspects of soft clay post treatment. Samples of soft clay were first prepared using K_0 consolidation and then subjected to additional 80 kPa pressures either form surcharging or vacuum preloading. Their results demonstrated key differences between the two preloading approaches, in terms of permeability, strength and pore water response (under cyclic loading). Interestingly, vacuum preloading generated a more flocculated microstructure compared with the more dispersed structure when surcharging was used.

I hope that you find these papers useful, stimulating and informative and that these papers spark debate on further developments of the role of ground improvements. As these papers show, ground improvement must first be founded in sound engineering and scientific practice. Can I, therefore, actively encourage you to discuss these papers to help further shape our understanding and development of current and future ground improvement processes. If our readership has any issues or comments related to the journal more generally then the editorial panel is always pleased to receive feedback. We look forward to hearing from you.

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