Editorial

Nilo Cesar Consoli BSc (Civil Engineering), MSc, PhD, PEng
Professor and Head of the Graduate Programme in Civil Engineering
(PPGEC), Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre,
Brazil (consoli@ufrgs.br)

It is with great honour that I am writing the Editorial for 2019's second issue of *Ground Improvement*. A lack of naturally occurring soils with good support capacities, as well as the need for cost reduction and sustainability, has spurred a search for new ground improvement solutions. I am pleased to present six papers from emerging countries that have begun to play increasingly important roles in the global economy.

All of these papers focus on practical applications, including the investigation of dynamic compaction adjacent to slopes, the use of polymer or superplasticiser for the improvement of soils and the furthering of understanding pertaining to pit foundations, dams and ballastless railways for the sake of improving future design.

From Iran, Mirzamomen *et al.* (2019) carried out a comprehensive experimental programme that investigated the effects of different variables on the results of dynamic compaction adjacent to slopes. Three sandy sloped models (450, 650 and 850 mm in height), with three slope safety factors (1.4, 1.6 and 1.8), were constructed in order to measure the effects of these variables, that included the height of slope, relative density of sand, tamping weight and falling height. Whenever a test resulted in slope failure, the failure modes were evaluated to discern the patterns of shear cracks and the failure mechanism.

From Oman, Mohamedzein *et al.* (2019) evaluated the use of polymers in improving the engineering properties of dune sands through mechanical and chemical tests. Characterised by a loose fabric structure, as well as problematic properties such as low shear strength and susceptibility to collapse when wetted, dune sands are unsuited to support structures, roads, landfill liners or water retaining earth structures. Usually dune sand is improved through either the addition of cement, cement-by-pass dust (CBPD) or incinerator ash. The experiment detailed in this paper used commercial cationic polyacrylamide polymer solutions with concentrations of 1–3%, prepared by adding polymer to vigorously stirred water. Particularly notable were results obtained from unconfined compression strength (UCS) tests performed on dune sand stabilised with 2% polymer and cured for 7 days, as they were similar to both the UCS results of sands stabilised with 12% cement and sands stabilised with 40% CBPD for the same amount of time. This is important because the cost of smaller doses of a polymer (2%) is generally less expensive than higher doses of cement (12%).

From Brazil, Milani and Silva (2019) attempted to improve earth walls and structures through the use of a cement-stabilised self-compacting earth (CSCE). CSCE is composed of soil, water, stabiliser and chemical admixture though it may also contain fibres and minerals. It should be sufficiently fluid to mould without needing mechanical densification in the form of compacting, squeezing or pressing. Polycarboxylate-ether-based superplasticiser (PEBS) and a cementitious stabiliser were added to the mix to improve development of mechanical strength. Brazilian tropical soils were used in the tests, one clayey and one sandy. The PEBS was added to soil-cement mixes, resulting in a CSCE system that was compatible with cement-stabilised rammed-earth techniques, as it had adequate fluidity, exudation control and particle segregation control.

From China, Sun *et al.* (2019) used finite difference software to analyse surface subsidence features of pit-in-pit foundations based on a sand-cobble stratum typical to the Beijing area. The stability and deformation of pit-in-pit foundations are significantly influenced by how they were excavated and the form their support structures take. These differ from more common pit foundations due to how the uncertain positioning of the inner pit affects deformations, making them asymmetrical. Related studies often focus on the deformation of a single side of a foundation pit, assuming them to be symmetrical and not taking into account the positioning of inner pits. This study found that the arbitrary excavation of inner pits affects the surface subsidence. It also found that it is an inner pit's depth, rather than position or width, that most influences the surface subsidence.

From China, Zheng and Xie (2019) analysed the problems that plagued the Huangbizhuang reservoir dam during and after its construction in 1958. These problems included dam collapses during the construction of the cut-off walls, cracks in the impermeable upstream blanket and continuous seepage. The authors proposed several dam design recommendations for future projects.

From China, Liu and Wang (2019) developed a procedure to calculate the dynamic shakedown limit for ballastless railways. Current design standards dictate that variables like quality of soil materials and compaction control be strictly established based on empirical knowledge and scale tests. This paper presented a new design method based on shakedown theory with

solutions that considered the dynamic effect of moving train-loads. The results could be used to enhance designs of earth structures for railway tracks.

I would like to thank the editor, the editorial board members and the staff for the opportunity to write this editorial. I would also like to thank all authors who submitted these innovative papers and the reviewers who curate these high-level works.

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