Editorial

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It is with great pleasure that I welcome you to this, the first edition for 2020 of the *Ground Improvement Journal*. As we enter the next decade of the 21st century, ground improvements continue to have a central role in ensuring that our infrastructure is fit for purpose, for example in helping maintain our transportation networks (Heitor and Ngo, 2019). The role of ground improvement is in helping engineers meet the needs of new developments, as well as keeping existing infrastructure functioning – something increasingly pertinent given in many well developed countries such as the USA, the infrastructure score card at best achieves a D+ (ASCE, 2017). Add in to the mix population growth, changing in populations demographics, new infrastructure demand patterns and the impact of climate change, it is clear that 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 (Roger, 2012). 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. This reflects the true diversity of aspects and knowledge needed to deal with ground improvement and the ground improvement process.

The papers in this edition can be broadly categorised around the theme of chemical stabilisation, covering grouting techniques and soil mixing approaches. In the first of these papers, Fattah *et al.*, (2020), describes an approach to treat a particularly challenging problem associated with wind-blown dune sands and their encroachment on infrastructure and agriculture land—a problem in many arid environments found around the world (Royal, 2012). Fattah *et al.*, (2020) demonstrated, by way of laboratory testing, how grout slurry mixes (made from various ratios of lime–silica fume) can help significantly reduce wind erosion of dune sands. This work will be of particular interest in many desert regions, for example Arabia, where many dune fixing programmes are ongoing. In the next paper, Dyer and Viganotti (2020) demonstrate how bio-grout injections through aerosol delivery can effectively treat unsaturated granular soils. Their experimental study illustrated how pulsed injections of using eutrophic (i.e. characterised by the addition of bacterial nutrients to cementation liquids) protocols enabled a more even distribution of cementing product at the soil-particle interface. Continuing the broad sub-theme of grouting techniques, Ricco *et al.*, (2020) undertook field and laboratory

measurements of ground stiffening achieved through the use of pre-fabricated vertical drains and radial deep consolidation, which they argued was a form of compaction grouting. Interestingly, this allowed them to compare estimations of improvements achieved from a number of commonly used predictive approaches (Asaoka, 1978, and Mantaras *et al.*, 2014), with measurement generated from field testing. Relatively good agreement was seen in many of these cases and through this provides some useful insights for future assessments of ground improvements.

Following this and covering work around soil stabilisation, Phanikumar (2020) also using a laboratory study, showed how use of fly ash (mixed at 10%) stabilisation of expansive soils created a soil-stabilised cushion reducing the heave witnessed by up to 70%. This work provides both an effective treatment process of a particularly challenging ground condition, namely expansive soils, as well as the effective use of a waste product. Continuing the sub-theme of soil stabilisation through mixing techniques, Bellato *et al.*, (2020) through experimental investigations encompassing mechanical testing and mineralogical analysis, showed how a relative new deep soil mixing approach – cutter soil mixing – can produce in one construction treatment phase a strengthen rectangular panel of soil.

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 have first been founded in sound engineering and scientific practice. It is particularly pleasing to see that the journal has seen a significant improvement in both the quality and quantity of articles received. On behalf of the editorial panel, may I take this opportunity to thank all our various contributors for their valuable input here. In addition, can I actively encourage our readers to discuss these papers to help further shape our understanding and development of current and future ground improvement processes. Finally, if you have any issues or comments related to the journal more generally, the editorial panel is always pleased to receive any feedback you may wish to provide – thank you.

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