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Editorial

Francesco Cecinato MSc, PhD
Assistant Professor, Department of Civil, Environmental and Mechanical Engineering, University of Trento, Trento, Italy

I am pleased to welcome our readers to the June issue of *Geotechnical Engineering*. As with every edition of our journal, this issue boasts a rather wide variety of hot geotechnical topics, ranging from field testing and foundations to tunnelling in rock, proposed by both academics and practitioners who often collaborate, co-authoring articles. Such virtuous dialogue between the two souls of geotechnics is at the core of our journal's aims, encouraging high-quality contributions in order to develop a greater understanding of the influence of geotechnics on the built environment. The contributions in this issue once again highlight our journal's international attitude, given the wide variety of nationalities of our authors. In addition to a collection of seven remarkable articles, this issue contains a discussion and the reviews of four recently published books in different geotechnical topics, providing useful guidance to the interested reader.

In recent years, energy geotechnics have received increasing attention, with special regard to renewable energy applications such as wind farms. The first paper, by Murphy *et al.* (2016), fits within this trend, being concerned with monopiles, which are the most common foundation system for supporting offshore wind turbines. Building upon an existing concept, the authors propose field experiments on winged monopiles installed in sand at two locations in Ireland. Equipping piles with steel wings is an effective way to increase a foundation's stiffness and lateral resistance. However, results suggest that conventional p–y methods may be unsuitable for accurately predicting the winged pile response. The experimental results show that adding wings allows higher loads to be mobilised and a reduction in horizontal displacements, however, further testing and possibly three-dimensional modelling are needed before a general method for sizing winged monopiles can be proposed.

The second paper, by Liu *et al.* (2016), deals with a relatively uncommon type of deep foundation, namely concrete open-ended pipe piles. Although this type of foundation is widely used in some Asian countries, existing design methods do not appear appropriate as they usually neglect the so-called soil plug effect and internal skin friction. The authors propose a bespoke design method based on cone penetration test correlations, able to account for the influence of compaction, plugging and friction fatigue effects on the bearing capacity of open-ended pipe piles. The method seems successful, as field tests conducted at two different locations in China show good agreement between measured and calculated pile capacity.

Next, we move back to Europe with the third paper, by Bellato *et al.* (2016), describing field testing in some peculiar geotechnical contexts of the Italian Alps, aimed at tentatively proposing a novel approach to calculate the shaft and base resistance of micropiles bored in very coarse, heterogeneous soils. Field test results show that neglecting the base resistance may result in excessively conservative design of micropiles, when installed in ground conditions that provide a very stiff response. The authors also show that applying existing design methods to the case examined does not lead to accurate results, and suggest a new approach based on the well-known β method, in which dilatancy, density and the stress level are considered. The reasonable agreement between measured and calculated bearing capacity confirms the suitability of the proposed method to deal with such peculiar soil conditions, although further investigation on the topic is desirable.

The last paper to be concerned with piled foundations in this issue is the fourth one, by Gorasia and McNamara (2016). Piles with enhanced shaft capacity obtained by adding outward protruding ribs, so-called ribbed piles, are considered. This solution appears promising for providing the required bearing capacity at reduced pile diameter and length compared to traditional bored piles, especially in highly urbanised areas where even the underground space can become congested. Ribbed piles could be installed relatively easily in overconsolidated clay, by profiling the ribs on the borehole surface using a bespoke tool prior to casting. The authors discuss the results of a series of centrifuge tests, highlighting the increase of pile capacity brought about by the ribs. A theoretical framework for design is also proposed based on existing approaches, and its effectiveness is demonstrated by comparison with test data. Despite the inherent idealisation of centrifuge modelling, and the need for developing viable equipment for real installations, results of this work suggest that ribbed piles potentially represent a significant advancement in piling technology.

Moving on from soils to rock engineering, the fifth paper, by Zou and He (2016), proposes a numerical approach to simulate the behaviour of circular tunnels in strain softening rock, taking into account the effect of the out-of-plane stress. The problem is tackled by subdividing the plastic region into a number of concentric rings and successively incorporating the

out-of-plane stress effect. This leads to the development of a step-wise calculation procedure, whose accuracy and practical applicability are demonstrated by comparison with existing theoretical solutions and through numerical examples. Results notably show that the residual and softening plastic radii and displacement increase with increasing out-of-plane stress, when this is the major or intermediate principal stress.

The sixth paper, by Bozorgzadeh and Harrison (2016), aims at establishing a methodology to determine the characteristic triaxial strength of rock as required in modern limit state design standards, such as the Eurocode. A certain lack of guidance in design documents is highlighted, as the strength of intact rock cannot be easily described with a single-parameter probabilistic distribution. The authors use published triaxial strength datasets to evaluate two statistical models, and suggest that the quantile regression model may be the most useful one to practising engineers. However, care must be taken with small datasets, as both methods may be unreliable. Hence, the need emerges to develop formal techniques that augment the limited test data.

Finally, the paper by Newman *et al.* (2016) is especially relevant to those operating in the ever-busy London subsoil, but also to anyone interested in learning about the engineering geology challenges in constructing a tunnel through a chalk formation. The authors describe the pre-construction modelling stages leading to selecting a slurry tunnel boring machine (TBM) as the most suitable option for tunnel construction, and discuss the TBM performance during construction. This interesting case study highlights the importance of identifying critical geological features during the ground investigation stage, for designers and TBM operators to be aware of possible problems that could arise during construction.

To conclude this issue, a discussion by Song *et al.* (2016) follows, providing clarifications on the topic of cut-off walls, inspired by an article published last year. Moreover, in the final pages of this issue our readers can find the reviews of four books on the topics of ground engineering, landslide risk assessment, soil liquefaction and stabilisation of contaminated soil.

I hope that you will find this issue interesting and that it will stimulate further discussion.

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