International Journal of Geosynthetics and Ground Engineering (2021) 7:100
https://doi.org/10.1007/s40891-021-00344-0

EDITORIAL

Guest Editorial for the Special Issue on "Soft Ground Improvement"

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Accepted: 22 November 2021 / Published online: 1 December 2021

Many big cities in the world are located in coastal areas where soft clays are deposited. In recent years, almost all big cities are expanding and the demand of using sites with soft soil deposits is increasing due to worldwide urbanization. Since soft clay deposits have low strength and high compressibility, for infrastructure constructions in those areas, ground improvement(s) is essentially needed for increasing the strength and stiffness of the deposits.

Although the development of soft ground improvement technique has a long history, it continuously developed with innovation of new materials to be used, new theories for analyzing the performance of the improvements, as well as accumulation of experience obtained from case histories. It is only a part of parcel of geotechnical engineering, but it has a large number of methods being used in the practice. Consequently, this Special Issue on 'Soft ground improvement' is not intended to include all aspects of the newest developments in soft ground improvement area, but rather to showcase some glimpses of the latest innovations and creativities, which we still believe will benefit both researchers and engineers working in this specific area.

After announcing the special issue, we received warm responses from the researchers as well as engineers and more than 15 papers were submitted within the specified period. There were a number of inquiries on whether the deadline for submission can be extended, but unfortunately due to the tight publication schedule we were unable to accommodate those requests. Although we did our best to manage the review process for the submitted articles, at the time to finalize this special issue, only 11 papers have been finally accepted. A few papers were rejected, but there are still some papers under review. We apologize to the authors of those papers. However, those successfully reviewed papers will be published in the future regular/general issues.

For these 11 papers [1–11] in this special issue, we would like to group them according to the ground improvement method being considered and then point out the key issue(s) investigated only in this editorial note. There are four articles dealt with new innovative techniques to increase efficiency of (vacuum) consolidation; four articles studied new technics of soft ground improvement using chemical/cement mixing method; one article studied replacement technique, one article investigated effects of microbial induced calcite precipitation on the strength and modulus of clays, and one article dealt with the site investigation using piezocone test for design of soft ground improvement. Additional descriptions of the aforementioned papers are as follows:

(1) *Consolidation techniques* Article 7:87 [4] experimentally studied the effect of air injection mode on the performance of air-booster vacuum consolidation and suggested a way of step-wise increase air pressure during the consolidation process. Article 7:93 [8] studied the vacuum dewatering of slurry using prefabricated horizontal drain (PHD) and proposed a method for predicting the variation of drainage rate from the PHD. Article 7:96 [10] investigated a field case history of combined vacuum pressure and embankment load induced consolidation with installation of prefabricated vertical drains (PVDs), and indicated that the existing design/analysis methods are valid and useful. Article 7:99 [11] experimentally investigated the displacement field around PVDs during vacuum consolidation using particle image velocimetry (PIV) technology, and suggested that the results can be used to design suitable (or optimum) spacing between adjacent PVDs.

(2) *Chemical/cement mixing* Article 7:82 [1] experimentally studied the effect of sodium alginate additive on reducing swelling potential of compacted clay, and for the soil tested, an optimum amount of additive of 0.75% by dry weight was suggested. Article 7:85 [2] experimentally investigated the method of using fly

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ash and cement to stabilize clayey sediments of lakes and reservoirs, and the optimized sediment/cement/fly ash mixtures to be used for road construction were suggested. Article 7:89 [5] experimentally studied the possibility of improving liquefiable sand by carbon material (i.e., biochar), and for the sand tested, adding 3–10% the biochar increased the number of loading cycle for inducing liquefaction of 30–50%. Article 7:95 [9] numerically investigated the behaviour of embankments on deep cement mixing formed column improved clay deposit, and for the cases investigated it has been concluded that the optimum values for area improvement ratio and elastic modulus of the columns were 30% and 100 MPa, respectively.

(3) *Replacement* Article 7:91 [6] experimentally as well as numerically studied the effect of replacing part of clay deposit by a layer of sand on the bearing capacity of the layered foundations, and for all the cases investigated, a significant increase in bearing capacity was observed.

(4) *Microbial induced calcite precipitation* Article 7:86 [3] experimentally investigated the effect of microbial induced calcite precipitation on improving the strength and modulus of compacted clays, and the results indicated that clays treated with bacterial spores exhibited greater strength improvements in the long term.

(5) *Site investigation using piezocone test* High quality site investigation is an essential issue for all geotechnical activities, and for soft ground improvement there is no exception. In Article 7:92 [7] numerically investigated the effect of micro-structure of soils on piezocone measurements, and their results showed the value of the empirical cone factor (N_{kt}) decreased with an increase in structural strength of the soil.

The Guest Editors of this special issue gratefully appreciate all contributors as well as graciously thank all reviewers for the Special Issue. We are also especially very thankful to Dr. Sanjay Kumar Shukla, Editor-in-Chief of this journal, for his strong support for the successful publication of this special issue.

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