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Editorial

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This May issue contains five interesting papers; four of them are dealing with settlements under earth structures and how to mitigate them. The last paper describes a reinforced foundation system to counter vibration amplitudes and impact forces.

The first paper is authored by Mitrani and Madabhushi (2010) and it focuses on remediation of subsoils with cementation to mitigate the structural settlements caused by seismic activity. The authors performed several centrifuge tests; two types of untreated soil configurations and cement-treated soil of different depths underneath the structures were physically modelled using centrifuge tests. Considerable reductions in settlements were achieved with full and partial depth treatments. The authors also noted that this type of remediation seems to have little effect on the accelerations transmitted to the structural elements. This paper also highlights the importance of physical modelling in evaluating the ground-improvement technologies for seismic studies.

The second paper is by Abdelrahman (2010) on a lightweight fill using blended sand, expanded polystyrene (EPS) beads and cement materials. If used as an embankment fill, this material can potentially reduce the total and differential settlements underneath the embankments. The focus of this research was on physical and strength properties. With an EPS-beads-to-sand blending ratio of 0.3–3%, the author noted a dry unit weight of 0.75–1.65 kg/m³. By adding cement, the blended mixture also showed enhanced shear strength parameters, which will make it a viable product for embankment application. This paper provides an important contribution to the construction of embankments that require strict settlement control (e.g. embankments supporting high-speed trains).

The paper by Ellouze *et al.* (2010) describes assessments of various methods, including Priebe's composite cell method, in predicting the settlements of soft clayey soils reinforced with stone columns. Three case studies and their field data were used in these assessments. The authors recommend methods other than Priebe's method for estimating settlements for stone-column-reinforced soft soils. They note that the recommendation was based on discussions on improvement ratio, design steps in the Priebe method and selection of elastic parameters. The editor anticipates further discussion on this topic which will examine or provide responses to the uncertainties mentioned in this paper.

The fourth paper, by Chai *et al.* (2010), discusses settlement prediction for soils improved by columns. The paper mainly deals with the development of a method using floating cement-stabilised columns and a slab system supporting embankment loading. This method was developed using a coupled finite-element analysis and a unit cell method and the approach was similar to the design of floating group pile foundation systems. The authors evaluated their method by comparing its predictions with various case studies in which cement columns were used to stabilise soft clayey soils in Japan; these comparisons are reported to be satisfactory. The editor feels that this is an important contribution in the field of deep soil mixing where settlement mitigation is one of the major application areas.

The fifth paper, by Heidari and El Naggar (2010), deals with a reinforced foundation system in the dynamic foundation field and provides a design methodology for such foundations. In this case, the foundation supports hammering systems that are used to break up and forge scrap metal. The main objective is to reduce vibration amplitude and impact forces transmitted by the hammering systems to subsoils. The design approach presented here is based on theoretical dynamic geotechnical concepts. A composite geosynthetic layer system was used as it enhances the overall stiffness of the treated soil, which in turn offers improved dynamic performance of the foundation system. Methodologies are presented on how to design foundation systems for both small and large hammer units.

The editor enjoyed reading these papers and hope readers will enjoy them too. Constructive discussion on these papers is always welcome and more details on the submission of discussion submissions can be found on the final page of each paper.

REFERENCES

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