

Editorial

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It is my pleasure to write the editorial for this issue of *Ground Improvement* as there are three invited papers from the keynote speakers of the International Symposium on Ground Improvement Technologies and Case Histories (ISGI09) held in Singapore in December 2009. The symposium was attended by around 200 delegates; half from Asia and half from outside of Asia. These invited papers have been reviewed in the usual process to ensure that the published papers are of a high standard and readily appreciated by readers of the journal.

The first invited paper by Raju and Daramalinggam (2012) reviews various ground improvement techniques undertaken in different ground conditions in a number of countries in Asia. This is made possible as the authors have gathered significant knowledge through a large number of ground improvement projects in Singapore, Malaysia, Vietnam, India and other Asian countries. With their vast experience, the authors review various ground improvement techniques and summarise the key features. They then evaluate the choice of technique adopted under different circumstances in a variety of environments. This is indeed useful to engineers who are inexperienced in ground improvement. For ground improvement works, the practical aspects involving installation, testing and verifications are equally as important as the design aspects. The large number of case studies presented in this paper is certainly beneficial to readers. The cases include the adoption of inexpensive and less time-consuming ground improvement techniques rather than expensive foundations to support large heavily loaded oil and chemical storage tanks, low-rise buildings, land reclamation perimeter bunds, and railways on swampy land. This paper provides a useful reference for engineers who are involved in ground improvement works, particularly for those working in Asia.

The second paper by Kitazume (2012) deals with the recently completed expansion of Haneda airport, Tokyo, Japan. This enables the airport to cater for international flights within Asia. Professor Kitazume of the Tokyo Institute of Technology is a ground improvement expert with many years of research in related topics at the Port and Airport Research Institute. Owing to poor ground conditions, large settlement is expected, resulting in necessary innovation in the ground improvement works such as the installation of sand compaction piles, sand drains and deep soil mixing. This is particularly crucial for the runway area which may affect flight landing and departure if the soft soils have not been treated successfully. Through programmes of careful and thorough quality control and assurance, the author demonstrates the important issue of ensuring the ground has been improved to

the required specifications for the given ground improvement technique adopted. In many countries, airports are constructed on unfavourable grounds and this paper is certainly beneficial to engineers who are involved in similar development.

Indraratna *et al.* (2012) present the use of vacuum and surcharge loading to improve soft soil. Professor Indraratna of the University of Wollongong, Australia, has conducted extensive research studies on vacuum consolidation for many years. Through a case study on the Ballina Bypass embankment, part of the highway linking Brisbane and Sydney, the authors conducted a comprehensive field study with extensive instrumentation to advance knowledge of vacuum consolidation together with surcharge for the given complex soft ground situations. They examine in detail the soil parameters before and after ground improvements. In addition, how the embankment moved in a lateral direction is presented. The authors report that vacuum pressure could effectively control the development of pore pressure in the embankment. Finally useful design charts on vertical drains are presented in the paper to evaluate both vertical and radial drainages, an improvement over existing design approaches.

Two other papers on the research of ground improvement are also included in this issue. Castro and Sagaseta (2012) examine pore pressure responses in stone columns, providing a useful fundamental study on this commonly used ground improvement technique. The authors conducted a field study for the construction of a ring road in marsh area in Sueca, near Valencia in Spain. The stone columns were installed by the vibro-displacement method causing the adjacent ground properties to be altered after ground improvement. A carefully planned soil investigation programme was undertaken and the authors performed laboratory tests to examine the soil properties before and after ground improvement. The pore pressure responses provided useful insight on the changes in pore pressures and hence stress changes in the soil throughout various stages of the installation of the stone columns.

The final paper by Juneja and Mir (2012) of the Indian Institute of Technology, Bombay, studies the behaviour of clay reinforced by sand compaction piles with smear in a triaxial cell. The effect of the smear zone on the sand compaction piles was examined through the pore pressure changes in the soil sample. It is interesting to note that the authors used the X-ray technique to examine the smearing of the composite soil in microscopic detail and the results are certainly useful. The paper reports that the smear zone degrades the composite soil strength by about 25%.

Of the five papers published in this issue, four are from Asia and Australia. I hope that you find the papers beneficial, in particular for those who wish to learn more about ground improvement projects from the two continents of Asia and Australasia.

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