Cite this article
Geng X (2024)
Editorial.
Proceedings of the Institution of Civil Engineers – Ground Improvement **177(4)**: 233–234,
https://doi.org/10.1680/jgrim.2024.177.4.233

Ground Improvement

Editorial

Xueyu Geng BEng, MEng, PhD, FICE, FGS, FHEA, CEng
Professor, School of Engineering, University of Warwick, Coventry, UK
(xueyu.geng@warwick.ac.uk)

On behalf of the editorial panel, I am delighted to welcome you to the fourth issue of *Ground Improvement*. This edition features seven insightful papers on various aspects of ground improvement, including stone column foundations, smear zones of vertical drains, soil enhancement with geosynthetics, and the impact of bio-cementation on steel slag materials.

The lead paper, authored by Serridge (2024), offers a comprehensive review of the vibro stone-column (VSC) techniques utilised in the UK over the past 50 years. It underscores significant advancements in VSC equipment and monitoring technologies, while also noting that the fundamental design approach has remained largely empirical and static since the 1970s. The paper discusses the predominant use of VSCs in commercial projects, which has often prioritised cost over innovation and full-scale field research. It further explores the environmental advantages of VSCs, current challenges in practice, and the necessity for more documented case studies and research to refine design methodologies.

The next paper by Arefpanah and Sharafi (2024) introduces a novel analytical solution for the radial and vertical drainage of stone column foundations under varying loads. This solution has been validated against related studies and centrifuge tests. It promises to advance the consolidation theory of stone column composite foundations and provides a foundation for predicting settlement in coastal areas.

In the third paper, Aparna *et al.* (2024) explore the impact of smear zone extent on soil consolidation characteristics under radial drainage. Their research reveals that a smear ratio greater than 4 results in soil behaviour akin to full remoulding. This condition decreases both the soil's undrained shear strength and its consolidation coefficient. The study underscores the necessity of accounting for smear effects when designing vertical drains for soil improvement.

In the fourth paper, Bajwa *et al*. (2024) assess the effectiveness of reinforcing soft clayey soil with a combination of polyethene and sand. Their study introduces a polyethene–sand–soft soil model that demonstrates a 155% increase in ultimate bearing capacity compared to soft soil alone and a 56% increase compared to sand-reinforced soft soil foundations. This enhancement is attributed to the tensile membrane action of the polyethene reinforcement, suggesting that this method is both viable and sustainable for improving soft soil foundations in civil engineering.

The fifth paper by Ashiq *et al.* (2024) explores the impact of polypropylene fibres (PPFs) on the engineering properties of Siwalik clay, prevalent in the Kashmir region of Pakistan. Through various tests on untreated and fibber-reinforced clay samples, the study reveals significant improvements in parameters such as unconfined compressive strength, tensile strength, cohesion, friction angle, and California bearing ratio. Moreover, the capital cost analysis and environmental hazard assessment confirm that PPFs are an environmentally safe and economically viable option for enhancing the performance of problematic soils.

In the sixth paper, Hamidi and Garousi (2024) investigate how the mean grain size of sand and the surface roughness of geomembranes affect the shear behaviour at the sand–geomembrane interface. The study reveals that the peak friction angle of the soil–textured geomembrane interface depends on various factors, including the mean grain size, inherent anisotropy, and the surface roughness of the geomembrane.

The final paper by Pakbaz *et al.* (2024) explores the effects of bio-stimulation and bio-cementation on electric-arc steel slag (EASS). Test results indicate that EASS, when subjected to bio-cementation, shows potential advantages in construction, including higher urease activity and calcite production compared to natural sand. However, after treatment, natural sand demonstrated slightly superior unconfined compressive strength, improved cohesion, and better permeability reduction.

I hope you find the diverse range of papers in this issue both informative and thought-provoking, sparking further discussion and advancements in the field of ground improvement. I would also like to express my gratitude to the authors, reviewers, editorial panel members, and the ICE publishing team for their invaluable contributions to this issue.

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