Cite this article
Vecchia GD (2025)
Editorial.
Proceedings of the Institution of Civil Engineers – Geotechnical Engineering **178(3)**: 274–275,
https://doi.org/10.1680/jgeen.2025.178.3.274

Editorial

Geotechnical Engineering

Editorial

Gabriele Della Vecchia PhD
Associate Professor of Geotechnical Engineering, Politecnico di Milano, Milan, Italy

As a Member of the Editorial Panel of *Geotechnical Engineering*, it is with great pleasure that I introduce the third issue of the journal for 2025. First of all, I would like to recognize the high-quality support of all the journal's reviewers and all the members of the Editorial Panel, that made possible the publication of this new issue.

At first glance, the topics covered in this issue may seem familiar to those in the field of excavations, urban tunnelling, piles used for slope stabilization, embankments, railway infrastructures, and cut-off walls. However, as any practicing engineer or researcher will recognize, a closer look reveals a more complex narrative. These papers demonstrate how established approaches and methods are being pushed to their limits to address the increasingly multifaceted challenges of our time—climate change, urban densification, aging infrastructure, and the emergence of new materials and technologies. The innovation presented in these contributions reflects a discipline that, while rooted in ancient practice, continues to evolve.

This issue features nine articles. The first two contributions cover aspects related to excavations in urban areas. The contribution of Prakhya *et al*. (2025) outlines the construction of a deep basement in central London using a mix of top-down and open excavation techniques, supported by temporary props to control ground movement. Ground movement and the effects on surrounding structures were closely monitored and compared with predictions from both simple models and detailed 3D finite element analysis. The prediction of deformations during deep foundation pit excavations near existing structures is addressed by Luo *et al*. (2025), who propose a simple method that combines the principle of minimum potential energy, linear elasticity theory, and the stratigraphic loss method to estimate lateral wall displacement and surface settlement, considering spatial effects. In this case as well, the method's accuracy is validated through comparisons with real engineering applications.

Field instrumentation plays a relevant role also in the paper of Jones and Grand (2025), which presents a 20-year study of strain gauges embedded in the sprayed concrete lining of a tunnel at Heathrow Terminal 4. Using the rate of flow method, measured strains were used to estimate stresses and compared with pressure cell data. Findings show an initial increase in compressive strain followed by a long-term decrease, likely due to groundwater pressure changes. Interestingly, the primary lining—though not designed for permanent loads—is bearing the full ground stress, while the secondary lining may only carry groundwater pressure.

The role of numerical analyses to deal with complex soil-structure scenarios is evident from the contributions of Islam *et al*. (2025) and Wang *et al*. (2025). The study of Islam *et al*. (2025) examines the risks posed by karst collapses to railways, focusing on the Beijing–Guangzhou railway line in China. Using the multi-source frequency domain method and finite element analyses, the Authors investigate factors like dynamic loading, groundwater fluctuations, and overburden thickness, showing that karst cavities in the railway embankment significantly increase vertical dynamic displacements and that groundwater fluctuations exacerbate these displacements. The study of Wang *et al*. (2025) vice versa exploits a 3D finite difference numerical analyses to validate a method proposed by the Authors to estimate the lateral pressure on rigid slope stabilization piles with Expanded Polystyrene (EPS) inclusions.

The need of continuous improvement in computational approaches is testified by the contributions presented in the following two articles, by Fisonga *et al*. (2025) and Wan and Doherty (2025). The paper of Fisonga *et al*. (2025) enhances the modified Cam clay model in the numerical code FLAC3D by introducing a calibration method using an isotropic pre-consolidation pressure multiplier, while the paper of Wan and Doherty (2025) presents a data-driven approach for predicting embankment settlement on soft soils using constant rate of strain (CSR) test data. By integrating CRS data directly into an automated analytical process, the method eliminates subjective soil parameter assignment, reducing manual effort and user-dependency.

The last two articles explore other fundamental applications of geotechnical engineering, further expanding the scope of this issue. The contribution of Xu *et al*. (2025) examines shear behaviour at geosynthetics–calcareous sand interfaces, relevant for reinforced revetment internal stability. Large-scale shear tests were conducted on geotextile, geogrid, and unreinforced calcareous sand under varying normal stresses (25–100 kPa). Results show that geotextile and geogrid reinforcement significantly impact interface dilatancy and the interface peak cohesion. The paper of Li *et al*. (2025) deals with the impact of seawater on bentonite-based cut-off walls used for coastal protection against seawater intrusion. Various bentonite mixtures were tested to assess the effects of seawater on workability, strength, and permeability, providing valuable guidance for the design of cut-off walls in coastal areas.

I hope that all readers enjoy this issue of *Geotechnical Engineering*.

REFERENCES

Fisonga M, Hu Y, Han S, Deng Y and Kaunda RB (2025) New numerical technique for the inbuilt modified cam clay constitutive model in Flac3D. *Proceedings of the Institution of Civil Engineers – Geotechnical Engineering* **178(3)**: 351–365, https://doi.org/10.1680/jgeen.23.00225.

Islam N, Linrong X, Usman AB *et al.* (2025) Study on field and numerical analysis of karst collapse as railway hazard. *Proceedings of the Institution of Civil Engineers – Geotechnical Engineering* **178(3)**: 324–338, https://doi.org/10.1680/jgeen.24.00242.

Jones BD and Grand C (2025) Strains in sprayed concrete tunnel linings at Heathrow terminal 4 and back-calculation of stress. *Proceedings of the Institution of Civil Engineers – Geotechnical Engineering* **178(3)**: 307–323, https://doi.org/10.1680/jgeen.23.00213.

Li W, Ting MZY, Qin J and Yi Y (2025) Effects of seawater on properties of bentonite cut-off walls with/without cement addition. *Proceedings of the Institution of Civil Engineers – Geotechnical Engineering* **178(3)**: 393–404, https://doi.org/10.1680/jgeen.24.00244.

Luo L, Zheng Y, Wang R, Ren X and Zhang Y (2025) Method for predicting deformation field of deep foundation pit considering spatial effect. *Proceedings of the Institution of Civil Engineers – Geotechnical Engineering* **178(3)**: 290–306, https://doi.org/10.1680/jgeen.23.00096.

Prakhya G, Vekaria K, Crompton C and Patel D (2025) Construction of a deep basement with a single-level prop – prop forces and wall movements. *Proceedings of the Institution of Civil Engineers – Geotechnical Engineering* **178(3)**: 276–289, https://doi.org/10.1680/jgeen.22.00177.

Wan X and Doherty J (2025) Data-driven forecasting of embankment settlements on soft soils using constant rate of strain test data. *Proceedings of the Institution of Civil Engineers – Geotechnical Engineering* **178(3)**: 366–377, https://doi.org/10.1680/jgeen.23.00327.

Wang S, Wang J, Chen Y and Zhang Y (2025) Method for calculating lateral earth pressure on rigid anti-slip piles with EPS inclusions. *Proceedings of the Institution of Civil Engineers – Geotechnical Engineering* **178(3)**: 339–350, https://doi.org/10.1680/jgeen.24.00276.

Xu L, Wang R, Chen J, Wang X and Meng Q (2025) Study on monotonic direct shear characteristics of geosynthetics–calcareous sand interface. *Proceedings of the Institution of Civil Engineers – Geotechnical Engineering* **178(3)**: 378–392, https://doi.org/10.1680/jgeen.23.00331.