Editorial

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This Special Issue includes eight recent case histories that demonstrate the developments and applications of geotechnical risk assessment and management approaches in engineering practice.

The inherent variability of geomaterials and the associated uncertainty in their properties have long been recognized as key contributing factors to project risks. Recent years have seen rapid theoretical developments on the characterization and evaluation of geotechnical uncertainty, and the approaches that quantify the propagation of such into risks in engineering system performance. This Special Issue is a showcase of these various aspects, with studies adopting a wide range of techniques from geostatistical analysis, random field modelling to machine learning approaches, addressing practical issues that include subsurface characterization, performance of dams and embankments, geogrid-reinforced soil walls, soil liquefaction and beyond. As such, the Special Issue was prepared with the aim to bridge the gap between research and practice in areas of geotechnical risk assessment and management.

Among the eight reported case histories, Stuedlein et al. quantify the changes in spatial variability features of the soil following various ground improvement methods and illustrate how these some subsurface characteristics can be correlated to distributions of liquefaction-induced settlements. Di Curzio and Vessia adopt the Partially Heterotopic Co-Kriging technique as the geostatistical tool to construct three-dimensional subsoil mechanical model with CPT data, while Shuku and Ching outline two sparse machine learning methods, namely sparse Bayesian learning and least absolute shrinkage selection operator (Lasso) and compare their methodological features and performances in subsurface strata characterization, also utilizing CPT data. Machine learning techniques also find applications in landslide studies, as Tang et al. demonstrate the potentials of the long short-term memory (LSTM) neural network model, through predictions of slope displacements at the Three Gorges Reservoir area in China. The significance of risk and reliability assessments is also demonstrated by Bathurst and Allen, who investigate the internal stability of geosynthetic mechanically stabilized earth (MSE) walls with reliability index and deterministic factor of safety. Shibata et al. present the evaluation of failure risks of earth-fill dams, defined as the product of failure probability and damage costs, while Huang et al. present the settlement predictions of a trial embankment using Bayesian updating approach in conjunction with monitoring data. Meanwhile, Fraser and Theunissen discuss the various considerations and risk management approaches for the design and construction of a Cutter Soil Mix (CSM) wall that supported the excavation of a basement.

It has been a privilege to serve as guest editor for this Special Issue, which is the perfect role to witness the new developments in risk assessment and management approaches and their applications in recent projects. We greatly appreciate the work by all the authors and reviewers who contributed to the high-quality submissions. We would also like to thank the Journal editors and staff for the opportunity to put together this Special Issue, and for their assistance throughout the process.

Reference: Leung, A.Y.F. (2021). Editorial. International Journal of Geoengineering Case Histories, https://www.geocasehistoriesjournal.org/, Vol.6, Issue 4, p. i - ii. doi: 10.4417/IJGCH-06-04-00.

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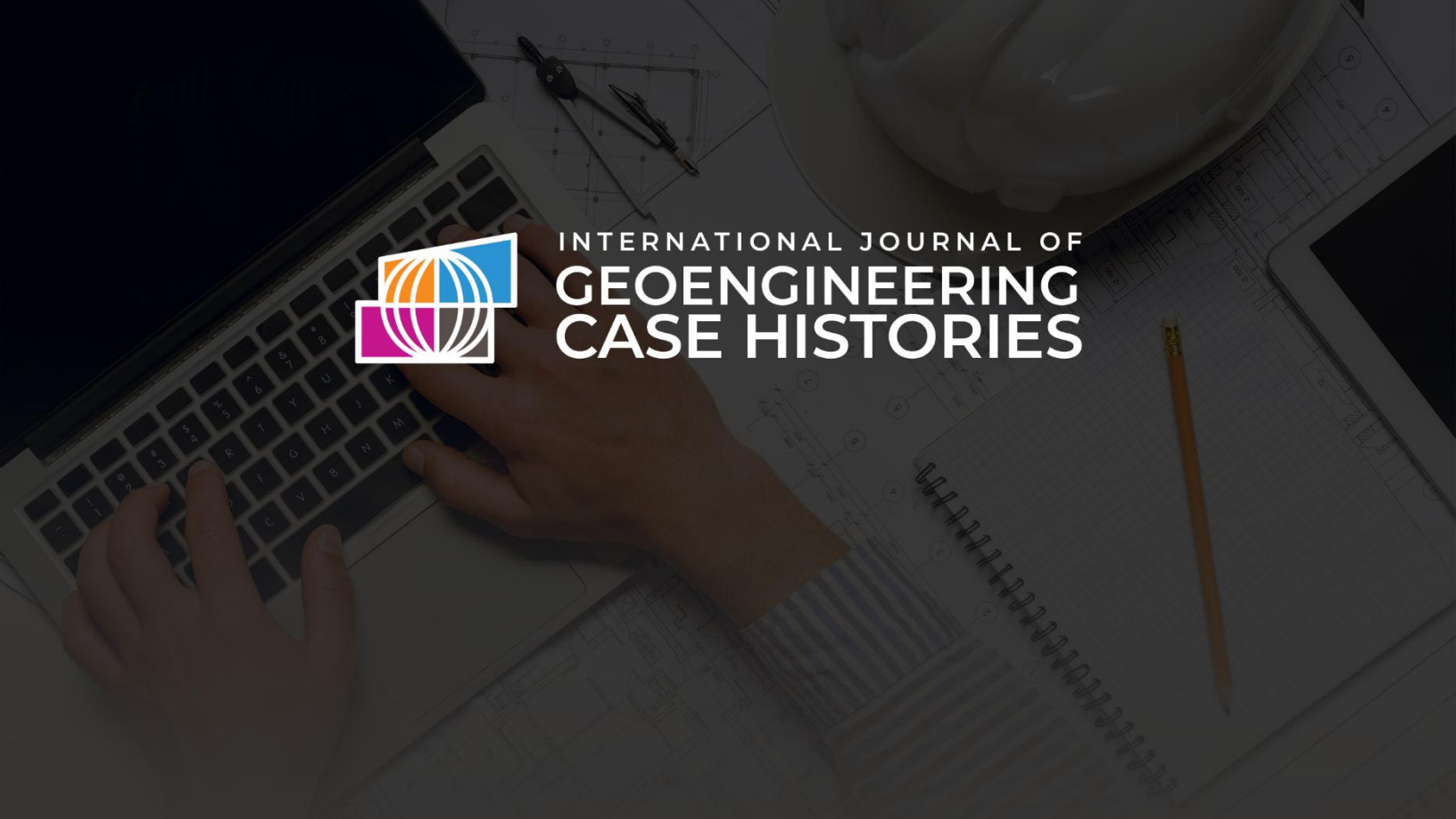
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