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EDITORIAL

Modelling spatial variability in geotechnical engineering

By the very nature of their origins and deposition, soils and rocks are variable spatially in their engineering properties, especially in the vertical direction. This variability is rarely taken into account directly in traditional geotechnical analysis. In the last two decades, the geotechnical community has begun to use probabilistic methods to take spatial uncertainties directly into account. The importance of modelling spatial variability has been demonstrated extensively in the literature. One obvious example is that spatial variability cannot be ignored if the differential settlement of a foundation is critical. Modelling spatial variability is also important for risk assessment in other areas of geotechnical engineering. For example, randomly distributed spatial variability in the shear strength of a slope, may lead to many different possible critical failure mechanisms over a suite of Monte-Carlo simulations. A deep slope failure mode would potentially have more severe consequence than a shallow one. It is thus important to model spatial variability in a rigorous way in any problem involving collapse of soil masses.

As a result of the general worldwide interest in the topic, we organised a special issue "modelling spatial variability in geotechnical engineering". The special issue, appearing as Vol. 10, Issue 1 of Georisk, contains invited contributions from Australia, USA, France, Taiwan China, Japan, Norway and Ireland. The majority of the special issue uses the Random Finite Element Method or the Random Finite Element Limit Analysis. Both static and dynamics problems are tackled. Static applications include the effects of spatial variability on elastic moduli and compressive strength of soils, bearing capacity of buried footings and slope stability. Dynamic applications include seismic risk analysis of treated ground soil foundations and reliability-based design of earth-fill dams subjected severe earthquakes. We are also happy to see an application of Bayesian statistical methods for the classification of cone penetration data. We would like to express our gratitude to the contributing authors and reviewers of the articles in this special issue and to the editors of *Georisk* for supporting this effort. The papers are in alphabetical order of the first author's last name.

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