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Editorial

Special Issue on the Geo-Environmental Problems Caused by Underground Construction

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Geo-environmental disturbances refer to the significant changes in physical, mechanical, and even chemical properties of soils; are closely related to interrelated multi-physical field coupling systems of solid particles, water, and gas in the shallow stratum; and are caused by underground engineering construction. The evaluation of the possible geo-environmental hazards is an important, noteworthy topic that is relevant to researchers and engineers involved in the construction of large-scale underground engineering. This is related to the suitability of civil engineering construction, especially for some complicated geological conditions such as saturated super soft soil, laterite, loess, sand gravel stratum, saline soil, frozen soil, and karst stratum with rich water.

The goal of this Special Issue is to present the recent developments in the interaction between the coupled multi-physical fields and underground structures, as well as the geo-environmental effect, to stimulate fruitful technical and scientific exchange between professionals.

This Special Issue features nine papers covering the various fields of geo-environmental problems caused by underground construction. Zhao et al. [1] carried out some field monitoring and numerical simulation work in super-large span twin tunnels and discussed the vault settlement, the stress of concrete, and the sum pressure. Zhang et al. [2] used the GEO-Studio finite element software to explore the influence of the comprehensive slope rate on the permanent displacement when the slope rate of each grade of multi-stage loess slope changes and the stage of multi-stage slope changes. Additionally, Su et al. [3] completed a large model test of a foundation pit supported by a pile anchor with a geometric similarity ratio of 1:10. In their paper, the researchers discussed the force and deformation characteristics of the support structure by simulating the conditions of additional load at the pit edge, soil layered excavated, and anchors tensioned. Zhang et al. [4] derived calculation formulas of stability factors under the four arc slip surfaces of filled slopes reinforced by a frame with prestressed anchor plates by using the improved Bishop method and proposed a search method for the most dangerous slip surface. Additionally, Zhao et al. [5] conducted some capillary rise tests on soil columns containing three layers of sandy soils with coarser over finer over coarser sandy soil to investigate the effect of the relatively finer soil interlayer. Jiang et al. [6] reported the results from a field investigation to determine the influence of groundwater in the process of tunnel excavation and established a hydrogeological model of the region from the inverted regional natural flow field parameters. Meanwhile, Wang et al. [7] used a numerical simulation method to establish a model of multi-seam goafs with different spacing conditions to investigate the subsidence reduction effects of various grouting schemes. Baraibar et al. [8] discussed a special procedure for injecting cement and microcement to waterproof the surrounding drilling area, thus preventing tunnels from functioning as a drain for an aquifer. Lastly, Wang et al. [9] numerically simulated four semicircular stratified sandstone specimens with different strengths and seven different bedding angles using RFPA2D-Basic V2.0 software—these research results can provide a theoretical reference for the safety and stability of underground engineering. Overall, the research presented in this Special Issue will enrich the perspective on the disturbance and environmental effects of geotechnical engineering construction.

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Although the submissions for this Special Issue have been closed, more in-depth research is still needed in the field of geo-environmental and construction disturbance to continue to address the many challenges that still need answers, such as construction disturbance effect, geo-environmental problems of special soils, environmental influence of energy pile, and seepage under multi-field coupling.

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