

Validation of Coupled Simulation of Excavations in Saturated Clay: Camboinhas Case History

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Abstract: This paper presents the results of an elastoplastic finite-element back analysis of an excavation made on a saturated soft organic clay deposit in Rio de Janeiro, Brazil. The excavation was conducted as part of an urbanization program, in which artificial islands were to be created in a swamp along the margins of the Camboinhas Lagoon. An extensive laboratory testing program was performed on undisturbed soil samples to characterize the stress-strain-strength behavior of the involved materials. Results from this laboratory testing program were used to calibrate a nonassociated elastoplastic constitutive model implemented in the ANLOG (Nonlinear Analysis of Geotechnical Problems) code. This code is based on the finite-element method and is capable of conducting fully coupled analyses by using a variety of constitutive models. Coupled analyses were performed to simulate the Camboinhas excavation, which was conducted under plane strain condition. Field measurements of both displacements and pore-water pressures obtained during the excavation are compared with the results of the numerical simulation. Analyses of the results show that monitored in situ and numerical results are in good agreement.

Full reference:

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