

COUPLED ANALYSIS OF EXCAVATIONS IN SATURATED SOIL

Christianne de Lyra Nogueira, D.Sc.¹; Roberto Francisco de Azevedo, Ph.D.²; and Jorge Gabriel Zornberg, Ph.D., P.E., M.ASCE³

Abstract: This paper presents finite-element analyses of excavations by using a coupled deformation and flow formulation. Specific numerical procedures were implemented into the finite-element codes to simulate the excavation construction and to solve the nonlinear coupled system. The paper discusses results of two generic excavations, with analyses conducted using different constitutive models and different excavation rates. Although the constitutive model affected the magnitude and distribution of the excess of the pore-water pressure due to the excavation process, the constitutive models only slightly influenced the dissipation rate of the excess pore-water pressure. Excavation rates that were one order of magnitude smaller than the hydraulic conductivity of the soil led to results representative of drained processes. Because of the slow rate needed for drained conditions, partially drained conditions normally prevail during excavations, highlighting the importance of coupled analyses.

Full reference:

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