

Abstract

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Finite Element Analysis of Soil Diaphragm Wall Interaction During the Construction of New Adjacent Building

This study is performed to investigate the influence of new building on the wall diaphragm of Shubra Elmezallat Metro Station, Cairo, Egypt. The building is located east of the station. The structural system of the building is reinforced concrete skeleton on raft foundation, rested on piles. The project consists of commercial ground floor, three administrative floors, and eight residential floors. The main goal of this study is to predict the influence of the proposed building on Shubra Elmezallat Metro station, using finite element analysis. The study includes the prediction of the stresses and deformations due to different loading cases. The used constitutive model for this analysis contains elasto-plastic materials. A yielding function of the Mohr-Coulomb type and a plastic potential function of the Drucker-Prager type are utilized. A linear constitutive model is employed to represent the station skeleton. The effects are expressed in terms of settlement and horizontal deformation of the station skeleton. The study includes the prediction of the settlement, the relative movements, the skeleton stress under different loading steps. The description of the used model, the output results, and the final conclusion are presented in this paper.