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Using numerical modeling method for design and constructive controlling of excavation wall in Madison Building, Ho Chi Minh city

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ABSTRACT

The basement of a high-rise building is the optimal space for technical systems and parking. However, the construction in narrow urban areas usually has many unstable hazards. In this study, a numerical model has been established and calibrated using the finite element method on Plaxis 2D software that allowed well control of the design and construction processes of the Madison Building basement. The model covers all structural elements and complex engineering geology conditions. Displacements of the excavation wall and surrounding ground base subsidence were analyzed corresponding to the constructive phases of three basements. The analysis results of the numerical model were consistent with the actual construction process that is useful for design and constructive controlling of the excavation wall.

1. Introduction

Currently, one of the most widely used urban design solutions in Vietnam is high-rise buildings that could provide several residential units. In high-rise buildings, basements are mostly used for parking space and technical systems. Basement design in high-rise buildings has achieved good performance and is suitable for urban construction. However, the construction often gets unstable geotechnical hazards, especially in narrow urban conditions. The basement construction changes the state of stress, deformation of ground base surrounding excavated area, water table,... These problems could lead to ground base displacement, surrounding projects damage if there is a lack of suitable solutions. Therefore, displacement prediction of excavation wall and surrounding ground base subsidence become an urgent task in

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