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Treatment Technology for Seepage in Foundation Pit Retaining Structures Under Existing Buildings - Postprint

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Abstract

The Dongjiekou Station of Fuzhou Urban Rail Transit Line 4 Phase I Project is located in the downtown area, constituting a three-level underground station featuring a cross interchange with Line 1. The surrounding environment is complex, with certain foundation pit retaining structures positioned immediately adjacent to existing buildings. Specifically, the diaphragm wall on the southern side of the western section was constructed by the neighboring shopping mall as an agent and is located directly approximately 6 m beneath the basement slab of the shopping mall. During foundation pit excavation, water leakage was identified in the retaining structure completed by the adjacent shopping mall. Through a combined construction process comprising pre-sealing by interior grouting at leakage points, pre-sealing by grouting through pilot holes beneath existing buildings on the exterior side of leakage points, and steel plate sealing during excavation, the leakage points were successfully sealed, thereby ensuring the safety of foundation pit excavation and structural construction. This article elaborates on the water leakage treatment methodology for foundation pit retaining structures immediately adjacent to existing buildings, drawing upon the case study of diaphragm wall leakage treatment at the Dongjiekou Station foundation pit of Fuzhou Urban Rail Transit Line 4 in proximity to existing buildings, thus providing a reference for projects under similar working conditions.

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Full Text

Introduction to Treatment Techniques for Water Seepage in Foundation Pit Retaining Structures Underneath Existing Buildings

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Abstract

The Dongjiekou Station of Fuzhou Urban Rail Transit Line 4 Phase I is located in the city center area, serving as an underground three-level interchange station with Line 1. The project site features a complex surrounding environment, with portions of the foundation pit retaining structures positioned immediately adjacent to existing buildings. Specifically, the underground diaphragm wall on the south side of the west section was constructed by a neighboring shopping mall and is situated approximately 6 meters below the mall' s basement slab. During excavation, water seepage was discovered in this retaining structure. Through a combined construction methodology that included grouting pre-sealing from the interior side of leakage points, grouting pre-sealing via drilled holes from the exterior side beneath the existing building, and steel plate sealing during excavation, the leakage points were successfully sealed, ensuring the safety of both excavation and structural construction operations. This paper presents a case study of the water seepage treatment for the diaphragm wall at the Dongjiekou Station of Fuzhou Urban Rail Transit Line 4, where the retaining structure was adjacent to existing buildings. The treatment techniques described herein provide a valuable reference for similar engineering scenarios.

Keywords: existing buildings; retaining structure; water seepage; grouting; leak stopping; anti-blowout device

Note: Figure translations are in progress. See original paper for figures.

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