Research on Ultra-Deep Diaphragm Wall Trenching Technology Under Complex Geological Conditions (Postprint)

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Abstract

The trenching of ultra-deep diaphragm walls when traversing adverse geological conditions is characterized by poor trenching quality, low efficiency, and high costs, exerting significant influence on subsequent foundation pit excavation, stability, and main structural quality. This study, focusing on the construction of diaphragm walls under complex geological conditions at Dongdaqiao Station of Beijing Rail Transit Line 28, identifies high-efficiency trenching equipment, proposes technical measures for precise control of trench wall verticality, summarizes management protocols for combined trenching equipment operations, and resolves critical construction challenges including slow trenching in complex geology, low verticality precision, and high safety risks.

Full Text

Preamble

Research on Trenching Technology for Ultra-Deep Diaphragm Wall Under Complex Geological Conditions

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Abstract

Trenching for ultra-deep diaphragm walls through adverse geological formations is often characterized by poor quality, low efficiency, and high costs, significantly impacting subsequent foundation pit excavation, stability, and structural quality. Focusing on the diaphragm wall construction at Dongdaqiao Station of Beijing Rail Transit Line 28 under complex geological conditions, this paper identifies efficient trenching equipment, proposes technical measures for precise

control of wall verticality, and summarizes management protocols for combined equipment operations. These approaches effectively resolve critical construction challenges, including slow trenching progress, inadequate verticality precision, and elevated safety risks.

Keywords: diaphragm wall; complex geology; trench wall stability; verticality

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