Key Technologies for Arrival of Extra-Large Diameter Shield Machines in Coastal Composite Strata (Post-Print)

Authors: Rui Zhang, Diao Xianqian

Date: 2025-07-29T19:11:10+00:00

Abstract

As a critical component of shield tunneling construction, large-diameter shield arrival technology involves complex processes with substantial risks. To mitigate hazards such as water seepage, sudden inrush, cracking, and settlement during shield reception in shallow overburden and highly permeable strata, this paper draws upon the Chunfeng Tunnel project as a case study to elaborate on comprehensive measures including shaft end reinforcement, reception guide platform, steel sleeve reception, portal sealing device installation, and shield reception parameter control. These integrated approaches effectively resolve the significant risk issues associated with large-diameter shield reception under such geological conditions, ensuring the successful reception of large-diameter slurry shields in shallow overburden and highly permeable strata.

Full Text

Preamble

Study on Key Technologies for Super-Large Diameter Shield Arrival in Coastal Composite Strata

Zhang Rui, Diao Xianqian

Guangzhou Metro Engineering Consulting Co., Ltd., Guangzhou 510000, China

Abstract

The arrival phase of super-large diameter shield tunneling represents a critical yet technically complex component of the shield tunneling method, entailing substantial construction risks. To mitigate hazards such as water seepage, sudden inrush, ground cracking, and excessive settlement during shield reception

in shallow overburden and highly permeable strata, this paper draws upon the Chunfeng Tunnel project as a case study. The study systematically elaborates on integrated measures encompassing working shaft end reinforcement, reception platform construction, steel sleeve reception, portal sealing device installation, and precise control of shield arrival parameters. These comprehensive strategies effectively address the significant risks associated with super-large diameter slurry shield reception under challenging geological conditions, thereby ensuring successful shield arrival operations in such composite strata.

Keywords: super-large diameter; composite stratum; reception; steel (short) sleeve sealing

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