Construction Technology for Internal Structures of Single-Bore Double-Track Shield Tunnels in Urban Rail Transit (Postprint)

Authors: Wang Yichen

Date: 2025-08-20T00:00:00+00:00

Abstract

Against the backdrop of integrated development of urban rail transit and various railway systems in China, the application of single-tube double-track shield tunnels is increasingly growing. Compared with conventional double-tube double-track tunnels, these structures feature larger diameters and more complex internal configurations, necessitating the installation of a middle partition wall, and their construction techniques differ significantly from those of single-track tunnels: within the limited cross-section, it is necessary to coordinate the prefabrication, installation, and cast-in-place construction of diverse structural components such as portal frames, middle partition walls, and curved segments, while conducting specialized optimization for the transportation, positioning, and joint connections of large prefabricated elements. This paper selects several typical single-tube double-track shield tunnel projects in China, elaborates on the conventional procedures for internal structure construction in such tunnels, summarizes the design and construction techniques employed in each project' s internal structure, and performs a comparative analysis from perspectives including construction efficiency, structural segmentation, degree of internal prefabrication, and tunnel length, thereby providing valuable references for engineering technical solutions in future similar construction endeavors.

Full Text

Preamble

Construction Technology of Internal Structures in Single-Tube Double-Track Shield Tunnels for Urban Rail Transit

Wang Yichen[1]

[1]Shanghai Tunnel Engineering Co., Ltd., Shanghai 200000, China

Abstract

Against the backdrop of integrated development between urban rail transit and various railway systems in China, single-tube double-track shield tunnels are being increasingly deployed. Compared with conventional double-tube double-track tunnels, these structures feature larger diameters and more complex internal configurations that require central partition walls. Their construction techniques also differ significantly from those of single-track tunnels, as they necessitate the coordinated prefabrication, installation, and cast-in-place construction of multiple structural components—including rectangular frames, central partition walls, and curved segments—within a confined cross-section. Specialized optimization is therefore required for the transportation, positioning, and joint connections of large prefabricated elements.

This paper examines several typical single-tube double-track shield tunnel projects in China to delineate the conventional construction sequence for internal structures. It synthesizes the design and construction methodologies employed across these projects, offering a comparative analysis based on construction efficiency, structural segmentation, degree of internal prefabrication, and tunnel length. The findings provide valuable technical references and engineering solutions for future similar projects.

Keywords: Rail transit; Regional railway; Single-tube double-track; Tunnel internal structures

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