Postprint: Assembly Technology for Prefabricated Central Partition Walls in Ultra-large Diameter Shield Tunnels

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Abstract

The Shanghai Suburban Railway Airport Link Line Project marks the first implementation in China of fully prefabricated assembly technology for interior structure construction in super-large diameter shield tunnels. The tunnel, with an outer diameter of 13.6 m and inner diameter of 12.5 m, utilizes prefabricated central partition walls of "inverted T-type" configuration. Each wall segment measures 1990 mm in length, 400 mm in thickness, and 9262 mm in height, weighing approximately 20.4 tonnes, thereby creating a high-speed railway tunnel featuring a single tube with double tracks. The project entailed the development of specialized assembly fixtures and transportation equipment for the central partition walls, establishment of assembly procedures, and formulation of precision control standards. Through continuous optimization of construction techniques during implementation, the assembly efficiency was significantly improved, installation deviations were substantially reduced, and overall construction quality was enhanced. This technology offers valuable mature experience for subsequent fully prefabricated assembly construction of interior structures in super-large diameter shield tunnels, demonstrating excellent potential for widespread promotion and application.

Full Text

Preamble

Prefabricated Intermediate Wall Assembly Technology for Super Large-Diameter Shield Tunnels

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Abstract

The Shanghai Airport Link Line project represents the first application of full prefabricated assembly technology for internal structures in super large-diameter shield tunnels within China. The tunnel features an outer diameter of 13.6 m and an inner diameter of 12.5 m. The prefabricated intermediate wall adopts an inverted T-shaped configuration, with each segment measuring 1,990 mm in length, 400 mm in thickness, and 9,262 mm in height, and weighing approximately 20.4 tonnes. This design creates a single-tube, double-track high-speed railway tunnel configuration.

To support this innovative approach, dedicated assembly equipment and transport devices were developed, a comprehensive assembly process was established, and precision control standards for intermediate wall installation were formulated. Through continuous optimization of construction techniques during implementation, the assembly efficiency was significantly improved, installation deviations were substantially reduced, and overall construction quality was enhanced.

This technology provides valuable, mature experience for subsequent super large-diameter shield tunnel projects employing full prefabricated assembly methods, demonstrating excellent potential for widespread application and promotion.

Keywords: super large-diameter shield tunnel; prefabricated structure; intermediate wall; assembly

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