Thrust Control Technology for Shield Tunneling Undercrossing Existing Lines in Close Proximity in Soft Ground: Postprint

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Abstract

This paper, based on the close-distance undercrossing of the existing Line 3 by the Jiucheng ventilation shaft—Shengcheng Avenue Station interval of Nanjing Metro Line 5 Section TA01, introduces a series of targeted measures adopted during shield tunneling through soft ground beneath the existing line under conditions of poor deformation of the existing tunnel. These measures ensured that the settlement of the existing tunnel satisfied requirements while simultaneously guaranteeing the safety and quality of the completed tunnel itself. Furthermore, the paper provides a targeted summary of the advance parameters during the undercrossing process and conducts a comprehensive analysis of settlement data from the existing line tunnel, thereby offering an effective reference for construction parameter setting in future undercrossing projects involving existing lines in soft ground conditions in the Nanjing area.

Full Text

Shield Tunneling Control Technology for Close-Distance Underpassing of Existing Lines in Soft Ground

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Abstract

This paper presents a case study of the Nanjing Metro Line 5 TA01 section between Jiucheng Ventilation Shaft and Chengxin Avenue Station, where shield tunneling was executed in close proximity beneath the existing Line 3 in soft ground conditions. Given the poor deformation characteristics of the existing

tunnel, a series of targeted measures were implemented during the undercrossing to ensure that settlement of the existing tunnel remained within permissible limits while simultaneously guaranteeing the safety and quality of the newly constructed tunnel. Furthermore, the tunneling parameters employed during the crossing were systematically summarized, and settlement data for the existing tunnel were comprehensively analyzed. These findings provide valuable reference for construction parameter selection in future undercrossing projects involving existing lines in soft ground conditions in the Nanjing region.

Keywords: soft ground; close-distance; orthogonal undercrossing; settlement of existing line; parameter setting

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