Postprint Summary of Construction Technology for Earth Pressure Balance Rectangular Pipe Jacking Undercrossing Urban Arterial Roads in Shallow Overburden Conditions

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Abstract

In modern urban subway construction, the construction of connecting passageways between subway stations and entrances/exits represents a technically demanding and high-risk engineering task. Particularly in areas with shallow overburden depth, the application of pipe jacking construction technology becomes especially critical. When pipe jacking machines traverse beneath urban arterial roads, the risks are substantial due to the complex underground pipeline networks and dense traffic flow. This paper selects the pipe jacking construction project for ancillary structures at Chisha Station as a case study, providing an in-depth analysis of the safe undercrossing of busy urban arterial roads using a rectangular earth pressure balance pipe jacking machine under shallow burial conditions. The article not only elaborates on pre-construction preparations but also meticulously expounds on the key technical points of supervision and control during construction, including precise control of jacking speed, rational arrangement of excavated soil volume, ensuring grouting pressure stability, and real-time monitoring of the construction environment. Through the recording and analysis of these critical data, this study aims to provide detailed reference and guidance for future projects that may encounter similar construction challenges, thereby reducing risks and improving construction efficiency and safety.

Full Text

Preamble

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Abstract

In modern urban subway construction, the construction of connecting passages between subway stations and entrances/exits is a technically demanding and high-risk engineering task. Particularly in areas with shallow overburden depth, the application of pipe jacking construction technology is especially important. When a pipe jacking machine traverses beneath urban arterial roads, the risks are considerable due to the complex underground utility networks and dense traffic flow above. This paper selects the pipe jacking construction project for the ancillary structures of Chisha Station as a case study, providing an in-depth analysis of the safe undercrossing of busy urban arterial roads using a rectangular earth pressure balance pipe jacking machine under shallow burial conditions. The article not only details the preparatory work before construction but also elaborates on the key technical points for monitoring and control during the construction process, including precise control of jacking speed, rational management of excavated soil volume, ensuring stability of grouting pressure, and real-time monitoring of the construction environment. Through the recording and analysis of these critical data, this paper aims to provide detailed references for future projects that may encounter similar construction challenges, in order to reduce risks and improve construction efficiency and safety.

Keywords: shallow overburden; rectangular earth pressure balance pipe jacking; urban arterial road; monitoring and control; parameter analysis

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