

城市环境下TBM施工对围岩稳定性影响的监测分析及支护参数优化

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MONITORING AND ANALYSIS OF INFLUENCE OF TBM CONSTRUCTION ON SURROUNDING ROCK STABILITY UNDER URBAN ENVIRONMENT AND SUPPORTING PARAMETERS OPTIMIZATION

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摘要

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摘要 重庆市轨道交通六号线一期五里店站—山羊沟水库节点工程是TBM首次应用于城市轨道交通的试验段工程, 为研究施工期间隧道围岩的稳定情况, 进行大量的现场监控量测。基于现场监测数据, 研究拱顶沉降、围岩深部位移、锚杆轴力、钢拱架内力及围岩接触应力的分布特性及变化规律, 并通过数值模拟进行支护参数优化, 为隧道后续施工及设计方案优化提供依据, 也可为TBM在类似城市环境中的应用提供参考。

关键词: 隧道工程 隧道掘进机(TBM) 围岩稳定性 监测与分析 支护参数优化

Abstract: The section from Wulidian to Shanyanggou Reservoir Station in Chongqing Transit Line 6 is the testing project, in which the tunnel boring machine(TBM) was firstly employed as a tool for the construction of urban rail transit. To investigate the stability of the surrounding rock of tunnel in construction, a large number of in-situ monitorings were conducted. Based on the monitoring data, the variation laws and distributions of the vault settlement, displacement in deep surrounding rock, axial force in bolt, internal force in steel arch and contacting stress with surrounding rock were analyzed in detail. Then, the supporting parameters optimization was accomplished using numerical simulation. The research is beneficial to fundamentally guide the follow-up construction of the tunnel and the design scheme optimization. The proposed technique has potential applications to a large range of urban construction engineering using TBM technology.

Keywords: tunnelling engineering tunnel boring machine(TBM) surrounding rock stability monitoring and analysis supporting parameters optimization

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