

重大工程实践

超前探测中探地雷达应用与结果的处理分析

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摘要:

在隧道施工中,由于地质条件的复杂性和勘察工作的局限性,往往造成地质勘查成果与开挖后的情况不一致,这就要求在隧道施工过程中进行超前跟踪探测,确保隧道施工的安全。本文主要介绍SIR-3000探地雷达系统在郴(州)宁(远)高速公路芒岭隧道超前预报中的应用概况,并采用空间域滤波和希尔伯特变换等方法对探测结果进行处理,根据处理结果对隧道掌子面前方溶洞、裂隙等地质情况进行预测。隧道后期的开挖情况证明了雷达预测结果的正确性,取得了较好的预测效果,同时也说明了采用空间滤波、希尔伯特变换等处理方法对改进实测数据质量方面的有用性。

关键词: 探地雷达 超前探测 希尔伯特变换 空间滤波 公路隧道

USE AND ANALYSIS OF GROUND PENETRATION RADAR FOR FORCASTING GEOLOGICAL CONDITIONS IN HIGHWAY TUNNELING

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Abstract:

Because of the complexity of geological conditions of tunnel surrounding rock and the limitation of site investigation before tunnel construction, the geological prospecting results usually do not agree with the real conditions. Consequently, advanced detection methods must be adopted in tunnel engineering in order to insure the construction safety. The paper presents the use of the ground penetration radar SIR-3000 system in Mangtoulung tunnel along the Chenzhou-Ningyuan express highway. The data was processed with the spatial filter and Hilbert transform. Karst cave and the cranny were forecasted in the front of tunnel face by GPR results. The excavation result testified the validity of the forecasted results. A better forecast effect was obtained. The result illuminates the serviceability of spatial filtering and Hilbert transform for GPR data processing.

Keywords: GPR Ground penetration radar Forecasting Hilbert transform Spatial filtering Highway tunnel

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