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### 论文

## 秦岭公路隧道2号竖井地应力与岩爆分析

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### 摘要:

秦岭公路隧道2号竖井主要位于混合片麻岩地层中,高地应力和岩爆是该竖井的主要工程技术难题。根据竖井的工程地质资料和邻近工程水压致裂法地应力测试结果,采用三维有限元法对竖井工程区域内的初始应力场进行反演回归分析研究:竖井地应力存在较大的水平地质构造应力,地应力分区分布,水平地应力最高达到28.7MPa,垂直地应力基本受岩体自重控制。在地应力场分析的基础上,利用陶振宇岩爆判据对竖井进行岩爆预测,竖井岩爆为轻微或中等类型;并采用脆性岩体的常偏应力准则,模拟分析竖井岩爆破坏区的深度,岩爆区最大深度为0.6m。通过与竖井开挖后岩爆状况进行比较,结果表明反演得到的竖井地应力和岩爆分析是合理的。

关键词: 隧道竖井,地应力,有限元,岩爆

## ANALYSIS OF IN SITU GEO STRESS AND ROCKBURST |AT NO.2 VENTILATION SHAFT TUNNEL OF QINLING HIGHWAY TUNNEL

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隧道竖井,地应力,有限元,岩爆

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Abstract:

The No.2 ventilation shaft of Qinling highway tunnel is mainly located in the mixed gneiss stratum. The main technical problems encountered in the shaft excavation are high in situ geo stress and rockburst. The paper examined the engineering geology of the shaft and the geo stress measurement results of nearby engineering by hydraulic fracturing method. Then, the geo stress field in the shaft area is calculated and regressed with 3D finite element method. It is shown that the geo stress in the shaft area has a high horizontal geological structure stress and is ly distributed in zones. The maximum horizontal geo stress is 28.7 MPa. The vertical geo stress is controlled by weight of rockmass. Based on the geo stress field, the rockburst prediction in the shaft is made according to the Tao's rockburst criteria. The depth of rockburst failure area is estimated with the constant deviatoric stress criterion of brittle rock mass. The results show that there are high possibilities of occurring weak and moderate rockbursts. The maximum depth of failure is 0.6 m in the surrounding rocks of the shaft. The results from the geo stress and rockburst analysis are well compared with the actual situations of rockbursts after shaft excavation.

Keywords: Tunnel shaft, Geo stress, Finite element method, Rockburst, Case study

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