论文

深部断层破碎带竖井围岩与支护系统稳定性分析

孙闯，张向东，张建俊

辽宁工程技术大学 土木与交通学院，辽宁 阜新123000

摘要：

将收敛-约束法应用于煤矿竖井支护结构稳定性分析当中，通过现场勘察与数值模拟手段，采用Hoek-Brown准则计算得出竖井围岩特征曲线与纵剖面变形曲线，结合现场采用的支护结构参数，绘制出支护结构特征曲线，分析围岩-支护相互作用关系，揭示该竖井支护结构破坏机理。引入高强预应力锚索进行高阻让压的思想，通过建立三维数值模型计算出围岩-支护相互作用关系曲线，确定合理的围岩位移释放量，指导混凝土二次支护时机。研究结果表明：Hoek-Brown模型计算结果与现场实际情况相符，收敛-约束法能够直观地评价支护系统的稳定性，提出的设计方案在现场实际应用中取得了理想的效果。

关键词： 竖井；支护系统；收敛-约束法；Hoek-Brown准则；高阻让压

Stability analysis of vertical shaft surrounding rock and supporting system in deep fault fracture

Abstract：

The Convergence Constraint method was applicated to the stability analysis of shaft supporting structure in Coal Mine.Through the investigation and numerical simulation method，it was calculated the ground reaction curves and longitudinal deformation profile by Hoek Brown criterion.Combined with the parameters of supporting structural，drawing the support characteristic curves，analysis of the interaction in surrounding rock and supporting structure，the failure mechanism of supporting structure in the shaft was revealed.Introducing the idea of high strength prestressed anchor for high resistance before pressure allowing，through the establishment of three dimensional numerical model to calculate the interaction curves in surrounding rock and support structure，a reasonable release amount of rock displacement was determined to guide the secondary support retaining of time.The results show that the results of Hoek Brown model is in consistent with the actual situation，Convergence Constraint method can more intuitively evaluate support system stability.The proposed design in the actual application achieved the desired effect.

Keywords: vertical shaft；supporting system；Convergence Constraint method；Hoek Brown criterion；high resistance before pressure allowing

通讯作者：孙闯

作者简介：孙闯（1983—），男，辽宁阜新人，博士研究生
作者Email: sunchuang88@163.com

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