

论文

矿柱稳定性影响因素敏感性正交极差分析

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摘要:

基于正交极差分析方法对矿柱稳定性影响因素敏感性进行了评价。在分析矿柱荷载、强度、失稳势函数、破坏形式的基础上,总结了影响矿柱稳定性的主要因素;针对矩形矿柱8个主要影响因素:采深、矿房宽度、矿柱宽度、矿柱高度、矿体的单轴抗压强度、上覆岩层的容重、矿柱长度、矿柱长度方向的间距,建立了计算矩形矿柱安全系数的简化公式。以江西某钨矿为例,采用正交极差分析理论,得到该矿矿柱稳定性影响因素的主次顺序为:矿房宽度>矿柱宽度>采深>矿柱高度>矿体的单轴抗压强度>上覆岩层容重,即矿房宽度、矿柱宽度对矿柱稳定性的影响最为显著,并得到了矿房宽度、矿柱宽度与矿柱安全系数间的关系曲线,对采场结构参数进行了优化,矿房宽度值小于21.03 m,矿柱宽度值大于3.718 m。

关键词: 矿柱; 稳定性; 影响因素; 敏感性; 正交极差

Orthogonal polar difference analysis for sensitivity of the factors influencing the ore pillar stability

Abstract:

Based on the orthogonal polar difference, sensitivity of the factors influencing the ore pillar stability was evaluated.Ore pillar load, strength, instability potential function, deformation model were analyzed.The main factors influencing ore pillar stability was put forward.A simplified formula was established to calculate the rectangle ore pillar safety parameter by considering the factors of mining depth, room width, ore pillar width, ore pillar height, uniaxial compressive strength of the ore, weight of the surrounding rock, ore pillar length and interval between pillars along the length direction.Orthogonal polar difference analysis theory was selected to investigate the factors influencing the ore pillar stability in a tungsten mine in Jiangxi Province.The sequence of the factors is listed from the most to least: room width, ore pillar width, mining depth, ore pillar height, ore strength and rock weight.It means that ore pillar stability is seriously influenced by room width and ore pillar, and the relationship curves is obtained.The mining parameters were optimized based on the analysis result.The room width should be less than 21.03 m, while the pillar width should be larger than 3.718 m.

Keywords: ore pillar; stability; influencing factor; sensitivity; orthogonal polar difference

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