

论文

地下开采扰动条件下露天矿边坡岩体结构变异与失稳模式分析

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摘要:

现场高密度电法探测表明受老虎台早期地下开采影响, 东露天矿边坡岩体赋存状态及岩体结构、力学特性发生了较大变异, 对边坡开挖稳定性有重要影响。应用开采“三带”理论分析了地下开采扰动区域分布及其与边坡的相对位置关系, 指出了边坡岩体各部位结构变异特征及主要失稳模式: 垮落带区域边坡岩体完整性差, 碎裂严重, 易发生局部塌陷破坏及块体倾倒破坏; 断裂带区域边坡岩体离层多, 竖向节理裂隙发育, 主要发生弯曲倾倒破坏; 弯曲下沉带区域边坡岩体完整性较好, 保持其层状结构, 局部可能发生楔形体破坏; 张拉带区域边坡岩体受张拉作用强烈, 主要发生张拉破坏。

关键词: 地下开采扰动; 边坡; 结构变异; 失稳模式; “三带”

Structural changes and failure mode of open-pit slope under underground mining disturbance

Abstract:

The field detection results of high-density electrical method showed that the rock mass occurrence state, structure characteristics and mechanical properties in east open-pit slope take changes on the influence of Laohutai underground mining, which had a major influence on slope stability. The distribution of disturbance area and spatial position relation between the slope and disturbance area was stood by application of "three zones" theory. The rock mass structure characteristics and main failure mode in different parts of the slope was pointed out as following: Rock mass integrity in the caving zone is bad and broken seriously, so it is easy to take local collapse and block topple instability; Abscission layer and vertical joints develops well in the rock mass of fracture zone, so it mainly takes crooked-toppling instability; Rock mass integrity in bending zone is well, which still keeps the stratified structural, and is likely to take local crooked-toppling instability; Rock mass in tension area is under powerful tensioning action, so it mainly takes pulling damage.

Keywords: underground mining disturbance; slope; structural change; failure mode; "three zones"

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