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充填法开采引起的地裂缝分布特征与现场监测分析

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摘要 通过对金川二矿区地裂缝的现场调查和槽探揭示, 分析地裂缝的分布特征及其与地下采矿的关系。利用自行研制的IGG-1型裂缝计对地裂缝的发展变化进行监测。结果表明, 金川二矿区的地裂缝两侧位移具有明显的三维特征。在此基础上, 讨论充填法开采引起的岩体移动和地表裂缝的形成条件、成因机制及影响因素。研究结果表明, 采充效应造成的围岩应力重分布、充填体刚度低、地下未充填空区的存在以及重复性的采动影响是金川二矿区地裂缝产生的主要原因。

关键词 [采矿工程](#) [充填法开采](#) [地裂缝](#) [现场监测](#) [金川镍矿](#)

分类号

DISTRIBUTION CHARACTERISTICS AND FIELD MONITORING OF GROUND FISSURES CAUSED BY BACKFILL MINING

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Abstract

The two major issues in front of the worldwide mining industry are work safety and protection of ground environment when carrying on underground mining activities. Cut-and-fill mining method is increasingly applied in China owing to its advantages of controlling ground pressure and protecting the ground environment effectively. However, few works and reports are known on the topics of large-scale rock mass movement and ground fissures resulting from the mining with backfill. An introduction to the phenomena of the ground surface deformation and ground fissures due to underground mining is given in Jinchuan Nickel Mine which is the largest underground mine with cut-and-fill mining in China. In 1999, many ground fissures and breakage on the ground surface appeared in Jinchuan No.2 Mine. Following an introduction to the distribution of the ground fissures and the correlation of the fissures with the location of underground ore body is presented. The emphases are put on the field investigation and monitoring for the fissures. A new type of three-dimensional fissure instrument IGG-1 is invented to measure the change of the fissures with the mining. The results of the measurement show that the three-dimensional displacement characteristics are distinct for the ground fissures. The mechanism and the influential factors are revealed from the field exploration and monitoring. It is shown that the stress redistribution in surrounding rocks resulting from the mining, low stiffness of the filling body, the existence of the void space underground and the influence of on-going mining activities are the main reasons for the occurrence of ground fissures. It is thus concluded that in mine design with cut-and-fill mining, the ground surface deformation and fracture must be taken into consideration.

Key words [mining engineering](#) [backfill mining](#) [ground fissure](#) [field monitoring](#) [Jinchuan Nickel Mine](#)

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