

综述评论

深部高地应力下岩石力学行为研究进展

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摘要 越来越多的煤矿和金属矿进入深部开采. 随着开采深度的增加, 一系列工程灾害如岩爆、煤与瓦斯突出、顶板垮落、底板突水等日益严重, 且深部开采中巷道与采场的维护理论也与浅部有十分明显的区别. 人们认识到这种差别的根源在于岩石所处的赋存环境上的差异, 深部与浅部在赋存环境上的差别是所谓“三高”, 即高地应力、高地温和高孔隙水压, 尤其是高地应力条件下岩石表现出十分特殊的力学行为. 简要介绍了深部开采现状、深部开采面临的技术难题以及深部岩体所处的高地应力环境, 在此基础上, 综述了深部高地应力条件下有关岩石力学性质的研究进展, 包括高应力条件下岩石的脆-延转化特性、岩石的流变特性、岩石的强度特征、岩石的破坏特征尤其是岩爆等. 文章最后指出深部条件下热-水-力耦合模型是一个值得关注的研究方向.

关键词 [深部开采](#) [高地应力](#) [岩石力学行为](#)

分类号

DEVELOPMENTS IN RESEARCHES ON MECHANICAL BEHAVIORS OF ROCKS UNDER THE CONDITION OF HIGH GROUND PRESSURE IN THE DEPTHS

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Abstract

More and more underground coal and metal mines have been developed into a deep level. With increase of mining depth, a series of engineering catastrophes such as rockburst, coal and gas burst, collapse of roof strata and water burst from floor strata are getting more serious and more frequent. In addition, supporting and retaining theory of tunnel and stope in the depths are different from the ones at a shallow levels. Such a difference is caused by the difference of geological environments between deep and shallow levels. The most distinguished differences between deep and shallow levels are the so-called three "high", i.e., high crustal stress, high earth temperature and high pore pressure. Under high crustal stress, rocks show some special mechanical behaviors. In this paper, the current state of underground mining in the depths, technical difficulties of deep mining and geological environment of high crustal stress of rocks in the depths are introduced. Moreover, the developments in researches on mechanical behaviors of rocks in the depths are reviewed, including brittle-ductile transition, time-dependent behavior, strength features and failure behaviors especially rockburst under the condition of high crustal stress. At the end of the paper, it is pointed out that the thermal-mechanical-hydrological coupling model under the conditions of deep mining is an attractive topic.

Key words [underground mining in the depths](#) [high crustal stress](#) [mechanical behaviors of rocks](#)

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