

矿井底板突水的水力劈裂研究

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摘要 矿井承压水上采煤底板突水问题是一个困难的问题。困难之处就在于影响因素太多, 而且由于矿井条件的不同, 难以找到统一的处理模式。从水力劈裂的机理入手, 通过分析工作面推进过程中采场及采空区底板力学条件变化导致的渗透性改变, 来推断底板突水的危险程度。在分析过程中, 引入了损伤的概念。损伤被用来描述采场底板的破坏程度(结构演变情况), 底板岩体的破坏直接导致底板渗透性的改变; 渗透性的改变为承压水提供了通路, 增加了底板突水的可能性。针对正交各向异性岩体建立了渗透系数与损伤变量的函数关系, 以此描述底板破坏对渗透性的影响。针对具体的算例, 得到了矿井底板突水的危险位置。

关键词 [采矿工程](#); [水力劈裂](#); [矿井底板突水](#); [数值方法](#); [损伤](#); [渗流应力耦合](#)

分类号

NUMERICAL STUDY ON WATER INRUSH ABOVE A CONFINED AQUIFER IN COAL MINING USING HYDRO-FRACTURING

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Abstract

It is a big diffusion for the mechanics of water inrush in coal mining that is above a confined aquifer. because there are many influencing factors. The situation differs greatly in various coal mining districts, and it is difficult to find a uniform model to solve the problem. In this paper, based on rock hydraulic fracture mechanism and its penetrability alteration, the base plate's stress state changing was studied. All of those would increase the possibility of water inrush. Aimed at a case of study, a water inrush danger location was presented and the concept was introduced. Damage parameters are used to describe the degree of rock damage, i.e., the rock structure evolution. The rock damage would

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induce the change of the penetrability. It was important for water inrush forecasting in mining works because the changes of base plate penetrability would make ways for the water form confined aquifer. Based on perpendicular anisotropic rock to upbuild the relation function between permeability coefficient and damage parameter, which was used to deduce the permeability change with base plate damage, the results of the numerical computing show that it agrees well with the real case.

Key words [mining engineering](#); [hydro-fracturing](#); [mining water inrush](#); [numerical method](#); [damage](#); [seepage and stress coupling](#)

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