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综放开采J型通风采空区渗流场数值分析

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摘要 以潞安矿区王庄煤矿5201综放面通风和瓦斯抽放为背景, 分析J型和U型通风时采空区破碎岩体内的渗流和瓦斯浓度分布规律。J型通风采空区渗流为“同源两汇”, 并有明显取近道的趋势, J型通风比U型通风更有利于瓦斯排放。为建立破碎岩体渗流数值模型, 还兼顾分析采空区上方的支承压力, 得出该处支承压力的分区特征。

关键词 [采矿工程](#) [综放开采](#) [J型通风](#) [采空区](#) [渗流场](#) [数值分析](#)

分类号

NUMERICAL ANALYSIS OF SEEPAGE FIELD OF J-TYPED VENTILATION IN GOB AREA UNDER MECHANIZED TOP COAL CAVING

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Abstract

The J-typed ventilation, based on the U-typed ventilation, is specially designed with one inflow and two outflows for draining gas better. It includes an extra tunnel of gas drainage called as tail tunnel, which is not built by tunnel driving but by a technique of small-section road retained along next goaf. To illustrate the advantage of such ventilation, this paper takes the ventilation and methane drainage of the 5201 mechanized top coal caving face and gob of Lu'an Wangzhuang mine as examples. Firstly, with the RFPAC2000 software and the volume control technique, the regionalized property of bearing pressure on the gob area is obtained as a guide of seepage modeling of the gob area. According to the regionalized property and the relationship between the bearing pressure and overbroken rock filling percentage, the seepage models of J-typed and U-typed gob areas are set up; and the gas flow characteristics and methane density distribution inside are calculated. The simulation results show that, one source and two affluxes are found for the air flow of J-typed gob and just at the beginning of entrance the gob inflow air is obviously bi-divided. One subflow slowly and tortuously moves towards the lateral wall or exit of the tail tunnel. The other gob subflow runs over the partial gob area in the neighborhood of the work face, and gets to the entrance of the air-return tunnel. Quite differently, the U-typed ventilation shows the arc distribution of air flow around the gob near the work face, and with the depth into the gob area increasing, the velocity of flow gradually drops. The thickness distribution of gob methane obviously changes from one place to the other. Generally speaking, in many a gob part, the J-typed methane thickness is much less than the U-typed one, or in other words, by using a J-typed ventilation the methane concentration at certain places of gob and face can get pretty improved.

Key words [mining engineering](#) [mechanized top coal caving](#) [J-typed ventilation](#) [gob area](#) [seepage field](#) [numerical analysis](#)

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