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EFFECTIVENESS OF DRILLING VENTILATION ON HEADING FACE IN LONG-DISTANCE TUNNELING

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Abstract

This paper explores the effectiveness of drilling ventilation in a semi-enclosed mine during the long-distance tunneling. Firstly, a resistance-pressure energy balance equation was established. Then, the drilling ventilation effect was analyzed at different borehole lengths and borehole diameters. After that, the drilling conditions were determined for the effective drilling ventilation of long-distance tunneling. The relationships between borehole diameter, borehole length, borehole position and effective airflow on the heading face were discussed in details. The results show that the effective airflow increases with the borehole length and the borehole diameter. However, the increase ceases when the airflow reaches the saturation point. Beyond this point, the maximum airflow depends on the fan capacity. The ventilation effect can be improved by increasing the borehole length between 0~200m. When the length falls between 100~650m, the ventilation effect can be enhanced by expanding the borehole diameter. When the auxiliary fan had a power of 2×30kW and the borehole diameter was 665mm, the transfer distance fell between 50~250m and the effective airflow was enough to prevent the circulation of foul air. The research findings shed important new light on downhole air management.

Key words: drilling ventilation, effectiveness analysis, heading face, long-distance tunneling

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