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PARAMETER OPTIMIZATION OF DUST-COLLECTING AND DEDUSTING SYSTEM WITH AIR CURTAIN IN HEADING FACE

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Abstract

Coal dust is a serious hazard for the global coal mining industry. The dust-collecting and dedusting system with an air curtain has been developed to solve the problems of dust control in a mine tunnel. One of the important factors that contribute to the limited performance of a dust-collecting and dedusting system with an air curtain in practice is the design parameters. In this paper, the optimization study was conducted to explore dust-isolating efficiency and find better design parameters. Meanwhile, to overcome the problem of low wind pressure at the jet outlet, a modified structure was used. The result indicated that the wind velocity attenuation amplitude was larger within 1 m from the jet outlet and the wind attenuation amplitude was smaller and faster with 1m~1.5m from the jet outlet. Furthermore, the dust-isolating efficiency is the most obvious when the nozzle exit width is between 10.575 mm and 11.802 mm. The results of this study would play a guiding role on the structural optimization of dust-collecting and dedusting system with air curtain.

Key words: air curtain, dust control, heading face, wind velocity

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