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Dust Control in the Process Selective Coal Mining in the Context of Western Donbas Mines with Worked-Out Area Stowing

Coal industry has been and remains the industry with the most dangerous, severe, and harmful labour conditions. Application of powerful mining equipment results in considerable formation of coal and rock dust.

Scientists from the National Mining University have proposed a technique of selective coal mining with worked-out area stowing. Fragmentation of coal conveyed from a stope and drifting face neighbouring a longwall is performed by means of crushing machine of ДО type which results in dust level increase. However, the great advantage of the coal mining technique concerning thin seams and very thin seams to compare with available techniques is in the decrease of mined coal ash content and nonavailability of barren rock in a mine.

Mining and stowing system МКДЗ-90 is applied to mine coal seams. Worked-out area is stowed with the help of stowing machine of ПЗБ or ZS-240 type. Worked-out area is stowed by means of floor undercut being a result of selective seam mining as well as rock left after boundary entry construction.

In the context of the described coal mining technique the necessity to decrease dust level is obvious as the process of operation of crushing machines forms large amounts of fine rock dust. However, application of water to decrease dust level is restricted by the fact that Western Donbas rocks can be used as stowing material if only their humidity is up to 18 %.

From the viewpoint of efficiency, covering of dust-formation areas is the best technique to control dust. Isolation of dust-producing equipment is very effective technique but it is somewhat cost-plus in terms of capital investment. However, it is very cheap in service. There many solutions concerning dust control of screens, feeders, bins, crushers, and other “dust-forming” equipment. Specific woven fabrics, rubber sheets, and films isolating dust-forming devices from the environment they are placed in. Sheets are either fastened over dusting surfaces or they isolate dusting holes of the equipment. Various tight seals are applied for effective protection. For example, vibration-resistant dust-compacting rubber is used. Special holders are applied for fastening as owing to them covers become easily detachable. Moreover, such dust-compacting systems reduce the noise level and air consumption of dust-collecting exhaust system.