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Longwall Mining Technology and Equipment

Longwall mining is a highly productive, efficient and safe way of extraction where coal is cut with a plow or shearer unit. Longwall mining technology currently accounts for about 35% of world coal production (2.7 billion tones in 2015). The share of application of this technology in coal producing countries has been increasing.

There are three main long longwall mining systems: longwall, pillar and combined. With longwall mining, coal face operations, within the floor, the excavation field, area or tiers are held simultaneously with the development headings, insufficiently ahead in the space stope. With pillar development system coal reserves are completely delineated by workings prior to the start of mining operations. The combined system brings together the elements of longwall and pillar development systems. The choice of system is influenced by many mining-geological and mining-geotechnical factors.

At the mines of Ukraine, the share of the use of the pillar development system is 86%, continuous is 10% and combined is 4%. In Western Donbas, the reserves are processed exclusively by the pillar development system. As cleaning equipment combines are used with auger MB410, MB444 and drum-type cutting head - KA-90, KA-200, and also Cat plough GH800. Coal is transported from stopes by scraper conveyors. To mechanize supporting processes, conveyor movement and roof control powered roof supports are implemented. Western Donbas is characterized by harsh mining and geological conditions, which include low thickness of strata (less than 1 m), presence of weak rocks in the roof and soil, solid coal with resistibility of cutting more than 400 kN / m. In spite of this, the pressure on the faces is growing every year. For example, in 2004, DTEK Pavlogradugol mines produced 11.4 million tons of coal, and in 2015 - 18.8 million tons. Such a result was achieved through proper mining planning, modernization of existing and purchasing new high-performance machinery. All this led to an increase in loads on the faces to 2.0 - 3.0 thousand tons per day, moving the face up to 200 m / month.

To achieve high productivity and safety of stoping it is necessary to use the equipment of a new technical level with the maximum mechanization of all technological processes in the face. The possibilities of new machinery for intensifying facing processes are far from being disclosed. Increasing the productivity of the longwall face is possible through the use of new automated systems.