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Dynamics of Coal Seams Development in Mine-Geological Conditions of Western Donbass Mines

At present, the development of Western Donbass seams is conducted with the help of native and foreign mechanized complexes such as: KD-80, KD-90, KD-99, DM, OSTROJ 70/125 and DBT. Purchase of high-resource stoping equipment produced by the Czech Republic and Germany allows decreasing the equipment failure and increasing the technical readiness coefficient in comparison with native producers.

The main task of Western Donbass mines is to raise coal extraction level. To solve this task it was proposed to increase stoping face line. This would increase face output by 25%.

The conducted analysis of statistical data on geometrical parameters and work of stoping faces for the previous 30 years shows that the tendency to increase stoping face length is directly proportional to the equipment progress. For example, in 2003 average length of longwall at Western Donbass mines was 169 m. But in 2006 with modern conveyors implementation (with remote haulage to the drift) the longwall length increase from 150-180 m to 250-300 m. In that year at Krasnoarmeyskaya Zapadnaya #1 mine there was installed a unique conveyor that is unparalleled both in native and foreign market. Double-chain face conveyor SP330 with remote haulage system that worked under the most severe conditions in stoping face with the length of 340 m and seam thickness from 1,4 m to 2,1 m with the daily output up to 6000 tonnes. In foreign countries since 90's of 20th century the length of stoping face line has reached 450 m with developed seam thickness of 2.5-3 m. Similar situation is observed in Australia, where at average seam thickness of 3 m the stoping face length increased by 300 m. The change for coal development by longwall mining method allows decreasing time spent on mounting/dismounting of stoping equipment because the quantity of coal extraction cycles in the longwall is reduced. It should be taken into account that immoderate increase of stoping face results in the decrease of workers' productivity, transportation of materials and equipment as it leads to bottlenecks.

In 2013 the implementation of innovative equipment allowed increasing coal extraction by 4% in comparison with the previous year. Moreover, mounting/dismounting operations time halved. Installation of new high-capacity equipment by foreign manufacturers allowed for full automation of processes in the longwall and in nearby mine workings.

To sum up, it should be noted that the development of coal industry directly depends upon power equipment that will pay back in short terms and allows to extract maximum quantity of mineral deposits stocks from Earth's interior.