

Oleksandr Frolov
A.V. Yavorsky, research supervisor
V.V. Tykhonenko, language adviser
SHEI «National Mining University», Dnipropetrovsk

Revisited Efficiency of Using Plough Plants in Ukrainian Mines

Problems concerning increasing capacity of power-driven complexes and worker safety in longwall faces are quite topical today. Plough plants which operating does not require workers being present in production face along with the increasing labor productivity are good alternative to out-dated equipment.

In 2009 first plough complex in Western Donbass was introduced in “Stepnaya” mine. This complex was produced by Bucyrus DBT, leading international company in producing mining equipment. Ploughs are manufactured taking into account manufacturing peculiarities and mining and geological conditions of coal enterprise. Accounting plough payback period is much shorter than analogue figures of coal shearers.

According to the estimations of DBT company and technical experts of the enterprise average productivity of plough plant after reaching production capacity will be 3,300 t/day that is far more than the maximum being reached using the available home equipment. Overhaul life of the plough plant is 5 mln t of coal that is 7-8 times more than the operating time of УКД-300 shearer being one of the most reliable types of home equipment.

Mining equipment being operated up to now does not allow reaching highly productive stoping of block 3 of “Stepnaya” mine due to the following reasons: inadmissibly high labour intensity in servicing out-dated equipment (exceeding world analogues by more then two times); inadequate resources and consequently low reliability level comparing to modern machinery (2,500-5,000 operating hours comparing to 15,000-40,000 ones); low power available per worker of shearers (105-180 kWt comparing to 800 kWt of modern plough plants); barring s of the existing longwall sets of equipment do not fit range of application as for the adjacent wall strata that is the main limiting factor of stable and failure-free operation of production faces.

There is the following field of use of Bucyrus DBT plough plants:

- applicability as for extracting seam thickness is 0.90-1.20 m;
- maximum possible longwall length is 310 m;
- maximum possible coal resistance to cutting in detached area is 400 kN/m;
- total nominal engine power of plough plant is 800 kWt;
- daily output being guaranteed be the manufacturer at extracted thickness of 0.9 m and coal resistance to cutting of 290 kN/m of 3,300 tons of pure coal;
- overhaul life of plough plant conveyor is 5 mln tons; overhaul life of support unit is 30,000 cycles.