EFFICIENCY OF SINGLE PASS LONGWALL (SPL) METHOD IN CAYIRHAN COLLERY, ANKARA/TURKEY

F. Şimşir and M. K. Özfırat

Longwall mining is the underground coal mining method mostly used in Turkey. Most of the collieries in the country produce coal from thick coal seams. The three methods mainly used worldwide in thick coal seams are longwall top coal caving (LTCC), multi-slice longwall (MSL), and, single pass longwall (SPL) methods. As shearer-loaders and roof supports get larger in size, the SPL method has started to be used widely both in Turkey and all over the world. In Turkey, ParkTeknik Co., a private mining company, has an important place among the many collieries in Turkey as it is the first mine which started applying the SPL method in a thick coal seam having a total thickness of 4.2 m including a soft dirt band which is between 50 – 80 cm thick. In this paper, the performance of the longwall using the SPL method at the ParkTeknik’s Cayirhan colliery is examined for a period of six months. Face and overall productivities are analyzed by taking into account labor and breakdown figures. The results showed that the mine operates at the level, or even higher, of international standards.

INTRODUCTION

Most of the coal seams in Turkey mined out in underground are thick coal seams (e.g. Tuncbilek, Soma, Cayirhan lignite fields) and about half of the lignite reserves of the country constitutes of thick coal seams [1]. Coal seams which cannot be mined out at a single pass are to be defined as thick coal seams. In the 80’s and 90’s, this thickness was said to be about 4 m. As technology developed, it is now possible to extract thick coal seams of 5.5 – 6 m thickness at a single pass.

The studies carried out in 2000 and 2002 [2 – 4] showed that it is possible to produce seams of 4.5 m thickness by single pass longwalling since there exist equipments higher than 4.5 m. The Lazy mine in Slovakia has a cutting thickness of 5.5 m and the mine operates by SPL with roof supports of 6 m height (Fig. 1a). Similarly, in South Africa, the height of roof support in Matla mine reaches up to 6 m (Fig. 1b) [5]. The first example of SPL in Turkey appears at ParkTeknik colliery’s sector C, in Cayirhan/Ankara (Fig. 1c).

In this sector, the thicknesses of upper coal, lower coal and dirt band are 1.7 m, 1.9 m and 0.5 – 0.8 m, respectively. The overburden thickness amounts to between 150 to 250 m. To the west of the region, the thickness of the dirt band rises to 1.3 – 2 m, on the other hand, to the east of the region, it decreases to 0.5 – 0.8 m. Since in sector C the thickness of the dirt band is low enough, here, the upper and lower coal seams are mined, including the dirt band, together by SPL (Fig. 2) [6, 7]. In this study, the total working times, the coal cutting times, and the breakdown times in three shifts are examined for six months. Moreover, the face and overall efficiencies resulting from these examinations are computed and given in tables and graphs.
Fig. 1. Equipments of thick coal seams operating by SPL: a, b — abroad; c — in Turkey

Fig. 2. Cross-section of longwall operating at ParkTeknik’s sector C