

UDK 622.2

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RATIONAL USE OF LAND RESOURCES IN THE MINING INDUSTRY DURING THE PLACEMENT OF OVERBURDEN ROCKS

Land resources are fundamental in the territory of each state, therefore they are subject to strict accounting and control. As a result of the activities of mining enterprises for the extraction of coal, ferrous and non-ferrous metals, building materials, etc., the land fund is experiencing the greatest impact and changes.

As a result of the intensive development of the mining industry, a significant number of man-made formations have been formed, such as spent quarries, warehouses of substandard ores, overburden dumps, slags and waste from processing industries. Each of these man-made objects occupies significant land plots. The situation is aggravated during the development of deposits: the deepening of the quarry is accompanied by an increase in the volume of overburden rocks and processing waste from the concentrator. For example, the Private Joint Stock Company «Sevny Mining and Processing Plant» (SevMPP) (according to the environmental impact assessment report) is planning activities for additional allocation of land resources for the expansion of the Annovsky quarry and the dump of the Annovsky quarry. The plans indicate an agricultural land plot with a total area of 761.3111 hectares. The designated land plot consists of

- 91 land plots (shares of private property) with a total area of 572.9731 hectares;

- 3 land plots for personal farming with a total area of 4,9062 hectares;

- state property with a total area of 183.4318 hectares.

SevMPP plans to change the purpose of land plots from agricultural land to industrial land. Considering that agricultural lands are the most valuable, the problem of waste disposal in the mining industry must be solved urgently. As a result, the task is formulated: to achieve the rational use of land resources by placing waste from mining and enrichment of the mining industry in the developed spaces of quarries. The relevance of the chosen research direction is due to the monitoring, control and conservation of land resources. The purpose of the work: to substantiate the possibility and principles of using spent quarry spaces to accommodate overburden rocks, existing quarries. A large number of specialists from research and design institutes around the world are engaged in the issues of internal dump formation. There are cases of the formation of internal dumps on temporary and permanent sides of quarries or complete filling of spent quarries. Mining production is able to supply not only minerals to the market, but also technogenic geo-resources formed in the course of mining operations.

The analysis of literary sources made it possible to classify the locations and the increase in the volume of overburden rocks on the need to expand land resources (Fig. 1).

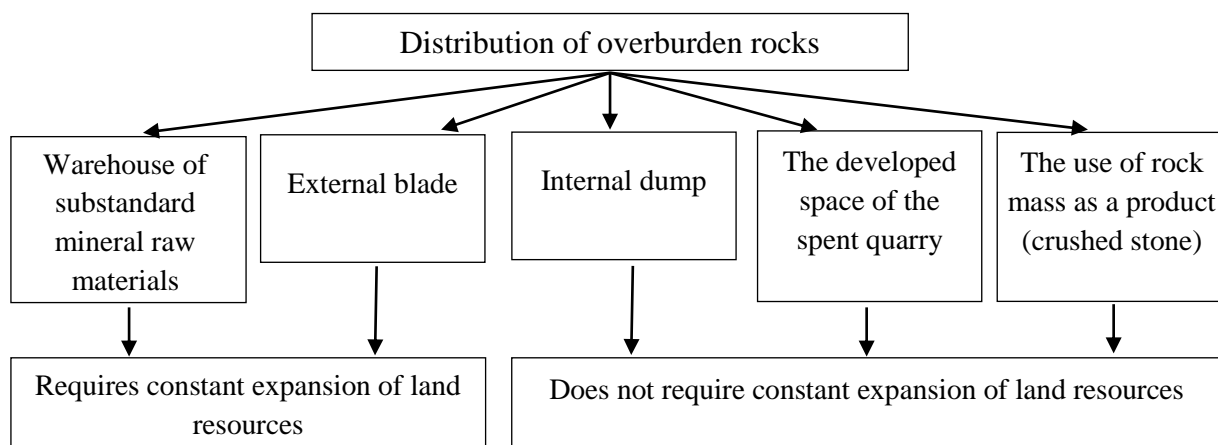


Figure 1 – The impact of an increase in the volume of overburden rocks on the expansion of land resources

Thus, the refusal to involve additional land resources is possible with the use of internal dumping:

- 1) within the boundaries of the existing quarry,
- 2) in the developed space of the spent quarry.

In the first case, quarries are widely known in which mining operations continue, and an internal dump is placed on temporarily non-working sides or sides placed in the final position. Examples are quarry No. 1 of the Central MPP, Pervomaisky and Annovsky quarries of the Northern MPP, Bardon Hill quarry and others.

The Bardon Hill quarry near Leicester in Leicestershire is one of the oldest continuous quarries in the UK. Last year, Aggregate Industries approved mineral reserves for another 27 years, expanding the quarry area. Over the first 14 years of production, it is necessary to gradually extract more than 12 million m³ of overburden material. The resulting overburden material from the upper horizons will be processed and transported back to the quarry. The rocks will be located at a depth of 125 m within the existing spent quarry.

In the second case, there is a practice of using the developed space of already spent and preserved quarries to accommodate overburden rocks. There are examples of the use of neighboring quarries (ideally, if the spent quarries are located at a small distance from the existing ones). Thus, the developed space of the Old Sibai quarry of the Bashkir Copper-Sulfur Combine, the Gologorsky quarry of the Magnezit combine, the Southeastern section at the Uchalinsky MPP, the quarries of the Sevboxitroda, Yuzhuralnikel, Donskoy MPP, quarry № 1 of the ArcelorMittal Kryvyi Roh, etc. was used.

The Magnezit combine used the Gologorsky quarry, characterized by a volume of 34 million m³, a depth of 144 m, and dimensions in terms of 800x500 m, to accommodate the overburden rocks of the Karagai quarry, which was located almost close to the Karagai quarry. Since 1974, overburden rocks have been placed in it. The dumping was carried out in a partially flooded space, since the drainage in the quarry was eliminated. The development of the dump was carried out mainly from the western side, a narrow strip along the southern side. After filling the quarry to the natural relief mark, the dump began to build up in height, which significantly exceeded the prevailing level of the terrain surface.