

TECHNOLOGICAL FEATURES OF COMBINED DEVELOPMENT OF MINING DEPOSITS

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ABSTRACT

In this article, in the basis of the analysis of sources, the technological features of open-pit mining upland deposits are revealed. The main factors influencing the effectiveness of open and underground mining have been determined, which will need to be taken into account when making design decisions to determine the boundaries of open and underground works.

Keywords: Mining careers, quarry boundaries, technological schemes, open-pit mining, geological and hydrogeological; mining engineering and organizational factors.

INTRODUCTION

The determination of the boundaries of careers is influenced by such basic factors as geological and hydrogeological; mining and organizational; technical requirements for the quality of the extracted mineral. According to the geological and mining technical conditions of the deposit, options for combined development are selected, and then they are compared according to the technical and economic results.

With a decrease in the thickness of the ore body on the flanks or the presence of isolated less thick ore bodies, good conditions are created for the development of open pit mining in the center of the deposit and underground works on the flanks, i.e. to combine work in a horizontal plane.

Deposits of considerable depth and limited strike, if it is necessary to increase the intensity of mining operations, it is advisable to work out simultaneously by a career and a mine with the combination of mining operations in the same vertical plane. The uneven distribution of the metal in the ore (in particular, a decrease in its content with depth or a change in the metal content in any direction along the strike of the deposit) requires the use of an open method to extract a richer part of the reserves, which gives better results. With the deep bedding of the enriched part of the deposit, preconditions are created for the priority development of underground operations.

When developing near-device reserves by the underground method, the choice of technological schemes is mainly influenced by the thickness of the ore body, the angle of dip, the length along the strike and dip, the

physical and mechanical properties of ores and enclosing rocks, the shape and amount of ore bodies and their mutual arrangement, as well as the nature of the distribution of the metal. By field, water cut of the field. Depending on the elements of occurrence (power, angle of incidence, length along the strike and depth of propagation), the technically possible productivity of the open pit and mine, the location of the opening workings, and the service life of the enterprise are determined. The significant strike length of the deposit favors its division into several extraction fields.

With an urgent need for raw materials, the increased metal content in the ore and the significant sediment thickness usually make it possible to give preference as a primary method to the underground method, which opens the deposit much faster than the open one. Significant water cut during combined development requires the construction of an underground drainage complex with its simultaneous or subsequent use for the delivery of ore or overburden from the lower horizons of the quarry, conducting tunneling operations to open a mine field or ventilating stagnant zones in deep careers.

The physical and mechanical properties of ores and enclosing rocks in the course of combined mining influence the choice of a technological scheme for transferring ore from a quarry to underground transport workings through ore passes, screens and crushers, or directly by quarry transport to the surface. For joint technological schemes, the most favorable ores are strong and medium strength, not prone to caking and sticking.

The influence of the properties of the host rocks affects mainly the location, the method of driving and maintaining transport and lifting structures (workings). Weak, unstable rocks in the recumbent flank and hard rocks in the hanging flank can lead to the placement of transport structures in the rocks of the hanging flank, despite some technical difficulties in mining operations.

Mining and organizational factors include: the study of this deposit, the experience of its development, the availability of specialists in open pit and underground mining, the technical equipment of the area of work (the size of the open pit and mine fields and the location of the opening workings (in the center of gravity of reserves).

The choice of the location of the opening workings is significantly influenced by the relief of the day surface. The mountainous terrain favors the use of technological schemes with common underground workings.

Climatic conditions (harsh weather, heavy precipitation) primarily affect the operation of open pit transport. Therefore, areas with the most severe climatic conditions contribute to the widespread application of the principles of combined development, especially in the joint use of underground transport workings. In unfavorable climatic and relief conditions, it may be necessary to consider technological schemes not only for combined development, but also for underground ore processing.

As the mining industry develops, more and more areas fall into the mining allotment zones, which in a number of places in the country causes significant damage to agriculture. Therefore, technological schemes for the development of near-field reserves using caving zones under dumps or overburden and tailings of concentration plants as backfill are becoming very promising.

Organizational factors also include the mode of mining near-field reserves at different spatial locations of open-pit mining zones. Obviously, underground mining operations in the zone of influence of the open pit should be carried out either with backfilling or leaving solid pillars. If, in the contours of the mine field, the day surface can collapse, this will significantly simplify the organization of mining operations at the deposit. In some cases, several technological schemes are combined (with backfilling when working under the open pit wall and with collapse after the board reaches the limiting contour and releases it from transport communications). In addition, when conducting underground work in the immediate vicinity of the open pit

operating in the open pit, the parameters of the elements of the development systems, methods of blasting operations and ventilation schemes must be mutually coordinated.

Thus, at the present time, based on the geological and hydrogeological, mining and technical and organizational conditions of the deposits mined by the combined method, it is necessary already at the first stage of the development of the deposit to have a generally complete strategy for its further development. The efficiency of field development is increased due to open-underground mining of near-field reserves, workings traversed in the mined-out area of the open pit.

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