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ECONOMIC-MATHEMATICAL MODEL OF FORMATION OF PRIME COST OF ORE EXTRACTION AT THE MINING ENTERPRISE

Today, economic-mathematical modeling is a powerful instrument to research the activity of industrial enterprises. The analysis of scientific studies showed that cost modeling of the ore extraction is an important task.

Economic-mathematical modeling of the cost price requires detailed studying at the Ukrainian enterprises. Cost models allow defining and optimizing the main expenditures, reducing production expenses, increasing economic efficiency of the enterprise functioning.

It should be noted, that different costs are formed at different stages of a production cycle. Cost of extraction (or block cost) is cost of the ore extraction from the mining block. It is connected with technological processes of extraction. Production cost (or all-mine cost) includes block cost and cost of transportation and rising of ore in the mine. Full cost includes all costs of production, processing and realization of ore.

Modeling of block cost is very relevant task. This cost can be very different in different mining projects. Therefore, economic-mathematical model of cost requires consideration of technological and mining peculiarities of ore extraction due to activity of mining enterprise. Such model allows defining cost elements, among them: material expenditures, salary, energy, depreciation and others.

This research presents mathematical apparatus, which describes interrelations between geotechnical parameters and main expenditures. Economic-mathematical modeling considers such mining parameters as: ore reserve volume in the block, ore durability coefficient, volume and structure of cut, preparatory and clearing work, time of block working, equipment productivity, monthly productivity of the block. They strongly influence the main expenditures and the cost price. The research allows constructing the regression model, which provides the accuracy about 96,4%.

The research introduced the cost model in the mining enterprises of the Kryvyi Rih region. It allowed defining cost price much more precisely, than other techniques. Such result allows using our model for the optimization of resources and expenditures, efficiency evaluation and mining projects feasibility.