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THE USE OF GENERAL-PURPOSE SOFTWARE FOR MINERAL-GEOMETRIC CALCULATIONS AT THE PROJECTION OF SURFACE MINING

One of the most time-consuming processes in the design of quarries is mining-geometric calculations that are carried out during the assessment and calculation of all types of stocks, justification of the folds and order of working out, mining-geometric analysis of the quarry field, determination of the volume of mining operations, drawing up a calendar plan of mining operations etc. Formally, the part of GGR in the total mining and technological project is about 45%, in practice, in the case of designing the development of deposits with complex mining and geological and mining-technological conditions of working off, in terms of labor costs and time expenditure, mining and geometric calculations can reach 70% of the entire process designing. Especially clear is the tendency to increase labor costs and time expenditure to perform mining and technological calculations, if it is necessary, the study of several variants of mining.

The popularization and widespread use of computer technology and constantly upgrading software, provides users with new opportunities, driven by the need of improvement of theoretical and methodological approaches to the solution of mining and geometric tasks. Due to this, the development of computer technology of mining and geometric calculations is an relevant research task.

The greatest part of labor cost and time expenditure in the process of automated GGR introduces the stage of creating models of deposits and mining, on the basis of which GGR is performed. The technology of modeling of geological objects, the choice of software tools and development method of the output data are determined by the conditions of deposit position and the technology of further development: for flat-dipping and horizontal deposits it is expedient to use a polygonal modeling system, for awry and steep dipping - spline modeling system.

During modeling the deposit surfaces, the output data about mineable minerals should be presented in the form of a database, which includes the coordinates of the mouth of the geological wells (X, Y, Z), data about the thickness of the cover stones and working thickness, various characteristics of the object. As a rule, this kind of data, is given to designers in the case of designing horizontal and flat-dipping deposits. On the basis of the output data base, a set of three-dimensional surfaces of the relief of the deposit is formed and roof and soil of the mineable minerals, which contours by future mining operations are marked.

Based on the analysis of the software market, which allows to solve the problems of mining and geometric evaluation of the deposit, the study considered the possible use of several budget-friendly, suitable to the technical basis and level of training of users of software packages. In these programs, the sequence of solid-state modeling of relief, ore body and deposit is systematic work with graphics and table documents. Polygonal

modeling is supported in the Surfer software package, solid state spline - in Mechanical DeskTop. A combination of polygonal and solid-state modeling is recommended for Mechanical DeskTop and AutoCAD Survey.

Computer technology of mining-geometric calculations is based on modular use of publicly available software and allows to carry out mining-geometric calculations within the acceptable error and reduce their labour intensity by 20-30% compared to traditional methods. Computer technology consists of six main stages: 1 - analysis of output data, software selection; 2 - formalization of the output data for the choice of software; 3 - creation of geoinformation models of the deposit and mining; 4 - estimation of model error; 5 - execution of mining-geometric calculations; 6 - evaluation of the results of the GGR. The error of the results of mining-geometric calculations which were performed on the basis of developed computer technology directly depends on the geoinformational density of the output data.

Thus, the use of general-purpose software for mining and geometric calculations significantly reduces time for processing information and its analysis, labor costs, accuracy and possibility of automated creation of models of deposits.