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METHODS OF STABILITY ASSESSMENT OF OPEN-PIT SLOPES IN THE ROCK MASSIVE

The development of technology of open-pit mining and the rapid pace of mining equipment development caused the increase in capacities of mining enterprises, in particular, quarries. Increasing the depth of mining operations requires the maximum accurate calculation of the parameters for maintaining stability of open-pit slopes and benches, taking into account each factor of the influence on the subsequent safe and cost-effective mining.

The purpose of the work is to analyze the methods of assessing stability of open-pit benches for the possibility of further safe and continuous management of the development of a deposit under such disturbing factors as: thrust fall, soil flow, subsidence and shifts.

Modern tendencies of minerals extraction in an open pit involve a constant increase in the depth of a quarry. For the current conditions the depth of 500-700 meters is not an impossible task, on the contrary, it is a goal that can easily be achieved. Special attention is required to assess the stability of slopes when carrying out this task.

One of the precise methods is the graph-analytic method of K. Terzaghi, which is based on the idea to consider a fault surface as a plane-cylindrical. This method gives effective results in a relatively homogeneous and unpolluted mass. The main disadvantage of using this method at the open pit where the slope is composed of homogeneous soft rocks is a large difference in the indicators of the rock massive points.

Nowadays, the technology of laser scanning of slope walls and open-pit slopes, which allows to carry out a volumetric analysis of slope walls with the identification of potential dangerous shifts in sloping areas, has gained its popularity at mining enterprises. Scanners allow building a 3D model taking into account disturbances and potential slip lines. The laser scanning technology is the most generalized and precise method. This method is less time consuming but economically inefficient for small enterprises.

There are many modern methods for calculating stability of slope walls, but each of them has a set of factors that are suitable for a specific method. Thus, the most appropriate method of observing stability provides an opportunity to evaluate all possible risks and predict them over time. Taking into account all possible disturbances, it is possible to determine the parameters of slopes stability and the limiting permissible deviations for a long-term stability and exploitation of the bench for the given purposes.