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NUMERICAL SIMULATION OF JOINTED ROCK MASS IN GEOMECHANICAL PROBLEMS

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Purpose. Study the possibility of realistically numerical simulation of a jointed rock mass and estimate the design rock mass strength involving discontinuity surface conditions and various shapes and sizes of rock blocks.

Methodology. The stress-strain state of rock mass could be determined using one of the numerical methods. We apply the finite element method (FEM) well proven in geomechanics problems in combination with the strength theory in the nonlinear formulation.

Findings. The reliability of numerical simulation depends on the reliability of determining the physical and mechanical properties of rocks. The Western Donbas

rocks can be characterized as poor-quality, jointed rocks and compressive strength significantly decreases due to watering. Decrease in the strength of the intact rock should be considered using structural factor which can be determined according to statistical strength theory. Numerical simulation is carried out to determine the displacement of excavation contour and configuration and dimension of the yielding area. The effect of discontinuity parameters such as distance between joints, orientation of joints and discontinuity surface conditions on the results of numerical simulation of stress-strain state is estimated. The correspondence between domestic rock mass stability system and classification based on Geological Strength Index is specified. It provides a possibility of designing the mining excavations using a good proven generalized Hoek-Brown strength criterion considering natural and technogenic disturbance of rocks.

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Key words: Structural Factor, Rock Joints, Rock Mass Strength, Statistical Strength Theory

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SUBSTANTIATION OF THE TECHNOLOGICAL CONDITIONS OF OPEN PITS' CONSERVATION

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Purpose. Theoretical definition of the matter of stand-by condition of production facilities at an open-pit and the development of technological approaches to its implementation under the operation of flat deposits; generalization of practical recommendations for meeting demand on mineral resources.

The methodology of research is scientific substantiation of stand-by condition of the fixed assets on the basis of the temporary stop of open-pit's equipment, mining workings and surface structure in accordance with the necessary preservation of their working condition for the further exploitation due to the market demand for the products.

Findings. The special aspects of domestic open-pits on the exploitation of flat deposits, which are characterized by large geometric parameters and production capacity, are analyzed. This significantly increases the cost of production and makes it impossible competing. According to the above, the technological scheme for the mining of temporarily of stand-by condition of ore in the final extraction of reserves is developed. In order to reduce the cost of overburden, due to the large parameters of the production space of the open-pit, the technological scheme of separation of the open-pit field into two parts of which one plot is temporarily under stand-by condition, is developed. The required stability of the non-operating of open-pit side and dump side is provided by the certain set of measures which are proposed by the authors (by changing the parameters of the development system and organization of mining and transport operations in the working area of the open-pit).