

Explosive failure and geomechanics in the development of mineral deposits

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The purpose of the work is to develop, on the basis of the theory and practice of controlling the action of an explosion in various mining technical conditions, an idea of the concept consisting in the development of theoretical prerequisites and geomechanical support of new methods for the explosive failure and fracture of rocks at great depths in the development of mineral deposits. In addition, our task was to determine how to effectively and safely solve specific technological production problems.

One of the aspects of the new conceptual approach for solving the problems of mining production related to the difficult conditions of mining of mineral deposits, in particular, manifestations of the seismic effect and gas-shock-dynamic phenomena caused by anthropogenic doing is considered. The approach is based on studying the interaction of research at the junction of the specialties "Geomechanics" and "Failure of rocks which allows the use of analogs of theoretical and experimental nature and the corresponding tools of one of them in the methodology of effective application of techniques and methods of the other.

Scientific novelty consists in the development of mathematical models of the processes of deformation and failure of geomaterials at a different scale level under the influence of static and dynamic loads reproducing natural conditions. Computer simulation is carried out on the basis of numerical methods for solving dynamic problems in the mechanics of a deformed solid. As a result of the simulation, it was shown that the explosive effect of the charges of the examined structures has a different effect on the stress-strain state of the surrounding rock massif, which allows selection of the technological parameters of the charge by conducting computer simulations to reduce the negative impact of blasting operations on the geological environment.