NEW THEORY OF ROCK MASSIF FRAGMENTATION BY USING EXPLOSION ENERGY

KONONENKO Maksym[1] & KHOMENKO Oleh[1]
[1]*Dnipro University of Technology, Dnipro, Ukraine*

Purpose. Ore mining involves the destruction of large volumes of hard rocks, which requires preliminary fragmentation by using drilling-and-blasting operations. Therefore, special attention is paid to the improvement and development of new methods for calculating the parameters of drilling-and-blasting operations that will improve the indices of drivage and stoping operations [1, 2]. The application of emulsion explosives, which are absolutely safe for transportation and storage, environmentally friendly as well as cost-effective [3-7] is another way of improvement of blasting technology. Therefore, at present moment, one of the main problems of mining production is increasing the efficiency of the rock massif fragmentation by using explosion energy.

Methodology. The creation of a new theory of rock breaking by an explosion around the charging cavity has been performed with the application of well-known laws of the theory of elasticity and the basic provisions of the quasistatic-wave hypothesis of the mechanism of solid medium breaking under the action of an explosion.

Findings. The hypotheses of the explosive action and the theory of calculating the values of the zones' radiuses of contortion and cracks formation around the charging cavity have been analyzed for developing the theory of the rock massif breaking by an explosion. According to the characteristics of the types of stress waves, deformations and fractures of the rock massif, zones around the charging cavity and their parametric schemes have been created and specialized. According to the theory of elasticity and the quasistatic-wave hypothesis of the mechanism of rock breaking under the action of an explosion, for all detected zones methods of calculation of their parameters have been performed. It is established, that the explosive destruction of the rock massif is realized according to the step laws of formation of zones of contortion, intensive crushing, and cracking, which comprehensively taking into account the physical-and-mechanical properties of the environment [8], energy characteristics of explosives and rock pressure. The application of the results of calculating the zones' radiuses of crushing, intensive grinding and cracks formation in the rock massif around the blast-holes and boreholes, allows determining the rational parameters of drilling-and-blasting operations during mining [9, 10] and ore breaking[11, 12].

Keywords: rock massif, charging cavity, explosive emulsion, contortion zone, zone of intensive grinding, cracks formation zone

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SUBSTANTIATION OF PARAMETERS OF TECHNOLOGY INSULATION OF ABSORBING HORIZONS OF BOREHOLES

SUDAKOV Andrey[1] & SUDAKOVA Diana[1]
[1]Dnipro University of Technology, Dnipro, Ukraine

Purpose. By robots є improved thermomechanical technology for isolation of clay horizons in drill holes

Methodology. The tasks were solved by a comprehensive research method. Containing analysis and generalization of literature and patent sources, analytical, experimental and industrial research.