SECTION 1
GEOTECHNOLOGY: TECHNICAL & TECHNOLOGICAL ASPECTS

PHYSICAL & CHEMICAL PROCESSES FOR COAL DESTRUCTION IN UNDERGROUND GAS GENERATOR

DYCHKOVSKYI Roman, FALSHTYNSKYI Volodymyr, LOZYNSKYI Vasyl & SAIK Pavlo
Dnipro University of Technology, Dnipro, Ukraine

Purpose. Estimate the material and thermal balance for providing the chemical reactions in underground gasgenn according to physical spreads of their fluency.

Methodology. Statistical processing of experimental results of work of a stand installation from underground coal gasification and their adaptation to specific mining-geological conditions of their possible use.

Findings. The current methods of calculation of safety mining parameters for underground coal gasification are described and analyzed. The possibility of generator gas (methane, oxides of carbon and other) extraction in from coal deposits destruction is considered. Experimental data on the application of hydrodynamic impact on a gas-saturated outburst coal seam and reducing gasodynamic activity are defined. The technological schemes of providing the pipelines stability that includes emergency protection and monitoring in on-line regime are proposed. Also is proposed and examined on special test installation the utilization of mining wastes in closed cycle of gasgenn. To determine correlations of safety mining parameters are used the calculation and analytical method based on numerical definitions of rockmass deformations. The recommendations for physical and chemical coal destruction are done based on economical indexes and environmental protection.

Key words: underground coal gasification, mining, mining-geological conditions

References


USING NON-BLASTING TECHNOLOGIES FOR DESTRUCTION OF HARD ROCK IN SURFACE MINING

SOBKÓ Borys¹, LOZHKOVO Oleksii¹
DREBENSTEDT Carsten²
¹Dnipro University of Technology, Dnipro, Ukraine
²Technical University “Bergakademie Freiberg”

Purpose. Determination the effective application field of non-blasting technology and technologies for the hard rock preparation for excavation during surface mining.

Methodology. The carry out researches are based on the study of the physical and mechanical rocks properties influence on the mining equipment productivity at the non-blasting preparation of hard rocks and the excavation technology on the operating expenditure of the mining enterprise.

Findings. Current technological solutions in the field of non-blasting destruction of hard rock at the surface mining in practice allow increasing the economic efficiency of the mining enterprise and reducing the negative influence on the environment. The feasibility of using non-blasting technologies is confirmed in practice at the development hard rock with uniaxial compression strength of 20 – 90 MPa. The productivity of equipment at the non-blasting destruction of hard rocks in quarries depends on the physical and mechanical properties of rocks. The main factors that influence on the process of non-blasting destruction of hard rock by mining machines are strength, fracturing and abrasiveness of rocks.

The main difficulty in choosing effective technique and technology for the non-blasting preparation of rocks for excavation is the justification of the mining machine type in accordance with the given quarry productivity and grain size of the products. The results of the carry out researches show that continuous mining machines have high productivity in the non-blasting destruction hard rocks. At the same time, the capital and operating expenditure of the enterprise in this situation are much higher than using machines of cyclic action. A significant disadvantage of continuous machines in the non-blasting destruction of the hard rock is the regrinding of the mineral, which leads to an increase of its losses due to a decrease of the commodity fraction. Justification of the transition expediency from drilling and blasting to the non-blasting preparation of hard rock to the excavation should note specific conditions of mineral deposit and carried out individually, taking into account the reduction of expenditure for drilling and blasting, loading, crushing process.

Preliminary studies were carried out as part of the preparation of the grant application for the NATO Science for Peace and Security program.

Key words: non-blasting technologies, mining equipment, hard rocks