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Summary of the doctoral dissertation titled:  
"Optimization of blasting works in rock mining"

Extraction of rock minerals with the use of explosives is the main technology applied in the country and worldwide. Increase of production as well as the need to reduce operating costs, trigger new technological solutions helping to obtain the most beneficial effects of conducted activity and to reduce adverse impacts. The technology of drilling and blasting is a complex, multi-stage process carried out under various geological and mining conditions and with the possible use of a wide range of explosives and blasting agents. The optimal effects of blasting works depend on the blasting parameters used, which are predictors for results achievement. Definition of these predictors as well as their control in an integrated project of blasting works is the main condition to meet expectations and to improve the quality of conducted technological operations. The implementation and application of the optimization procedure ensures long-term improvement of the results in the aspects of quantity and quality of obtained minerals and minimization of adverse impacts.

In order to achieve the main aim of the dissertation, it was necessary to define basic elements of blasting works, which determine the following technological operations and final results obtained. Within this dissertation a state-of-the-art analysis was conducted in the field of applied methods of evaluation and analysis of components of drilling and blasting technologies. Moreover observations and experimental tests were realized in the selected opencast mine and the results were analysed.

The work was conducted in four stages, including: analysis of source materials, evaluation of applied blasting methods in the aspect of applicable regulations, analysis of the effects of drilling and blasting works conducting along with these effects testing and analysing. Furthermore, costs of blasting works realization as well as optimization conditions and quality management in opencast mining were analysed. In the part relating to the regression analysis of tests results, predictors having significant influence on the mining process, the obtained effects as well as adverse impacts were identified. The scope and the methods of their control as well as optimal conducting of blasting works were determined. Optimization procedure enabling implementation of this method in mines using blasting techniques and in the areas of macro-levelling works realization was developed

In the summary of this dissertation scientific and application objectives of the completed research and the optimization procedure development were underlined. The justification of the dissertation development showed the analysis of source materials and a comparison of economic aspects of the proposed solutions aiming risk minimizing and costs and potential losses reduction.