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Abstract of doctoral thesis

Prediction of Flyrock Hazard Zone Range in Surface Mine Blasting

The PhD thesis presents a new proposal to approach the issue of prediction of *Flyrock Hazard Zone Range* (ZSZROS), which is an attempt to quantify not measurable external factors (*Audit of the Blasting Operation*) and including the variability of important parameters of blasting works and the possibility of recognizing its variability.

The distinction between the concepts of "*flyrock distance*" from "*Flyrock Hazard Zone Range*" created a new space for research allowing for the determination of the impact of key parameters of drilling and blasting operation on ZSZROS as well as for quantification of the previously unmeasurable relations.

The conducted study showed a relatively small amount of works devoted to the methods of controlling the values of the parameters of the rock deposit mining process. This inspired the author to undertake research in this still poorly recognized area. The synthetic collection of information about the currently used explosives and the available control and measurement technologies allowed for the systematization of the flyrock hazards determination methods. The analysis of the formulas made it possible to determine the factors influencing this impact to the greatest extent.

As part of the simulation tests, the burden (z) was selected as the quantity having the greatest impact on the dispersion of rock fragments. Taking into account the available control and measurement tools, a new method was developed to determine the boundary value of the seabed for the purpose of calculating *Flyrock Hazard Zone Range*.

The second proposed new calculation method uses the specific charge q as the primary variable. During the research, for the purposes of determining the ZSZROS, the variables *Local specific charge* (q') and Δq were defined.

The q' parameter describes the mass of MW per unit volume of rock mas in situ while the Δq parameter describes the difference between the amount of energy supplied during detonation of the explosive and the amount of energy resulting from the demand by the rock

mass. The selection of two mutually complementary relations made it possible to take into account the geometric (z) as well as energy (q) parameters.

Since it has been shown that the unrecognized size of the burden has the greatest impact on the uncontrolled dispersion of the flyrock, in the longer perspective of research on this phenomenon, it is necessary to focus on eliminating the variability of parameters, which, by definition, should be unchanged. It is worth remembering that having knowledge about the variability of parameters is one thing, and the technical possibility of eliminating them is the other side of the analyzed problem, which should be given more attention in the future.

Peter