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INTRODUCTION INTO THE NEW METHODS OF NATURAL STONE BREAKING

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Nowadays the demand for the natural stone construction materials is very high and continues its increase in most countries. In connection with that the output of its kinds, from which various wares are produced, is being carried out. The production of natural stone is conducted in the most countries with certain differences in output volume and its nomenclature, as well as the purpose of the initial and repeated production. In the meanwhile new means of its destruction, aimed for the efficiency increase and preservation of the natural quality of output resources are have been invented, approved and launched into the production line within the last ten years. According to a new trend, all means of the natural stone destruction, including wedge-operated that are typical for the solid stone production pits, are used and improved. One of the ways of this improvement is the introduction of the plastic substances into the breaking process and the supply of the proper technical facilities and mining technologies.

The typical attribute of all natural stone production facilities is the technical complication and high value of their inner reorganization in order to use new technologies. In most cases cardinal alterations are needed within the going opening methods and the resources taking out preparation system. Because of that mining operations within the most natural stone production facilities are being carried out regardless to the possibilities that are linked to the appearance of new effective ways of rock destruction. Some of those mining technologies that are highly adapted to the existing mining-geological and mining-technical conditions of minerals production are the technologies of natural stone breaking using the plastic substances. With the right characteristic calculation the can be used for the natural stone production of any solidity, are effective with the system of natural and artificial fissure and do not need any unique and expensive equipment for their application. They can be easily adapted to negative external environment conditions and also have high safety and harmlessness index.

The nature stone breaking technologies that are linked with ousting the plastic substances from blast holes is based on the direct rock destruction method that has its basis from the new principles of fissure advance in fragile environment. Its static are dynamic type of forming demands the application of specific technological set, devices and materials that are need for its practical

usage. The most significant direction of the natural stone production is its breaking from the massive as a number of monoliths and blocks that makes possible the production of wares of any forms, sizes, and for any purpose while saving the maximum of the raw materials natural attributes. Though the suggested method aimed for achieving the mentioned goal, it is not used in production today. That allows us to mark the development and substantiation of natural stone breaking technology using different plastic substances out as a separate scientific area that has its own goals, problems and prospects. Equally with that we should consider that the circle of scientific and practical researches on studied problem is quite narrow and usually defined by the basis, created by The Mining Institute of the Siberian department of Russian science academy.

It is reasonable to start work with clarification of problems, defining the prospects for block stone production in the world, analysis of used technics and technologies of its breaking and carrying out their comparison. Then it is necessary to validate the basic parameters of block stone breaking technologies using the plastic substances in the conditions of their intensified ousting from the blast holes into the formed fissure and also their comparison with the technologies based on other ways of rock destruction. After that the experimental inspection of the new mining technologies parameters in the laboratory conditions is needed. Then the main attention must be devoted to the block stone breaking technologies development and their experimental check in the conditions of open means of mineral deposit processing. Besides, the additional areas of the method of direct destruction of fragile materials using plastic substances effective application validation is highly needed. In this case we would need the development of the corresponding mining and construction technologies as well as the results of their natural conditions tests. This cycle of works is concluded by the validation of the accepted technical and technological solutions in the area of block stone breaking using plastic substances according to the factors of the environment and labour protection for the conditions of open means of mineral deposits processing.

The following objectives are considered as the most important:

- regularities of the crash-origin fissure advance, blast holes forming within fragile materials depending on their spatial location, from which the plastic substances ousting happens, identification, and also development and experimental check of their major geometric parameters calculation methods;

- identification of the correlations between the energetic indexes of the crashing system and the rheological and volume characteristics of plastic substances, physical and mathematic qualities of destructed fragile material, and geometric parameters of applied blast holes;

- verification of the fragile materials crash destruction technologies with plastic substances depending on their effective application area;

- verification of the block stone crash breaking with plastic substances according to its impact on the environment and labour conditions for the open mineral deposit processing method;

The novelty of the performed work in this area so far is showed by the following:

- identification of the forming of the fissure configuration, that is formed along and across the blast hole axis, regularities and the evidence of the possibility of its control by definition of its internal orientation comparative to the blast hole axis, from which the plastic substances ousting happens;

- identification of the single tool strike necessary power, that is designed for the block stone breaking with plastic substances, that serves as its choice foundation;

- the evidence of the possibility of using crash destruction of fragile materials using plastic substances for the breaking of stone of any known solidity and mineralogical composition provided by the choice of needed combination of plastic substance's liquidity, geometrical parameters, pressurization, blast hole walls voltage concentrators, wedge configuration, and used breaking system energetic indexes;

- the evidence that the mechanized versions of block stone crash breaking technologies, based on plastic substances usage, have minimum impact on the aerial environment and are save and harmless.

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