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DETERMINATION OF ANISOTROPY OF ARRAYS AND ITS INFLUENCE ON THE EXTRACTION OF GABBROID ROCKS

At present, the task of determining the plane of the best disintegration for deposits of facing stone and gabroid breeds in particular is still relevant. There is a small number of theoretical and experimental studies of the mechanism of determining the anisotropy at the given time, which, moreover, are imperfect and time-consuming.

Anisotropy, that is, different properties in different directions, is the main characteristic feature of crystalline rocks. As noted earlier, an array of rocks in most of them is characterized by the presence of highly developed ordered fracturing, the cause of which is the anisotropy of its structure.

When using natural stone anisotropy in the process of extraction of blocks from deposits, it is possible to significantly increase the efficiency of work without increasing costs, but only due to the optimal location of mining faces and the optimal choice of the direction of the front of the mining operations. For example, in the case of wedge-shaped destruction of monoliths (or division into blocks), the number of strokes for separating the block from the array along the direction of the best split is two times less than that perpendicular to it and five times smaller than the oblique angle. This feature is nothing but a mechanical manifestation of a certain orientation of crystals of minerals in natural stone. The anisotropy of the properties in this case is conditioned by so-called static surfaces, which are determined by the orientation of the crystal lattices of the minerals.

Despite considerable research on the problem of determining the direction of anisotropy of the massif, the current practice of extracting a block stone in quarries of igneous rocks does not yet provide appropriate recommendations regarding the choice of the optimal direction of the split line at the separation of blocks and monoliths and is mainly based on the experience of workers. Therefore, the task of using modern research methods to determine the mechanical properties of a natural stone, taking into account its anisotropy, is relevant.

In order to ensure the high-yielding of blocks of natural stone of the appropriate quality, it is necessary to take into account the natural anisotropic properties of rocks in the operation of the deposit, that is, their uneven ability to split in different directions.

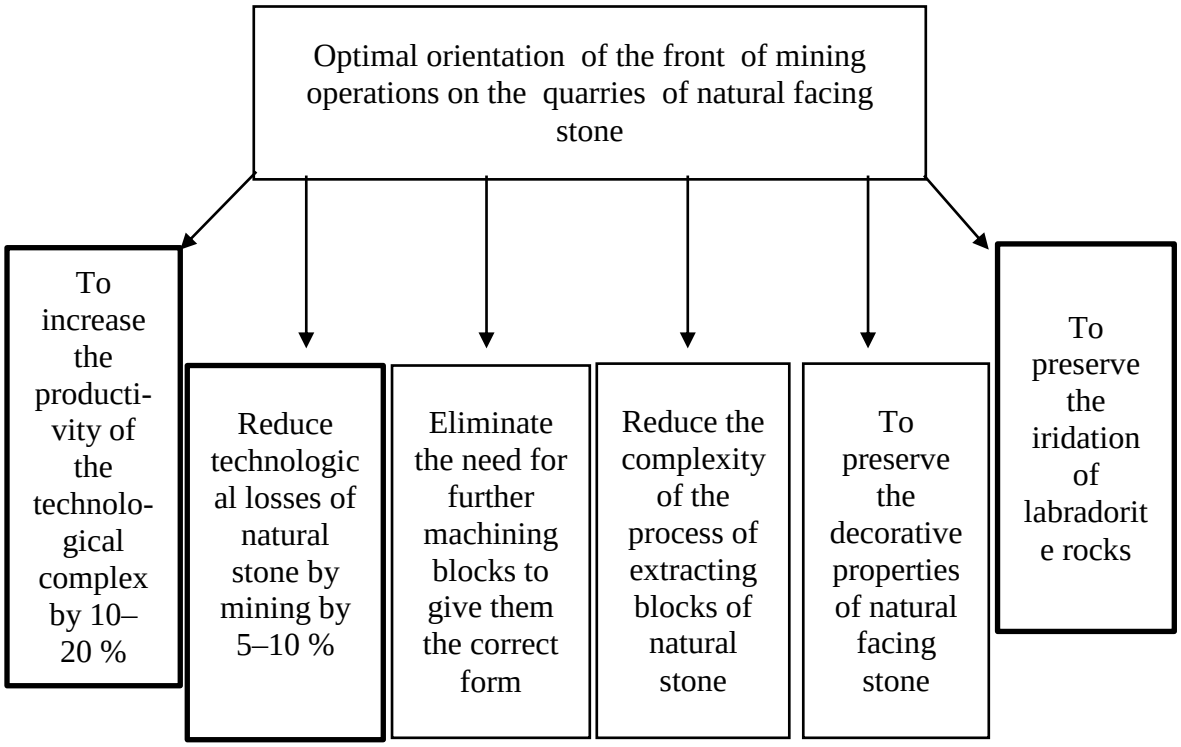
According to the research results, it was established that:

- for the Golovin, Kamenobrydi and Kamianopichi labradorites, the weakness of the minerals is manifested between the crystals of plagioclase and pyroxene, whose forms are elongated in the direction from the northwest to the southeast;

- for Slipchitsky, Bukinsky, Torchinsky, Gorbulu and Slobodskoe gabbornites - between crystals of plagioclase and pyroxene grains oriented from the northwest to the southeast.

All studies during geological exploration and the creation of a project for the development of deposits give an average value regarding the choice of the direction of the ascent of the mine and the direction of the anisotropy of the array.

The study of the anisotropy of mechanical properties of natural stone arrays and the development of an express method for its determination allows us to choose the optimal direction of mining operations and the direction of separation of the monolith into blocks with a two-stage extraction scheme. The direction that minimizes labor and energy costs to separate blocks from an array of natural stone, as well as an increase in the percentage of the output of blocks of natural stone, which has natural fracture, is considered to be the optimal one.



As a result of the use of the proposed methodology for investigating the anisotropy of mechanical properties of natural stone, azimuths of the best fragmentation for a number of rocks of the Korosten pluton.