tance transducer and enable pulses were don't given from the control system to thyristors driving points of the inverter. I.e. the quiescent condition is excluded. Only after the electrode touch with a welding surface enable pulses were begun to give to driving points of thyristors. Those decisions permit to eliminate voltage surges at the circuit of the inverter load diagonal, to increase the frequency, to decrease losses of the inverter, to substitute gate-turn-off thyristors for ordinary thyristors, to exclude the inverse diode bridge from the power circuit.

In conclusion should note that the device was considered with the load in the form of a transformer welder. Though the proposed device is available for other electro technical transformer loads in which the quiescent condition isn't operating condition and may be excluded.

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PROBLEMS AND PROSPECTS OF NATURAL STONE DEVELOPMENT

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Stone is one of solid minerals involved by the human into the development and further use at the dawn of its existence.

For the Russian Federation and the countries of the Commonwealth of Independent States the tendency of cap stone production small volumes is indicative. First of all, it is connected with the prevailing architectural tradition, which doesn't suppose natural stone construction work large volumes, in our country and also with the undergrade raw material being handled and then used. The low level of rock mining operating enterprises' equipment with state-of-the-art technologies, mining methods and technologies' imperfection, lack of finished products permanent sale markets, and also the insufficient level of geological exploration of reserves, transport and personnel problems are evident; specific negative trends consisting in the presence of stone processors, the production capacity of which far exceed the possibilities of their raw material resources base, being typical of some regions of the Russian Federation (Ural). It stimulates the production maintenance on account of procurement and subsequent processing of the foreign stone, increases the product cost and reduces the population employment. As a result of this, in the Russian Federation, not more than 1-2 kg of cap stone per caput a year are mined (the analogous factor for the Hellenic Republic makes about 50 kg of cap stone a year, 2007).

In spite of the presence of a great amount of disadvantages, the main consequence of which are useful minerals heavy tolls at the procurement, blasting technologies and cap stone breaking-out are widely used all over the world. Together with this the saw methods of monolith recovery find application. Cap stone breaking-out wedge methods used independently or in combination with other known methods are kept on being used at a great amount of cap stone open casts all over the world.

Despite of high labour intensity the drilling-and-wedge method is wide-spread as it doesn't need expensive equipment, specifies the lowest requirements to mining and geological conditions of development and provides the required quality of the procured units.

In the middle of the eighties of the last century N.G. Kyu offered the method of oriented rock failure using putty substances. This method cardinally differs from the one of hydraulic rock failure on the root principles of fracture, means of operating and areas of application, though it borrows some elements from it (the destruction through a shot hole, the possibility of static and dynamic fracture load application). The first experiments on brittle materials failure using putty substances were carried out under laboratory conditions in terms of a unit of organic glass and plasticine blown in into the crack being formed in the static mode [1].

The method of directed rock fracture using putty substances got further development in 2000-2002, when H.G. Kyu offered and tested the dynamic variant of rock failure by the mentioned method. Under his leadership the first well resulted brittle artificial materials impact fracture experiments under laboratory conditions were carried out. After that, the first full-scale experiments on the directed dynamic fracture of a granite unit by hand method were carried out on the "Green Hill" experimental polygon of the Mining Engineering Institute of the Siberian Branch of the Russian Academy of Sciences under the leadership of N.G. Kyu [2].

The possibility of crack evolution process control was proved in the course of the further carrying out of the experiments on brittle environment fracture with putties. The essence of the method consists in the fact that a shot hole is drilled in the brittle material and it is filled with putty. At the static fracture a sealer (granular material, for example) is laid over the putty. A wedge equipped with hard alloy metal inserts, which form linear antipodal furrows on the shot hole

walls, is embedded into the sealer. The stretching forces affecting on the part of the two meeting flat surfaces of the embedded wedge cause the concentration of tensions in the furrows until their size is sufficient to break the environment down and form the initial crack. The considered fracture method has a very wide application area, which is associated with any activity, for the implementation of which the oriented or non-oriented fracture of brittle materials of natural or man-made origin is needed.

Natural stone, being a valuable building material, possesses a range of peculiar properties distinguishing it from other kinds of solid minerals. These properties present special requirements to the development technologies and methods depending on: chemical composition of the stone; the natural or artificial origin crack system presence; the development waste materials future use possibility; life duration, strength, ornamentality, permeability to air, and also the future products' sizes and form directly connected with the possibility of the broken-out monoliths to the places of their processing.

The global leadership in the area of facing granite and marble production volumes belongs to the People's Republic of China, which is in the big margin from the nearest competitors with the tendency of further increase in production. The European countries keep the global leadership in terms of cap stone production volume distinct from granite and marble – touchstone, tiff, quartz, quartzite, sand rock, serpentine, shale rock and travertine. Among the countries of Africa and Near East the facing granite and marble production leader is the Islamic Republic of Iran, and other stones – the Republic of Turkey. The North and Central America countries are characterized with small production volumes of cap stone of various kinds and covering of domestic needs owing to the import from other countries. The South American region differs by all kinds cap stone production small volumes, which are restricted with its internal market wants.

All theoretically existing rock failure methods, which can be applied at cap stone recovery are used in the world's practice, inclusive those known from the earliest times. At the solid stone breaking-out the most promising and applied method is drilling-and-breaking-off (drilling-and-blasting and drilling-and-wedge ones) of average strength stone – cutting with rope saws, and that of low strength stone – cutting with jib saws. The world's experience testifies that at the large dimensions monoliths breaking-out the drilling-and-breaking-off (drilling-and-blasting and drilling mud methods) and rope sawing are preferable, at the average and small dimensions monoliths breaking-out - the drilling-and-breaking-off (drilling-and wedge method) and jib sawing.

The analogues of the rock failure method using putties are drilling-and-wedge and drilling mud ones (powdery inexplosive destroying compositions) as they also destroy stone through shot holes, developing a directed crack gradually by means of creating thrust force affecting its walls. The introduction of the new rock failure method based on the destruction by putties in the mode of their dynamic driving out of the shot hole in combination with the known cap stone breaking-out methods into mining technologies will afford plenty of technological advantages. Compared to the analogous drilling-and wedge method these advantages consist in: the reduction of length and number of shot holes in the flat surface of the marked split-off; the main working operations performance time and labour intensity cutting; the reduction of solid waste output due to the split-off surface curvature decrease; the shape retention of the shot hole's estuarine part; the possibility of series-produced impact driver application, the driver being of another primary purpose at its insignificant implement. In comparison with powdery inexplosive destroying compositions these advantages consist in: the lack of requirements to the shot holes' mouths sealing; consistency of the failure results; solid wastes output reduction; little dependence on the work performance seasonal fluctuation; best work performance sanitary conditions guarantee.

Nowadays the mining technologies based on diamond-and-rope and jib sawing, drilling, and also hydraulic and hand wedges application together with thermal spalling or blasting got the maximal distribution at the procurement of cap stone all over the world. A differential peculiarity of the cap stone development is the application of several rock failure methods in the technology of monolith breaking-out, that distinguishes it from other kinds of solid minerals development. In the foreseeable future the existing tendency will retain. It will be supplemented by the invention and implementation of new rock failure methods at their being improved at the same time.

The common feature of the equipment used at the cap stone procurement is high efficiency and wide range of technical characteristics. There are broken-out monoliths' maximum dimensions tight constraints together with that, they are in strong interrelation with this equipment effective work area. These constraints are oriented to the monoliths of average and small dimensions; it is connected with the possibility of stone processing equipment effective work at plants.

The applied mining technology estimation on the environment and labour protection factors is necessary to carry out proceeding from the volumes of the coming pollution agents with due account for the applied collective protection means efficiency.

While estimating the danger level of the mining practice influence on the environment it is necessary to proceed from the premises that: various mining technologies affect differently on the main natural environments; each of these environments is characterized by two state levels – the required (high) and current (low) ones; the actions aimed to the required main

natural environments' state provision are defined by the mining technologies depending on the applied rock failure methods; compared to the natural environments' current state exponents the mining technology defining its best value is chosen.

While estimating the danger level of the mining practice influence on the labour conditions it is necessary to proceed from the premises that: the compared mining technologies affect differently on the industrial injury or occupational illness possibility; the labour conditions requirements are characterized by two state levels the required (high) and current (low) ones; the actions aimed to the required labour conditions' state provision are defined by the mining technologies and depend on the applied methods and means of their performance; at the heart of the labour conditions evaluation the mining technologies' possible versions comparison based on the minimum of negative effect on the human should lie.

The mining practice isn't referred to the number of productions characterized by the increased danger for the environment and labour conditions. The estimation of its level of effect on the environment and labour conditions should be carried out with due consideration of the constraints imposed on the mining manufacturing technologies.

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SUBSTANTIATION OF PARAMETERS OF TECHNOLOGIES OF SHOCK DESTRUCTION OF FACING STONE WITH APPLICATION OF PLASTIC SUBSTANCES

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A complex of problems solved at rock fracture technologies designing using plastic substances, should include an obligatory consideration of the following items: the account of the applied putties' properties; the account of the fractured rocks properties; the account of the beaten monoliths' required dimensions (blocks); the crack formation features account consisting in the substantiation of their form and dimensions; the applied techniques' features account lying in the substantiation of geometrical parameters of shot holes, stress concentrators on their walls or in face parts, sealing-in esturial parts or shot holes' walls, form and sizes of wedges, and also the energy of a single impact of the instrument.

At the mining technologies projecting it is necessary to take into account the fact that using a plastic substance characterized with low flowability will make the crack fronts intersection of natural or artificial origin and also the continuation of the formed crack formation even at their separate parts out on the free surface possible. The case demands the opening size of the intersected crack to be less than that of the crack formed using putties. Thereat it will not need a supplementary volume of the putty as in the fracture course it is not filtered through the fractured material.

The account of the properties of brittle materials fractured at the cap stone breaking-out using putties can be restricted by three basic rocks – granite, marble and limestone. Every of these rocks, being most commonly used, possesses a standard set of properties taken into account when projecting mining technologies (strength; volume of quarts; color (composition); structure; resistibility to mechanical effects, corrosion and environmental conditions; cold endurance; water absorption; wearability; maximal dimensions of monoliths (blocks) and their products. Other cap stone kinds breaking-out technologies can be considered as analogous ones to any of them.

The sizes of receiving sites of the facilities serving for rock sawing restrict the sizes of the cap stone monoliths. In this connection it is necessary to strain after the output of the monoliths (blocks) sized within the limits of the minimal to medium ones: width – 2-2,8 m; height - 1,2-1,7 m. For this purpose it is necessary to use the one-step breaking-out or to select the sizes of the broken-out monoliths multiple of these values due to their length variation. At the existing restrictions on sizes the weight of the monoliths (blocks) delivered to plants mustn't exceed 40 t, proceeding from the density of the rocks broken out.

When projecting mining technologies based on their fracture use with the help of putties, it must be born in mind that with the longitudinal crack growth their form gradually strains after the change from ellipse to circle. Together with this, the form of the cross cracks has a clearly defined circular character and doesn't depend on the size growth in the course of further delivery of putties. The impact or static origin cracks formation should happen at the possibly minimal consumption of the putty as its increase promotes the appearance of the flexural forces and differently directed curvature of the cracks' pattern.

The sizing of blind cracks obtained by the impact method depending on the volume of the introduced putties can be carried out on the basis of the computation founded on the principles of the quasistatic delivery of putties. The dimensions of the cracks obtained by the impact method and volumes of the putties necessary for this and calculated on the ba-