tions for the moment are: a) the energy resources and secondary energy resources use accounting and control system creation; b) the performance analysis and technology updating; c) the exchange of earlier technologies and equipment for advanced ones; d) the energy saving organization on the basis of energy-engineering combination principles.

At the petrochemical industry enterprises the waste energy use is provided, but the degree of their utilization and directions of use are imperfect for the most part imperfect and require a further elaboration.

From the main waste energy use trends adduced in scientific literature only the following ones can be recommended to the industrial isopropyl benzene production: a) the process stream warming-up in the primary and secondary processes; b) the production area and dwelling heating; c) the source and chemically purified water warming-up; d) the ventilation systems' air heating; e) the waste vapor compression heat pump system use within the product and semiproduct dispenser and recovery systems; f) the various parameter cold production; g) the water vapor production.

The exergy method of thermodynamic analysis has a good, constantly developed methodical base and is widely used for the analysis and evaluation of the heat and power systems' thermodynamic perfection.

When developing new energy saving technologies they usually confine themselves to the modernization of separate elements of heat and technology schemes, pay insufficient attention to the creation of integrated systems of heat and refrigeration supply enterprises inclusive of those using low-potential secondary energy resources.

The share of waste energy consumption from the waste treatment facilities is very low nowadays and makes at the average 8-10%. At the high-temperature technology enterprises the share of internal waste sources heat production achieves 50% of the total heat consumption. At the low-temperature processing the utilized heat consumption share makes total only 4-8%.

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CAP STONE BREAKING-OUT PERFORMANCE SAFETY METHODS

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The principle of providing comfortable conditions of work at a mining venture is the development and introduction of techniques and technologies of breaking out useful minerals excluding the occurrence and influence of negative factors of production on the human body. Thereat, it is necessary to take into account that the main reason of traumatism consists in the subjective attitude of the human to hazardous factors of production, and that of morbidity – in the efficiency of preventive measures against harmful production factors and the human's personal physiological features.

At the procurement of natural stone the drilling-and-blasting, drilling-and-wedge and drilling mud methods with unexplosive destroying compositions, cutting with rope and rotary saws, ring cutters, bars and thermal spalling are the most popular ones. The drilling-and-wedge method is applied at the hard rocks procurement, but very seldom – independently. At the procurement of average and low strength stone the cutting method gained its popularity. The drilling-and-wedge method in the specified case is tended to be changed by highly mechanized methods. In the open cast mines, where natural stone is broken off by cutting, it is used in supplementary works, when stabilizing monoliths or giving them a regular form.

A comparative evaluation of all the cap stone breaking-out methods being currently in use has been carried out, inclusive of the method based on plastic substances application. The worksites were certificated on microclimatic, vibration and noise working conditions; the severity and intensity of physical labour mechanized forms being also analyzed.

It follows from the analysis carried out that the work performance using all the considered breaking-out methods, exclusive of thermal spalling, doesn't promote the above-level change of temperature, speed and air humidity of the operating space, provides optimal well-being at the existing effective and effective-equivalent temperatures. The design features of the equipment used at the cap stone breaking-out drilling methods condition optimal and permissive labour provision on the vibration action. By contrast to this, the performance of work using methods based on cutting and thermal spalling is connected with the above-level vibration action, that is partially compensated by the absence of a permanent contact of the worker with the cutting tool and short-run static holdup of the thermal spalling plants during the work. The noise characteristics of the equipment applied at drilling, cutting and thermal spalling exceed the exposure limits. The worst factors are referred to the thermal spalling, that is connected with giving and burning of the hydrocarbon fuel jet under heavy pressure. However, the above-level noise of perforators, rock breakers and explosions at the natural mineral breaking-out drilling methods is mainly low-frequency and broadband unlike high-frequency and narrowband noise of rope and rotary saws, ring cutters and bar machines. This points to the fact that the above-level noise associated with the application of natural stone breaking-out

drilling methods are less dangerous for the human, than those associated with its cutting. The current mechanized forms of physical labour conform to the permissible rates in its severity and intensity everywhere.

It appears from this that irrespective of the carried out preventive measures against the occurrence and influence of harmful production factors, the drilling-and-wedge technologies of stone fracture are the most secure ones on their action on working conditions.

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