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THE FEATURES OF A COMBINED SCHEME APPLICATION IN TRANSPORTATION OF ROCK MASS IN THE QUARRIES OF ROUGH GRAVEL RAW

Every year the volumes of crushed stone production are increasing. It is due to the fact that the volumes of construction roads, housing and buildings are also increasing in the world.

When a quarry depth increases, the transportation distance and the volumes of rock mass also increase which, in turn, increases production costs and reduces competitiveness. Mining companies have to modernize production by reconstruction of the existing and introduction of new technological lines with the use of effective methods of blasting and modern crushing equipment.

Different kinds of transport, such as railway, vehicle, conveyor, hydraulic, cable and air transport are independently or in combinations used in a quarry. At major quarries of Ukraine, vehicle transport is used for transportation of rock mass. With the increase of the transportation distance the effectiveness of a certain type of transport dramatically reduces. Therefore, there is a need for the use of such combined schemes of transportation of rock mass which would provide the design capacity of the quarry and, if necessary, increase it.

The combination of mining transport allows to accelerate the preparation of deposits for operation, to intensify mining and stripping operations and to obtain the greatest technical and economic effect.

Quarry transport should meet following requirements: ensuring a certain freight turnover and continuous operation; lessening labor-intensive operations; providing traffic safety and maintenance of work.

Such factors as the characteristics of the cargo transported, the distance of transportation, the scope of work and the pace of their development influence on the choice of quarry transport. The capacity of vehicles depends on the freight turnover; and the pace of mining operations determines the requirements for maneuverability of vehicles.

The use of combined transport scheme provides reduction in fuel costs, reduction of personnel, as well as improvement of working conditions for people in a quarry and environment safety. Combined transport scheme allows operating in the most favorable conditions. Thus, the type of the vehicle, the assessment of its basic parameters and technical-economic indicators are of great importance.

Taking into consideration the mining-technical and mining-geological conditions, it is advisable to use the automobile-conveyor transport for the haulage of the rock mass at LLC "Vury quarry". Now, the depth of the quarry reaches 66 m and the distance of transportation within the open quarry is 1 km. The rock mass from the excavated bottom is transported by dump trucks to the bunker of jaw crusher located in the quarry on the horizon with a mark of +132. Crushed rock mass with the fraction of 0-400 is transported to an accumulation warehouse by the inclined conveyor (angle 14°) with a length of 436

m to the elevation height of 100 m. This rock mass is further processed to produce crushed stone of different fractions. The product of primary crushing with 0-32 fraction is screened and transported by a conveyor to store it temporary in the quarry.

The use of cyclic-flow technology in open-pit mining is helps to increase (compared with cyclic) efficiency, to reduce costs for deposit development, to increase the productivity of excavators, to reduce by several times the need for powerful trucks, to minimize losses during transportation of the rock mass, to maintain rock mass quality and to reduce negative impact on the environment (namely the amount of dust and gas by reducing the number of loading machines).

The performance of cyclic-flow technology depends on the size of blasted rock mass. Therefore, the requirements to the quality of the rock mass in cyclic-flow technology are increased. The maximum size of a piece, which can be processed by a jaw crusher Sandvik C160 can reach only 1.6 m.

For cost-effective transportation of rock mass by the automobile-conveyor transport, the scope of its application should be correctly justified. Also, efficient conditions for vehicles should be ensured, which depends on the number and the location of transshipment points in a quarry. The parameters of the automobile-conveyor complex are: the height, the distance, the volume of rock mass transportation by automobile and conveyor transport, the number of transshipment points. These parameters depend on the volume of the rock mass, mined in the stages of quarry development.