

MEASUREMENT OF THE MOVEMENT PARAMETERS OF ELEMENTS OF DIAMOND WIRE SAW

The measurement of the movement parameters of production equipment is essential for monitoring and controlling the manufacturing process. In this case the production equipment of natural stonemining enterprise was investigated. The modern diamond wire saw Zhongyuan Machinery ZY-45HT was used as the operating equipment.

The physical process of diamond cable cutting can be described as the penetration of a chisel into the solid body. The chisel presses into the rock as a wedge under the influence of the thrust force, and moves simultaneously in the direction of cutting under the impact of cutting force destroying the rock ahead of itself.

The scheme of the working face of the diamond wire saw Zhongyuan Machinery ZY-45HT is shown in Figure 1.

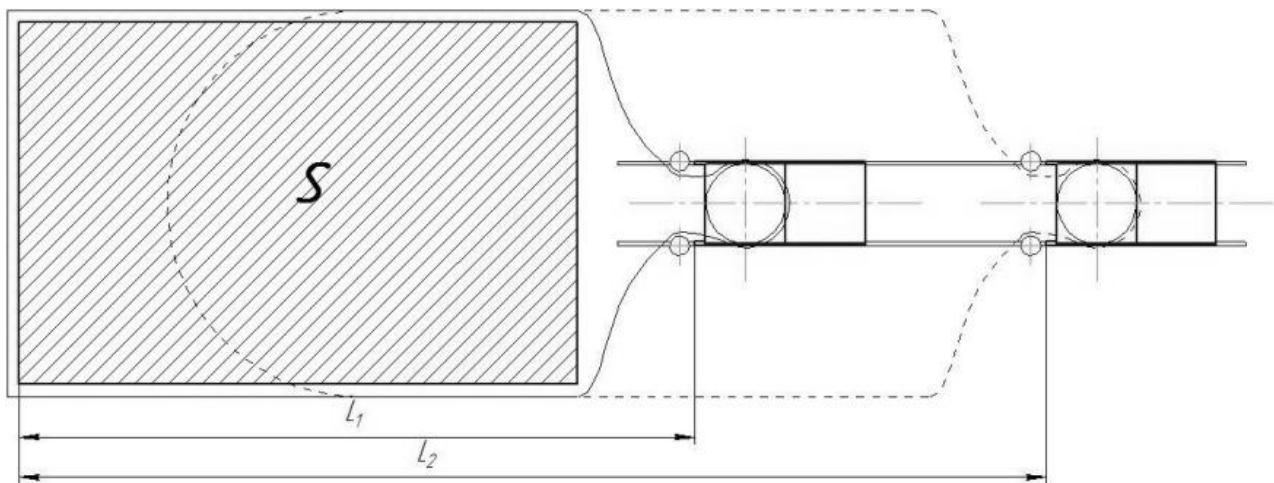


Fig. 1. The scheme of the working face of the diamond wire saw (horizontal cutting)

S - the area of the separable surface;

L_1 - the distance from the farthest point of the monolith to an extreme point on the body of the installation in the initial position;

L_2 - the distance from the farthest point of the monolith to an extreme point on the body of the unit in the final position.

The aim of the investigation of the movement parameters of the diamond wire saw on the rails is the determination of instantaneous cutting productivity with the subsequent determination of total productivity.

The diagram of changing of the coordinate of the diamond wire saw in the course of the experimental period is shown in Figure 2.

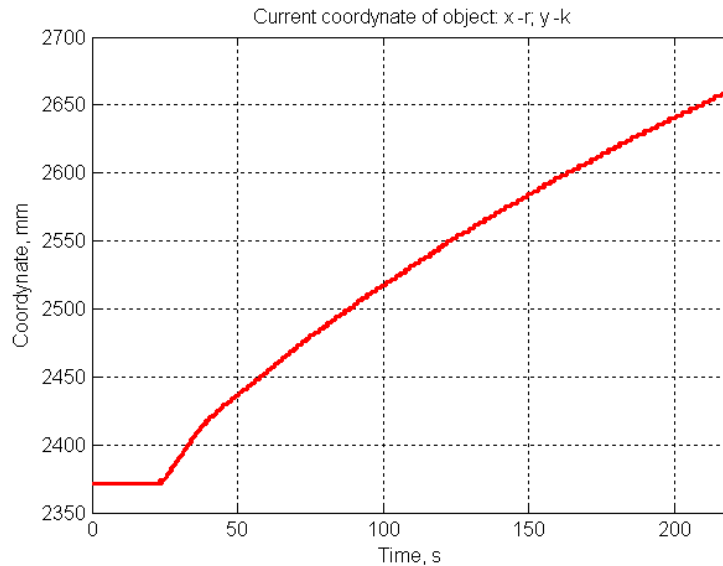


Fig.2. The diagram of the dependence of the coordinate on the cutting duration

Movement parameters data of the diamond wire saw have been gained in the result of the algorithmic processing of video images. On the basis of obtained coordinates it is possible to determine the instantaneous rate of movement of the diamond wire saw on the rails.

The method of the research of movement parameters of the diamond wire saw on the rails using the computer program of video image processing makes it possible to explore the process of displacement of wire saw on the rails in details.

The method of manual measurement of the movement distance using the tape-line doesn't offer the determination of the movement speed at any point of time in contrast to the suggested method.

The application of the suggested method of video image processing offers the possibility to determine the instantaneous productivity of the diamond cable unit. On the basis of the present coordinates it is possible to forecast the final cutting time and to handle the indices of cutting productivity using the changes of the indices of current and main motor speed of the diamond cable unit.