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# NEW VIEWS ON EXCAVATOR SERVICE

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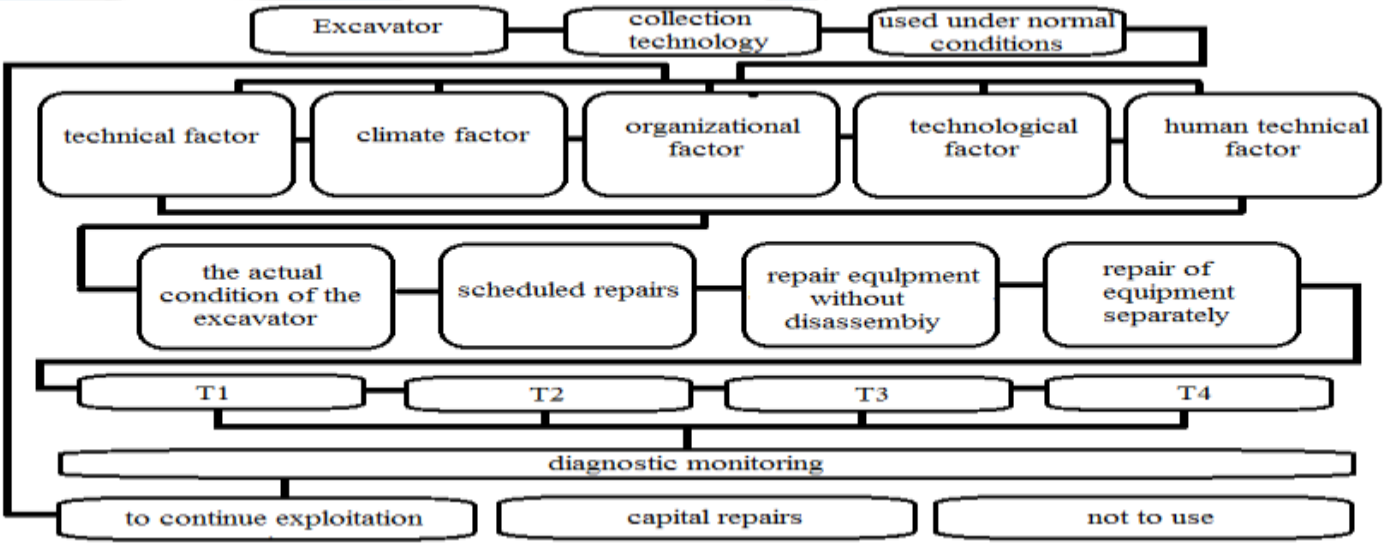
**Abstract**
The article examines the role of diagnostics and service life in the repair of excavators. It was found that the productivity of excavators depends on the condition of the excavator.

**Keywords** excavator, diagnostics, repair, maintenance

## Introduction

The development strategy of large mining enterprises in the country is aimed at further improving product quality and competitiveness and gradually increasing production volumes. In this regard, special attention is paid to the active renewal and modernization of the fleet of mining enterprises and the purchase of new high-capacity equipment and the effective use of existing equipment. The role of excavators is important in the extraction and loading of minerals in the fields.




Picture 1. Construction of an analog model of the operating time of excavators

The correct choice of excavators in mining enterprises is selected depending on the geological, mining technical, physical and mechanical properties of the rock and the height of the ledge. The excavators selected in Figure 1 carry out efficient and quality assembly work in a special area. The assembled excavator performs excavation and loading operations at the quarry. As a result of the factors influencing the operation process, it affects the design, condition, performance of the excavator, so it is necessary to carry out timely maintenance and repair of equipment. The role of diagnostics in carrying out this work is great. A necessary condition for maintenance is to keep the equipment in good condition, which in turn requires the correct use of diagnostic tools. A distinction must be made between diagnosing the technical condition of metal structures and electrical equipment. Ultrasonic, acoustic, vibrating, organoleptic, electric, electromagnetic, radioisotope, X-ray types are mainly used to diagnose the metal structures of excavators. The purpose of diagnostics is to determine the dynamics of change of excavator equipment. The vibroacoustic method allows high-precision detection and evaluation of various defects in equipment and devices, for example, prevents the occurrence of defects in the incorrect placement, production, installation of electric motors and gearbox shafts.

The magnetic method is based on the analysis of changes in the magnetic field that occur in places where defects in products made of ferromagnetic materials occur. Diagnosis using the magnetic method is inexpensive and does not require highly qualified specialists and extensive theoretical knowledge. The method of detecting magnetic defects can detect cracks, gaps, lack of penetration and delamination to a depth of up to 10 mm with a minimum size of more than 0.1 mm. The rolling method is used to diagnose technical objects made of electrically conductive materials. Basically, the rolling method is used to detect defects located at a depth of 8 ... 10 mm; to measure the thickness of coatings; determines the physical and mechanical properties, composition and chemical composition of the object. The radiation method is based on recording and analyzing the parameters of ionizing radiation passing through the control object and determines the elemental composition, overall dimensions and internal defects of the substances. If diagnostic work is not carried out in a timely manner, it will result in some appearance of the excavator equipment shown in Figure 2.

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*а.* *б.* *в.* *г.* *д.*

Picture 2. Excavator equipment.

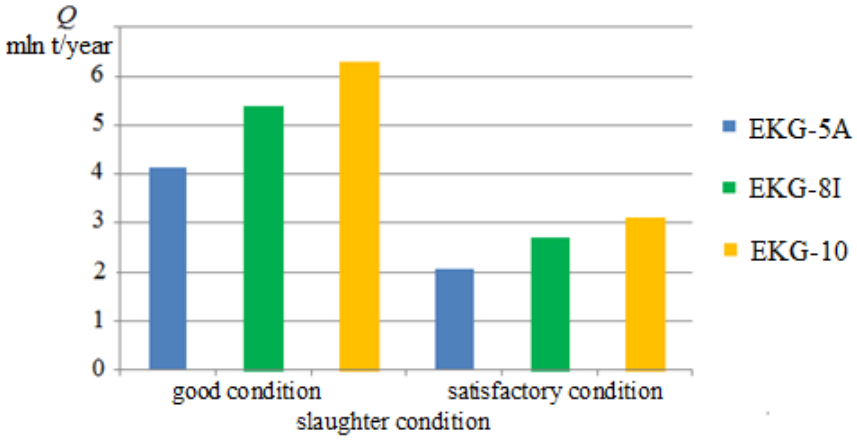
*а* – bearing of the excavaror; *б* – sedlavoy podchimnik axis; *в* – pulley; *г, д* – walking trails.

Figure 2a shows a saddle bearing that serves to move the bow between the excavator boom. As a result of stress on the bearing axis, over time it becomes as shown in Figure 2b. The pulleys on the saddle bearing and the rollers on the walking body will appear in Fig. 2c, g, d if lubrication is not carried out in time.

The equation for changing the annual operating time of an excavator from its service life is determined by the following expression.

$$Q_{god} = [Q]\left(-5 \cdot 10^{-4} \cdot Y^2 + 6 \cdot 10^{-4} \cdot Y + 1\right)$$

$Q$ – the basic value of the annual operating time of the excavator under normal conditions. $Y$ – the number of annual repairs of the excavator.




Picture 3. Diagram of the productivity of excavators on the condition of the slaughterhouse

In Figure 3, we can see that drilling and blasting in the quarries is carried out qualitatively and efficiently, timely cleaning of the pit with graders. The annual capacity of the EKG-10 excavator exceeds 6 million tons. This not only affects productivity, but also causes the excavator equipment to wear out quickly. Long-term and high-quality operation of excavators requires the right choice of technology in the

organization of work, timely diagnostics, maintenance and repair work leads to reliable, efficient operation of the machine.

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