STUDIES ON THE MODERNIZATION OF LARGE CAPACITY EXCHANGERS EXISTENCE IN MINIER ROVINARI BASIN

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Abstract: *This paper presents improvements to parts of the excavatorERc1470/30/7, resulting in: increasing the volume of annual mines by improving the time of intensive and extensive use, lower production costs, increased operational safety, improving the quality of the delivered production, reducing the excavator's weight by replacing some subassemblies having lower weight, low power consumption, optimization of excavation capacity, ensuring the ergonomic comfort of the excavator and protection of electrical and mechanical circuits.*

Keywords: capacity excavators, coal extraction machine

1. Introduction

The rotor excavator is a machine used in quarries to cut coal in and out coal deposits to deposit or take up the coal from the warehouse and send it to conveyor belts to coal mills. The rotor excavator is a German-style construction with a technological level of the '60' years the reference moment was in 1967 when they were put into operation 2 at Cicani SRs 470/18 / 0.5 and SRs 470/15 / 3,5 respectively, and in 1969 Garla Career in operation a Sch Rs 1400/30/7 excavator. TAKRAFF has shipped to the Rovinari 3 basin rotor excavators type ERc 1400-30 / 7, 1 at Rosia quarry, 1 at Tismana I quarry and 1 at career Tismana II.

In our country we use SRS-type rotors - manufactured in R.D. German and Sch Rs - manufactured in R. Germany. The symbolization has the following explanation: S,Sch - excavator with rotor portcupe, R - with track travel, s - rotor followed by some numbers: the first number is the volume of the cup in liters, the second number represents the height of cut above the displacement, the third number represents the cutting depth below the level tracks [2].

The rotor excavator is the most important type of continuous-action excavator.

This excavator surpasses in both productivity and simplicity both bucket and bucket excavators the ones with several elite type cups and have a wide use in quarries in Oltenia mining basin- Rovinari and Motru [1]. By properly adjusting the cutting height, the rotor excavators ensure in the process of excavation and continuous transport, obtaining large productions. I can crawl both above the level of the tracks, using straight cups and underneath the track, using cups reversed mounted on the rotor. In principle, all rotor excavators have a similar construction. The differences that occurring refers to how the material is taken from the loading and delivery troughs into the circuit main transport from the quarry.

2. Parts parts

The parts of the excavator ERc 1400/30/7, for example, are as follows: excavator gear mechanism, swing mechanism, swing mechanism, mechanism of travel on the support carriage, wheel lift-up mechanism portholes, connecting bridge and support and teaching carriage, electrical installation, cab order, material transport mechanism.

3. Functionality

From a constructive and functional point of view, wheel and bucket excavators meet two distinct functions, namely:

- excavating and loading of dredged material;
- transporting the excavated material through the bands on the aggregate to the front collector strip [3].

At the rotor excavator, the cups cut off the front material and a conveyor belt transports excavated material to a discharge point. These types of machines work along with rail transport systems, with bands and transborder bridges. Rotor Excavators are machinery commonly used to excavate from the level upward movement. They can work well below the level of movement, but at much lower depths than tracked excavators. The use of a low-level excavator is limited the fact that the conveyor belts are effective only at inclinations below 20 °. In the rotor borer, the swinging rotor arm is torsioned as the rotor with the buckles moves in a plane parallel to the boom axis. The length of the arm can exceed 70 m and can be lifted up to a 30˚ inclination.

4. Technical features

Rotor excavators can be divided into five different classes depending on the main ones functional parameters and quality indicators, the most advanced rotor and bucket excavator cutter being considered that excavator that has the following functional characteristics and makes

Part IV:

- Daily capacity Q = 240000 m3
- rotor diameter D = 21.6 m
- Cup capacity I = 6.3 m3
- maximum peripheral force U = 1460 kN
- rotor arm L1 = 70.5 m
- the radius of action of the depositing part L2 = 119 m
- cutting height h1 = 50 m
- Cutting range h2 = 98 m
- tape width B = 3.2 m
- service weight DG = 138000kN [1]

The acquisition of equipment for the day-to-day operations in our country was made taking into account:

- the nature of the covering rocks;
- cutting resistance to lignite and rock covering;
- groundwater and artesian water regime;
- the terrain configuration;
- the slope angle;
- total excavation depth [3].

Rotor excavators at the Rovinari thermal power plant have the following technical data:
- deposition transport volume 5.600 m3 / h;
- load transport volume 5,600 m3 / h;
-coating factor 0.8 t / m3;
- service weight 706 t;
- maximum length 102 m;
- maximum width 13 m;
- maximum height 26 m;
- the distance from the center of the machine to the center of the rotor with 40 m cups;
- maximum discharge height 14 m;
- maximum discharge height relative to the platform surface 10.5m;
- the maximum load height reported at the platform edge 15 m.

5. Enhancements to the control cab and electrical installation

In the case of an upgraded control cab, its operation must be carried out by means of the hydraulic system for horizontal and lifting the cab. This installation provides the power and working time required to operate the control cabin set by air cushions on the articulated metal frame on the machine arm. The ergonomic comfort of the excavator will be accomplished by: pneumatic dampers, air conditioning, resting synoptic panel, program control, closed-circuit television for important parts of the machine (the part of the wheel reducer with cups and lane 5), ergonomic chair.

At the electrical side, the following upgrades can be made:
- the Ward-Leonard groups and the DC motors can be dropped can be replaced with asynchronous electric motors with short-circuit rotor and converters frequency;
- giving up asynchronous motors with winding rotor and starting resistors and replacing them with asynchronous electric motors with short-circuit rotor and frequency converters;
- replacement of dynamic switching devices with imported devices and programmable automatic machines;
- to diversify and ensure maximum safety measures through imported devices;
- the electric motors are provided with thermistors in the stator winding for protection additional engine overheating;
- temperature sensors are provided at all drum and electric motor bearings;
- all manual lubrication points must be connected to automatic centering lubrication.

6. Conclusions

As a result of the improvements that will be made, the following results will be obtained:
- increasing the volume of annual mines for each modernized excavator by improving the time of intensive and extensive use;
- by reducing the consumption of cups, teeth, electricity, costs will be lower; increasing the operational safety as the risk of damage is eliminated;
- replacement of defective or worn-out parts by operative interventions due to constructive improvements;
- improving the quality of production delivered by obtaining a lower grain coal;
- new cups and teeth reduce the possibility of producing vibrations with consequences in the construction metal;

- low power consumption by replacing the Ward - Leonard groups of the DC and induction motors with coil winding and starting resistors, with motors asynchronous electric motors with short-circuit rotor and frequency converters;
- protection of the wheel drive with overloads by a VOITH turbo-coupled clutch;
- Raising the ground guard by using a small guard with a larger guard;
- optimization of the excavation capacity through functional assembly through programmable a the rotor support arm swing mechanisms, the wheel wheel and the excavator movement;
- increase the operating time of belt conveyors by replacing rollers with garland type rollers on the route;
- rehabilitation and reliability of control and signaling circuits, by simplifying without diminishing the protection and safety functions;
- Simplify the action of horizontal and lifting the control cabin by replacing it electrical installation with hydraulic system;
- additional protection of motors against overheating and implicitly increase the duration of the operation by mounting in the winding stator of thermistors;
- ensuring the ergonomic comfort of the excavator by modernizing the control cabin;
- ensuring the power and working times required to operate the control cabin through the implementation of the hydraulic installation for the cabin horizontal and lifting.

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