METHODS OF INCREASING ENERGY EFFICIENCY OF LIFTING MACHINES

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In industry, studies have been carried out on the optimal control, commissioning and linear suspension of lifting machines, which are used in lifting and unloading work in industrial materials from one place to another, in the installation of construction construction, in building material warehouses.

Currently, in manufacturing enterprises, phase rotor asynchronous electric motors are used in loaders. Control of their speed is carried out by connecting additional resistance to the rotor. But this method also generates a lot of energy consumption. An additional resistance coupling scheme to phase rotor asynchronous electric motors is shown in Figure 1.

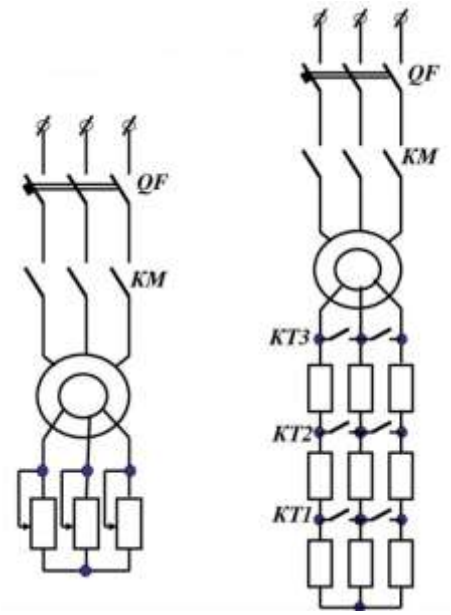

Figure 1. Additional resistance coupling scheme to phase rotor asynchronous electric motors

By the nature of the work, these machines are periodic moving machines. One of their main parameters is the load-bearing capacity. The carrying capacity is determined by the unit of mass (kg, t). From the fact that the load depends on its mass for weight and the speed of free fall, its unit is defined as (N, kN). As well as load-bearing machines are characterized by the service area, load-bearing height and the cost of loads falling on the ears, speed of movement of the work process, mass, expendable capacity and supports. The carrying capacity of the lifting machines depends on the ear of the hook. The pendulum is said to be the distance from the axis of the turning part of the crane to the carrying hook. Therefore, cranes are characterized by the moment of load (the product of the weight force of the load on the arm of the cargo sail-hook).

During the study, a thyristor control system was analyzed in order to control the speed of electric motors and increase the energy efficiency in it. The thyristor control system made it possible to control its speed through the expression U2=m by changing the voltage supplied to electric motors. The scheme for controlling the speed of electric motors through the thyristor unit is shown in Figure 2.

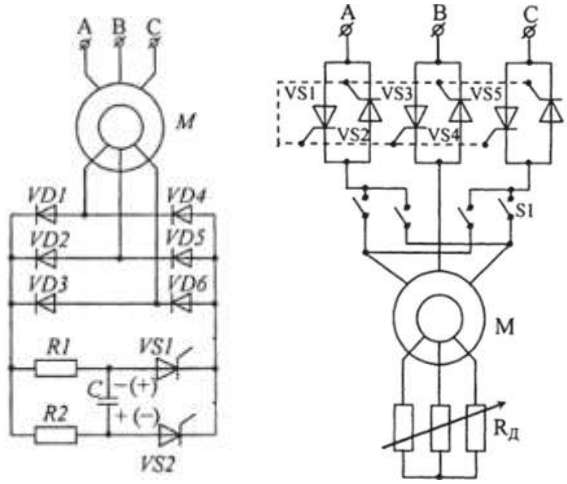

Figure 2. Scheme of controlling the speed of electric motors through the thyristor unit

The speed of lifting machines is calculated depending on the mass of the load on it and the performance of the machine. During the study, it was found that the torque in it also decreased in turn when controlling its speed through the thyristor block. It was observed that during the operation of freight cars, the operating modes of I changed at a

quick opportunity, turning the electrical energy in it into heat. As a result of this observation, it was found that the amount of heat that is being heated is low in energy efficiency due to the fact that fodal is not being utilised. Figure 3 cites the general cyclization of the load-bearing Mashina.

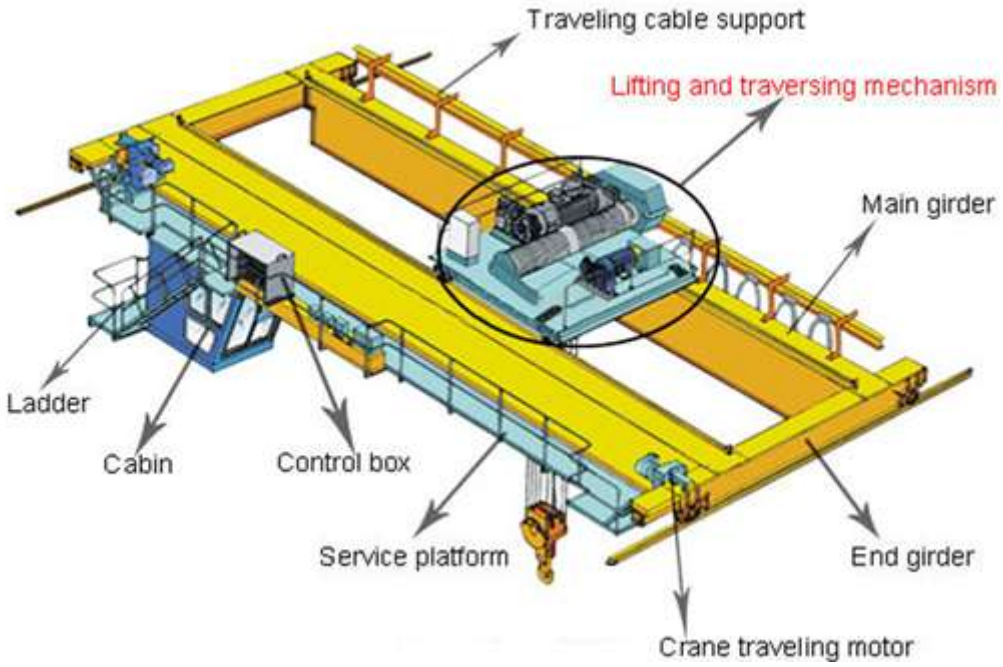

Figure 3. General fixation of the load-bearing Mashina

Linear control system designed to control asynchronous electric motors. There are three types of control of electric motors in this.

1.Vector control.

2. Speed control.

3. U / f dependency control.

A high voltage frequency converter has the ability to control in two different systems.

1.Automatically.

2.By hand.

The voltage sinusoidal distortion in the Switch does not exceed 4%. Overheating and grinding currents are not observed in the insulation of the chimney. When the network voltage changes to 15%, the engine automatically maintains power and speed in one norm. he will be in a state of mind as simple as possible the control process. The touch LCD panel

displays the electric motor on the display in the settings, position text and graphic position. Provides an error warning and keeps it running.

When the frequency control system is analyzed, it has an increased resistance to mechanical forces as a result of low electrical energy consumption and the optimal development of its speed linear control system. Figure 4 is surrounded by electricity consumption in a tri-homogeneous control system.

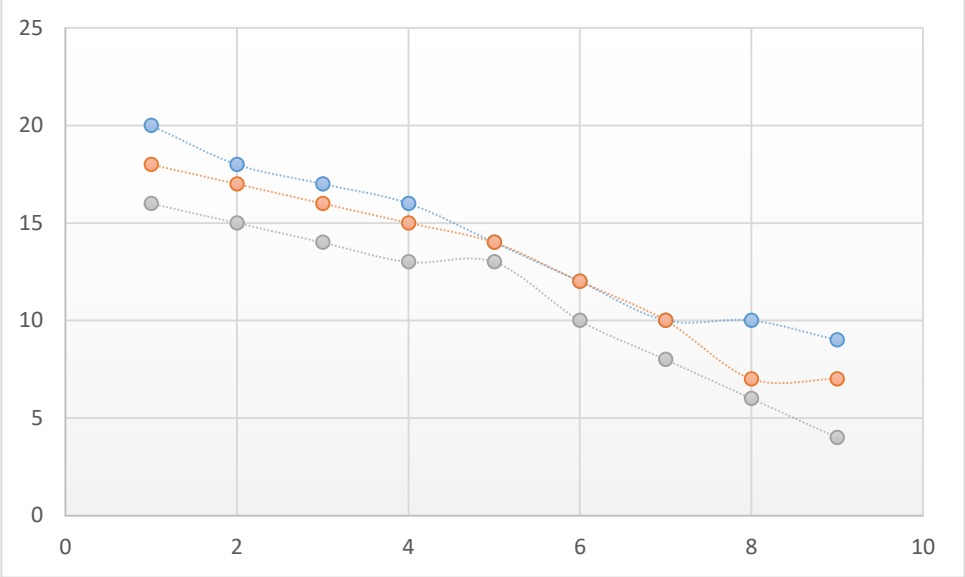

Figure 4. Energy efficiency graph

Blue color: energy efficiency in speed control by connecting additional resistance.

Yellow color: energy efficiency in speed control through Thyristor block.

Gray: energy efficiency in controlling the speed through a frequency converter.

As can be seen from the energy efficiency the most optimal method for controlling the speed of the lifting machine and increasing the energy efficiency is found to be through the frequency modifier.

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