

# IMPACT ON TECHNOLOGICAL FREQUENCIES AND POWER CHARACTERISTICS SCRAPER

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*The influence of frequencies for technological and energy characteristics scraper. The dependences of specific performance and power consumption scraper on the current frequency.*

*Scraper, frequency, current, power, performance, power loss, the specific consumption of electricity.*

Rejection frequencies causes a change in the angular velocity of the motor, which in turn causes a change technological characteristics of working machines. Current frequency also affects the energy losses in electric drives.

Currently gained distribution variable frequency drives. Especially widely they are used in electric drives transport machines.

The purpose of research - to determine the effect on the frequency of the current technological and energy characteristics scraper.

Materials and methods research. The analysis of the angular speed of the electric scraper and energy losses rejecting frequencies was performed using the theory of the electric relating electromechanical properties of induction motors, power transmission characteristics of working machinery, electric power steady state, and the use of mathematical modeling.

In experimental studies, current frequency changed by frequency converter, thus measuring the rotational speed of the conveyor shaft tachometer and determined its specific performance and power consumption.

Results. If you change frequencies mechanical characteristics of induction motor on the working area described by the equation [1].

In scraper point static resistance does not depend on the angular velocity, ie  $MC = \text{const}$  [3].

Then, in steady state operation or Synchronous angular velocity of the motor at rated frequency current holder FH:

Then equation (3) can be written as:

where we get

For engines with a rigid mechanical characteristics  $\omega_n \approx \omega_{0n}$  because

Performance scraper [2]:

Speed performance scrapers and scraper directly proportional to the angular velocity of the drive shaft:

The law of productivity scraper while written as:

Experimental dependence of performance and speed of the conveyor scrapers hnoyeprybyralnoho TSN-2,0B (Figure 1) showed that they are linearly dependent on the current frequency.

Switching frequencies affects the power losses in the motor. Iron loss from eddy current and hysteresis are defined by the formula [1].

If you change the frequencies of induction motor rotor iron loss can be neglected [1]. Then the expression for the iron loss at rated voltage will look like:

In variable frequency drives scraper voltage change is directly proportional to frequency current.

In variable frequency drives scraper specific power consumption is given by:

Thus, lower frequencies causes an increase in specific consumption of electricity in the scraper, and its increase - decrease. In variable frequency drives at lower frequencies compared to the nominal specific power consumption is reduced compared to the unregulated electric 2 - 3%, while the increase - increases.

### **Conclusions**

Performance scraper is directly proportional to frequency current. Based on the studies found that at lower frequencies by 40% performance scraper reduced to 40% and the specific power consumption increases by 61%.