

INFLUENCE OF VOLTAGE DEVIATION ON THE TECHNOLOGICAL AND ENERGY CHARACTERISTICS OF FEED MIXER

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When the voltage deviation from the nominal value arising losses caused by the loss of active power and change the life of electrical insulation, technological change performance settings, cost and quality of products.

The actual deviation Voltage in Ukraine greatly exceeds the permissible value. Expectation voltage deviation is within 16 %, and a change in voltage range is 15-28 % of the nominal.

Deviations voltage causes a change in the angular velocity of the engine, which in turn causes a change in the technological characteristics of working machines.

It also changed in the electric energy loss.

The purpose of research - to determine the effect of voltage deviation for technological and energy characteristics of feed mixers.

Materials and methods of research. The analysis of the angular speed electric mixer feed and energy loss during voltage deviation conducted using the theory of the electric relating to electromechanical properties of asynchronous electric motors, power transmission characteristics of working machinery, electric power steady state and the use of mathematical modeling.

In experimental studies stress on the engine changed using transformers, thus measuring the rotational speed of the shaft tachometer. Using a mix of uneven depending on the angular velocity, determined its change in voltage deviation from the nominal value.

Results. The dependence of the angular velocity feed mixer at a deviation voltage is described by the equation:

$$U_* = \sqrt{\frac{K_3 s_n}{s \omega_*}} = \sqrt{\frac{K_3 s_n (1 - s_n)}{s(1 - s)}}. \quad (1)$$

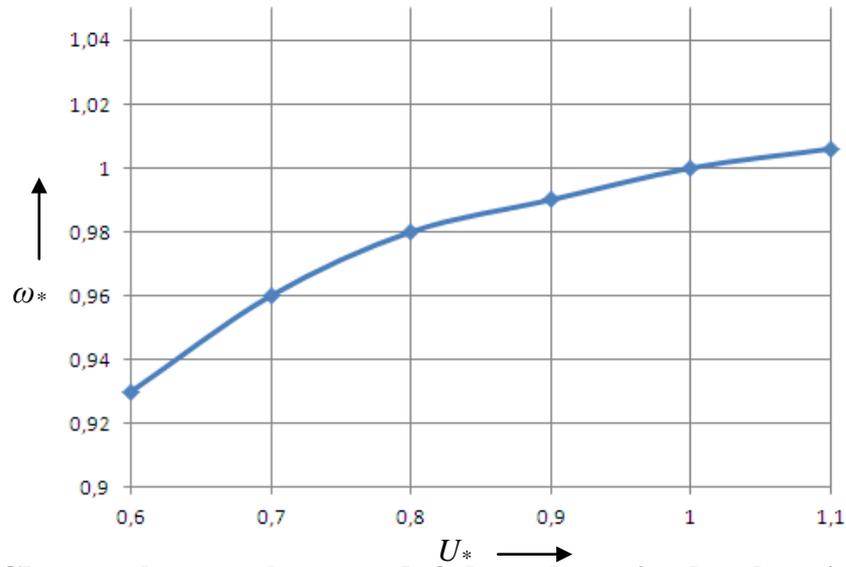


Fig. 1. Change the angular speed of the voltage in the electric mixer feed

Experimental studies of the angular velocity changes by changing the voltage mixers have shown that these dependences are nonlinear and describes complex functions (Figure 1). By reducing the voltage from the nominal value of the angular speed mixers nonlinearly decreases, and at higher voltages - slightly increases.

Dependence uneven mixing of feed voltage shown in Fig. 2. When the voltage deviation from the nominal value of uneven mixing increases.

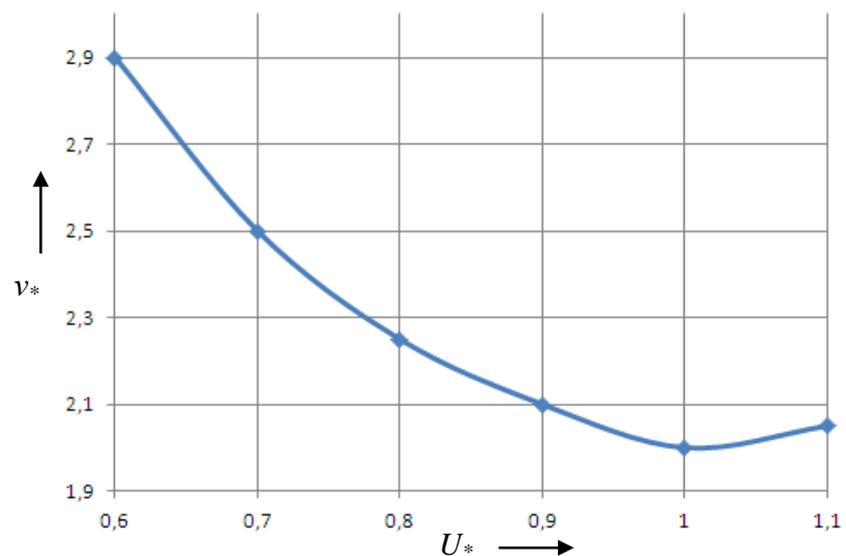


Fig.2. Dependence dimensions uneven mixing of feed mixer C-12 on the

voltage

Dependence of the unit cost of electricity feed mixer from the voltage described by equation (Figure 3):

$$q_* = \frac{1 + \frac{1 - \eta_n \cdot (\alpha U_*^2 + 1)}{\eta_n (\alpha + 1)}}{1 + \frac{1 - \eta_n}{\eta_n}} = \eta_n + \frac{(1 - \eta_n)(\alpha U_*^2 + 1)}{(\alpha + 1)}. \quad (2)$$

With increasing voltage electricity unit costs increase.

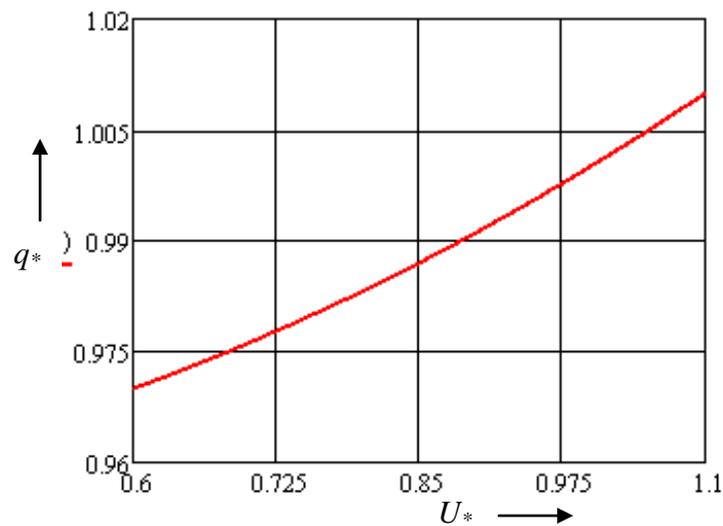


Fig. 3. Dependence of the unit cost of electricity voltage

Conclusion

In dismissing voltage changes and uneven angular velocity feed mixer for mixing a complex algorithm.

As a result of studies found that at lower voltages 20 % mixing of the uneven growing by 0.3 % and unit costs of electricity - to 2 %.