DESCRIPTION OF DEFECTS OCCURRING IN ASYNCHRONOUS MOTORS.

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Annotation. *The article covers theoretical information about the causes of inefficient operation of electric motors, energy saving measures in electric drives, types of damage in asynchronous motors and mechanical damage. Through this, it is aimed to increase the efficiency of electric machines by reducing wastage.*

Keywords:*technological, operational, management, reverse, damage, network, adjustment,*

It includes the use of electrical equipment within the specified normative parameters, improving the quality of service, keeping technological electrical equipment in optimal operating mode, and similar activities. The main electrical equipment used in production is electrical and lighting equipment.

The main part of the enterprise's electricity consumption is accounted for by the electric drives of technological machines. Optimizing the operating modes of electric drives and using adjustable electric drives provides greater economic efficiency. Various factors can affect the inefficient operation of electric drives.

Reasons for inefficient operation of electric motors:

-under or overloading;
-operating at voltages lower or higher than the nominal voltage;
- low-quality electricity supply;
-poor repair and service;
- consumers with low energy performance;

The following can be cited as energy-saving measures in electrical installations:

- rational choice of motor power;
- change to a motor with high energy performance;
- limit the routine work mode and intensify the work process;
- adjustment of electricity quality indicators;
- maintaining optimal working conditions.
- change the motor connection scheme depending on the load
- adjustment of motor speed according to technological requirements
- adjustment of motor energy consumption according to the load
- reactive power compensation.

Asynchronous motors are mainly damaged during starting, overloading, reversing and braking. Damaged motors are repaired in the prescribed manner. Currently, the

number of repaired asynchronous motors in production is increasing. It can be observed that the parameters of the motor operating mode do not correspond to the parameters of the passport due to the lack of full compliance with the repair technology. Due to the decrease in energy performance of the motor, it has a significant impact on the amount of waste in the enterprise. [6]

Damage to an asynchronous motor is classified based on various criteria. Mainly motors are found in mechanical and electrical damage. Mechanical damage to an induction motor includes deformation of the rotor shaft, loosening of the fixed stator, failure of bearings, contamination of rotating parts, and the like. The causes of mechanical damage to an asynchronous motor may be:[5]

The origin of phase asymmetry leading to motor vibration

Due to overloading the motor shaft with mechanical load

Due to errors in the assembly of motor components.

Mechanical damage accounts for an average of 10% of total damage to asynchronous motors.

Electrical injuries:

The causes of electrical injuries are divided into the following 3 groups:

- Network failures. Power outages in the electrical network due to various reasons (for example, wind gusts, thunderstorms, rain, etc.). These failures are the most common, accounting for 80% of asynchronous motor failures. These failures are often caused by voltage fluctuations or oscillations, asymmetry, phase loss, and sinusoidality.
- Damage caused by high currents. This can be caused by overloading the motor, interphase or interwinding short circuits, insulation deterioration, and other reasons.
- It includes damages that occur due to insulation wear, moisture, and damage due to a decrease in resistance.

In addition, AM injuries are studied by dividing them into the following 2 groups: external and internal injuries:[5]

External injuries include:

1) Incorrect connection of the motor to the network or disconnection of the network wires;
2) Burning of the preservative fusible ingot
3) Applying a voltage greater or less than the rated voltage to the motor.
4) Malfunction or connection of driving or control devices
5) Motor overload
6) Malfunction or failure of the engine ventilation system.[6]

Internal injuries, in turn, are divided into mechanical and electrical injuries. Mechanical damage includes:

1) Bearing damage;

2) Deformation or breakage of the rotor;
3) Loose or broken brush handles;
4) The appearance of deep grooves on the contact rings or brushes;
5) Improper fastening or loosening of the stator to the housing;
6) Formation of cracks in bearings and casing.

Electrical injuries:
1) Inter-winding connection;
2) Disruption of pipelines;
3) Short circuit between the housing and the windings;
4) Deterioration of insulation;
5) Incorrect connection of the reels in the reels;[6]

The most common faults in induction motors are:
1. Motor overload and stator winding burning -31%.
2.Inter-winding connection -15%.
3.Bearing damage-12%
4.StatorDamage to the sheath or loss of insulation - 11%
5.Statorand non-uniformity of the air gap between the rotors-9%.
6.2-phase operation of the motor -8%.
7.-5% damage to shorted rotor booms.
8.Improper fastening or loosening of the stator -4%.
9.Uneven distribution of the load on the rotor - 3%
10.Rotoraxis misbalancing -2%.

One of the most common types of damage to asynchronous motors is defects caused by poor quality electricity.

Conclusion (English Translation)

The analyses presented above show that improving the efficiency of electric drives largely depends on analyzing their operating conditions, identifying the causes of malfunctions, and implementing energy-saving measures. The main reasons for the inefficient operation of asynchronous motors include load mismatch, voltage deviations (either lower or higher than the nominal value), poor power quality, inadequate maintenance, and the use of consumers with low energy efficiency.

Energy-saving measures such as the rational selection of motor power, the use of high-efficiency motors, adjustment of power quality indicators, speed control according to load and technological requirements, and reactive power compensation can provide effective results.

Failures in asynchronous motors mainly occur during starting, reversing, braking, and overloading processes. These failures are of both mechanical and electrical nature. The main causes include installation errors, excessive mechanical

loading, phase asymmetry, insulation breakdown, and voltage fluctuations in the power network.

According to the study, nearly 80% of all asynchronous motor failures are related to electrical network issues, voltage fluctuations, and insulation deterioration. In addition, mechanical damages such as rotor deformation, bearing failure, and stator loosening also account for a significant portion of total failures.

In conclusion, the reliable and efficient operation of electric machines can be ensured by operating them within normative parameters, providing high-quality maintenance, controlling power quality, and implementing energy-saving technologies. This, in turn, helps to reduce energy losses in production and increase overall energy efficiency.

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