LINEAR ASYNCHRONOUS ELECTRIC DRIVES IN INDUSTRIAL AGRICULTURAL INSTALLATIONS

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Today's electric drives in industrial agricultural machinery and machines need extensive optimization and modernization. Development of rational industrial agricultural electrical installations based on linear asynchronous engines solving this problem.

The purpose of the study is to prove the expediency and rationality of using linear asynchronous electric drives in order to simplify the kinematic schemes in rod conveyors, which are used for manure clearing at stall maintenance on livestock farms.

LAEDs are noncontact, without mechanical connections between the stator and the secondary drive element, there is no cumbersome intermediate mechanical link. The movable part of the linear drive performs translational motion, so the application of these drives to working machines with the translational movement of the working body makes it possible to simplify the kinematics of the mechanisms, reduce the losses in transmissions and improve the reliability of the mechanism as a whole. Linear asynchronous drives differ from conventional asynchronous drives in that they have an open magnetic lead and a circular field in the air gap of linear drives can not be obtained under any circumstances. If in a conventional asynchronous drive the magnetic circuits of the stator and the rotor are closed, then in the linear asynchronous drive they are open. The main disadvantage of such engines is the appearance in the air gap of reflected electromagnetic waves due to the open stator design. This phenomenon is called the edge effect. The edge effect worsens the energy performance of installations, which limits its use. It leads to the appearance of additional vortex currents in the secondary element, which cause additional active losses in the secondary element and lead to distortion of the magnetic flux in the air gap, reduces traction effort and stiffness of the mechanical characteristics of the drive. This disadvantage can be eliminated by applying compensating windings. When designing linear asynchronous drives to reduce the edge effect it is possible to apply a circuit with a stator longer than the rotor, or vice versa, with a rotor longer than a stator. The rotor in linear drives is sometimes called a runner. Linear asynchronous drives find application for reciprocating motion. However, in this case it is possible to use them where the low energy values are acceptable.

The use of linear asynchronous electric motors makes it possible to significantly simplify the kinematic schemes of the drives of rod conveyors and thereby increase their efficiency while reducing the consumption of electric power in comparison with traditional schemes.