Abstract

In the thesis, according to the assignment, the modernization of the electric drive of a tower crane with a lifting capacity of 10 tons is considered The work provides general information about tower cranes and formulates the requirements for electric drives. The system «frequency converter - asynchronous motor» was chosen as the most efficient electric drive for a tower crane. The load of the tower crane was calculated and the type of asynchronous electric motor, the power of which corresponds to the rated power, was selected. The electric motor was tested for heating and overload capacity, the parameters of its equivalent circuit were determined.

The power circuit of the electric drive is considered, the frequency converter is selected and the parameters of its elements are determined. A mathematical model of the electric motor is given, the parameters of the control object are calculated, and a structural diagram of an automated electric drive is shown. To analyze the dynamic characteristics of the electric drive, a model was built in the MatLab simulink program and transient processes were studied under various modes.

The paper considers measures to ensure safety during the operation of load-lifting mechanisms and determines the economic efficiency of the proposed electric drive.