

Abstract

This graduation project provides for an automated electric drive of high-speed passenger elevators located in high-rise buildings. The main section contains general information about the electric drive of passenger elevators and formulates requirements for their electric drives and control systems. The most effective electric drive system for an elevator is the “frequency converter - asynchronous motor” system.

Elevator loads were calculated, and an 11 kW squirrel-cage induction motor was selected according to the rated power. The main and auxiliary power elements of the elevator electric drive were selected, calculations were carried out, and the parameters of the engine replacement circuit were determined. The natural and artificial mechanical and electromechanical characteristics of the selected electric motor are built.

A power circuit of an automated electric drive is developed, a frequency converter is selected and the parameters of its elements are determined. An electric drive control system is developed and the parameters of its main elements are calculated. A mathematical model and block diagrams of an induction motor and a frequency converter have been created. Its dynamic characteristics were studied and transient graphs were obtained in the MatLab program.

In the section of life safety, the situation with labor protection at the facility where the elevator system is used was analyzed, and the evacuation time in the event of an emergency was calculated.

In the economic section, calculations were made to assess the economic efficiency of electric drive systems for elevators.