

Annotation

The dissertation paper presents an asynchronous electric drive of a drawing mill with individual powering of driving electric motors according to the IF-AD scheme with a three-circuit system of subordinate control of the tension of the wire being processed in the inter-drum spans. The system has an internal contour of the current regulator, a contour of the speed regulator and an external contour of the tension regulator, which makes it possible to maintain the necessary ratio of the speeds of the drive motors in order to ensure equality of the second volumes of the processed material between the exhaust drums. In this case, the electric drive of the last block is the leading one and ensures the output of the mill at a given operating speed. The system is tuned to the technological optimum, at which, at given levels of wire anti-tension, the moments of driving electric motors are minimal, which provides energy savings in accordance with the dependence of pressure on the die on anti-tension.

The analysis of possible ways to control the power parameters of drawing is carried out on the basis of a mathematical description of the relationship between the technological parameters of the mill and the electromechanical system of its electric drive, and the most optimal option is chosen to reduce the breakage of the wire. The criteria for optimal control and regulation of a straight-through drawing mill with the aim of optimizing energy consumption are defined. To improve the accuracy of the stabilization of the power parameters of dragging in order to reduce wire breakage, tension sensors are used.

Quantitative and qualitative analysis of the oscillograms obtained as a result of studying the virtual model of the developed electric drive of the rolling-drawing mill in Matlab environment allows us to conclude that the proposed system of subordinate coordinate control meets the requirements of the technological process. Since the error of maintaining the speed of drawing and the deviation of tension and counter-tension does not exceed the maximum allowable values.

