

THEORETICAL RESEARCH OF DYNAMIC LOADING OF A ROPE ELECTRIC HOIST WITH A THREE-STAGE PLANETARY REDUCER, CAPACITY $Q=50$ KN

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Abstract: Rope electric hoists find wide application in material handling activities. In considerable part of the time they operate in transient processes which results in significant dynamic loading of the planetary reducer elements, due to starting and stopping of the asynchronous electric motor and the mass of the load being lifted. In the development of new construction, it is especially important to precisely determine the dynamic loading as the correct strength calculation of the lifting mechanism elements and the safety of the rope electric hoist depend thereon.

A three-mass dynamic model is used to research the dynamic loading of the lifting mechanism during lifting and lowering of suspended load, lifting load from the floor; i.e when the lifting mechanism is driven by the electric motor.

To solve the systems of differential equations describing the motion of a three-mass dynamic model of the lifting mechanism for rope electric hoists while taking into consideration the damping of EC, MathCAD programs have been created. The results from the theoretical researches as obtained through the software product MathCAD are shown graphically. Conclusions have been made basing on the theoretical researches performed of the lifting mechanism with three-stage planetary reducer for rope electric hoists.

Key words: rope electric hoists, theoretical research, dynamic loading, lifting mechanism