

material. The analytical solution of problem is executed, is analysed maximal efforts in the hauling organ of setting length of rope, his mechanical parameters, height of mixture in a pipe, its parameters and the set harmonic motion of overhead end of rope, that corresponds the real conditions of work of the pumping setting. The got solution allows to probe the different modes of operations of the pumping setting depending on the period of change of speed of overhead end of rope and parameters of the pumping setting.

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**Key word:** vibrations, mathematical model, longitudinal vibrations, rope with a load on the end, motion on the harmonic law of overhead end of rope

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## RIGIDITY OF ELASTIC SHELL OF RUBBER-CABLE BELT DURING CABLE DISPLACEMENT

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**Purpose.** Establishment of a character of the influence of geometric parameters on shear rigidity, determination of maximum stresses in a layer of elastic shell located between the cables and the drum, and development of an algorithm for determination of shear rigidity of rubber-cable rope (belt) shell relatively to the driving drum. Determination of a lower boundary of the efficiency coefficient in a process of interaction of the rubber-cable rope (belt) with sheaves and drums, that are driving and driven, lined with elastic materials and with hard operating surfaces.

**Methodology.** Construction of a model, determination of a stressed state of the elastic material of a deformed shape located between the cables and the drum on the shear of cables relatively to the drum by the methods of linear theory of elasticity. Establishment of analytical dependencies of rigidity and parameters of a stress-strained state of a layer of rubber located between cables and a drum from the shear of cables relatively to the drum in a closed form.

**Findings.** Dependencies for determining the rigidity and parameters of a stress-strain state of a rubber layer located between the cables and the drum from their mutual shear, the method of determining the dispersion of deviation of calculated displacements from the given. Obtained results allow considering the shape of an elastic layer, the level of reliability of the results when calculating the stress-strain state of rubber-cable tractive elements from the shear of cables relatively to the

drum. The value of the lower boundary of the efficiency coefficient in a process of interaction of a rubber-cable rope (belt) with sheaves and drums, that are driving and driven, lined with elastic materials and with hard operating surfaces.

Possibility to determine a stress-strain state of a layer of elastic material, caused by the shear of cables relatively to the drum of the machine. Possibility of formulating the condition of strength of rubber-cable tractive element loaded with shear forces from the side of the drum. This increases the level of safety of use of rubber-cable belts and ropes and increases their lifecycle. Determination of a lower boundary of the efficiency coefficient in a process of interaction of the rubber-cable rope (belt) with sheaves and drums, that are driving and driven, lined with elastic materials and with hard operating surfaces, allows improving the accuracy of calculations of drives of machines with such operating elements.

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**Keywords:** rubber-cable rope, driving drum, shear of cables, elastic shell, rigidity, stress-strain state.

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