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DETERMINATION OF DRYER DRUM MOISTURE EXTRACTION DEPENDING ON ITS OPERATING MODES

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Abstract:

Objective. The article presents the results of experimental studies of a drying drum with a developed chain drive installed in a cotton gin plant to determine the moisture intake from raw cotton, depending on its operating modes.

Methods. As can be seen from table 3.5. the average values of moisture extraction from raw cotton inside the drum depend on the feed rate of raw cotton to the dryer drum and its mode of operation.

Results. This is explained by the fact that with an increase in the speed of rotation of the drying drum, the time spent by the dried cotton inside the drum decreases.

Conclusion. Thus, it can be said that the actual values of moisture extraction from the dried raw cotton located inside the drum in drum dryers depend on its productivity for dried cotton and on the operating mode, that is, on the rotation speed of the drum dryer.

Keywords: Flail, drying, drum, SB, drive, cotton, moisture extraction.

Introduction. A chain drive for a 2SB-10 drum dryer has been developed, manufactured and implemented [1].

The following revolutions of the drum dryer were investigated: 8, 10 and 12 rpm. To obtain reliable data in the compared variants of experiments, raw cotton of the second industrial grade with the same preliminary moisture content equal to 13.6%. At each repetition of the experiments, the moisture content of raw cotton after the drum dryer was determined at least three times and the actual average moisture withdrawal was determined for the compared variants of the experiments. The temperature of the drying agent for all compared variants of experiments was unchanged and set equal to 1800C. The amount of the supplied drying agent for all variants of the experiments was equal to 180,000 m3/hour. The results of the experiments are shown in table 1.

Methods. As can be seen from table 3.5. the average values of moisture

extraction from raw cotton inside the drum depend on the feed rate of raw cotton to the dryer drum and its mode of operation. At the selected performance values of the drying drum for dried cotton 8, 9 and 10 t/h, for example, when the drum is operated at a speed of 8 rpm, the actual value of moisture extraction from raw cotton inside the drum decreases from 5.7% to 4.4 %, respectively, when the drum is operating at a speed of 10 rpm, the actual average value of moisture extraction from raw cotton located inside the drum decreases from 5.3% to 4.0%.

Table 1.

Determination of the actual moisture extraction of the dryer drum, depending on the productivity of the dried cotton and its mode of operation

Investigated operating modes of the drum dryer, rpm	Actual moisture withdrawal as a percentage of dried cotton, depending on the performance of the dryer drum for dried cotton, t/h		
	8	9	10
	5,6	4,8	4,3
8	5,8	4,7	4,4
	5,7	4,8	4,5
Medium	**5,7**	**4,76**	**4,4**
	5,1	4,4	4,1
10	5,4	4,4	4,0
	5,4	4,5	3,9
Medium	**5,3**	**4,43**	**4,0**
	4,6	3,7	3,4
12	4,7	3,8	3,3
	4,7	3,8	3,4
Medium	**4,66**	**3,76**	**3,36**

Results. This is explained by the fact that with an increase in the speed of rotation of the drying drum, the time spent by the dried cotton inside the drum decreases. Also, with a constant supply of the amount of drying agent with its unchanged temperature, with an increase in the productivity of the drum for dried cotton, it leads to a decrease in moisture extraction from raw cotton.

Discussions. Also, as can be seen from the data in Table 3.5. with the selected identical productivity for dried cotton, the average indicators for moisture extraction from raw cotton decreases with an increase in the drum rotation frequency, that is, from the speed of rotation of the dryer drum. If, at a selected productivity of 8 t/h, with an increase in the speed of rotation of the dryer drum from 8 rpm to 12 rpm, the average indicators for moisture extraction from raw cotton decreases from 5.6% to 4.66%, for example, with a productivity of 10 t/min. hour with an increase in the rotation speed of the dryer drum from 8 rpm to 12 rpm, the average indicators for moisture extraction from raw cotton decreases from 4.4% to 3.36%. This is explained by the fact that with an increase in the speed of rotation of the drying drum, the time spent by the dried cotton inside the drum decreases.

Conclusion. Thus, it can be said that the actual values of moisture extraction from the dried raw cotton located inside the drum in drum dryers depend on its productivity for dried cotton and on the operating mode, that is, on the rotation speed of the drum dryer.

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THEORETICAL STUDIES ON SCREW CONVEYOR FOR TRANSPORTATION AND CLEANING OF LINTER AND DESIGN OF CONSTRUCTIVE PARAMETERS OF TRANSMISSIONS

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Abstract:

Objective. The article presents theoretical studies on the basis of structural parameters of screw conveyors and transmissions that transport and clean fluff. An analysis of the laws of change of the angular speed of the conveyor screw shaft was obtained. Connection graphs are built based on processing laws of screw motion. Based on the analysis of the connection graphs of the parameters, the limit values of the height of the screw waves, which ensure sufficient cleaning efficiency and high productivity, have been determined. Determination of the parameters of the fluff-carrying and cleaning screw conveyor based on theoretical studies

Methods. In system dynamic analysis studies, all rotating masses of the equipment are attached to the screw shaft. In the studies, the mechanical dynamic characteristics of the electric motor were mainly taken into account. The kinetic energy of the system was determined using Lagrange's II-order equation, and a system of differential equations representing the motion of the machine unit for the screw conveyor was derived.

Results. Based on the solution of the problem, the law of movement of the screw of the screw cleaner was obtained. The pitch of the screw, the height and pitch of the wave on the surface of the screw, and the

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