DETERMINING THE EFFECT OF THE WALLS OF THE COTTON STONE CATCHER CHAMBER ON THE COTTON RAW MATERIAL

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Abstract. In this article, the influence of the walls of the stone catcher chamber on cotton raw materials in cotton ginning enterprises was determined and analyzed.

Keywords: Air, pipe, cotton, lattice, raw materials, mechanization, screw conveyors, elevators, fans.

Аннотация. В данной статье определено и проанализировано влияние стен камнеуловительной камеры на хлопковое сырье на хлопкоочистительных предприятиях.

Ключевые слова: Воздух, труба, хлопок, решетка, сырье, механизация, винтовые конвейеры, элеваторы, вентиляторы.

Today, due to the fact that the Republic of Uzbekistan is the world leader in cotton cultivation and its re-export, and cotton ginning enterprises are moving into clusters, scientific researchers and scientists are putting the issue of further improvement of existing techniques and technologies in order to prepare high-quality fiber products that meet world standards.

In this regard, it is important to analyze the degree of seed damage during the process of cleaning and ginning of cotton during technical and technological processes, i.e. cleaning in pneumatic transport, and taking measures to prevent it. Based on the requirements of the present time, we should pay special attention to the damage of seeds in the technological processes of the raw material transportation system from cotton ginning enterprises. During the technological processes of

transporting cotton by air and separating it from air, the task is to preserve the quality and original natural features, while preventing damage to the seed. [1]

Many theoretical and practical studies have been carried out to preserve the original natural features of cotton in the process of extracting it from the air, but today it remains urgent to develop a technique and technology that can fully meet the requirements of the time. Because prevention of damage to the cotton seed prevents the increase of impurities in the contents, therefore universal technology has not been developed to prevent the damage of the seed in the flow of cotton moving in pneumatic transport.

Based on the above, the reasons for the formation of damaged seeds in technological processes and the issues of improving the places where they are damaged in technological processes are currently relevant.

This article is devoted to the creation of constructions that improve fiber quality based on the prevention of seed damage as a result of the research conducted by the authors. As a result of the conducted scientific research, it has been shown that it is important to choose a structure that allows obtaining quality fibers and to preserve the natural properties of cotton based on the detection of seed damage in the pneumatic transport system. Today, the problems of preserving the natural properties of cotton and reducing seed damage on this basis remain relevant. Therefore, it is appropriate to carry out scientific research in this regard.

Identifying the causes of seed damage in cotton processing technology and developing ways to reduce it. Also, in the pneumatic transport device, the cotton gently pushed in the pipe with the help of air, and it is carried out evenly.

We consider heavy compounds as mass mod points. It is the speed of the AV plane

hit with Let's check the impact process in relation to the coordinate system (Fig. 1).

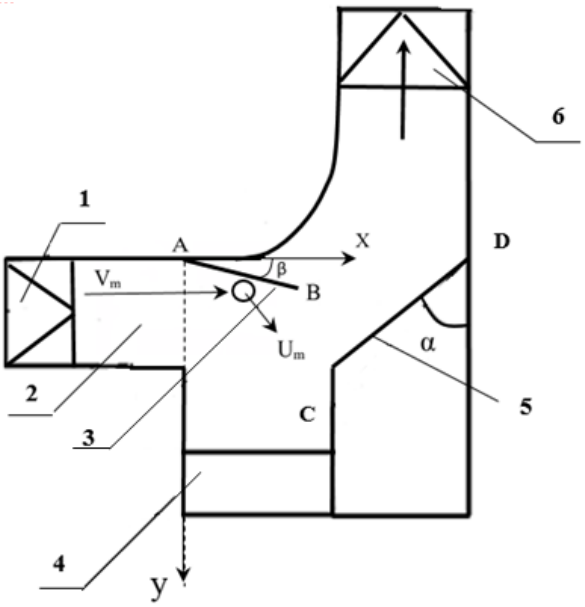

Fig. 1. Coordinate system of impact process.

1-inlet pipe, 2-working chamber, 3-AB- plate, 4-pocket,

5-SD-plate, 6-output pipe

When this dryer is working, the cotton enters the 2nd working chamber through the 1st inlet pipe. Cotton and heavy mixtures hit the AB-plate 3 installed in front of the inlet pipe and change the direction of movement SD-plate

5 will change sides. The cotton pieces hit the surface of SD-plastic move upwards under the influence of air force and are transferred to the next machine through the outlet pipe 6.

AB-plate's angle b, SD-plate's angle a shows that their position can be changed. The position of the plates is changed when cotton particles with heavy impurities fall into the pocket or when the efficiency of the device to trap heavy impurities decreases.

In this article, research was conducted to determine the impact force generated when a piece of cotton hits the AB-plate opposite the inlet pipe.

Let M be the point of impact of the object on the plank. If the plank is taken as absolutely hard and smooth, the angle of impact of the object is equal to the angle of its rotation. Let the velocities of the body before the impact and after the impact be - respectively. Since AV-plank is immobile, its speed is zero.

$k = -\frac{U_m}{V_m}$ (1)

It is no different here. If the coefficient of friction between the body and the plate is taken as the angle of descent and the angle of rotation, the following relationship between the speeds is appropriate [3]

(2)

After the impact, the heavy mixtures are accelerated in the -plane with an initial velocity under the influence of aerodynamic force and self-gravity. In this case, the forces acting on heavy mixtures are:

Aerodynamic pressure forces of air in the direction of the x, y - axes

(3)

The weight of the heavy mixture is G; transverse diametrical cross-sectional surface:

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We formulate the differential equations of the movement of a heavy mixture in air based on Dalimber's principle

$$\begin{cases} m * \ddot{x} = R_x \\ m * \ddot{y} = -R_y + G \end{cases} \quad (4)$$

or

$$\begin{cases} m * \ddot{x} = R_x = c_x * S_0 * \frac{\rho_m * (V - \dot{x})^2}{2} \\ m_2 * \ddot{y} = -c_y * S_0 * \frac{\rho * (V - \dot{y})^2}{2} + m * g \end{cases} \quad (5)$$

Initial conditions: $t = 0 : x(0) = y(0) = 0;$ (6)

$$\begin{cases} \dot{x}(0) = U_m \sin\alpha \\ \dot{y}(0) = U_m \cos\alpha \end{cases} \quad (7)$$

Since this system of differential equations is nonlinear, it was solved numerically based on the MAPLE-9.5 program. Heavy mixture in the vertical direction after impact,The law of the speed of motion depending on the x1-coordinate.

m_{20}=0.02k(кг) mass of heavy mixture.1-к=0.25;,2-к=0.5;3-k=0.75;4-k=1;5-k=1.25;6-k=1.5;7-k=1.75;

Analysis of results

Under the influence of the air flow, the heavy objects move separately from the cotton pieces and hit the AV-plate. We can consider this situation as a collision of a rigid body with a rigid flat smooth plate. For this reason, we can consider the angle of impact of the object as equal to the angle of rotation. After the impact, heavy objects move towards the device pocket under the influence of their own gravity. We can see this from the changes of the velocities with time and x1 coordinate in Figure 2. Basically, the mass is 20 gr. there is a high probability that more objects will fall into the device pocket. While moving objects in the horizontal direction, x1-coordinate speed does not change (4m/s-5m/s), while u1-coordinate speed increases**.**

Conclusions

1. A mathematical model of the laws of movement of cotton pieces containing heavy impurities to the AV-plaster, along the inner surface of the plate, was made in the working chamber of the new device.

2. On the basis of the developed mathematical models, the laws of movement of cotton pieces with heavy mixtures together and when they are separated from each other have been determined numerically.

3. During movement of cotton pieces in the working chamber of the device, as a result of volume expansion, separation of additional impurities occurs. Before the heavy mass mixture hits the AV-plate, the rest falls into the device pocket in the next process.

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