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Theoretical Study of the Factors Affecting Raw Materials in the Process of Breaking Cotton Wool

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Abstract: in order to identify the factors that cause unevenness and to eliminate them to a certain extent, we study the process of direct undermining in a theoretical way.

Keywords: Cotton, brass, bronze, corner speed, acceleration, force, time, mass, force, crystal, impact points.

Introduction

We have already mentioned that in cotton ginning enterprises, seeded cotton is crushed and transferred to production mechanically using RP, RBX, RBA brand crushers.

During the process of crushing and transfer to the air transport pipeline, the crusher has to move back and forth. In this case, there is a need to continuously increase or decrease the length of the air pipe. Therefore, a portable horizontal conveyor with a length of 4-7 m is installed parallel to the direction of the thresher, and the cotton is dropped onto this conveyor belt [9; 4-5 p.]. The mouth of the air pipe is placed on the cotton falling from the tape. As a result, the breaker does not need to change the length of the sliding pipe by such a distance [18; 2-6b]. 1 - pneumotran in the picture.

Conclusion of Muammon

The ratio of the impact arc length l_z to the impact time t_z is equal to the difference of the initial and subsequent speeds of the pile. Accordingly:

$$\frac{0{,}5(m_1 v_1^2 - (m_1 + m_n)v_2^2}{m_1 v_1 - (m_1 + m_n)v_2} = v_1 - v_2$$

Here are the following:

$$m_1(v_1^2 - v_2^2) - m_n\, v_2^2 = 2[m_1(v_1 - v_2) - m_n v_2](v_1 - v_2)$$

After several transformations, we get the following:

$$3v_2^2(m_1 + m_n) = 2v_1 \cdot v_2(m_1 + m_n)$$

According to him:

$v_2 = \frac{3}{2}v_1$ ёки $v_2 = \frac{3}{2} \cdot 7{,}2 = 4{,}8\ m/s$

On the other hand, we try to find the cotton mass mn that can be separated from one pile:

The performance of the spoiler:

$П_г = m_n \cdot n_ч \cdot n_q \cdot 10^3$, kg/s;

Usually, the work of the crusher is equal to 10-12 tons/hour.

To find out how much cotton can be sent to production in one second, we will perform the following actions.

$$П_г = (10 \div 12) \cdot \frac{1000}{3600} = \frac{(2{,}78 \div 3{,}33)кг}{сек};$$

End of belt rotations $n_ч = 125\frac{cycle}{min} = \frac{125}{60} = 2{,}08\ \frac{1}{c};$

When the number of cells = 8:

$$m_n = \frac{П_г}{n_ч \cdot n_q \cdot 10^3} = \frac{2{,}78 \div 3{,}33}{2{,}08 \cdot 8}$$

Or it is equivalent to:

$$m_n = 0{,}167 - 0{,}2\ kg$$

If we want to determine the amount of cotton per square meter, then this value will be equal to the following:

If we take the average value of 167÷200 g, then 184 g of cotton will correspond to each pile.

$$2{,}4m_1 - 883{,}2 = F_3.t_3$$

$$15{,}795 \cdot m_1 - 1863 = F_3 \cdot l_3$$

According to Newton's 2nd law

$$F_ч = m_1 \cdot a = m_1 \cdot \left(\frac{v_1 - v_2}{t}\right) = m_1 \cdot \frac{7{,}2 - 4{,}8}{t} = m_1 \cdot \frac{2{,}4}{t};$$

From this

$$m_1 = F_ч \cdot \frac{t_з}{2{,}4} = \frac{0{,}93}{2{,}4} \cdot t_з$$

$$m_1 = 0{,}38 \cdot 10^3 \cdot t_з$$

According to the information given in the scientific literature, the time of impact of metal pegs with cotton is 0.0025÷0.003 seconds.

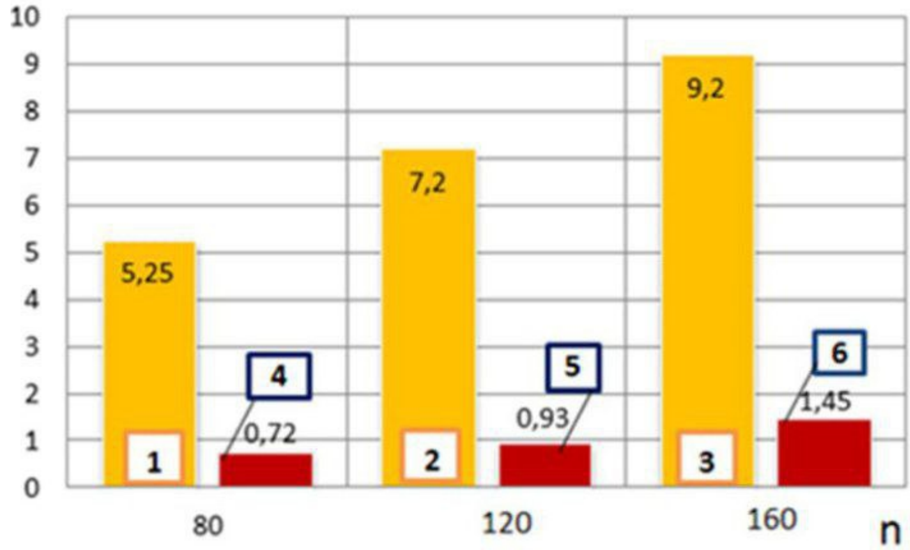

Fig. 1. Changes in the impact force of the ball and the speed of the ball

According to him

$$m_1 = 0{,}38 \cdot 10^3 \cdot = 1{,}14 \text{ kg}$$

Here: 1, 2, 3-string shear speed, m/s 4, 5, 6-string shear force, kN

According to him

$$m_1 = 0{,}38 \cdot 10^3 \cdot = 1{,}14 \text{ kg}$$

Here, m_1 is the mass of one pile of cotton.

According to the legality of the change in the amount of movement:

$$m_1 v_1 - m_2 v_2 = F_з t_з$$

We assume that the impact force obeys Hertz's law.

He is alone

$$F_з = \Delta \cdot C$$

According to the law of change of kinetic energy:

$$m_1 \cdot v_1 - m_2 \cdot v_2 = F_з \cdot l_з$$

$$m_1 \frac{v_1^2}{2} - m_2 \frac{v_2^2}{2} = F_з \cdot \Delta$$

$$1{,}14 \cdot 7{,}2 - 1{,}324 \cdot 4{,}8 = F_з \cdot l_з$$

$$1{,}14 \cdot \frac{7{,}2^2}{2} - 1{,}324 \cdot \frac{4{,}8^2}{2} = F_з \cdot \Delta_з$$

$$\begin{cases} 1{,}84 = F_з t_з \\ 14{,}1 = A = F_з l_з \end{cases}$$

From:

$$\frac{14{,}1}{1{,}84} = \frac{F_з l_з}{F_з l_з} = \frac{l_з}{t_з}$$

As a result of mutual reduction of the corresponding values in the equation, we get the following:

$$\frac{l_з}{t_з} = 7{,}66 \frac{м}{сек};$$

From here we can find out how far the pile moves during the impact;

$$l_з = 7{,}66 \cdot t_з = 7{,}66 \cdot 0{,}003 = 0{,}02 \text{ м} = 20 \text{ мм}$$

So, it turned out that the deformation caused by one pile of chambarak in the cotton layer is equal to 20 mm.

A stress or strain occurs on the surface where the impact force is applied. It is precisely these tensile forces that cause quality defects in cotton.

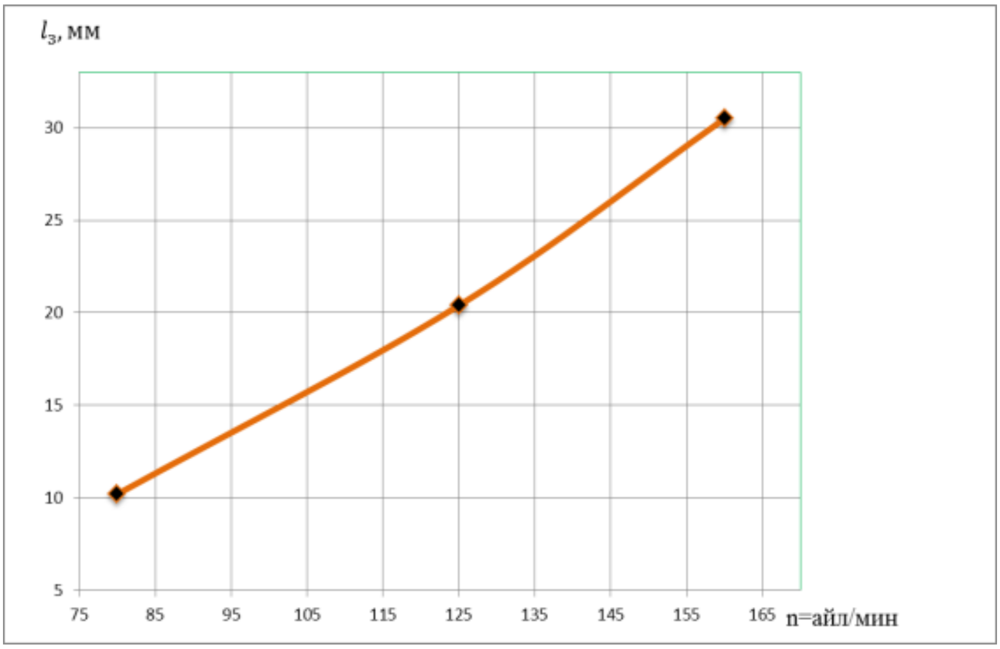

Fig. 2. Change in the cotton wicking process

Figure 2 shows how far the belt moves when it is woven into a layer of cotton at speeds v_1 = 5.25, v_2 = 7.2, v_3 = 9.2 m/sec. Stress or strain, by definition, is the force exerted by this force

$$G = \frac{F_з}{S}, \quad (10)$$

The impact area is represented by the surface of the pile in contact with the cotton.

Figure 6 shows the dependence of the angle between the pile sector and diameters on the increase of the impact surface resulting from the impact. According to him, the increase in the diameter of the pile is sec

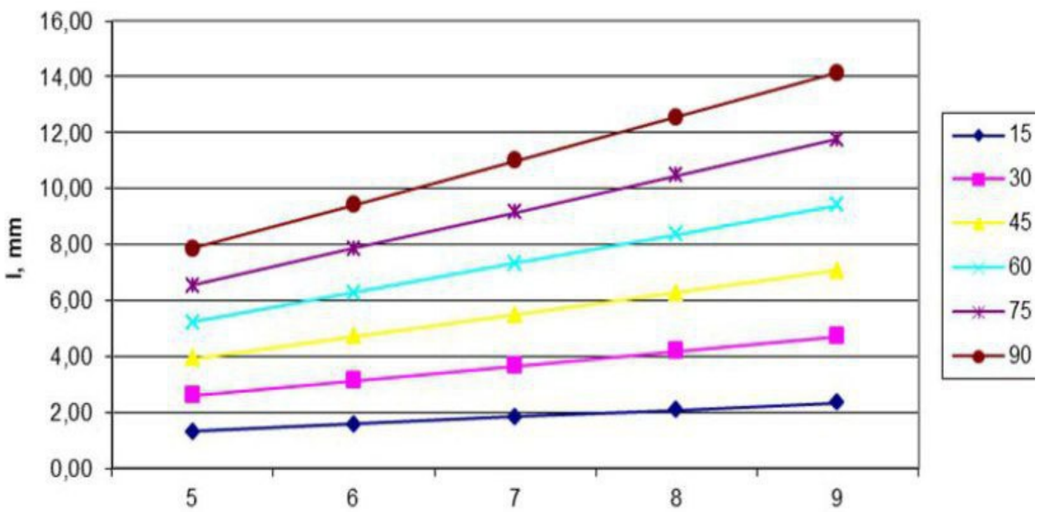

Figure 3. Dependence of the length of the cotton-plunger on the radius r of the pile and the angle of the arc sector α

1-table. The dependence of the pile on the cotton layer on the radius of the pile and the angle between the sectors

№	The dependence of the pile on the cotton layer on the radius of the pile and the angle between the sectors		Peg and cotton layers and area of influence, mm		
	0<α<90	4<r<10	l=пrα/180	h, мм	S=l*L
1	15	5	1,3	10	13,08
2	30	6	3,1	10	31,40
3	45	7	5,5	10	54,95
4	60	8	8,4	14	117,23
5	75	9	11,8	16	188,40

The values given in table 1 are the values based on the laws of Hers, change of momentum, and change of kinetic energy.

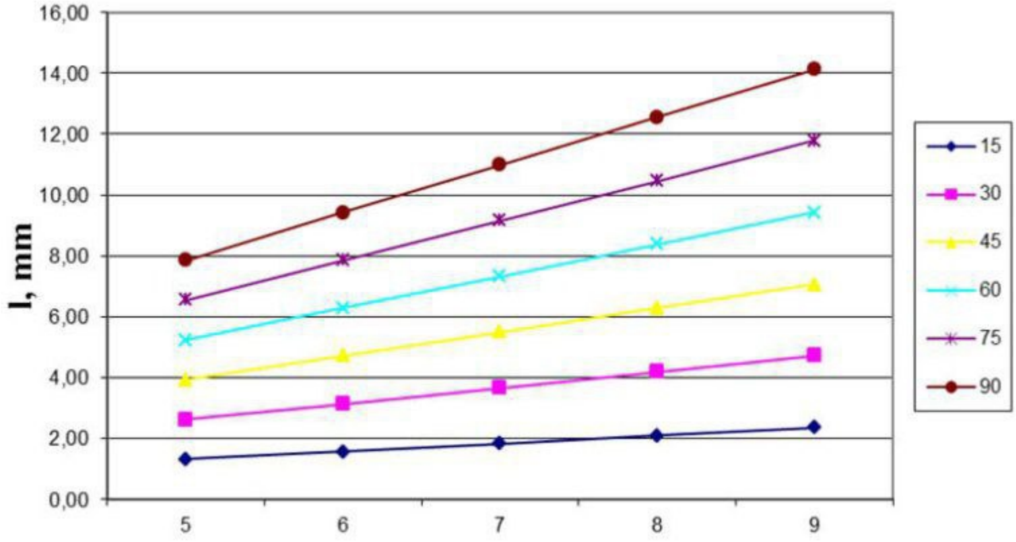

Figure 4. Dependence of the length of the cotton-plunger on the radius r of the pile and the angle of the arc sector α

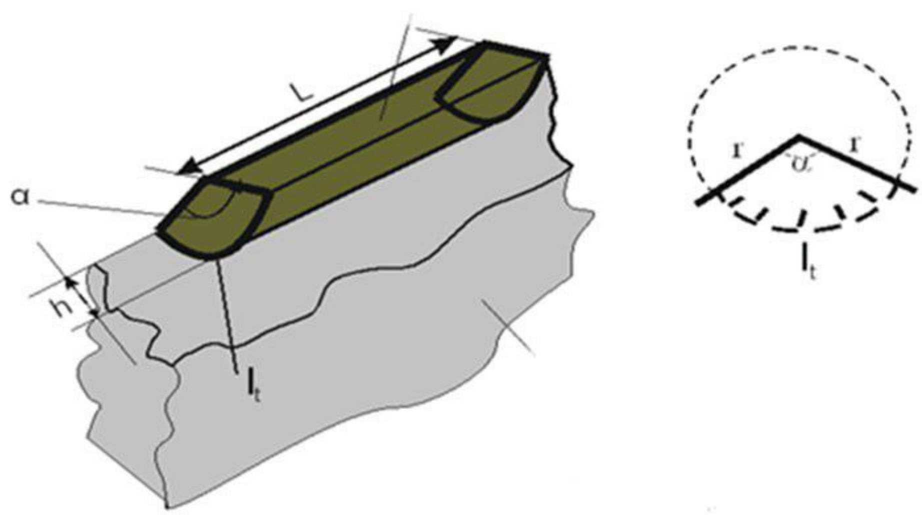

Figure 5. Pile contact zone of cotton

Fig. 6. The increase of the impact area depends on the length of the working pile and the angle between the sector of the circle

The pile and cotton layer in Figure 6 is equal to the following:

$$S = l_t \cdot L \qquad (11)$$

If we set this to 10,

$$G = \frac{F_3}{l_t \cdot L}, \qquad (12)$$

According to it, if the denominator, that is, the values of l_t and L increase, the voltage decreases. On the contrary, it increases.

CONCLUSION

Increasing the number of piles in the direction of rotation (=(10-12)0) and increasing the number of piles located in the warp area from 2 to 4 will increase the cotton's density to 37.2 kg/m3.

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