RESEARCH OF TIMING TAKEN TO RECEIVE COTTON FROM THE TRANSPORT OF THE PLPH-III INSTALLATION

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ABSTRACT

Low productivity was studied due to design shortcomings of PTX-20, PL and PLPX-III devices. By replacing the cotton-free transport on the existing PL device, the operation efficiency of the device is reduced by an average of 17% in the process of putting the next cotton transport. It was studied that the absence of cotton in stock in transport reduces the efficiency of the device by 50% when increasing the efficiency of the device to 30 t / h. It is necessary to set the cart to a continuous shed for continuous reception of cotton by eliminating the free time in the receiving-transfer device. At the same time, it was studied that the size of the bunker should be optimal, taking into account the amount of cotton in the cart. As a result of the study, it was found that the coefficient of spread of cotton varies from 1.0 to 1.5 K and the capacity of the device at 30 t / s, the volume of the bunker is from 8.3 to 12.5 m3. it was determined that a transmission device should be introduced.

Keywords: device, bunker, transport, cart, volume, cotton, labor productivity**.**

INTRODUCTION

The analysis of machines and mechanisms for unloading cotton from the transport cart has determined the main direction in the creation of a rational type of reception-transmission devices. However, several key parameters of the device that determine the required work productivity value when unloading cotton have not been identified. To date, all receiving and transmitting devices have been designed without taking into account the main factors affecting the level of mechanization and productivity. For example, the design parameters of PTX-20, PL and PLPX-III devices do not take into account the issue of increasing productivity [1]. Experiments in production have shown that the decrease in the productivity of PL and PLPX-III machines in receiving cotton is due to the time they take to replace the cotton to prepare for shedding [2]. For example, in the process of replacing the empty cotton transport on the PL device and placing the next cotton transport on the receiving device, the efficiency of the device is reduced by an average of 17%. When the efficiency of the receiving devices is increased to 30 t / h, the absence of reserve cotton in the transport reduces the efficiency of the device by 50% [3].

Let’s look at the cotton acceptance process to determine the optimal amount of cotton in the receiving hopper of the device.

The arrival of vehicles for unloading cotton to the receiving device can be divided into the following three situations:

- Long-distance delivery of vehicles;
- Uniform dispatch of vehicles;

- Dispatch of vehicles in case of congestion on the receiving device.

In the first case, we can not even talk about the receiving bunker, because the vehicles are sent at intervals. In the third case, with the increase of congestion, the preparation time of cotton spinning vehicles around the receiving device decreases sharply, i.e., part of the preparation time for spilling is spent on the previous spinning transport. The organization of uniform shipment of cotton for shedding allows the transport to be partially ready for shedding.

In the PLPX-III device, research work was carried out in production to study the timing of the receipt of cotton from trucks. For ease of analysis in the acceptance process, the quantities obtained are shown in Figure 1 in the form of a cyclogram. In this case, there is no congestion and there is no break in the delivery of cotton.

Table 1 shows the process of picking cotton.

The cyclogram in Figure 1 is divided into two stages, i.e .;

t_0 - the time interval elapsed for the installation of the cart to unload the cotton;

t - the time interval taken to unload the cotton.

More time is spent setting up the cart to unload the cotton $t_0 = t_1 + t_2 + t_3 + t_4$

(1)

here t_1 - Time to remove the tarpaulin from the 1st car;

t_2 - Time taken to open the 1st car board;

t_3 - Time taken to open the 1st car board;

t_4 - The time taken to tilt the 1st car.

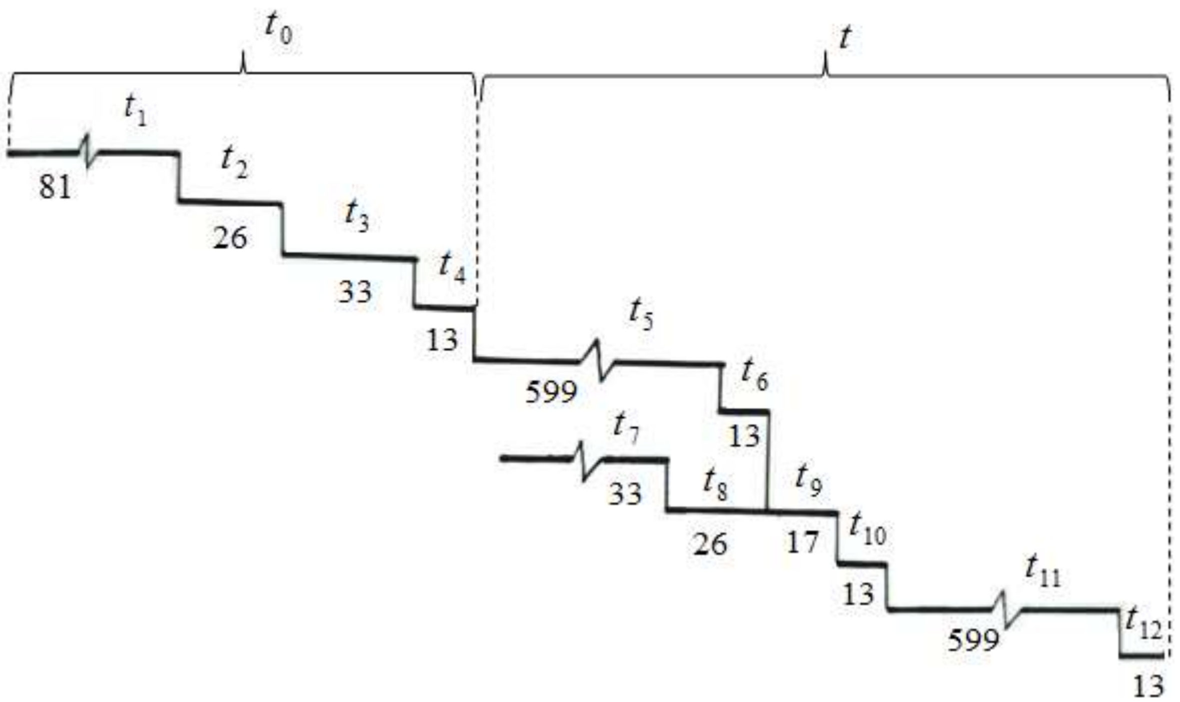

Figure 1. A cotton unloading cyclogram consisting of two carts

The time taken to unload the cotton is as follows $t = t_5 + t_6 + t_9 + t_{10} + t_{11} + t_{12}$ (2)

The time taken to unload the cotton from the 1st cart;

t_6 - 1-чи бўшаган аравани олдинги ҳолатга келтиришга кетган вақт;

t_9 - араваларни алмаштиришга кетган вақт;

t_{10}- 2-чи аравани қиялаштиришга кетган вақт;

t_{11} - 2-чи аравадан пахтани туширишга кетган вақт;

t_{12} - The 1st went to restore the vacated car to its previous state time.

Since the time taken to remove the tarpaulin from the second cart t_7 and the time taken to open the board t_8 are in the time interval from the first cart t_0 to t unload the cotton, and the time spent is not taken into account. However, the time taken to close the cart board is also not taken into account, as this process takes place after the cart is removed from the unloading area.

Therefore, the total reception time is expressed as follows $T = t_0 + t$

(3)

It is necessary to set the cart to a continuous shed for continuous reception of cotton by eliminating the presence of free time in the receiving-transfer device.

Table 1 Implement the PLPX device timing of receiving cotton from the transport cart

Naming and implementation structure	Average duration of work, sec.
Removing the tarpaulin a) From the 1st car b) From the 2nd car	81 81
Transport board opening a) From the 1st car b) from the 2nd car	26 26
Sending to PLPX a) Tilt the 1st cart b) Tilt the 2nd car	13 13
Put cotton in the 1st cart	599
Replacement of cars	17
Pour the cotton in the 2nd cart	599
Bring the 1st empty car back to its previous position	13
Bring the 2nd empty car back to its previous position	13
Close the side of the 1st car	38
Close the side of the 1st car	38

At the same time, the receiving and transporting bunker should be of optimal size, because the overgrowth of the bunker leads to an increase in the size of the device, and a decrease in the size of the bunker leads to a decrease in the productivity of the device. It is known that an increase in cotton leads to a decrease in density, which in turn increases the volume of cotton. It is necessary to take into account the coefficient of spread in the increase in the volume of cotton. According to studies [4], it has been studied that the value of the propagation coefficient for different types of devices ranges from 1 to 1.5. From this, the optimal size of the bunker E_0 is expressed as follows, taking into account the efficiency of the receiving and unloading device.

$$E_0 = t_0 \frac{\Pi_m}{\rho} K \text{, м}^3 \qquad (4)$$

here Π_m - operating capacity of the device by mass of material, kg / sec;

ρ - average density of cotton in the vehicle cart, kg / m^3;

K - the coefficient of spread of cotton in the bunker of the receiving-transmitting device.

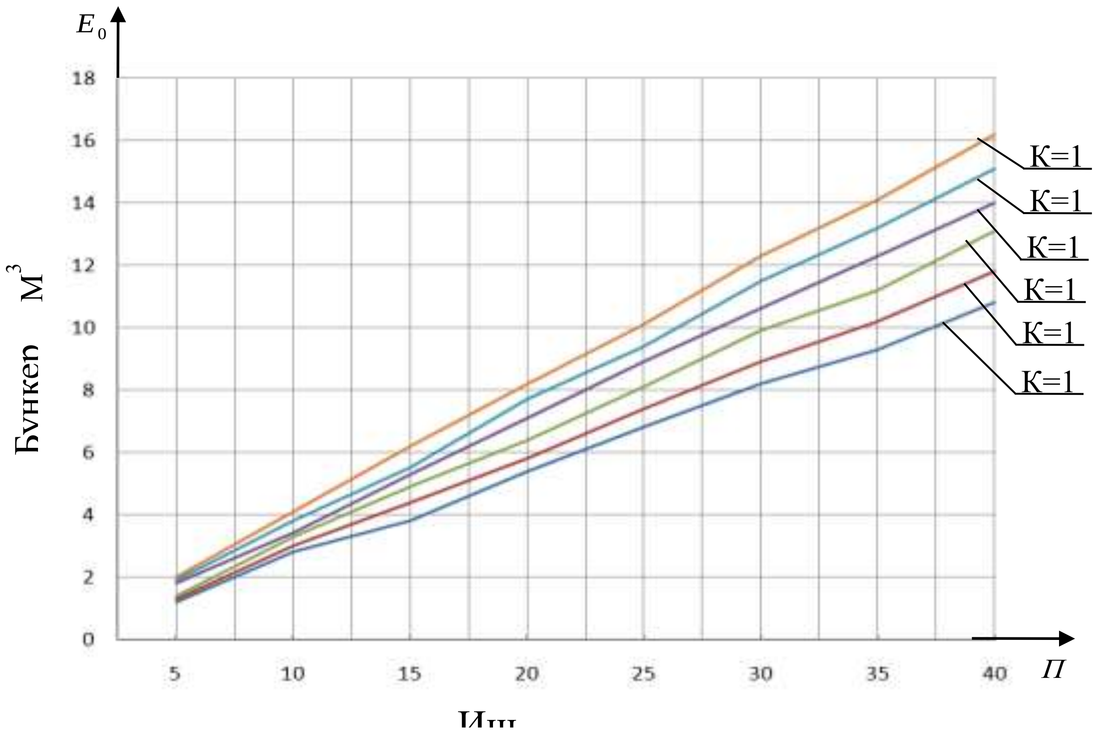

Figure 2. Graph of the dependence of the performance of the receiving-transmission device on the size of the bunker

Figure 2 shows a graph of the dependence of the bunker on the required size, taking into account the coefficient of propagation and the work efficiency in the variation of K from 1.0 to 1.5. At the same time, the capacity of the bunker will be around 8.3 to 12.5 m^3, and the actual volume of the PLPX-III device will not exceed 2-2.5 m^3. One of the main reasons for this is the low operating efficiency of the device and the lack of a receiving bunker.

By eliminating congestion in the reception and unloading of cotton delivered by truck to the ginnery, the device indicates the need to introduce in the production of an improved cotton picking and unloading device with a hopper of the required size to increase productivity.

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