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«THE PROCESS OF TECHNICAL GRADES OF MEDIUM STAPLE COTTON AT GIN FACTORIES AND ITS ANALYSIS»

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cotton - Namangan-77, grade 1, moisture in cotton - 8.2%, dirt before cleaning - 2.4%, dirt after the dryer drum - 1.95%, in the proposed device after cleaning - 1.71%, the cleaning efficiency of the device increased from 15% to 20%.

Conclusion. When using the proposed device for production: the natural state of cotton is preserved, the length of the fiber and the seed coat are not damaged. In such a device, the cleaning efficiency can increase by 15-20%, and the number of neps in the fiber obtained from refined cotton can decrease by 40-60%.

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THE PROCESS OF TECHNICAL GRADES OF MEDIUM STAPLE COTTON AT GIN FACTORIES AND ITS ANALYSIS

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Abstract:

Objective. In this article, the process of processing industrial grades of medium staple cotton in gin factories and its analysis is considered. Also given is the result requirement according to the standard.

Methods. An analysis was made of the quality of medium-fiber cotton raw materials and its indicators, as well as the degree of damage.

Results. After ginning, the control of the pubescence of raw cotton seeds is carried out according to industry standards. Industry standards are reviewed and updated every five years.

Conclusion. One of the causes of seed damage is that the density of the raw material changes as it increases due to the pressure of the seed comb. It has been studied that some of the saw teeth are broken or the pegs of the seed comb are damaged, causing fibrous seed to come out of the seed. One of its main disadvantages is the mixing of seeds with fibers and seeds, which is manifested by an increase in the distance between the rods.

Keywords: cotton, gin, fiber, process, saw gin, type, class, impurity, effect.

Introduction. That is no coincidence that the cotton industry is at the forefront of global agriculture, requiring sustainable quality performance and broad support for initiatives. These two key metrics - quality and sustainability - often go hand in hand when designing supply chain processes. These indicators, which are the requirements of the current developing period, require the introduction of new and high-quality technologies and the improvement of existing ones. Reforming and researching the design of the cotton gin, which is considered the main link in the cotton ginning process, plays a very important role in improving the quality of cotton fiber.

The competitiveness of cotton fiber in the world market is mainly determined by the length of the fiber, its appearance and the amount of dirty waste in it. For this reason, in the technological process of primary processing of cotton, serious attention is paid to improving the quality of

the fiber. Over the past period, the size and range of cotton produced, its acceptance and initial working conditions have changed, reconstruction work has been carried out at many cotton ginning enterprises, some machines have been replaced that do not meet the requirements of outdated times. In addition, new standards for cotton products are being introduced.

All industrial grades of medium staple cotton are processed in sawmills. One or two rows of gins are installed in the fiber section of the cotton gin, each of which is equipped with one 3KhDDM gin with a UMPD working chamber or two or three 5DP-130 (4DP-130) gins. According to the "Program for 2021-2022 to increase and radically improve the yield and quality of fiber produced at the cotton processing enterprises of the Uzpakhtasanoat association, it is recommended to install one or two DPZ-180 gins instead of 3KhDDM and 5DP-130 (4DP-130) gins.

Methods. For a continuous supply of cotton to the gins, a hopper can be installed at the end of the distribution auger to collect excess cotton. The performance of the sawmill is determined according to table 1 for industrial grades of cotton. The dirtiness of cotton before cleaning should correspond to the indicators given in table 2.

Table 1

Productivity of a power-saw bench for technical grades of cotton, kg/s

The type of cotton	Model of the Saw Gin			
	3KhDDM	4DP-130	5DP-130	DPZ-180
Types I and II	780±25	2000±200	2000±200	2800±280
Types III and V	550±25	1200±100	1200±100	1700±170

Usually, productivity is given according to the technical passport of demons. The productivity of the gins is reduced by 10-15% when separating the fiber of selected varieties of cotton that are difficult to clean. When seed cotton is ginned, the gins are set in a "reduced" mode of operation, that is, the productivity of the gins is reduced by 15-20% when processing all selected types of cotton.

Results. The effect of gin on cleaning impurities and dead cells (K. percent) is determined by the following formula:

$$K = 100 - \frac{S_v x V}{S_x}$$

Here: Sx- impurity (mortality) of the cotton coming from the feeder in the gin, percentage; Sv - the amount of impurities (dead) in the fiber after gins, percentage; V- planned fiber output, percentage. The cleaning (replacement) of the raw (raw roller) roller in the working chamber of the gin is carried out, as in the processing of cotton, in one shift:

- first and second grades not less than twice:

- third, fourth and fifth grades at least four times.

After ginning, the control of the pubescence of raw cotton seeds is carried out according to industry standards. Industry standards are reviewed and updated every five years.

Table 2

Soiling of cotton before ginning

Raw cotton			
Class	Type	Impurity before polishing (from gin), percentage (no more)	
		Normal cleaning	Hard cleaning
1	I	0,8	0,9
	II	0,8	1,0
	III	0,8	1,2
	IV	1,2	1,8
2	I	1,0	1,5
	II	1,0	1,5
	III	1,2	1,8
	IV	1,6	2,4
3	I	1,6	2,4
	II	1,6	2,4
	III	1,8	3,0
	IV	2,4	3,6
	V	3,0	5,0

One of the main requirements for a cotton gin is to obtain a quality product, to prevent damage that can occur during the separation of seeds from the fiber, to achieve high performance of the machine and to ensure maximum cotton yield. In the study of the service life of the saw, the following disadvantages are observed: the appearance of knots in the fiber emerging from it is mainly associated with the breakage or failure of a large number of saw teeth. Seed damage, many defects in fiber content, i.e., seed coat impurities, and the need to make the saw blade very sharp, i.e., the width of the tooth tip should be less than 0.4 mm, were revealed. The positive effect of this invention is that the cultivation of cotton has become much easier. Before Eli Whitney invented the gin machine, ginning was labor intensive, but after this invention, it became easier and faster, and farmers earned more money.When mixed with fibers, a release of the fibers is also observed, and this can be shown to be due to the deviation of the fiber opening from the desired position.It should be noted that the process of developing a genie machine involves a very long period. The modern cotton gin was invented in the United States in 1793 by Eli Whitney (1765-1825). Whitney applied for a patent on October 28, 1793; the patent was issued on March 14, 1794, but not confirmed until 1807.

Discussions. One reason for seed damage is that the density of the raw material changes as it increases due to the pressure of the seed comb. It has been studied that some of the saw teeth are broken or the nap of the seed comb is damaged, causing fibrous seed to come out of the seed. One of its main drawbacks is the mixing of seeds with fiber and seeds, which is manifested by an increase in the distance between the rods. A decrease or cessation of the feed rate of raw materials may be due to a small amount of raw cotton from the supplier or insufficient supply to the working chamber.[1]

Also, due to the increase in the density of the raw material shaft, the fibers remain on the saw teeth or do not separate from the teeth at all, which causes jamming at the bottom of the bars. In addition, one of the main drawbacks of the machines is fiber burnout or sticking at the top of the columns.

According to the researchers, the improvement in the quality of the fiber as a result of the work of the gin in the expanded chamber occurs mainly due to a decrease in the density of the raw material, which improves the coating of the fiber, and reduces the friction force of the cotton on the walls of the chamber. , and saves energy spent on ginning.

They also studied the effect of raw material density during the ginning process

and concluded that fiber quality scores are higher at low raw material density.

According to them, reducing the density of the raw material will improve the coating of the fibers and reduce the frictional forces acting on the surface of the working chamber and columns, thereby improving the quality of the fiber. In existing fiber separation machines, the efficiency is directly proportional to the density of the raw material. [2]

R. Sulaimanov [3] obtained an algorithm for solving the problem of seed movement dynamics and mathematical models that allow theoretically determining the optimal parameters of cantilever columns, the distance between columns and spacers in the production of additional seeds. Basically, the distance between the saws has been reduced, a new method and device for obtaining additional seeds has been proposed.

In the study by J. Ergashev [4], a notch was made in the lower part of the pipe installed in the working chamber of the genie machine. When air is forced into the pipe, the air flow exiting through this slot is directed towards the saw cylinder. As a result, it is possible to increase the amount of fiber sticking to the teeth of the saw cylinder under the influence of air. The air flow directed towards the saw cylinder accelerates the exit of saws separated from the fiber from the working chamber.

Studies have shown that by reducing the saw speed from 730 min^{-1} to 550...620 min^{-1}, the amount of waste and fiber defects can be reduced by an average of 20%.

Conclusion. The main parameters that cause damage to seeds in a cotton gin are determined. Among the parameters to be determined, the stability of the raw material and the speed of its rotation, which are considered the most important, have been carefully studied.

Analyzed studies conducted by scientists to accelerate the stability and turnover of raw materials. Based on the analysis, the rotation of the raw material shaft is accelerated by a rotating disk with piles installed on the side of the working chamber. It was also proposed to prepare the surfaces of the grates with grooves so that the seeds separated from the fiber could be released in a timely manner from the working chamber of the gin.

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