ORGANIZATION OF COMPACT SPINNING TECHNOLOGY IN TEXTILE CLUSTERS

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Abstract: The article proposes a system of continuous supply of raw cotton in continuous spinning technology and methods of maximizing the preservation of the natural properties of the fiber and obtaining high-quality yarn.

Key words: Cotton fiber, fiber properties, fiber separation process, automatic bale opener. yarn, compact raw cotton processing technology, spinning technology.

Introduction. Currently, topical issues are further improving the efficiency of cotton-textile clusters, increasing the capacity for deep processing of cotton raw materials, widespread introduction of scientifically based methods and intensive technologies into this process, as well as issues of timely elimination of problems arising in the activities of cotton-textile clusters [1].

In the cotton-textile clusters created in the Republic, it is necessary to properly organize the processes of production of finished products from raw materials, to study the possibilities of introducing technology for the production of high-quality and competitive yarn from harvested cotton fiber.

In order to reduce the cost of yarn produced by the traditional method and ensure its standard quality indicators at spinning enterprises, a sorting (Lot) of various types of cotton fiber is preliminarily formed and introduced into production [2]. When producing yarn in accordance with the requirements of customers, each enterprise uses technological regulations developed based on its own capabilities [3]. The production of yarn at the enterprises is organized using various types of raw materials. Spinning enterprise LLC "Nukus Textile" produces yarn from fibrous waste st-3, st-7 and recovered fiber from st-36 in the range of Ne 20 and exports to the PRC [4].

Currently, most spinning enterprises practice the production of yarn using a mixture of low-grade cotton fibers of the 4th-5th type and fibrous waste. One of the pressing issues is the introduction of a compact and resource-saving technology for the effective use of cotton fibers harvested in cotton-textile clusters.

On the example of “Bo'ston Cluster” LLC, located in the Ellikkala region of the Republic of Karakalpakstan, the processes of producing cotton fiber and yarn from this raw material were studied. The company was established in 2018, the production of raw cotton has been established, and currently the harvested raw cotton is completely processed and exported in the form of finished products.

Information on the processing of raw cotton produced by Bo'ston Cluster LLC in 2020

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<th>Available</th>
<th>The amount of raw Fiber production, t</th>
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The “Boston Mega textile” LLC produces traditional Ne 21 yarns; 24; 16; 30 and yarn “Sairo” Ne 20; 14, the production of denim fabrics and towels in the amount of 10 million sq. m per year [5].

“Bo'ston Cluster” LLC produces cotton fiber of the Sultan selection. This raw material is completely processed at the spinning mill and yarns of various assortments are produced. In the future, it is necessary to improve the traditional methods in the cotton-textile cluster in order to create compact technological regulations for the processes of cotton processing.

Based on the integration of the processes of primary processing of cotton and spinning, which are currently used in practice, it is possible to introduce resource-saving innovative technologies. For example, Bo'ston Cluster LLC supplies a spinning mill with 10,000 tons of cotton fiber per year.

In traditional technological processes, the deterioration of the natural properties of cotton fiber under the influence of repeated mechanical shocks has been scientifically substantiated [6]. On the basis of the studies carried out, the factors that negatively affect the quality indicators of cotton fiber were identified, which are long-term storage of raw cotton in riots; pressing into bales under high pressure; repeated mechanical shock effects in technological processes and others [7,8].

In the research work carried out by A.T. Ochilov, it was found that moisture and biological activity of seeds during storage of raw cotton in riots, an increase in temperature caused the deterioration of fiber properties. Changes in indicators have been established, for example, a high rate of damage in unripe raw cotton of grade III during storage, an increase in fiber damage in raw cotton of grade I by 6% during monthly storage, by 8% during storage for three months and in subsequent processes of bale opening up to 10-11% [9].

It is scientifically substantiated that under the action of pressure there is a decrease in the specific breaking load of the fiber, its upper average length, breaking elongation and an increase in the index of short fibers, the amount of trash impurities in the process of pressing cotton [10].

Of great importance for the economy of Uzbekistan is the introduction of a technological system that can reduce the impact on cotton fiber in the technological process and produce high-quality fiber, raw materials and finished products in cotton-textile clusters.

The spinning shop of Bo'ston Cluster LLC has launched the production of ring-spinning yarn using technological equipment from Truetzschler (Germany) and China Texmatech Co. Ltd (PRC), and yarn is also produced on rotor spinning machines from Truetzschler (Germany) and Rieter (Switzerland).
Traditionally, at these enterprises, on the basis of standard sorting, a bale mix-rate is drawn up, which is loosened and transferred to the next stage.

Based on the results of the analysis of scientific research and processes using the example of Bo'ston Cluster LLC, it was found that the existing traditional technologies of fiber separation and yarn production are carried out by parameters that negatively affect the properties of the fiber.

In a spinning mill, it is recommended to organize a section for separating the fiber from the seeds. Raw cotton should be adopted on the basis of standards, taking into account the moisture content and the content of impurities, and if moisture and impurities are exceeded, the raw cotton must be dried and refined, and in this case, it is necessary to introduce an innovative technology for storing and processing raw cotton into ready-made products.

To do this, it is recommended to unpack the raw cotton briquette, dry, peel, separate the fiber from the seed and store the fiber in mini bundles weighing 2 tons, 1800 mm × 3000 mm in size. Mini riots can be transported for subsequent processes. In the spinning industry, there is no need for loosening, since the mini bundle is formed from individual fibers (instead of raw cotton in traditional technology), has a lower density, which allows efficient mixing of the fibers. In the mixture, the fibers are in a discrete state, and their distribution in semi-finished products and in yarns is more uniform, homogeneous in composition due to loose compaction. Due to the maximum preservation of the natural properties of the fibers, it will be possible to obtain yarn that meets the requirements of the international criteria Uster Statistic 2018. The recommended compact technology for processing raw cotton is shown in Fig. 1.

**Figure 1. Recommended compact technology for processing raw cotton**

**Conclusion.** Based on the analysis of the activities of Bo'ston Cluster LLC, the possibilities of the cluster for processing the harvested raw cotton in full volume with the possibility of creating a compact technology for the production of fiber and yarn have been identified.

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