SCIENTIFIC RESEARCH OF IMPROVING THE QUALITY OF YARNS ON A SPINNING MACHINE

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Demand for textiles has always been high in the domestic and global markets. Demand is always high, especially for products that meet consumer requirements and have high hygienic, aesthetic and operational properties. The yarns used to make these products must be of high quality. To obtain high-quality yarns, leading firms are conducting several important studies to improve the efficiency of spinning machines, machine design and yarn quality. Examples of these innovations are the increase in the number of loops on spinning machines, the introduction of compact spinning machines and equipment, and continuous and wasteless spinning. Changes in this form are still going on in the spinning machines.

In order to further improve the quality of the yarn, the designers of spinning machines have recently been actively working on the development of compact devices that spin the fibre and reduce the hairs on the surface of the yarn. The spinning process differs depending on the use of the yarn, the type of raw material used and the spinning methods. The raw material is selected according to the customer's order. The quality of the yarn is also assessed based on consumer requirements [1,2,3].

Various additional works are carried out to meet the needs of consumers. In addition to the properties of the raw material, the properties of the yarn also depend on the alternation of the working parameters of the process equipment. It should be noted that different spinning methods can be used to obtain yarn with different properties from the same raw material. The main function of the ring-spinning machine is to make yarn from the yarn. In normal yarns, the tension of the cross-sectional fibres is greater, and the tension of the fibres decreases as they move toward the centre. Due to the fact that the fibres have different stresses, the structure of the yarn is uneven and has low resistance to tensile forces.

In compact yarns, we can see that the fibres are evenly distributed in the cross-section of the yarn. This arrangement of the fibres also has a significant effect on the subsequent steps. Normal yarns have low tensile strength and high hair strength. In compact yarns, these problems are eliminated.

The spinning machine consists of forming a coil of yarn that is several times thicker than the yarn to ensure the continuity, firmness and shape of the yarn, which is convenient for further processing. The ring spinning machine mainly performs three technological processes - stretching, baking and wrapping [2, 3,4].

The spindle, which separates the guide rods from the spool windings on the suspension handle of the supply device, passes through the seal of the drive mechanism and comes to the supplied pair of the extension device. In the stretching tool, the plug is thinned to a fixed linear density and emerges from the discharge pair in the form of a thin tube. There is a fluff sucker under the extractor cylinder, which pulls the fibres into the fluff sucker system when the thread breaks.

When the resulting furnace is twisted into a thread, the thread passes through a conductor and is continuously baked under the influence of a spinning wheel that rotates at a high frequency. The thread is then passed through a looped loop into a tube [5,6,7].

Several scientific studies have been conducted to improve the quality of spun yarns. Two experiments were selected for the experimental test work. It is known that in a ring spinning machine, the stretching pairs consist of three rollers and a cylinder. An elongation device of the first strand, selected for the experimental work, was fitted with a device for compacting the flow of fibres between the first and second pairs. The elongation device of the selected second leg was left in working condition. With the help of the installed equipment and working tools, 27 tex yarns were produced and the quality of the samples was studied in the modern laboratory equipment of the enterprise. The results obtained are presented in Table 1.

Table 1. Physical and mechanical properties of 20 tex yarn with linear density

№	*Threat indicators*	*Indicators of the yarn produced in the enterprise*	*Indicators of the thread obtained by installing the sealant*
1	Coefficient of variation by thread number [U%]	10,65	10,34
2	Unevenness coefficient of variation of the rope CV m%	13,40	13,02
3	Yarn knots Neps, 200% per/km	125	120
4	General defects, number/km	173	170

We know the important role of the densifiers in the active zone of the stretching device in the formation of the thread. Virtually all modern stretching devices are equipped with seals. Compression before and during elongation of the product ensures that the fibres move evenly over the elongation area. In addition, the placement of the densifiers in the active zone of the elongation device affects the dimensions below the torsion triangle. That is, at the end of the triangle and at the angle of the twist, the parameters of the toughness of the product are affected by the twisting of the output cylinder of the stretching tool with the furnace.

At the end of the triangle and at the corner of the twist, the product's rigidity parameters are affected by the twisting of the output cylinder of the stretching tool with the mouse [8-11].

In our study, we used the coefficient of variation in the number of yarns spun at the enterprise and the number of yarns spun experimentally [U%], the coefficient of variation of the roughness of the yarn CV m%, yarn Neps, 200%/km, total defects, number/km The difference in indicators was determined.

The coefficient of uneven variation of yarn CV m 3% improved compared to the yarn produced by the experimentally spun yarn, and the coefficient of variation by yarn number [U%] improved by 2.9%. One of the indicators of the appearance of spun yarn is its surface imperfections. The flatter the yarn and the fewer fibres on the surface, the better the quality of the yarn. As a result of our research, defects in the appearance of the spun yarn were checked on the USTER TESTER 6.

As a result, the number of spinning yarns produced by the enterprise and the number of experimental spun yarns improved by 4%. The quality of the yarn improved after the addition of a compactor to the spinning machine. The coefficient of variation by yarn number [U%] is improved by 0.31%, the coefficient of variation of rope unevenness is improved by CV 0.38%, as well as thin areas of yarn, Thin -40% / km 25%, yarn Neps, 200% / km was found to decrease by 4%.

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