FACTORS AFFECTING THE QUALITY OF YARN COMING OUT OF SPINNING MACHINES

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Abstract
This article examines the factors affecting the quality of yarn produced by a ring-spinning machine. The article presents the properties of N_e=32 yarn obtained by changing the twist angles of the yarns produced by the ring spinning machine and compares them with the properties of the yarns produced at the enterprise. The quality indicators of yarn obtained by changing the twisting angle of the yarn in the ring-spinning machine are expressed in tables and histograms.

Keywords: ring spinning machine, thread, tex, cylinder, hairiness, coefficient of variation, stretching couple, linear density.

The demand for cotton fibre is increasing day by day to satisfy the growing population and the need for clothing. Switzerland (Rieter), Germany (Truchler), and Italy (Savio, Martzoli) are the major factories for the production of new generations of spinning yarn production techniques and technologies. attention is being paid to improving the required raw materials without compromising quality indicators.

Decree of the President of the Republic of Uzbekistan dated May 5, 2020, No. PF-5989, dated September 16, 2019 Decision No. PQ-4453 on the further development of light industry and production of ready-made products, dated February 12, 2019 "Deepening the reform of the textile and sewing-knitting industry and increasing its export potential" The following dissertation will help to a certain extent in the implementation of the tasks defined in the "On Expansion Measures" and other normative legal documents related to this activity [1].

The yarn used as a product of the spinning process varies depending on the type of raw materials used and the methods of spinning. Raw materials are selected depending on the

cooking of the thread and the customer's order. Also, the quality of the yarn is evaluated based on consumer requirements [2]. To satisfy the demand of the consumer, additional works of various types are performed. In addition to the properties of the raw materials, the yarn properties also depend on the alternation of the work of the technological equipment. It should be noted that yarn with different properties can be obtained from the same raw material in different spinning methods [3].

The main function of the ring-spinning machine is to produce yarn from the pile. The purpose of the spinning machine is to ensure the continuity and durability of the product, which is several times thicker than the thread, and to form a coiled thread with a convenient shape for further processing. In the ring-spinning machine, mainly three technological processes are performed - stretching, twisting and winding [4].

Spindle, prism and hanging reel handles are used in the supply devices. In stud and prism supply devices, because the package rotates heavily under the influence of its own mass, hidden elongation occurs in the pile [5].

Therefore, spinning machines are mainly equipped with devices with hanging spool handles.

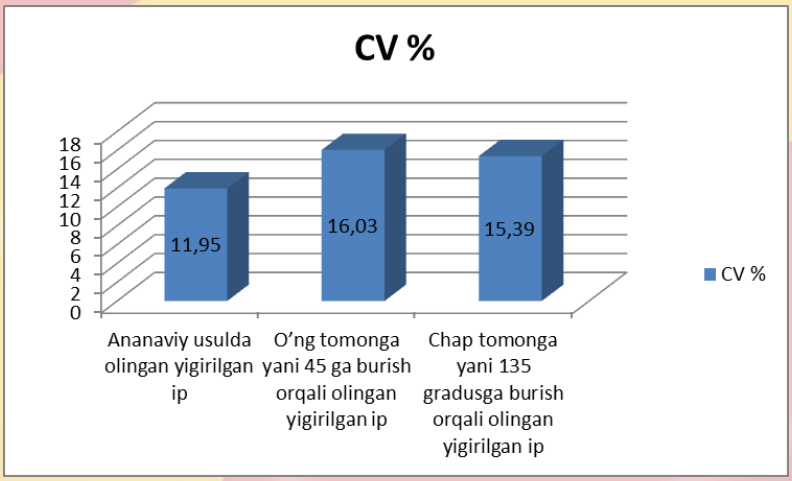
In the ring spinning machine, the pile is stretched and thinned to a specified linear density, the fibres in it are stretched and thinned, and the fibres that makeup it are moved relative to each other and distributed over a larger distance. As a result, the rear and front ends of the fibres are straightened and parallel to each other [6]. The thin tuft coming out of the stretching tool is twisted to turn it into a thread [7]. When the thread is twisted, the fibres that makeup it are located along the spiral lines and are pressed together and become denser. As a result, there is a frictional force between them, which indicates the resistance of the thread to shearing forces. Twisted thread is carried out using a twisting-winding device [8,9]. To improve the quality of the thread, by changing the angle of the fibre flow coming out of the ring spinning machine, the bundle of fibres coming out of the burning cylinder is given at different angles, and by giving the necessary twist to the spinning thread, the quality indicators of the obtained yarn meet the standard requirements.

The research was carried out in the conditions of the thread production enterprise "Namangan tokimachi" LLC (Uzbekistan) located in the Namangan region. The yarn was produced on the ring spinning machine installed at the enterprise using the CSM 2114 ring spinning machine. In the study, experiments were conducted to improve the quality indicators of spun yarn. It is known that today, in a ring spinning machine, the stretching pairs consist of a cylinder and a roller, and based on experiments, yarns are obtained by changing the twist angle of the fibres coming out of the spinning pair to 450 and 1350 degrees. By changing the twist angle, a spun yarn with the number N_e=32 was produced. Based on the experiments, he selected three samples for the sample.

Table 1. Physico-mechanical parameters of yarn spun from 100% cotton fibre with number N_e=32.

	CV %	U %	Thin -50 % (/km)	Thick +50 % (/km)	Nep +200 % (/km)	The twist given to the string twist/meter
Traditional spun yarn	11,95	15,23	7	146	653	900
Spinned thread obtained by twisting to the right, i.e. 450 degrees	16,03	11,88	16,33	137,43	634,77	897
The spun thread was obtained by twisting to the left i.e. 1350 degrees	15,39	11,49	8,16	57,15	544,28	903

The unevenness of the spun threads is the repetition of thin and thick areas found in the threads. In our research work, we compared the spun yarns, i.e., the spun yarns produced in the enterprise, and the spun yarns obtained through the experiment, and it was achieved to determine the difference in their indicators.



1-diagram. Yigirilgan iplarnin variatsiya koeffitsienti

In this case, the coefficient of variation for the number of spun yarn produced at the enterprise is 11.95%, and for the skein made by changing to 450, the coefficient of variation by the number of the yarn is 16.03%, and the skein made by turning the fibre flow between the stretching pairs to 1350 the coefficient of variation for the yarn number was 15.39%. In this case, we can see that the unevenness of the yarn in the sample compared to the yarn produced in the enterprise has improved. The unevenness of the threads is shown in diagram 1.

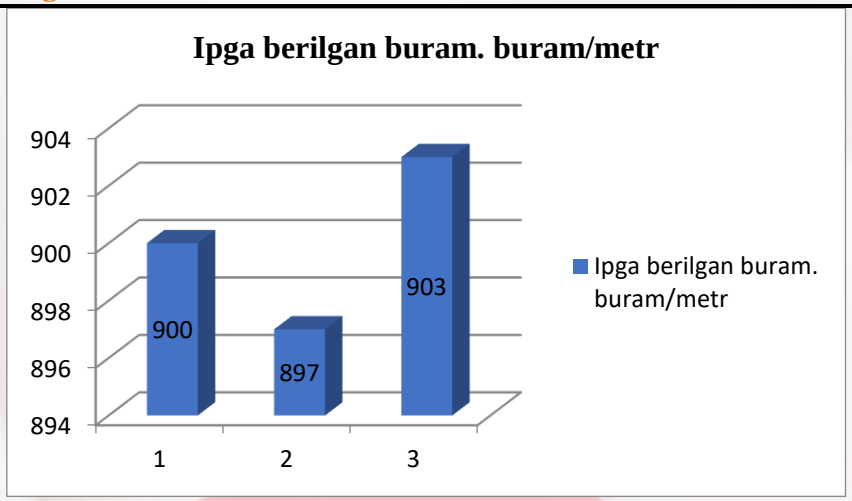


Diagram 2. The twist given to the spun threads. 1-The twist given to threads obtained by the traditional method. 2- A twist given to a kalava thread turned by 450 degrees. 3-twist obtained by twisting 1350 degrees.

Defects on the surface of yarn are called yarn naps. The cleaner and smoother the defects on the surface of the threads, the better and cleaner the surface of the woven fabrics. In the studies, the number of threads of yarn obtained traditionally was 653 when checking for defects on the surface of the thread using the USTER TESTER 5 device manufactured by the Swiss company Uster.

The number of loops of yarn twisted at 450 m was 634.77, and the number of loops of yarn twisted at 1350 twist was 544.28 (Scheme 3).

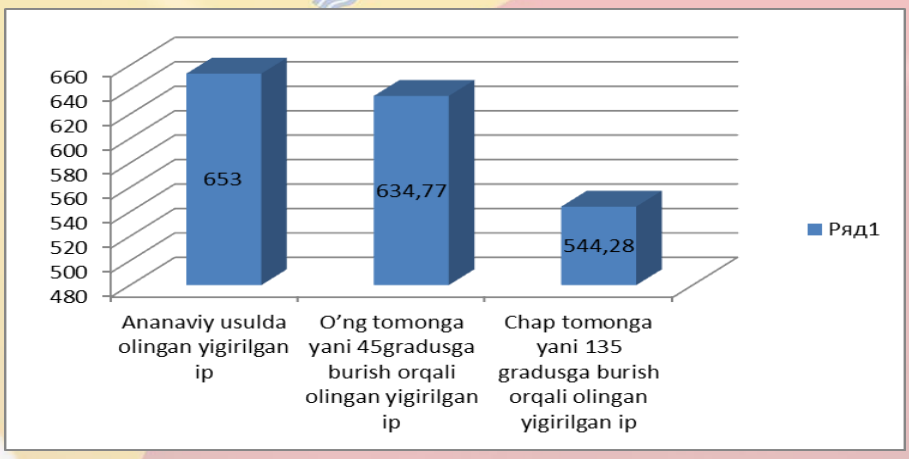


Diagram 3. The number of neps of spun yarn

It can be seen that when comparing the number of eps of yarns with the number Ne=32 obtained on the CSM 2114 machine, the yarn in the sample compared to the yarn produced at the enterprise improved by 2.8% when comparing the tex yarns.

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