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Changes in the Uneven Indexes of Sliver and Threads by Different Technological Processes

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Abstract. The article describes information about textile yarn with texture 20.0, which was obtained from the cotton yarn samples in the laboratory of "Spinning Technology" of the Tashkent Institute of Textile and Light Industry at the cotton processing plant in Akkurgan district of Tashkent region. Worked out in three different options, firstly, raw cotton was converted into fiber in the laboratory of the mill, and the quality indicators of the obtained sliver, wick and thread were studied in the modern equipment of the Uster Tester-5 in the Enterprise" Shovot tex", and were also studied the physic-mechanical properties of the threads in the laboratory" CentexUz" and proposed an optimal variant of the technological process for release

Keywords: thickness, durability, uniformity, ripeness, hollowness, rope irregularity, linear and quadratic inequality

I. INTRODUCTION

In the spinning process, the quality of yarn depends first of all on the properties of the primary raw material and the fiber. Properties of fiber include their thickness, firmness, uniformity, ripeness. For example, the thickness of the fibers is important in the process of spinning. The nature of the removed threads depends on the thickness of the fiber. Thin fibers are made of thin, smooth, even and durable threads. Thin yarn is made of fine, light fabrics, knitwear. The thinner the fibers, the more cross-section of the yarn of the same thickness. As a result, the structure of the yarn increases the contact surface of the fibers, increases the friction force, and leads to a higher strength of the yarn. In addition, the most important quality indicators are the inadequacy of the yarn. As a result of increased yarn unevenness in the fabrics, the pathways are formed and the appearance is impaired, and the number of defects increases. The greater is the rigidity of the yarn, the less is the possibility of using the strength of the yarn and the single threads in the threads, resulting in a deterioration of the mechanical properties of the yarn and the severity of the interruption of weaving.

Unevenness is a negative property of products in a spinning mill, often negatively affects the technical and economic indicators of the enterprise, as well as the physico-mechanical properties of yarn. It is important to test and control the unevenness of spinning products and to identify the causes and timing of the unevenness factors. The more the interruption in the time of wrapping and forming threads in spinning machines, the higher the unevenness of the thread. As a result of the increase in thread breakage, the employment of workers increases, and also leads to a decrease in the working productivity of machines.

When a product that is uneven in structure or linear density extends into a different machine, it changes the area of the tensile strength and the friction force.

It is difficult to analyze the unevenness of spinning products. There are many types of unevenness for spinning products: the formation of the first spinning phase and the subsequent spacing and the addition of new types of inequalities.

II. METHODOLOGY

The research was conducted at a cotton gin in the Akkurgan district of Tashkent region. Cotton sorts of the 4th type Sultan sorting were processed in three different technological processes in the district, the samples of cotton fibers obtained in the laboratory of the Department of "Spinning technology" at the Tashkent Institute of textile and light industry received 20.0 tex. threads.

The cotton raw was first converted to fiber in the laboratory of processing in three variants, and the quality characteristics of the yarn, wool and yarn were obtained by the Uter Tester-5 equipment of the Shovot Tex enterprise researched at “CentexUz Lab”.

The linear and quadratic inequalities of the coil after the combing and calibration processes were solved, and the results of the tests are shown in Figures 1 and 2.

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The technological process sequence is shown in Figure 1 below.

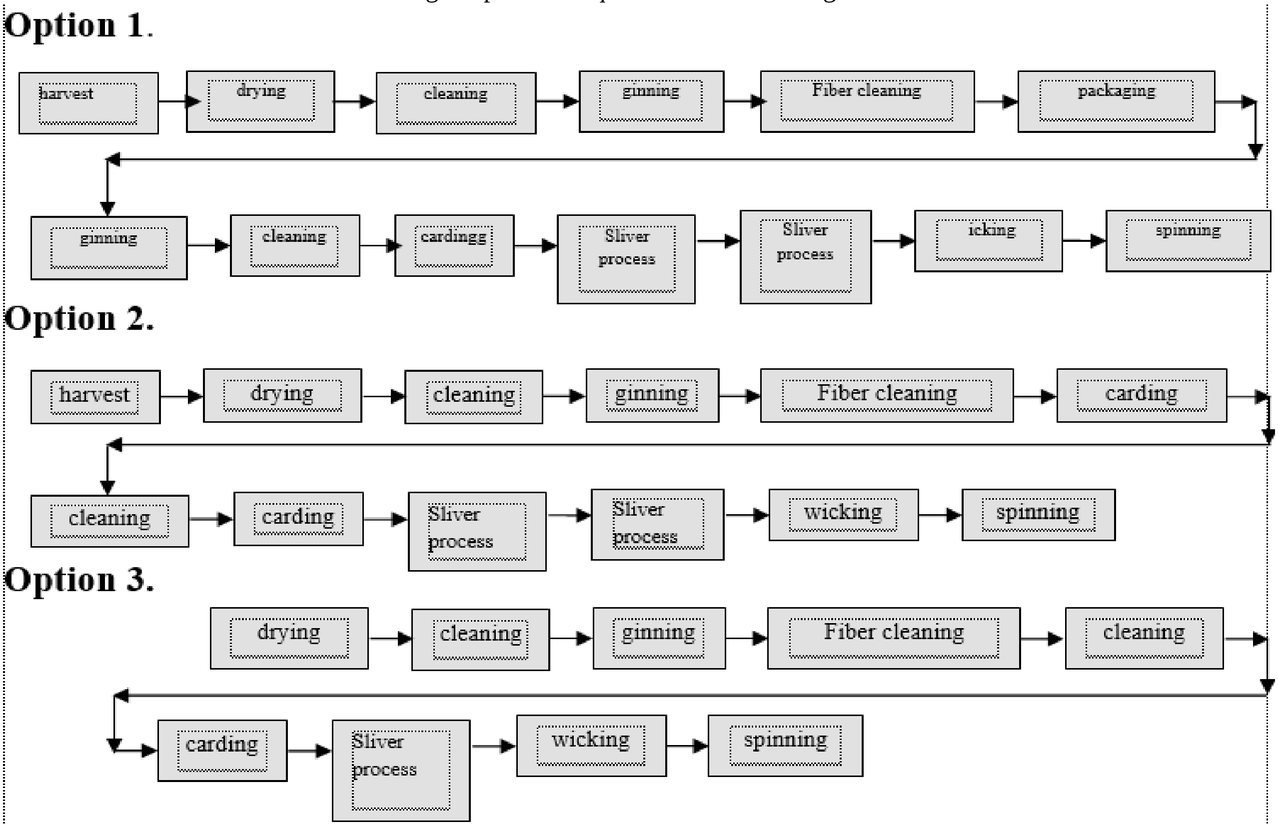

Figure 1. Technology of obtaining yarn from raw material

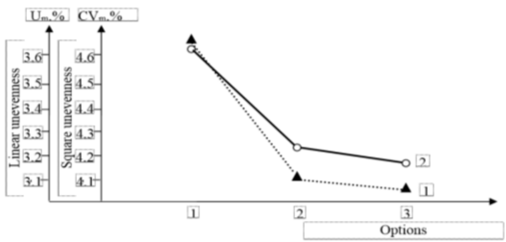

Figure 1. Changes in linear and quadratic unevenness of sliver after carding.

1-linear unevenness, 2-squared unevenness

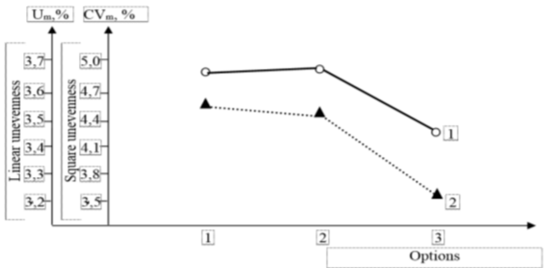

Figure 2. Changes in linear and squared irregularities of the sliver after the sliver process

1-linear unevenness, 2-squared unevenness

III. RESULTS AND DISCUSSION

Analyzing the linear and quadratic unevenness of the sliver after combing and slivering process, comparing with the uneven indicators of the products in the process of obtaining yarn from fiber in the technological process sequence in Option 1, the linear unevenness of the sliver in the yarn process of the variant 2 was decreased to 11.1%, square unevenness decreased by 12.6%, linear unevenness in the sliver machine increased by 0.3%, square unevenness decreased by 4.0%, in the process of obtaining a thread from the fiber in the technological process sequence in the variant, the linear unevenness of the plank in the comb machine is increased to 11,9% in the option 3, square unevenness to 14,0%, the sliver machine linear roughness is to 5.0%, squared roughness decreased by 20.0%. Analysis of the results shows that In the process of obtaining a thread from the fiber in the 3-variant technological process sequence, it was seen that the unevenness indicators of the product obtained from the combing and piloting machines were lower than those of other options. The quality of spinning products is called unevenness. Unevenness affects the technical and economic performance of the work, as well as the physical and mechanical properties of spinning and weaving products. Many factors, such as unevenness raw materials are often the result of technological processes and machine design, disruptions in the working regime, and the distance and repair of workers from machines.

Structural unevenness of products of different types and unevenness in their properties are of different character. Depending on the character, the changes in the structure and properties of the product are as follows: periodic, random, functional, which is one-sided growing deviations (quality indicators are constantly increasing or vice versa); local (random, sudden increase in product line intensity); combined (total of several types of inequality).Linear density inequality is one of the key factors in assessing the quality of yarn and other products of the spinning process.

As the greater is the strength and other properties of the yarn, the greater will be the stability, elasticity of fabrics and knitwear.

Uneven strands of linear density cause specific defects in production. For this reason, it is important to study and control the unevenness of spinning products in the production environment in accordance with the above factors.

Determines the following types of unevenness in the specific properties of length: linear density, number of fibers in cross sections or different lengths of cross sections, product unevenness (density), physical and mechanical properties of product (strength, elasticity, elasticity); humidity, air permeability, electrical resistance, electrical resistance, the size of electrical charges, etc.).

The indexes of the yarn unevenness under different technological processes were investigated and the results of the tests are presented in Table 1.

Table 1 Indicators of unevenness of yarn produced by various technological processes

O/n	Indexes	Options		
		1	2	3
1.	Linear density, U_m %	7,52	7,48	7,30
2.	Coefficient of variation on linear unevenness, %	2,8	1,6	2,2
3.	Square unevenness, CV_m, %	9,46	9,46	9,19
4.	Coefficient of variation on quadratic unevenness, %	2,8	1,6	2,2
5.	Square unevenness in 1 meter, CV_m,%	3,05	3,49	2,95
6.	The coefficient of variation on the square unevenness in 1 meter, %	7,2	6,9	6,6
7.	Square unevenness in 10 meters, CV_m,%	1,59	2,35	1,61
8.	Coefficient of variation on Square unevenness in 10 meters, %	16,1	12,0	12,2
9.	Square unevenness in terms of the number of neps (-40%), %	2,3	0,3	0,5
10.	Square unevenness in terms of the number of neps (+35%), %	27,3	33,5	18,8
11.	Square unevenness in terms of the number of neps (+140%), %	38,5	108,8	36,0
12.	Square unevenness in terms of the number of neps (+50%), %	1,8	3,3	1,8
13.	Square unevenness in terms of the number of neps (+200%), %	8,3	18,5	5,5
14.	lanate,%	6,68	6,53	6,70
15.	Coefficient of data on lanate,%	3,0	2,3	2,2

As can be seen from the results of the research conducted, when we compared the unevenness of the obtained yarn according to Option 1, the linear unevenness of the obtained yarn according to Option 2 is 1,6%, the coefficient of variation on the linear unevenness is 42,9%, the square unevenness does not change, the coefficient of variation in square unevenness decreases by 42,9%, the square unevenness in 1 meter increases by 12,6%, the coefficient of variation in square unevenness in 1 meter decreases by 4,2% , square unevenness in 10 meters increases by 32,3%, the coefficient of variation in square unevenness in 10 meters decreases by 25,5%, square unevenness by the number of neps in (-40%) by 86,9% , square unevenness in terms of the number of neps at (+35%) to 18,5%, square unevenness in terms of the number of neps at (+140%) to 64,6%, square unevenness in terms of the number of neps at (+50%) to 45,5%, square unevenness in terms of the number of neps at (+200%) to 55,1% , the coefficient of variation on the slope is reduced to 2,2%, the coefficient of variation on the slope is reduced to 23,3%, the linear unevenness of the threads obtained by Option 3 is reduced to 2,9%, the coefficient of variation on the slope is reduced to 21,4%, the square unevenness is reduced to 2,9%, the coefficient of the coefficient decreases to 8,3%, square unevenness in 10 meters increases by 1,2%, the coefficient of variation in square unevenness in 10 meters decreases by 24,2%, square unevenness in terms of the number of neps in (-40%) by 78,3%, square unevenness in terms of the number of neps in (+35%) by 32,1%, square unevenness in terms of the number of neps in (+140, the square unevenness in terms of the number of NEPS (+50%) does not change, the square unevenness in terms of the number of neps (+200%) decreased by 33,7%, the hairyness increases by 0,3%, the coefficient of variation on the hairyness decreases by 26,7%.

IV. CONCLUSION

Study results show that linearity and quadrature in linear coefficients in the carding machine varies from 11.1% to 14.0%, in linear coefficients in the combustion machine, compared to the coefficients of the slab derived from other technological processes decreased from 3% to 20.0%.

The results of the study showed that the variations in the fiber yarn in the process sequence variants decreased from 1.6% to 86.9% compared to the process threads in the 1st and 2nd versions of the process.

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