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Influence of Cotton Fiber of Different Composition and Secondary Material Resources on Single-Cycle Elongation Deformation of Yarns

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ABSTRACT: In this article, 4 different variants obtained from a mixture of returns and fibers in the spinning process, ie 25% cotton fiber secondary material resources + 75% cotton fiber, 20% cotton fiber secondary material resources + 80% cotton fiber, 30% cotton fiber secondary material resources + 70% Yarns were obtained from cotton fiber and 15% cotton fiber secondary material resources + 85% cotton fiber, and their one-period elongation adeformation was detected.

KEYWORDS: elastic deformation, elastic deformation and plastic (residual) deformation

I.INTRODUCTION

A distinctive feature of light industry in a market economy is the short-term period of production, which justifies the need to produce a large range of products in small volumes. This leads to frequent changes in the product model, a decrease in batch size, and an increase in start-up frequency. In order to maintain the competitiveness of production, it is necessary to respond flexibly and adequately to changes in external market conditions by the internal organization of production. Basic research on the theoretical basis and practical support of the flexibility of the production system. The production of garments and knitwear plays an important role in increasing the efficiency of knitwear production. Knitwear is used in the manufacture of clothing, as well as in the production of artificial lace, fur, technical and medical products. Knitwear, unlike other textiles, stretches in all directions due to its ability to change the shape and size of the material. The loose loop structure makes the knit soft and wrinkle-free. Improving the efficiency of production of clothing and knitwear is based on solving interrelated problems: the introduction of advanced technologies, the widespread use of automation and mechanization, advanced organization of labor and production. At present, in the garment industry of the republic it is important to produce high-quality, low-cost yarn for the textile industry from the returns in the production of clothing. Today, the development of a long-term strategy of structure

industry from the returns in the production of clothing. Today, the development of a long-term strategy of structural change in Uzbekistan requires taking into account not only domestic but also global processes and problems. From this point of view, the transition to an economy with a new model of development - the efficient use of local resources - is one of the most effective tools for sustainable structural change and sustainable development.

Textile fibers, yarns are soft, thin, flexible under normal conditions. Therefore, they will be located randomly in the free state. Fiber undergoes various bending deformations in the production of yarns and in the manufacture of products from them. Half-cycle, single-cycle, and multi-cycle performance are also studied in bending deformation.

Textile fiber, yarns are not broken by semi-circular bending deformation. Scientific studies have shown that fibers can be damaged if they bend at an edge with a radius of 80-90 microns. But in practice the fiber, the threads do not bend at such a small radius edge. Therefore, the semi-circular bending deformation of the yarns is not studied.

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II. METHODOLOGY

The complete deformation that occurs in a single-cycle elongation deformation consists of three parts: elastic deformation, elastic deformation, and plastic (residual) deformation. In this case, the first two deformations (elastic, elastic) are reversible deformations, and the third (plastic) is non-reversible residual deformations. The reason for the formation of elastic deformation is that the distance between the particles of polymeric substances changes slightly under the influence of external forces. In this way, the interdependence of molecules and atoms is preserved. But the valence angles grow less.

As a result of elastic deformation, the volume of the body increases. The propagation of the elastic deformation is equal to the speed of sound. According to Prof. IV Kragelsky, the distribution of elastic deformation in baked cotton yarn is 1425 m/s, in linen yarn - 1900 m/s. Thus, the propagation of elastic deformation in 1 m long yarns takes place within 0.0007-0.0005 s, which is greatly accelerated. But the valence angles grow less.

Elastic deformation develops at a small rate. Its speed depends on the environmental parameter. At high temperatures and with the absorption of water vapor, the development of elastic deformation of fiber fibers is accelerated, as the mutual gravitational force of the molecules of the substance is reduced. Passes quickly during the relaxation process. In practice, the amount of static load suspended on the yarn to calculate the fraction of elastic deformation is taken as 25 or 50 percent of the absolute strength of the yarn.

Single-cycle elongation deformation of yarns with different amounts of fibers and turns was determined and the test results are given in Table 1.

N₂	Indicators	A mixture of secondary material resources in the yarn,%			
		25% cotton	20% cotton	30% cotton	15% cotton
		fiber secondary	fiber secondary	fiber secondary	fiber
		material	material	material	secondary
		resource +	resource + 80%	resource + 70%	material
		75% cotton	cotton fiber yarn	cotton fiber yarn	resource +
		fiber yarn			85% cotton
					fiber yarn
The number of turns of the rope, 400 br/m					
1.	Flexible deformation, %	0,55	0,60	0,60	0,37
2.	Elastic deformation, %	0,35	0,26	0,32	0,53
3.	Residual (plastic) deformation, %	0,10	0,14	0,08	0,10
The number of turns of the rope, 500 br/m					
1.	Flexible deformation, %	0,49	0,53	0,55	0,31
2.	Elastic deformation, %	0,38	0,29	0,35	0,56
3.	Residual (plastic) deformation, %	0,13	0,18	0,10	0,13
The number of turns of the rope, 600 br/m					
1.	Flexible deformation, %	0,45	0,45	0,50	0,28
2.	Elastic deformation, %	0,40	0,33	0,37	0,57
3.	Residual (plastic) deformation, %	0,15	0,23	0,13	0,15

Table 1

Changes in the single-cycle elongation deformation of yarns with different cotton fiber and secondary material resources

III. RESULTS AND DISCUSSION

Comparing the results of the study with the performance of 25% cotton fiber secondary material resources with a number of twists of 400 br / m + 75% cotton fiber yarn, 20% cotton fiber secondary material resources + 80% cotton fiber yarn elastic deformation content of 8.3%, elastic deformation content increased by 25.7%, residual deformation content increased by 28.5%, 30% cotton fiber secondary material resources + 70% elastic deformation content of cotton fiber yarn increased by 8.3%, elastic deformation content increased by 8.5% increased, residual deformation content decreased by 20.0%, 15% cotton fiber secondary material resources + 85% elastic deformation content of cotton fiber secondary material resources + 85% elastic deformation content of fiber yarn decreased by 20.0%, 15% cotton fiber secondary material resources + 85% elastic deformation content of cotton fiber yarn decreased by 20.0%, 15% cotton fiber secondary material resources + 85% elastic deformation content of cotton fiber yarn decreased by 20.0%, 15% cotton fiber secondary material resources + 85% elastic deformation content of cotton fiber yarn decreased by 20.0%, 15% cotton fiber secondary material resources + 85% elastic deformation content of cotton fiber yarn decreased by 20.0%, 15% cotton fiber secondary material resources + 85% elastic deformation content of cotton fiber yarn decreased by 20.0%, 15% cotton fiber secondary material resources + 85% elastic deformation content of cotton fiber yarn decreased by 20.0%.

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yarn increased by 32.7%, elastic deformation content increased by 33.9%, residual deformation composition did not change, 25% cotton fiber secondary material resources with the number of twists 500 br / m + 75% cotton fiber secondary material resources + 20% cotton fiber secondary material resources + 80% cotton fiber elastic deformation content of yarn increased by 7.5%, elastic deformation content decreased by 23.6%, residual deformation content increased by 27.7%, 30% cotton fiber secondary material resources + 70% elastic deformation content of cotton fiber yarn 10, Increased by 9%, elastic deformation content decreased by 8.3% to 7.8%, residual deformation content decreased by 23.07%, 15% cotton fiber secondary material resources + 85% elastic deformation content of cotton fiber yarn 36.7 % decreased, elastic deformation content increased by 32.1%, residual deformation composition did not change, 25% cotton fiber secondary material resources with the number of turns 600 br / m + 75% compared to the performance of yarn from cotton fiber, 20% cotton fiber secondary material resources + 80% elastic deformation composition of yarn from cotton fiber did not change, elastic deformation content decreased by 17.5%, residual deformation content increased by 34.7%, 30% cotton fiber secondary material resources + 70% obtained from cotton fiber elastic deformation content of yarn increased by 10.0%, elastic deformation content decreased by 7.5%, residual deformation content decreased by 13.3%, 15% cotton fiber secondary material resources + 85% elastic deformation content of cotton fiber yarn 37.7% decreased, the elastic deformation composition increased by 29.8%, the residual deformation composition did not change.

IV.CONCLUSION

The analysis of the results showed that with the increase in the number of twists of the yarns obtained from the loops, the elastic deformation composition decreased, and the elastic and residual deformation composition increased.

In addition, compared to the performance of 15% cotton fiber secondary material resources + 85% cotton fiber yarn, 20% cotton fiber secondary material resources + 80% cotton fiber yarn residual deformation content is higher than other yarns.

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