E- Global Congress
Hosted online from Dubai, U. A. E., E - Conference.
Date: 29th November 2024
Website: https://eglobalcongress.com/index.php/egc
ISSN (E): 2836-3612

RESEARCH CONDUCTED TO REDUCE THE HAIRINESS OF YARNS PRODUCED ON RING-SPINNING MACHINES

Abdumutaliyev Inomjon Muhammadjon ogli
Master's student, Department of Textile Industry Products Technology, Namangan Textile Industry Institute, Namangan, Uzbekistan

Bobojanov Husanhon Tohirovich
Doctor of Technical Sciences, Professor, Department of Textile Industry Products Technology, Namangan Institute of Textile Industry, Namangan, Uzbekistan

Yusupov Alijon Abdujabbor ogli
Tayanch doktorant, Namangan to‘qimachilik sanoati instituti.
Doctoral Student, Namangan Institute of Textile Industry, Namangan, Uzbekistan

Abstract

The fact that there is a high level of competition in the world market of thread and yarn shows the need for the creation of modern, automated techniques and technologies that allow rapid changes in the quality, quantity and assortment of products. In this regard, by radically improving the quality indicators of spun yarns, at the same time, creating effective systems for increasing the quality and competitiveness of spun yarns, by developing high-efficiency equipment, control and measurement tools and technologies at spinning enterprises, and by improving the constructions of spinning machines. Implementation of targeted scientific research in areas such as product quality improvement is considered one of the urgent tasks

Decree No. PF-155 of the President of the Republic of Uzbekistan dated September 2, 2023 "On additional measures for financial support of the textile industry", dated January 10, 2023 Measures to support the activities of cotton-textile clusters, fundamentally reform the textile and sewing-knitting industry, and further increase the export potential of the sector Decree No. PF-2 dated January 21, 2022 "On measures to promote deep processing and production of finished products with high added value and

ISSN (E): 2836-3612

their export at textile and sewing and knitting enterprises" This dissertation research serves to a certain extent the implementation of the tasks defined in Decree No. PF-53 [1-4] and other regulatory legal documents related to this activity.

It is known that the structure of a thread is understood as such a form from which a bond is formed between individual fibres to obtain a thread, as well as the characteristics of the elements that make it up, as well as the following section of the thread [5]. The thread structure is characterized by the following indicators:

- the number of fibres in the cross-section of the thread and their location;
- the nature of fibre arrangement along the length of the yarn;
- distribution of fibres by number (uniform distribution);
- the distribution of fibres in the yarn by quality.

We consider the effect of twisting a fibre product on the arrangement of fibres in its cross-section.

In order to develop the ring spinning process, diagonally striped cylinders with 8° diagonal groove angles of the fibre flow cylinder were developed. Directing the fibre flow towards the centre between the stretched pairs in the produced cylinder spinning machine leads to a decrease in the cooking triangle. For the sample, research was carried out on yarns spun with a linear density of 20 tex and a composition of 100% cotton fibre on a ring spinning machine operating at the "ARTSOFTTEX" LLC enterprise. Yarn samples were produced in the enterprise on a ring-spinning machine and in a modified state of the enterprise's spinning machine output cylinders. Industrially spun yarns, stray fibres from the fibre flow, and fibres that have come out of the twisted triangle do not connect with other fibres during the twisting of the spun yarn, so they increase the hairiness of the yarns. Grading the grooves of the take-out cylinders prevents the fibre ends from coming out of the yarn and ensures that the fibre ends are held on the yarn surface during twisting.

A twist triangle is formed as a result of the gradual transfer of twists to the spinning yarn with a roller. It creates a certain tension in the bundle of fibres in the thread.

In the cross-section of the spun yarn, the fibres are not symmetrically distributed in the fibres located at the edge of the twisted triangle of textile

ISSN (E): 2836-3612

products, the smallest in the fibres located inside the twisted triangle. During this asymmetric distribution, it causes the fibre to break according to the situation in the spinning triangle, the fibres do not cause the yarn to be cut slowly, and the outer axial yarn takes over the loading, thus they also cause the warping of the yarn. As a result, the strength of the thread decreases and the strength of the fibres is used less.

Taking this into account, the grooves of the exhaust cylinders are changed. Studies have shown that the quality indicators of spun yarn with cylinder grooves of 200 have significantly decreased hairiness and increased breaking strength compared to yarns produced by the enterprise.

Table 1. Physico-mechanical parameters of spun yarn with a linear density of 20 tex

Quality indicators	The speed of the car	Exhaust cylinder bore graduations	Coefficient of variation by thread number [U%]	Coefficient of variation of thread unevenness, CV 1m %	Thin parts of the thread, Thin -40 % /km	Thick areas of thread, Thin 50 % /km	Knots of thread Knot, 200% ta/km	Fertility level, H	Relative tensile strength sN/tex	Elongation at the break by force applied to the sample
Quality indicators of spun yarn produced at the enterprise	15000 rpm	-	10.65	4.59	60	60	138	6.20	15.8	5.29
	16000 rpm	-	10,12	4.02	43	76	156	6.41	15.2	4.88
	17000 rpm	-	10.60	4.11	45	85	185	6.85	14.9	4.85
Quality indicators of spun yarn obtained by changing the grooves of the output cylinder	15000 rpm	80	10,19	4.26	47	38	120	6.28	15.9	5.93
	16000 rpm	80	10.74	4.09	95	75	108	6.14	15.9	6

	17000 rpm	80	10.75	3.89	90	90	133	6.13	15.5	5.8
Uster statistics 2023	5%	-	-	3.43	59	50	118	4.6	18.78	6.39
	25%	-	-	3.91	97	85	188	5.0		5.77
	50%	-	-	4.35	180	135	303	5.5	15.82	5.29
	75%	-	-	4.98	311	253	482	6.2		4.89
	95%	-	-	5.6	564	426	719	6.7	13.84	4.48

In an industrial ring spinning system, all fibres entering the zone of stretching pairs are parallel to the axis of the spun yarn being spun. In this new system, the width of the yarn starts to gradually decrease as the tension of the front rollers decreases, thus creating a reduction in the twisted triangle. In our research work, we compared the physical and mechanical properties of the spun yarn obtained by the enterprise method and the spun yarn obtained by changing the grooves of the output cylinders of the ring spinning machine with each other, based on the analysis of the spinning laboratory equipment manufactured by the Swiss company Uster. Determination was achieved.

During the research, the hairiness indicators of the spun yarns obtained on the ring spinning machine were compared with the Uster Statistics 2023 indicators, and the results obtained by changing the rifle grooves of the output cylinder were compared with the indicators of the enterprise and Uster Statistics. If the speed of the ring spinning machine is 15,000 rpm, the hairiness level of the spun yarns produced at the enterprise is 6.2 H, while the hairiness index of the spun yarn obtained without changing the speed and changing the rifle grooves to 80 is 6.28 H it was found out.

It was found that the hairiness level of the spun yarns produced at the speed of the ring spinning machine at 16000 rpm is 6.41 H, and the hairiness index of the spun yarns obtained by changing the riffle grooves to 80 is 6.14 H.

During the research, when the speed of the ring spinning machine reached 17,000 rpm, the hairiness index of the spun yarn produced at the enterprise was 6.85 H, and the hairiness index of the spun yarn obtained by changing the rifle grooves to 80 was 6.13 H, according to 75% of Uster Statistics was found to be correct.

Conclusions

Conclusion Based on the results obtained above, it was found that when the speed of the ring spinning machine is changed and the angle of the cylinder is changed to 80 degrees, the hairiness indicators of yarns are in a positive state.

References

1. Decree of the President of the Republic of Uzbekistan dated May 1, 2024 No. PF-71 "On measures to take the development of the textile and sewing-knitting industry to a new stage".
2. Decree of the President of the Republic of Uzbekistan dated September 2, 2023 No. PF-155 "On additional measures for financial support of the textile industry" PF- Decree No. 2.
3. Decree of the President of the Republic of Uzbekistan No. PF-2 dated January 10, 2023 "On measures to support the activities of cotton and textile clusters, radically reform the textile and garment and knitwear industry, and further increase the export potential of the sector."
4. Jumaniyazov Muxammadjon Baxromovich. (2024). Yigirish korxonalaridagi qaytimlar va chiqindilarni qayta ishlash texnologiyasini takomillashtirish» dissertatsiyasi, Toshkent.
5. Yusupov, A., Bobojanov, H., & Yusupov, S. (2024, March). The influence of the grooves of the grooved cylinder on the yarn quality in the ring spinning machine. In American Institute of Physics Conference Series (Vol. 3045, No. 1, p. 030015).
6. Yusupov, A., Bobojanov, H., & Yusupov, S. (2024, March). Investigation of the effect of densifier installed in the break draft zone of the ring-spinning machine on yarn quality. In AIP Conference Proceedings (Vol. 3045, No. 1). AIP Publishing.
7. A.A.Yusupov, S.A.Yusupov H, T, Bobojanov. (2023). The factors affecting the quality of yarn produced on ring-spinning machines. European Journal of Interdisciplinary Research and Development. 13.
8. Sharifhon Alihanov Alijon Yusupov, Husanhon Bobojanov. (2023). Influence of the Twisting Triangle on Yarn Quality in a Ring Spinning Machine**.** Eurasian Journal of Engineering and Technology. 17.