ACADEMICIA

ISSN: 2249-7137 Vol. 11, Issue 3, March 2021 Impact Factor: SJIF 2021 = 7.492

ACADEMICIA
An International Multidisciplinary Research Journal
(Double Blind Refereed & Peer Reviewed Journal)

DOI: 10.5958/2249-7137.2021.00600.5

ANALYSIS OF CHANGES IN THE PHYSICAL AND MECHANICAL PROPERTIES OF TWISTED YARNS AS A RESULT OF FINISHING

Yusupov Alijan Abdujabbar ugli*; Bobojanov Husankhon Tokhirovich; Yuldashev Jamshid Qambaraliyevich*****

*Researcher,
Department of Metrology Standardization and Quality Management,
Namangan Institute of Engineering and Technology,
Namangan, UZBEKISTAN
Email id: alijonyusupov533@gmail.com

**Associate Professor,
Department of Technology of Products of Textile Industry,
Namangan Institute of Engineering and Technology,
Namangan, UZBEKISTAN
Email id: husanbobojanov@gmail.com

***PhD Associate Professor,
Technical Sciences, Namangan Institute of Engineering and Technology,
Namangan, UZBEKISTAN
Email id: jamshid_yu_q@mail.ru

ABSTRACT

The article examines the effect of the finishing process on the physical and mechanical properties of twisted yarns based on practical research. The results of the applied research were analyzed, and graphs of correlation coefficients of variability in terms of unevenness, tensile strength and tensile strength of the obtained samples were constructed and analyzed. Based on the analysis, alternative options were recommended. The defining properties of yarn and threads in the standards include linearity, toughness, toughness, elongation, and flatness. The linear density of yarn yarns is determined by the text value, such as fibres. The thickness of the yarn is determined by the mass in grams of 1000 m yarn in the text system. The higher the numerical value of the text, the thicker the yarn.

KEYWORDS: *Spinning yarn, Annular spinning, Twisted, toughness, Unevenness, Tensile strength, Product quality, Spindle, Carda, linear density, Relative elongation, Relative elongation, Consistency.*

INTRODUCTION

One of the important tasks in the implementation of the program of measures for the further development of the textile industry is to increase the production capacity of finished products by spinning yarn. The finishing of spun yarns has a direct impact on their quality. This requires scientific research on them. The quality and durability of dyed and twisted yarns are inextricably linked with the mechanical, physical and chemical properties of the fibers that make them up, and their listed parameters must be proportional to each other. In turn, technical equipment is needed to measure, evaluate or test the performance of the product and the performance of the yarn [1-5]. The more reliable and perfect the tool, the clearer the results of the experiment. Measuring or testing instruments without the involvement of the subject, that is, striving to minimize externalities is an important aspect of development.

MATERIALS AND METHODS

The defining properties of yarn and threads in the standards include linearity, toughness, toughness, elongation, and flatness. The linear density of yarn yarns is determined by the text value, such as fibres. The thickness of the yarn is determined by the mass in grams of 1000 m yarn in the text system. The higher the numerical value of the text, the thicker the yarn. In studies, the process of dyeing yarn has been evaluated based on mechanical tests. To study the effect of the dyeing process on the yarn quality parameters, a two-and-a-half-pound bale wrapped in 25x2 tex yarns was selected for the sample and divided into four equal samples. Option 1 was painted black, Option 2 was painted pink, Option 3 was bleached, and Option 4 was taken as raw yarn [6-9]. The physical and mechanical properties of each sample were then studied. The properties of all yarns in the variant obtained for the experiment were checked against the standard requirements and the results were summarized in Table 1. The mechanical properties of the yarn change as a result of the finishing of the yarn.

TABLE 1. THE PROCESS OF FINISHING YARN AND MECHANICAL TESTING OF SUBSTANCES

№	T- The properties of the yarn	Untreated (raw) thread	Bleached thread	Yarn painted in black	Yarn painted in pink
1	Linear density of yarn, (tex)	25x2	25x2	25x2	25x2
2	Uster rope unevenness, Um (%)	8,57	9,27	8,6	9,25
3	Breaking force, sN	683,5	718,5	635	715
4	Coefficient of variation, (St)	10,82	11,7	10,87	11,65

5	Relative tensile strength, sN / tex	13,67	14,37	12,7	14,3
6	Coefficient of variation in relative tensile strength, CV%	5,52	6,58	4,55	7,04
7	Relative elongation at break,%	5,5	5,1	4,6	4,62
8	Coefficient of variation of relative elongation at break, CV%	6,09	6,03	4,81	6,59

The spinning industry consists of a complex of continuous technological processes, in which uncontrolled external and internal changes, in which there are several interrelated and conditional factors, directly affect the quality of the products being processed. As a result of the individual or joint influence of these factors, disturbances occur in the stability of the technological process, which leads to a sharp change in the quality indicators of the finished and finished products, that is, the appearance of unevenness. By making the unevenness simpler, it can be called the repetition of the creamy and thin areas along the length of the product. If the entire length of the spinning thread is analyzed by determining the linear density, the number of fibres, the ripeness and the number of twists in different incisions, transverse forties, it is possible to observe that these indicators are not the same in length. So it turns out that when these indicators go from one-fortieth to another, they change, depending on the structure of the thread and lead to unevenness. So, the concept of unevenness theoretically expresses how much the product properties (linear density, tensile strength, number of bends) differ from the average in quantity [7-10]. The spinning industry consists of a complex of continuous technological processes, in which uncontrolled external and internal changes, in which there are several interrelated and conditional factors, directly affect the quality of the products being processed.

As a result of the individual or joint influence of these factors, disturbances occur in the stability of the technological process, which leads to a sharp change in the quality indicators of the finished and finished products, that is, the appearance of unevenness. Twisting -consists of twisting the individual threads, forming a single plane of threads, to increase their ripeness and strengthen the twisting of the hem thread. Before twisting, the threads are plastered so that the surface turns out much smoother. In the preparation of the bobbin thread by adding three single threads, after the twine, the threads are twisted in reverse to the twine of the hem thread. When the bobbin thread is made of 6 single threads, it is first twisted by adding two threads, and then by adding three pairs of twisted threads, the hem is turned upside down to the twine of the thread. Then the twist of the bobbin thread will not loosen. Well, twisted and strengthened threads form rings when sewing (the machine throws thread) and often break off. The reel takes in itself the processes of finishing yarn, boiling, bleaching, dyeing, appretizing and glueing. To determine the unevenness of 25x2 woven yarns, we used four types (processed yarn, black yarn, pink yarn, raw yarn) relative to each other. The roughness graph of the rope was compared. Raw yarn roughness is 8.57%, bleached yarn is 9.27%, black yarn is 8.6%, pink yarn is 9.25%.

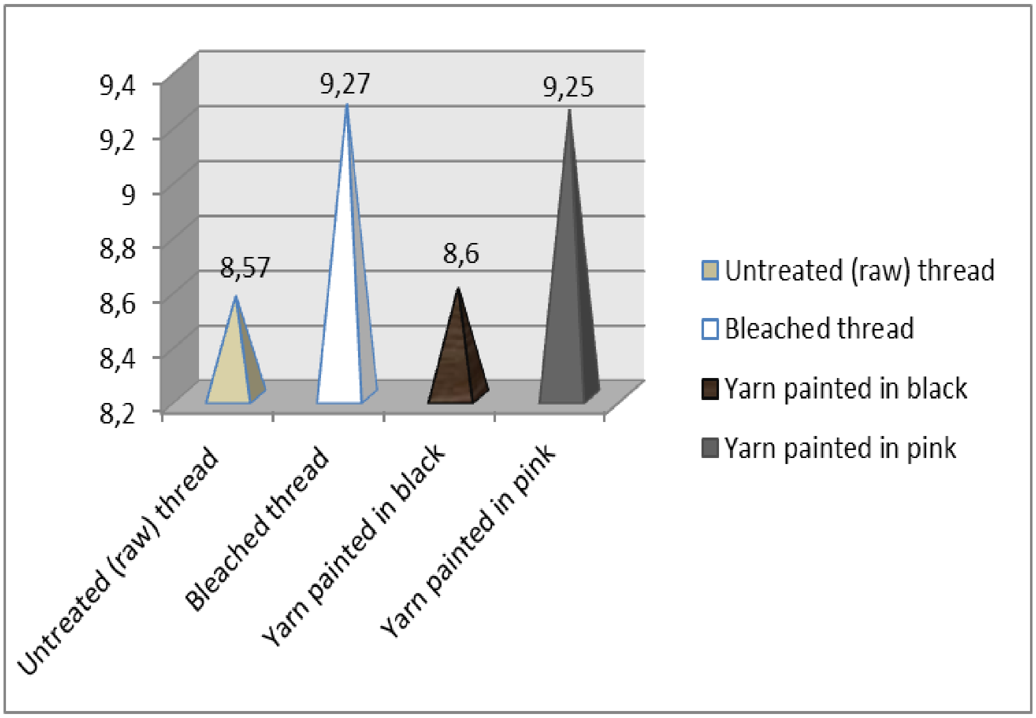

Figure 1. Unevenness graph of threads

The relative elongation at break of the 25x2 textured yarn obtained in the experiment after four different methods were also tested according to the Uster standard. The experiment found that the tensile strength of untreated yarn was 5.5%, bleached yarn 5.1%, black yarn 4.6%, and pink yarn 4.62%. The elongation at break was known to be superior to the rest of the quality of the untreated yarn. Black and pink dyes have a relatively low elongation at break. It was found that the elongation at break was 10% different from black and pink yarns. Experiments have shown that the relative elongation of untreated yarn is 16% higher than that of black and pink. This means that experiments have shown that dyeing yarns with chemicals reduce their elongation at relative elongation. The experimental yarns were treated in 4 different ways and their properties were compared. The properties of yarns processed by different dyeing methods of the same linear density (untreated yarn, bleached yarn, black dyed yarn, pink dyed yarn) differed from each other. According to the Uster standard, bleached yarn showed the best results in terms of relative toughness, although it was uneven. Experiments have shown that black yarn has a lower quality than pink yarn. It is advisable to take into account the different properties of yarns based on the time of exposure to chemicals in dyeing them. Because the black yarn is in the dye liquid for a long time, it was found that the quality indicators decreased compared to the remaining samples. Figure 2. Relative elongation at break. Figure 3. Breakdown power results diagram.

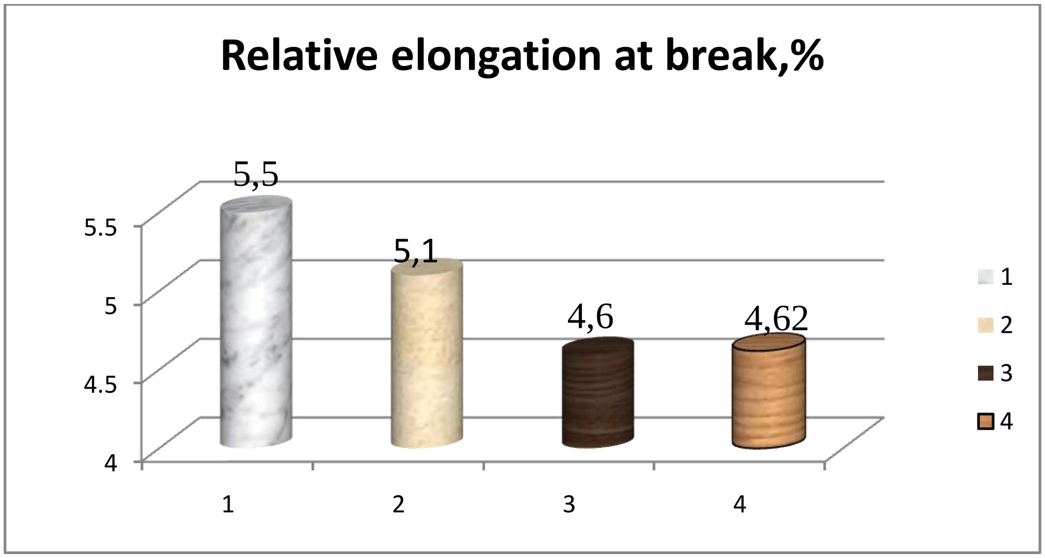

Figure 2. Relative tensile strength of yarns.

1 unprocessed raw yarn. 2 bleached yarn, 3- black thread, 4 pink coloured yarn

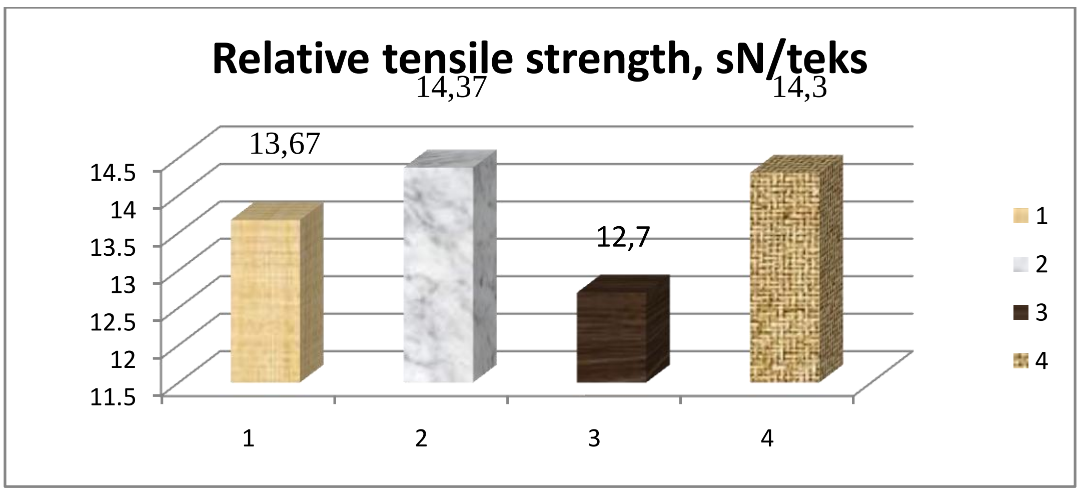

Figure 2. Relative tensile strength of yarns

1 unprocessed raw yarn. 2 bleached yarn, 3- black thread, 4 pink coloured yarn

It is also advisable to dye the fibres of different grades and their products with separate dyes for dyeing. The temperature and time of dyeing the fibres and yarns should be optimal. Theoretical and practical conclusions based on the research analyze the trends in the development of techniques and technologies of yarn production, enrichment of the domestic and foreign markets with competitive products by expanding the range of textile enterprises in Uzbekistan using local raw materials.

CONCLUSION

Based on the results of the experiments, the tensile strength, which is one of the main quality indicators of the yarn, is set at 683.5 sN for the raw (raw) yarn. As a result of bleaching these raw yarns, it was found that its tensile strength increased by 718.5 sN or 5%, its tensile strength decreased by 635 sN or 7% when given a black colour, and increased by 715 sN or 4.5% when given a pink colour. These results show that different dyes have different effects on the strength of the yarn during the dyeing process.

REFERENCES

1. Kosimov, A. A., Bakhriddinova, S. F. K., & Abdulazizov, S. A. O. (2020). Classification Of Terry Products Made Of Natural Fiber. *The American Journal of Engineering and Technology*, *2*(11), 133-141.
2. Atambayev, D. D. O. (2020). Analysis Of Fibrous Wastes Generated During Spinning Of Cotton Fiber In The Re-Spinning System. *The American Journal of Engineering and Technology*, *2*(09), 86-90.
3. Kosimov, A. A., Bakhriddinova, S. F. K., & Abdulazizov, S. A. O. (2020). Classification Of Terry Products Made Of Natural Fiber. *The American Journal of Engineering and Technology*, *2*(11), 133-141.
4. Atambaev, D. D., & Olimjonov, D. K. (2020). Production of arkok (enlama) hair wool fabrics on modern flexible fabric knitting machine in textile. *ACADEMICIA: An International Multidisciplinary Research Journal*, *10*(11), 2294-2299.
5. Bobojonov,H.T.; Yusupov,A.A.; Yuldashev,J.Q.; Sadikov, M.R.; (2020) Influence of deformation properties of yarn on the quality of knitted fabric. Test Engineering and Management. May-June 2020 Pages 29502-29513.
6. Kosimov, A. A., Bakhriddinova, S. F. K., & Abdulazizov, S. A. O. (2020). Classification Of Terry Products Made Of Natural Fiber. *The American Journal of Engineering and Technology*, *2*(11), 133-141.
7. Bobojanov, H. T., Jumaniyazov, J. Q., Gofurov, Q. G., & Gofurov, J. Q. (2019). The relationship between the properties of yarn and knitted. *Textile Journal of Uzbekistan*, *1*(1), 7.
8. Yuldashev, J. Q., & Bobojanov, H. T. (2020). Study Of The Influence Of The Parameters Of The Sampling Zone On The Condition Of The Capture Of Fibers By The Drum Teeth. *The American Journal of Engineering and Technology*, *2*(08), 75-78.
9. Sarimsakov, A. U., Ahmedov, B., & Abdullajanov, B. (2020). To Study Circling Of The Seed Roller At Ginning Process With Practical Method. *The American Journal of Engineering and Technology*, *2*(11), 142-148.
10. Sarimsakov, K. Artikova, R. Muradov. (2020). The effect of the speed of the seed roller on the efficiency of the gin machine // tadqiqot.uz, 4(3), 36-43. http://dx.doi.org/10.26739/2181-9696-2020-4-7
11. Yuldashev, J. Q., & Bobojanov, H. T. (2020). Study Of The Influence Of The Parameters Of The Sampling Zone On The Condition Of The Capture Of Fibers By The Drum Teeth. *The American Journal of Engineering and Technology*, *2*(08), 75-78.