

The Research on the Spinning Technology of Untwisted Core Ribbon Yarn

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Abstract: It is generally known that the Core-spun yarn produces within the rotor twist more and needs to be untwisted. Based on this point, principle & spinning technology by using small needle loom is introduced in this paper. Meanwhile, the number of crochet needle and the arrangement of its configuration are analyzed to discuss the effect on yarn. Besides, the author also attempts to discuss the feasibility of producing the untwisted core yarn and did some experiment to confirm it from the point of twist. The objective of the research reported in this note was to reduce the production of processes and its cost. Increase the added value of finished products while improving the quality of yarn.

Keywords: In rotary; untwist; Core-spun yarn; spinning technology

1. Introduction

In recent years, With the escalation of the textile industry, fancy yarn, with its changing structure, distinctive appearance effects, rich color and striking three-dimensional, has a pivotal position in the yarn and fancy yarn fabric. And it was favored by the vast number of professionals and consumers. From the 1980s, fancy yarn has gradually developed into another fashion element on the domestic and international textile market. Varieties with fancy yarn, covering almost all of the textile industry, and has been widely used in fashion fabrics, textile fabrics, knitted garments, hats, scarves and decorative materials.

Due to its rough mad style, soft, plump, good drape, high value-added features, The experiment proceeds Core ribbon yarn which are designed for the production of carpets and curtains. The number of crochet needle and the arrangement of its configuration are analyzed to discuss the effect on yarn. Besides, the author also attempts to discuss the feasibility of producing the untwisted core yarn and did some experiment to confirmed it from the point of twist. The objective of the research reported in this note was to reduce the production of processes and its cost. increase the added value of finished products while improving the quality of yarn.

2 Experimental

2.1 Laboratory equipment

The test machine used in this experiment is a small prototype of fancy yarns which was provided by Suzhou Hua Fei Textile Technology Co., Ltd.. Machine inverter was configured in the head of its nose section to regulate the speed and winding speed^[1]. A side of the head is hollow spindle, The hollow spindle principle of spinning was first developed by George Mitov at the Institute of

Clothing and Textiles in Bulgaria^[2]. the other side is a small needle, which contains two types one is within the rotor, and the other for the outer rotor. Typically, the inner rotor was used to process eyelash yarn, ribbon yarn as well. external rotation type generally used for processing ribbon yarn. While with the side of the hollow spindle can produce ring yarn, knot yarn wave lines and so on.

2.2 Spinning Principle

Core yarn through the yarn guide directly into the cavity of the needle cylinder, Sheath, which are clasped by the hook, are woven into a tubular leather strap wrapped around the core yarn. When the needles turn at the right time, the cam inside the shell makes the needle move up and down. When the needle reached its highest point, The original form of the coil slip below the needle latch, Then the needle began to decline and hook the sheath. When the needle below the needle cylinder rotary gate due to its turn. The old coil which below the needle, seals the needle hook then off the needle, At the same time to form a new Coil. With the continuous rotation, the tape was manufactured. The finished tape produce a twist when the needle cylinder round every circle. So the yarn produced by Rotary need untwisting. The working principle of the internal circulation type small syringe shown in Figure 1:

2.3 product

In this study, The syringe we have used with its 12 pin slots, The innovation in this experiment lies in that we used the combination of crochet and straight pin configuration. Thus breaking the spinning tradition that use crochet to product merely. Fundamentally improving the spinning speed and the fluffy of the yarn.

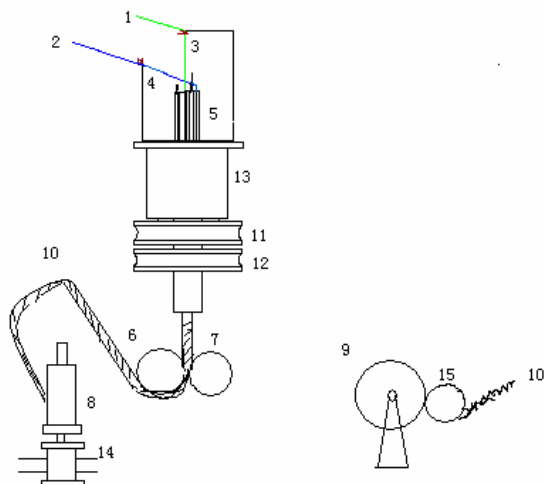


Figure 1 .Internal circulation type small syringe band loom

1.corn yarn 2.sheath 3,4,10-Thread-guides
5.Syringes 6.nip roll 7.output roller 8.bobbin
9.Yarn cheese roll 11.Case back to the wheel
12.Syringes back to the wheel 13.shell 14.ring
15.Grooved drum

- ①、②..... the straight needle; 1、2.....the crochets;
- speed adjustment range of the host 0~255;
- Core yarn used:Wool Roving
- sliver weight: 0.48g/m;
- sheath: 100% black polyester filament
- fineness: 8.3tex;
- Breaking strength greater than 5.5CN/tex
- elongation at break Less than 14%;
- Twist: 80; Twisted way: z twist
- host speed: 80;
- speed of the roller and spindle:26r/min

Table 1: the spinning parameters of the yarn

The number of crochets	the configuration of the crochets	the effect on yarn
One		
Two		

Three		
Four		

By comparison, for the use of wool fiber to do the core yarn, Core ribbon yarn which is produced by only one hook, the polyester yarn and tops staggered order, soft, and possess good elasticity; hygroscopicity as well as Spinnability. Core ribbon yarn which is produced by six hook, the yarn wrapped tightly and touched with hard-soft. In addition, as the use of polyester filament, the yarn own bright color , high strength, excellent abrasion performance and good flexibility.

2.4 Possibility of untwisted yarn production

There are so many influence factors of the tape yarn twist, such as pre-tension, core yarn false twist, etc ^[3].but the mainly factor to influence the final twist are Core yarn twist and the tape twist, Among them, the tape yarns are produced by the paper yarn. First Paper yarn twist is change within a certain range. Because the leather yarn twist is equal to the yarn needle tape speed divided by the output speed, (n/va) In order to wove normally, the output speed of tape yarn can not be less than the minimum normal weaving speed, Therefore, in order to get the final untwisted yarn in this trial, core yarn twist can be changed to reach the balance between the paper twist and the corn yarn twist. Such as Figure 2

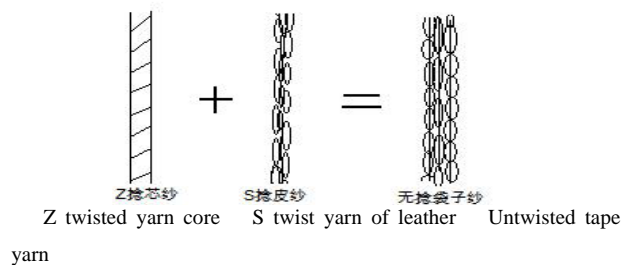


Figure 2. twist balance of tape yarn

2.5 Spinning Experiments of Core ribbon untwisted yarn

Test method: Frequency in a certain ratio of main and auxiliary mainframe ,Change the speed of the host, and spun untwisted corn ribbon yarn. Experimental data shown in Table 2

Table 2.Experimental data

Core yarn twist	40	50	60	80	90	100
high degree of false twist device(cm)	2.2	2.2	2.2	2.2	2.2	2.2
Speed of the host	236	198	146	95	88	22

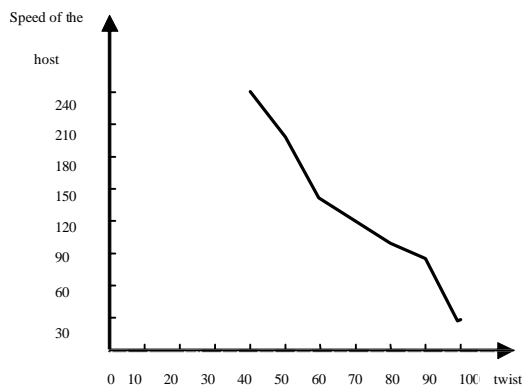


Figure 3.Velocity distribution of the host when different twisted core yarn to twist equilibrium

Though the experiment we can see that in the process of yarn spinning system as long as we pay attention to the pre tension, core yarn false twist, yarn twist of core yarn and the paper yarn, moreover, we should pay close attention to speed of the host , then untwisted core ribbon spun yarn can be carried out.

Through experiments We can see that using 40-100 twist untwisted wool roving to produce untwisted core tape yarn, the required speed of the host is less and less.

3 Experimental conclusion

Through the above test,we can sum up that in the same conditions.(Such as the core yarn fineness of the same, Speed of the host are the same):

One: The more the number of the crochet, the more closely woven tape is. and the more rigid feel of the yarn, However, the coated core yarn for the degree is much better;

Two: The more stitches, the more thick core yarn, the slower of the spinning speed; This is mainly because the more the syringe needle in a circle and the more time required, so the spinning speed is more slowly;

Three: External rotor spun yarns little twist, and the rotary spinning yarn twist larger, Generally requires untwisting;

Four: In the test, we used the idea that use a straight needle substitute for a crochet one.It breaks the traditional spinning ideas and improves the spinning speed, spinning out of the soft, plump scallops yarns;

Five: Considering the pretension, core yarn false twist, twist direction, host factors such as spinning speed et al. Untwisted yarn can be spun successfully

4 Outlook

It seems clear that textile markets, like other markets, will be dominated in the coming decades by a combination of factors. These will include an increasing demand for customer choice, and an increasingly rapid technical and technological advance. So we cannot expect that the modern fashion customer will happily revert for long to Core-spun yarns and their fabrics , like Carpets and curtains. Therefore, we must try our best to take measures to meet the demand. On the one hand, new techniques should be employed in making yarns and products. On the other, we can use scraps of wool and some fee fibers to spun into roving which used as corn yarn. This can greatly enhance the value-added products and products in the same competition on the market.We can also take fiber composite or laminated manner to make the products with outstanding sound-absorbing, flame retardant and other features. they will noticeably enhance the aesthetic effect of a fabric in which they are used.

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