The American Journal of Engineering and Technology
(ISSN – 2689-0984)
Published: November 30, 2020 | **Pages:** 166-173
Doi: https://doi.org/10.37547/tajet/Volume02Issue11-26

IMPACT FACTOR
2020: 5. 32
OCLC - 1121105677

New Range Of Raw Silk Twisted Threads

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ABSTRACT

The article gives linear densities, quantity and direction of twisting, as well as production characteristics of new twisted threads from raw silk. Elastic and plastic indicators, relative breaking loads, breaking elongation of twisted threads obtained from 2,33 and 3,23 tex of raw silk giving 700-800 tw/m from cocoons of the Uzbekistan-5 and China hybrid are given. The principle of operation and technological parameters of the machine for the production of twisted yarn are fully described. The analysis of foreign literature on the subject is studied. A rational twisting interval for weaving fabrics has been determined. A patent has been obtained for the invention of a new yarn assortment production method.

KEYWORDS

Raw silk, emulsion, gluing, twist, twisted thread, deformation.

INTRODUCTION

Despite the dominant role of the raw material base, until recently its various branches of silk processing developed unevenly and are at different levels in technology, the state of the material base, the level of development of science and technology.

Twisting products from continuous threads are produced in special twisting factories, in

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twisting shops of silk factories and textile manufacturing enterprises that produce chemical fibers and threads. The assortment of twisted products is very diverse. Along with twisted yarns used in weaving and knitting, they produce a variety of twisted products for consumer and technical purposes.

This paper presents the urgency of the problem, the sequence of technological processes for the production of twisted silk threads from raw silk for the production of medical gauze. To fold several threads, and give them a twist, first the raw silk is rewound onto a spool. Before rewinding, the hanks are checked for gluing, in our case, low gluing was determined, therefore, in order to soften the glued places, the threads are treated with an emulsion by sprinkling. After that, the raw silk is kept in the break room and rewound onto a two flanged reel on the new MT-85 Japanese system.

The principle of operation and technological sequence of drawings are given. Twisting is carried out by folding 3 strands of raw silk 3,23 tex gives a left twist S 550 tw/m and adding 2 strands of raw silk 4,65 tex with a left twist S 450 tw/m. The twisting process was carried out on a TK-2 twisting machine. The process of fixing the twist of the finished twisted yarns was performed on the Japanese equipment SC-750. According to the results of the study, the qualitative indicators of twisted threads are given: linear density, coefficient of variation in linear density, breaking load, breaking elongation, direction and amount of twist and coefficients of variation in twist [1, 2].

The paper provides, the properties of the twisted thread, substantiated by the compiled geometric model and data analysis. A high correlation of linear density with the number of twists of the thread and the possibility of expanding raw materials for a new range of crepe silk fabrics has been proven. The tabular material contains theoretical and experimentally substantiated formulas for the linear density of the threads, the coefficient of twist, twist and the number of twists per meter. The necessity of preparation of raw materials with ideal uniformity of the linear density of the threads, especially for dyed silk fabrics, has been substantiated [3].

RESULTS AND DISCUSSIONS

In order to make clothes for men and women from natural silk, yarns with the effect of spinning from raw silk made of Ariak cocoon are made and dyed with light-colored dye. The yarns were given 500, 1000, 1500, 2000 tw/m per meter and dyed with weak acid dyes, and the strength of silk fabrics was achieved by increasing the number of twists [4]. Raw silks are woven from double cocoons to create new embellishments on the body threads. The article describes the properties of spun yarns obtained by bottom-up and top-down weaving methods [5]. The article provides information on the silk cluster in the Karnataka region of India and the spinning machines used in silk processing in Ramanagaram [6].

Expansion of the range of fabrics depends on the composition of raw materials, combining which in percentage terms you can diversify fabrics from natural silk, using raw silk of different linear density by adding them and giving them a twist of varying degrees: low from 150-300 tw/m, gently sloping from 400-900 tw/m and high 1000-3200 tw/m.

We have developed a new method for producing twisted yarn using a three-stage technology (patent UZ No. IAP05253) [7, 8].

In order to create a method for producing twisted threads from raw silk, which provides a technical result, with significantly improved breaking characteristics and an increased share of elastic components of deformation, allowing them to be used as raw materials for the production of silk fabrics with non-crease properties, first, two threads of raw silk are

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folded and twisting 800cr/m in the left direction, then folding these two threads and twisting up to 750 tw/m in the right direction and for the third time adding the last two threads and twisting up to 700 tw/m in the left direction, using raw silk linear density 2,33 or 3,23 tex.

If a twist of less than 700 tw/m is used for the production of a complex thread, then a non-increased proportion of elastic components of deformation is achieved, and when they are used in tissues, the effect of high crease resistance is not obtained.

If the twist above 800 tw/m is used to produce a complex yarn, then the rigidity of the yarn increases, which increases the unwinding of the strands and the breakage of the weft, shuttle yarn in weaving.

Only if the specified parameters are observed, a twisted thread is obtained, with a high elastic component of deformation, which, when used as raw material, ensures high crease resistance of the fabric.

The method of production and the characteristics of threads with an increased proportion of elastic components of deformation are given in Table 1. [9]

Table 1.

Method of production and characteristics of threads

The name of the threads and methods of production	Linear density, tex	Relative breaking load, cN / tex	Breaking elongation,%	Deformation components, %		
				elastic	elastic	plastic
raw silk Uzbekistan-5	2,33	36,8	18,5	34	33	33
raw silk Chinese	3,23	37,9	18,7	34,1	32,9	33
Twisted 2,33 x 2S 800 x 2Z 750	9,34	39,8	19,9	46,7	30,5	22,8
3,23 x 2S 800 x 2Z 750	12,96	41,8	21,2	49,2	29,6	21,2
Twisted 9,34 x 2S 700	18 ± 0,9	42,8	22,7	51,9	28,7	19,4
12,96 x 2S 700	26 ± 0,8	45,3	23,2	55,0	28,0	17,0

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The specified twisted yarns can be produced on modern reed-twisting machines installed in twisting shops of silk-processing enterprises. (Fig. 1.)

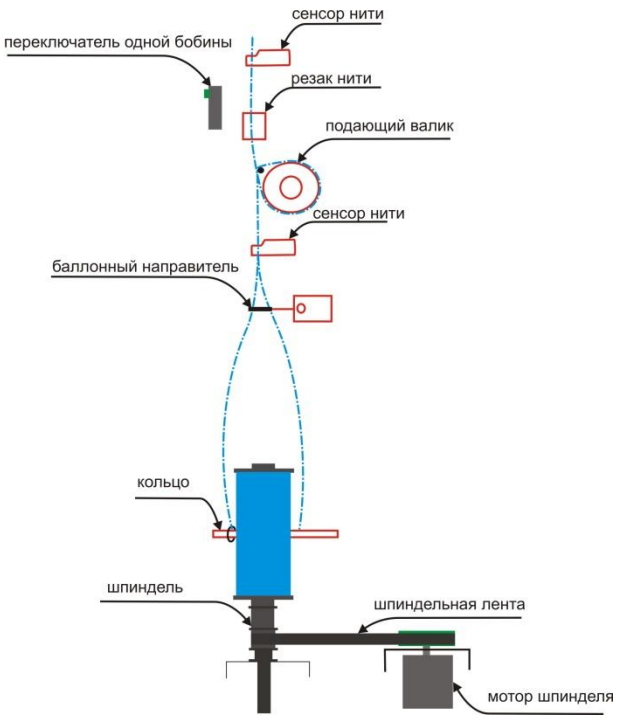

Figure: 1. Technological diagram of a modern cane twisting machine MTCW-D / T

The main parameters of the machine:

1. An interactive condition is available on the display screen ";
2. The feed shaft runs on a servo motor to enable the setting of the yarn speed up to 100 m / min.
3. One spindle is driven by a separate motor for the output coil, and the inverter control system makes it possible to install an addition to the simultaneous start / stop of all coils, it is possible to stop and restart each coil.
4. All bobbins are equipped with thread sensors, and the thread cutter is triggered when the thread breaks, and also stops the drive of the defective output bobbin, thus saving energy consumption.

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Table 2.

Parameters of MTCW-D / T cane twisting machine

Spindle height	255 mm
Winding drum	85 x 40 x L185
Thread speed	Max 100 m / min (with servo motor control)
Spindle speed	Max. 9000 rpm (with inverter control)
Feed motor	0,5 kW
Hydraulic motor	0,75 kW
Spindle motor	0,09 kW/ conical bobbin
Ring diameter	95 mm
Feeding devices	Nelson's mechanical shaft
Ring traverse installation	Hydraulic drive
Filament sensor	Photocell switch and contact switch
Thread cutter	Thread end attachment type
Thread spool frame	Built-in frame of reels 8 lek
Number of twisted threads	8 strands maximum
Number of output coils	40 pieces

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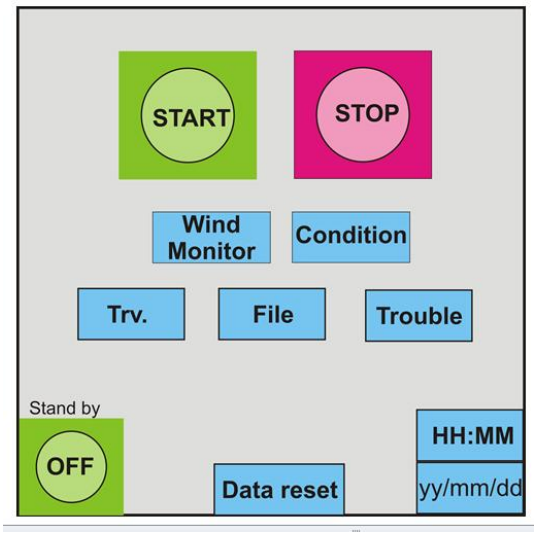

When the power is turned on, the following startup display appears on the screen.

- Launch display

You can use this display to start and stop the machine by selecting menu items.

- Winding monitor

This monitor shows length, process time, etc. while the machine is running.

- Terms

You can select this control to set the thread winding conditions by specifying such conditions by recording and displaying file data

This control is used to change the ascent speed. Moreover, it is heavily used for the enhanced movement of the crosshead in manual control mode.

- File

This control is used to display the currently recorded file data in table form.

- Malfunction

This control indicates the nature of any malfunction and its background.

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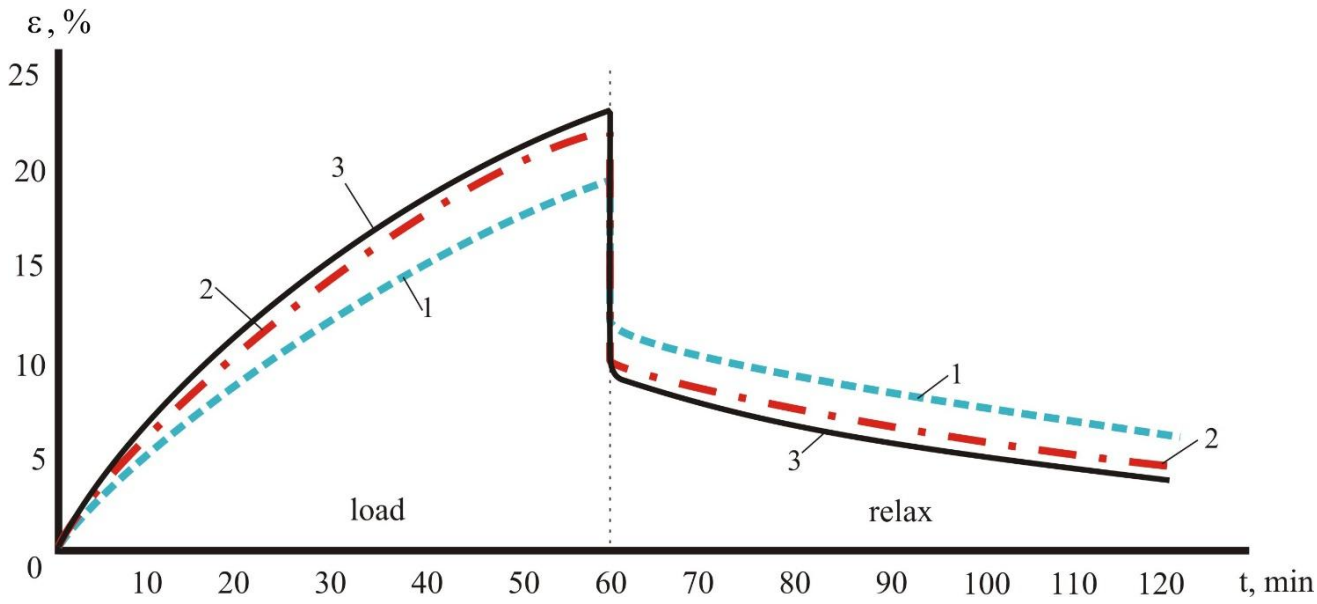

Figure: 4.2. Deformation curve of silk threads

during loading and rest

1-raw silk 2.33 and 3.23 tex; 2-twisted thread 18 tex; 3-twisted thread 26 tex;

As seen from Fig. 2. and tab. 1 for raw silk (2,33 and 3,23 tex) the components of deformation: elastic, elastic and plastic are almost equivalent. Due to re-folding and twisting, the elastic-elastic deformation accounts for about 80% of the total elongation. This factor gave us the opportunity to develop a fabric with high crease-resistant characteristics.

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