

THE IMPACT OF VARIOUS DEFECTS IN DETERMINING IP QUALITY

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Abstract

This article analyzes the impact of various types of defects on yarns. The formation of thickened yarns due to sliver breakage in natural and synthetic fibers is discussed. Such defects mainly result from improper reconnection of the sliver after it breaks. The study investigates the causes of these breakages and evaluates preventive measures aimed at reducing their occurrence. The results provide insights into improving yarn quality by minimizing sliver breakage through optimized mechanical adjustments and process control.

Keywords: defects, luminosity, capacity, mass, unevenness, motor, air pressure, mechanism.

Introduction

Currently, Saurer Czech and Saurer Group, in cooperation with other companies, produce many models of pneumatic spinning machines under the BD brand. One group of these machines is manufactured under the BD 300 model (models BD 310, BD 320, BD 321 and BD 330). These machines are designed for spinning yarn on cotton fiber.

In order to improve the quality of yarn, facilitate maintenance and increase the economic efficiency of production, the following mechanisms are installed in the machines:

- "third arm" - a mechanism for removing bobbins filled with yarn, installing an empty bobbin and providing a spare winding of yarn on its right side;
- a connecting lever or semi-automatic connecting mechanism to facilitate the connection of the yarn in case of its breakage;
- control device – serves to display the set and actual parameters of the machine, to set, perform technological calculations, control the spinning start process, and monitor the operation of the machine. On the display in the control mechanism, all

indicators are displayed in the prescribed order or reset. It is possible to select the necessary language for communication (English, German, French, Russian, etc.);

- device for starting the spinning process;
- lights indicating yarn breakage;
- pulleys, belts for changing speeds in the transmission section;
- information gathering system (in some machines);
- air pressure change warning lights (in some machines);
- additional engine for adjusting the speed of rotation of the camera (in some machines);
- automatic air pressure adjustment device (in some machines).

The machine does not differ much from previous machines in terms of its technological structure. In it, the principle of operation of the processes of wick supply, discretization, transmission and yarn formation, yarn winding is implemented in the same way as in previous machines. However, due to the use of new technical solutions in the mechanisms and devices that perform these processes, their parts, transmission of motion to the machine and its control, the quality of the yarn is improved, the size of the productivity increases, and economic efficiency increases. This is a very important result.

Thickened threads are formed as a result of a broken cocoon, with its end becoming entangled with another cocoon. The main defects found in raw silk are various, and include: short thickened areas, longer densely packed areas, protruding and displaced silk ends on the surface of the thread, and the spiraling of one or more threads around the middle threads when the cocoon threads are stretched differently.

In addition, defects also affect the weaving process. That is, yarn thickening is the presence of warp or weft threads in the fabric with a linear density higher than the linear density of the main fabric. Local thickening is the thickening of warp or weft threads in short sections. Separated yarn - defects such as warp or weft threads that differ in tension, twist, color or cross-section from neighboring threads also affect the weaving process.

The following defects occur in artificial yarns: uneven or insufficient spinning of viscose yarns (occurs when the yarns are formed in excessively acidic pickling baths), different coloration of the yarns (occurs when the spinning solution is not homogeneous and is dirty), hairiness of the yarns - the ends of broken and isolated yarns protruding from the surface of the yarn (occurs when the spinning solution is

not well cleaned of air bubbles and the solution is not very viscous), twist - wavy twisting of the yarns in the short section.

The appearance of cotton yarn is checked according to the GOST 15818-80 standard; short-section unevenness, knots (thinning, thickening); visible to the eye, parts of the seed, leaves, bark fibers, fragments of cobs, various external defects, etc. They are divided into classes A, B, V. Unevenness means that the yarn and threads are not uniform in thickness, curling, curling and elongation. To determine unevenness, the yarn is compared with a standard (sample) stored in the laboratory, and the indicators are measured several times in appropriate instruments and put into appropriate formulas, and the unevenness is calculated as a percentage. Yarns made of chemical fibers and staple fibers are more uniform in terms of their properties than complex yarns made of natural fibers and natural silk.

At least 10 tubular yarns are selected to determine the class of spun yarns.

The entire product unit is wound on a screen winding device with a gap of 1.5 mm on a black board up to a length of 100 m, and the yarn class for each side is determined by comparing it with the reference indicators. The winding of the spun yarns on the board is carried out evenly. To easily calculate the defects in the spun yarns, a black cardboard template is placed on the wound yarn. This template is divided into 10 rectangles. The height of each rectangle is 20 mm, and the width is designed to view 25 wound yarns. The sum of the defects of the yarn 5 m long on one side and 5 m long on the other is calculated and compared with the table to determine the yarn class.

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Figure 1. Illustration of the NOC device for determining the purity of yarn.

A cardboard template is placed on the board on which the yarn is wound. This template has 10 rectangular holes. The length of the yarn inside the rectangle is 5 m. The defects on the yarn inside the rectangle are counted from both sides of the template. Based on the result obtained, the number of defects per 1 g of yarn is determined by the following formula.

$$n_1 = \frac{10^3 * n}{T * L}$$

where: T-yarn linear density, tyex; n-number of defects in 10 m of yarn; L=10 m.

Recently, a number of methods and equipment designs have been created to control product defects in the spinning industry. Currently, visual, gravimetric, mechanical, capacitive, photoelectric and other types of measuring methods are widely used for these purposes.



The methods and devices of the company "Sylveger" (Switzerland) for detecting defects in spun yarns occupy one of the highest places. One of the most common devices for detecting defects in spun yarns during the spinning process is the "Uster-Tester". The following characteristics are obtained on the device: the most common defects in 1 km of spun yarn - thinning (-20, -40, -50, -80 %); thickened (+35, +50, +70, +100%), knots (+140, +200, +280, +400%). The equipment has high performance and diagnoses the condition of equipment in the technological process.

Another device for determining the purity of yarns is the AOPN-5 photocell type. In the photocell type, defects are detected based on the passage of light between various types of photocells (vacuum, phototriode, photoamplifier, etc.) and a light source. For example, defects in the device are divided into: large thickening, yarns with a diameter of 1.5, thickening, yarns with a diameter of more than 1.5 and a length of more than 10 cm; very thickening, yarns with a diameter of more than 2; thinning, yarns with a diameter of less than 0.6 and a length of more than 10 cm. In addition, devices with capacitive sensors are also used to determine and control the purity of yarns. The test yarns are passed through a plate capacitor, then its resistance changes. The resistance of the capacitor is inversely proportional to its capacitance, and the greater the mass of the yarn, the smaller it is.

Conclusion: In conclusion, the increase in irregularities as a result of yarn breakage causes defects in yarn. Yarn irregularities affect the quality of yarn. Therefore, improving the equipment for detecting yarn irregularities and cleanliness and using devices designed with sensors and photocells will detect defects and improve the quality of yarn.

References

1. Pelos, T. P. (2010). *Spinning technology and equipment*. [Textbook].
2. G'aniyev, T. A. (1995). *Occupational safety in the textile industry*. Uzbekistan.
3. Hasanov, B. K., & Sodiqova, N. R. (2004). *Theory and technology of preparing yarns for weaving*. Uzbekistan.
4. Mahmudova, G., Siddiqov, A., Karimov, A., & Sarimsaqov, O. (2021). Study of the movement of cotton particles and heavy impurities in the working chamber of a pneumatic cleaner. *UNIVERSUM: Technical Sciences*, February 2021. <https://7universum.com>



5. Mahmudova, G., & Toshmirzayev, Q. (2021). About automation of loading and unloading of cotton raw materials at cotton factory stations. *Academicia: An International Multidisciplinary Research Journal*, October 2021. <https://saarj.com>
6. Mahmudova, G., Yo‘ldashev, X., & Qurbanov, D. (2021). Investigation of foreign lint cleaning system technologies. *PEDAGOGLAR Journal*, December 2021. www.pedagoglar.uz
7. Ubaydullaev, M. M., & Mahmudova, G. O. (2022). Defoliation – high yield. *Journal of Advanced Research and Stability*, May 2022. www.sciencebox.uz
8. Ubaydullaev, M. M., & Mahmudova, G. O. (2022). Medium fiber S-8290 and S-6775 cotton agrotechnics of sowing varieties. *European International Journal of Multidisciplinary Research and Management Studies*, May 2022. <https://eipublication.com/index.php/eijmrms/article/view/163>
9. Babaeva, M. N., Islomova, G. O., Karimov, N. M., & Sarimsaqov, O. Sh. (2020). Theoretical study of air density and speed changes in cotton pneumatic transport pipelines. *FarPI Scientific-Technical Journal*, May 2020. ISSN 2181-7200.
10. Maxmudova, G. O. (2022). Analysis of automation in the cotton raw material reception system at cotton factories. *Journal of Science and Technological Development*, Bukhara, No. 6/2022. ISSN 2181-8193. <https://journal.bmti.uz/>
11. Maxmudova, G. O. (2022). Analysis of the dynamics of moving cotton in pipes. *European Journal of Emerging Technology and Discoveries*, JIF 8.925. ISSN (E) 2938-3617. <https://europeanscience.org/index.php/1/article/view/95>
12. Turg‘unov, D. U., & Maxmudova, G. O. (2023). Analysis of the dynamic model of seed movement in cotton seed transportation. *FarPI Scientific-Technical Journal*, No. 2, 2023. ISSN 2181-7200.
13. Turg‘unov, D. U., & Maxmudova, G. O. (2023). Analysis of spinnability indicators of new working body designs for cotton separators. *FarPI Scientific-Technical Journal*, No. 6, 2023. ISSN 2181-7200.
14. Maxmudova, G. O. (2023). Development of aerodynamic cotton seed transportation process. *FarPI Scientific-Technical Journal*, No. 8, 2023. ISSN 2181-7200.