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INFLUENCE OF THE LOAD VALUE ON THE TOP ROLLERS OF THE DRAFTING SYSTEM OF THE RING SPINNING MACHINE ON THE YARN QUALITY

ВЛИЯНИЕ ЗНАЧЕНИЯ НАГРУЗКИ НА ВАЛИКИ ВЫТЯЖНОГО ПРИБОРА КОЛЬЦЕПРЯДИЛЬНОЙ МАШИНЫ НА КАЧЕСТВО ПРЯЖИ

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ABSTRACT

LOAD, YARN, GRADE, DRAFTING SYSTEM, TOP ROLLERS

The experimental work was carried out in the laboratory of the department "Technology of spinning". Samples of yarn were produced on a ring spinning machine with pressures of 98 N, 127 N and 156 N, with the subsequent determination of the physicomechanical properties of the yarn on modern measuring instruments. The recommended values of the load on the top rollers of the drafting system were determined.

АННОТАЦИЯ

НАГРУЗКА, ПРЯЖА, СОРТ, ВЫТЯЖНОЙ ПРИБОР, НАЖИМНЫЕ ВАЛИКИ

Экспериментальные работы проводились в учебной лаборатории кафедры «Технология шёлка и прядения». Образцы пряжи были выработаны на кольцепрядильной машине при нагрузках 98 Н, 127 Н и 156 Н, с последующим определением физико-механических свойств пряжи на современных измерительных приборах. Были рекомендованы оптимальные значения нагрузки на валики вытяжного прибора.

Currently, the spinning mills of the Republic of Uzbekistan are equipped with high-speed, high-performance ring spinning machines of well-known foreign companies.

Spinning machines and processes carried out on them are quite complicated. To produce high-quality products on these machines and increase their productivity, it is necessary to deeply study and analyze the physical nature of the processes carried out on them, determine the optimal performance of technological processes.

In the process of yarn production, the main attention should be paid to spinning transitions, and it is also necessary to know well the dependencies between the properties of yarn.

For example, fiber thickness is important during spinning. The property of the yarn produced depends on the thickness of the fiber. Fine, uniform and durable yarn can be made from fine fiber.

From thin yarn produce thin, lightweight fabrics, knitted fabrics. The finer the fiber is, the more fibers in the cross section of the yarn are at the same thickness. Moreover, in the structure of the yarn, the contact area of the fibers with each other increases, which leads to an increase in the friction force, as a result, the strength of the yarn increases. The relative strength of the yarn produced from thick fiber is small. This indicator is sufficiently tangible for thin yarn.

To obtain the required quality during the spinning process of the yarn, a certain amount of fibers should be placed in the cross section of the yarn. When yarn is produced with a minimum linear density, the linear density of the fiber becomes critical. From this it follows that in the cross section of the yarn of the minimum thickness, the minimum number of fibers is variable. In addition, there are also negative aspects to very fine fibers. Such fibers during spinning are the cause of tangling, the formation of neps, as a result, the appearance and quality indicators of yarn are deteriorated.

Along with this, the unevenness of the yarn in thickness is considered the main indicator of quality. Due to unevenness in products, a defect such as banding appears and the appearance worsens. The greater the unevenness of the yarn in linear density, the lower the coefficient of use of the strength of the fibers in the yarn, and in complex yarns – the strength of single yarns, as a result, the mechanical properties of the yarn deteriorate, the number of breaks in weaving and when rewinding the yarn increase.

In a market economy, experimental studies have been conducted to produce high-quality yarn at spinning mills. For this purpose, yarn samples were worked out on a ring spinning machine at various loads on the pressure rollers of the exhaust device 98 N, 127 N and 156 N and their physical and mechanical properties were determined.

The results are shown in Figures 1-3.

Comparing the obtained results with respect to the yarn performance at a load on the pressure rollers of the drafting system of 98 N, the yarn produced at a load of 127 N, the quadratic unevenness in linear density decreased 7.7 %, the quadratic unevenness in twist - 2.1 %, the strength decreased by 21.6 % , the quadratic unevenness in strength increased by 38.1 %, the elongation at break increased by 6.1 % ha, the quadratic unevenness in elongation at break increased by 6.9 %, for yarn produced at a load of 156 N, the quadratic unevenness in linear plane hardening increased by 20.0 %, the quadratic unevenness in twist did not change, the strength decreased by 12.2 %, the quadratic unevenness in strength increased by 33.5 %, the elongation at break increased by 15.6 % ha, the quadratic unevenness in elongation at the break increased by 31.7 %. From this it follows that with an increase in the load on the drafting

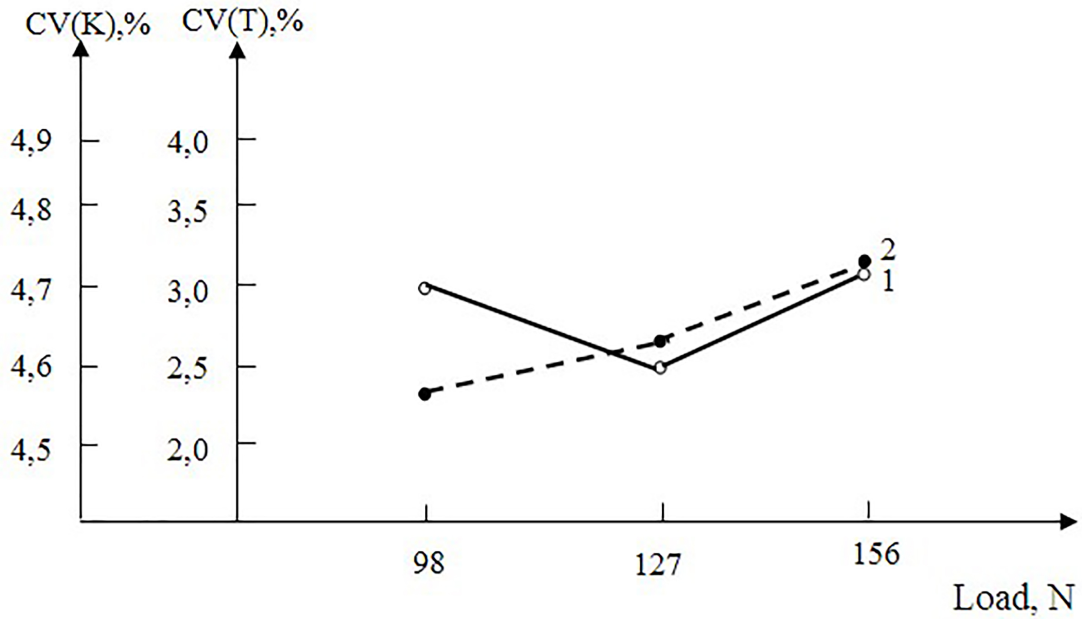

Figure 1 – The influence of the load of the drafting system on the quadratic unevenness of the yarn in linear density and twist (1- quadratic unevenness in twist of yarn; 2- the quadratic unevenness of the yarn in linear density)

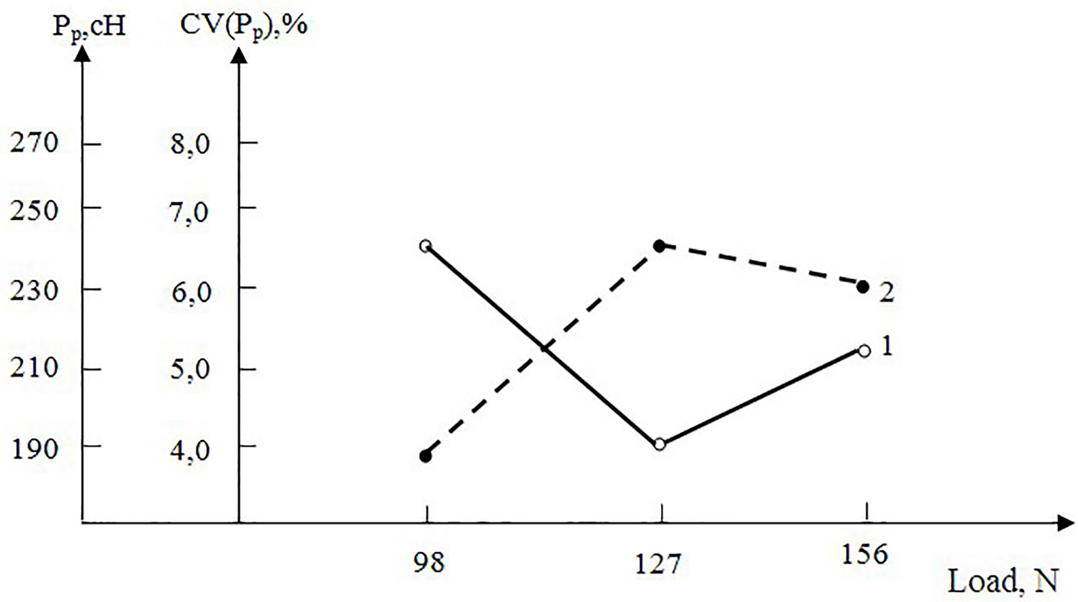

Figure 2 – The influence of the load of the drafting system on the strength of the yarn and the quadratic unevenness in strength; (1- strength; 2- quadratic unevenness in strength)

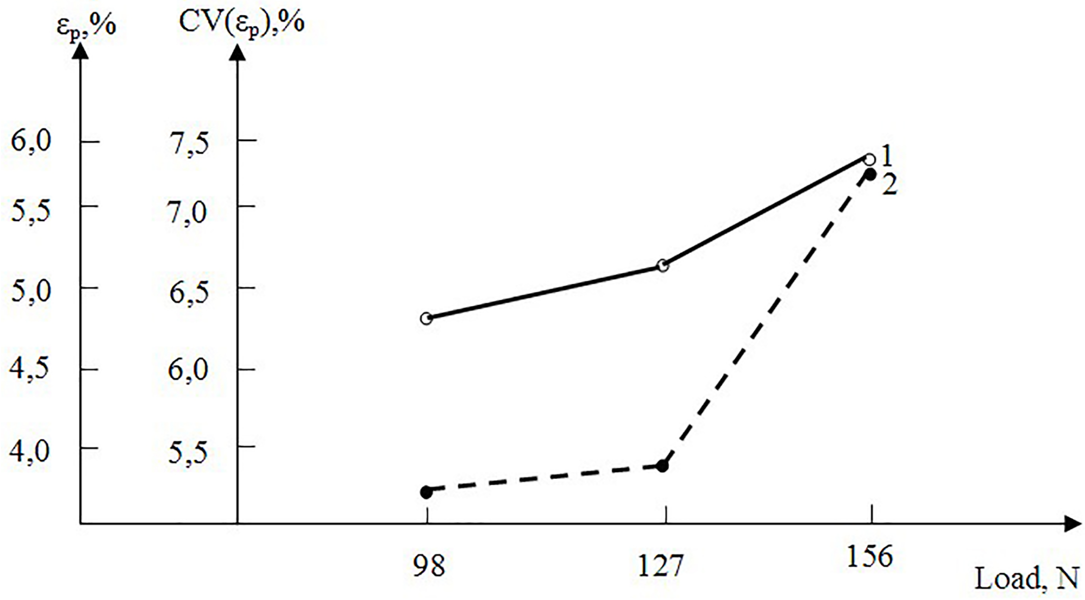

Figure 3 – The influence of the load of the drafting system on the elongation of the yarn at break and the quadratic unevenness on elongation at break (1 - yarn elongation at break; 2- quadratic unevenness in elongation)

system, deterioration in yarn quality indicators is observed.

Drawing a conclusion, we can say that with an increase in load, the quadratic unevenness in the linear density of yarn decreases from 7.7 % to 20.0 %, the quadratic unevenness in twist − 2.1 %, the strength decreased from 12.2 % to 21.6 %, the quadratic unevenness in strength increased from 33.5% to 38.1%, the elongation at break increased from 6.1 % to 15.6 %, the quadratic unevenness in elongation at break increased from 6.9% to 31.7 %.

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