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DEVELOPMENT OF A STAND FOR STUDYING THREAD TENSIONS WHEN KNITTING HYBRID LINEAR TEXTILE PRODUCTS OF THE "FETUCCIA" TYPE

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The high speed of the spinning machines generates a lot of friction and thus additional heat is given to the yarn and as a result - the moisture in the yarn evaporates. Dry fibers have reduced mechanical resistance and this worsens the technological applicability of the yarns. Wool fibers have the widest application in the production of yarns and are distinguished by the most complex fiber structure.

In the hybrid technique for knitted yarns – braided cords, two mechanical effects are applied at the same time: twisting of the fiber bundle and looping to weave the cord. Twisting has a constant intensity of impact on the fibers, but looping is cyclic in nature. The sinusoidal variation of the strains in the thread induces cyclically variable stresses that have a major impact on the quality of the hybrid thread. Strains depend on the setting of the knitting head, but stresses can be measured at the input and output of the process.

In a preliminary experiment, the influence of the combinations of different components in the knitted yarn on its appearance and the quality of knitted fabrics, as final products, was investigated. Yarns of two linear densities, 18 and 25 tex, with different composition - wool type, were made. The yarns are spun in a worsted spinning mill of the company "E. Miroglio" EAD. The production of the yarns takes place according to a spinning plan, which includes the necessary data for obtaining the physical and mechanical indicators and the sequence of technological processes.

The subject of this article is a concept of electronic control of the knitting cycle, which consists of: sensory control of the tension of the knitting thread when forming the loop, visualization of thread stress on display, avoidance of stresses and deformations above the elastic limits, reduction of the difference between the minimum and maximum tension of the threads in the knitting cycle, maintaining constant tension in the threads during successive knitting cycles.

The purpose of the development is a block diagram of electronic control of the knitting cycle: sensor - strain gauge, converter, processor, control of the speed of the knitting head, adjustment of loop rows, control program and display. The development of a stand for electronic monitoring and control of a hybrid spinning-knitting head is interdisciplinary in nature: textile materials technology and process automation. The stand can be used in: technological optimization of new products of the "Fetuccia" type and as a didactic tool in the training of textile specialists.

The tasks to be performed are: literature research, making of the stand and description of its functioning.

Keywords: braided cord, knitting head, electronic monitoring