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Changes in the Properties of Warp Yarns under the Effect of Different Loads on the Wrapping Machine

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ABSTRACT

This article examines the changes in the properties of warp yarn under a different load under a wrapping machine. During the study, samples of yarn Nm = 40/2 spun by ring method and Nm = 40/2, Nm = 34/2, Nm = 27/1 spun by pneumomechanical method were taken. The strength characteristics of the yarn samples were tested and analyzed on the basis of numerous experiments. According to them, when we wrapped yarn samples Nm = 40/2 on a machine TW2-D, it was found that the optimum result can be achieved when a load of 147 g is applied and the tension is adjusted.

KEYWORDS: *warp yarns, weaving process, wrapping machine, loan*

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INTRODUCTION

The role of the textile industry in the textile industry is no secret. This is because the final basic process of cotton fiber or any textile fiber ends with the formation of the fabric, if it is used for this purpose. Two types of yarn are used to make the fabric: the warp and the weft. The threads of the warp are placed along the length of the fabric, and its strength and durability depend on its strength. The weft yarn runs along the cross section of the fabric. The strength of the warp threads and the number of twists are greater than the weft thread.

METHODS

The purpose of our research is to study and analyze the effect of deformation of the warp yarn in weaving on the quality of the fabric, and experimental work was carried out at Art Soft Tex LLC. During the research, SSM TW2-D wrapping machines and VTS-9 twisting machines used, as well as Uster dynamometers (Uster Tenzorapid, Tenzolab) to test laboratory yarn samples. During the study, samples of yarn numbered Nm = 40/2 spun by the ring method and Nm = 40/2, Nm = 34/2, Nm = 27/1 spun by the pneumomechanical method were taken. The strength characteristics of the yarn samples were tested and analyzed based on numerous experiments.

RESULTS

The following are the quality parameters of the yarn samples, mainly the tensile strength, elongation at break and deformation forces.

Table 1. Changes in the mechanical properties of Nm = 40/2 open-end yarns under load

Parameters	Without puck	Lower puck (87) gr	107 gr	127 gr	147 gr	167 gr	187 gr	208 gr	228 gr	247 gr
Strength, B-work	654,4	626	631	657	690	658	652	678	611	628
Elongation	5,67	5,48	5,39	5,64	5,7	5,5	5,5	5,48	5,14	5,3
Strength, RKM	16,02	15,3	15,4	16,1	16,9	16	15,9	16,6	14,9	9,3

The diagrams below are provided to simplify the results of the table above and to make the analysis easier to understand.

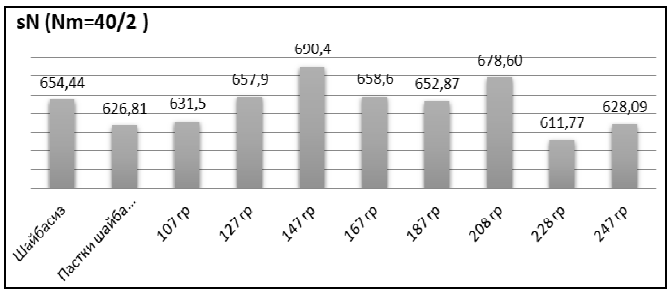

Fig 1 The force exerted by the load to break it

In the histogram shown in Figure 1 above, we can see the change in force exerted by the load as a result of the change in load. According to them, in the samples we took, the loads applied to the yarn during the process of wraping yarn samples were considered differently. When no load is applied to the yarn samples, ie when the sample is taken without a puck, the breaking result is 654,4 sN, the highest result is 690 sN under a load of 147 g, and the lowest is 611 sN when exposed to a load of 228 g. the result was achieved.

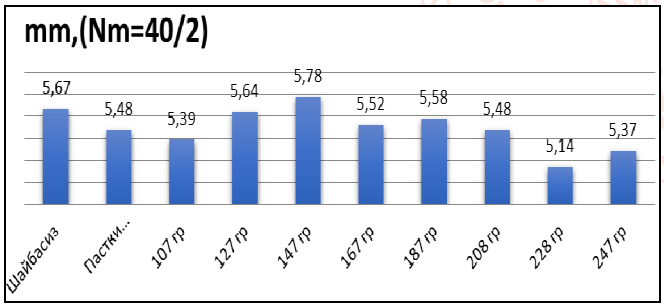

Fig 2 Elongation at break due to load

Considering the data in Figure 2, this diagram shows the elongation at break under load. According to him, the elongation at break was 5.67 mm when taken without a puck, 5.78 mm when loaded at 147 g, and 5.14 mm when loaded at 228 g.

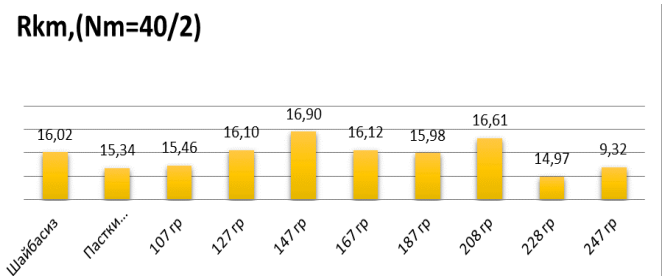

Fig 3 Strength under load

The diagram in Figure 3 shows the change in tensile strength when we apply a load to the samples. According to him, the tensile strength was 16.02 Rkm when taken without a puck, 16.90 Rkm when loaded with 147 g, and 9.32 Rkm when loaded with 247 g. When we conclude from all the results obtained, we can see that we have the best performance when we apply a load of 147 g to our sample. This means that when we wrap Nm = 40/2 yarn samples on a TW2-D machine, a load of 147 g is applied and the optimum result is achieved when the tension is adjusted. This, in turn, reduces the number of breaks due to the high strength of the yarn during the weaving process.

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