PRACTICAL CONTRIBUTIONS TO THE STUDY OF RESISTANCE ASSEMBLIES MADE WITH WARP KNITS

OANA Ioan-Pavel [1], OANA Dorina[2]

[1,2] University of Oradea, Romania, Department of Engineering and Industrial Management in Textiles and Leatherwork, Faculty of Energy Engineering and Industrial Management, B.Şt Delavrancea Str., nr.o, 410087, Oradea, Bihor, Romania

Corresponding author: Oana, Ioan-Pavel, E-mail: oanaioanpavel@yahoo.com

Abstract: *Based on the principle that a body to be obtained by sewing the material to provide resistance and the like in the stitching assembly, the experimental study of which developed resistance is compared with the resistance materials to effectively assembled by the assembly line. The experimental values resistance for assemblies were obtained in the testing for resistance to sliding stitch ASTM D 434 using Tinius Olsen HK5T test type machine.*
The assembly strength was determined for warp knitted fabric and satin charmeuse, made of poly-filamentary wires and mono-filament polyester and polyamide. Resistance assembling is one of the major determinants of the quality of the stitching. It is defined as "the tensile strength or friction." Tenacity stitching seam rupture is the force recorded at its weakest point. Seam abrasion resistance is the number of cycles required friction mesh destruction of seam.
It can be said that the strength of the used assembly, the seam 301 is achieved by, in most of the cases, lower resistance knitted studied. In these cases, the primary findings presented, it is clear that the assembly is not appropriate in terms of reliability and maintainability of the product. Such a situation requires a first step to change the type (class) of stitch used. Another way to remedy the deficiencies could be using a sewing thread with a lower finesse or strength in grain, especially in the upper loop of wire used in the study-specific.

Key words: *fabrics, structure, assembly, knitted fabric, satin, material*

1. INTRODUCTION

The main factors affecting the strength of assembly are:

♦ **Factors linked to seam**

• **stitch type** - assembly generally made with a stretch stitch type chain is stronger than an assembly made of a rigid seam, of a simple stitching type.

• **stitch density** - a density greater resistance favors, but too high values lead to the destruction of the material and implicitly to decreased resistance assembly

• **thread tension** - tension is preferable to stronger wire being careful not to produce seam wrinkling

♦ **Factors linked to sewing**

• **wire resistance** - from the point of view of resistance wire, loop resistance has a greater influence on resistance than the resistance in grain assembly.[1-2]

A resistance of assembling must be equal to that of the material assembled so as to achieve a balanced that will withstand the stresses to which the product will be subjected during wear. For this reason the choice of qualitative and quantitative factors should be weighted influence, to prevent an over strengthening is not required assembly. [3]

2. PRESENTING COMPARATIVE EXPERIMENTAL VALUES RESISTANCE FOR ASSEMBLING

The experimental value resistances for assemblies were obtained in the testing for resistance to sliding stitch ASTM D 434 using Tinius Olsen machine type test HK5T. The average values obtained are summarized practical data for all four types of knitted studied in Table 1, together with strength and elongation at break for knits with and without assembling.[4-5]

Tabel 1. *The experimental values determined for the resistance assembling*

Code knit	sample test with assembly		free sample test assembly		resistance assembly[N]
	breakout force[N]	elongation at break[mm]	breakout force[N]	elongation at break[mm]	
P275 30	273,75	28,13	522,22	37,86	280,45
P275 45	281,175	34,5	582,15	43,85	282,16
P275 60	300,70	44,16	620,62	54,41	309,78
P275 90	265,59	21,93	615,81	35,35	246,6
P26 30	361,18	35,75	390,21	35,39	367,37
P26 45	229,28	35,37	341,81	43,13	312,5
P26 60	353,38	40,30	529,71	41	366,63
P26 90	291,98	27,46	527,69	30,16	329,27
R25 30	274,26	45,51	355,60	50,88	279,5
R25 45	237,70	46,01	439,48	53,02	262
R25 60	171,85	40,92	682,84	67,99	177,23
R25 90	151,55	38,115	477,25	57,26	155,94
R2030	152,78	50,53	179,70	45,89	280,73
R20 45	139,47	50,91	193,98	46,25	143,5
R20 60	143,69	53,58	188,08	54,51	146,24
R20 90	162,43	51,12	199,01	47,14	167,13

For charmeuse fabric of polyester filament yarn of poly-P275, relatively uniform resistance varies with the angle of assembly test. The maximum value is recorded for the angle of 60 °, while the minimum value finding angle of 90 °.

Figure 1 illustrates the change in resistance compared with the resistance of assembly due to the fabric-free assembling [5].

The chart shown highlights of the assembly similar behavior for the four-way test. At the same time it can be seen that the fabric strength is much superior to the resistance of assembly, the double knitted fabric resistance values, regardless of the direction of testing. This indicates that the assembly is too little resistance compared to fabric. Consequently, as was found during testing and assembling fails first, at relatively lower values.

The things are somewhat different in the case of satin fabric of polyester filament yarn of poly-P26. In this case, test direction of 30 ° and 45° were similar values were obtained for resistance of the assembly and the resistance of the fabric, which suggests that these assembling are equilibrate. For angles 60 and 90 ° can vary substantially between the two values, raising again the question of insufficient resistance against the fabric assembly.[6] From the point of view of the resistance variation with angle assembly arrangement of fabric in assembly, one can observe a uniform behavior at the request of stretching the range exceeding 50N. It can therefore be concluded that the directions of 30 ° and 45 ° are optimal for the realization of a balanced assembling.[6]

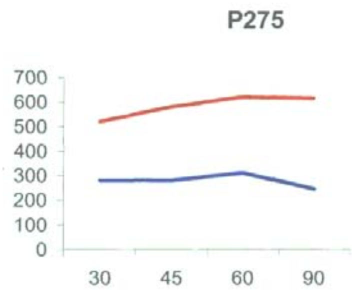

Fig. 1: *Assembled with the angle of change in resistance test Knitting P275*

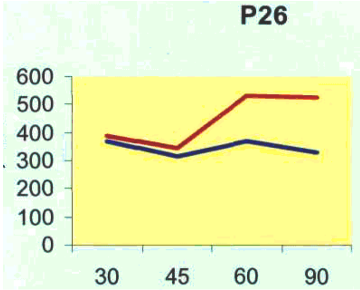

Fig.2: *Variation of the angle resistance test assembly for fabric P26*

Figure 3 shows a graph of resistance for comparison assembly in the case of knitted fabrics made of polyester yarn. From the graph it appears that the two resistant knits in different assembly, satin fabric is superior in this regard. The largest differences are found for the directions of 30° and 90°, about 25% of the top. For the other two directions are not those great differences of 9.5% and 15.5%.

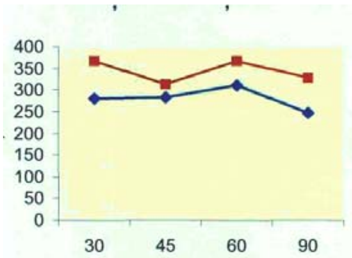

Fig. 3: *Graph versus change in resistance assembly for knitted fabrics made of polyester yarn*

Charmeuse fabric of yarns of polyamide 25 is characterized by a steady decrease in resistance assembly on the four-way test. This decrease is more pronounced for the last two lines of the arrangement of fabric in assembly, leading to the resistance assembly angle of 90° to about half the value corresponding to the angle of 30°. From the comparison chart shown in Figure 4 that the best situation in which assembly and fabric have similar resistance is the direction of 30°. Otherwise, the assembly is significantly less resistant than the material.[5-6]

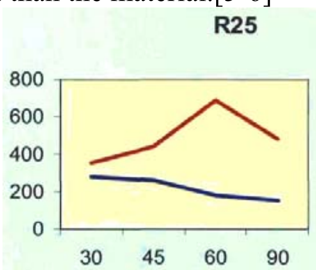

Fig. 4: *Variation of the angle resistance test assembly for fabric R25*

Satin fabric of yarns of polyamide 20 is the only one that presents a distinct situation from the other knits. Do not forget that this is the only fabric made from mono-filament yarn, which in addition have and greatest finesse. Figure 5 shows the variation of the angle resistance test assembly for this type of fabric. It can be seen that for the 30° direction is greater the assembling resistance than the resistance of the knitting fabric in an amount of 280N, while the strength of the fabric is approximately 180N. This indicates that the assembly is too strong in that case. It should also be emphasized again during testing of the assembly behavior of satin fabric R20, it was found breaking and jerking knitted and then an assembling.

The rest of the test lines of assembling strength is much lower, approximately half of the maximum value recorded for the 30° direction. The differences from the fabric resistance are not so large and R20 is preferably the fabric assembly in the direction of 45°, 60° and 90°. Moreover, the behavior of assembling directions 45° and 60° is the same, the values are almost equal.

Fig. 5: *Variation of resistance test assembling angle fabric R20*

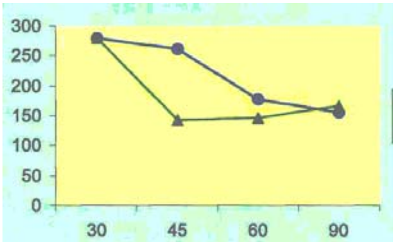

Fig.6: *Graph compared to resistance variation for knitted fabrics made from yarn assembling PA*

A comparison graph of the assembling resistance to the knitted threads of polyamide from Figure 6 shows that the knits have a similar behavior to the directions of 30° and 90°, while the other two angles are distinct differences in test value. If the angle test angle of 60° the two values are closer to assembling resisntace, the difference being about 17% for the test the angle of of 45° if the difference reaches 45%. It can be concluded that the assembly is obtained for best R25 fabric [7].

3. CONCLUSIONS

As a general conclusion, we can say that the resistance assembling used, made by stitching 301 is one of the cases, being at a lower resistance by the studied knittings. In these cases, the primary findings presented, it is clear that the assembly is not appropriate in terms of reliability and maintainability of the product. Such a situation requires a first step to change the type (class) of used stitch. Another way to remedy the deficiencies could be using a sewing thread with a lower finesse or strength in grain, especially in the upper loop of wire used in the specific study[5-7].

There are also knits that assembly directions are balanced in terms of resistance. These directions are given priority in the design of product lines for sectioning, which can be the basis for the development of new approaches style products, and reinterpreting the existing problems in order to optimize the seam and the product reliability and maintainability

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