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Evaluation of the Structure the Costume Fabric over its Surface

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ABSTRACT: The article gives a notion of the tissue surface, the projection estimated a ledge of warp and weft threads on the surface of weft support, warp support and equal support tissue. The results of the experiment finished last five times wash cloth and had come to equilibrium.

KEYWORDS: Sstructure of the tissue, the support surface, warp and weft threads, the diameter of the thread, the wave height of bending, stretching, straightening, density, wear resistance.

I.INTRODUCTION

Recently, the range of weaving goods have expanded significantly. It was enriched with new types of weaved fabrics, in particular weftsupport, if the warp thread is based on the warpsupport. If the equally is warp and weft thread, it is equalsupport., under the support surface fabric understands the relative area, which is in contact with its body wears out. Based on their structure fabric can be selected into three types of support surface. If the fabric is based on wear its body with weft thread, by appearance it is weftsupport, if the warp thread is based on the warpsupport. If the equally is warp and weft thread, it is equalsupport. However, due to the unevenness of the warp and weft diameter and on the magnitude of contort in the fabric on a supporting surface, the fabric of weft support weft acts as the warp thread but in considerable lower quantities. On the warp supporting fabric for the same reason, the weft thread also acts as on the supporting surface, but in considerable lower quantities.

II. REVIEW OF THE KNOWN WORKS

There is a group of fabric such as furnishing for which the serve time in the primarily is dependent on the wear, and tear, in turn from its supporting surface. These fabrics are produced in the industry by appearance support surface. They have low durability as the basic on the fabric wore and broken weft thread, after which the fabric becomes unfit for further future, in the spite of the fact that the warp thread is even. Obviousness on the sheets, in which is tear as a result of operation always takes place along the warp threads, in the breaking of the weft threads. Obviously, fabric are the more points of support than the other equal serves a longer, which is especially important for mass consumers furnishing such as the army.
The central scientific research institute of the cotton industry (CSRICI) in Moscow was developed by experimentally method numerical estimate the support surface of fabric.
Method provided:

1. Ironing pattern of fabric through the carbon paper with using ironing press or iron.
2. Dyeing points of fabric from carbon paper.
3. Counting the number of warp and weft dyeing points of support [1]. On fig.2 carries out the print of weft support, the warp support and equal support on the fabric, obtained using from this method [2].

In this method, the support surface of the (RM) numerically estimated by the ratio amount of warp (M_{wp}) and weft (M_{wt}) threads on support surface by as much as possible for given fabric in the number of support points which is equal production on the density of the warp thread (D_{wp}) on the density of weft thread (D_{wt}) on the 1sm^2 (see table).
In (CSRICI) usage of refer to above methods were developed the technology of manufacture fabrics for furnishing on shuttle less loom which provides to increase in durability fabric is about 1.5 times without increasing its cost [2]. So

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essential effect has been achieved that fact, that fabric is elaborated with equal support , and no weft supporting surface, resulting in wear fabrics are became essentials to share not only weft thread, but and warp.

III. NEW WAY OF MATERIAL CONSUMPTION REDUCING

The table shows the equal support finished and coarse fabric is obtained from CSRICI by the new technology in comparison factors on the weft supporting fabrics are produced by the technology of standard. Indicators of the finished fabric are shown after washing five times as after washing five times and the structure of fabric will stabilize and unchanged substantially during the period of wear.

Table. The equal support finished and coarse fabric is obtained from CSRICI

№	Indicator	Indicators of fabric			
		finished		Coarse	
		warp support	equal support	warp support	equal support
1	The point of warp support, M_{wp}	387	392	385	390
2	The point of weft support, M_{wt}	107	247	106	243
3	Total of supporting point, $M_{wp}+M_{wt}$	494	639	491	633
4	The relative share the points of support, $RM=(M_{wp}+M_{wt})/(D_{wp}\times D_{wt})$	0,75	0,98	0,75	0,97
5	Loss of strength from scuffing fabric, %				
6	- by warp	33	30	27	23
	-by weft	60	28	44	22
	-by total	93	58	71	45
7	Wide of fabric, sm	148,2	146,7	167,2	166,2
8	Threads of strength for 1 sm.				
	by warp, D_{wp}	41,1	41,5	40	40,4
	by weft, D_{wt}	24,9	26,2	25,1	25,3

In the fabrics of equalsupport with weft are compared with number of the points of support warp increased approximately 2,5 times. As a result of the equalsupport fabrics by compared with weftsupporting fabric relative share of the points of support increased from 0,65 to 0,98 and the total loss of strength from scuffing fabric decreased by about 1,5 times.

For overpatching the support surface of the fabric is necessary, firstly, hold of the experiment-calculated method is determining the type of support surface the fabrics, and secondly using this method is come to corresponding (weaving) loom and get the equalsupporting fabric and further shows the strength of its supporting surface. The lack of a simple method of determines the type of support surface on the fabric is one of the main reasons that to bar the development of technology fabric with the supporting surface.

The method of experimental the numeral of the support surface is developed in CSRICI, laborious require careful counting the number of support points. Less experiment-calculated of method determines the type of support surface fabrics, below, consists in determining the estimated thickness of the fabric. It allows to more quickly estimate the type of support surface and move to elaboration of equalsupporting fabrics.

IV. EXPEREMENT RESULT AND DISCUSSING

To compare the picture of sectional fabric (fig.1) of weftsupport estimated thickness of the fabric (B_{wt}), equally .

$$B_{wt} = h_{wt} + d^{I}_{wt} \quad (1)$$

If the fabric is the warp support estimated on the thickness of fabric, (B_{wp}), equally

$$B_{wp} = h_{wp} + d^{I}_{wp} \quad (2)$$

If (B_{wt}) is more (B_{wp}) the fabric is weftsupport, if (B_{wp}) is more (B_{wt}), the fabric is warpsupport , if (B_{wt}) is equal (B_{wp}) the fabric is equalsupport.

ISSN: 2350-0328
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(1) and (2) in the formulas are following conventional signs:
h_{wt} – the height of wave winding on the weft threads, mm.
d^{I}_{wt} - conventional diameter of the weft thread crumpled on the fabric by its thickness, mm.
h_{wp} - the height of wave winding on the warp threads, mm.
d^{I}_{wp} - conventional diameter of the warp thread crumpled on the fabric by its thickness, mm.
The height of wave winding are respectively with the warp (h_{wp}) and the weft threads (h_{wt}) mm (see, Fig.1) are

$$h_{wp} = \sqrt{l_{wp}^2 - f_{wt}^2} = \sqrt{\left(\frac{L_{wp}}{L_f \cdot D_{wt}}\right)^2 - \left(\frac{1}{D_{wt}}\right)^2} = \frac{1}{D_{wt}}\sqrt{\left(\frac{L_{wp}}{L_f}\right)^2 - 1}, \quad \text{mm} \qquad (3)$$

$$h_{wt} = \sqrt{l_{wt}^2 - f_{wp}^2} = \sqrt{\left(\frac{L_{wt}}{L_f \cdot D_{wp}}\right)^2 - \left(\frac{1}{D_{wp}}\right)^2} = \frac{1}{D_{wp}}\sqrt{\left(\frac{L_{wt}}{L_f}\right)^2 - 1}, \quad \text{mm} \qquad (4)$$

where:
l_{wp} – The length of warp threads in the same element of fabrics, mm.
f_{wt} - The distance between the weft thread in the same element of fabrics, mm.
L_{wp} – The length of unbent warp threads are drawn from the square pattern of fabric size, mm.
L_f –The size of square pattern's fabric from which is draw from warp and weft threads for the unbent, mm.
D_{wt} - The density of weft threads in the fabrics , yarns/mm.
l_{wt} - The length of weft threads in the same element of fabric, mm.
f_{wp} – The distance between the warp threads in the same element of fabric, mm.
L_{wt} – The length unbent of the weft thread is drawn from the pattern of fabrics' size $(L_f \times L_f)$, mm.
D_{wp} - The density of warp threads in the same element of fabric, yarns/mm.
The distance between the weft threads (f_{wt}) and warp (f_{wp}), mm equally

$$f_{wt} = \frac{1}{D_{wt}}, \qquad f_{wp} = \frac{1}{D_{wp}}, \qquad (5)$$

Calculating diameters of the warp (d_{wp}) and weft threads (d_{wt}), before the formation on the fabric, (mm) equally:

$$d_{wp} = 0{,}0357\sqrt{\frac{T_{wp}}{\delta}}, \qquad d_{wp} = 0{,}0357\sqrt{\frac{T_{wp}}{\delta}} \qquad (6)$$

where : T_{wp} , T_{wt} - the linear density, respectively, warp and weft threads, tex.
δ – coefficient for determine the conventional diameter of threads before forming it into fabric, g/sm^3.
In forming the fabric of warp and weft threads are rumpled and conventional diameter of warp (d^{I}_{wp}) and conventional diameter of weft d^{I}_{wp} in the direction of thickness fabric becomes less by the amount of crushing.
If the warp and weft threads are made of the same types of fibre, the value of crumpling can be expressed by a common factor crushing (K), which is:

$$K = \frac{d^{I}_{wp} + d^{I}_{wt}}{d_{wp} + d_{wt}} \qquad (7)$$

It is known that the amount of diameters warp (d^{I}_{wp}) and weft (d^{I}_{wp}) are always equal the amount of the heights of waves the warp, and weft in the fabric

$$d^{I}_{wp} + d^{I}_{wt} = h_{wp} + h_{wt} \qquad (8)$$

Therefore,

$$K = \frac{h_{wp} + h_{wt}}{d_{wp} + d_{wt}}. \qquad (9)$$

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Vol. 5, Issue 9 , September 2018

so, $$d^I_{wp} = K \cdot d_{wp} \qquad d^I_{wt} = K \cdot d_{wt} \qquad (10)$$

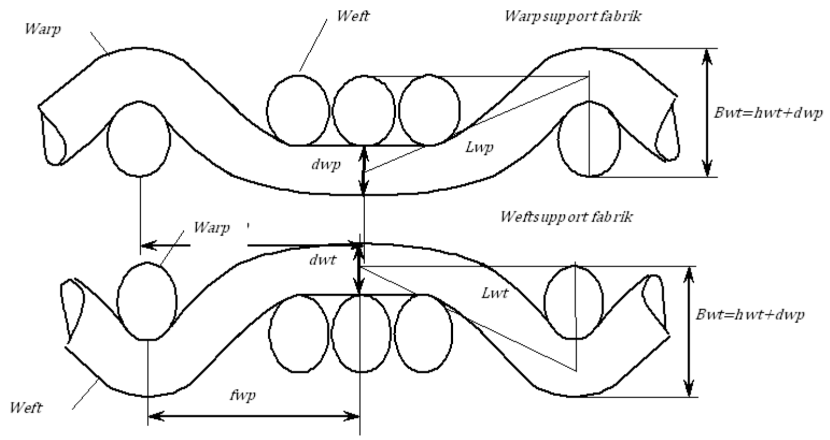

Fig.1. The cuts tissue along the warp and weft

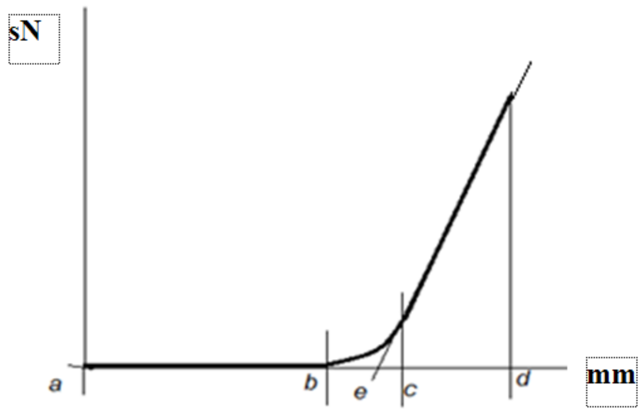

Fig.2. Diagram straightening and stretching the filaments taken out of fabric

Noted for method identification the length of thread ($L_{wp,}$ L_{wt}) is drawn from a fabric pattern of backside the length thread (L_f) which is drawn from the fabric pattern , smooth out hand and its length is measured on the millimeter ruler. The method is not accurate and subjectively, as if unknown is fully smoothed out thread before measurement.

In CSRICI method was developed [3] which the length of smothed out warp and weft (L_{wp}) threads, drawn from the fabric pattern is determined experimentally on dynamometer for rupture yarns on the diagram rupture such as a dynamometer STATIGRAP L.

In a fabric patter is applied a signs for warp and weft at a distance (L_f), for example 500x500 mm. For these sign threads are drawn from patterns, charged into the clamps of the dynamometer, the distance between the clamps which are also equal (L_f). The thread is broken or load about 50 %. In this diagram removed off diagram stretching or tearing threads, (on fig.2).

The diagram tearing threads its area “Ab” reflects the size of different length’s thread from its smoothing out conventionally whithout imposition, so it is parallel abscissa. The area “bc” reflects the different length of part’s thread the smoothing out part of stretching and the area “cd” reslects the differen length of the thread from tension. On the inclined area of the diagram, reflectings tensile threads, pass straight to its intersection with the line of the abscissa (point “e”). The area of diagram “ae” reflects the differen length of thread straightening without stretching and the area “ed” increment length from stretching. The length of straightened thread drawn from the fabric is L_f+ae.

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The above formula is defined: B_{wt} and B_{wp}. If $B_{wt} > B_{wp}$, is fabric weftsupport, if $B_{wt} < B_{wp}$ the fabric is the weftsupport, if fabric $B_{wt}=B_{wp}$ is equalsupport.
The results of calculation can be controlled determining the thickness of fabric (B_{ex}) which determined experimentally on the device for determining the thickness of the fabric. The thickness of the fabrics for furnishing can be determined under the load removed 30 sN. In dependence on the type of fabric load can changed.
Example of defining a support surface fabric. Initial data of charactize fabric pattern :
D_{wp}=40,0yarns/sm=4,0yarns/mm. D_{wt}=25,1 yarns/sm=2,51yarns/mm. T_{wp}=29 tex. T_{wt}=50 tex. L_f=500 mm. L_{wp}= 515 mm. L_{wt}=578 mm.
δ - 0,85g/mm^3, as for thread from cotton.

$$h_{wp} = \frac{1}{4,0}\sqrt{\left(\frac{577}{500}\right)^2 - 1} = 0,221, \text{ mm}$$

$$h_{wt} = \frac{1}{2,51}\sqrt{\left(\frac{517}{500}\right)^2 - 1} = 0,105, \text{ mm}$$

$$d_{wp} = 0,0357\sqrt{\frac{T_{wp}}{\delta}} = 0,0357\sqrt{\frac{29}{0,85}} = 0,208, \text{ mm}$$

$$d_{wt} = 0,0357\sqrt{\frac{T_{wt}}{\delta}} = 0,0357\sqrt{\frac{50}{0,85}} = 0,274, \text{ mm}$$

$$K = \frac{(h_{wp} + h_{wt})}{d_{wp} + d_{wt}} = \frac{0,126 + 0,212}{0,208 + 0,274} = 0,701$$

$$d_{wp}^{I} = K \cdot d_{wp} = 0,701 \cdot 0,208 = 0,146, \text{ mm}$$

$$d_{wt}^{I} = K \cdot d_{wt} = 0,701 \cdot 0,274 = 0,192, \text{ mm}$$

$$B_{wt} = h_{wt} + d_{wt}^{I} = 0,105 + 0,192 = 0,297, \text{ mm}$$

$$B_{wp} = h_{wp} + d_{wp}^{I} = 0,221 + 0,208 = 0,429, \text{ mm}$$

$B_{wt}>B_{wp}$,. Consenquently, the fabric of weft supporting.

V. CONCLUSION

Analysis of the results of the study shows that the structure of the estimate was controled by determining the thickness of the fabric. The thickness of the fabric (B_{ex}) was found experimentally. B_{ex} was equal 0,492 mm. Consenquently the fabric of weft supporting.

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