RESEARCH OF PARAMETERS A STRUCTURE OF JACQUARD FABRICS

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In the study, the structural parameters of jacquard fabrics were studied. The bending wave height of the warp and weft threads, the geometric and maximum densities of the warp and weft for the jacquard fabric of fundamental weaves with short, medium and long overlapping are determined depending on the coefficient determining the height of the bending waves. It has been established that in jacquard fabric during the transition of weaves from long floors to short overlap: the maximum density on the warp and on the picks decreases; geometric density at the warp and at the weft increases; the wave height of the bending of the threads on the warp and weft remains unchanged. The intensity of the process of producing jacquard fabric on a loom in a section with short overlaps is higher relative to a section of fabric with medium and long overlaps.

Key words: fabric, weave, overlap, density, filling.

The density of the fabric on the warp and the weft, and their ratio have a great influence on the structure and properties of the tissues. The density of the fabric on the warp and on the weft depends on the diameter of the threads and on the type of weaving in the fabric. The maximum density of a fabric with a short overlap of plain weave is less important than any other weave of threads with a medium and long overlap in the fabric (derivatives of plain weave, twill, satin weave and derivatives thereof). The type of weave has a great influence on the structure and properties of the fabric. In particular, plain weave fabrics (with short overlappings) have a greater breaking load and a warp of weft and warp threads than fabrics of other types of weaves (medium and long overlaps), while fabric production (short overlaps) is accompanied with great tension [1].

The task was to study the parameters of the structure of jacquard fabric when it was developed on a loom, on the basis of fundamental weaves. Since jacquard fabrics within the repeat unit for fundamental weaves have short (1/1), medium (1/2) and long overlaps (1/3), it should be expected that the threads have different stress states as during the formation of fabric on the weaving the machine, and after removing the fabric from the machine. For jacquard fabric in the pattern of weaving with short, medium and long overlap, linear density of warp and weft threads $T_{warp} = T_{weft} = 25x2$ tex, depending on the coefficient determining the height of the bending waves, the height of the bending wave of warp and weft threads, the maximum and geometric density of the fabric on the warp and on the weft yarn [2].

Tables 1 - 3 show the effect on the geometric and maximum densities of the warp and weft for the fabric with variable repeat unit of the warp and weft in the fabric, that is, weaves with short, medium and long overlaps.

Table 1
The values of geometric and maximum densities on the basis and weft for jacquard fabric of fundamental weaves with long overlappings (1/3).

The order of the phase structure of the fabric	Coefficient determining the height of bending waves		The height of the bending waves, mm		Geometrical density, mm.		Maximum density, thread / dm.	
	by warp K_{ho}	by weft K_{hy}	by warp h_{warp}	by weft h_{weft}	by warp l_{warp}	by weft l_{weft}	by warp P'_{warp}	by weft P'_{weft}
marginal	0,27	1,73	0,069	0,445	0,383	0,257	261	389
III	0,5	1,5	0,128	0,386	0,378	0,298	265	336

IV	0,75	1,25	0,193	0,321	0,367	0,329	273	304
V	1	1	0,257	0,257	0,351	0,351	285	285
VI	1,25	0,75	0,321	0,193	0,329	0,367	304	273
VII	1,5	0,5	0,386	0,128	0,298	0,378	336	265
marginal	1,73	0,27	0,445	0,069	0,257	0,383	389	261

Table 2.
The values of geometric and maximum densities on the warp and weft for jacquard fabric of fundamental weaves with medium overlappings (1/2).

The order of the phase structure of the fabric	Coefficient determining the height of bending waves		The height of the bending waves, mm		Geometrical density, mm.		Maximum density, thread / dm.	
	by warp K_{ho}	by weft K_{hy}	by warp h_{warp}	by weft h_{weft}	by warp l_{warp}	by warp K_{ho}	by weft K_{hy}	by warp h_{warp}
marginal	0,27	1,73	0,069	0,445	0,425	0,257	253	389
III	0,5	1,5	0,128	0,386	0,418	0,312	239	321
IV	0,75	1,25	0,193	0,321	0,403	0,353	248	283
V	1	1	0,257	0,257	0,382	0,382	262	262
VI	1,25	0,75	0,321	0,193	0,353	0,403	283	248
VII	1,5	0,5	0,386	0,128	0,312	0,418	321	239
marginal	1,73	0,27	0,445	0,069	0,257	0,425	389	253

Table 3
The values of geometric and maximum densities on the warp and weft for jacquard fabric of fundamental weaves with short overlaps (1/1).

The order of the phase structure of the fabric	Coefficient determining the height of bending waves		The height of the bending waves, mm		Geometrical density, mm.		Maximum density, thread / dm.	
	by warp K_{ho}	by weft K_{hy}	by warp h_{warp}	by weft h_{weft}	by warp l_{warp}	by warp K_{ho}	by weft K_{hy}	by warp h_{warp}
marginal	0,27	1,73	0,069	0,445	0,509	0,257	197	389
III	0,5	1,5	0,128	0,386	0,498	0,339	205	295
IV	0,75	1,25	0,193	0,321	0,476	0,401	210	249
V	1	1	0,257	0,257	0,445	0,445	225	225
VI	1,25	0,75	0,321	0,193	0,401	0,476	249	210
VII	1,5	0,5	0,386	0,128	0,339	0,498	295	205
marginal	1,73	0,27	0,445	0,069	0,257	0,509	389	197

The analysis of table 1-3 shows that when jacquard fabric is developed during the transition of weaves from long floors to short floors: the maximum density on the warp and on the weft decreases; geometric density at the base and at the weft increases; the wave height of the bending of the threads on the warp and weft remains unchanged.

Fabrics with a maximum density of P'$_{warp}$ and P'$_{weft}$ for both filament systems are almost impossible to produce on a weaving machine. Therefore, the production of tissues with a lower (actual) density of P$_{warp}$ and P$_{weft}$ is performed on both systems of warp and weft threads. The ratio of the actual density of P$_{warp}$ and

P_{weft} to the maximum density of P'_{warp} and P'_{weft} is characterized by filling the fabric with fibrous material and is determined by the following ratio

for warp threads $K_{Ho} = P_{warp} / P'_{warp}$ (1)
for weft threads $K_{Hy} = P_{weft} / P'_{weft}$ (2)
for fabrics $K_{fabric} = K_{Ho} \cdot K_{Hy}$ (3)

The filling factor of the fibrous material takes into account the density of the fabric, the linear density of the threads, the type of overlap of one system of threads of another system of threads in the repeat unit, weaving of the fabric. The fill factor of the fibrous material indicates the tension of the fabric on the weaving machine. The closer the filling coefficient is closer to unity $K_{fabric} < 1$, the more intense is the production of fabric on a loom [3].

For jacquard fabric in a repeat pattern of weaving with short, medium and long overlappings, linear density of warp and weft $T_{warp} = T_{weft} = 25x2$ tex, actual density of P_{warp} and P_{weft} equal to 200 yarn / dm. we will calculate the fill factor of the fibrous material and present the results in table 4.

Table 4
Influence of the type of tissue overlap on the fill factor

№	Type of overlap fabrics	Repeat unit weaving		Filling coefficient		
		by warp R_{warp}	by weft R_{weft}	by warp K_{Ho}	by weft K_{Hy}	fabric K_{fabric}
1.	long overlap fabrics	4	4	0,70	0,70	0,49
2.	medium-overlap fabrics	3	3	0,76	0,76	0,58
3.	short overlap fabrics	2	2	0,89	0,89	0,79

The analysis of table 4 shows that when changing the type of overlap of the fabric, the coefficient of filling with fibrous material is different. The most intense process of fabric production on a loom occurs on a site of fabric with short overlappings, since the index of the coefficient of filling with fibrous material is closest to unity.

Conclusions
1. During the production of jacquard fabric during the transition of weaves from long overlapping to short overlapping: the maximum density on the warp and on the weft yarns decreases; geometric density at the warp and at the weft increases; the wave height of the bending of the threads on the warp and weft remains unchanged.
2. The intensity of the process of producing jacquard fabric on a loom in a section with short overlaps is higher relative to a section of fabric with medium and long overlaps.

Literature
1. Rakhimkhodjayev S.S, Kadirova D.N. «Sovremenniye metodi proektirovaniya tkaney» - Tashkent. TITLP.2006g.
2. Kadirova D.N., Research of structure of fabrics. International Journal of AdvancedResearch in Science, Engineering 2018/11.
3. Ravandi S. A. H. and Valizadeh M., Improving Comfort in Clothing, Chapter