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STUDY ON SHOULDER CHARACTERISTICS AND MODELING STRUCTURE OF YOUNG WOMEN IN HUBEI PROVINCE BASED ON 3-D SCANNING

(ИССЛЕДОВАНИЕ И МОДЕЛИРОВАНИЕ ПЛЕЧЕВОГО ПОЯСА ЖЕНСКИХ ФИГУР С ИСПОЛЬЗОВАНИЕМ ТЕХНОЛОГИИ ТРЕХМЕРНОГО СКАНИРОВАНИЯ)

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Abstract: Clothing shoulder modeling is a big part of the research on the anastomosis between human morphology and clothing. This essay got the sizes of shoulders by selecting 100 young women in Hubei province and using non-touching 3-D human body scanning, then got the variation of data of different shoulder sizes of subdivision morphology by using SPSS software to do mathematical statistics and feature analysis in order to find the relationship between different shoulder modeling and human shoulder shapes, made accurate modeling that matches the clothing, provided reference for young women's dress structure design and production model proportion in Hubei Province.

Clothing shoulder modeling is a big part of the research on the anastomosis between human morphology and clothing [1-4]. The clothing shoulder structure's research is based on shoulder pattern design theory, doing key structure parameter analysis and series pattern experiments. By analyzing structure parameter we can get different kinds of shoulder modeling and different kinds of sleeve modeling which is related to shoulder modeling and find the relationship between them. We randomly selected 100 women aged from 18 to 25 from Hubei province to use their shoulder structure date as research samples and by using mathematical statistics, graphic analysis and version manufacture to research on women's shoulder structure parameter and find the regulation. The result is very important to young women's dress structure design and production model proportion in Hubei Province.

We measure human body by using non-touching 3-D human body scanner (made in Germany). In order to reduce error, we do 3 times measurement on same sample and during measurement the sample should stand exactly like what the scanner required.

We randomly selected 100 women aged from 18 to 25 from Hubei province for measurement, the average age is 22.5 and the average height is 161.5 cm, draw the data of shoulder breadth, shoulder obliquity, brachium and upper-arm circumference.

We done some pre-process to the data and use normal distribution method to analyze. Figure 1 shown the results.

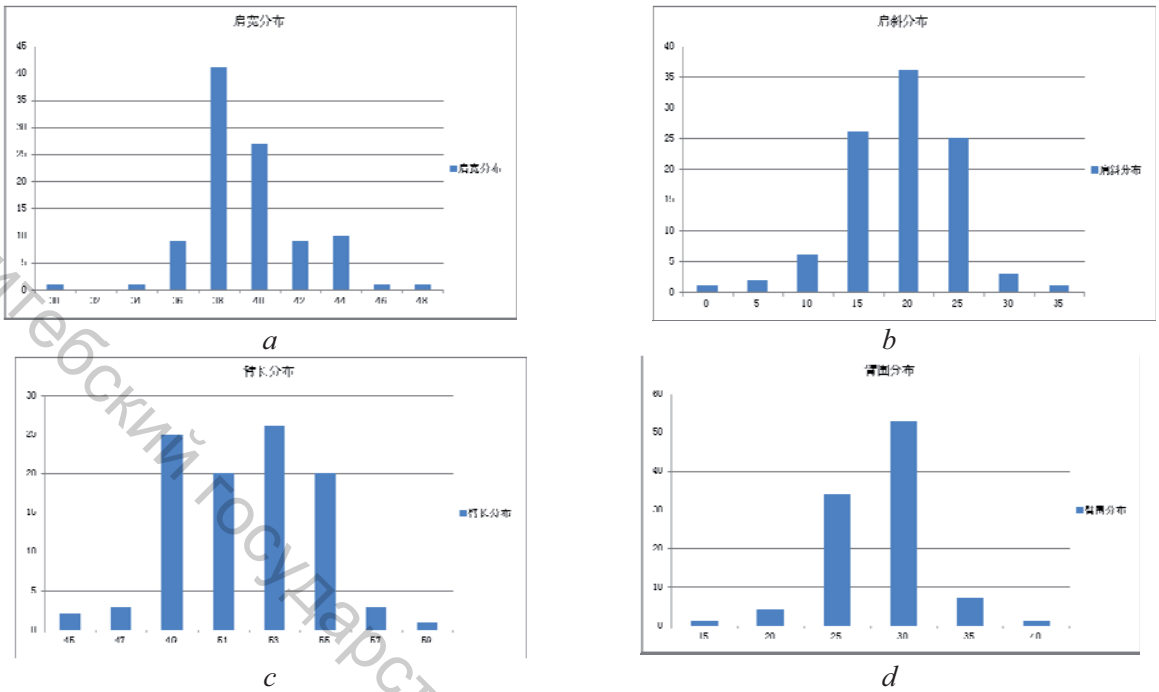
From the data we can see that the variation range of the shoulder breadth is mainly between 34 cm and 44 cm, the shoulder obliquity is between 10 degree and 25 degree, the brachium is between 47 cm and 55 cm, the upper-arm circumference is between 20 cm and 35 cm that mean the diameter of upper arm is between 6.4 cm to 11.2 cm.

Compare the data to GB/T1335.2-2008, using *K*-means fast clustering method to calculate the intermediate data of two types (Table 1).

At last we can use shoulder obliquity as explained variables, shoulder breadth, brachium and upper-arm circumference as explanatory variables to build a multiple linear regression equation so that we can see the linear relation between explained variables and explanatory variables. Set shoulder obliquity as dependent variable *Y*, shoulder breadth, brachium and upper-arm circumference as independent variables *X1*, *X2* and *X3*, set the linear regression equation as (1):

$$Y = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 X3 + \varepsilon . \quad (1)$$

In this equation: β_0 is a constant, β_1, β_2, β_3 are regression coefficients, means the error that caused by other factors. Using SPSS software to do statistical analysis, the results are shown in Table 2 (*B* means samples' regression coefficients; sig. means significant difference).



a *b* *c* *d*

Figure 1 – Distribution of date of shoulder: *a* – shoulder breadth , *b* – shoulder obliquity, *c* – brachium, *d* – upper-arm circumference

Table 1 – K-means fast clustering method computing result

Shoulder characteristic	Intermediate date of Cluster	
	Type 1	Type 2
Shoulder breadth	40.36	37.48
Shoulder obliquity	12.77	21.13
brachium	52.44	49.95
Upper-arm circumference	27.24	24.97

Table 2 – Linear regressions

Factors	Non-standard coefficient		Standard coefficient	t	Sig.
	B	Standard error	Trial version		
constant	85.612	9.918		8.632	.000
Breadth X1	-1.261	.200	-.600	-6.300	.000
Brachium X2	-.570	.189	-.277	-3.020	.003
Upper-arm X3	.375	.160	.241	2.340	.021

From Table 2, we can learn that, β_0=85.612, β_1=-1.261, β_2=-0.570, β_3=0.375, the regression equation is (2):

$$Y = 85.612 - 1.261X1 - 0.570X2 + 0.375X3 \quad (2)$$

We chosen a sample to check the equation: shoulder breadth was 44 cm, brachium was 55.8cm, upper-arm circumference was 28 cm, so

$$Y = 85.612 - 1.261 \times 44 - 0.570 \times 55.8 + 0.375 \times 28 = 8.82\text{dgree} \quad (3)$$

The result given by SPSS is a little different from the sample's 10 degree, but this difference is in allowable range. So that we can say we can use multiple linear regression equation to make sure the difference in different body shapes and offer important references to set standard in women's dress.

This essay is based on fashion cycle an aimed at researching shoulder modeling. We draw the data of shoulder structure and analyze the effects caused by shoulder design on shoulder structure date. By

setting shoulder modeling model, we can find the relationships in shoulder obliquity, shoulder breadth and so on, so that we can analyze these factors that affect the shoulder modeling and use these factors to make standard for shoulder modeling classification. That means we can make sure the factors due to a given shoulder modeling or we can make sure the modeling due to given factors. The researches in modeling and structure can be put together and it can provide reference for young women's dress structure design and production model proportion.

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ПРОЕКТИРОВАНИЕ ДВУХПОЛОТЕННЫХ ЖАККАРДОВЫХ КОВРОВ

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Ключевые слова: Ковровые изделия, двухполотенный способ производства, нити Frize, индустриальный стиль, Vision Texcelle.

Реферат: в условиях ОАО «Витебские ковры» была спроектирована коллекция ковров с учетом современных тенденций в оформлении интерьера и воплощена благодаря технологии двухполотенного способа производства ковровых изделий из нитей Frize. Патронирование коврового изделия осуществлялось при помощи дизайнерской программы VISION TEXCELLE.

Декоративные текстильные изделия привносят новые краски в кажущийся завершенным облик помещения, освежая общую идею интерьера. Ковер можно смело причислить к самым древним изделиям в мире. С давних пор ковры являются символом достатка хозяев и одним из самых интересных аксессуаров интерьера.

Исходя из современных тенденций, была спроектирована коллекция ковров с учетом технологии двухполотенного способа производства ковровых изделий из нитей Frize в условиях ОАО «Витебские ковры». Преимуществом этой технологии по сравнению с прутковыми является возможность получения ковров шириной более 2,5 м с уменьшенным расходом ворсовой основы. Эта возможность достигается за счет того, что нерабочие нити ворсовой основы делятся на 2 полотна.

Преимуществами проектируемого изделия является сравнительно невысокая отпускная цена (результат использования недорогого сырья), а также его эстетическая выразительность.

Творческим источником в проектировании коллекции ковров стал индустриальный стиль, который приобрел большую популярность в последнее время. Стиль зародился в конце двадцатого века из конструктивизма и минимализма с элементами гранжа. Он возник в бывших складских, промышленных и заводских помещениях. В то время многие здания сменили свое назначение и из рабочих превращались в заброшенные, естественно появились желающие привести их в надлежащий вид.

Особенность индустриального стиля – подчеркнутая технологичность, небрежность, потертые стены, неприкрытые коммуникации, балки и трубы - все должно выглядеть как на промышленном предприятии. В индустриальном стиле применяются старое добротное или