

Optimizing Sleeves Pattern for Vietnamese Airlines Stewardess Uniform--Ao Dai

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Abstract. Ao Dai is Vietnamese national costume and usually used as airlines stewardess uniform. As uniform, Ao Dai is required to be fitted and beautiful. However, the sleeves of Ao Dai limit stewardesses arms motion when they raise hands over head or move arms frequently. The sleeves of Ao Dai are one-piece raglan sleeves. By changing sleeve width with -0.5cm, 0cm, 0.5cm, 1cm and 1.5cm, 5 samples were made. 8 subjects wore samples to evaluate the comfort and beauty of Ao Dai sleeves with five levels of psychological scale method. It could be seen that, sample A₃ was the most appropriate one, which could satisfy comfort and beauty request. The study identified the suitable sample through optimizing the sleeves pattern which was evaluated with five levels of psychological scale method.

Introduction

As one kind of traditional clothing, Ao Dai known as Vietnamese national costume is very popular [1]. Ao Dai is used as work uniforms in many different fields including Airlines companies [2]. As Airlines stewardess uniform, Ao Dai promotes Vietnamese costume culture with its unique folk style. In order to be fitted and beautiful, the sleeves of Ao Dai are designed as one-piece raglan sleeves with no shoulder seam, small armhole depth. Due to fitted, the sleeves of Ao Dai limit the freedom of arms motion when stewardesses raise hands over head or move arms frequently. Based on the above requirements, optimizing the pattern of Ao Dai sleeves to obtain suitable sleeves with aesthetic and comfort is meaningful.

Methodology

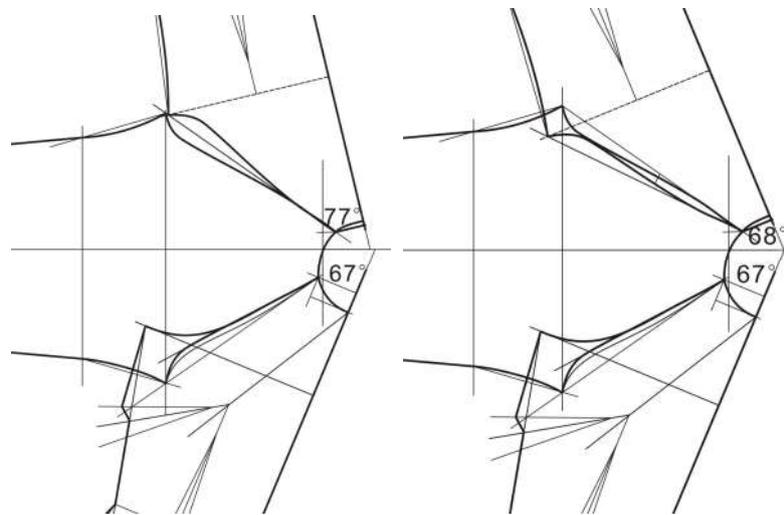
One-piece raglan sleeve analysis

One-piece raglan sleeve, namely the front piece sleeve and back piece sleeve are joined to be one piece in sleeve center line with no seam. The sleeve center line slope (usually 0° ~ 20°) of one-piece sleeve is based on shoulder slope (average Asian women shoulder slope is 20° [3]), and the connection points of sleeve and body pieces are set on front and back armpit points [4]. In general, the bicep line and the sleeve center line slope decrease with the increase of sleeve width.

Vietnamese Ao Dai sleeves structure analysis

Ao Dai structure draft is formed according to long-time experience, whose style is similar to Chinese cheongsam. Ao Dai sleeves can be classified as raglan sleeves. However they have no visualized angle between sleeve center line and horizontal line. Firstly pieced body structure with sleeve structure together (Fig. 1a), resulting in 23° (90° - 67°) between front sleeve center line with horizontal line and 13° (90° - 77°) between back sleeve center line with horizontal line. Then

second rotation, the back angle changed from 13° to 22° (Fig. 1b). Through two times of rotation, Ao Dai sleeve center line slope was found to fit well with Asia female's front (22°) and back (18°) shoulder slope [5].



a First Structure analysis b Second structure analysis
Fig. 1: Analysis of Ao Dai body structure and sleeve structure

Ao Dai sleeve structure optimization

Data

17 positions data of 40 Human airlines stewardesses were collected (tab. 1) by SPSS to extract the standard figure, whose data were used to optimize Ao Dai sleeves.

Experimental protocol

Structure was drawn according to the standard figure somatic data. By changing sleeve width with -0.5cm, 0cm, 0.5cm, 1cm and 1.5cm, 5 samples were made, namely A1, A2, A3, A4 and A5 (Fig. 2) .

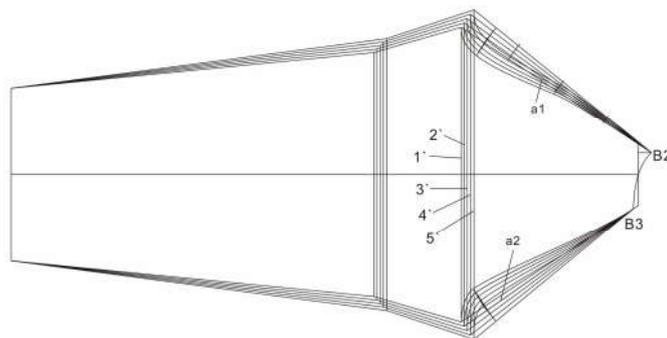


Fig. 2: Optimization of Ao Dai sleeves pattern

5 samples were made by using the same fabric with uniform Ao Dai. 8 subjects of 165/84A were chosen to wear and evaluate aesthetic and comfort of samples subjectively with five levels of psychological scale method. When aesthetic evaluated, subjects should stand naturally and arms droop normally with 5 evaluated positions (shoulder, front armpit, back armpit, upper arm, lower arm). When dynamic comfort evaluated, subjects were required to do 7 representative arm movements for judging the comfort of 6 positions, including above mentioned 5 positions and armhole bottom. The evaluation results were as shown in Fig. 3~ Fig. 10.

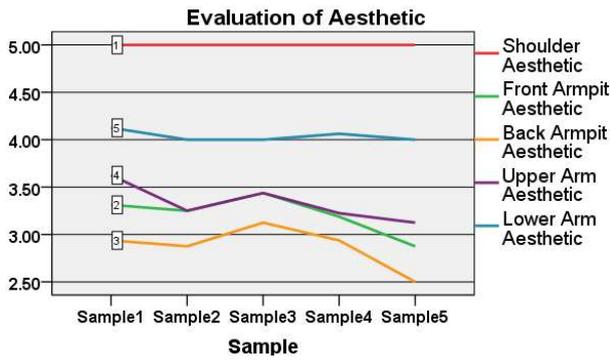


Fig. 3: Evaluation of aesthetic

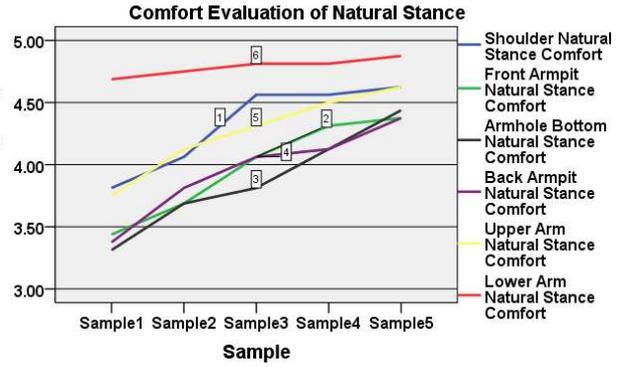


Fig. 4: Comfort evaluation of natural stance

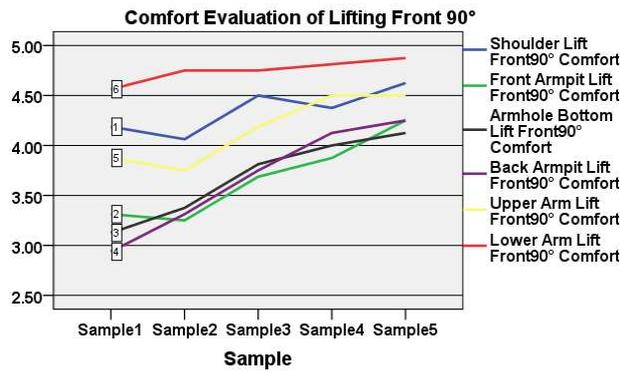


Fig. 5: Comfort evaluation of lifting front 90°

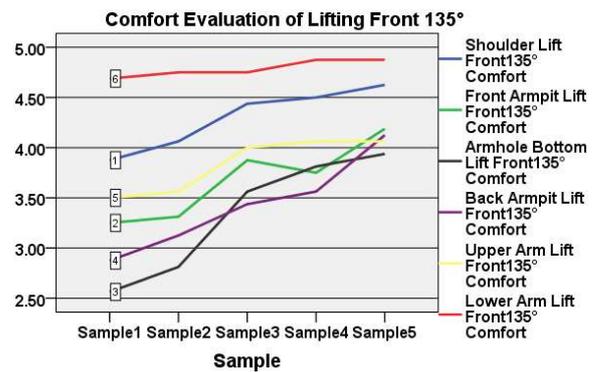


Fig. 6: Comfort evaluation of lifting front 135°

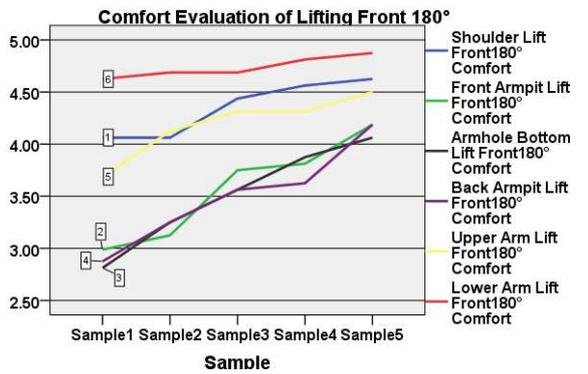


Fig. 7: Comfort evaluation of lifting front 180°

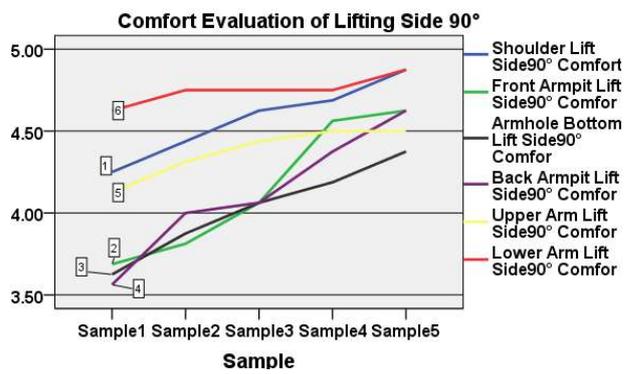


Fig. 8: Comfort evaluation of lifting side 90°

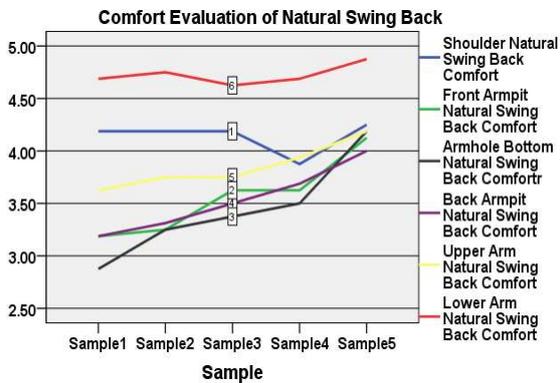


Fig. 9: Comfort evaluation of natural swing back

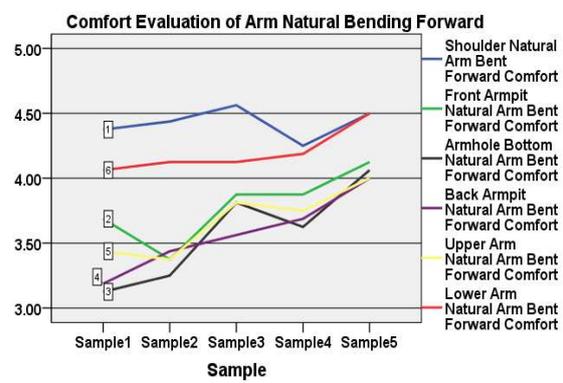


Fig. 10: Comfort evaluation of natural bending forward

Table 1: Measurement of basic statistics

	Mean	Std. Error of Mean	Median	Std. Deviation	Variance	Minimum	Maximum
Height	53.1825	.51494	54.0000	3.25678	10.607	46.00	62.30
Weight	165.0750	.50050	165.0000	3.16542	10.020	158.00	173.50
Dress Length	127.6925	.15285	127.9500	.96673	.935	125.00	129.50
FWL	41.3650	.08818	41.5000	.55772	.311	40.00	42.80
BWL	38.0400	.09653	38.0000	.61051	.373	36.00	39.00
BNP to WP	74.3950	.33040	75.0000	2.08965	4.367	70.00	77.50
S.L.	55.4925	.23652	56.0000	1.49587	2.238	52.50	58.00
N.L.	36.0300	.10973	36.0000	.69400	.482	34.00	37.50
B	84.2450	.37788	83.8000	2.38993	5.712	81.00	92.00
W	67.8925	.52448	68.0000	3.31712	11.003	60.00	74.50
H	90.1000	.44979	90.0000	2.84470	8.092	84.00	96.00
A.G.	33.9650	.12893	34.1000	.81541	.665	31.00	35.20
B.C.	25.9500	.18077	26.2000	1.14332	1.307	22.00	27.30
P.S.	19.6025	.22585	19.3000	1.42837	2.040	17.80	22.00
FNP to Bust	19.0675	.10606	19.0000	.67078	.450	18.00	21.00
N.B.	16.6475	.09641	16.5000	.60974	.372	15.50	18.50
S.S.	21.1950	.16878	21.0000	1.06746	1.139	19.50	23.50

Conclusions

By using five level psychological scale method to evaluate the static beauty and dynamic comfort of the samples, it could be seen that sample A1 was the best on aesthetic, but the worst on comfort; Sample A2 was slightly inferior to the sample A3 on aesthetic, but comfort was poorer; Sample A3 was slightly inferior to the sample A1 on aesthetic, and better on comfort, which could satisfy the working requirements; The sleeves of sample A4 and A5 were loose, so comfort was good, but poor on aesthetic. The aesthetic ranking was $A1 > A3 > A2 > A4 > A5$, and the comfort ranking was $A5 > A4 > A3 > A2 > A1$.

Above all, sample A3 could meet the requirements of the stewardess uniform both on aesthetic and comfort.

References

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