Evaluation of Efficiency of Ease Techniques for Blouse Arm Holes

Saichon Mongkon[1,a,b*], Srikanjana Jatuphatwarodom[2,b], Sutusanee Boonyobhas[3,b], Sakorn Cholsakorn[4,b] and Rattanaphol Mongkholrattanasit[5,c]

[a]*Phrae Vocational college, Yuntaragitgoson road, Phrae, THAILAND.*
[b]*Faculty of Home Economics Technology, Rajamangala University of Technology Thanyaburi, Pathumthani, THAILAND*
[c]*Department of Textile Chemistry Technology, Faculty of Industrial Textiles and Fashion Design, Rajamangala University of Technology Phra Nakhon, Bangkok, THAILAND*

Abstract The objective of this research was the experiment with the ease techniques on blouse arm holes. The fabrics in the testing were thin silk, cotton muslin, and chiffon. Four ease techniques were basting, gathering by iron press, gather sewing, and pucker foot. The experiment engaged with students, dressmaker, and garment factories stitchers. The standard time measurement method was used. Percentage and average techniques were used for the statistical analysis. The results were as follows: The pucker foot technique gave better performance than the others. Concerning the standard time of the four techniques with the three kinds of fabric, the time of thin silk was 0.27 minutes; of cotton muslin, 0.27 minutes; and of chiffon, 0.34 minutes. Thin silk resulted in the strongest seam of 251.31 newton.

Keywords: Blouse Arm Holes, Ease Techniques, Thin silk, Cotton muslin, Chiffon

1. Introduction

Arms are important parts of human body organs. We move our arms to do our daily lives at all times, day and night, such as to help to get out of bed, open or close the door, wash the face, brush the teeth, drive a car, work and do everything – all activities of our daily lives. Sleeves are important parts of garments. Therefore, we have to wear clothes with sleeves that suit our daily lives [1].There are many styles of sleeves for women according to the fashion trend and generation. Good sleeves must be related to the blouse, look perfect and enhancc the wearer's personality [2].Nice garments must have pretty good sleeves that fit to the body movements. Sleeves must not be tight because arms are most frequently used for changing our body movements [3].

The researcher is a teacher at a vocational college, teaching the students at both the certificate and the diploma levels. In the courses on women's clothing, it was noticeable that the students had problems on sewing the sleeves. The process of sewing women's clothes includes the bodice front, the bodice back, necklines, collars and sleeves. The process of sewing sleeves is the most difficult step for the students. They faced a lot of problems caused by the fabric and the sewing or stitching. The problems caused by the fabric are the sleeves tension and seam pucker arm holes. The problems caused by the sewing or stitching are the inappropriate of thread tension, the irrelative of the lower bottom and the top thread tension, and the under standard of the seams.

*Corresponding author: Tel +66 (08) 41698260
Email address: saichon_2514@hotmail.com (Saichon Mongkon)

From the above problems, the researcher was interested in finding the solutions to these problems about sewing blouse sleeves. An experiment was undertaken to compare the gathering of 3 blouse arm holes from 3 kinds of fabric: a thin silk, muslin and chiffon, with 4 techniques: basting, gathering by iron press, gather sewing to guide and pucker foot. The outcome of this research will be useful for students, manufacturers and interested people.

2. Experiment

2.1 Materials

2.1.1 Three kinds of fabrics: thin silk, muslin, and chiffon.

2.1.2 Thread number 60 made by fiber polyester 100% twisted 35: inch.

2.2 Equipment

An industrial straight stitch sewing machine gathering pucker foot, an iron, an industrial needle DB No.11, a needle No.7, a time recorder, Instruments for tensile Strength Testing, Mettler Toledo, thickness of fabric by a standard test ASTM D 1777 – 96, Magnifying glass.

2.3 Methods

2.3.1 Testing the physical properties of thin silk, muslin, and chiffon.

2.3.2 Testing the sewing ease techniques using 4 techniques which are basting, gathering by iron press, gather sewing to guide, and pucker foot to find out the solutions to sewing blouse arm holes.

2.3.3 Recording the standard time for gathering the blouse arm holes by a time recorder. The Complete Randomized Design (CRD) was employed while three kinds of fabrics and 4 methods were repeatedly experimented, resulting in 12 x 3 or 36 statistic mean.

2.3.4 Testing the tensile Strength of fabric after ease by a standard test ASTM D 1683 - 04.

2.3.5 Comparing the standard time. Analysis of variance ANOVA and hypothesis testing of the samples over two or more groups (One - Way ANOVA: F-test) were used.

3. Results and Discussion

The experiment was on using 3 kinds of fabrics: a thin silk, muslin cotton, and chiffon in sewing the arm holes with the following four techniques: basting, gathering by iron press, gathering sewing to guide, and pucker foot to guide. The result was as follows:

3.1 Testing the physical properties of thin silk, muslin, and chiffon.

Table 1: *Results of testing the physical properties of thin silk, muslin, and chiffon.*

Physicaltesting	Results of testing		
	thin silk	muslin	chiffon
Fabric weight	66.04 g/m2	73.59 g/m2	76.06 g/m2
Thickness	0.044 mm.	0.057 mm.	0.106 mm.
Number warp:inch	99	103	108
Number weft:inch	70	87	84
Size warp	55.44 deniers	113.40 deniers	101.52 deniers
Size weft	170.28 deniers	82.20 deniers	119.16 deniers
Twist warp	S turn	Z turn	S turn
Twist weft	-	Z turn	Z turn

Table 1 showed the testing results of the physical properties of thin silk, muslin cotton, and chiffon. In terms of weight, thickness and the number of warp, all were similar. The number of warp of the three fabrics is 66.04 g/m, 73.39 g/m, and 76.06 g/m grams per square meter respectively. Thin silk has the smallest weft thread of 55.44 deniers, followed by the chiffon of which the weft thread was 101.52 deniers. Muslin cotton has the smallest deniers of 82.20 deniers; the next was chiffon' of 119.16 deniers. The weft of thin silk was the biggest; 170.28 deniers. Twisting of muslin cotton was the Z turn style while the chiffon is the S turn style in warp and the Z turn in weft, and thin silk twist was the S turn style in warp but untwisted weft.

3.2 Testing of sewing the arm hole

The four techniques employed are: basting, gathering by iron press, gathering sewing to guide and pucker foot to guide as shown in Figure 1 – 4.

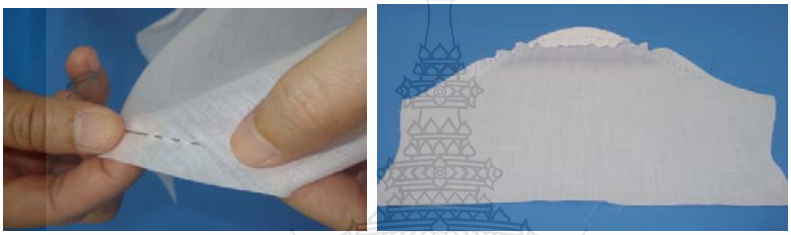

Figure 1: *Basting*

Ease Technique for Blouse Arm Holes by basting uses needle No.7 most of the thread 1 line Blouse Arm Holes by basting distance of 3 stitches 1 inch.

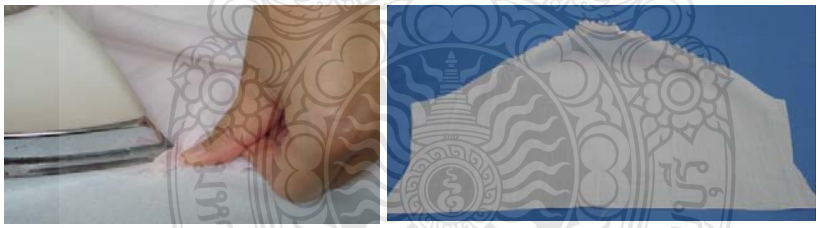

Figure 2: *Iron press*

Ease Technique for Blouse Arm Holes by iron press angle uses iron to press on Arm Holes by thumb angle iron.

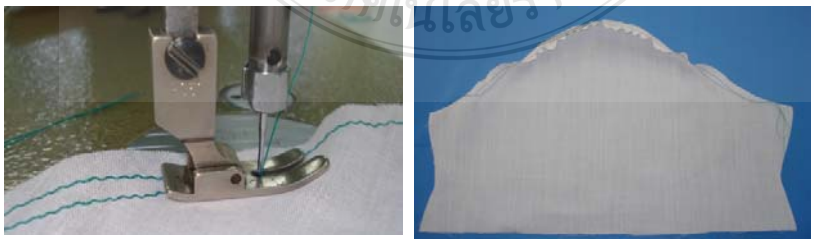

Figure 3: *Gathering sewing to guide*

Ease Technique for Blouse Arm Holes by gathering sewing to guide uses stitches sewing machine sewing draw a line 2 line to blouse arm holes select lock stitch length 7 stitches:1 inch.

Figure 4: *Pucker foot to guide*

Ease Technique for Blouse Arm Holes by pucker foot to guide uses Industrial straight stitches sewing machine 1 line sewing in blouse arm holes by pucker foot to guide select lock stitches length 7 stitches:1 inch bobbin thread adjusting to tight.

3.3 Comparing the standard time of the four Ease Techniques for Blouse Arm Holes by a time recorder

Comparison of the standard time of the four Ease Techniques for Blouse Arm Holes: basting, gathering by iron press, gathering sewing to guide, and pucker foot to guide in the 3 experimental groups.

Table 2: *The standard time of Ease Techniques for Blouse Arm Holes by basting.*
unit : minute

Experimental group	people	Thin silk mean	Average	muslin mean	Average	chiffon mean	Average
student	1	1.54	1.52	2.10	2.04	3.54	3.63
student	2	1.47		2.16		3.14	
student	3	1.55		1.88		4.21	
dressmaker	1	0.39	0.43	0.57	0.88	2.00	2.21
dressmaker	2	0.52		0.58		2.31	
dressmaker	3	0.40		0.56		2.33	
garment factories sewing worker	1	0.50	0.51	1.42	1.53	2.29	2.65
garment factories sewing worker	2	0.52		1.62		3.24	
garment factories sewing worker	3	0.53		1.57		2.43	

From Table 2, the findings of the study on the standard tine of sewing the arm hole by gathering with basting indicated that the dress maker spent the least time to ease a thin silk at sleeve with the average time of 0.43 minutes; next was the garment factory sewing worker, spending the average time of 0.51 minutes and the students, spending the most time of 2.04 minutes. Besides, in gathering the average arm hole of chiffon, the dressmaker spent the least average time of 2.21 minutes while the garment factory sewing worker spent 2.65 minutes and the student spent the most average time of 3.63 minutes.

Table 3: *The Standard time of the Ease Techniques for Blouse Arm Holes by iron press*
unit : minute

Experimental group	people	Thin silk mean	Average	muslin mean	Average	chiffon mean	Average
student	1	2.52	2.93	0.35	0.34	0.44	0.46
student	2	3.12		0.47		0.51	
student	3	3.17		0.22		0.43	
dressmaker	1	1.04	1.15	0.18	0.19	0.20	0.21
dressmaker	2	1.31		0.19		0.21	
dressmaker	3	1.11		0.21		0.23	
garment factories sewing worker	1	2.06	1.86	0.33	0.29	0.34	0.35
garment factories sewing worker	2	2.07		0.26		0.30	
garment factories sewing worker	3	1.45		0.31		0.43	

From Table 3, the findings of the study on the standard tine of sewing the arm hole by iron press indicated that the dress maker spent the least average time of 1.15 minutes to ease a thin silk at sleeve; next were the garment factory sewing worker spending the average time of 1.86 minutes, and the students spending the most time of 2.93 minutes. Besides, in gathering the average arm hole of muslin, the dress maker spent the least time of 0.29 minutes, next were the garment factory sewing worker spending 0.29 minutes and the student spending the most average time of 0.34 minutes. In gathering the average arm hole of chiffon, the dress maker spent the least time of 0.21 minutes; next were the garment factory sewing worker spending 0.35 minutes and the student spending the most average time of 0.46 minutes.

Table 4: *The standard time of Ease Techniques for Blouse Arm Holes by sewing to guide*
unit:minute

Experimental group	people	Thin silk mean	Average	muslin mean	Average	chiffon mean	Average
student	1	0.55	0.90	0.49	0.64	1.48	1.77
student	2	1.15		0.88		2.31	
student	3	1.02		0.56		1.54	
dressmaker	1	0.29	0.37	0.23	0.25	0.42	0.47
dressmaker	2	0.38		0.24		0.48	
dressmaker	3	0.46		0.30		0.53	
garment factories sewing worker	1	0.25	0.29	0.20	0.25	0.54	0.88
garment factories sewing worker	2	0.32		0.28		1.08	
garment factories sewing worker	3	0.30		0.27		1.03	

From Table 4, the findings of the study on the standard time of sewing the arm hole by gathering sewing to guide indicated that the garment factory sewing worker spent the least average time of 1.15 minutes to ease a thin silk at sleeve; next were the dressmaker, spending 0.37 minutes and the students, spending the most time of 0.64 minutes. Besides, in gathering the average arm hole of chiffon, the dress maker spent the least time of 0.47 minutes; next were the

garment factory sewing worker, spending 0.88 minutes and the student spending the most average time of 1.77 minutes.

Table 5: *The standard time of Ease Techniques for Blouse Arm Holes by pucker foot to guide*
unit: minute

Experimental group	people	Thin silk mean	Average	muslin mean	Average	chiffon mean	Average
student	1	0.50	0.46	0.49	0.47	1.31	1.32
student	2	0.52		0.53		1.54	
student	3	0.38		0.40		1.11	
dressmaker	1	0.14	0.14	0.16	0.18	0.17	0.18
dressmaker	2	0.12		0.15		0.18	
dressmaker	3	0.16		0.18		0.20	
garment factories sewing worker	1	0.20	0.22	0.13	0.19	0.41	0.30
garment factories sewing worker	2	0.23		0.22		0.30	
garment factories sewing worker	3	0.24		0.22		0.20	

From Table 5, the findings of the study on the standard time of sewing the arm hole by pucker foot to guide indicated that the dressmaker spent the least average time of 0.14 minutes to ease a thin silk at sleeve; next were the garment factory sewing worker, spening 0.02 minutes and the students, spending the most time of 0.46 minutes. Besides, in gathering the average arm hole of muslin, the dress maker spent the least time of 0.16 minutes; next were the garment factory sewing worker, spending 0.19 minutes and the student spending the most average time of 0.47 minutes. In gathering the average arm hole of chiffon the dressmaker spent the least time of 0.18 minutes; next were the garment factory sewing worker, spending 0.30 minutes and the student spending the most average time of 1.32 minutes.

Table 5: *Compare with the standard time of Ease Techniques for Blouse Arm Holes*

unit: minute

fabric	Average Time of Ease Techniques for Blouse Arm Holes			
	basting	iron press	gather sewing	pucker foot
Thin silk	0.82	1.98	0.58	0.27
Muslin	1.43	0.27	0.38	0.27
Chiffon	2.83	0.34	1.04	0.60

From Table 5, Compare with the standard time of Ease Techniques for Blouse Arm Holes found that thin silk by iron press spending the most time of 1.98 minutes and pucker foot spent the least time of 0.27 minutes; muslin by basting spending the most time of 1.43 minutes and iron press, pucker foot spent the least time of 0.27 minutes; chiffon by basting spending the most time of 2.83 minutes and iron press spent the least time of 0.34 minutes.

Table 6: *The analysis of the Variance of the experiment on the arm hole sewing using 4 techniques*

Source of variation	df	SS	MS	F	Sig
Between groups	3	2.976	0.992	1.851	0.216
Within groups	8	4.287	0.536		
Total	11	7.263			

From Table 6, the analysis of the Variance of the experiment on the arm hole sewing, using 4 techniques indicated that the time spent to ease arm hole on the 3 types of fabrics: thin silk, muslin cotton, chiffon was not significantly different at the reliability level of 0.05. The standard time of gathering the arm hole of muslin was the least at 0.60 minutes; of the thin silk, 0.89 minutes, and of the chiffon, 1.20 minutes. Actually, the working hour of the garment industrial factory was 8 hours or 480 minutes per day. The minimum wage according to the labor law was 215 baht per day. Hence, the cost of gathering the arm hole of muslin cotton was 0.26 baht (215x0.06/480) while the cost of gathering the arm hole of thin silk was 0.39 baht 215x0.39/480) and the cost of gathering the arm hole of chiffon was 0.53 (215x0.53/480) [4]. Obviously, the gathering arm hole of muslin cotton needed the least time of only 0.60 minutes and the cost of 0.26 baht.

3.4 Testing the tensile strength of fabric after ease by a standard test: ASTM D 1683 - 04. (Standard test method for failure in sewn seams of woven apparel fabrics)

Table 7: *The test of tensile strength of fabric*

Fabrics	Tensile Strength (newton)
Thin silk	251.31
Muslin Cotton	174.95
Chiffon	197.90

From Table 7, the test of tensile strength of fabrics indicated that thin silk had the most tensile strength of 251.31 newtons. Because silk was natural fibers having the highest toughness; next were the chiffon with 197.90 newtons of tensile strength, and cotton muslin with the least tensile strength of 174.90 newtons, due to its least toughness quality.

Compared with standard student uniform[5] regulative physical characteristics the strength of the seam students wear uniforms for students wear uniforms have quality and materials suitable for use. With quality materials, the strength of the seam should not be less than 120 newtons.Can see that the three types of fabric the strength of the seam, rather than the standard.

4. Conclusion

The comparison of the efficiency of gathering the arm hole indicated that gathering the arm hole of thin silk by iron press spending the most time of 1.98 minutes and pucker foot spent the least time of 0.27 minutes; muslin by basting spending the most time of 1.43 minutes and iron press,pucker foot spent the least time of 0.27 minutes; chiffon by basting spending the most time of 2.83 minutes and iron press spent the least time of 0.34 minutes Concerning the strength of the seam, thin silk showed the highest strength of the seam; however, the skills and expertise of the stitcher can affect the efficiency of sewing.

5. Acknowledgement

I would like to express my grateful appreciation to the Office of Vocational Education Commission, Ministry of Education for the support and fund, and my special thanks to all of my lecturers. I would also like to thank the Textile Chemical Technology Department, Faculty of Industrial Textiles and Fashion Design, Rajamangala University of Technology Phra Nakhon for the kind support with the testing textile instruments.

6. Reference

[1] Tomli, R., **GARMENT AND PROCESS OF CUTTING AND SEWING CLOTHES**. United Stante Patent +Office. Patent No. 2886821. 19 May 1959
[2] Jaruwan supplungh. **The costume designer**. Bangkok: Odeon Store, 2000
[3] Verinthon sonprince. **Shapes and patturn making**. 2nd Bangkok: keadkanpim, 2007.
[4] Shikanjana ponasha. **Industry Ready-made Clothing Construction**. Shangshun book Limited.1997
[5] Thai Industrial Standards Institute **Standard school uniform**, uniform cloth.2004