

# The Standardization of Graded Sizes through Comparing Bodice Patterns by Draping Method and Studied Flat Pattern Method -Using Replica Body-

Kue-Nam Shim

Dept. of Clothing & Textiles, Mokpo National University, Mokpo, Korea

**Abstract :** Education of clothing and textiles in the university is various according to the purposes. Among that clothing construction and practice is what is needed the most in understanding the process of apparel producing, and is the basic subject of areas from apparel designs to quality management. Producing apparel starts from planning the bodice pattern according to the human body shape. Basic bodice pattern should be highly practical so that production of all items of apparel patterns can be possible. Also, a basic bodice pattern needs to be planned in the way that even beginners can use it by classifying sizes according to each body measurements. Thus in this study, bodice patterns will be produced in way of draping method subjecting university students in early 20s, standardized and classified sizes will be calculated from it and bodice pattern made by studied flat pattern method will be examined and compared so that finally suitability will be compared. As a result of examining and comparing bodice patterns made by draping method and studied flat pattern method on the model of the human body produced by plaster method, sizes were classified into 5 levels. As a result of evaluation of creation, satisfying consequence from various body shape was acquired and it is expected of the beginners who are stating from clothing construction and practice to be educated by using the result of this study.

**국문요약 :** 대학에서 의류학과 교육은 그 목적에 따라 다양하나 의복구성은 의복제작과정을 이해하는데 필요한 것으로 의복디자인분야 부터 품질관리에 이르기까지 기본과목으로 되어있다. 의복제작은 인체의 이해에 따른 기본원형의 설계로 시작된다. 기본원형은 활용이 다양하여 모든 종류의 의복 패턴 제작이 가능해야 한다. 또한 각 인체 치수에 맞는 사이즈를 등급화하여 초보자라도 누구나 활용할 수 있는 기본원형을 설계하는 것이 필요하다. 따라서 본 연구는 20대 초반의 대학생을 대상으로 입체재단 방법에 의한 기본원형을 제작하여 등급별로 표준화된 치수를 산출하고 연구된 평면재단 방법에 의한 길의 기본원형을 비교·검정하여 적합성을 비교하였다. 석고법에 의하여 제작된 인체 모형에서 드레이핑된 기본원형과 연구된 평면재단 방법에 의한 기본원형을 비교 검정한 결과 5단계로 치수를 등급화 하였다. 착장평가 결과 다양한 체형에 만족한 결과를 얻어 의복구성을 시작하는 초보자들에게 활용하여 교육할 수 있으리라 기대한다.

**Key words :** standardized and classified sizes, draping method, studied flat pattern method, Replica body

## 1. Introduction

Education of clothing and textiles design and manufacturing in the university is various according to the purposes. Specifically, clothing construction and practice is what is needed the most in understanding the process of apparel production, and is the basic subject of areas from apparel designs to quality management. Producing apparel starts from planning the bodice pattern according to the human body shape.

Basic bodice pattern should be highly practical so that production of all items of apparel patterns can be possible.

Also, a basic bodice pattern needs to be planned in the way that even beginners can use it by classifying sizes according to each body measurements.

Research on regarding size and grading by Kwon *et al.*,

(1998, 2000) and research on comparing woman apparel size system by Lim *et al.*,(1999) are basic researches for regarding size and grading of bodice pattern.

The intention of this research is to classify bodice pattern by sizes and do the grading so the college students who major in clothing and textiles can use it easily.

Thus this experiment was done in the following steps, with university students in their early 20s.

Step 1: Sizes of each area of the body, which are required for drawing Flat Pattern, were measured and a body form was produced for the Draping Method (by way of replica method.).

Step 2: The suitability of fitness of basic upper garment produced by way of flat pattern method and draping method is evaluated

Step 3: Those with standardized body type were chosen among the subjects, and with their breast circumference as the standard, the sizes of each body areas were classified, then the averages of each body areas from each classified categories were calculated.

Experimental garment (basic upper garment) made by flat pattern, which was produced by the calculated average sizes of each body areas were given to the subjects of each appropriate size categories and they evaluated the suitability in the state of apparels put on.

## 2. Material and method

### 2.1. Subjects

70 people were chosen whose drop size (difference between waist and breast size) was 12~20 cm, excluding special body shape, during 1999/3/20~2001/10/31. For Draping Method, the bodice form was built by plaster (replica) (Shim, 1999). To examine the possibility of body form use, each sizes of the part are measured and compared to human body size. The error extent is within 5%. The comparison categories were chosen and limited to widths (Front intersected breadth, Back intersected breadth), lengths (Front waist length, Posterior shoulder length, back length, Neck point to nipple length, Nipple to nipple length) and circumference (Bust Circumference, Waist Circumference) of important parts of body.

### 2.2. Flat pattern method and draping method

For producing experimental garments, Flat Pattern Method was based on Shim(1999) standard but was partially amended in reference of evaluation of wearing, and Nancy(1995) method was used for Draping Method. Basic bodice pattern is produced by flat pattern method

**Table 1.** Measuring item

Item	Size(cm)
Bust circumference	86
Waist circumference	65
Front waist length	39.5
Back length	37
Front intersected breadth	33
Back intersected breadth	35
Posterior shoulder length	38
Neck point to nipple length	16
Nipple to nipple length	23.5

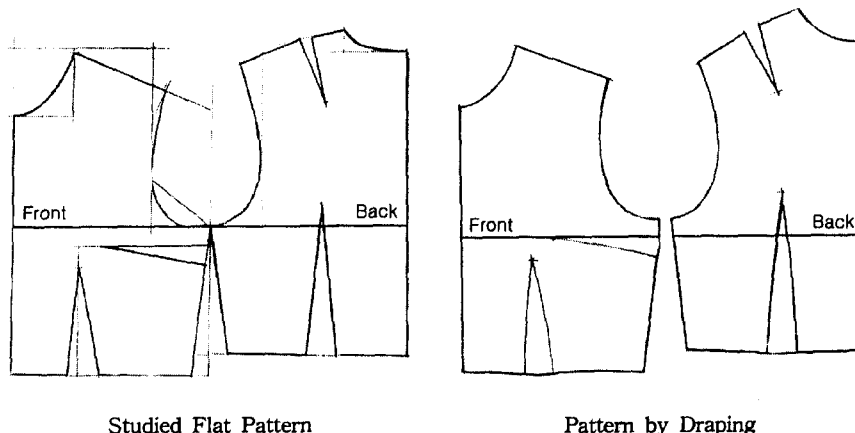
which is was made by measuring each human body sizes of selected subjects and also by draping method from body form of each subjects. Experimental garments (basic upper garment) are made for the evaluation when worn by each basic pattern. Basic bodice patterns drawing by two different methods are shown in Fig. 1, and body sizes used in the experiment are shown in Table 1.

### 2.3. Characteristic of material

Material was cut in regular sizes; its strands were organized and were ironed in natural condition after being wet. Physical characteristic of material for producing basic dress is shown in Table 2.

### 2.4. Appearance test

The suitability of fitness of basic upper garment pro-



**Fig. 1.** Basic bodice pattern.

**Table 2.** Characteristics of material

Material	Weave	Weight(g/cm) (KS K0991)	Thickness(mm) (KS K0506)	Density filaments/inch)(KS K0511)	
				Warp	Weft
Cotton100%	Plain	2.98	0.31	62	64

**Table 3.** Item of appearance

No.	Item of appearance test	5pt	4pt	3pt	2pt	1pt
1	Is the circumference of neck in the appropriate position and is it wrinkle free?					
2	Is the neck area wrinkle free?					
3	Are the shoulder point, side?					
4	Is the extra space of front intersected breadth enough?					
5	Is the extra space of back-intersected breadth enough?					
6	Is the bust point on the appropriate position and is the breast line parallel with horizontal line?					
7	Is the arm hole line on the appropriate position and is the extra space?					
8	Is the arm hole area wrinkle free?					
9	Is the waist line on the appropriate position and parallel with horizontal line?					
10	Is the amount and length of anterior dart of waist line appropriate and on the appropriate position?					
11	Is the amount and length of posterior dart of waist line appropriate and on the appropriate position?					
12	Is the extra space of breast line appropriate?					
13	Is the extra space of the waist line appropriate?					
14	Is the feeling in the arm area when worn well?					
15	Is the appearance as a whole well?					

duced by way of flat pattern method and draping method is evaluated. Appearance inspectors were composed of a total of 10 - 5 apparel construction major professors and 5 professional pattern makers with actual industrial career experience. Evaluating was done in scores ranging from 5 (very good) to 1 (very bad) for 12 categories. Each category was to be checked for the appropriate score <Table 3>.

### 2.5. Statistic and analysis

T-test was operated in order to get average, standard deviation of appearance test points for each category and to test differences. Using Windows SPSS did analysis.

## 3. Results and discussion

### 3.1. Choosing subjects

Body form was produced with 70 female university students in their early 20s. Difference from actual body size was examined and 52 of them were chosen in the first step. 36 of them who had standard body form were determined to be the subjects of this experiment. The classification was done for 36 subjects; the unchosen 16 subjects were the ones with out-of-standard-range shoulder angle. On the base of recent researched average of shoulder angles of women in their 20's, angles below 15° and above 26° were excluded.(Mee-Sung, Choi 2000). Chosen subject of actual research was 52 among the 70 originally chosen for experiment. Subjects were limited standard somatotypes by the research of Lee(2001). Table 4 shows the average rate of errors by each subject for each of the compared categories. It clearly shows that the sizes of actual body and body form closely match - by the fact that each category error rate is within the range of 0.3~4.4%(Lee, 2001).

**Table 4.** An error rate by item

No.	Item	Error	Error rate
1	Bust circumference	0.1~2.0 cm	0.6~2.4%
2	Waist circumference	0.2~1.0 cm	0.3~1.5%
3	Front waist length	0.2~1.5 cm	0.6~3.9%
4	Back length	0.5~1.6 cm	1.4~4.4%
5	Front intersected breadth	0.5~1.1 cm	1.6~3.5%
6	Back intersected breadth	0.5~0.9 cm	1.5~2.7%
7	Posterior shoulder length	0.3~1.5cm	0.8~3.9%
8	Neck point to nipple length	0.1~0.7 cm	0.5~3.2%
9	Nipple to nipple length	0.2~0.7 cm	1.1~3.9%

### 3.2. Evaluation in state of worn

The results of the analyzed evaluation of the original experimental clothing produced by the Flat Form Method and Draping Method are shown in Table 5.

The Flat Pattern Method and Draping Method each received 3.66 and 3.82 points - which is higher than standard - by an average point as a whole. The evaluation results were higher for both categories compared to Lee (2001), but the fact that experimental clothing made by Draping Method gets a higher evaluation remains valid. The category with difference was only one item, which is less than 5 items from Lee, Young-Woon's. The reason seems to be due to partial rearrangement for correcting the discordance of shoulder lines and unnecessary wrinkles around shoulder area of the original bodice pattern (1999). Thus, it is clear that standard somatotype does not have much difference in adequacy, whether it is made in the Method of Draping or Flat Pattern.

**Table 5.** The results of the external sensory evaluation

No.	Flat pattern		Draping		T-value	F
	M	SD	M	SD		
1	3.65	0.79	3.67	0.89	0.109	.915
2	3.55	1.06	3.73	0.96	0.090	.927
3	3.53	1.15	3.62	0.88	1.041	.044
4	3.91	0.96	4.30	0.86	1.190	.236
5	3.68	0.90	3.72	0.04	1.679	.096
6	3.82	0.88	3.88	0.99	1.986	.053
7	3.63	0.93	3.80	0.06	1.825	.071
8	3.95	0.98	4.52	0.83	1.807	.006**
9	3.79	0.95	3.89	0.01	2.765	.080
10	3.55	0.76	3.82	0.01	1.621	.108
11	3.70	0.90	3.82	0.90	0.676	.501
12	4.13	0.96	4.17	0.05	0.722	.472
13	3.35	0.91	3.50	0.06	0.826	.410
14	3.18	1.12	3.30	0.10	0.571	.568
15	3.51	0.83	3.57	0.84	0.209	.829
	3.66		3.82			

\* $0.01 < \alpha < 0.05$  \*\*  $0.001 < \alpha < 0.01$  \*\*\* $\alpha < 0.001$ 

### 3.3. Regarding size and grading

As basic upper garment produced by flat pattern method got good evaluation with basic upper garment by draping method- as a result of evaluation when worn- it is assumed that the result can be size regarded and graded. Thus for regarding size and grading, 82.1cm which is the average breast width of women aged 20~24 in reference to national body size report(1998) was used as standard grading which is the basic size(Bust Circumference) of an upper garment was decided to be 3 cm in reference to woman apparel size of Korea Agency for Technology and Standards(1999). As a result of this way of classification,

size category was divided into 5. As for the rest 8 sizes, the average of the sizes that go under each breast width size category were calculated. Table 6 shows 5 grading of measurement of sizes for drafting basic bodice pattern.

### 3.4. Examination

5 basic upper garments produced by regarding size and grading which were obtained from Table 6 was clothed on the subjects who fall under each size category, and the suitability of fitness was evaluated. The result of the evaluation is shown in Table 7. Every evaluation categories got high scores. Thus, it is thought that the students who are about to start apparel organization for the first time can study flat pattern by applying basic bodice pattern made by classification in standard of breast width. The result of evaluation in the state of wearing the bodice pattern apparel, which was produced into 5 different graded categories, is shown in Table 6. Because relatively standardized body shaped subjects (N=36) were chosen, the scores were high. Thus, it can be judged that it is possible for the students, who are majoring the apparel study for the first time, to be educated in Flat Pattern Method by using this result as a resource.

## 4. Conclusions

As a result of examining and comparing bodice patterns made by the Draping Method and the Studied Flat Pattern Method on the model of the human body produced by plaster method, sizes were classified into 5 levels.

As the result of this evaluation, satisfying consequence from various body shapes was acquired and it is expected for the beginners, who are starting from clothing con-

**Table 6.** Regarding size and grading

(unit: cm)

No.	Item	79	82	85	88	91	Mean
1	Bust circumference	77.6~80.5	80.6~83.5	83.6~86.5	86.6~89.5	89.6~92.5	84.62
2	Waist circumference	63.5	65.5	68.5	71.5	75	38.20
3	Front waist length	39.5	40	41.5	43	42	41.10
4	Back length	37	37	38.5	39	39	38.06
5	Front intersected breadth	30.5	31	31.5	32	32.5	31.56
6	Back intersected breadth	33.5	33	34	35	36	34.16
7	Posterior shoulder length	38	38.5	39	39.5	39.5	38.88
8	Neck point to nipple length	23.5	24.5	25	25.5	26	24.90
9	Nipple to nipple length	15.5	16	16	26.5	16.5	16.22
	N	6	11	8	5	6	36

**Table 7.** The result of evaluation

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Mean
Mean	3.67	3.77	3.75	4.08	4.14	4.03	3.86	3.87	3.81	3.72	3.78	4.10	3.75	3.53	3.85	3.85
SD	0.87	0.86	1.13	0.82	0.82	0.87	1.11	0.88	0.88	0.88	0.87	0.87	0.84	1.10	0.78	

struction and practice, to be educated by using the result of this study.

The research of evaluation in state of wearing apparels must be done in each classified categories, and as the body shape changes as time goes by, the research must continue in pace with the change.

This experiment was limited by number of subjects, who is only 36, so it might be dangerous extending the applying extent. Thus, more definite examination is needed by more evaluation of subjects, and as the sizes and formation of human body are changing rapidly, constant measurement and evaluation is needed to be held.

### Acknowledgments

This paper was supported in 2002 by research funds of Mokpo National University

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(2003년 11월 13일 접수)