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Expert sewing and ironing techniques and jacket appearance

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Abstract

Purpose: Cloth can form a curved surface without wrinkling through deformation in shear and tension. Deformation is achieved in clothes production by ironing. We clarify how a skilled worker deforms cloth to produce curved surfaces.

Design/methodology/approach: We investigated advanced techniques of sewing and ironing used to produce three-dimensional jackets and compared jackets made by experts with and without the techniques using the same jacket patterns. We interviewed the experts to clarify the aim of each process.

Findings: Advanced techniques were mainly used on the sleeve, shoulder, armhole, pocket flap and collar. The use of advanced three-dimensional techniques affected the silhouette of the jacket and both parts and the overall shape of the jacket. The shape of the jacket became smoother and more curved and thus better fitted a dress form. The effects of the application of advanced techniques on each jacket part became clear, with all parts mutually affecting the silhouette of the jacket. The experts imagined the form that the designer aimed for in the pattern and accounted for it. In other words, the construction was at the discretion of the experts. It is thus necessary to understand the effects of the techniques in making clothing that is more beautiful and fitted. This will help in designing and producing beautiful and comfortable clothes.

Originality/value: Understanding the effects of expert sewing and ironing techniques will help in the efficient production of clothing that is more beautiful and comfortable.

Keywords: Expert, sewing, ironing, techniques, three-dimensional jacket shape

Paper classification: Research paper

Introduction

Clothing is constructed of sewn cloth to cover a three-dimensional dress form. The clothing form is made up of many non-developable surfaces that cannot become a plane without expansion and contraction. The construction of a clothing pattern involves the deformation of cloth to make a curved surface composed of non-developable surfaces. The outline of the pattern is generally a curve, as is the outline of the resulting clothing. Expansion and contraction of the cloth is necessary to form a curved surface from a plane cloth. Because cloth is easy to deform in shear, tension, and in-plane compression unlike other sheet materials (e.g., paper), it can form a curved surface without wrinkling. To make a three-dimensional shape for clothing, sewing and ironing techniques (moulding, pre-shaping or easing, also known as *kusetori* in Japanese) are used. It is said that these techniques help make a garment more beautiful and comfortable [1–4]. Methods of sewing and pressing techniques for *haute couture* and tailored garments are explained in textbooks covering general sewing and textile curriculums [1–4], and such techniques are necessary in making the final garment shape that the designer and modelist wants.

Recently, factories have begun using automated and alternative pressing techniques in mass production [4]. However, the relationship between the designer's intention and the final product is rarely researched. Furthermore, the effect of the interaction of the design and production process on the final appearance of a garment is unclear.

Niwa et al. [5–7] investigated the effect of sewing techniques on the construction of a man's jacket to clarify the required properties of clothing material when plane cloth is sewn to make clothing. Mahar et al. [8] explained the mechanism of sewing techniques according to shear and compressive deformation. However, they did not clearly present the effects of these techniques. Understanding the effects of such techniques will assist the efficient construction of clothing that is more beautiful and comfortable. We thus observed the process of producing jackets with and without employing these techniques for the same patterns and investigated the effects of the techniques on the final garment shape.

Experimental

In this study, an Italian pattern [9, 10] for a tailored jacket was used to make two sample jackets (Figure 1). One jacket (Jacket I1) was made employing advanced sewing and ironing techniques and the other jacket (Jacket I2) was made without using those techniques. The cloth and sub-materials, such as the interlining and lining, were the same (Table 1). Mechanical properties of the face fabric, laminated fabric and adhesive interlining are given in Table 2. The samples were made by two sewing experts with more than 10 years' experience in making high-quality clothes. In this study, we focused on techniques used in industrial mass production for high end ready-to-wear clothing. Thus, instead of hand sewing, machine sewing was adopted including the use of adhesive interlining and stay tape. We observed the entire process of producing the jackets from cutting to finishing, and compared the jacket shapes in the middle and at the end of the process.

Table 1 Specifications of the cloth and interlining

	Weave structure	**Mass (g/m^2)**	**Yarn count (warp × weft)**	**Density, yarns/cm (warp × weft)**	**Material**
Face fabric	Plain	270	154 × 145 tex	11 × 7	Wool 80%/ Nylon 20%
Adhesive interlining	Plain	31	33 × 33 dtex	40 × 24	Polyester 100%

Table 2 Mechanical properties of the face fabric, laminated fabric and adhesive interlining

	Elongation at 500gf (%) (warp × weft)		**Shear stiffness (gf/cm·degree) (warp × weft)**		**Bending rigidity ($gf \cdot cm^2/cm$) (warp × weft)**	
Face fabric	17.1	17.2	0.75	0.69	0.208	0.151
Laminated fabric	13.3	14.0	1.70	1.47	0.503	0.423
Adhesive interlining	17.7	22.9	0.48	0.48	0.006	0.003

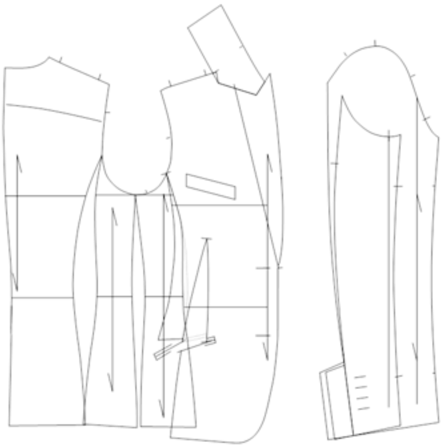


Figure 1 Jacket pattern [9]

Results and Discussion

Priorities of techniques

In making the three-dimensional shape, the sewing experts prioritized 1) preserving the straightness and length of the necessary grainlines of the specified pattern parts and 2) making a three-dimensional shape without changitng the seamline length of the specified pattern parts.

The experts imagined the form that the designer was aiming for in the pattern and treated the cloth according to their own interpretation. In other words, the experts were allowed to use their discretion in the construction of the garment.

Parts and methods of three-dimensional techniques

Different techniques were used depending on the part of the jacket. The parts that techniques were applied to are given in Table 3. The techniques employed for each part are described as follows. We mainly describe the techniques for Jacket I1.

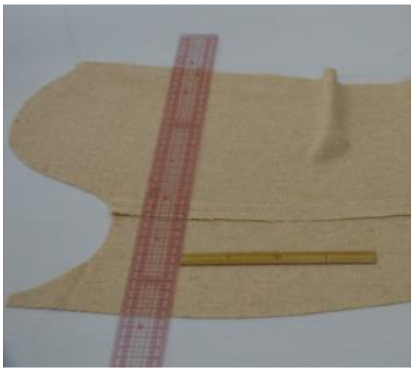
Table 3 Parts to which techniques are applied

Part of pattern	Parts to which advanced techniques are applied
Front bodice	Dart lines, lapel returning line, shoulder line, side panel line
Side bodice	Front line, back line, side line
Back bodice	Center back line, back sideline, shoulder line
Front + side + back bodices	Armhole line, hemline, shoulder line
Collar	Rolling line under collar and top collar
Top sleeve	Side line to join under sleeve

Top + under sleeve	Sleeve hemline, shoulder armhole line, joining line with top and under sleeve
Flap of pocket	Joining line with bodice

1) Sleeve

The experts sewed the under and top sleeves to match each grainline as shown in Figure 2(a). The return line of the sleeve was set not at the seamline of the top and under sleeve but at the line of one-third of the outer sleeve as shown in Figure 2(b). They pressed the top and under sleeve so that the designated line was to be the return line. They also pressed the sleeve hemline according to the return line of the sleeve as shown in Figure 2(c). A running stitch was sewn beside the armhole line to make an inflated sleeve as shown in Figure 2(d).



(a) Agreement of grainline

(b) Return line

(c) Folding of sleeve hemline

(d) Ease stitch around armhole line

Figure 2. Techniques used on the sleeve

2) Collar

To make a smooth rolling line, a running stitch was sewn on the under collar as shown in Figure 3(a). To match the seamline of the top collar to that of the collar band, the top collar was pressed to make the roll line straight and then sewn to the collar band as shown in Figure 3(b).

(a) Seamline on the under collar

(b) Top collar and collar band

Figure 3 Techniques used on the collar

3) Lapel and dart on the front bodice

To make a smooth return line on the lapel, experts bonded stay tape inside the rolling line as shown in Figure (a). At the same time, the lapel was ironed to make a curved surface that covered the bust smoothly. Darts were sewn with reinforced cloth as shown in Figure 4(b).

(a) Stay tape (b) Darts with reinforced cloth

Figure 4 Techniques used for the lapel and dart on the front bodice

4) Shoulder line

To fix the length and shape of the shoulder line, stay tape was bonded beside the shoulder line on the front bodice as shown in Figure 5(a). The shoulder line on the back bodice was contracted to match the length of the shoulder line on the front bodice as shown in Figure 5(b).

(a) Shoulder of the back bodice

(b) Shoulder of the front bodice

Figure 5 Techniques used on the shoulder line

5) Armhole line of the bodice

Because the armscye in the armhole line was on a bias line, it was easy to change. Thus, they considered while pressing not to stretch the cloth. To keep the armhole line, stay tape was bonded on the opposite side of the seam allowance as shown in Figure 6.

Figure 6 Techniques used on the armhole line

6) Hemline of the bodice

To keep the length of the seamline of the hemline, the folded seam allowance of the hemline was pressed without stretching. Thus, the seam allowance did not stick to the face, as shown in Figure 7.

Figure 7 Techniques used on the hemline of the bodice

7) Joining front, side and back bodices

Side and back bodices were sewn by matching each grainline as shown in Figure 8. When the bodices overlapped, they were sewn by pushing the cloth with an iron to provide shear deformation as shown in Figure 9.

Figure 8 Matching grain lines of front, side and back bodices

(a) Sewing (b) Pressing

Figure 9 Sewing and pressing for shear deformation

8) Pocket flap

The pocket flap was sewn on the bodice part. To along with the body when the jacket was put on the dress form, the expert held the bodice part while sewing the pocket flap and sewed it as shown in Figure 10.

Figure 10 Grabbing the bodice

Differences in Jacket Appearance According to Manufacturing Techniques Employed

Figures 11–13 show the final jackets (Jacket I1 and Jacket I2) from the front, side and back. Figure 11-13 reveals different jacket silhouettes obtained using different techniques. Thus, the techniques used affected the appearance of the jackets. The greatest differences were in the sleeve, shoulder, armhole line, pocket flap and collar. We describe the differences for each part in detail below.

(a) Jacket I1 (b) Jacket I2

Figure 11 Photographs of the fronts of Jackets I1 and I2

(a) Jacket I1 (b) Jacket I2

Figure 12 Photographs of the sides of Jackets I1 and I2

(a) Jacket I1 (b) Jacket I2

Figure 13 Photographs of the backs of Jackets I1 and I2

1) Sleeve

Figure 14 shows the sleeves of Jackets I1 and I2. The applied techniques gave the sleeve cap of Jacket I1 a more three-dimensional shape. Additionally, the folding line on the top sleeve of Jacket I1 was more curved. Thus, when the sleeve was fitted on the dress form, a more three-dimensional curve and shape was obtained. In particular, when ironing the wrist line, the folding line was not made at the seamline but at the folding line of the top sleeve as shown in Figure 14 (a). For this reason, the cuffs faced towards the front.

(a) Jacket I1 (a) Jacket I2

Figure 14 Comparison of the sleeves

2) Shoulder line

Figure 15 shows the shoulders of the two jackets. The shoulder lines were sewn contracting for both jackets. However, for Jacket I1, stay tape was used opposite the margin of the shoulder seamline, while for Jacket I2, stay tape was used in the margin for convenience. Ironing was carried out without stretching for Jacket I1, but with stretching in the case of Jacket I2 for convenience. Jacket I1 had a more three-dimensional shape without changing the seamline length of the front bodice. The advanced techniques helped provide three-dimensional shape such that the shoulder parts better fitted the dress form.

(a) Jacket I1 (b) Jacket I2

Figure 15 Comparison of shoulders

3) Armhole

Figure 16 compares the armholes of the two jackets. By applying the techniques used to make Jacket I1, the armhole shape of the pattern is kept after sewing. Without these techniques, the armhole lines lost their shape.

On the armhole lines, the same stay tape was bonded at different places. For Jacket I1, the tape was bonded on the opposite side of the seam margin, while for Jacket I2, the tape was bonded on the seam margin for convenience. On the front bodice, the armhole shape was preserved during sewing and ironing by maintaining the grainline direction for each part.

In the case of Jacket I2, the weft grainlines of the two side bodies were not connected in a straight line. The armhole line deformed owing to the bending of the weft grainline and the method of applying the bonding tape. This deformation resulted in wrinkling on the side of the chest of the front panel and the shoulder part of the armhole. Thus, the deformation of the armhole affected the shape of the shoulder.

(a) Jacket I1 (b) Jacket I2

Figure 16 Comparison of armholes

4) Pocket flap

Figure 17 compares the pocket flaps of the two jackets. When sewing pockets on the bodice of Jacket I1, the expert held the bodice part and sewed it. In this process, the pocket flap was sewn on the bodice part such that it was straight when the jacket was put on the dress form. Consequently, the space between the welts could not be opened. The jacket was fitted on the dress form on the basis of its silhouette.

(a) Jacket I1 (b) Jacket I2

Figure 17 Comparison of pocket flaps

5) Collar

Figure 18 compares the collars of the two jackets. For Jacket I1, a seam line was made at the roll line of the top collar. The top and under collar parts were sewn and ironed by making the roll line straight, and the top collar was then folded at the line without wrinkling or at an angle to make it aesthetically pleasing.

(a) Jacket I1

(b) Jacket I2

Figure 18 Comparison of collars

Conclusion

This study revealed that the silhouette of a jacket is affected by the application of advanced techniques in clothing production. The effects of applying these techniques on each part became clear, and all parts mutually affected the silhouette of the jacket. Therefore, the effects of the techniques need to be considered in the manufacture of clothing that is more aesthetically beautiful and better fitting. This knowledge will help in the efficient design and production of beautiful and comfortable clothes.

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