

An approach to design solution and virtual representation of garments by using three major pattern making principles.

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Abstract:

Pattern making is an accomplished technique requiring technical ability, flexibility for interpretation of design and a realistic understanding of the construction of garments. It is a feature of bridge function between design and development. This is an effective and conservative approach which can be manipulated by a technique known as flat pattern designing to construct the pattern for various types. The making of patterns is the beginning of the cycle of designing garments. Designs are substantially constructed without understanding that the design is based on certain concepts. Pattern making principles are essential to know for making flat patterns and alterations according to individual design. When we perceive the basic principles of pattern making and modification we produce any kind of design without affecting the original pattern size and shape. By knowing the three basic principles, any pattern can be generated and changed. Analyze the designs and determine which principles to apply to the developing pattern in order to ensure that the exact replica of the design will emerge from the finished pattern shapes. Working pattern, consist mainly of basic bodice front and back pattern derived from them. These working patterns should remain seamless. These patterns can be manipulated and changed into the shapes through the slash-spread technique. The slash-spread technique is easy to understand as it clearly illustrates the changes taking place. This paper was designed to understand the three major pattern making principles of a particular design of flat pattern making systems through three dimensional pattern making process.

Keywords:

CLO 3D; Virtual, working pattern; Dart Manipulation; Added fullness; Contouring; Design analysis.

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Introduction:

Pattern creation is a skilled practice that calls for technical proficiency, flexibility in design interpretation, and a realistic understanding of how clothes are made[1]. It is also known as feature of bridge function between design and development. A fundamental or establishment design can be made by any of the two strategies, to be specific, by drafting or by hanging fabric on a dress form[2]. Pattern drafting is characterized as a procedure or strategy of drawing patterns on brown paper with perfection and clarity, based on the body estimations or standard measurement chart[3]. This is an effective and conservative approach which can be manipulated by a technique known as flat pattern designing to construct the pattern for various types.

Now a day's automation has been a key factor of success in modern garment manufacturing industries as well the application of computer and automated system is widely practiced for design solution[4]. However, the majority of current works on computerized pattern drafting have concentrated on the development of a simple pattern modification method allowing pattern professionals to express their talent more quickly, rather than the development of pattern drafting principles[5]. As technology is evolving design solution should be practices in CAD system also besides the manual method in order to meet quick throughput time in terms of solution. Understanding the procedures and guidelines is important prior to pattern drafting processes as this is mandatory to achieve an accurate and precise pattern.

Pattern terminology used to interpret the design solution:

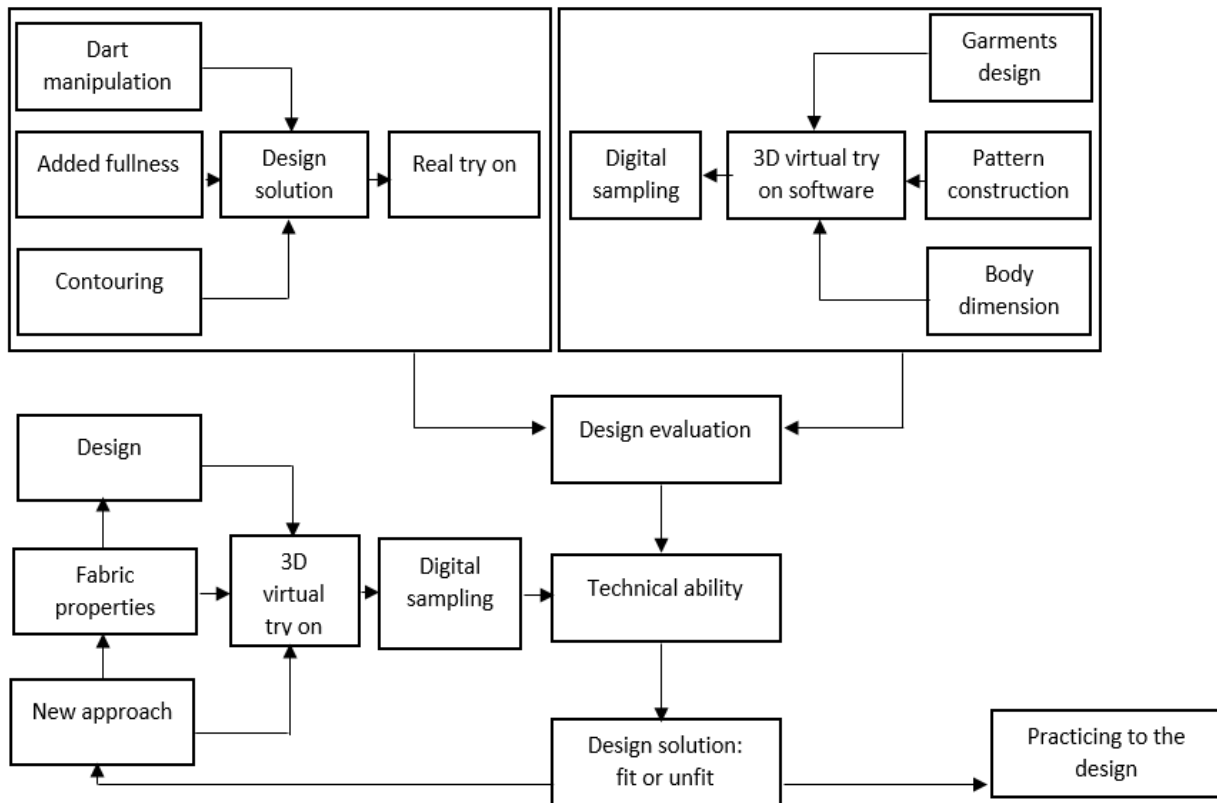
Category	Issue	Technical ability	Ref.
Construction	Basic pattern set	A five-piece pattern set, consisting of front and back bodice and skirt and a long sleeve, illustrating the proportions of a particular shape or figure. Basic patterns are always traced for creating flat patterns of different types, and then further modifications are made by slash and spread techniques.	[6][7][8]
	Flat Pattern	The flat-pattern approach is where the whole pattern is drafted from	7]

	Working Pattern	measurements on a flat surface, using rulers, curves and straight edges[Working pattern is construct conforming to the specific dimension of particular style without allowance. Working pattern pieces are cut and marked for the common name of the pieces and the size of the garment to which they belong	[9][10]
Style line creation	Pattern manipulation	The act of slashing and spreading, or pivoting a pattern to modify its original form. A well-fitting basic block is used when applying either of these techniques. The new form of the pattern represents design features of the garment.	[11][12]
		Pattern plot The act of placing lines on a traced copy of the working pattern relating directly to the design features. The lines are used as guidelines for pattern manipulation.	[13][8]
		Pivotal point A fixed point on pattern, frequently the point of the bust, from which the pattern is pivoted. This makes change of shape to the pattern piece, but does not change the fit	[13][8]
Fit & Balance	Ease	The additional value that we add or subtract from the actual body measurements in order to meet desirable comfort, flexibility and easy movement is called ease	[14][15]
		Stress Stress refers how much pressure generated to the body by garments and vice versa when a garments adorn to a body	[16]
		Strain Strain refers to how much the garment is stretched when being worn to the body	[16]

Principle of the work:

Pattern making principles are essential to know for making flat patterns and alterations according to individual design. It is the responsibility of the patternmaker to analyze designs and determine which principles to apply to the pattern in development to ensure that the exact pattern replica

emerges from the finished pattern shapes. When we perceive the basic principles of pattern making and modification we produce any kind of design without affecting the original pattern size and shape. By knowing the three basic principles, any pattern can be generated and changed.



The above chart depicts the way of applying three pattern principles to a design solution. The task initiated from the application of principles manually based on design analysis. In experiment 2 virtual technique applied to understand the pattern accuracy. After analyzing both experiment we can evaluate the design solution based on pattern accuracy or technical ability. If the pattern construction fit with the design configuration we can suggest the technique for further practicing, if negative further new technique applied to get the desirable solution manually and virtually.

Experimental work-02: Design solution front part

Step 1

At first front pattern needs to be traced on fold with a pushpin and transfer Guideline 6. Their side seam and shoulder guides should be included. Cut pattern from paper and it should remain unfold. Connect guidelines, marking guideline 6 on shoulder left

side of the pattern only. Then Mark A 3 inches from shoulder tip and down 1/4 inch. Mark B and C 1 inch below armholes on side seam guidelines. Draw a curve line from A to B. where after Blend armhole to point C. Draw slash lines from bust points to shoulder tip. Finally cut pattern from paper.

Step 2

In this stage at first Cut slash lines to, not through, the bust points. Then place the pattern on the paper. Close A guideline 6 (broken line) and B waist dart; open new shoulder dart. Draw slash lines from bust points to side seam C to D. Lastly trace the pattern and Draw grainlines.

Step 3

Here in this point slash lines needs to be cut to, not through, the bust points. Then place on paper. After that close A guideline 6 (broken line) and B, C waist dart. Open new shoulder dart D and side dart E. Finally trace the pattern and Draw grainlines.

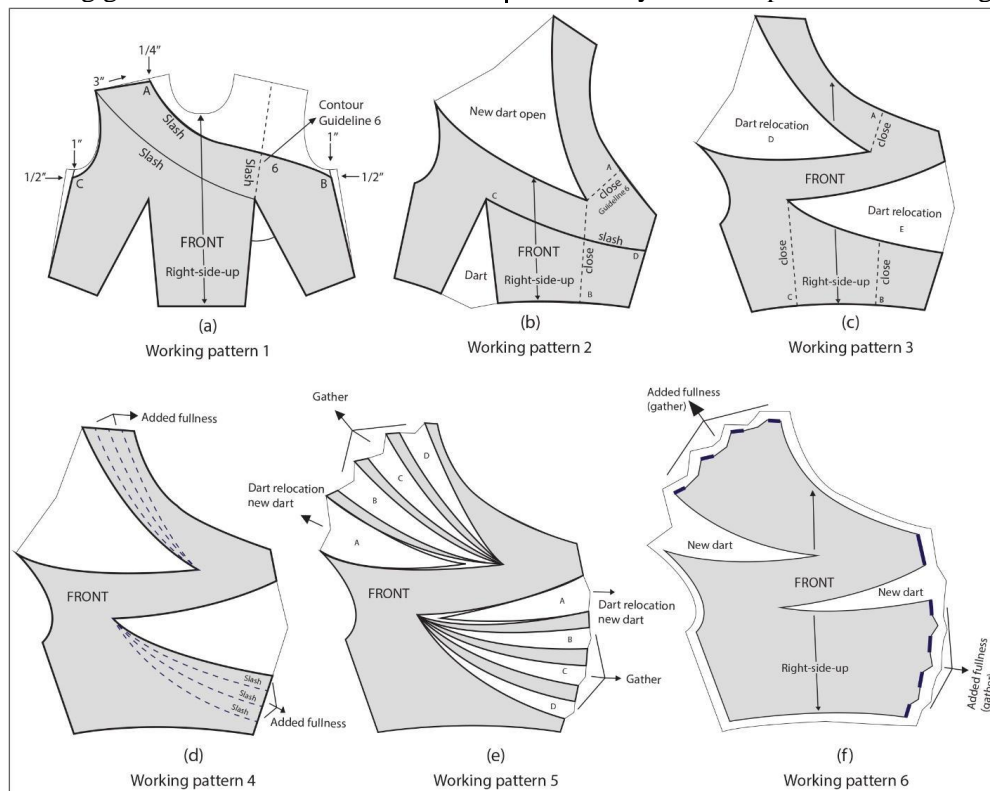


Fig-01: Design Solution (manual) Front part

Step 4

At this stage slash lines needs to cut, not through, the bust points. Then Place on paper. Here we need to ensure new shoulder dart should be minimized and side dart as well. After that slash lines should be opened and add measurements for gather (added fullness). Finally trace the pattern.

Step 5

At this stage dart should be relocated at point A, in both sides Shoulder and side seam. Then redraw the pattern. After this open slash lines and add measurements A, B and C for gather (added

fullness). Finally trace the pattern.

Step 6

New dart relocation in shoulder and side seam (one side). Then mark gather area. Afterwards Trace the pattern and draw grainlines. Lastly add seam allowance.

Experimental work-02: Design solution back part

Step 1

Here back pattern needs to be traced. Then convert mid-Neck Dart B from mid-shoulder A dart. Lastly draw dart legs to the center point of the cross mark.

Step 2

Here at first style line should be repeated and armhole shape instruction should be given for the front pattern (Figure 5). Then Label pattern right-side-up. After that pattern should be cut from

shaded area. Finally, Complete patterns for test fit.

Step 3

Here at first shaded area should be cut from pattern and add seam allowances. Finally, Complete patterns for test fit.

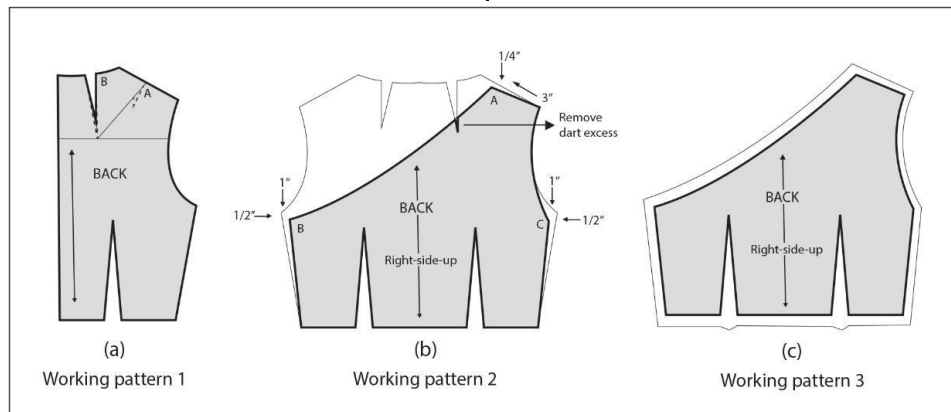


Fig-02: Design Solution (manual) Back part

Experimental work-02: Design solution 3D CLO software

The traditional pattern-making process is very time-consuming and requires professional fashion design knowledge. In order to develop a form-fitting garment to meet customer's individual needs, pattern makers must rely on a "trial and error" procedure until the customer is satisfied. But in Three Dimensional designs, 3D pattern design

lessens the steps necessary in the product development phase. All prototyping is done accurately with less of the chance for human error. In this paper authors did Three Dimensional design analysis of three major Pattern making principles in CLO3D software. Then transferred only one design into paper though printing which was the combination design of the three major pattern making principles.



Fig-03: Design solution 3D CLO software

**Discussion**

The way of pattern making processes is closely related to the fit as well as production. As technology is evolving 2D pattern and 3D pattern are both important for design solution. Design solution are always major concern to the designers, technician, pattern makers or experts to get desired output. In the light of above observation, this paper develops a methodology of reactive 2D/3D procedure to support the garment design modification[17]. Firstly, the designer initiates the design solution by applying slash and spread method to the targeted area in order to create style line maintaining the grain line direction. We can apply contouring and added fullness chronologically to get the desired solution. 3D CLO

software works simultaneously to solve the design which is more effective and efficient methodology of design solution comparing the traditional and modern technology as the 3D software pattern solution will give us stress and strain mapping also besides the fittings. Styling features are always key to find the design solution, but the proper method & media applying play vital rule to come up with good result. As a result 3D practicing besides the manual practicing is important as CAD systems for garment design leads to highly accurate cloth shape results for virtual prototyping and quality evaluation tasks[18]. The results of experiment carried out with the design practitioner are encouraging and prove the validity of our approach and evaluation.

Conclusion

Flat pattern making is the quickest and most effective process designed to create patterns of design that monitor the size consistency and fit of mass-produced garments. Flat pattern making is unusual among other methods in relying on copies of patterns (working patterns) previously produced for manipulation using slash, or pivotal methods. Flat patternmaking is based on three major patternmaking principles and techniques: *dart manipulation* (relocating darts), *added fullness* (adding more fabric in the design), and *contouring* (fitting to the hollows of a model's figure)[19]. Designs are usually created without understanding that certain principles are the basis for the creation. Design analysis will play a vital role in ensuring the project begins and remains on track. This can often help to estimate the performance of a product before it even exists as an integral part of design activities. Analyze the designs and determine which principles to apply to the developing pattern in order to ensure that the exact replica of the design will emerge from the finished pattern shapes.

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