

GEOMETRICAL LOCOMOTION: AN INNOVATIVE APPROACH FOR THE 3D PLEATING TECHNOLOGY

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Abstract

The creative pattern development is an emerging trend in the clothing fashion. It gives the designer to think vigorously innovative ideas into the three-dimensional creation. Further, rejuvenate the idea generation in different viewpoints to conceptualize and craft manifestation, which symbolizes the designer's inner prospects. Throughout this research paper, the researcher is going to analyse the creative pattern development method with an innovative manual approach for permanent pleating technology. The data for this project-based study was collected from a qualitative basis with practical experience in a design studio environment. The researcher had identified the technological gap in the existing permanent pleating technology when applied to the creative design scenario. A creative solution for the identified problem has experimented under a unique concept, which has been explored through special geometrical movements connected with creative pattern folding techniques. The study is going to create a final garment range of 6 outfits, which is modest yet, unique, conceptually creative, and fashionable targeting an emerging group of a unique customer base.

Keywords

Creative Pattern Development, Pleating, Fashion, Geometrical Movements

Introduction

This research is going to combine the interests of the modest consumer with innovative pattern approach under a concept called "Locomotion", which means the energy or the power of rotational motion or movement. The initial idea was based on a lifestyle trend of a unique community. The final outcome of this study, the 6-outfit collection was created inspiring from specific lifestyle moment that was shared throughout the Internet by this group, which is, doing skateboarding while wearing trendy clothing. This has initiated to select street skating movement as the inspiration for the collection.

Skate boarding is a lifestyle sport that is done in special tracks and unconventional locations. A very unique movement in skate boarding is identified as the spinning at the edge of their tracks. The rider moves in a full circular rotation. While this movement happens it is photographed number of times and it has created a visual of set of lines that rotate around a common spot as displayed in the below image.

Using this inspirational visual, the researcher has developed the concept of rotational motion and experimented the creative fabric manipulation technique, pleating created in rotational directions and crafting a silhouette around the female body. However while the experimentation process it was identified the 3D pleats needs to be permanently fixed but it was discovered that permanent pleating industry only provides the option of parallel knife, box and inverted pleats through machinery.



Figure 1: The rider moves in a full circular rotation in skate boarding (whatever skateboarders, 2016).¹

So throughout this research, it was experimented to come up with an innovative manual approach for the permanent 3D pleating technology to overcome this identified gap.

Literature Review

There are three basic methods used to pleat fabric: hand, pattern and machine. These methods can be used individually or in combination in various ways to yield different results and textures (George, 2012).

Hand Pleating – This method uses hand folding a piece of fabric, pleat by pleat. When pleating the bodice of a dress and the desired effect will be very contoured around the body, a seamstress will pin the pleats one by one to the dress form with a piece of bias fabric. This is considered a difficult and time-consuming hand pleating and cannot be duplicated by machine or pattern pleating (George, 2012).

Pattern Pleating – This method of pleating employs the use of a cardboard pattern or a tool referred to as a “pleat board.” Pleating boards are still used and sold today but mainly for the home sewer. When using a pleating board, the fabric is stuffed into spaces and then pressed with a steam iron (George, 2012). Today the majority of professional pleating is done with the use of large pleating patterns, spanning up to four yards in length. Some of the more complex patterns can take several months to complete, before they are even ready to be used for fabric pleating. Certain types of irregular pleating can only be done with the use of a pattern. For example, sunburst and combination pleating have to be done using a pattern. Above right is an example of an accordion and herringbone (or chevron) combination pleating pattern (George, 2012).

Machine Pleating – There are several different ways these machines can be built to accomplish the task of pleating. Machine pleating is the least expensive method when making simple pleats like side pleats, box pleats or crystal pleats because they require less labor than other pleats. One big advantage of machine pleating is that the entire roll of fabric can be pleated at once and used for a variety of applications. There are other couture type pleats that are made by

¹ All figures in this paper are excerpts and reproductions downsized by the author.

machine as well. These higher end pleats are usually a combination of two or all of the processes described above (George, 2012).

Fused Pleating: In this method, pleating that has been fused to interfacing to stabilize the pleating (International Pleating [IP], 2012). This process is beneficial for the following reasons:

- The increased stability of the pleating significantly reduces sewing labor cost
- Can reduce the fabric loss factor with certain pleating styles
- Expands styling options, for example pleated jackets.

The above benefits or the expectations of the existing fused pleating method are basically for time saving, strengthening fabric. It does not help the consumer to have uneven pleats from the machine pleating.

This research is a combination of the hand and pattern pleating with an added manual innovative fusing tape method with uneven pleating crease lines, which is not currently used in creative pattern or pleating industry.

Aims and Objective

- Introduce a collection for the cultural consumers which is modest yet conceptually fashionable.
- Introduce an innovative solution for the permanent 3D pleating technology in manual basis with the usage of creative pattern manipulation.

Research Methodology

The research area was identified through global and local trend research and the objective was identified. All the practical work was based under a studio environment and the researcher has been following the creative construction methods with 100% personal involvement. The collection was made based on the size 12/ Medium standard mannequins and live model fittings.

The characteristics of the inspiration were converted into the collection with creative pattern manipulation and the innovative solution for permanent 3D pleating was explored and analyzed with few experimented methods. All work has done with the data collected through online articles, books, contemporary designer work, global trends, expert advice and also the personal Knowledge and experience as an undergraduate design student about the 2D to 3D design development and problem solving.

Research and Concept Development

From Human to the entire universe the whole balance and life is filled with movement. Movements are simply life. What makes it different from one to another is how innovative people are with their own movements. Since the human has solved the mysteries of the universal physics, and invented tools, it has been the secret ingredient for innovative human movements. The concept, “Locomotion” is all about the art of one of the extraordinary combinations of human movements and adventure.

This concept is built with universal physics of circular and rotational motion combined with Skateboarding tricks and tracks as the inspiration source. This inspiration source was specifically selected due to the relativity of skateboarding to the target customer base Mipsters (The Guardian [TG], 2014). They have openly followed some activities including skate boarding which are new to their culture to express their changed lifestyle to the world

(Cunningham, 2018). Qualities of skate boarding like rotation, and circular motion are explored using techniques like repetition and layering combined with rotation through the concept development process. As described in the introduction section, rotational lines are identified with the skateboarding motion photography and it has inspired this collection towards innovative rotational pleating.

Also, to indicate the speed of the skateboarding the idea of gradient print options are explored to be included as a surface treatment. The flat pattern before pleating has been printed in a gradient. So, when the rotational pleating is applied, it has created unique appearance for the gradient with color overlapping situation, which finally helped to achieve the rapid moment changes of the skating movements.



Figure 2: Process of Concept Development [(tvnz), (We hear it, 2013), (Disrupt Surfing), (Cummins, 2019), (Haden, 2018), (Blue Tile Obsession, 2012)].



Figure 3: Process of Design Development (2D to 3D) [(Skateboard, 2012), (Rebloggy, 2012)]; Figure 4: Three-dimensional (3D) pleats incorporated with silhouette ideas.

Design Development, Data Analysis & Discussion

Starting from selecting the fabrics, it was finalized few different types of satin fabrics in order to be used in garment areas that need different thicknesses and stiffness. The selection of the fabric base was based on the requirement of the permanent pleating (requirement of non-crease recovery quality) and sublimation printing. For both techniques, a major requirement was to have composition of higher amount of polyester percentage. Also, it was used one of these high-quality satin fabrics for the lining panels to add more exclusivity to the design. Also, the very high-quality fabrics treated with digital printing also added very high value to the designs.

These printing ideas are created inspired from the speed factor of the skating movements and it is applied as a gradient effect in two different color ranges. These actions have given the garment the successful change to compete with the high-quality brands in the target market and attract more customers to the brand with the competitive quality of the garments in affordable price for a designer wear. So, this can be identified as strength of the product offer.

Problem Identification

As discussed earlier with the inspiration from the rotational repetition of the skateboarding, the creative pattern was developed through rotational pleating. The pleats are required to be permanent to maintain the design of the outfit. According to basics, of the permanent pleating, the fabrics with required compositions were selected. The major problem identified with the industrial permanent pleating was it was limited to knife, box and inverted pleats with regular

widths and it was required to be parallel. Industry has no solution with machinery to achieve creative uneven permanent 3D pleating.

Also, with the rotational pleating method, the inner side of the fabric becomes visible in the final look. So, the lining is required to be bonded together with the face fabric to make an even appearance. The initial solution identified for this problem was using industrial adhesive bonding technique and with pressing create the permanent pleat. However, most of the designs were created from one piece of fabric with creative folding, so the panels were not compatible with the available bonding machine sizes in the industry base. So, the bonding idea was converted in to a double side fusing idea with bonder web material, which is a manual customized process, which is unique, and innovative and created high value to the collection. It was not only expected the pleating effect by this technique but also expected to provide a facility of keeping the body temperature without wearing multiple layers by having two fabric layers bonded together. Since the bond web breathable, this idea was even feasible with the comfort ability too.

But when it reached the realization level it was realized the effect it gives looks too solid and does not give an elegant and feminine look for some designs of the target consumer lifestyle and it was a weakness of the process. So the full coverage fusing technique has been changed in to a more innovative solution for the selected designs, which also similarly support the permanent pleating while giving the expected look for the customer as well.

In this method, a fusing tape is applied along the pleat lines only and the fabrics are bonded along the pleat line only to create the pleat later with pressing. This technique did not ruin the effect and rich value of the fabric and the researcher was able to successfully create innovative pleats and it added high value to the garment and it allowed to reach the expected standard of the product in related to the market targeted.

When Applying this technique and designing the collection was based on the target consumer clothing values such as covering the skin as well as not enhancing the female body shapes in a very sharp manner. So the researcher has followed the draping on mannequins method with hand pleating for the initial design development. The pleats were created on dummy in a creative folding methods and directions to create a garment from a one piece of fabric. In order to reducing the attention towards the body shape, some exaggerated shapes have been created through the creating pattern manipulation and folding at specific areas.

Afterwards, the initial creative pattern was taken to flat surface and fine-tuned with an effective usage of flat pattern making techniques. Specially the area where the inner side is visible when the creative rotational 3D pleating was done was considered and decided to have a contrast lining panel to be full fused only at the edge of the panel while the other areas fused using the innovative tape fusing method.

The range of 6 outfits was created as the final outcome of the discussed creative pattern manipulation techniques and creative 3D permanent pleating with the innovative manual approach.

The Gradient printed gown of the outfit 1, the hoodie of the outfit 2, the pant of the outfit 5, the green gradient top of outfit 4 and the solid red top of outfit 6 are all created with the bonding tape manual pleating technique with one piece of fabric creatively rotational pleated. Along the pleated detail a binding in contrast color was introduced to emphasize the pleat detail. To achieve the required draped appearance a lightweight material.

The Purple gradient printed frock of outfit 2 and Green gradient printed top of outfit 3 were created with the same bonding tape technique and the one piece of fabric pleated and then curves created through creative folding towards center. Since in these garments the exaggerated shape

needs to have a stayed appearance, the fabric used was slightly higher weight than the other material used in the collection.



Figure 5: 3D pleating into Final Designs; Figure 6: Final collection with 3D pleating.

In the outfit 5, the green gradient Hoodie has been done as a combination of pattern pleating and the innovative bonding tape manual pleating technique. This is a result of a creative pattern manipulation and can be converted from 2D form to 3D form and again to 2D form, while keeping the crease permanent and shape recovery quality. A slightly higher weight fabric is used for this design also to create the 3D shapes sharply.

Also as discussed previously in the research, the gradient effect also used effectively to support well to the 3D pleated areas to be emphasized.

Conclusion

This research was based on a creative pattern development method and an innovative approach for the permanent pleating as a solution for an identified technological gap in the permanent pleating technology. So, the aims and objectives for this study was identified based on the target consumer behavior and the creativity which are to introduce an innovative solution for the permanent 3D pleating technology in manual basis with the usage of creative pattern manipulation and introduce a collection for the cultural consumers which is modest yet conceptually fashionable.

As discussed throughout the research, the concept for this experimental study was identified based on the target consumer lifestyle and it was all about rotational motion which the researcher has combined with the 3D pleating direction. With a number of experimentations

under laboratory environment by using the method of creative pattern draping on mannequins and afterwards fine-tuning the pattern with the usage of existing flat pattern development techniques the researcher was able to create initial silhouette ideas. Then with the use of the introducing innovative manual method to keep the pleats permanent, the researcher was able fulfill the aims and objectives of the study successfully with a range of 6 outfits, which are innovative, modest and yet creatively fashionable.

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² This article provides many www-links. Some of them do not work anymore. In case you need access, please, contact the editors who will approach the authors for details.