

Enhancing Feminine Look Through Optical Illusion

T.D.Kumanayake, C.P.Vithanage

Department of Textile & Clothing Technology, Faculty of Engineering, University of Moratuwa

Abstract: *The aim of wearing shape wear is to illustrate the perfect body shape to outside world. Body shaping technology has been derived from ancient times and the techniques have evolved with time based on the different body shapes desired by women. Nevertheless, most of the shape wear techniques are identified as harmful to the human body in consistent usage as it compresses the natural muscles in gaining the required body shape. Through this research, it was experimented to find out an effective solution for the issues of shape wear in creating a perfect appearance of the figure of the wearer. In order to achieve the objective of this research, a combination of optical illusion and silicon printing techniques have been used in developing outfits. A selected optical illusion theories have been used to develop artworks which was applied to a suitable fabric base through silicon printing and an illusion has been created in order to pretend enhanced feminine appearance of the body of the female wearer. Since, this new technique is used to create a perfect body only visually, the harmfulness of shape wear is avoided. Throughout the research, different types of designs has been experimented and analyzed in order to find out the best solutions for harmless shape wear for regular usage.*

Key words: *Body shaping, Shapewear, optical illusion, silicone printing.*

I. Introduction

The term shape wear refers to garments that apply compression and contour specified parts of the body of the female wearer in order to improve the feminine look. Girdle, metallic and whale bone corsets, teddies, camisoles and shape wear with different techniques and fabrications were used from ancient Greek period up to present [1]. Conventional shape wear has been incorporated into undergarments, such as girdles, for shaping the abdomen, and panties or briefs, for shaping the buttocks and lower abdomen [2].

At present, shape wear is combined with different compression levels to achieve different shaping results. Therefore, different techniques such as seamless technology, advanced pattern cutting techniques and advanced materials are used to achieve required body compression levels. Further, as body enlargement method, pushup techniques combined with silicone form/pads insertion are used at present [1]. Both methods are used to fulfill different requirements and reach a perfect body shape.

1.1 Silicon Printing Application In Fashion Industry

Silicone screen printing is one of the most suitable printing technique to apply on garments which need high durability, high elongation and high quality with performance and it makes clothing more stylish, comfortable and easier to maintain [3]. Special features of silicone application are excellent durability, colour fastness, improved fashion appearance, high elongation, fast cure, operation-friendly, easily pigmented, environmentally sound and in apparel, silicone coatings are breathable, comfortable, and suitable for skin contact [3].

1.2 Optical Illusion Usage In Fashion Industry

Occasionally, the blind spot in human eye may cause the brain to gather the signals coming from the optic nerves in a wrong way. Therefore, while the eye and the brain are trying to see the reality, they may also cause illusions. This causes the visual object to be interpreted inaccurately. This inaccurate perceptual interpretations are so abundant that these are called in psychology as the “Perceptual Illusion” or “Optical Illusion” [4]. Optical illusions are known to be used in numerous areas with various techniques and different product categories like architecture, fine arts, textiles and fashion design. In recent years, optical illusion types are frequently used especially, within the field of fashion designing in clothing models, styles, silhouettes and fabrics [4]. There are different types of optical illusions which cause different results.

1.2.1 Geometry and Angle Illusions

- **Bending / Hering Illusion**

This illusion, discovered by the German physiologist Ewald Hering in 1861, includes vertical lines constituting two parallel line segments (Fig. 01). These lines look bent outwards and inwards due to the inaccurate depth perception and perspective caused by the lines with angles on the background. Therefore, the illusion is also called as the “Bending Illusion” [4].

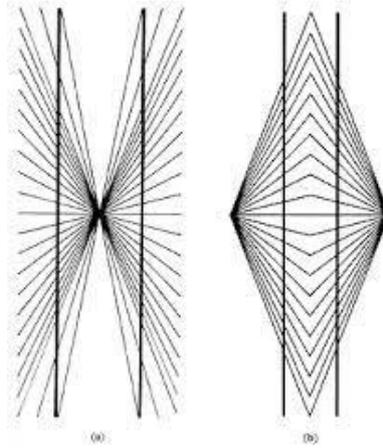


Fig.01 Bending / Hering Illusion

- **Oppel-Kundt Illusions**

In this illusion, the segment B was found by dividing two vertical lines called 'A' and 'C' into two equal spaces. Thereafter, the space between the lines A and B was subdivided into vertical lines with equal intervals between the space between the lines B and C with equal length was left empty. Herein, the interval between A and B is perceived as wider than the interval between B and C (Fig: 02) [4].



Fig.02 - Oppel-Kundt Illusions

- **Müller-Lyer Illusion**

This illusion was discovered by the German psychologist Franz Carl Müller-Lyer in 1889. Two lines of the same length are perceived to be of different lengths due to the linear patterns with the fins of arrow at the beginning and end of the lines (Fig.03) [4].

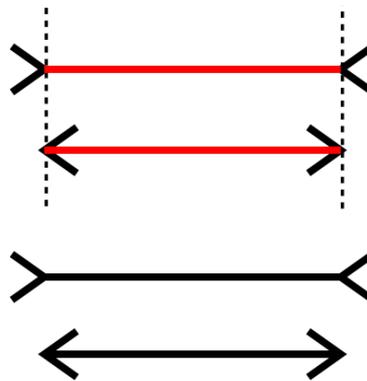


Fig.03 Müller-Lyer Illusion

1.2.2 Color Illusions (Hue Difference)

- **Bezold Effect**

This effect, named after a German professor of meteorology, Wilhelm von Bezold, is based on the fact that colors appear differently depending on the color of setting (environment). The red color on a white background appears lighter, and the red color on a black background appears darker (Fig.04)

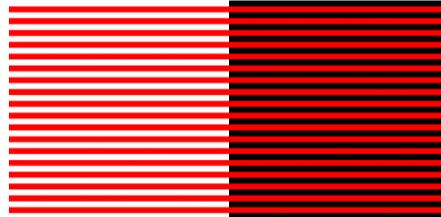


Fig.04 - Bezold Effect

Design elements use to make the link between optical illusion theory and the final perception of the design. The elements are components which can be isolated and defined in any visual design. They are the structure of the work and can carry a wide variety of messages through, Point, Line, Form, Shape, Space, Movement, Colour, Pattern and Texture [5].

1.4 Identification of the Problem.

Shape wear is one option which most women generally selects to achieve the perfect body shape. However, Shape wears physically harms the body by wearing prolonged time period and consistent usage of shape wear creates high possibility to increase harmful effects to the body [6]. Every single technique in shape wear stayed to be appears slim and sleek by compressing the body, sculpting it into a particular shape. Shape wear with firm and medium compression are best worn for only few hours because it provides powerful control to specific areas squeezing the wearer's body and restricting blood circulation. If shape wear is too restrictive, wearer may have trouble in breathing properly. An extremely tight shape wear squeezes the lungs, causing the lungs to have difficulty in expanding enough to take in a proper amount of oxygen [7].

The objective of this research is to explore the possibility of using optical illusion theories combined with silicon prints for female garments to showcase feminine figure instead of using shape wear.

II. Methodology

Most suitable optical illusion theories were identified by observing the female body shapes and ability of illusion in each theory. Selected optical illusion theories were combined with the design elements and art work solutions were created to achieve the research objective. Adobe illustrator software was used for art work developments and basic patterns were created through Lectra software.

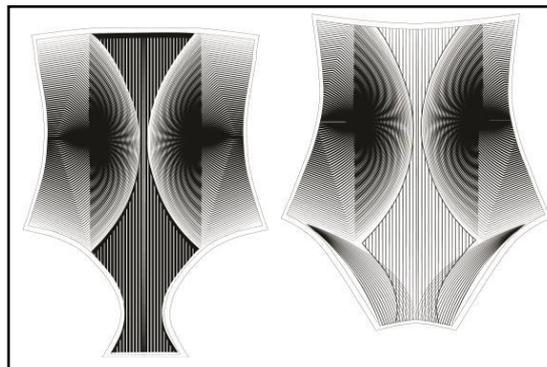


Fig.05. Art work development No.01

In developing the Art work No.01 (Fig 05) Bezold effect of colour illusion and Muller-Lyer illusion was used while in artwork No.02 (Fig.06), and No.03(Fig. 07) Negative-Positive illusion was used with vertical and diagonal lines.

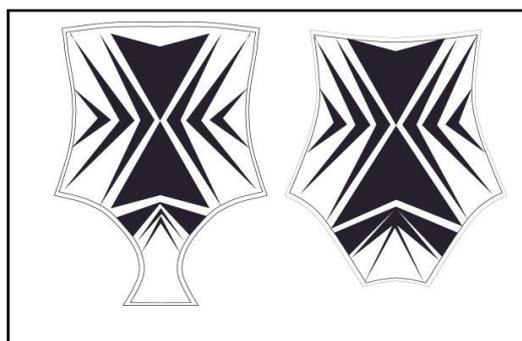


Fig. 06. Art work development No.02

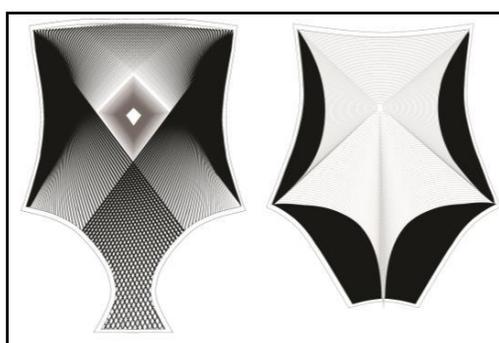


Fig. 07. Art work development No.03

The appropriate materials were selected based on the requirements of silicone print technology. Therefore 80% polyester 20% elastic fabric was selected for experiments. Using an automatic silicon printing machine fabric cut panels were printed with above art work developments and dried under the temperature from 120⁰C – 150⁰C. Thereafter, fabric panels were stitched together in order to complete the sample garments and were fitted on to the model for analysis.

III. Results and Discussion

3.1 Printed Sample No.01

According to the Bezold effect of colour illusion, front area of the sample garment (Fig.08) appears darker and side areas appear lighter. Thus, the dark area gets emphasize from entire design and side views hide from the eye. This illusion combine with the curve lines in design and creates unnatural curvy body outlines. This effect enhances the narrow perception of body by hiding the natural body outlines without any other physical effect. Further, front upper body appears elongated due to the vertical lines and Muller-Lyer illusion. Back view provides slender and lean body shape due to the effect of vertical directions. According to the Negative-Positive illusion, positive space in back, emphasis the area. Negative space supports to enhance the slim perception of waist.

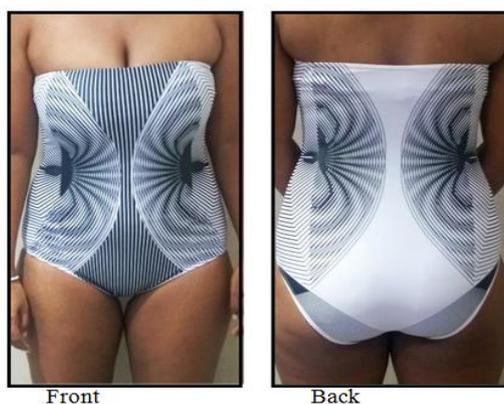


Fig 08: Printed sample with Art work development No. 01

The Muller-Lyer illusion has been followed vertically for main two lines in front (Fig.09). Eye moves along these line direction and created elevated illusion of the body.

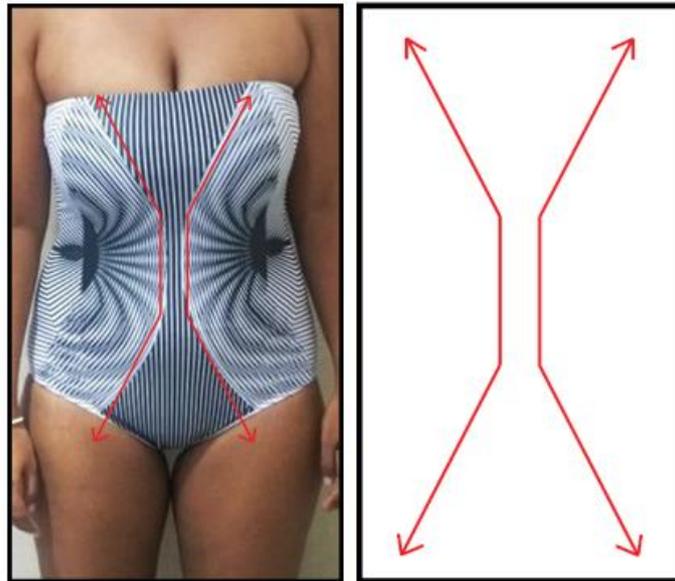


Fig.09 - Muller-Lyer illusion vertical direction.

The area, between front-side parts and center front part as shown in Fig.10 has been formed according to horizontal Muller-Lyer illusion. As the effect of this illusion, negative area catches the eye at the first glance and moves along the curve line illusion. The illusion optically reduces the girth of the waist and creates curve effect. Thereafter it bends outward and creates 3D illusion giving hourglass shape by focusing the hip, waist and bust.

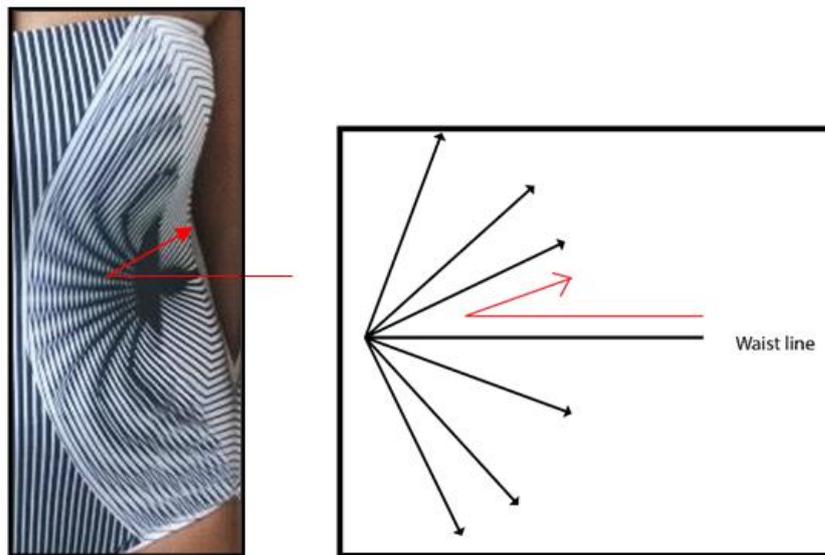


Fig 10. Muller-Lyer illusion horizontal direction

The angle between the waist line and ending line of middle part as shown in Fig.11 creates hip perception as increased. There is a negative correlation between the angle and hip perception.

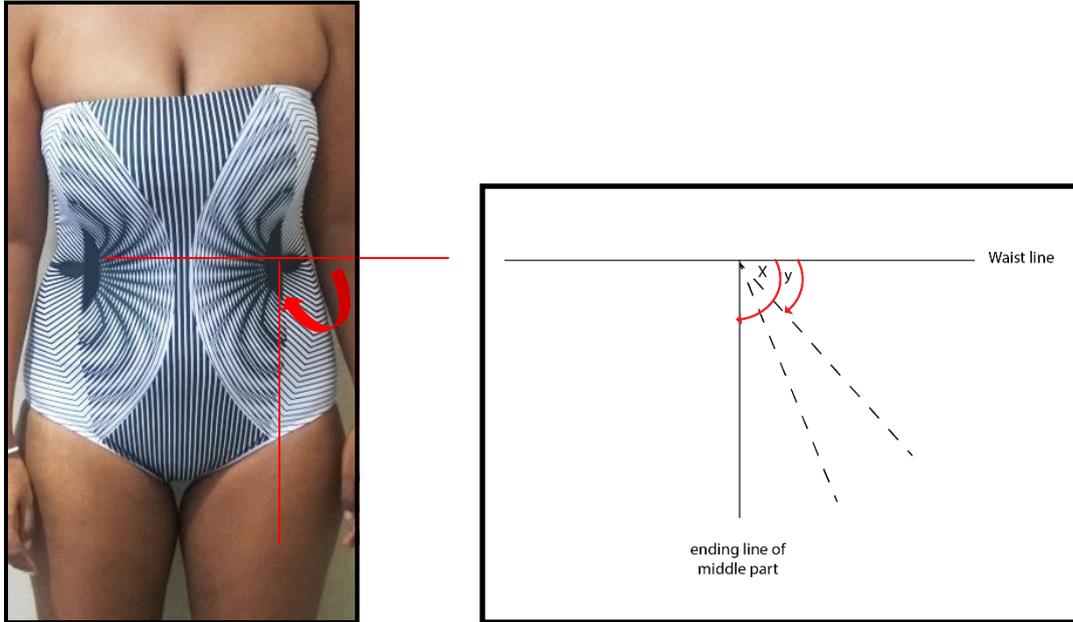


Fig. 11– Angle between waist line and ending line of middle part

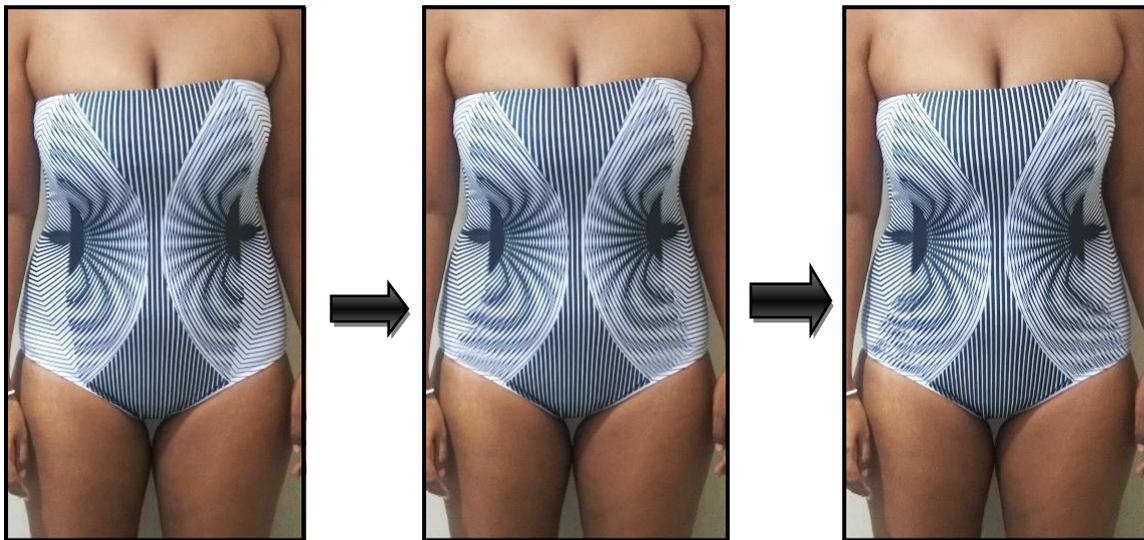


Fig. 12 Changing of body shape due to accumulating the angle of the ending line.

The body shaping illusion can be improved by accumulating the angle of the ending line. Fig.12 shows the changing of the entire body perception due to the experimentation.

3.2 Printed Sample No.02



(a) without horizontal line (b) with horizontal line.

Fig.13 Printed sample with Art work development No.02

Negative-Positive illusion has been used to enhance the body shape. Negative spaces fill as pointed arrow heads around the waist. All the arrow heads pointed inwards to the center point on the waist line. It creates narrow waist perception. Along the waist line there are equal intervals between each black lines. When these intervals gradually increase, the negative space reaches up to the neck line and leg opening. It appears wider at bust and hip areas. Difference between Fig.13 (a) and (b) is the presence of horizontal line and negative space at the waist line and the sides. This effect provides an optical illusion effect by creating the waist slimmer in Fig.13(b) than the waist in Fig.13 (a). Considering this design experiment, body shape can be change from line or shape directions.

3.3 Printed Sample No.03



Fig.14 Printed sample with Art work development 03

Diagonal lines and negative-positive space has been used in Fig.14. Positive space inside the diamond shape, grip the eye contact at the first look on design. Thereafter, eye moves around the design but contact does not break. Diagonal lines in front, starts from side seam as below waist level and above waist level while lines move diagonally towards opposite side. It creates triangular shape at the middle of top and bottom in upper body by overlapping each line. Therefore, this triangle effect on bust reduces the perception of the bust and triangle effect on abdomen reduces the perception of the abdomen. Negative space created slimming illusion in sides but the shape of black space widen the view of hip area. The entire front area creates flat and hidden bust due to the overlapped lines, wide hip due to the shape and space of negative space and widen the body perception. Curved lines in back, enhance and reduce the body view by creating 3D illusion effect. It visually provides Narrow waist line with shaped hidden buttock.

IV Conclusion

This experimental research was based on the objective of finding out an effective solution to body shaping with less harmful techniques to the body while creating a perfect figure only visibly. This combination of optical illusion artworks and silicon printing was successfully introduced to create the perfect body proportions by both enhancing the natural body shape and reducing the body muscles without any physical harmful effect. Moreover, with the innovative technique, it was able to provide comfort to the wearer while achieving a prominent outer appearance. Therefore, the use of shape wear which cause health issues and uncomfortability to the wearer in regular usage can be avoided.

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