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International Journal of Fiber and Textile Research

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ISSN 2277-7156

Original Article

DESIGN AND CONSTRUCTION OF 3-D SURFACE DESIGNED WEDDING GOWN MADE OF NATURAL FABRICS SUITABLE FOR THE TROPICS: AN ALTERNATIVE TO THE POLYESTER SATIN WEDDING GOWN

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Received 22 February 2013; accepted 21 March 2013

Abstract

A bride exchanges her marriage vows in a special gown meant to be worn only once, an indication of the importance attached to the event. This study sought to find a solution to the uncomfortable polyester satin wedding gown worn for such occasions by brides in tropical countries like Ghana, an obvious colonial legacy. The experimental study focused on the use of natural fabrics in place of satin and addresses the inadequate lustre in natural fabrics which is a major consideration in the choice of satin for wedding gowns and finally, developed a surface decoration technique that adds interest and surface attraction to natural fabrics. The study revealed interesting results: natural fabrics from seed and bast fibre categories could be used for wedding gowns. Surface decoration methods developed such as fraying, knotting, pulling, twisting and splitting resulted in the creation of three dimensional (3-D) surface design which was stacked onto a base fabric made of a fitted dress underneath. Finally, design positions could be altered at any time as they do not form an integral part of the gown. The result is an innovative wedding gown that offers a new look for tropical weddings. It is a highly competitive product making less use of technology.

© 2013 Universal Research Publications. All rights reserved **Keywords:** *fabric development, wedding gown, natural fabrics, surface decoration technique, symbolic cultural identity.*

Introduction

Marriage is one of the three great public occasions in a person's life aside christening and burial. The wedding, which is the ceremony, comes with a special dress or gown befitting the bride's social status - an extraordinary special wedding dress that leaves up to a person's individual fantasy. The religion and culture of the wedding participants also suggest the colour, style and ceremonial importance of the gown. The emphasis is on the individuality of the bride (McIntyre, 2010) and for this reason there is a real shift in what women want. Consequently, there are far more choices than before. The fashion industry now offers a dress for everyone because; it has become obvious that the bridal population is characterized by differences in age, lifestyle and ethnic heritage, among other factors. As a result, what was hitherto considered an appropriate wedding gown has been broken (Mellinger, 1993).

There are now alternatives as to where weddings can be held rather than either the low-key or church weddings which have been the norm previously. Weddings could be held at the beach, gardens and museums, among others. Davies (2001) has no doubt that the wedding gown will carry on changing in fabric and altering in form and will remain with us. Since the civil wedding laws were relaxed in the 1990's, it has made room for marriages to be conducted almost anywhere. As wedding fashion continues to evolve separately from the general vogue, people have felt freer to allow full rein for their imaginations. The gown therefore has to live up to the occasion. Symbolic as it is, everything about it must resonate with meaning. The modern wedding dress according to Mellinger (1993) must have a timeless beauty and be finished with beautiful details on the finest fabric. It has to exude a woman's most heartfelt hopes and fantasies.

There are also geographical differences in weather with

corresponding fabrics appropriate for each type of weather condition. Some fabrics are suitable for some weather conditions all year round whiles in some locations, changes in the weather require changes in the fabrics used. Ghana for instance is situated in the tropics with fairly stable weather throughout the year. Temperatures range between 22-35 degrees Celsius with average annual temperatures of 26 degrees Celsius. It is therefore considered to be a warm climate region. Fabrics suitable for such climates are those from plant sources, for example, cotton and linen. They have desirable qualities such as good absorbency, good heat conduction and ability to withstand high temperatures. Moisture passes freely through the fabrics, thus aiding evaporation and cooling. Therefore, where comfort is of primary concern or importance, cotton is the suitable choice (Kadolph & Landford, 1998).

Again, there are different cultures all over the world with corresponding clothing that upholds that culture's heritage even in the face of globalization. Many wedding dresses in China, India and Vietnam are coloured red, the traditional colour of good luck and auspiciousness whiles the western wedding dresses are usually white. The white wedding dress for Europe and America has come to stay and was greatly influenced by Oueen Victoria's marriage to Prince Albert of Saxe in 1840 (Wedding, 2012) in which case, the bride, Queen Victoria, wore a white wedding gown which caught the attention of many. It is to be emphasized that white, prior to that royal wedding, was not the colour of wedding dress but blue. According to Mellinger (1993), this initiated a popular demand for distinctive white wedding gowns that to this day has never abated. These cultures are strongly embedded such that it is difficult to permeate even with global influence. Wedding dresses have experienced changes in colour and probably silhouette but the traditional white colour especially for Europe still holds supreme. No matter how modern the bride is, it is important to celebrate the sense of history and culture behind the traditional wedding gown. It is therefore imperative to have a wedding gown that has a comfortable and compatible blend of the bride's personal style that embraces tradition with blush of fantasy to enhance the charm and captivating beauty of the bride (Steveson, 1978).

Africa is so diverse, and has thousands of ethnic groups; specific wedding rituals vary from region to region. A wedding in Africa is seen as a combination of two families, with their traditions playing a major role in the ceremony. Some rich African families plan two weddings, one in the traditional style and the other influenced by the Western or Islamic culture. Most traditional wedding ceremonies in Ghana have similar characteristics that transcend many ethnic groups. The typical church wedding, borrowed from foreign influence has for some time now tended to play the traditional marriage ceremony to the background. This development can be attributed to the rise in Christianity over the past few decades. Weddings in Ghana are held indoors, most often in church and in some occasions at home. Indoor weddings last for two hours or more and refreshments are held right after the ceremony. For all these periods, the bride still wears the gown until after the event. Majority of churches do not have the luxury of air conditioners. Tradition also demands that the bride is well covered and exhibit a sense of decorum. Even in the face of warm weather, the polyester satin bridal gown is still the favourite choice of many despite the fact that the fabric is warm and therefore not comfortable when worn in searing heat of the tropics. This is attributed to the fact though silk satin which offers high water absorption, high temperature regulation properties, high breathability and high antimicrobial qualities is not readily available on the Ghanaian market and when it does, is very expensive. Willbanks (2012) affirms that silk is the premier choice of fibre content for bridal satin fabrics. However, silk satins are more expensive than satins containing acetate or polyester. With the rich cultural heritage and the challenges of the generally high average ambient temperature, it is most appropriate that a wedding gown that is suitable for the weather conditions prevailing in Ghana is designed to provide some level of comfort, without taking away the distinctive look of the bride appropriate for this 'once-in-alifetime' ceremony. The gown must be innovative, modern and compete favourably with the famous and glamorous satin wedding gown. The bride in today's globalized world can get married in any style at all deemed appropriate and more importantly suitable and one can be sure she will look beautiful in any style she chooses to wear on her special day.

Fashion product marketing now focuses on the consumer which is why it is outrageous to develop a product without taking the consumer into consideration. The consumer has become more independent, intelligent and more savvy, for products to be dumped on her. She is 'someone not anyone' (Hinces & Bruce, 2007). It is important for apparel product developers to know the consumer, her wants and desires and be able to provide the right product that satisfies her needs. The Ghanaian contemporary bride wants her wedding dress to be unique, personal, comfortable and aesthetically pleasing. Cohen (2006) explains that, 'it is not what you want to sell, but what your consumer wants to buy'. Satin is a traditional dress fabric and its use as a wedding dress fabric has gained prominence and acceptance the world over. It is very luxurious and looks glamorous even in its simplest form. However, as the world is fast changing, so are traditions changing to meet the ever changing needs of a globalized world. Research has shown that a great number of people travel abroad to have their wedding with the location determining the style and fabric (Bridalwear-UK-December 2005, 2007). Depending on where people decide to wed, there should be a dress that corresponds to the climate of the area. The product is therefore not just for Africa but also people who wish to have their weddings in the tropics. It can also be used in Europe and America during the summer by those who want something new, unique and glamorous as satin wedding dress

Materials and Methods

The wedding gown was from a natural fibre source, specifically cotton which solved the problem of heat build up associated with satin. The strongest point of satin which is lustre is absent in natural fabrics. It was important therefore to find a way of making the natural fabric attractive if not lustrous. A three dimensional (3-D) surface decoration technique was therefore employed, with a base fabric onto which it was attached. This provides a great deal of flexibility in positioning of the surface design without destroying the base fabric, as compared to conventional surface decoration methods such as applique, printing, embroidery or laser cutting.

The study was primarily experimental and involved knotting, pulling, fraying, twisting and splitting to create the 3-D effect. Inspiration was drawn from African fetish traditions, such as masks, headdresses, the environment in which such outfits are worn; houses (mud houses), textiles and accessories (Geofery-Schneiter, 2001). The aim was to translate these elements into an appropriate 3-D design that reflect the source and also have an African twist to it.

The ideas mentioned had qualities such as smooth and rough surfaces, transparency, frayed/split ends, texture and some flashes of colour. Visual references gathered for inspiration had qualities such as smooth and rough surfaces, transparency, frayed/split ends, texture and some

flashes of colour. These qualities were therefore considered as determinant factors in development of the 3-D techniques for the surface decoration. Most of the ideas considered had frayed ends especially as seen in skirts of fetish priestesses, headdresses and the edges of thatched roofs. Fraying was selected in the development of the fabric used in decorating the base fabric. For better results, it was required of the frayed end not cling or roll during the process. To this end, series of preliminary experiments were conducted to establish which of the selected fabrics frayed best. The selected fabrics in the experiment included mercerized cotton, linen, scrim, jute, muslin and cotton organdie. Apart from fraving, other methods such as knotting, splitting and twisting as mentioned earlier were considered in the development of the 3-D surface fabric. The resultant effects had the potential of achieving the essential quality sought for namely; capable of embellishing the base fabric. Table 1 shows characteristics of the selected fabrics after fraying.

Table 1: Outcome of fabrics frayed and the results obtained after fraying

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Fabrics	Effect after fraying
Mercerized cotton	It frayed considerably well but rolled into rope form in the process of fraying and therefore
	could not achieve the desired effect of frayed ends coming out in single yarns.
Linen	It behaved like mercerized cotton when frayed.
Scrim	Frayed easily, had considerable amount of lustre, light weight and had interesting textures
Jute	Jute had similar features like scrim except for the fact that it was fluffy, coarse and
	uncomfortable on the body.
Muslin	Frayed very easily, did not cling nor roll in the process of fraying, light weight, transparent,
	flexible and comfortable to the skin.
Stiffened sinamay	Frayed considerably well, came out in curled single strands, light weight and transparent

Preliminary Experiment

3-D Development of Fabrics

The reason for the development of fabric was to look for alternatives(s) for lustre in satin which has been a very important consideration in its choice as fabric for wedding dress. Since the 3-D technique is intended to be attached to a substrate, the appropriateness of the particular technique to be used and the base fabric was carefully considered. In fact, these two issues were the subject of experiments carried out in the project. The experiments were based on well-defined parameters such as suitability of the base fabric in terms of weight, comfort, drapery and flexibility of both base fabric and the 3-D design developed and finally, the suitability of the base design and its application in garment manufacture. The experiments also considered important qualities such as heat, weight, lustre and stability. The preliminary experiment carried out on frayed ends established muslin as the most suitable for the project. This was based on the fact that muslin as compared to the other fabrics frayed very easily. The frayed ends did not roll nor cling to each other during the process of fraying. This was established by observing the behaviour of the fabrics as they were being frayed with a dissecting needle. Above all, it was light weight, transparent and comfortable to the skin. The substrate to which the 3-D design created was stuck to be selected out of the following fabrics: lawn cotton, cambric cotton, cotton organdie and voile. These fabrics were light weight, comfortable, breathable and draped considerably well with the exception of cotton organdie which did not drape but had all the other qualities.

A further study in the development of the 3-D technique comprised the formation of raised surfaces to be stuck to the surface of the base fabric. Inspiration in this respect was drawn from the round features of African mud houses, with their round thatch and the mounds created for the cultivation of yarn and other tubers. The features were mimicked by stuffing small pieces of cotton wool in cut pieces of the frayed muslin. A light weight ribbon was used to tie a knot behind the stuffing. The cotton wool was made invisible by underlaying the muslin with organza before tying; a development which also gave the knot stability. A number of these knots were made and arranged on lawn cotton which served as the base fabric. Different colours of the base fabric were used in this experiment to help in determining the usual impact suitable for the execution of the final work.

Results of the different stages of the fabric development are shown in Figure 1.

Further to this, twisting as a technique was employed to create raised effects resembling the knots without tying. The fabric used for this experiment was cotton organdie which held up the twist because of its stiff but flexible nature. The twisted raised portions of the cloth stayed up without any additional support when the pressure was released. This is shown in Figure 2.

For further variety and to explore other 3-D fabric



Figure 1: Different stages in the 3-D surface technique.



Figure 2: 3-D surface design created by twisting cotton organdie fabric.



Figure 4: 3-D surface decoration technique made by fraying stiffened sinamay.

decoration methods and still in the spirit of drawing inspiration from rounded and uneven edges of references associated with the African environment mentioned earlier, cambric cotton with fusible backing paper and underlayed with lawn cotton fabric were heat pressed together, making the fabric stable. The resultant composite was cut in circles with pinking shears to give it a zigzag effect which gave an illusion of a frayed edge. This was placed on the base fabric which was subsequently pulled through and held in place with fine hand needle stitch. The pulled fabric gave a balllike effect on the surface as seen in Figure 3.

Still another variety that featured feather-like frayed ends was created by fraying stiffened sinamay (Figure 4). It was



Figure 3: 3-D surface technique created by pulling the base fabric through a composite construction.

selected for the experiment because of its ability to fray and still remain stable enough. Although the fabric was stiff and brittle, it frayed considerably well. Due to its stiffened nature, fraying the ends was made possible with the aid of a pin which enabled picking of the yarns one at a time without breaking them in the process. The frayed ends came out as curled single strands and a cotton bias binding was used to finish and reinforce the edge. The effect created was made more dramatic by rolling them to cause an overlap of some of the curled single strands. These 3-D surface attachments were arranged on voile.

The last experiment involved the use of organza with fusible backing paper on cotton. The organza together with the backing paper was heat-pressed and split immediately. As it cooled, the curls were formed which gave a very interesting and dynamic visual impact (Figure 5). It mimicked the uneven fringes of an African hut or the jagged ends of a village fence. Organza, a man-made fabric was introduced because it was the only fabric that achieved the curled effect after the experiment.

Garment Design

After developing the 3-D surface design techniques, there was the need to design the actual garment onto which the 3-D designs were to be stacked. Thatham & Seaman (2006) are of the view that "when designers invest a great deal of effort into creating a beautiful fabric, they tend to keep outlines as simple as possible". A critical look at all the techniques developed pointed to the fact that the frayed and knotted effect was the most appropriate because it



Figure 5: 3-D surface decoration effect developed from organza with fusible backing paper.



Figure 6: Final wedding gown design based on the knotted and frayed effect.

conformed to the parameters set for the development of the 3-D technique most applicable for use in creating a wedding dress that turned out to be innovative, contemporary and most suitable for the tropics. Its beauty required a simple silhouette to project the fabric design in view of the aesthetically unpleasant effect created when an elaborate silhouette and a complex textile are combined in a garment. A simple outline of a body hugging floor length dress was designed and sewn with lawn cotton fabric. Lawn cotton was chosen for its relatively light weight, breathability, comfort, drape and ability to provide stability for the surface design.

Results and Discussion

Five techniques were developed from the visual references gathered. The references had an element in common which had predominantly rough and smooth surfaces. A look at a number of the visual references revealed a ball-like effect which was also explored. A technique was developed from each of the references and even though the effects created had rough and smooth surfaces, different fabrics were used based on the reference material from which the technique was developed with each having peculiar and use suitability. All these techniques developed had both high and low points and these were observed in the process of making the garment.

Figure 1 was a very successful technique in terms of design concept. It is body friendly, transparent and therefore colour was seen through creating a dynamic impact. Frayed ends resembling feathers produced a very nice texture which gave an interesting visual impact. The challenges associated with this concept included the fact that, it worked well on coloured background to project the frayed ends. Background colour was important because it contributed to the overall effect of the design with flashes of colour. The base fabric selected had to be light weight in order to avoid adding weight to the finished garment. Again, the fabric was already designed and therefore needed a simple silhouette to project its beauty. If a white background was used then the muslin had to be dyed to bring the contrast needed to project the design. It however had wide application in garment making because it can be applied all over the garment or at specific areas to create impact.

Figure 2 was stable and airy, had ribbon-like effect which was very interesting, a minimal stretch given to the fabric did not distort the twist when pressure was released, and it went back to its original twisted state. It was very fine and lustrous and able to wrap around the body. But, it was not advisable to cut through due to the nature of the design and also did not drape and therefore had limited use in garment making. It was useful in the making of a train or creation of detail for specific areas or for the entire gown.

Figure 3 had both the base and design fabrics made of breathable textile which eliminates warmth. Its application in garment came with some restriction like distortion in build up was eliminated taking into account the fusible cotton backing. It also created interesting designs when manipulated. It however worked better on coloured fabric only due to the application of pigment to the already made organza. It needed the right amount of heat to produce the curly effect and was difficult to determine how much heat was needed. Also, it had to be split immediately after the application of heat and left to cool to achieve the curled effect.

All the techniques developed did not form an integral part of the base fabric and therefore design positions can be altered anytime without destroying the base fabric. However, it must be noted that with the exception of Figure 3 where the surface design was made possible with the aid of the base fabric by pulling the fabric through the holes created in the circles, the rest are independent of the base fabric. However, the design in Figure 1 could be altered at any time because it is a simple hand stitch that secured the surface design to the base fabric. Again, the nature of the design has demonstrated that the unconventional method of garment making is the best possible way to transform the design into a garment; but the rest went through drafting and sewing especially the base fabric and later arranging the surface design on the already sewn garment.

From the above, Figure 1 proved directional. This was due to the fact that it met the criteria set out for the development of the 3-D design ideal for a wedding dress for the research. It comes with characteristics such as transparency for colour to be seen through, rough and smooth surfaces, interesting texture resulting in a feathered effect, light weight and flashes of colour. A sample gown was therefore made with Figure 1 and the result is Figure 6. Figure 6: is a simple garment made from Figure 1 (frayed and knotted effect). The individual pieces created were hand stitched on the sewn garment made of lawn cotton serving as a substrate in a manner that reflected the garment design. The sample garment had a coloured background flow of design when the fabric was cut through. This limitation was due to the fact that the surface design was created with the aid of the base fabric which was pulled through the holes unlike the case of Figure 1 where the surface design was stitched onto the base fabric. An unconventional method of garment making was therefore the alternative. In this case, the fabric was draped directly on the body and secured with buttons.

Figure 4 made use of a light weight fabric and therefore could be applied in volume. It is netted and therefore airy. Its transparent nature meant that colour was seen through giving an added visual impact. It also turned out to be very versatile and created very interesting effects when manipulated. It was able to create volume and stability on its own. It however came with certain challenges which included its brittle and stiff nature and therefore meant that care had to be taken to produce a very good finishing. The base fabric had to be flexible to provide balance and add to the drape of the garment in order to produce a graceful outlook. For comfort, care had to be taken to avoid too much exposure of the fabric to the body.

Figure 5 gave a very vibrant and versatile effect. The split technique made it very airy and therefore the idea of heat which was very important to project the surface design which was white with gold and white ribbons used to tie the knot. A coloured background was employed because of the decline in traditional wedding dress (Bridalwear-UK-December 2005, 2007) and therefore the need for more sophisticated bridal wear and vibrant colours, as seen in the bridal designs of jean Fox and Venus, where colour has been introduced as overlays such as pink over cream. Colour is a very symbolic tool used to express and convey the message intended. In Ghana, colour is a non-verbal way of indicating moods. The wrong choice of colour could therefore be detrimental.

The colour palette (white, gold and red) was carefully considered after series of research into colour symbolism in Ghana. White is a symbol of purity and joy. It is associated with festive occasions, spiritual purification, sanctification rites, among others. Gold is a symbol of commercial value and social prestige. It is a symbol of royalty, wealth, elegance, high status, supreme quality and glory, and red symbolises a sense of seriousness, sacrifice and struggle (Edusei, 2003). The colour palette used was very appropriate for wedding and hence, its application.

Conclusion

It is worth appreciating that, this research is not just solving a continental problem but can also be viewed as offering a dimension to new approaches to wedding dresses the world over. The innovation lies in the invention of 3-D techniques and also converting non dress fabric in the case of Figure 2 into a new end use. It is an interesting and thought provoking process, requiring great innovation with less use of technology and yet producing a very competitive product.

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Source of support: Nil; Conflict of interest: None declared