Precious Circles – Zero Waste Design

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Keywords: Zero-waste, design, tessellation, sustainable

With the contemporary methods of fashion construction only effectively using 85 percent of fabric in a garment, 15 percent of the total fabric is left on the cutting room floor (Cooklin, 1979). This waste occurs because pattern pieces have irregular shapes, which make them difficult to interlock perfectly to be able to use 100 percent of fabric length and width. This waste is leaving a significant ecological footprint.

Different ways of eliminating the negative space around pattern pieces by manipulating these pattern pieces have been identified by McQuillan (2011). One practice design is *tessellation,* which consists of one shape or motif that repeats to fill the width and length of the fabric. Depending upon the tessellated shape, there will be wasted areas that are not included in the design, which is mostly along the selvedge of the fabric. Holly McQuillan has tried different ways to overcome this problem. One is using mathematical objects called fractals, which have random shapes to reduce or eliminate the waste at the edges. The other solution would be using a smaller sized version of the tessellated shape as it gets closer to the edges of the fabric (McQuillan, 2011) or using tessellated shapes with only straight edges instead of curved ones to meet the fabric width (Carrico & Kim, 2013). The shortcomings of tessellation method are as follows: first, the final look is not predictable before the cutting process is finished; second, this method usually cannot follow the curves of the human body because layering tessellated shapes from a non-raveling fabrication on a dress form creates a sculptured garment rather than a draped one; finally, the whole process could consume a greater amount of fabric in comparison to a conservative, modern cutting method.

In this design possible solution for eliminating negative space in the *tessellation* practice was investigated. My experimental process was to eliminate fabric waste by using curved motif while keeping the more traditional appearance and flattering the curvy, feminine silhouette. I was inspired by a fragment of silk fabric with several cut out circles. At first glance this appeared to me as a lace or eyelet fabric, but actually was circles cut out from the fabric erratically, for making cloth-covered buttons. Then I thought why not make a textured fabric by cutting out circles in an organized manner and using these circles as self-fabric embroidery or as another garment piece since I did not want to waste any fabric.

To start my tessellation design journey, a two-piece garment was designed: a crop top with tessellated made with pieces only and a pleated skirt with the fabric resulting from the cutting out of circles with different diameters from around the bottom of the skirt yardage. To test the

idea and plan for the desirable fit and length of the skirt, a toile skirt was created with 24-inch wide gingham. After constructing the skirt and cutting out circles, a couple changes were made to the initial design. One of them was shortening the length of the skirt and the other one was using the whole width of the fabric in order to have sufficient circles to make the top and have flared skirt rather than straight.

My first concern for generating a tessellation garment was choosing drapable but non-raveling fabric, since finishing the edges of the tessellated pieces and the cut work areas would be very time consuming and, if not done perfectly, it would have a negative influence on the final appearance of the garment. Therefore, I chose matte, resin-treated knit that looked like leather. In order to create a more aesthetic cutwork fabric, it was determined that different sized circles would offer an interesting rhythm and provide material for making the top Since a needle would make holes in this type of fabric, stitches for any basting were done along the cutting edge of the circles. The skirt waist was fitted with topstitched knife pleats and closed with an exposed zipper at the center back. This zipper had black tape with gold metal teeth to keep the cohesiveness of the design with black topstitching on pleats and joining stitches of the top. To prevent the waist from stretching, a 5⁄8 inch wide, grosgrain waist stay was applied to the inside waist of the skirt with black topstitching to keep in harmony with rest of design of cut edges and black top-stitching. Rather than typical layering of tessellated shapes, I used the varied-by-diameter circles by joining them edge to edge with black stitching done by machine at points of abutting.

The design was evaluated by a panel of textiles and clothing graduate faculty for fit and appearance. The design was rated excellent for set, proper ease and hang of garment. It was rated excellent in visual aesthetic, unity of design, single strong focal point, and elements of design.

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