Gradable Zero-Waste Bridal Jumpsuit with Transformable Components

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Zero-Waste (ZW) is "fashion design that wastes no fabric, by integrating pattern cutting into the design process" (Rissanen & McQuillan, 2016, p. 11). This type of sustainable design approach is an ideal alternative to traditional pattern cutting in which upwards of 10-15% of fabric is routinely wasted (Carrico et al., 2022; Rissanen & McQuillan, 2016). However, an inherent flaw exists when attempting to take a ZW approach into production- it is not possible to grade a ZW garment as there is no room to grow or shrink pattern pieces in the already completely utilized pattern cutting marker. Design researcher, Carrico (2016, 2018, 2021), has developed a systematic solution to this issue. She suggested a pattern cutting approach wherein strategically placed seamlines are added to a ZW design. Then, a designer can insert fabric strips of various sizes into the seamlines to grow or shrink the pattern at key locations.

Seam	Size 6	Size 8	**Size 10**	Size 12	Size 14
CF/CB Bodice	0.25"	0.375"	**0.5"**	0.625"	0.75"
Side Seams	0.25"	0.5"	**0.75"**	1.125"	1.5"
Bodice Princess	0.25"	0.3125"	**0.375"**	0.5"	0.625"
Waist	0.25"	0.375"	**0.5"**	0.625"	0.75"
Hip	0.25"	0.5"	**0.75"**	1"	1.25"
Inseam	0.25"	0.4375"	**0.625"**	0.90625"	1.01875"
Pant Princess	0.375"	0.5"	**0.625"**	0.75"	0.875"
Pant Hem	0.25"	0.375"	**0.5"**	0.625"	0.75"

Table 1: Grade distributions by size and seam location

Thus, the purpose of the present design was to create a gradable ZW bridal jumpsuit using the method developed by Carrico (2016, 2018, 2021). Among brides there is a growing, "emphasis on sustainable and environmentally friendly designs" (Forcier, 2021, para. 2). Jumpsuits are also trending. Another bridal trend is to have transformable gowns with features such as removable overskirts, trains, or sleeves to create a second look for the reception (Forcier, 2021). Therefore, the design incorporated transformable components. Transformable designs are important as they can allow wearers to create multiple looks from a single design (Chen, 2014). Thus, the present design sought to create multiple looks with the same jumpsuit using removable components to increase the wearing options and sustainability.

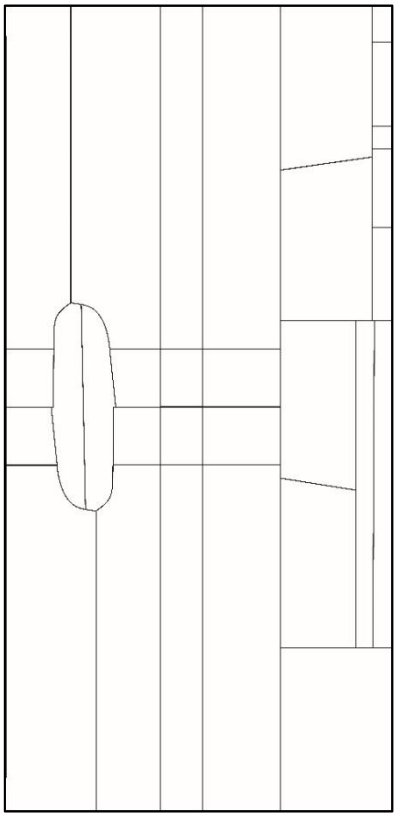

Fig. 2: ZW marker (cut in silk, batiste, and crepe)

The designer started by sketching some jumpsuit ideas for today's bride. The inspiration for the silhouette was the glamourous gowns worn on the silver screen by actresses such as Bette Davis and Jean Harlow in the 1930s. Flowing palazzo pants and a draped, bodice with deep v-necklines were ultimately adopted to embody the look of the inspirational time period.

The grading approach was determined early on so that it could be considered when designing the garment. The grading approach was based on Mullet (2015) and is displayed in Table 1. The hardest grade to accomplish was the crotch point grades, which were achieved through the insertion of a strip into the inseam. Another challenge was the pant length. The pants were a rectangle from the hips down, so the grading strip was sewn to the pant bottom, which were hidden in the deep, 3" hem.

Next, the designer flat patterned a pair of wide-legged trousers for the jumpsuit. The gradable seamlines were then placed at the proper locations on the pants to allow for a size run (6-14) to be created. The pants were digitized into Optitex to create a marker allowing the designer to visualize what fabric remained for the bodice. Four different bodice solutions were tested before the final Grecian-style bodice was adopted. Darts were added to the front and back waistline for fit and the shoulders were pleated. Then, the gradable seamline placements were

determined. Each bodice piece was bound along the CF/CB and side seams using half of the corresponding grading strips.

The jumpsuit was constructed from 45" wide white 100% silk dupioni, fully underlined with 45" 100% cotton batiste (cut with the ZW pattern). The lining was 100% polyester crepe (45" and cut with the ZW pattern). The gradable strips were cut from extra yardage of the fabrics in the necessary widths for the size.

All remaining fabric in the marker was utilized to create the transformable components. Each component could be added to the design using small snaps and wearers could mix and match. A small bar was created for the front neckline between the bust. A large bar was made for the upper back neckline. Two long ties could be used in the back v-neck to make a bow. A large bow was made and could be slid onto either bar before snapping the bar into place. Finally, two pleated sleeves were created from the negative space made by the pant crotch curves. These sleeves were bound with the remaining fabric. All removable components were silk, batiste, and crepe, which was included for stability in place of interfacing. (see the following link for images: https://youtu.be/Ve50auubYUw)

A muslin was produced in polyester satin to test the pattern and fit. The lining was sewn next to confirm the fit before cutting the silk. The silk jumpsuit was cut and each piece was underlined with batiste before seaming. Beaded floral appliques were added to the bodice fronts using a hand pick stitch prior to adding the bodice fronts to the waistband. The appliques were chosen for their silver color and incorporation of subtle star patterns which reflected the inspiration of silver screen starlets in the 1930s. An invisible zipper was hand-picked into the center back seam and the pants were finished with a blind hem.

The present design represents a unique approach to ZW design by incorporating the grading method developed by Carrico (2016, 2018, 2021) and adding transformable design components. The inclusion of transformable components allows wearers to create a multitude of looks. This design creates a sleek, fitted silhouette inspired by old Hollywood glamour, a-typical of ZW designs which tend to be loose to accommodate more sizes of wearers (Rissanen & McQuillan, 2016). Thus, the present design pushes the gradable ZW method into new territory while still satisfying consumer needs namely the desire for multiple bridal looks and sustainability.

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