

Gradable Zero Waste Outerwear

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Keywords: Sustainability, Zero-waste, Grading, Garment Finishes

Contextual Review and Concept- This jacket was made in response to a challenge among several design researchers/educators to apply a method used to resize zero-waste garments. Previous research into zero-waste design has shown though zero-waste garments have been recognized in research and exhibitions, they have not become a large part of the mass market industry (Carrico, 2020). One significant obstacle to making zero-waste garments available to a range of customers is producing garments in a range of sizes (Carrico & Kim, 2014, Rissanen, 2014). Zero-waste patterns are designed like puzzle pieces, interlocking to eliminate any gaps and leave no scrap behind once cut (Townsend & Mills, 2013). This does not allow for pattern pieces to be enlarged or decreased, as they would no longer interlock and would not be cut zero-waste (Carrico, 2020).

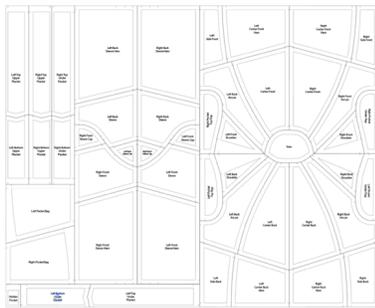


Figure 1. Zero-waste pattern layout.

In an effort to make zero-waste garments more marketable and allow for grading to various sizes, Carrico (2020) created a method for resizing garments without making changes to the original pattern shapes. Instead, seams are strategically placed to allow for trim or strips of fabric to be inserted. These strips grow or shrink in width, effectively sizing the garment up or down. As part of the challenge, each participant selected a different garment category (outerwear, evening wear, menswear, children's wear, etc.) and created a gradable zero-waste design. To test the applicability of Carrico's method, each design was first patterned in a mid-range size and graded up and down 1-2 sizes. The category chosen for this garment was women's outerwear. In accordance with standard industry size ranges, I began with a size 10 and graded my design to sizes 6 and 14.

Technique, and Execution- I began by designing a zero-waste bomber jacket pattern in half scale, as I knew the process would be experimental and did not want to waste resources. Once my overall pattern shapes were established, I began choosing placement for my strip inserts to allow for my design to be graded. I used the slash-and-spread grading lines established by Mullet (2015) in *Concepts of Pattern Grading: Third Edition* as a guide for seam placement. Seam lines were drawn onto the pattern and a ½ inch section was removed to allow room for the strip. In the full-scale pattern, this translated to a 1-inch-thick strip with ½ inch wide seam allowances. The pattern pieces were then cut apart at the seam and pieced together on a 22.5-inch-wide layout (translating to 45-inch-wide fabric in full-scale). This resulted in a pattern layout that would be 45 inches wide by 36.25 inches long (Figure 1).

By beginning with a 1-inch-wide strip, I ensured that the strips within the design would not disappear when graded down to a size 4. However, if the design was to be graded below a size 4, the bands would disappear, changing the final appearance of the garment. Should the design need to be graded below a size 4, the

mid-range width of the bands would need to be enlarged to ensure the appearance of the final garment in consistent throughout the size range.

Next, I began cutting and constructing my mid-range garment. The zero-waste pattern layout was printed on a plotter and placed over 45-inch-wide fabric that had been placed on-grain and the edges had been squared off for cutting. Bands were cut from additional fabric to be used as the inserts. The final product was then constructed, piecing together the zero-waste patterns and appropriately sized bands for each area of the garment. Additionally, sizes 6 and 14 were constructed from muslin fabric to confirm the grading process worked properly. Figure 2 displays the three jacket sizes, showing the gradable areas and growth or decrease of the bands. The white fabric represents the zero-waste pattern, while the black and red fabric represents the gradable bands.

Aesthetic Properties and Visual Impact- Bands were cut from various colors to add to the aesthetics of the final garment. The contrast of the inserted bands creates a strong visual impact and makes for a marketable product. The taupe fabric was cut on bias to allow the bands to contour to the curves of the seamlines. The cream fabric was cut on straight-of-grain to help stabilize the shape and fit on the garment. Self-fabric was used in the shoulder and sleeve cap areas to reduce the bulk of the design and give the viewer's eye a central location to focus. As seen in Figure 2, the bands around the shoulder blend in with the body of the jacket.



Figure 2. Sizes 14, 10, and 6.

Cohesion- The continuity of the chevron bands within the body of the jacket and sleeves provides a cohesive look to the garment. This shape is echoed in the slanted pocket flaps as well. The cream color of the bands is repeated in the rib knit collar, cuff, and hem of the jacket, while the taupe color is seen in horizontal and vertical bands throughout the design. Color repetition causes the viewer's eye to move around the design without causing distraction or strain to the eye.

Design Contribution and Innovation- This gradable jacket design successfully proves Carrico's (2020) zero-waste grading method can be applied to women's outerwear. Additionally, this project highlighted and found a solution to an obstacle in Carrico's method: garment finishes. Traditionally, outerwear garments are faced and lined to finish the inside and protect seam allowances from fraying. However, lining was not an option in this project, as it would require the use of an additional zero-waste pattern and bands, adding significantly to the construction time and cost of the final garment. Answering this problem, I finished the inside of the jacket with additional bands that acted as coverings for the inserted areas. Wide bands were placed on the inside of the jacket where the gradable bands had been inserted into the design, pressing all seam allowance towards the center. I then stitched-in-the-ditch of the band inserts to secure the inside covering. For seams where no band was inserted, bias binding was applied to the seam allowance. Ultimately, this created a clean finished inside and raised the quality of the garment.

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