Application of Experimental Patternmaking Techniques to Increase Utilization and Creative Potential of American Alligator Leather

Casey R Stannard, Lauren Lansdell, and Susan Lindrew, Louisiana State University, USA

Today, a major issue facing the American alligator leather industry is a surplus of hides in the market which is causing a significant price slump (Fannin et al., 2021). Finding new uses for alligator leather is of critical importance to regions where alligator is a major agricultural product. However, alligator is a challenging leather to use in apparel products. The long, irregular shape of the hide can make it difficult to cut many items and garments require numerous skins (Belleau et al., 2004). Previously, Belleau et al., (2004) reported best practices for utilizing alligator leather in apparel. They suggested careful prior planning before cutting into hides and the use of vinyl for mock-ups. For sewing, they suggested lapped seams, bias binding for seam finishes, and using a leather mallet to flatten seam bulk. This investigation was almost 20 years ago and did not use experimental patternmaking techniques (EPT). Thus, the purpose of the present research was to apply EPT to determine the best approach for utilizing more of each alligator hide and maximizing the creative potential of alligator leather for fashion.

Recently, designers have begun to explore new design methods called EPT. Experimental patternmaking "breaks all the traditional rules in order to innovate new and exciting ideas and shapes" (Almond, 2010, p. 15). EPT includes subtraction cutting (SC), transformational reconstruction (TR), zero waste (ZW), planar flux (PF), and pattern magic (PM).

SC was developed by Julian Roberts (2013) and considers the space inhabited by a wearer to create designs as opposed to thinking about the pattern pieces needed to cover the body (James et al., 2016). Garments made using SC are irregularly draped and highly unique.

TR is a technique by designer Shingo Sato. TR patterns are made by draping a simple control garment on a dressform and then drawing complex lines (seams) onto that control garment. The control garment is cut along the drawn lines to create pattern pieces for the design (Saeidi & Wimberly, 2017).

ZW patternmaking is the process of eliminating fabric waste at the cutting stage by using the entire width and length of the fabric in a design (Rissanen & McQuillan, 2016). Pattern pieces are puzzled together so that no waste is produced (Saeidi & Wimberly, 2017).

PF grew out of the SC method (Sharma, 2018). In this method, the designer, Sanah Sharma (2018) advised that a designer must conceptualize pattern pieces joining in 3D space. To add volume without unnecessary yardage the PF method employs the concept behind a Mobius strip in which one end of a pattern is twisted and then sewn to the next piece.

PM was originated by Nakmichi (2010). The PM approach is outlined in a four-book series and relies heavily on origami and Japanese design aesthetics (McKinney et al., 2016).

Methods

To investigate, a design team (one undergraduate student, a graduate student, and a professor) completed five designs. Each design employed a different EPT and highlighted the use of alligator leather. Each design was completed by a single designer with consultations throughout the process with the design team. Initial planning sessions included discussing ways to sew leather seams, how to finish any raw edges, and pattern layout possibilities on the alligator hide. All designs were a combination of support fabrics and alligator leather to decrease the overall cost and increase creative potential.

Results

The design team created five garments using different EPT and alligator leather. The first garment was a draped, full-length gown that employed SC (Roberts, 2013). It was made using black and white printed cotton sateen with pink alligator inserts at the hips. These inserts were cut from the 3D leg portions of the hide. The designer draped it so that the curved leather followed the shape of the body. The remaining alligator was then utilized for a second design.

The second design was created using the TR ribbon method. The designer created a short, trapeze dress in tan linen with large, ribbon-shaped color-blocked sections across the surface. Hot pink alligator was used to create a Peter Pan collar and as "pop-of-color" inserts along the curvilinear color block sections of the design which were teal in color.

A third design employed ZW techniques. This design was a cardigan-style ZW caramel-colored wool coat with a brown alligator leather collar that was also ZW. The designer utilized the dimensional leg portions of the hide to create a ruffled effect on the collar.

PF was chosen for the fourth design. The design was an emerald-green, midi strapless gown with fullness at the hips. The design was created from a rectangular piece of fabric (3 yards in length). All pattern pieces were grouped in the center. Before sewing, the side pieces were flipped underneath the remaining yardage to achieve volume as is typical in PF. Brown alligator appliques with a bound edge were added to the bodice sides to further emphasize the method.

Finally, PM was used in the fifth design, a shift dress in navy cotton with a gold-colored alligator yoke. The designer worked with the "parring down and opening out" (Nakamichi, 2016, p. 40) approach which created dimensional curved seams along the dress. The alligator yoke was seamed by machine to the dress and the raw edges were bias bound.

Discussion and Conclusions

Each of the EPT were successfully employed alongside alligator leather. Key requirements for designing with alligator were considered and combined by the design team.

Many of the findings agreed with Belleau et al.'s (2004) suggestions. First, one must carefully consider the shape of the hide before designing. Mockups of the hide can be made from vinyl to help in determining effective usage of the hide or how to drape the hide onto a specific design. When sewing layers of alligator, it is preferable to use a lapped seam to reduce bulk. Leather needles and industrial sewing machines are useful, but domestic machines can be successful when sewing alligator. Finally, the raw edges of the alligator leather must be considered if they will not be hidden by seams. Edges can be finished with bias binding or painted with leather dye.

The team identified new considerations for designing with alligator and EPT. Alligator is thick and does not conform to the tight corners that are often part of EPT. A mixture of support fabrics and leather works best for these types of patterns. The fabrics can perform the turns and corners that were not possible with the leather. However, combining alligator with lightweight fabrics can affect the hang. Light fabrics can be interfaced to help with this issue.

Additionally, the first team did not focus on maximizing leather utilization. Instead, they recommended buying extra hides to match scale patterns (Belleau et al., 2004). Contemporary focus on sustainable design practices, such as ZW, pushed the present design team to incorporate most of each hide into designs. By using smaller pieces of alligator, it was possible to create multiple designs from hides. The 3D leg portions, which are typically discarded, were draped to curved parts of the body, like hips, or the fluted shapes were harnessed to create a ruffled collar.

References

Almond, K. (2010). Insufficient allure: The luxurious art and cost of creative pattern cutting. *International Journal of Fashion Design, Technology and Education, 3*(1), 15-24. DOI: 10.1080/17543260903582474

Belleau, B., Marquette, Y., & Summers, T. (2004). Practical techniques for designing with exotic leather: American alligator and emu. *Clothing and Textiles Research Journal, 22*(1/2), 53-60.

Fannin, J. M., Penn, J., & Stannard, C. (2021). *Identifying value-added markets for Louisiana's wild and farm-raised alligator industry* [Grant]. Louisiana Sea Grant Competitive Research Program (Project ID: R/A-63). NOAA Award # NA22OAR4170105

James, A.M., Roberts, B.M. & Kuznia, A. (2016). Transforming the sequential process of fashion production: Where zero-waste pattern cutting takes the lead in creative design. *International Journal of Fashion Design, Technology, and Education, 9*(2), 142-152.

McKinney, E., Stanley, A., Plummer, B., Thompson, K., & Rorak, W. (2016). Tacit magic: Understanding the principles behind Nakamichi's creative pattern cutting. *International*

Journal of Fashion Design, Technology, and Education, 9(2), 130-141. DOI: 10.1080/17543266.2016.1165740

Nakamichi, T. (2010). *Pattern magic.* Laurence King.

Nakamichi, T. (2016). *Pattern magic 3.* Laurence King.

Nickum, M., Masser, M., Reigh, R., & Nickum, J. (2018). Alligator (alligator mississippiensis) aquaculture in the United States. *Reviews in Fisheries Science & Aquaculture, 26*(1), 86-98.

Rissanen, T. & McQuillan, H. (2016). *Zero waste fashion design.* Bloomsbury.

Roberts, J. (2013). *Free Cutting.* https://subtractioncutting.tumblr.com/

Saeidi, E. & Wimberley, V. S. (2018). Precious cut: Exploring creative pattern cutting and draping for zero-waste design. *International Journal of Fashion Design, Technology and Education, 11*(2), 243-253. DOI: 10.1080/17543266.2017.138999

Townsend, K. & Mills, F. (2013). Mastering zero: How the pursuit of less waste leads to more creative pattern cutting. *International Journal of Fashion Design, Technology and Education, 6*(2), 104-111. DOI: 10.1080/17543266.2013.793746