Women Climbing Pant Prototype

Dawn Michaelson, Auburn University, AL, USA

Keywords: functional clothing, ready-to-wear, textile innovation

Waist 26", Hip 36", Pant Length 41", Bust 35"

The sport of climbing encompasses bouldering, indoor climbing, sport climbing, traditional climbing, ice climbing, and mountaineering (Outdoor Foundation, 2016). US climbing participation have steadily increased over the last 10 years with female participation growing from 30% to 50% in some climbing areas (Outdoor Foundation, 2016; USA Climbing, 2016). Climbing apparel research, especially for women, is limited but the results indicate similar needs for women worldwide (Jung & Chun, 2013; Michaelson, 2015; Suh, 2013). Women climbers expressed a need for better fit, more movement/stretch in crotch to hip area, higher back waist, durable and flexible knees, accessible pockets while in harness, adjustable pant length, and performance stretch textiles with improved durability, breathability, elasticity, and comfort in their climbing pants (Jung & Chun, 2013; Michaelson, 2015; Suh, 2013). This prototype seeks to address these functional design and textile needs for women climbers.

Textiles were sourced prior to pant design to fulfill the consumers' needs based on prior research (Jung & Chun, 2013; Michaelson, 2015; Suh, 2013). The prototype incorporates four different textiles. The main textile is a technical 4-way stretch woven, Schoeller®-dynamic, in Pacific Blue that has high elasticity, water repellency, breathability, durability and superior comfort ratings. The crotch gusset insert is a 12% stretch compression jersey, Sportek ™, which incorporates MaxDri™ for wicking and a MicroBlok™ antimicrobial finish. Pocket linings and interior articulated knee are made with a stretch athletic mesh with wicking properties. The interior knee facing is 330 denier Cordura™ which is lightweight yet has high abrasion resistance properties.

Once textiles were sourced the jean pant block was designed to accommodate the stretch properties of the textiles. An initial fit was done before modifying the pattern to accommodate the functional design requirements. Watkins & Dunne's (2015) functional design book was referenced for possible design changes along with a market survey. The prototype pant features a high waistline that sits on the natural waistline so it doesn't fall before the harness. Additionally, an interior adjustable elastic casing was added inside the waistband to accommodate waist measurement differences within the size range. To enhance mobility without compromising fit, a wide elongated stretch gusset was added to the crotch and is similar to a gusset found in equestrian pants. The pant gusset starts wide at the back seat and then narrows as it extends to the inner thigh. Accommodating the need for a flexible yet durable knee, the front pant leg was separated at the knee with the lower leg attaching to the upper with a separate stretch mesh so wearer has flexibility and breathability without unnecessary weight. The upper leg has a reinforced knee facing and is articulated to shape the knee area allowing it to stay in place when climbing. Functional welt zippered pockets are on each thigh, positioned in different directions, and were designed to be accessible while wearing the harness. Additional functional features are three gear loops on the waistband to accommodate a chalk bag or other lightweight gear. A lower leg strap was added so the pant can be rolled and secured below the knee with a snap, if desired. To increase seam durability, prototype has safety stitched side and inseam along with dual needle top stitching in crotch, around gusset, and side seam. A fit test and wear trial was conducted and initial results show there is an increase in fit, mobility, and comfort along with aesthetic appreciation for the style and color of the pant.

While this prototype sought to address women climbers pant needs, it also demonstrates that outdoor/sport apparel designers can address the needs of climbers by concentrating on functional design and performance textile sourcing. Advances in textiles, fit, and patternmaking technologies can aid in increasing fit, mobility, protection, and comfort in future pant styles, especially for women who are increasingly participating in the sport of climbing.

References

Jung, S., & Chun, J. (2013). Professional climbers' demand for movement functionality in pants. *The Research Journal of the Costume Culture, 21*(2), 261-271.

Michaelson, D. (2015). *Assessing functional needs of rock climbing pants*. (Master's thesis) Retrieved from Auburn University Electronic Theses and Dissertations. (http://hdl.handle.net/10415/4624)

Outdoor Foundation. (2016). *Outdoor recreation participation topline report 2016.* Retrieved from http://www.outdoorfoundation.org/pdf/ResearchParticipation2016Topline.pdf

Suh, C. (2013). A survey on the purchasing behavior and preference of mountain climbing pants for the development of women's functional mountain climbing pants patters. *Journal of the Korean Society of Clothing and Textiles, 37*(1), 90-100.

Watkins, S. & Dunne, L. (2015). *Functional clothing design: From sportswear to spacesuits*. New York: Fairchild Books.

USA Climbing. (2016). *Climbing competition results.* Retrieved from http://usaclimbing.net/rockcomps/comps/results