

**Topic № 3**  
**APPAREL TECHNOLOGY**

*687*  
*Tailoring (apparel) Industry.*



Youth revue: collection of the specialty Construction and modeling of clothing from textiles in PGO Princess Maria Luisa - Sofia led by Eng. Maria Koleva



Youth revue: students collection from the specialty Clothing production from textiles from ISU Metodi Draginov - the village of Draginovo, led by Eng. Elka Djurakova

## SEAM PERFORMANCE OF MOTORBIKE SUIT

**Goran Demboski, Ruzica Stevkovska Stojanovska**

*University "Ss. Cyril and Methodius", Faculty of Technology and Metallurgy,*

*Department of textile engineering, Skopje, North Macedonia*

goran@tmf.ukim.edu.mk

According findings, the worldwide automobile industry's fastest expanding product is the motorbike. Since it is crucial [1] for motor bikers protection and help in lowering the risks and seriousness of injuries [2,3], wearing proper personal protective equipment is required in many countries [4] to increase its safety on the road. Consequently, in 2002, the European Standard EN 13595 for "Protective Clothing for Professional Motorcycle Riders" was established. However, Europe recently created a new garment protection standard called EN17092 that complements EN 13595. Achieving this criteria should result in improved seams because the bulk of motorcycle apparel currently on the market has not previously been certified for seam strength [5].

Kevlar is a very strong synthetic fibre, invented by Stephanie Kwolek in 1965 and manufactured by DuPont. This fibre is mostly renowned for its tensile strength, heat resistance, ballistic resistance, and resistance to cuts and punctures. These factors contribute to its widespread use in the motorbike industry as well as the automotive, aerospace, and military sectors [6]. On the other hand, Coolmax fabric offers breathability and moisture management, making it a fantastic option for consumers seeking best possible comfort.

Stitching and seaming are still most dominant and efficient techniques of joining garment parts and creating 3D garment form. Since the seams have significant impact on the quality and appearance of the finished garment, the performance of the seams must accompanies the performance of the garment. There is no value having the world's hardest denim if it falls apart at the seams. This is why, for creating protective and safe clothing, the seam strength is one of the key variables [6]. Finding the CE emblem stamped on a product's label, which confirms testing in accordance with the necessary standard, will help you choose better motorbike clothing or active wear [7].

The objective of the paper is to evaluate the performance of various seam types of motorbike suit. Seams investigated were of seam class 5, type 5.01.01 having three layers of fabrics (coolmax – Kevlar - coolmax), connected by stitch type 301. The second seam is of seam class 1, type 1.01.02, of two fabric layers (coolmax - kevlar) connected by stitch 401.504. Stitch type 301 is formed with two threads, needle and bobbin thread, while stitch type 401.504 is overlock safety stitch [8]. Kevlar type of fabric is one of the most famous type of materials for motorbike clothing, providing adequate protection for wearer [4], while Coolmax fabric as moisture-wicking polyester and "breathable" fabric, providing wearer comfort.

The testing of the seams is according standard EN 13594:2015, Protective gloves for professional motorcycle riders. The test involves pulling a seam apart using CRE tensile testing machine and measuring the maximum force until seam failure. The clamping jaws distance is 30mm. The results of investigation are shown in table 1.

Table 1. Seam breaking strength

Seam type	5.01.01	1.01.02	
Stitch type	301	401	504
Force [N]	526.3	210.6	258.6
Elongation [%]	211.8	150.1	45.1
Extension [mm]	63.6	217.5	65.3
Seam strength [N/mm]	21.1	8.4	10.3

The results for seam breaking strength are calculated by dividing the breaking force by the width of the tested seam (25mm). The seam strength for the first type of seam is 21,1N/mm. For the second type seam, the seam strength is 8.4N/mm and 10.3N/mm, for the stitch type 401 and 504 respectively. The seam type 5.01.01 remains undamaged during testing and the seam strength equals breaking strength of the fabric. The second seam type, 1.01.02, show two peaks of breaking strength. The first peak is the moment of breaking the stitch 401 and the second peak is the point of breaking the overlook stitch 504. The seam failure of this seam is a result of the sewing thread breaks and the fabrics in this case remain undamaged.

The fabrics strength were also investigated, and the Kevlar fabric shows high breaking strength in both testing direction, while the coolmax knit shows much higher strength in longitudinal direction. Obviously, the seam type 5.01.01 show high breaking strength due to seam configuration, where the thread just quilts the fabrics together and does not contribute to seam strength. Therefore, this seam falls in AAA class in the first zone (almost 75% higher) according to the standard EN 17092. In addition, the strength of the seam 1.01.02 is within the limits of the standard for different zone and class, because the failure of the seam is the result of breaking of the sewing thread. Based on these results, it is to expect that the performance of this seam type can be achieved applying sewing thread of higher strength.

**Keywords:** seam, breaking strength, motorbike clothing

#### References:

- [1] Bollschweiler, N., Marzen, S., Ehrmann, A. New Method to Measure Abrasion of Motorcyclist Protective Clothing. Short Scientific Article. *Tekstilec*, 2018, 61(3), pp.152-161
- [2] De Rome, L., Ivers, R., Fitzharris, M., Richardson, D., Wei, D., Haworth N., Hertitier, S. Motorcycle protective clothing: Protection from injury or just the weather? *Accident Analysis and Prevention*, 2011, 43(6), 1893–1900, doi: 10.1016/j.aap.2011.04.027.
- [3] De Rome, L., Ivers, R., Fitzharris, M., Haworth, N., Hertitier, S., Richardson, D. Effectiveness of motorcycle protective clothing: Riders' health outcomes in the six months following a crash. *Injury – International Journal of the Care of the Injured*, 2012, 43, 2035–2045.
- [4] CSIR- Central Leather Research. Protective Apparel for Bikers. The leather post. Vol.4, Edition 2, 2019.
- [5] New motorcycle clothing standard (Pt 4). 24.04.2020, see: <https://www.webikeworld.com/new-motorcycle-clothing-standard-pt-4/>.
- [6] Overcoming Aramid Fabric Limitations: Erez's Breakthrough in Product Development. *Coating*. Jun 20, 2023. <https://erez-therm.com/kevlar-fabric/>.
- [7] Haworth, N., De Rome L., Varnsberry, P., et al. Motorcycle protective clothing: Are stars better than standards? In: Schofield P (ed). *Australasian road safety research, policing and education conference*. Australia: ARSRPE; 2007, pp. 171–1911. paper no.12949.
- [8] Gurarda, A. Seam Performance of Garments. *Textile Manufacturing Processes*. InTech Open. 2019. DOI: <http://dx.doi.org/10.5772/intechopen.86436>



<https://doi.org/10.53230/tgm.1310-912X.2023.0010.23>

## LADIES SPORTS DRESS

**Victoria Stoyanova<sup>1</sup>, Maria Rangelova Koleva<sup>2</sup>**

*Vocational high school for clotting "Kn. Maria Luisa",  
specialty „Construction, modeling, and technology of textile clothing”,  
Cherni vrah boulevard 37, Sofia, Bulgaria  
viktoria.stoyanova173@gmail.com*

These days every woman can find at least a few pretty dresses in her wardrobe, for various occasions. The dress is a symbol of elegance and femininity, perfect for every day, a best friend. The woman's dress is a upper-shoulder garment, known to people since ancient times. As far back as Ancient Greece women wore fabrics wrapped around their bodies, which were tied at the waist and fixed at the shoulders using fibulae.

Today buying a fashion item is like going out for an afternoon coffee – it is a reason for a good mood. We don't even think about how long a garment's journey is to become our favourite acquisition. An idea needs to find the right fabric and material combination. It is a huge amount of work from a constructive point of view, and no less from a technological one.

We are looking at a model development of a ladies' sports dress, using the Bulgarian State Standard (BSS/ БДС), applying it to construct a drawing of a basic construction of a ladies' dress in semi-fitted silhouette and showing the basic steps of creation of said model. Different methods have been applied to transform folds, which present the rich tools in construction and modeling to achieve a more advanced model development.

The garment flares from the waist down, which contributes to the comfort of wearing and freedom of movement. The dress combines two colours, with the darker used to make the side pieces elongate and make the silhouette more fitted, making it suitable for shorter ladies. A detailed technological sequence for making the garment has been developed with the necessary patterns and technique used. The production follows a specific order of steps and material processing using a various set of machines and tools. The model is made life-size at each point of the design, which is a testament to the value of the methods used.

It is an extreme advantage to have a sports dress made from breathable and soft fabrics that caress the skin. The journey an idea goes through is sometimes too long and difficult. The final touch always brings satisfaction, especially the gleam in a lady's eyes, with a beautiful and comfortable dress.



**Keyword:** construction and modeling, model development, technology

## REGULATIONS IMPACT ON SUSTAINABLE DEVELOPMENT OF CLOTHING

**Maria Rangelova Koleva<sup>1</sup>, Ivelin Rahnev<sup>2</sup>**

<sup>1</sup> *Vocational high school for clothing "Knyaginya Maria Luisa", Sofia*

<sup>2</sup> *E.Miroglio EAD- Sliven*

maria\_rk@abv.bg

These days, the concept of sustainability is extremely relevant in the fashion world. The market is practically a maze of offers and everyone is trying to reach the light at the end of the tunnel. It is vital for consumers to be informed on how to competently choose sustainable textile products of high quality.

This article provides basic guidance on what is really high quality and is truly in line with the ecological needs of our planet.

Organic materials are grown according to the standards for organic farming, and the ones most commonly used are cotton, jute, silk and wool. The category of organic textiles includes clothing and home textiles, and in practice the requirements for certification and origin are the same. Organic cotton is generally defined as cotton that is grown from non-genetically modified plants, and without the use of synthetic agricultural chemicals such as fertilizers or pesticides.

Organic means natural and it's something that provides benefits for the environment. This practice combines tradition, science and innovation to benefit the environment and ensure everyone and everything involved a good life quality. No product is 100% sustainable, but the aim is to educate and raise awareness of sustainability in production, business and consumption.



There's a high quantity of sustainable and ecological certificates for textiles at the European and international level. Recognizing all of them is overwhelming, if not impossible, but it is of key importance for people to be aware of the most important ones to avoid being misled. Sustainability certificates provide information on the origin of the materials used, animal welfare, sustainable production, recycling, social responsibility, etc. The goal is for everyone to be informed so they're able to make a choice and prioritize the planet.

**Keywords:** organic, ecological, social, principle of sustainability.