

Effect of different textile structures on Modern sewing seam

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Summary

People who are interested in the ready-made garments industry works hard to improve the efficiency of both manufacturing and production process. In addition, they work hard to reduce the resulting defects by knowing the causes and try to prevent it. One of the most important efforts in this regard is to use modern production technology in the manufacture of ready-made garments. Modern manufacturing technology and fashion trends affect the fashion designers thought globally in the ready-made garments industry field. So, it is important to benefit from modern technology in the clothes production process. In particular, the aim of this modern technology is to produce clothes that perform specific functions meanwhile have a beautiful appearance that follows the international fashion trends. It is important to considered the garment products functionality when assembling different fabrics and during the production and manufacturing processes during the designing process. This is because of its nature such as the direction of the fabric, comfort, balance and drape on the body. So, it requires a technical approach that is consistent with its natural and mechanical properties.

Each product has its functional characteristics which are the main determinant of its design lines and are derived from the effects of the used materials, the elongation ratios of cloth, the nature of this product and standard specifications.

The research aims: To investigate the effect of mixing various mechanical and nature fabrics on the quality of clothes functionality through experimental study. As these factors highly affect the designing process of the product and raising its final aesthetic value. In addition, to develop a production plan for a product that fulfils the desired goal.

Research hypothesis is that, there is a presence of differences statistical function due to the effect of using different types of sewing seam and different types of fabrics on the quality of sewing.

The research problem can be conceptualized through the following questions:

1. To what extent is it possible to apply ultrasonic welding technology to the garment production in Egypt?
2. To what extent is it possible to find some solutions to solve the problems of sewing in different fabrics on one product?
3. What are the best ways to mix two different fabrics and the effect on the quality of sewing with the ultrasonic welding machines?

Research Importance:

Improve the quality of produced garment products by mixing various fabrics using ultrasonic welding machines.

Research Goals:

1. Solving problems of sewing different fabrics together with modern techniques by using the ultrasonic welding machines according to their physical and mechanical properties.
2. Setting appropriate standards for the production of ready-made garments from multiple fabrics.
3. Improving the quality of garments during the production process.

Research Hypotheses:

1. There are differences significant statistical between the properties of the fabrics and the production process of the garment.
2. There are also differences statistically significant between avoiding expected sewing problems and committed to apply the proposed standards.

Search Limits

Spatial Boundaries: Experimenting fabric samples inside an equipped place with various industrial sewing machines and testing on fabrics with standard test laboratories.

Time Limits: The period from 2016: 2018

Human Boundaries: Women's clothing products

Sample Search: Fabrics used: Fabrics " Woven 1/1, twill 3/1"

Standard Specification for Materials / Standard Specification for seam and stitching.

Methodology:**This research depends on**

A descriptive approach (analytical): Analytical study of different types of fabrics and ways of sewing them together in the manufacture of ready-made garments.

Experimental Approach: Experimenting the integration of different fabrics and selecting the best alternatives to achieve high quality of the products using the ultrasonic welding technology.

A number of laboratory tests were carried out to determine the level of the samples functional and aesthetic performance on produced under the research, to determine their different properties and find the relationship between these properties and the variables study factors (types of fabrics – seam types).

In this study, two different types of textile were used, with the necessary determine the variables for the used machine to control the combination of the pieces, the thread type, the needle type and the size of the needle to the traditional sewing, also the necessary heat and speed of wheels which proportional by using the ultrasonic welding machines.

The fabrics of the research samples were chosen: "Woven fabrics 1/1, Twill 1/3" The research samples were fabricated from different fabrics mentioned above using four different seam types superimposed, lapped, flat seam and ultrasonic welding the patterned search samples

are 4 samples with the necessary variables for the machine used to adjust the combination of the fabric gathering such as the type of thread, the type and size of the needle, Adjust the needle-thread tension and the press of presser foot. also, the necessary heat and speed of wheels which proportional by using the ultrasonic welding machines.

After conducting the study samples according to the specific specifications and variables, a series tests were carried out to determine the level of functional and aesthetic performance of the produced samples, as well as a survey questionnaire to measure the aesthetic value of the proposed samples.

Sewing Tests:

Laboratory tests were conducted on the research samples to determine the effect of the physical and mechanical properties on the study variables.

Tensile Strength and Elongation of Sewing Test

This test was carried out in accordance with ASTM D 1683: 04 at the Textile Design and Technology Center of the Faculty of Applied Arts.

The Appearance of Sewing Test

The appearance of sewing was judged by measuring the amount of sewing crease which was measured subjectively according to AATCC Test Method 143-1992

Results:

The study found the following results:

The best types of textile compositions proposed to be combined to give the best results were for fabric structure woven 1/1&twill 1/3 for ultrasonic welding and flat seam in terms of appearance. The highest value of tensile strength and elongation of sewing was the same type of fabrics using lapped seam then ultrasonic welding.

After conducting the research experiments and reaching the results, these results were tested and the following values were found:

The average values show that:

- The highest value of the sewing strength was (432 Newton) made by the woven materials sample using lapped seam and noted that there was rupture of the fabric without cutting the sewing line itself.
- sewing with ultrasonic welding achieved a value of (317 Newton) for the same combined fabric samples and noted that there was a rupture in the sewing line position.
- sewing with superimposed seam achieved (214 Newton) as the value of the sewing strength of sample.
- The lowest value of the tensile strength was (185 Newton) for the flat seam for the fabrics under study and noticed that there was a rupture of the material at its weakness.
- The best appearance of the woven fabric sample(woven 1/1,twill 1/3)for the ultrasonic welding and flat seam followed by superimposed seam and the least value of appearance for sewing and the highest degree of crease for the lapped seam.

Research applications

The alternatives that achieved the best results were applied to two design for female for the spring and summer of 2018 and suggested a production plan to be installed inside the garment factories.

The study presented a set of recommendations and proposals to develop the benefit of mixing fabrics in apparel designs to give aesthetic and functional results.

The study recommended further research to solve the problems of manufacturing in the garment factories to achieve the highest levels of production efficiency, with the need to provide scientific standards for mixing different fabrics properties with scientific basis and using modern technology to address the problems faced by the garment industry.

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