Taking advantage of the modern technological possibilities of shuttle-less weaving machines on the aesthetic side for ladies fabrics produced by high-twist polyester fibers.

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Research Summary:-

The design of textiles does not depend on the selection of simple compounds of plain weave textile, 1/1 or Twill weaves or Satin Weaves. It doesn't depend also on using color effects in the production of decoration, but rather to produce single-color fabrics where different production theories are used to obtain the effects of Striped patterns or One or more decorations, which represent or provide many features, and fabrics with Striped patterns have special characteristics that are not available in other fabrics, as these fabrics are used for T-shirts or upholstery, which improves the aesthetic appearance of fabrics in the simplest possibilities, which leads to increased strength For its purchasing power.

There are many technical methods for the production of Striped patterns fabric have increased recently in the Egyptian market and became very competitive which prompted the researcher to do studies contribute to enrich the production of this type of fabrics, as ten samples have been produced, taking advantage of the latest modern technologies in weaving looms, Three samples using an additional Over Beam, three samples using a color -selector device, and four samples by controlling the change in the speed of turning the (Cramming motion) on and off. This led to the possibility of producing some aesthetic variables for ladies' fabrics by obtaining linear twisted fabric by using an over beam, resulting in multi-level fabrics, and crosswise stripped pattern using the Color Selector by using decorative Wefts with different types of continuous polyester filaments where Different thicknesses are used by controlling the change in the speed of the Cramming Motion. The suspension of the Cramming Motion results in a difference in the densities of the design Wefts, where different thicknesses are used in different densities for single design to obtain linear striped patterns With highs and lows and therefore all these variables led to increase the aesthetic and decorative value of this type of fabrics, which increases the spread of this type of fabrics.

Key words:

Shuttle-less looms - ladies fabrics - polyester fibers – (POY) Polyester Partially Oriented Yarn – (DTY) Polyester Drawn Textured Yarn – (FDY) Polyester Fully Drawn Yarn – (ITY) Yarn Intermingled textured – (VID) VIDAN Yarn

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Research problem:-

- The stability of the operational specifications of high-twisted polyester used in ladies' fabrics and lack of plurality in the specifications of these fabrics.
- The weakness of the aesthetic side in relation to the specifications of the implementation machine resulting in traditional fabrics with a single texture.

Importance of research:

-The research is a scientific study specializing in the effect of different number of twists and the direction of twisting and weave structure to access multiple-touch surfaces and new aesthetic effects.

-Utilizing the modern technological capabilities of shuttle-less weaving machines to create unlimited diversity in the development of high-twist polyester fabrics and maximize the aesthetic aspect of this type of fabrics.

Research assignments:

- The Looms with modern possibilities will increase the ability to produce various fabrics in terms of texture, general appearance, physical and aesthetic characteristics.

-The different number of twists used in the production of fabrics has a clear effect on the properties of the fabrics produced.

-The different of the weave structures used affect the properties of the fabrics in terms of the final use of the product.

Research methodology:

This scientific research follows the experimental and analytical approach.

Part One:

The most important recent developments on the shuttle-less machines

1-Development in the process of selection of Weft Color Selector

In the past few years, there have been many changes and developments in the methods of inserting weft thread using the Weft color Selector, where the number of fingers used in the reversible device reached 8 - 12 - 16 color and the control systems of these fingers moved from the mechanical method or using Cardboard in the textile machines with the jacquard (Ferdol) to electronic control (electrically) where the order of the colors of the weft is entered into the machine through the electronic control unit microprocessor.

2-use the extra over Beam

Using the additional warp beam (over Beam) to get out of the narrow space of fabric production to a wider range allows for the creation of designs that are difficult to obtain or produce using only one beam (the original warp beam).

3-motion take-up

where different densities are used and varied by stopping (cramming motion) where this suspension of (cramming motion) produces a variation in the densities of the design wefts where the use of different types of wefts with different densities of the same design It was difficult to produce with the old traditional machines, resulting from recent developments in modern textile machinery to take advantage of the diversity in the use of different wefts and thus obtain homogeneous fabrics

Types of Filament Polyester Yarns

1. Polyester Partially oriented Yarn (POY)

The commonly used and rolling title is (POY), and also known as Polyester pre-oriented Yarn, the first partial oriented yarns. These threads are manufactured from the raw material called polyester chips, which results from mixing the two chemical compounds, then the raw material is melted and pushed strongly under high pressure to spinnerets.

2- Polyester Drawn Textured Yarn (DTY)

These yarns are known as DTY-their common name, which is the abbreviation of polyester drawn textured yarn and mean any drawn yarns on which withdrawals are made and the formation is obtained from the continuous polycarbonate filament POY which is Drawing and twisted to produce DTY yarns which are mainly used in textiles and Knitted fabrics, home furnishings, seat covers, bags and many other uses.

3- Polyester Fully Drawn Yarn (FDY)

Polyester Fully Drawn (FDY) is the abbreviation for full-length polyester yarn and also known as Polyester Filament Yarn (FDY), namely, continuous polyester yarns which is used as a weft yarn for the fabric industry as used in knitting fabrics with other yarns for different fabric specifications. Also used in home furnishings fabrics for velvet fabrics, towels, nightwear and other uses.

4- Intermingled textured Yarn (ITY)

This type of filament is of two types of continuous polyester (FDY + POY), and this quality is characterized by high durability and is one of the most used threads for the production of fabrics, especially ladies ' clothing.

Part Two

This section aims to enrich this type of fabrics where 10 samples were produced using the modern developments that characterize the test machine as follows:

1- Three samples using extra over Beam

2- Three samples using the Weft color selector

3- Four samples using change in the speed and stopping the (cramming motion)\

Firstly: Using extra over Beam.

Table (1) shows samples of experiments carried out using extra over Beam.

Samples no.	Warp data									Weft data				
	Beams No.	Types of Filament	Yarn count	Twists No./M	Twist Dr.	Ends/ CM	Reed NO.	Total warping	Reed width	Types of Filament	Yarn count	Twists No./M	Twist Dr.	Ends /CM
Sample no. 1	Beam (1)	FDY	75/72	1800	2S:2Z	36	9	5616	163 CM	FDY	75/72	1800	S	32
	Beam (2)	FDY	300/96	300	S	27								
Sample no. 2	Beam (1)	FDY	75/72	0	-	100	10	10474	173 CM	FDY	75/72	1800	S	32
	Beam (2)	FDY	75/72	0	-	42								
Sample no. 3	Beam (1)	FDY	75/72	2200	2S:2Z	28	14	7306	162 CM	FDY	75/72	2200	2S:2Z	28
	Beam (2)	FDY	75/72	1800	2S:2Z	70								

Secondly: Using Weft color selector.

Table (2) shows samples of experiments carried out using Weft color selector.

Samples no.	Warp data									Weft data					
	Stripes No.	Types of Filament	Yarn count	Twists No./M	Twist Dr.	Ends/ CM	Reed NO.	Total warping	Reed width	Stripes No.	Types of Filament	Yarn count	Twists No./M	Twist Dr.	Ends /CM
Sample no. 4	First Stripe	FDY	75/72	1800	S	36	18	6228	171 CM	First Stripe	FDY	75/72	1800	2S:2Z	32
	second Stripe	ITY	80/48							second Stripe	FDY	75/72	1800	2S:2Z	
										Third Stripe	FDY	300/96	300	S	
Sample no. 5	Beam data	FDY	75/72	2100	2S:2Z	36	18	5904	162 CM	First Stripe	ITY	80/48	2100	2S:2Z	32
										second Stripe	FDY	150/96	-	-	
										Third Stripe	Lurex	80	-	-	
Sample no. 6	First Stripe	DTY	100/48	2000	4S:4Z	28	14	4872	172 CM	First Stripe	DTY	100/48	2000	4S:4Z	28
	second Stripe	DTY	100/48	1900	4S:4Z					second Stripe	DTY	100/48	1900	4S:4Z	
	Third Stripe	DTY	100/48	1800	4S:4Z					Third Stripe	DTY	100/48	1800	4S:4Z	
	Fourth Stripe	DTY	100/48	1700	4S:4Z					Fourth Stripe	FDY	100/48	1700	4S:4Z	

Thirdly: using change in the speed and stopping the (cramming motion).

Table (3) shows samples of experiments carried out using change in the speed and stopping the (cramming motion).

Samples no.	Warp data									Weft data				
	Beams No.	Types of Filament	Yarn count	Twists No./M	Twist Dr.	Ends/CM	Reed NO.	Total warping	Reed width	Types of Filament	Yarn count	Twists No./M	Twist Dr.	Ends /CM
Sample no. 7	Beam data	FDY	75/72	2100	2S:2Z	36	18	6192	170 CM	DTY	75/72	1800	2S:2Z	50
										DTY	300/96	-	-	30
Sample no. 8	Beam data	ITY	130/60	800	2S:2Z	32	16	5248	162 CM	ITY	80/48	1800	2S:2Z	28
										ITY	130/60	800	2S:2Z	20
Sample no. 9	Beam data	DTY	100/48	1500	2S:2Z	28	14	4816	170 CM	VID	75/48	1800	2S:2Z	29
										VID	75/48	1800	2S:2Z	21
Sample no. 10	First Stripe	FDY	75/36	2100	2S:2Z	56	14	6352	152 CM	DTY	300/72	800	Z	34
	second Stripe	FDY	75/36	2100	2S:2Z	28				DTY	150/48	1800	S	29

Part Three:

Results and discussions:

The first variable: the use of the over beam

In this variable, multiple linear striped patterns are obtained using the different structures weave as well as the difference in tension by the original beam and the over beam. The use of different structures weave with varying tension for each beam has different surfaces that touch a smooth, shiny and rough surface In addition to the multi-surface, the aesthetic aspect of this sample is shown in the crimping produced by the plain Striped patterns, which results in a more rough surface thanks to the high twist factor used for this Stripe. What affects the increase in elongation and stiffness of the sample produced.

The settings used in this variable are to adjust the appropriate tension on each beam, especially since each beam has a different shrinkage than the other switch due to the difference of the textile structure used for each beam, in addition to adjusting the height of the healds in order to reduce the shedding as much as possible preventing the cutting of the beams threads if possible.

Variable 2: Using the Color Selector

Another variable was used to find a variety in the samples produced using the Selector color selection system, in which many different samples were produced using many variables, the most important of which is the use of different materials of colored polyester (colored - metallic fibers) different count, the number of different twists per meter as well as direction of the twists as well as the use of densities of different wefts and fabric structures if possible.

The hold of the weft inside the left rapier was adapted to suit these different counts, as well as adjusting the opening angles of the cutter for proper selvage on the right side of the machine.

It is also necessary to be careful when dealing with metal wefts, which in some samples reduced the speed of the machine.

The third variable: the use of change in the speed and stopping the Cramming motion.

Where the change in the speed and shutdown of the (cramming motion) was used as a third variable for the variation in the change in the produced samples and thus create diversity in the aesthetic form of the samples produced and this variable is considered a new addition to get the striped from the weft patterns by using a different counts as well as using Different densities in used wefts in addition to the different number of twists and the direction of twisting where take-up rollers (woven take-up) rotates quickly in the case of light densities with thick wefts and vice versa this take-up rollers rotates at a slower speed in the case of high densities with fine counts and thus is Smoothing of the produced sample this sample is thicker as a result of multiple surfaces.

Results:

1- Getting out of the circle of traditional specifications for the production of ladies fabrics capable of satisfying all tastes.

2- taking advantage of modern developments of the shuttle less weaving Looms with Darts to obtain innovative textile and aesthetic effects.

3- Using colored wefts and metal wefts with different yarns count to highlight the aesthetic aspects.

4- use different twists in different directions with the weave structures to create a clear change and effects that increase the marketing value.

Recommendations:

1- utilizing modern technological methods of weaving machines and adapting them to enrich the scientific research in the implementation of new samples.

2- to take advantage of the continuous development of the polyester yarns and the emphasis on the means of communication between the factories used for these yarns and between the scientific department in the college to learn about everything that is new in this field always developed.

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