The effect of twisting threads on the surface contact of curtain fabrics

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Introduction: -

The textile design is the product of different elements such as colors of the threads for both warp and weft and the structural composition of the fabrics such as simple and complex textile structures and the structural composition of the thread i.e. Spinning methods for both natural and synthetic fibers as well as application and twisting of the threads, twisting comes as one of the elements of the structural composition of the thread because it has an impact on the clarity of the idea of the design in woven fabric, and the appearance and quality of the final woven are affected by the textile specifications in terms of yarn spinning, the number of twists in the unit of measurement, type and number of each, from warp and weft and the density of warp and warp threads in the unit of measurement, and the number of threads put in the comb , as well as textile structures or application method in addition to the final processing of the product .

The research aims to use the textile materials that are characterized by beauty and luxury, such as the natural silk material, and make a number of different twists in the unit measurement for this yarns to open new horizons characterized by luxury, beauty and innovation in the world of textile design, such as the production of curtain fabrics with innovative designs with functional and aesthetic properties using silk threads and with a number of different twists per square meter and various structural methods for obtaining aesthetic effects on the woven surface, such as plisse and crepe .

Theoretical framework of the research: -

Twist is a spiral winding applied to a thread to maintain the consistency and bonding of its components of parallel filaments or fibers in addition to increasing its strength, and twisting is estimated by the number of turns (twists) per unit length (inch or meter). The twisting direction of spun yarns of natural and synthetic fibers or of continuous filaments includes two main directions: s-twist or z-twist. Achieving the direction of the twist stops, whether towards the right or the left, depending on the direction of the rotation of the spindle in the direction of the hour hand or the reverse.

The basis of the twisting process is to give the thread the strength necessary to counter the stress it is exposed to during the production or use of fabrics, since the thread must have a minimum tensile strength even in the case of threads used as wefts that are not subjected to significant stresses.

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The effect of twisting on the mechanical and natural thread properties:

1- The durability of the thread is closely related to the number of twists in the longitudinal unit of measurement where the fibers combine spiral paths at the beginning of the twisting process, leading to an increase in the surface friction between the fibers together, and this is reflected in the high resistance of the tensile strength and the strength of the threads increases by increasing the twists until a certain point known as the optimal twisting where maximum durability is then reduced.

2- An increase in twisting results in a decrease in the diameter of the thread and an increase in its density.

3. The twisting increase is accompanied by a contraction in the length of the thread due to the increase in the angle between the filaments and the longitudinal axis of the thread and the spinning of the filaments spirally around the axis of the brimmed thread leading to a contraction in the length of the thread, ranging from 3: 2% in the threads of the lower twist to 12: 10% in the threads of the high twist.

4- The amount of twisting has an effect on contracting properties. The filaments that have a low twist number tend to shrink more than those with high twists.

5- The low twisting of the spun yarns results in a lofty thread that has the ability to recover its original thickness after decompression.

6. Twisting affects the amount of rays reflected from the surface of the thread and then the luminosity, the increase in twisting in the single thread reduces luminosity, because by increasing the twisting coefficient of a certain limit, it causes wrinkles in the thread to disperse the light falling on it and absorb it leading to a decrease in luminosity.

7-Twisting affects the ability of the thread to absorb liquids. The more twisting, the less the ability of the thread to absorb water and dyes.

8- Twisting affects the degree of rigidity of the thread and its elasticity. The more the twisting coefficient increases - the greater the compression of the filaments to each other - the greater the rigidity of the thread.

9. The twisting affects the ratio of the elongation of the thread. The twisting process leads to a decrease in the length of the thread, as an inevitable result of the rotation of the filaments around the axis of the thread.

The effect of twisting on the functional properties of fabrics:

The natural properties of fibers and structural composition affect certain properties of fabrics that can be measured. In addition to these physical properties, there are some moral or sensory properties that are appreciated by the personal feeling and are expressed in relative comparison, including texture, occlusion, and luster, and they are all important factors in the field of fabrics, like: Fabric durability. The thread is wrinkled in the woven, the permeability of the fabric to air, fabric thickness, shrink-resistant fabrics.

Aesthetic effects that can be obtained by twisting:

Many researchers have proven that twisting has a significant effect on the aesthetic appearance of fabrics. As the twisting increases, the impregnation of the thread increases in the fabric, thereby producing:

1- A fabric with a rough surface that is uneven takes different shapes and is characterized by aesthetic properties represented by a change in texture and the appearance of irregular shapes on the surface of fabrics gives an extension of the design.

2- The light refraction on these uneven surfaces is in different angles and directions, which distinguishes them with properties of varying luminosity degrees depending on the angles of the light falling on them.

3-The appearance of sunken and prominent areas on the surface of the fabric, which achieves the third dimension in the woven fabric and allows the making of artistic formations in the fabric.

4- The effect of the feather on the fabric surface allows the designer to make use of it in making designs suitable for all uses.

5- The effect of plese, whether in length or width, which allows it to be used in the field of clothing.

The practical experience of the research topic

Samples of fabrics were made using various specification methods and also using a number of different number of twists and also using a different yarn count from natural silk threads and experiments were produced on an electronic jacquard machine and data were obtained as follows- :

The strength of the jacquard device: 3072 hooks, the number of hooks in design: 2560 hooks, the number of repetition: 4 repeats.

Width of Repeat: 35.5 cm, Fabric width without selvedge: 142 cm

Warp specifications- :

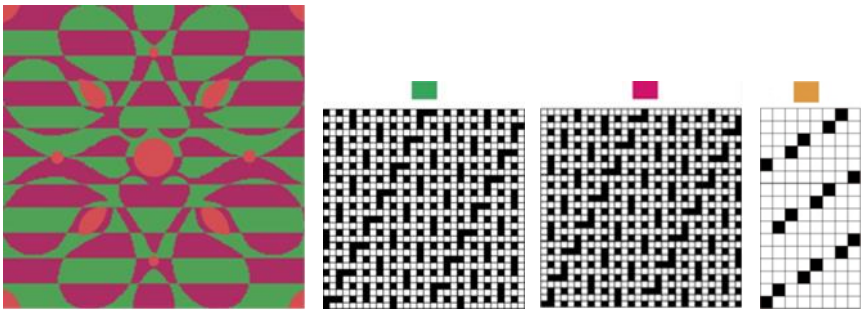
The number of warp threads = 72 threads / cm on the loom, the warp count = 150/1 denier polyester, the warp colors = one white color, the comb count = comb 9 doors / cm and by the 8 thread / door

Weft specifications: -

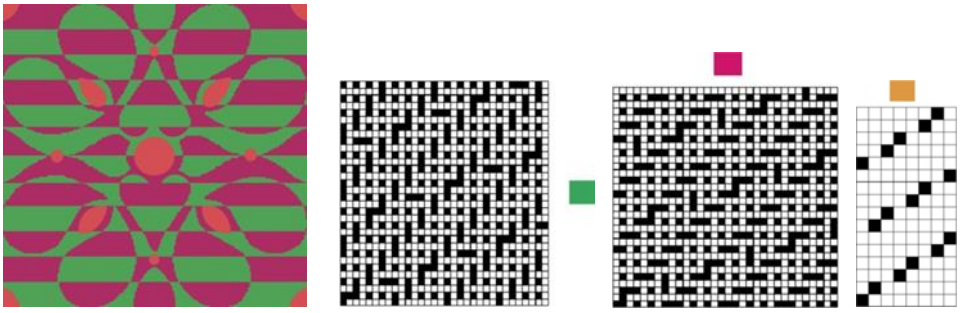
Sample numbers	Weft type	Weft count	Number of weft /cm	Arrange the wefts	Weight per square meter of sample
1	Natural silk 100%	270denier	35	1100:300 twists	331.89
2	Natural silk 100%	135denier	45	1570:600 twists	275.2
3	Natural silk 100%	270denier	35	1100:300 twists	318.33
4	Natural silk 100%	135denier	47	1570:600 twists	275.03
5	Natural silk 100%	135denier	47	1570:600 twists	285.44
6	Natural silk 100%	1800denier	18	480:200 twists	561.67
7	Natural silk 100%	270ddenier	30	1100:300 twists	338.7
8	Natural silk 100%	270denier	30	1100:300 twists	332.24
9	Natural silk 100%	135denier	45	1570:600 twists	273.71
10	Natural silk 100%	270denier 1800denier	25	780:200 twists	489.64

Implemented design specifications: -

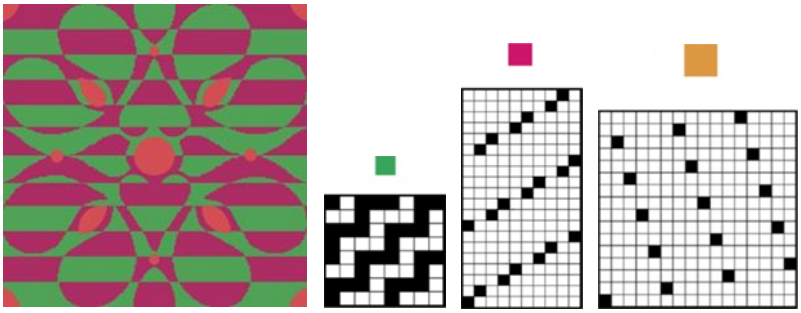
Design 1 : weaves structures :



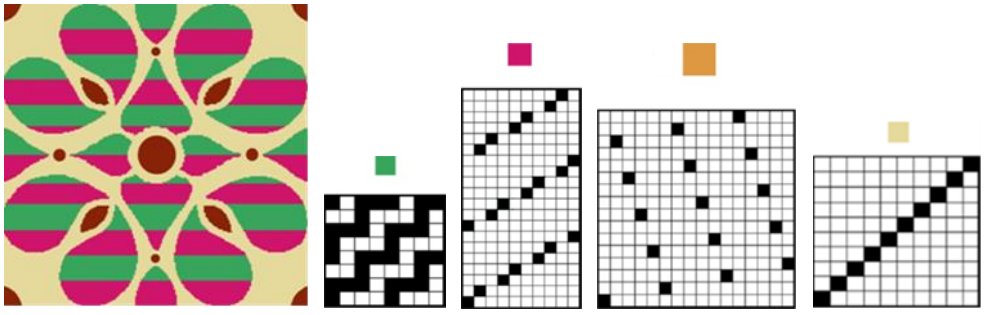
Design 2 : weaves structures :



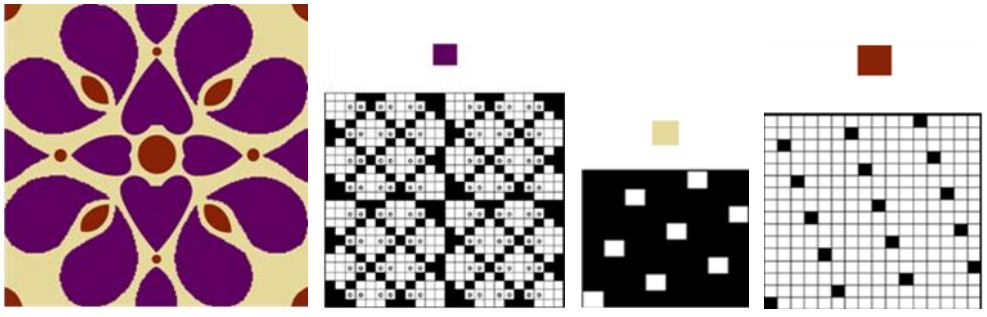
Design 3 : weaves structures :



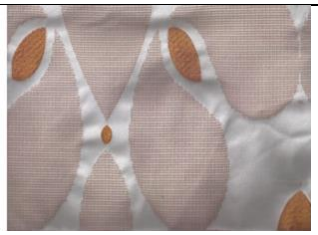
Design 4 : weaves structures :



Design 5 : weaves structures :



Results and discussions:

Design 1	
	
Design 2	
	
Design 3	
	
Design 4	
	
Design 5	
	 

Recommendations:

1- The researcher recommends taking advantage of the increase in the number of twisting threads to obtain technical and aesthetic effects on the produced fabrics

3- Using the twisting factor as one of the elements of the structural composition in the fabric to obtain innovative effects using different materials

Refernces:

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