Operate metallic yarns on air- jet looms while reducing the number of the relay nozzle

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Research problem:

1 - The use of high-pressure relay nozzles for air – jet looms when dealing with metallic yarns as wefts to produce curtain fabrics, which leads to the speed of damage to eat and the speed of clogging.

2 The prevailing thought when dealing with air – jet looms with the difficulty of passing metallic yarns as weft threads on these machines for the weight and lack of property to feel these wefts only using the full number of relay nozzles available in the machine.

3 - The rise in the price of hard currency against the local currency and the liberalization of the exchange rate and its unavailability, which led to the difficulty of importing spare parts at factories or the high operating cost as a result of import.

Research goals:

The research aims to:

The possibility of obtaining woven fabrics suitable for use as curtains fabrics manufactured on air-jet looms using metallic yarns as wefts to create the desired decoration using all the possibilities of air-jet looms , taking in the first place the need to provide the number of relay nozzles used in the machine with no use high pressures and the consequent lack of speed of destruction of these parts and thus are provided in the spare parts in the factory, which will result in reducing the operating cost without affecting the quality of the finished product factory as well as the provision of hard currency associated with the import Ta parts resulting in improvement in the economic situation of the country.

Research hypotheses:

1 - Determine the optimal number of air – jet relay nozzles looms when producing curtain fabrics when using metallic yarns as wefts leading to the provision of a number of spare parts in the machine, thus saving operating cost.

2 - The use of air pressure (2.5 bar) leads to the non-consumption of relay nozzles quickly, which entails the provision of hard currency accompanying the import of spare parts consumed by the air – jet looms.

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Research limit:

The use of metallic yarns as wefts to produce curtain fabrics, taking advantage of all the possibilities of air – jet looms taking into account the use of the minimum number of relay nozzles available in the machine and the subsequent reduction of operating cost without affecting the quality of the finished product manufactured.

Research Methodology:

Experimental analytical approach.

Previous studies:

The previous studies section is divided into two parts: -

1 - Part One:

We briefly talk about air – jet looms in terms of explaining the following points:

A - How to pass the weft thread through the pressure of the air – jet looms.

B - Development trends in air – jet looms.

C - Extrusion timing of weft yarns with air – jet looms.

D - The main parts needed to complete the weft extrusion process with air – jet looms. E - Components of relay nozzles used in air – jet looms.

F - Interstitial distances between relay nozzles used by air – jet looms.

G - Forms of relay nozzles of air – jet looms.

H - Problems of relay nozzles with air – jet looms.

L - Treatment of relay nozzles with air – jet looms.

M - Maintenance of relay nozzles with air – jet looms.

The second part2: -

In this section we talk about the metallic yarns, through which we review the following points:

A - Definition of metallic yarns.

B - Methods of production of metallic yarns.

C - Types of metallic yarns.

Practical Experiments:

The practical program consists of two main parts:

1- The first part is a histological experiment where the research samples were produced

2- The second part is to conduct some laboratory tests on the research samples.

Part I - Histological Experiments:

It is a histological experiment where the research samples were produced and the number of 9 different samples by:

Change the number of relay nozzles used to produce research samples (30 - 40 - 50) relay nozzles at a pressure of 2.5 bar.

Change the order of the posts between the metallic and polyester yarns and was arranged as follows:

2. filament cane filament: 1 filament polyster filament
1. filament cane filament: 2 filament polyster filament
2. filament cane filament: 2 filament polyster filament

Operational Notes for Samples Executed on Machines with Jet Air Pressure:

Sample number 1-2-3:

The position of the weft thread preparation device has been adjusted by placing it directly in the same direction as the main nozzle path to facilitate the process of extrusion of the weft thread without friction of the reed yarns as well as the opening of the breath mechanically by moving the net forward to reduce the tension on the warp yarns so as to facilitate the pushing of weft yarns made from the reed through the breath to reduce cut the weft seam using 2.5 bar pressure and the full number of relay nozzles. after selecting the speed used in the implementation of the sample and the angle of entry of the weft thread and the exit angle in proportion to the pressure used, the number of relay nozzles used, and the order of wefts used. It runs smoothly without any glitches or interruptions with a sample shape that has a visual-free appearance. we also note that the angle of entry of the weft for the sample number (3) from the angle used in each sample (1 - 2) is adjusted according to the order of the wefts used to produce the sample number (3) in which the number of polyster yarns exceeds the yarn.

Sample number 4 - 5 – 6:

At the beginning of the operation there were obvious defects in the samples produced by the escape of energy through the relay nozzles that were stopped and after several experiments by operating relay nozzles and stopping others and switching between them and adjusting the angle of entry of the weft was reached an ideal sample using the choice of stop valves (1 - 5 - 8 - 11 - 14). bearing relay nozzles, no ((1, 2) - (9, 10) - (15, 16) - (21, 22) - (27, 28)) we also note the adjustment of the angle of entry of the weft for sample (6) from the angle used in both Sample number (4-5), in accordance with the order of wefts used to produce sample No. (6), in which the number of polyester yarns exceeds the yarn of reeds.

Sample 7-8-9:

As a result of the use of a minimum of relay nozzles in the machine with the use of pressure of 2.5 bar, there was a continuous process of cutting cane threads at intervals during the process of self-extrusion. however, by reducing the speed of the machine to 300 servos / d, the operation was smooth without cutting the reed yarns, and at the beginning of the operation, there were obvious defects in the samples produced. enter the weft thread and choose stop valves (1 - 5 - 8 - 11 - 14 - 17 - 20 - 22 - 24 - 25). bearing relay nozzles, no (1, 2) - (9, 10) - (15, 16) - (21, 22) - (27, 28) - (33, 34) - (39, 40) - (47, 48) - (49, 50)). an ideal specimen was found containing a light defect that is not clear and acceptable to the product, which is the occurrence of glazing of the yarn used in the fabric produced. note that there is no modification of the angle of entry of the weft for the sample 9 from the angle used in each of the sample (7 - 8) to use the minimum amount of relay nozzles that were operated to produce these samples with a pressure of 2.5 bar.

Part II Fabric Testing:

A - Weight per square meter test.

B - Tensile strength test.

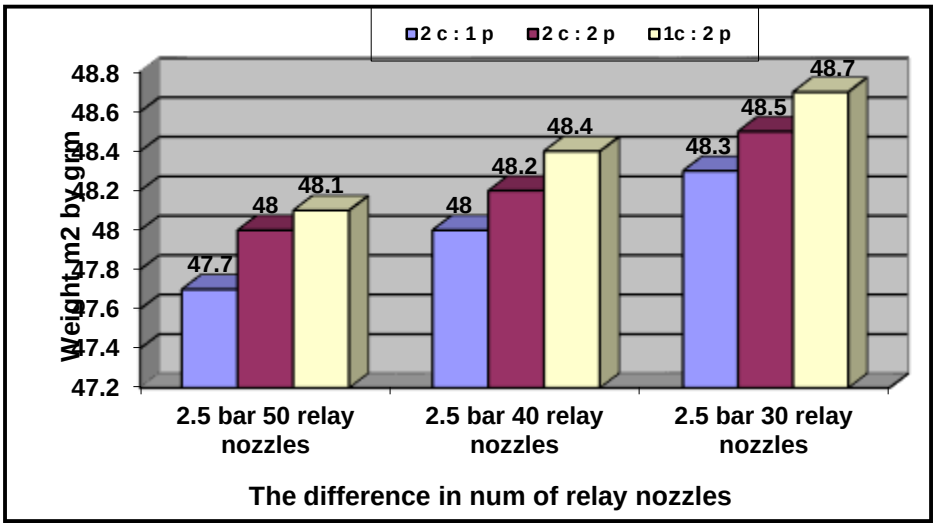
Results and discussion:

The following table shows the results of the tests for the samples under study:

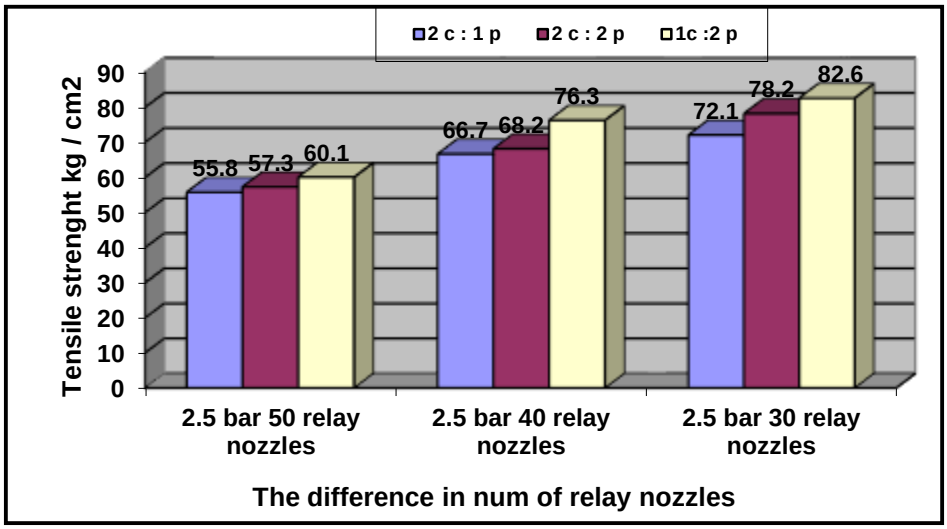
Tensile strength in the weft direction	Weight per square meter in grams	the test / the sample
55.8	47.7	1 Sample No
57.3	48	2 Sample No
60.1	48.1	Sample No 3
66.7	48	Sample No 4
68.2	48.2	Sample No 5
76.3	48.4	Sample No 6
72.1	48.3	Sample No 7
78.2	48.5	Sample No 8
82.6	48.7	Sample No 9

Based on the results of this table, the following relationships were drawn:

A - The relationship between the weight of the square meter in grams of the produced fabrics and the difference in the number of relay nozzles.



B -The relationship between the tensile strength in the direction of the weft of the produced fabrics and the difference in the number of relay nozzles.



The following table The amount of air consumed to produce the research samples: Summary of results

1 - Fabrics produced with 30 relay nozzles recorded the highest readings of the tensile strength in the direction of the weft - weight per square meter - of fabrics produced at 40 relay nozzles and finally 50 relay nozzles which had the same operational specifications.

2 - Fabrics produced in wefts order 2 Polyster: 1 cane has the highest readings of both tensile strengths in the direction of the weft - weight per square meter - of fabrics produced in wefts order 2 Polyster: 2 canes and finally in wefts order 1 Polyster: 2 canes The same operational specifications.

3 - There is an inverse relationship between the number of relay nozzles and the tensile strength readings in the direction of the weft - the weight of the square meter - for the fabrics having the same operational specifications.

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