Study on Squeezing Machine in Knit Dyeing Industry

Course Code: TE 4214

Course Title: Projects (Thesis)

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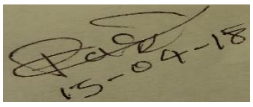
A thesis submitted in partial fulfillment of the requirement for the
Degree of Bachelor of Science in Textile Engineering
Advance in Textile Wet Processing

Spring, 2018

DECLARATION

We hereby declare that the work which is being presented in this thesis entitled **"Study on Squeezing Machine in knit Dyeing Industry"** is original work of our own, has not been presented for a degree of any other university and all the resource of materials uses for this thesis have been duly acknowledged.



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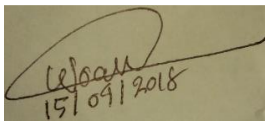

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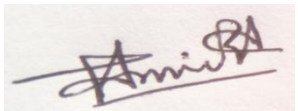

Tanvir Ahmed Chowdhury — **15-04-18** (**Date**)

Supervisor

ACKNOWLEDGEMENT

Firstly, we express our gratefulness to almighty Allah for his divine blessing makes us possible to complete this project successfully.

We are grateful to our supervisor **Tanvir Ahmed Chowdhury**, Assistant Professor, Department of Textile Engineering, Faculty of Engineering, Daffodil international University. Deep knowledge and keen interests of our supervisor in the field of textile dyeing and finishing influenced us to carry out the project work. His endless patience, scholarly guidance, continual encouragement, energetic supervision, constructive criticism, valuable advice, reading many inferior draft and correcting these at all stages have made it possible to complete this project.

We would like to express our thanks to **Prof. Dr. Md. Mahbubul Haque,** Head, Department of Textile Engineering, Faculty of Engineering, Daffodil International University for his kind help to finish our project report.

We would like to deliver thanks to our entire course mates in Daffodil International University, who took part in the discussion while completing the course work.

Finally, we would like to express a sense of gratitude to our beloved parents and friends for their mental support, strength and assistance throughout writing the project report.

Abstract

Squeezing machine is used for extracting water from dyed fabric by squeezing through rollers having different pressure. Squeezer machine designed to extract water from piece goods treated in rope form. They are used as an intermediate devices such as washers or autonomous devices. In the latter case they are usually full-width squeezers. The first padder rollers gives proper squeeze to the fabric and extracts the water and the second squeeze roller passes the fabric half the speed of the first squeeze roller which causes the softener chemicals to properly pass into the fabric.

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CHAPTER: 1

INTRODUCTION

CHAPTER: 1

INTRODUCTION

1.1 Introduction:

After dyeing process from the dyeing machine then the fabrics are ready for squeezing. It is the process to remove the water from the fabrics partially by squeezing. Squeezing machine plays an important role in knit finishing section of the knit fabrics. Squeezing machine is used for reducing water from the wet fabric. It reduces the water content of the fabric.

1.2 Objective of Squeezing Machine:

- To remove the water from the fabric.
- To control the width of the fabric.
- To control the length of the fabric.
- To control the spirality of the fabric.
- To control the over feeding system.
- To increase the softness of the fabric.
- To remove the crease mark of the fabric.
- To reduce fabric surface water content.
- Squeezing the fabric for proper softening chemical penetration.
- Applying softening chemicals to the fabric.

1.3 Significance of the Study:

The importance of the study is given below:

- We know about knit fabric and different finishing process by squeezing machine.
- Different parts of squeezing machine and its mechanism.
- Deep knowledge about control of fabrics Dia, Shade, Pressure, Overfeed and GSM changing process by squeezer machine.

To achieve the above mentioned knowledge, I have observed a lot of processes of finishing.

CHAPTER: 2

LITERATURE REVIEW

CHAPTER: 2

LITERATURE REVIEW

2.1 Flow chart of Squeezer machine:

Turntable (Basket)

↓

De-twister

↓

Ring Guide Speeder

↓

Feed Roller

↓

Dancing Roller

↓

Water Pander

↓

Balloon former

↓

Extracting Squeezer

↓

Dancing roller

↓

Softener padder

↓

Balloon Former

↓

Padding squeezer

↓

Main squeezer

↓

Conveyors Blanket

↓

Politer

↓

Delivery basket

2.2 Schematic Diagram of Squeezer machine

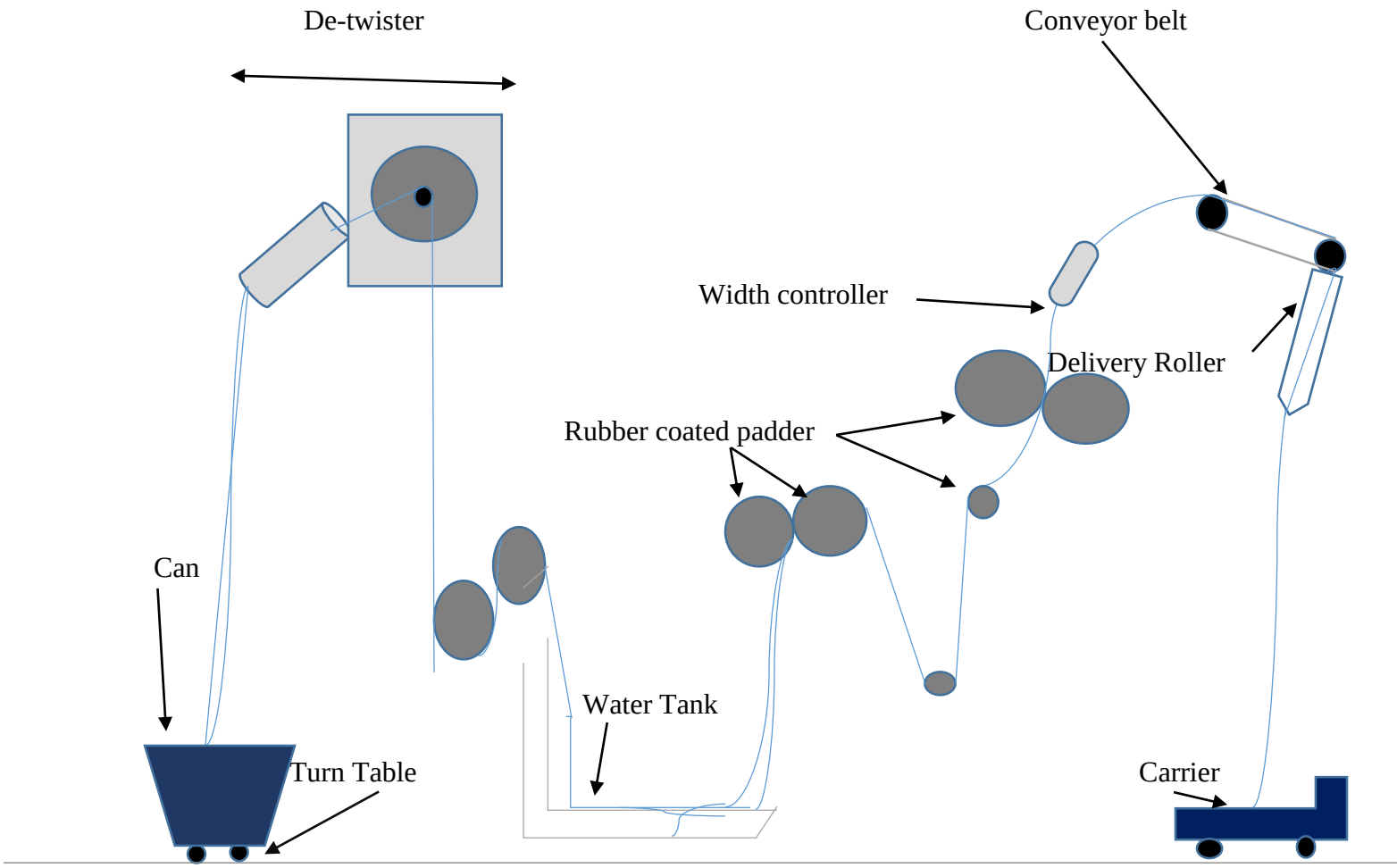

Fig 1: Schematic Diagram of Squeezer machine

The expander width is adjusted as S/J- 20%, PK-25%, Int.-35%, Lacoste-40% wider than the required width. There is a pair of rubber coated padder, where water is removed from fabric when passed through the nip of it.

Normally squeezer contain single or double padders where,

1. One for removing water and

2. Other for applying finishing chemicals such as softener.

2.3 Machine specification:

Brand name: CORINO MACHINE

Type/model no:-ST2-

Origin: Italy

No of motor: 11

Price of machine: 1.5 corer

Year: 2007 Suitable

Fabric: Wet tubular knitted Fabric

Fig: Squeezing M/c Back View

Fig: Squeezer M/c Front View

2.4 Main Parts of the machine

1. Turn Table

2. Can

3. De-twister

4. Motor

5. Padder roller

6. Water Tank

7. Compress air meter

8. Twister

9. Monitor

10. Spirality roller

11. Shape

12. Conveyor belt

13. Delivery roller

2.5 Function of machine parts:

1. Turn Table-It controls the fabric rotation. Turn table is driven by motor, it can turn clockwise or anticlockwise according to untwist needing.

2. De-twister-By the de-twister rope formed fabric become untwists form (spirality control) De-twister will auto de-twist the roped fabric and in feed smoothly.

3. Motor-Produce compress air in tuber fabric.

4. Padder roller-To create pressure into the fabric by this rubber coated roller

5. Tank-Two tank are place in this machine. A. chemical tank B. water tank. Top of the tank flow water to the fabric and bottom tank drainage.

6. Pressure meter-Pressure control of machine for fabric.

A .Grey meliance fabric required pressure: 4KG

B. White Fabric required pressure: 4KG

7. Monitor-To control all process or machine

8. Spirality roller- spirality control+ Twisting control by this roller

9. Squeezer- Squeezer consists of 2 sets rubber roller and 2 sets Pneumatics cylinder.

The pressure of the squeezing roller is adjusted by two sets reduce valve.

The water squeezing device and softener expression device are driven by one motor separately, the two motors are controlled by inverter.

10. Shape-Diameter /crease control of the fabric are fabric are can be used shape only without Rib fabric.

11. Conveyer belt-The fabric pass into spirality roller to folding roller /delivery roller.

12. Folding/ Delivery roller-By folding roller fold the fabric keep into the fabric carries.

13. Tension Regulator- Set with a regulation-resistance to adjust tension between squeezing roller and delivery roller.

2.6 Function of the Machine:

1. Used to remove excess water after pretreatment process and dyeing.

2. Delivered fabric to create Free State.

3. Before squeezing balloon is formed with the help of compressed air passing by a nozzle or air sprayer.

4. This Machine is used for impregnating softening liquid to wet process of double dip the tubular fabric.

5. It can control the diameter of fabric and GSM and shrinkage by over feeding mechanism.

6. To impart soft finish to the fabric by using required softener.

7. It is high efficient and easy to operate.

2.7 Working Principle:

After completing the dyeing process from the dyeing machine then the fabrics are ready for de-watering. The de-watering machine tubular fabrics are mainly processed. There is a magnetic sensor which scene the twist of the fabric and its direction and turn the fabric in opposite direction to remove twist automatically. Here dewatering is performed De-watering is the process to remove the water from the fabric completely by squeezing and it is done by

the padder. A suitable expander is used before the fabric is passed through the nip of the padders, which expands fabric flat wise and adjust the width.

1. At first the fabric takes from the carries to feed the top of the machine tower .where two roller catch the fabric.

2. Then the fabric passed into 4 roller in this machine.

3. Then flow air into the fabric surface.

4. Here a Padder are place in this machine which through pressure in the fabric surface. High pressure is required for light shade and low pressure are required for deep shade of fabric.

5. Here one control board are place in this machine. Which control the machine process.

6. In this machine from exhaust roller the fabric flow in to the free roller and from free roller the fabric flow to the conveyor belt. Then the fabric come out.

7. To control the fabric dia by the shape which are place in this machine.

8. At last process in this machine the fabric delivery by two delivery roller. And two folding roller are place in this machine which are fold the delivery fabric keep into the fabric carries.

2.8 Special Features of Squeezer Machine:

- Single squeeze roller and single padder present.
- One for squeezing and other for applying softener finished.
- Above 80% water can be removed
- Maximum 60 inch diameter can be extended.
- Softener tank present.

CHAPTER: 3
MATERIALS & METHODS

CHAPTER: 3

MATERIALS & METHODS

3.1 Maintenance during Operation:

- Proper balloon form by compressor air otherwise crease mark appears.
- Padder contract point adjust perfectly according to the fabric construction otherwise accurate water will not remove.
- Albatross must be clean every one or two hours later.

3.2 Use of Chemicals:

1. Silicon: For using silicon to increase softness of fabric

2. Softener: For using Buyer Requirement. To soft the fabric from hard fabric. Softener is applied to soften the fabric as well as it improves the hand feel.

3.3 Controlling points or Control system:

- Overfeed control-As required. Higher the GSM higher the over feed.
- Pressure-3-7 bar as required. Higher the GSM lower the padder pressure.
- Speed control-As much as possible (40-60 m/min). Higher the GSM lower the speed.
- Width control- Fabric width is adjusted as per required width.

3.4 Machine Checking points:

- To check m/c area clean
- To check m/c motor
- To check utility
- To check roller

3.5 Fabric checking points:

- To check shade (color)
- To check diameter
- To check GSM
- To check fabric faults (shrinkage, crease mark, spirality)

3.6 Power consumption:

Voltage: 400V

Frequency: 50Hz

Maximum power: 24kwatt

3.7 Manpower Required:

Worker: 02

1. Operator

2. Helper

3.8 Production:

Capacity: 7 tones/shift

Actual production: 5or 6 tones/shift.

3.9 Utility:

1. Water

2. Electricity

3. Compressed air

(To form the tube fabric into balloon with a view to remove

Crease)

3.10 Controlling Point:

1. Diameter setting must be accurate.

2. Excess padder pressure may cause fabric damage. Padder pressure

Depends on fabric construction.

3. Speed must be optimum.

4. Higher the fabric speed leads less removal of water.

5. Overfeed.

3.11 Find out the limitations and faults of the machine and

Advise for removing these:

1) Workers does not record the pressure, in dia and out dia of different fabric in record book

2) Workers set the pressure of squeeze roller for different fabrics same. But higher GSM fabric needs more pressure than lower GSM fabric. So removal of excess water is not sufficient

3) Machine maintain are very difficult and costly.

3.12 Pre-Caution:

- For your personal safety observe the fabric passage
- Wrong passage causes accidents

CHAPTER: 4
DISCUSSION OF RESULTS

CHAPTER: 4

DISCUSSION OF RESULTS

4.1 Analysis of deference types of fabric, colors, GSM, speed and pressure of squeezing machine:

The speed and pressure of squeezing machines is depending upon the fabrics and shade variations. Some of items is given bellow:

Table N0:4.1.1

Sl. .No	Fabric Type	Color Types	GSM	Pad Pressure(KG)	Speed	Over feed
1	Strip S/J	Blue/sky	130	1	50 rpm	20
2	Single jersey	Kaki	135	1	50 rpm	20
3	1x1 L. Rib	Grey	135	4	55 rpm	25
4	2x1 L. Rib	Light pink	155	4	60 rpm	20
5	60/40% CVC S/J	Black	170	2.25	60 rpm	25
6	High S/J	TPX	200	1	65 rpm	25
7	Pique	Black	200	2	70 rpm	20

8	50/50% PC D/Lacoste	Red	220	2	60 rpm	30
9	Interlock	White	280	4	80 rpm	20

In this table, we can see that the GSM is related with machine overfeed and machine speed. For example, we can see that low GSM is 130 and machine speed 50 rpm overfeed 20 for Stripe S/J fabric. But we can see that high GSM 280 and machine speed 80 rpm overfeed 20 for Interlock fabric. So it can be said that GSM is must related the machine speed and machine overfeed.

-Shape Card used only for special types of fabric which name are below:

A. pique

B. S/Lacoste

C. D/Lacoste

Otherwise, Shape card used When according to Buyer requirement and Mention name it's.

Other hand, over feed need according to buyer Requirement and Condition fabric or color or GSM.

Basically, here in this process light color needs high pressure and lower speed. Where deep color needs lower pressure and higher speed. The squeezing machines speed and pressure is also depending upon the color of the fabrics. There are two types of color of fabric 1. Light color 2. Deep color .Now this are given bellow:

For Deep colors fabric

Table No: 4.1.2

S l No	**Colors of fabric**	**speed**	**Pressure(KG)**
1	Navy Blue	50 rpm	1.5 kg

2	chocolate	50 rpm	1.5 kg
3	Bottle Green	50 rpm	1 .5kg
4	Brown	60 rpm	1 kg
5	Red	60 rpm	1 kg
6	Royal Blue	65 rpm	1.5 kg
7	Black	70 rpm	1 kg

In this table, we can see that squeezing pressure & machine speed is different for different color of fabric. For Example we can see that for navy blue color of speed 50 rpm & Pressure 1.5 Kg. But we can see that for black color of speed 70 rpm & pressure 1 kg.

For Light colors of fabric

Table No: 4.1.3

S l No	**Colors of fabric**	**speed**	**Pressure(KG)**
1	Lemon	40 rpm	4kg
2	Light blue	40 rpm	4 kg
3	Light kaki	40 rpm	4 kg
4	Sky blue	45 rpm	4kg
5	Yellow	50 rpm	4 kg
6	Kaki	50 rpm	4 kg

In this table, we can see that squeezing pressure & machine speed is different for different color of fabric. For Example we can see that for Lemon color of speed 40 rpm & pressure 4 Kg. But we can see that for kaki color of speed 50 rpm & pressure 4 Kg.

4.2 Here, Comparing to deference Types of Fabric and color, speed, pressure of squeezer machine.

For single jersey

Table No: 4.2.1

S l No	**Color fabric**	**GSM**	**Speed**	**Pressure(KG)**	**Over feed**
1	Dk. Blue	150	60 rpm	1 kg	20
2	Graphite	175	70 rpm	1.5 kg	25
3	Sant	180	60 rpm	0.5 kg	25

In this table, we can see that different GSM, Speed & pressure for different color of fabric. For example, we can see for Dk. Blue for GSM 150 speed 60 rpm & pressure 1 Kg. but we can see that for sant color GSM 180 speed 60 & pressure o.5 kg.

For Rib Fabric

Table No: 4.2.2

S l No	**Types of fabric**	**Color of fabric**	**GSM**	**speed**	**Pressure(KG)**	**overfeed**
1	1/1 Rib	Black	220	60 rpm	1 kg	20
2	4/1 Rib	Royal Blue	250	65 rpm	1 kg	25

3	2/2 Rib	Grey mélange	300	70 rpm	4 kg	25

In this table, we can see that different GSM, Speed & pressure for different color of fabric. For example, we can see for Black for GSM 220 speed 60 rpm & pressure 1 Kg. but we can see that for Grey mélange color GSM 330 speed 70 rpm & pressure 4 kg.

All color of fabric chemical used are Enzyme and silicon

For Several Types of fabric

Table No: 4.2.3

S l No	**Types of fabric**	**Color of Fabric**	**GSM**	**speed**	**Pressure(Kg)**	**Over feed**
1	Strip fabric	Light sky blue And White	162	60 rpm	3 kg	20
2	CVC	Black	165	50 rpm	1 kg	20
3	Inter lock	white	180	60 rpm	4 kg	20
4	Teri fleece	Black	195	60 rpm	1.5 kg	20
5	P k Lacoste	Red	200	60 rpm	1.5 kg	25
6	Double P k	Black	220	65 rpm	2 kg	25
7	Fleece	Blue	280	60 rpm	1.5 kg	25

In this table, we can see that different GSM, Speed & pressure for different color of fabric. For example, we can see for Light sky blue And White for GSM 162 speed 60 rpm & pressure 3 Kg. but we can see that for **Blue** color GSM 280 speed 60 rpm & pressure 1.5 kg.

All condition of fabric Accord to Buyer required shade

The GSM of Fabric Feed Pressure and Machines Speed Depends Upon the Type of Fabric. Which Are Given Bellow:

For Single Jersey:

Table No: 4.2.4

Fabric Type	GSM	Speed	Pressure(Kg)
Single Jersey Lacoste	125	50rpm	1.5Kg
Stripe Single Jersey	130	50rpm	1Kg
Single Jersey	135	55rpm	1 Kg

For single jersey: For a single jersey fabric, such as single jersey, single Jersey and stripe single Jersey where the GSM of those fabrics are 125,130,135.there we are using a limited range of machines speeds and feed roller pressures. For this type of fabrics always keep the machine speeds is 50, 50, 55 Rpm and feed roller pressures is 1.5, 1, 1 Kg. Otherwise uneven finished products are achieve.

For Rib Fabric:

Table No: 4.2.5

Fabric Type	GSM	Speed	Pressure(Kg)
1/1 Rib	220	60 rpm	1 Kg
4/1 Rib	250	65 rpm	2.5 Kg
2/2 Rib	300	70 rpm	3 Kg

For rib fabrics: For rib fabrics group such as 1/1rib, 4/1 rib, 2/2 rib where the GSM of those fabrics are 220,250,300. We are using there the machine speeds 60,65,70 rpm and feed roller pressures is 1, 2.5, 3 Kg. Above this range of machine speeds and pressures this type of fabrics are not finished perfectly. Since the rib fabrics are one kinds of heavy fabric, for this reason we are increased a little range of the machine speeds and feed roller pressures than the group of single Jersey fabrics.

For Pique Fabric:

Table No: 4.2.6

Fabric Type	GSM	Speed	Pressure(Kg)
Single pique	180	55 rpm	1.5 Kg
Pique Lacoste	200	60 rpm	2 Kg
Double pique	220	65 rpm	2.5 Kg

For pique fabrics: For pique group of fabrics here we take three types of pique fabric samples such as single pique, pique Lacoste and double pique. Here this type of fabrics are heavy fabrics than the single Jersey. So their GSM is high than a single Jersey fabrics. Here we keep the machine speed 55, 60, 65 rpm and feed roller pressure is 1.5, 2, 2.5 Kg. Otherwise unexpected finished product are achieve

4.3 Feed Roller pressure:

Table No: 4.3.1

Bar	PSI	Kg	Lbs.
1	14.5	90	200

2	29	205	450
3	43.5	315	700
4	58	425	940
5	72.5	540	1200
6	87	650	1440

4.4 Some Sample Fabric Are Attachment:

Table No: 4.4.1

Sl. No	Name of fabric	Sample fabric
1	**Single Jersey**	
2	**Rib**	

3	**Pique**	
4	**Fleece**	
5	**CVC**	
6	**Strip fabric**	

CHAPTER: 5
CONCLUSION

CHAPTER: 5

CONCLUSION

Conclusion:

This project work basically helps us to meet the knowledge about Squeezer machine. It is a important study in the field of wet processing technology. The study confirmed that Squeezer machine for fabrics and always so obvious for finished fabric. It important to identify which Squeezer machine is more effective for Shade, Pressure, Overfeed, Speed, GSM & Fabric diameter. Comparing the More different material of Squeezer machine, it can be said that both not lead to same result. Our results show that the Shade, Pressure, Overfeed, Speed, GSM & Fabric diameter of Squeezer machine.

Finally once again thanks to our honorable teacher, we are still here as a reflection of your kind hard working. And our precious family for their never ending loves and inspire at every stages of our life. Without their continuous support we realized that we would not be a person we are right.

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