Faculty of Engineering

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Study on Stentering Machine in Knit Dyeing Industry

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Study on Stentering Machine in Knit Dyeing Industry

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Declaration

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

_____ _____

Sumon Biswas Avi Date

This is to certify that the above declaration made by the candidate is correct to the best of my knowledge.

_____ _____

Tanvir Ahmed Chowdhury Date
Supervisor

ABSTRACT

This aim of the study is to know about stentering machine in knit dyeing industry in details. A lot of processes were observed to conduct this study. Specially the change of diameter and GSM were observed very cautiously. Four fabrics including single jersey, lycra single jersey, rib and interlock fabric were selected for this study. The process of changing diameter and GSM were studied very carefully. Finally, a relation between overfeed and diameter has been found out. Similarly a relation between overfeed and GSM has also been calculated.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Stentering is the one of a series of textile finishing processes, where the selvedges of an open-width fabric are held at a predetermined width with maintaining proper tension. The attachment to the selvedges can be by pins (pin stenter) or clips (clip stenter). Traditionally the process was done on simple frames, but now it is done in a stentering machine which usually contains a dryer. The term "stentering" is used for passing a fabric through a stenter or tenter.

Stentering is done for a variety of reasons-

- To stretch the fabric so that any unwanted creases can be removed.
- To remove the wrinkles of fabric.
- To control the length and width of fabric.
- To dry the fabric
- To perform heat-setting on the thermoplastic materials.
- To control the GSM and shrinkage of fabric.
- To perform the curing operation on pigment printed fabric.
- For the fixation of various chemical finishes.
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1.2 Significance of the Study:

The importance of the study is given below:

i. Well known about knit fabric and different finishing process by stenter machine
ii. Different parts of stenter machine and its mechanishm
iii. Deep knowledge about Dia and gsm change process by stenter machine

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

CHAPTER 2

LITERATURE REVIEW

2.1 Fabric:

The term fabric can be defined as a planner structure produced by interlaced/interlooped yarns or fibers and felts made by interlocking fibers. It is a manufactured assembly of fibers and/or yarns that has substantial surface area in relation to its thickness and sufficient mechanical strength to give the assembly inherent cohesion. Basically, there are three methods by which fabrics are made.

2.2 Finishing:

In textile manufacturing, finishing refers to the processes that convert the woven or knitted cloth into a usable material and more specifically to any process performed after dyeing the yarn or fabric to improve the look, performance, or hand feel of the finished textile or clothing. The precise meaning depends on context.

Some finishing techniques such as bleaching and dyeing are applied to yarn before it is woven while others are applied to the grey cloth directly after it is woven or knitted.[3] Some finishing techniques, such as fulling, have been in use with hand-weaving for centuries; others, such as mercerization, stentering are byproducts of the Industrial Revolution.

2.3 Stenter Machine:

A machine or apparatus for stretching or stentering fabrics. The purpose of the stenter machine is to bringing the length and width to pre determine dimensions and also for heat setting and it is used for applying finishing chemicals and also shade variation is adjusted. The main function of the stenter is to stretch the fabric widthwise and to recover the uniform width.

2.3.1 History of Stenter Machine

One of the most important pieces of textile finishing machinery is the stenter, which is also called tenter; it is sometimes referred to as the stenter frame, and in the U.S.A. the word “frame” alone is used. The chief function of the machine is to stretch the

fabric, and some stenters are devoted to this purpose alone, but the great majority combines stretching and drying.

The oldest form of stenter was the fixed hand-frame, which comprised two parallel rails on which were mounted rows of pins to hold the cloth; when the fabric had been impacted on the pins by hand the rails were caused to move apart by cross rail, so that the cloth dried in the stretched state, free from creases, and further, some control over the final dimensions was released. This system is still used for lace and net fabrics where widths of 400 inches may be encountered; cloths as the crepe georgette are also often dried on the hand –frame, which gives control of length as well as width. The hand-frames are generally placed in warm rooms, a gentle current of air is provided by large flaps over the frames; narrower hand-frames are sometimes arranged in tiers.

The first continuous stenters were also multilayer drying machines, and this type persists in the wool and worsted trade, the first tentering machine being made in 1854 by Whiteley of Huddersfield; the single layer or stenter is generally used for cotton, silk, and rayon, although some two tier or return stenters are in operation for silk and rayon fabrics.

❖ **Figure of Stenter Machine**

Figure No 2.1: Stentering Machine

2.4 Different Types Of Stenter Machine

2.4.1 Hot Air Stenter (Quadra)

It has been continuously upgraded machine to keep up with the growing demands of the industry. Today, due to its special features, Quadra is preferred among other brands. Features that outsmart Quadra are:

- Varioflow air circulation system - with separate blowers for top and bottom nozzles, impinges hot air throughout the chamber in absolutely uniform manner from center to selvedge, selvedge to selvedge. Air ratio between the top and bottom is controlled electronically as each blower motor is driven by VFD**.**(There are no mechanical dampers and therefore the airflow is very smooth). These high speed blowers are specially designed to increase the air flow which has increased productivity. Even one side flow is possible with increased or decreased air pressure depending upon fabric construction and air permeability. Especially, utilized when heat setting lycra based fabrics and also for coating applications. Filtering of circulated air and insulations are very effective to reduce fuel consumption etc.

- The Stenter is fully equipped with requisite capacity of reduction gear box with direct coupled motors avoiding chain & belt drive. The system helps in increasing the efficiency of individual drive console besides reducing power consumption and maintenance cost.

- Tensions between Padder and Stenter draw roll and over feed roller are controlled by unique drive system with load cell feedback and PC controls makes it easy to set the machine tension to suit the fabric. With electronic control over the air flow, it is easily possible to handle lightest to heaviest fabric with the same efficiency.

- Other features of the machine include directly coupled geared motors to individual screws to adjust the width individually through PLC and self- lubricating type main chain. Especially for knitted fabrics, selvedge gumming, steaming, trimming, edge spreaders, driven stainless steel scroll rollers and fabric center support is provided. Available working widths are from 1200 to 4800 mm with oil heated, steam or direct gas fired systems.

- Machine can be fully automatic with PLC and touch screen to control all the processing parameters at fingertip and have repeatability in process. Accessories like centralizing and stretching device, fully automatic bow and weft straightener, fabric temperature indicator and dwell time controller, exhaust humidity controller, auto over feed control system is also available to enhance the quality and repeatability of the finished fabric.

2.4.2 Stenter 10F

The word 10 F stands for 10 flames.in stenter 10 F clips are used to stretch the fabric and this is a disadvantage that holes appears on the selvedge of the fabric and also uneven dyeing is achieved.

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2.4.3 Stenter 8F

Stenter 8 F has 8 flames and the main purpose of 8F stenter same as 10F stenter. The basic advantage of the machine is dyeing can also done on 8F machine and has I.R system. Finishing, dyeing can also done even we can dye pigment , heat setting and also we can control skew and bow problems and another advantage is using light shades no clip marks appears.

2.4.4 Knit Stenter

The basic difference of the knit stenter machine is that it is used for knit fabric weft straightening, heat setting, dyeing and light shades and also for print and knit finishing chemicals applications. Pins are also provided with the clips. Flat rollers are present and a brush to hold the pin, the L-guide is also used for knit fabric and a selvedge cutter with suction.

2.5 Specification of a Stenter Machine:

Brand Name	Bruckner
Serial no	72276-0463
Origin	Germany
Year of manufacture	1995
Speed range	15-30 m/min
Temperature range	50-250C
Used utilities	Electricity, Gas, Compress air, Steam
Production capacities	8 ton /day
No. of chamber	3
Maximum fabric width	102”
Minimum fabric width	30”
Steam pressure	2 bar
Air pressure	10 bar
Applied for	Open tube fabric
No. of ratamatic burner	6
Extra Attachment	Mahlo weft straightener
M/C parts	Burner, Nozzle, Exhaust air fan, Over feed roller, Suction fan, Chain arrangement

2.6. Different parts of Stentering Machine:

Following elements are available in the stentering machine-

01. Overfeeding roller
02. Brush roll
03. Perforated Steam and Air tunnel
04. Sensing band
05. Sensing monitor
06. Slower moving pin chain
07. Gluing device
08. Heated chamber
09. Selvedge cutting device
10. Anti-static bar or rod
11. Delivery rollers
12. Conveyor belt
13. A pair of Padders
14. Bowing and Skewness correction device
15. Gas tunnel
16. Hot air flowing nozzle
17. Motor
18. Air suction hood
19. Control panel and so on……

2.7. Different sections of Stenter Machine:

2.7.1Padder Section:

In the padder section the fabric is treated with chemicals specially with softener and acid in two tanks

2.7.2Weft Straightener:

The main function of Weft Straightener is to control the bowing &Skewnesss of the fabric.

2.7.3Width Setting Chamber:

This Chamber controls the width of the fabric by clip of 10 pin.

2.7.4Heating Chamber:

This chamber controls the shrinkage and the G.S.M of fabric.

Temperature Range:

Cotton ⟶ 150°C~170°C.

Polyester ⟶ 165°C~185°C.

With Lycra ⟶ 175°C~190°C.

2.7.5Cooling Chamber:

This chamber cooled the hot fabric before reach to delivery zone.

2.7.6 Exhaust Motor:

This specific part used to exit the steam produced in the chambers and also exit the extra temperature from the machine.

2.7.7 Delivery Zone:

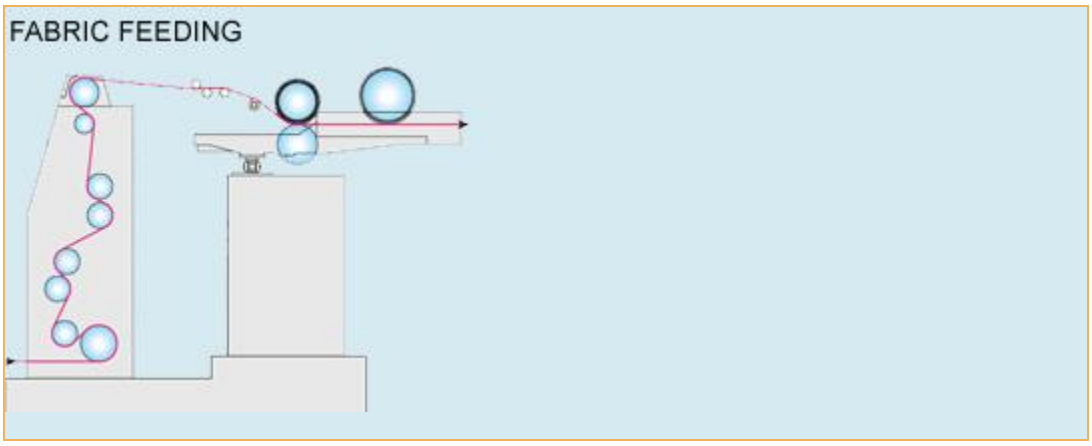
This zone delivered the fabric in a folded form. In this zone the fabric has to pass through several rollers in order to prevent the formation of crease mark in the finished fabric.

2.8. Production procedure: Checklist before production:

Parameters / Items	Value / checking
Machine setup	a) Threading of machine as per process requirement b) Parameters set up should be as per process requirement.
Fabric availability	According to program schedule and the route card having test status "OK"
Preparation of chemicals	Checking of preparation and also the shifting of liquor to the delivery tanks.
Tape fabric	Availability
Batches for winding	Availability
Accessories, necessities and utilities	Availability
Machine	Clean condition.
Manpower	Availability

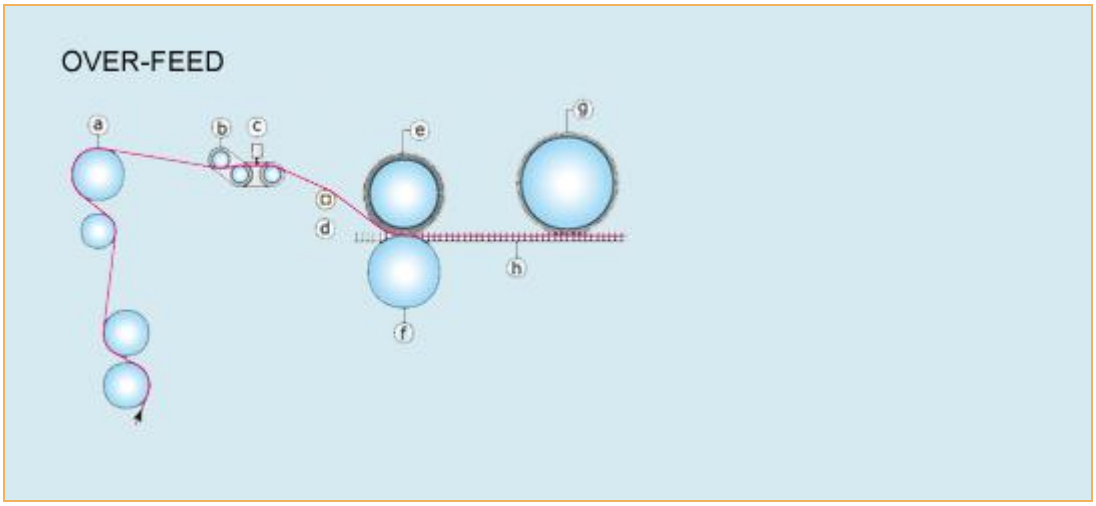
2.9 Features of a Stentering Machine:

2.9.1 Fabric Feeding:



The In-feed system can be supplied suitable to take up fabrics either from batches or loose folds. The machine can be supplied with a J-Scray or an Accumulator for continuous operation. OPTIMA 2510 Stenters are provided with very efficient un-curlers and Infra-Red Edge Sensors which actuate the in-feed device provided with Rack and Pinion system, ensuring perfect fabric holding in clips or pins even at high speeds exceeding 100 meters per minute.

2.9.2.Over-Feed



A simple and accurate over-feed system using Variable Frequency Drives with AC Geared Motors ensures perfect and precise Over-feed control as required by the fabric, ranging from -10% to +50% by control of motor speed. It is very simple and easy to maintain. Separate drives control the Fabric Tension and Selvedge Tension rollers. A closed loop control system with encoder can be provided for precise control of the drives.

2.9.3 Weft Shrinkage:

Conicity of rails can be easily obtained by acting upon the individual width controlling screws of each compartment, de-clutching the individual unit from the main width adjustment control system and adjusting the individual rail to precise requirements, by acting upon each gear box provided on individual adjusting screw with the help of a hand-wheel. A suitable indication is provided on each gear box for precise control. It can also be automatically regulated as pre-programmed by acting on individual motors, with PLC Control.

2.9.4 Chain Rails:

Properly seasoned Cast Iron chain rail guides are provided to support the moving pin clip chain. They are strong and distortion free even when operating at elevated operating temperatures and at speeds in excess of 150 meters per min. Various combination of entry and exit chain rails are supplied for different applications. Extended entry rail track up to 6.3 meters can be provided which can support the Fabric feeding device, the Steaming device, Selvedge Gumming and pre-drying unit etc. Extended exit rail tracks up to 5.8 meters length can support the conventional Air Cooling zone, Selvedge Trimmer, Chain cleaning device etc.

2.9.5 Pin Clip System:

The clips are made of several individual, pressure die-cast, easily replaceable components. These components are made from special corrosion-resistant aluminum alloy and are distortion-proof even at the high heat setting temperatures; These components are very well studied to the lowest individual details and are designed to ensure long trouble-free performance with all kinds of fabrics.

The steel shoe holding the clips are fitted with sintered metal liners and connected with steel links. The roller chain glides smoothly on special cast iron rails. The superb sliding properties of sintered metal considerably reducelubrication requirements even at the high heat setting temperatures, thus ensuring safe operation and long life. On request, the machine can be equipped with special polymer liners for lubrication free

working. Optima 2610 are equipped with a vertical return pin chain.

2.9.6 Chain Cleaning System:

SWASTIK OPTIMA 2510 can be equipped with a suitable chain cleaning device with steam, consisting of a set of hard-chrome plated nozzles with flexible steam connections, for easy and fast cleaning of pin-clip chain.

2.9.7 Weft Correctors:

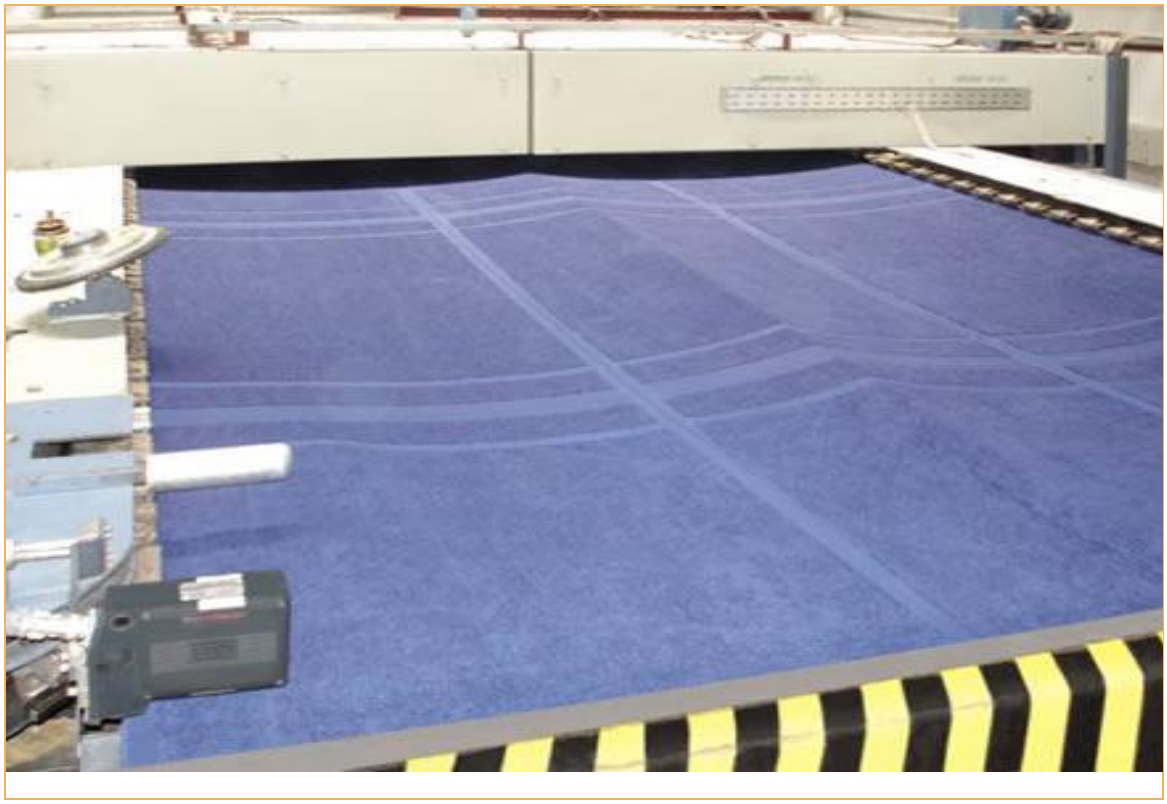
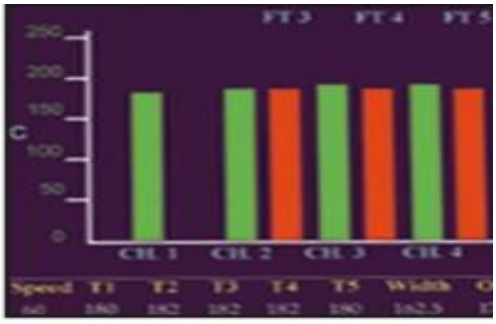


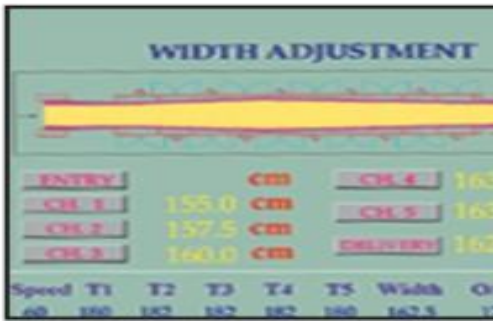
Figure No 2.2: Weft Corrector

A simple motorized, quick acting two-roller Bow and four roller Skew Weft Corrector is provided for efficient correction of weft distortions. Alternatively, on request, the machine can be equipped with Automatic Weft Corrector with optical sensors and digital control. Additional sensors can be fixed on the machine exit to ensure perfect weft straitening.

2.9.8 Width Adjustment:

The OPTIMA 2510 is equipped with a standard motorized width adjustment device with common shaft with gear boxes mounted on top of the dryer. The width adjustment device is controlled from the control desk by means of push buttons. Setting of individual screws can be done by means of a hand wheel acting through the clutch on individual gear boxes. The OPTIMA 2510 can also be equipped with individual motors and controllers for the individual screws which are controlled from the control desk either individually or all at a time. A suitable indicating arrangement is provided on the Operator Console.

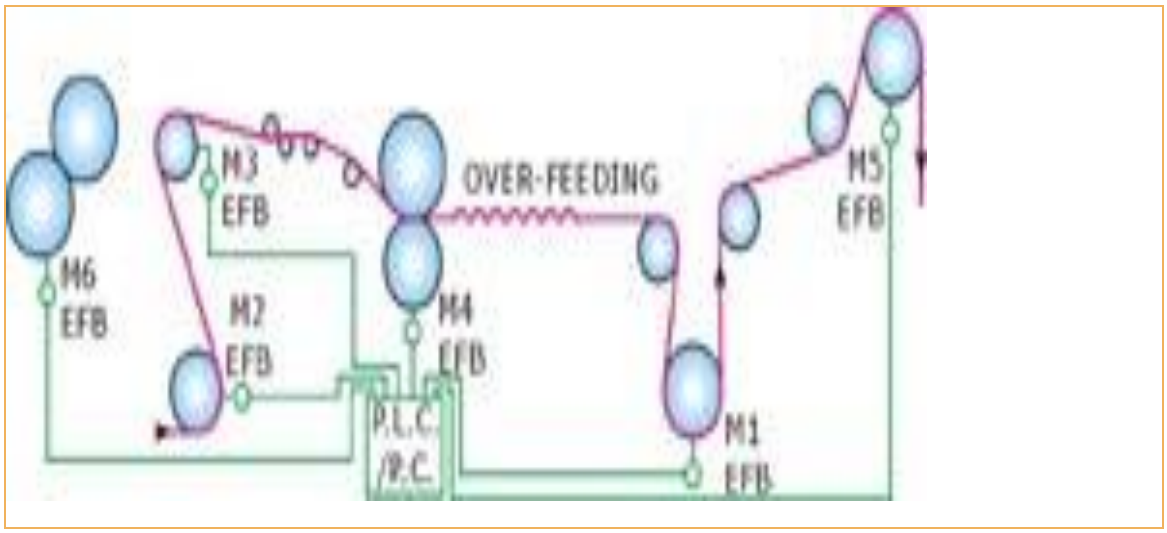




2.9.9 Delivery:

The SWASTIK OPTIMA 2501 Stenters can be equipped with various types of batch winders-- small batches or big batches or a plaiting down mechanism or any two.

2.9.10 Main Drive:



OPTIMA 2510 is equipped with multi-point AC Drives with Frequency converters -- one each for Mangle, Stenter Main Drive, Stenter Draw Roller Drive, Overfeed Drive, Selvedge Tension Drive, Pinning Brush Drive, Plaiter and Batching Drive etc.

Machine is equipped with a suitable Control Panel housing all controls gears for, Main Drive as well as Blowers. A bridge is located on the entry box, which houses all controls, temperature controller speed meter, overfeed indicators etc., and on request with PLC/Micro Processor / PC etc.

2.9.11 Lint Filter

Figure No 2.3: Lint Filter

A suitable filter is provided just above the heat exchanger or in case of direct fired Natural Gas Burners, in the duct. The filter is easily accessible and can be cleaned standing outside the chamber while the machine is in operation. A second security filter is also provided.

2.9.12 Exhaust System:

Standard machines are provided with suitable number of exhausts to efficiently remove the moist and contaminated air. The exhaust blowers can be supplied with frequency controllers and moisture sensors to maintain uniform moisture and excellent drying results.

2.9.13 Heat Recovery System

OPTIMA 2510 can be equipped with suitable heat recovery systems to pre-heat atmospheric air with the help of exhaust air, to feed to stenter at high temperature or to heat water to be used in processing machines or in boiler as feed water.

2.9.14 Vertical Return Pin-Chain:

SWASTIK STENTER OPTIMA 2610 & 2620 are well designed Stenters suitable to process Open width Knit fabrics, with a vertical return chain (Model 2610) and a vertical return chain with conveyor Belt (Model 2620).The machine is generally equipped with a Centering-cum-opening device; one or two padders and a weft corrector at the in-feed. Driven Scroll rollers, Mechanical de-curlers, pneumatically actuated pin-on device, Selvedge Gumming device, Steaming device with IR pre-dryer are fixed in the entry zone. The exit zone is generally equipped with an efficient cooling arrangement, Edge Trimmer, a fabric take off roller, Plaiter with conveyor and a Batching device.

SWASTIK OPTIMA 2510 is usually equipped with a heavy duty Two or Three Bowl Mangle designed to impregnate starch / finishing chemicals / tinting agents and squeeze all types of fabrics, including delicate textile fabrics made from natural fibres, man-made fibres and its blends. Pressure Rollers are usually made from heavy duty pipes with heavy shaft and covered with synthetic / natural rubber. Generally the driving roller is hard Rubber or Ebonite covered. Troughs are of Stainless Steel with guide rollers suspended from the side walls. Trough can be easily lifted or lowered for easy cleaning. Chemical dosing arrangement can also be provided. To avoid Centre-Selvedge variations, the mangle can be supplied with the top roller in "Anti-deflection" construction.

2.10 Functions of Stenter Machines:

1. Heat setting is done by the stenter for lycra fabric, synthetic and blended fabric.

2. Width of the fabric is controlled by the stenter.

3. Finishing chemical apply on fabric by the stenter.

4. Loop of the knit fabric is controlled.

5. Moisture of the fabric is controlled by the stenter.
6. Spirility controlled by the stenter.
7. GSM of the fabric is controlled by stenter.
8. Fabric is dried by the stentering process.
9. Shrinkage property of the fabric is controlled.
10. Curing treatment for resin, water repellent fabric is done by the stenter.

2.11 Components of Stenter Machine:

- Padders
- Weft straightener (Mahlo)
- Burners 10
- Heat recovery
- Attraction rollers
- Circulating fans 10,8
- Exhaust fans 2
- Winder 2
- Clips
- Pins
- I.R
- Cooling drums

2.12 Working Procedure of Stentering Machine:

The fabric is collected from the batcher to the scary and then it is passed through the padders where the finishes are applied and sometimes shade variation is corrected. The fabric is entered into the mahlo (weft straightener) the function of the mahlo is to set the bow and also weave of the fabric is griped by the clips and pins are also provided but the pins has a disadvantage that they pins make holes at the selvedge but the stretching of the pins are greater than the clips. These clips and pins are joined to endless chain. There are 8 to 10 chambers provided on the machine each chamber contains a burner and filters are provided to separate dust from air. The circulating fans blow air from the base to the upper side and exhaust fans sucks all the hot air within the chambers. Attraction rollers are provided to stretch the warp yarn.

After stentering we can increase the width of the fabric up to 1.5-2 inch. The speed of the machine is about 7-150 m/min.3 meters fabric can run in each chamber. Temperature is adjusted that according to the fabric as for,

1. PC 210 c
2. Cotton 110-130 c

Figure No 2.4: Stentering machine

2.13 Heat setting and stretching process in stenter machine:

2.13.1 Heat setting and stretching:

Heat setting is a mechanical process before dying of TC+CVC fabric to give dimensional stability and shrinkage control. Whereas stretching is also a mechanical process before dying of all cotton fabric to remove crease marks and to get required width for next process.

2.13.2 Material and chemical used:

Sometimes wetting agents (.e.g. mixture of surface active compound) are used as chemical for the heat setting and stretching process.

Softening Agent→ SMART SOFT CB 180, Taiwan.

Silicon finish→ Zero finish CT 9180

2.14 Different Types of Finishing Process by Stenter m/c:

i. Soft Finish: (chemical used –solosoft/softex/cationic softneretc) For Fabric Soft Hand Feel.
ii. Resine Finish: (chemical used –Fixapet Eco, Condensol, Soliasolutionetc) For WrinkleFree Fabric
iii. Easy Cone Finish/ Wrincle Free Finish: (chemical used –Fixapet Eco, Condensol, Soliasolutionetc)ForWrinkleFree Fabric.
iv. Paper Touch Finish: (chemical used –V.HKN, Binder etc) For Fabric paper type Hand Feel.
v. HardFinish: (chemical used –Bas, Binder etc) For Fabric Hard Hand Feel.
vi. Curing: High Temperature Method. Here No Chemical is used and Temperature range 180-200c
vii. Water Repeliency Finish: For One Side Coating Fabric
viii. Water Proof Finish : For Both Side Coating Fabric

2.15 Checking points

2.15.1(m/c parts):

- To check m/c area clean
- To check m/c motor
- To check burner
- To check blower
- To check chain & roller
- To check delivery roller

2.15.2Fabric checking points:

- To check GSM
- To check diameter
- To check fabric faults (crease mark, dye spot.)

2.16 Use and Maintenance of Stenter Machine:

(1) Mounting thread expander board and active threads expansion rate roll, you must be the central thread the arrow with the direction of movement of the fabric, otherwise, make the fabric wrinkle.

(2) Passive thread expansion rate roll during installation must be threaded in the center of the arrow and fabric running direction of the roll surface. The passive thread expansion rate force poor only wrinkle role.

(3) Threaded expansion rate and smooth surface to prevent the accumulation of garbage, embedded in the groove, so that ability to reduce the expansion rate, the well to prevent scratches fabric or produce articles flowers. In order to improve the capacity of $(1+x)^n = 1 + \frac{nx}{1!} + \frac{n(n-1)x^2}{2!} + \cdots$ rate may be appropriate to increase the thread lead and the first few.

(4) When using roll bending expansion amplitude should be noted that the roller surface cleaning and the rotation of the roll bending flexible or not, to prevent abrasion of fabric.

(5) Compared with the threaded expansion amplitude expansion rate of the expansion rate of the roll bending device capability. But its structure is complex, improper use, easy to produce by the dense uneven and lordosis arc of latitude bend.

2.17 Common failure causes and solutions:

Stenter frame range the end of the box exhaust back door does not open in a timely manner

The main reasons: The stenter frame range inside the steam does not timely row clean, low-voltage protection switch caused by stenter frame range box no action. Solution: 1, setting inside the exhaust port filter blockage, 2, the identification of low-voltage protection switch or bad stenter frame range box.

Plate fast to send exception (good times and bad)

The main reason: fast delivery clutch failure. Fast delivery of the failure of the clutch power supply contactor. Solution: First, identify where the failure occurred, find the two 24V bulb were connected to the terminal of the clutch and brake, two light bulbs on behalf of the clutch and brake, normal working hours, fast delivery action a light, fast delivery stop lights . Plate fast delivery period, on behalf of the clutch light, contactor and lead failure in the clutch, in general, is the contact pads worn clutch caused by the premise of the gap increases, the contact pads flat , adjust the distance, or replacement of the clutch. Mounted directly in the reduction gear box, clutch bearing badly, belts loose points would have been better, the fundamental solution to a new one. Plate fast delivery period, on behalf of the clutch does not light: Check for clutch work with the contactor is action, action words, the contactor contacts mounted on the head have a problem, repair it, still does not work, then lead check and clutch DC 24 V voltage. Contactor action did not view the instruction panel light emitting diodes indicates whether good or bad identification of the contactor coil. Inserts location of the clutch and stop of the trip switch position whether the check. (Under normal circumstances, the contact device installed head bad more)

Three. Socks board feet easily slide out

The main reason: Most socks feet, plate screw worked loose out, plus socks operatives operating board to shake the powerful. Solution: Under normal circumstances, do not touch the socks feet, plate from Socks foot distance as small as possible. Screws to ensure that the work in the tight state.

Four. Socks dry and poor

1. Time to check the first drying fan action on setting machine action at the wrong time to find out the reasons to make it normal, all dust filters on the fan cleaning cleaning time, otherwise, even if the time on the lost function of a drying fan.

2. The oven door to check all of the side of bad and good repair and not related to the place of the adjustment in place. The wind deflector in the oven, to be adjusted according to the different length socks.

3. Air inlet dust filters check the oven clean again. This is especially important this work, to do good or bad, directly affect the air volume of the oven, the size of the impact of the air flow to dry socks. Required to get clogged with dust, regular inspection of this work, and adhere to such a good job. Dust-clogged with dust, equal to the air intake there is no air flow will greatly reduce the drying effect is seriously affected. After the dust-cleaning, the air volume is still small, and should check the heater at the bottom of dust blocked, clogged with dust, to take up according to the bottom of the heater with a flashlight, part of the heater can see the light, cannot see it, remove the heater, cleaning with high pressure water jets, heater completely clean so far. While doing the daily inspection of the oven with the trap is good or bad. Then oven function will be fully realized.

The quality and size of the steam quality directly affects the dry good or bad. The stenter frame range door open, look at the socks should not have a lot of water.

CHAPTER 3

MATERIALS & METHODS

4.1 Materials:

In this research, we have taken sixpretreated (scouring, bleaching, dyeing/ printing)cotton knit fabric samples and specification of these samples is mentioned inTable 4.1.

Sample No.	Sample Name	Yarn Count	Fabric Diameter	Fabric GSM
01	Single Jersey	30's	67"	122
02	Rib	28's	84"	165
03	Lycra Single Jersey	34's	63"	125
04	Interlock	26's	67"	170

4.2Methods:

At first wet dyed fabric is feed on the stenter machine. Then the fabric is treated by stenter machine including overfeed, temperature and chemicals. After stentering the output fabric comes out with change in diameter and GSM.

We noticed that for the different over feeding and temperature the GSM of fabrics are different. The dia of the fabric also can be increased or decreased by the process of stentering machine. After stentering, the yarn count of the fabric remain same.We get more luster and soft fabric after the process of stentering machine.

CHAPTER 4

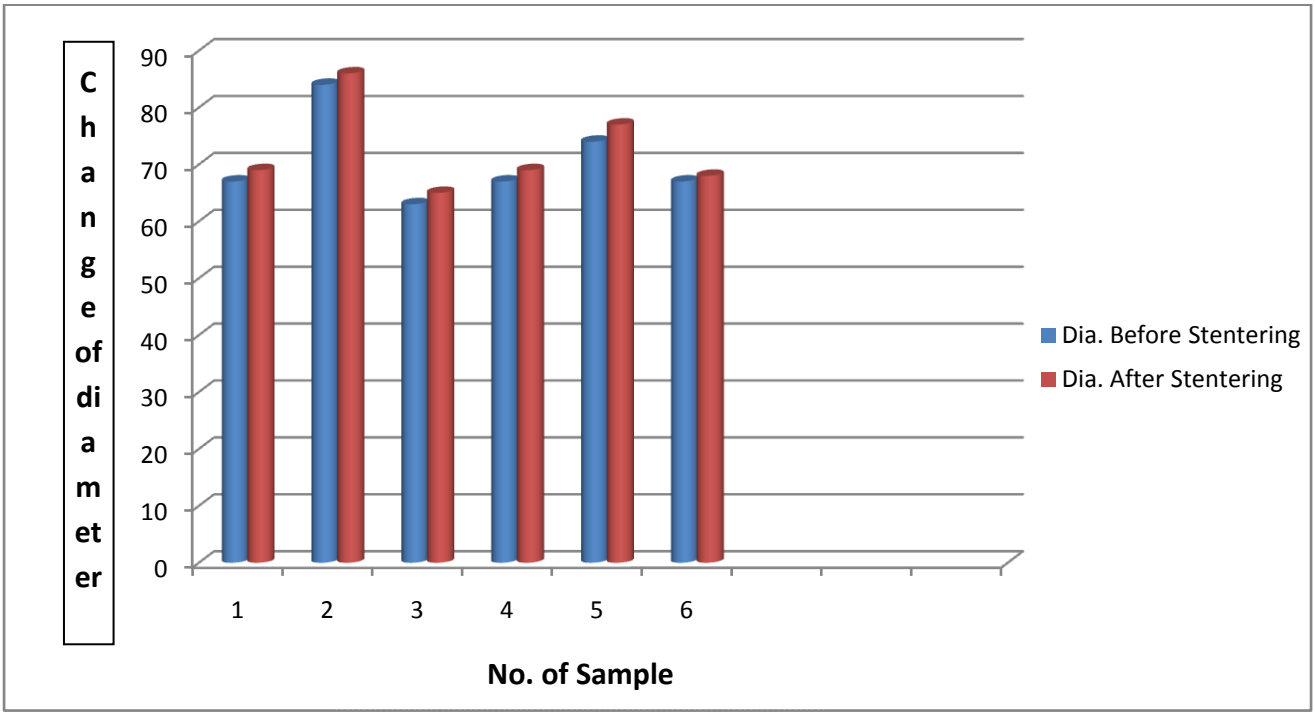
DISCUSSION OF RESULTS

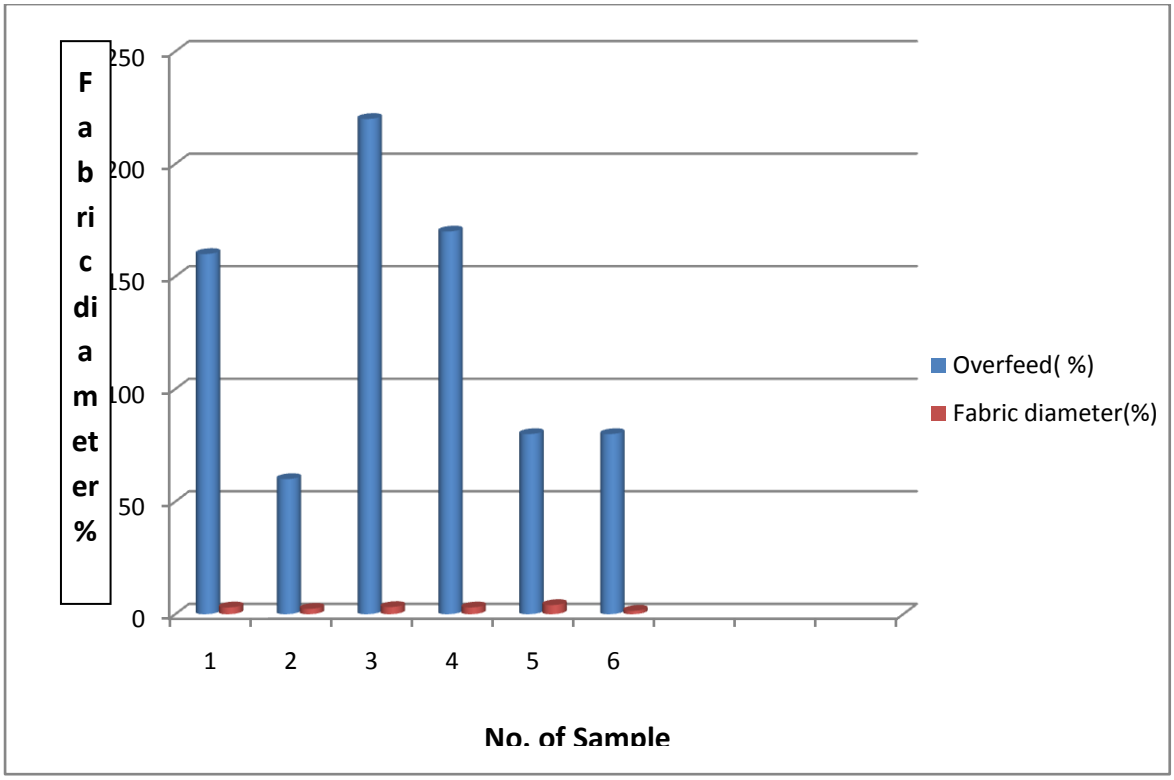
5.1. Analysis for Diameter Change:

After comparing fabric Width before Stentering and fabric Width after Stentering of four samples we get percentage of changing Width

Table-5.1: Diameter before and after Stentering.

Sample No.	Sample Name	Dia before Stentering	Over Feed (%)	Dia after Stentering	Change of Dia	Percentage (%) Change of Diameter
01	Single Jersey	67"	160	69"	2"	2.99
02	Rib	84"	220	86"	2"	2.38
03	Lycra Single Jersey	63"	170	65"	2"	3.17
04	Interlock	67"	80	69"	2"	2.99



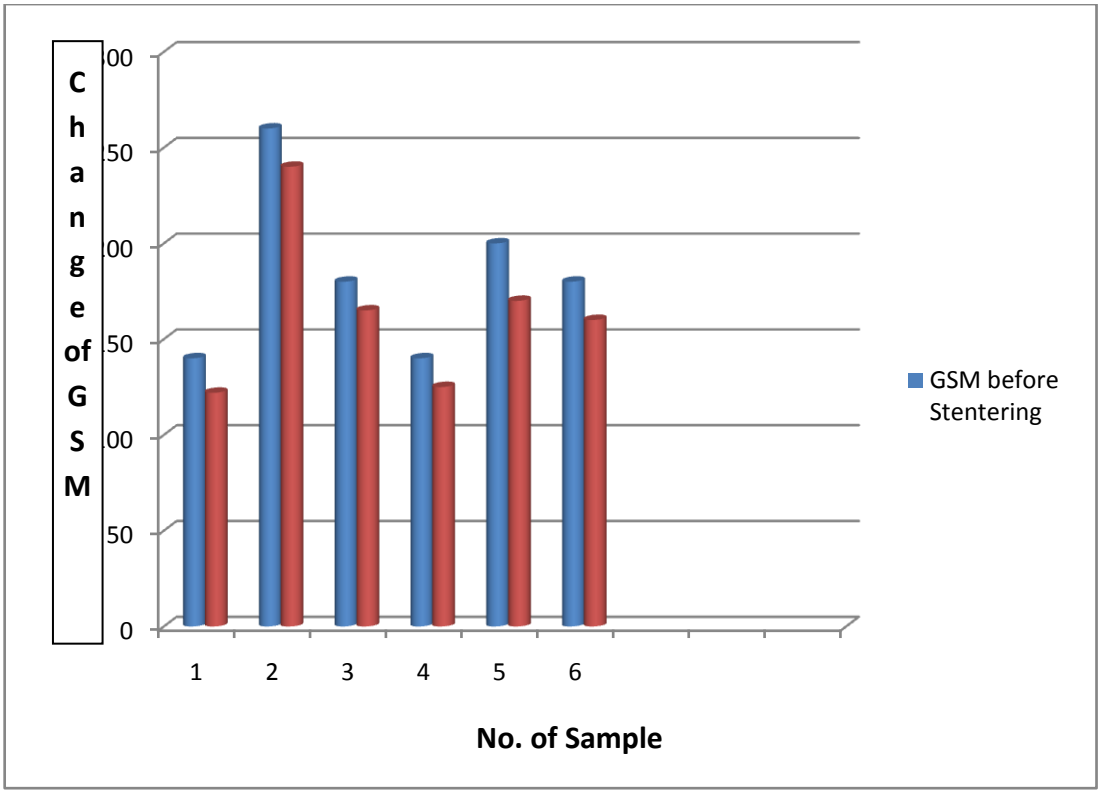


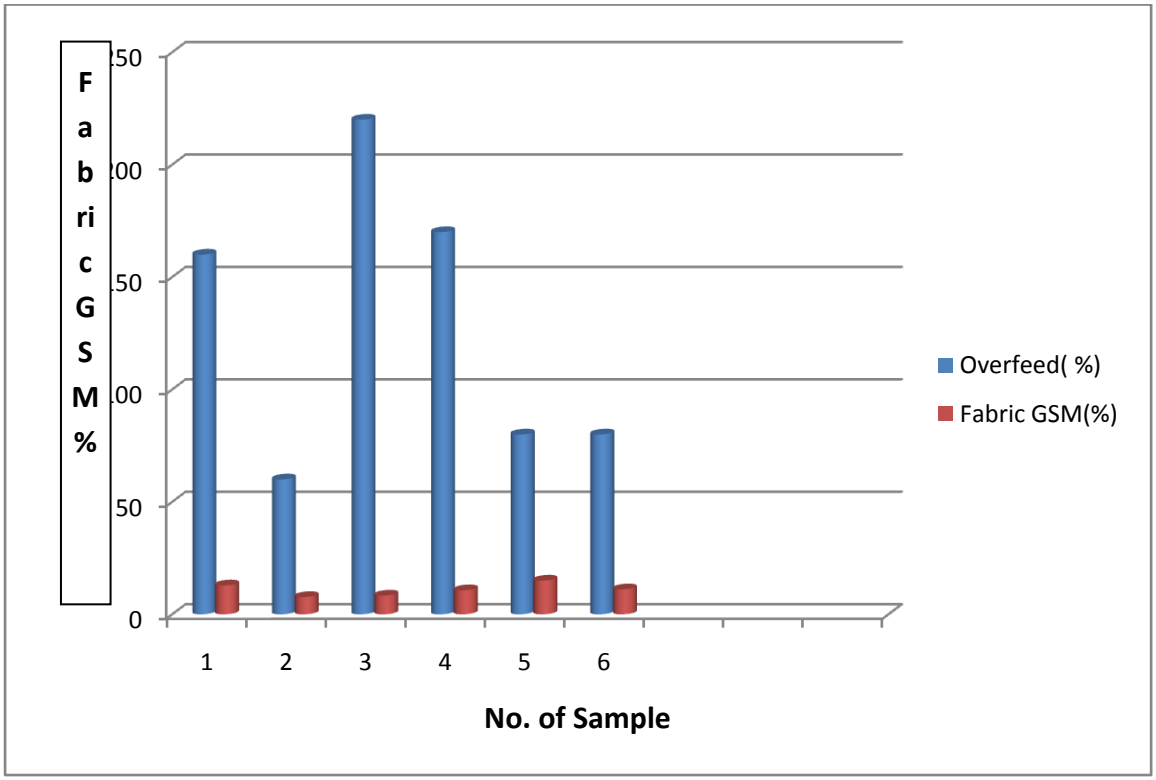
5.2 Analysis for GSM Change:

After comparing fabric GSM before Stentering and fabric Width after Stentering of four samples we get percentage of changing GSM

Table-5.2: GSM before and after Stentering.

Sample No.	Sample Name	GSM before Stenter	Over Feed (%)	GSM after Stenter	Change of GSM	Percentage (%) Change of GSM
01	Single Jersey	122	160	140	18	12.86
02	Rib	165	220	180	15	8.33
03	Lycra Single Jersey	125	170	140	15	10.71
04	Interlock	170	80	200	30	15





CHAPTER 6

CONCLUSION

Conclusion :

This project work basically helps me to meet the knowledge about Stentering machine. It is a important study in the field of wet processing technology. The study confirmed that Stentering machine for fabrics and always so obvious for finished fabric. Stentering machine is used for bio-polish process which gives fabrics a clear, luster & even surface appearance. It important to identify which Stentering machine is more effective for GSM& Fabric diameter. Comparing the two different material of Stentering machine, it can be said that both not lead to same result. Our results show that the GSM & Fabric diameter of Stentering machine.

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

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