



Daffodil
International
University

Industrial Attachment

**Turag Garments & Hosiery Mills LTD.
South Panishail, Zirani, Kashimpur, Gazipur-1712,
Bangladesh**

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Advance: Fabric Manufacturing Technology
Program: B.Sc. in Textile Engineering
Department: Textile Engineering
Daffodil International University



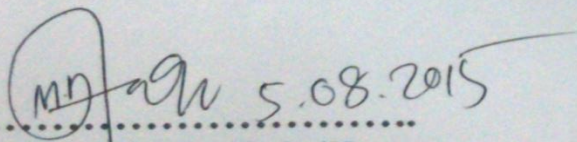
Daffodil
International
University

Faculty of Engineering
Department of Textile Engineering

Approval Sheet

The industrial attachment entitled Industrial attachment report on Turag Garments & Hosiery LTD. July 2015 Prepared and submitted by in partial fulfillment of the requirements for the **Degree of Bachelor of Science in Textile Engineering** has been examined and hereby recommended for approval and acceptance.

Signature of supervising Teacher

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Prof. Dr. Md. Mahbubul Haque
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We should also like to thank the official of Knitting Department, Turag Garments & Hosiery LTD. for helping us to know about the duties & responsibilities. Our gratitude also goes to all the employees Of Turag Garments & Hosiery Mills LTD. for their sincere co-operation, support & valuable advice which they have provided us during the two months of training.

Declaration

We hereby declare that, this project has been done by us under the supervision of **Professor Dr. Md. Mahbubul Haque**, Head of the Department , Department of Textile Engineering, **Daffodil International University**. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree and it is submitted in partial fulfillment of the requirement of Bachelor of Science in Textile Engineering degree of Daffodil International University and we also remain responsible for the inadequacies & errors.

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Abstract

Aim of this project to know about knitted fabric produced in our country. Quality and production of knit fabric depends on the machine quality. Different number of needle, machine Gauge, machine diameter, no of feeder used in the knitting machine on the requirement of the fabric quality. In knitted fabric different stitch length and GSM is contain. For fulfill this requirement it must be changed the machine equipment's.

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Chapter: 1
INTRODUCTION



Introduction

1. Introduction:

Textile and garments sector is the biggest and fastest growing sector in Bangladesh. It is also the highest foreign currency earning sector in Bangladesh. Among this sector, Knit garment is growing very rapidly due to smaller investment requirement, greater backward linkage facility & higher profit than woven garments. That's why export of knit garments is increasing steadily for last few years and up to now.

Textile education can't be completed without industrial training. Because this industrial training minimizes the gap between theoretical and practical knowledge and make us accustomed to industrial environment. We got an opportunity to complete two-months long industrial training at Turag Garments & Hosiery Mills LTD. which is a 100% export-oriented composite Knit Dyeing Industry. It has well planned & equipped fabric dyeing-finishing and garments units in addition to facilitate knitting and knitwear manufacturing.

1.1 Importance of industrial training:

The industrial attachment is the process, which builds understanding, skills and attitude of the performer, which improves his knowledge in boosting productivity and services. University education provides us vast theoretical knowledge as well as more practical attachment, in despite of all these industrial attachment helps us to be familiar with technical support of modern machinery and skill about various processing stages.

It also provides us sufficient practical knowledge about production management, work study, efficiency, industrial management, purchasing, utility and maintenance of machinery and their operation techniques etc. the above mentioned cannot be achieved successfully by means of theoretical knowledge only. This is why it should be accomplished with practical knowledge in which it is based on. Industrial attachment makes us reliable to be accustomed with the industrial atmosphere and improve courage and inspiration to take self a responsibility.

We have prepared this report as required on completion of our attachment of our attachment course in regarding guideline given by the university authority.

1.2 Objective:

1. To know the machineries of knitting section like, circular knitting machine and inspected machine with a complete detail.
2. To know analysis a fabric and its design.
3. To know the various types of raw materials and their uses (like as Lycra yarn, Blended yarn, cotton yarn and others)
4. To know the functions of varies parts of a machine (such as needle, sinker, cam, feeder, sensor, etc.)
5. To know the indicated faults and its remedies and the learning of increasing the efficiency of a machine.



Chapter: 2
INFORMATION ABOUT FACTORY



Basic information about the factory



2.1 Basic information about the factory:

Name of factory: Turag Garments & Hosiery Mills LTD.

Date of establishment: Turag is an export oriented knit garments manufacturing unit
This was established in 1996.

Factory Address: Turag Garments & Hosiery Mills LTD.
South panishail, Zirani, Kashimpur, Gazipur-1712,
Bangladesh.

Corporate Office: Turag Garments & Hosiery Mills LTD.
Serenity, House no 15, Road No 12
Sector-1 Uttara, Dhaka-1230
TEL: +88-02-8919815, 8931738
E-mail:- info@turagbd.net

Owner and investor: M.A. Khalek

Certification: FAIR TRADE

As a textile conglomerate having, 40320 spindle spinning.
Given by, FLOCERT GmbH of Germany in 2007

Quality Certification: ISO 9002

Marks & Spencer

NANOTEX

TUV

DuPont Teflon

Puma

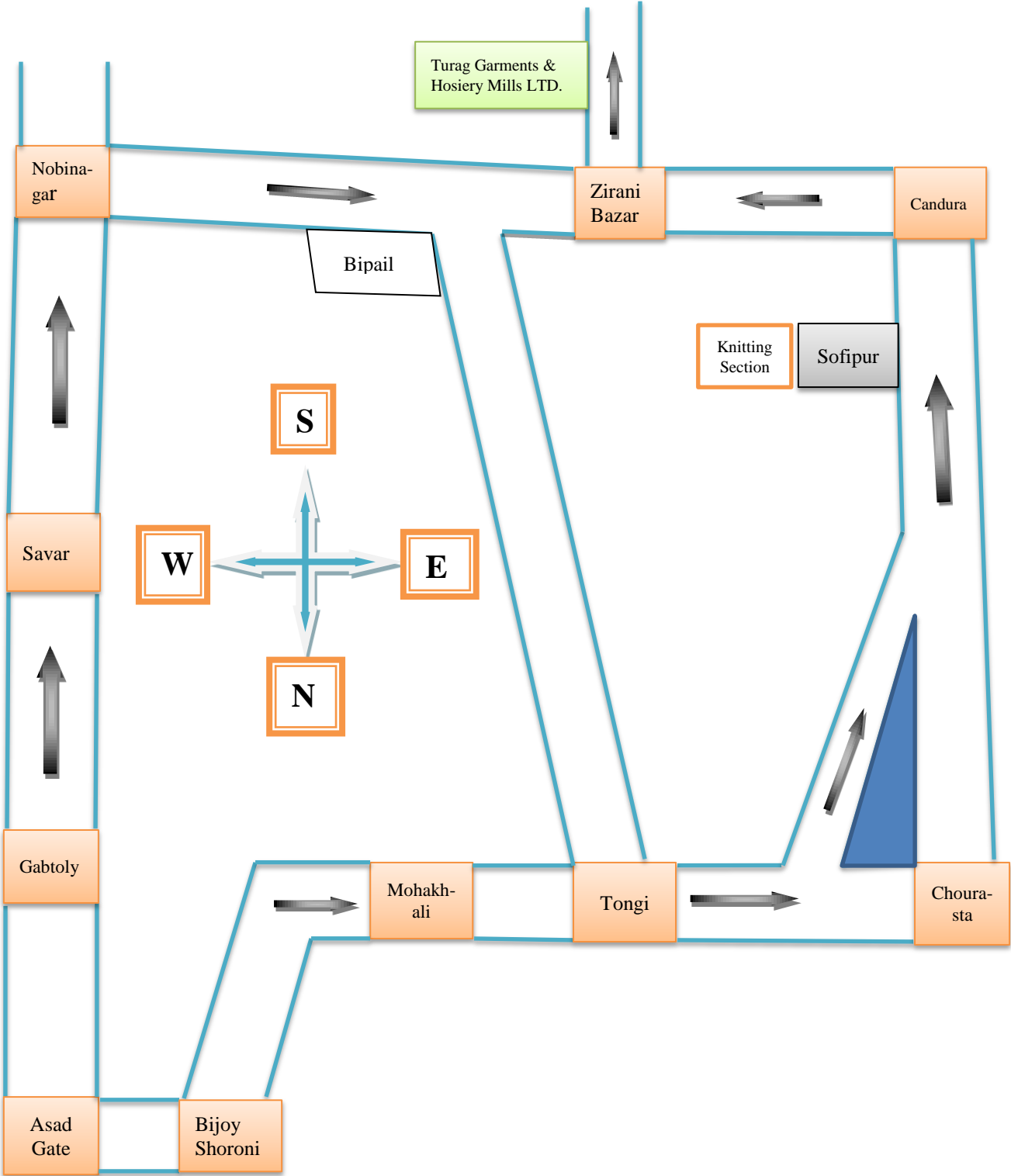
DOTS by Cu (Control union)

OE by CU (Control Union)



General information about the factory

2.2 Location Lay Out of Turag Garments & Hosiery Mills LTD.:



2.3 Production capacity information of the factory:

- * Garments – 3.2 million pcs/Month
- * Embroidery – 8000 pcs/day
- * Printing – 30000 pcs/day
- * Knit Fabric – 26 tons/day
- * Dye Fabric – 32 metric tons/day
- * Washing – 14000 pcs dyeing & 40000 pcs wash/day

2.4 Actual production information of the factory:

- * Garments – 2.5 million pcs/month
- * Embroidery – 6500pcs/day
- * Printing – 25000 pcs/day
- * Knit fabric – 18 tons/day
- * Dye fabric – 20 tons/day
- * Washing – 9000 pcs dyeing & 25000 pcs wash/day

2.5 List of Buyer and customer:

| Name of the Buyers | Country | Logo |
|--------------------|---------|---|
| H&M | Sweden |  |
| C&A | Belgium |  |
| Tchibo | Germany |  |
| Zara | Spain |  |

| | | |
|---------------------------|-----------|---|
| Pull & Bear | Spain |  |
| Bon Prix | Germany |  |
| Mayoral | Spain |  |
| United colors of Benetton | Italy |  |
| Le moir CO.LTD | Japan |  |
| Target | Australia |  |
| KappAhl | Sweden |  |
| New Yorker | Germany |  |
| Takko | Germany |  |
| Mustang | Germany |  |
| Big Star | Poland |  |

2.6 Countries of Exports:

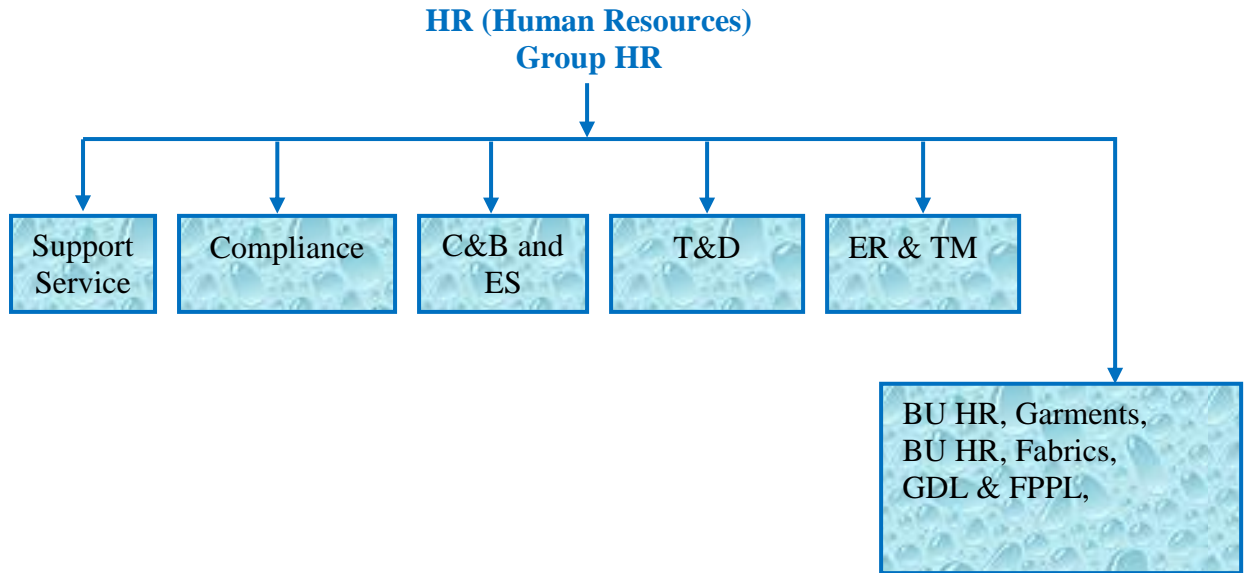
- A) Germany
- B) Sweden
- C) Italy
- D) United Kingdom
- E) Austria
- F) Belgium
- G) Spain
- H) The Netherland
- I) France
- J) Norway

Chapter: 3
Human resource and
Organization structure

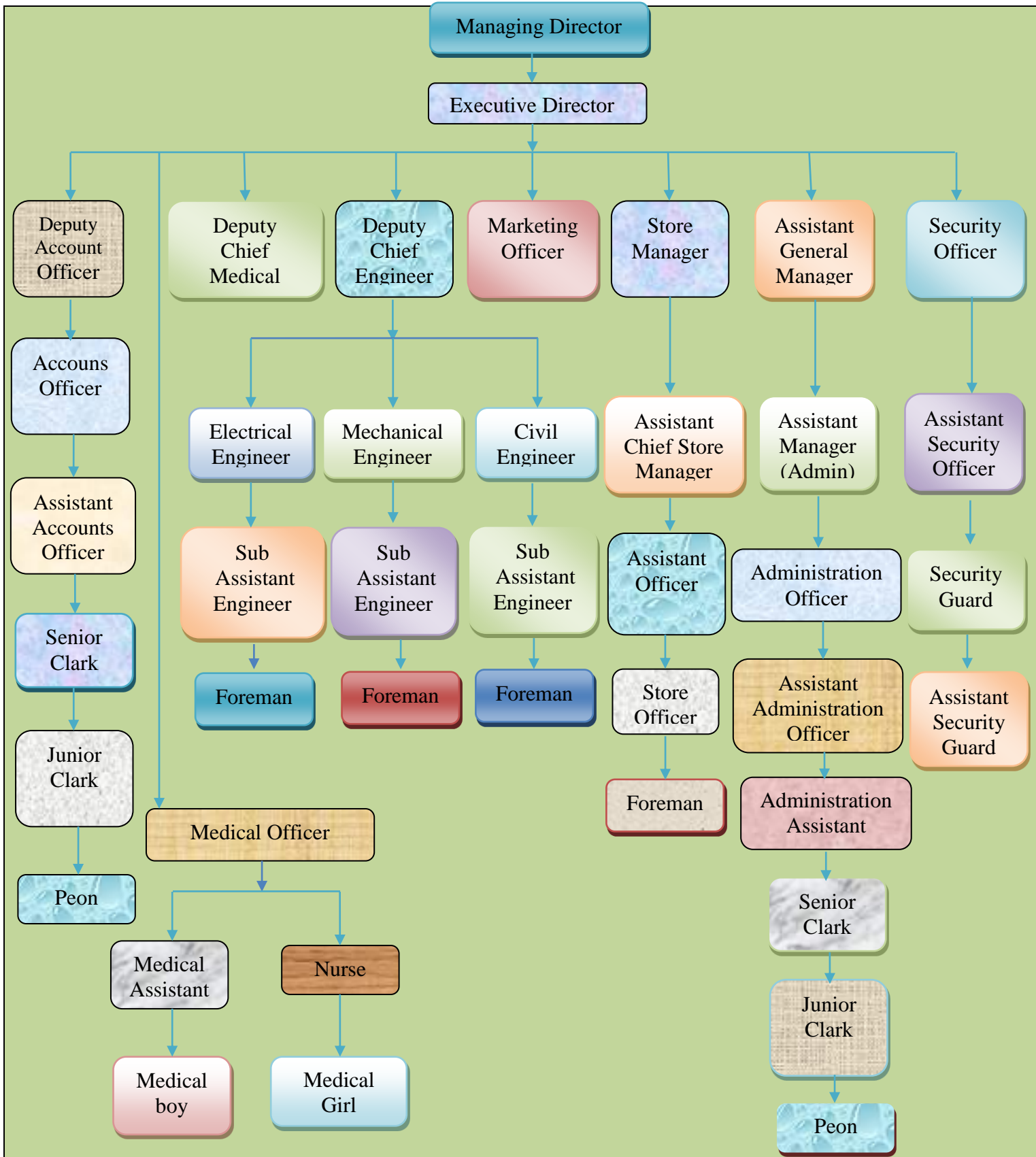


3.1 Human Resource Management:

In Turag Garments and Hosiery mills LTD. There is a controller i.e. Managing Director/ Chairman who controls the entire factory. Besides these, the respective department Chief controls the entire department.



3.2 Organ gram of Administration Department:



Chapter: 4
Raw material



4. Raw material:

Raw material is a unique substance in any production oriented textile industry. It plays a vital role in continuous production and for high quality fabric.

4.1 Types of raw material:

1. Yarn
2. Fabric
3. Dye stuff
4. Chemical and auxiliaries

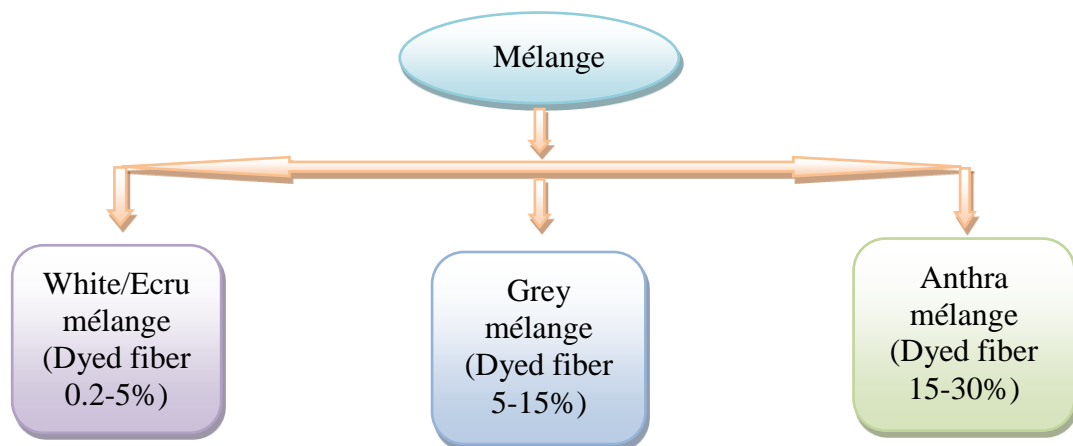
4.2 Name and source:

4.2.1 Yarn:

The raw material (cotton yarn) used in Knitting are the product of another spinning Mill. They produce carded and also combed yarn according to their buyer requirement. The yarn count range vary for carded yarn from (34/1) to (7/1) Ne. The yarn count range vary for combed yarn from (40/1) to (20/1) Ne.

4.2.2 Mélange:

Mélange is produced by blending different amount of top dyed fiber with grey fiber. Different types of mélange used in knitting are:



4.2.3 Sources of mélange:

- Patartoli spinning LTD.
- Prime spinning LTD.
- Aman spinning LTD.

4.2.4 Sources of polyester:

- Kader Synthetic.
- * **Count:** 75den, 100den, 150den.

4.2.5 Sources of Lycra:

| Brand Name | Country |
|------------|---------|
| Roica | Taiwan. |
| Texlon | Korea |
| Acelen | China |
| Creora | Japan |
| Lioli | China |

* **Count:** 20den, 30den, 70den.

4.3 Price list of different types of yarn:

4.3.1 Cotton:

| Yarn Count | Combed Yarn | Carded Yarn |
|------------|-------------|----------------|
| 40/1 | 3.65 \$/Kg | 2.65-2.7 \$/Kg |
| 34/1 | 3.00 \$/Kg | 2.5-2.6 \$/Kg |
| 32/1 | 2.90 \$/Kg | 2.30 \$/Kg |
| 30/1 | 2.70 \$/Kg | 2.30 \$/Kg |
| 28/1 | 2.70 \$/Kg | 2.25 \$/Kg |
| 26/1 | 2.65 \$/kg | 2.25 \$/Kg |
| 24/1 | 2.60 \$/Kg | 2.25 \$/Kg |
| 22/1 | 2.55 \$/Kg | 2.20 \$/Kg |
| 20/1 | 2.50 \$/Kg | 2.15-2.2 \$/Kg |

4.3.2 Polyester Yarn:

Kader Synthetic - 2.40 \$/Kg

China - 1.60 \$/Kg

4.3.3 Lycra Yarn:

20 den - 12.70 \$/Kg

40 den - 8.40 \$/Kg

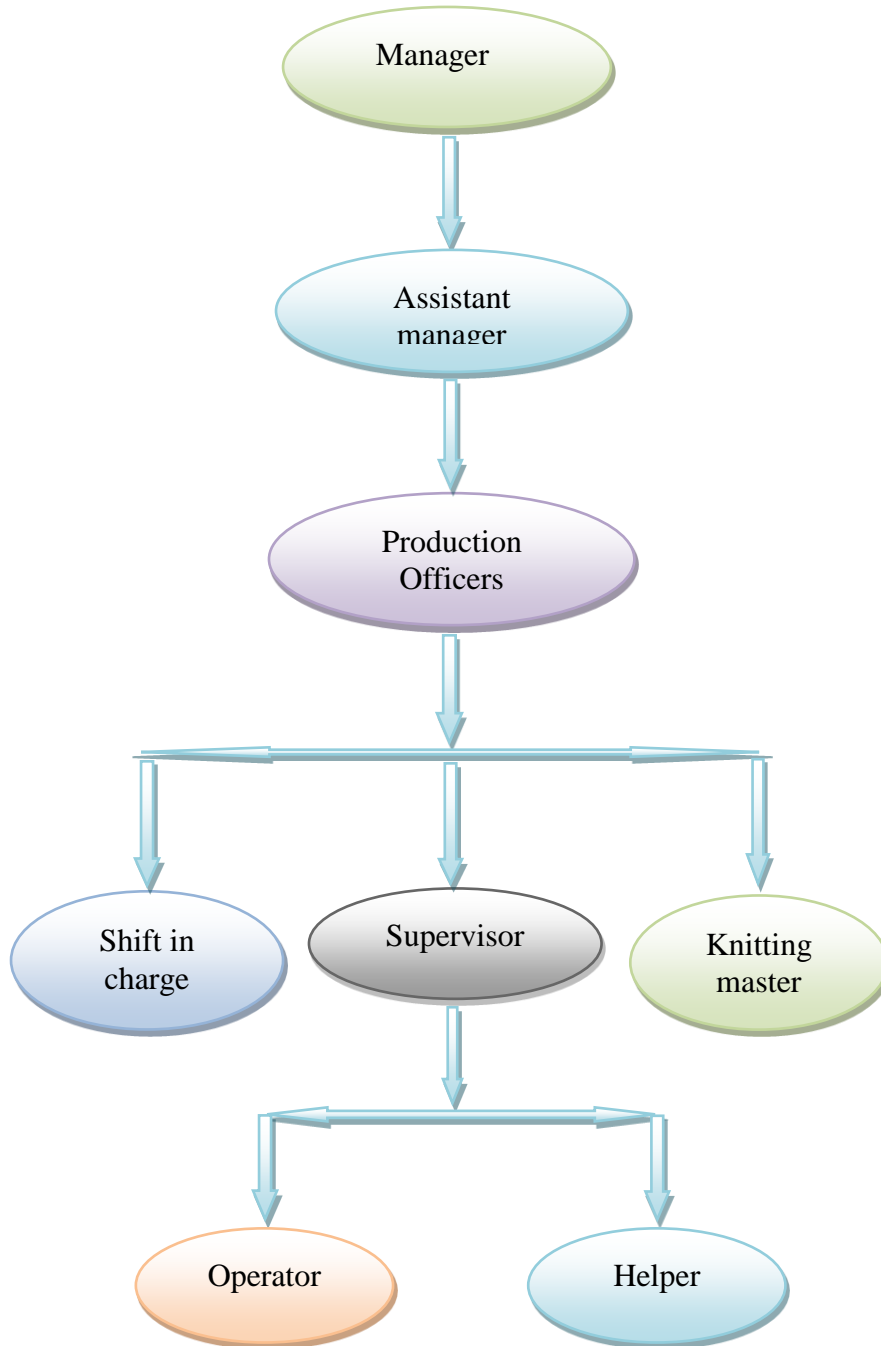
70 den - 7.50

Chapter: 5
KNITTING SECTION

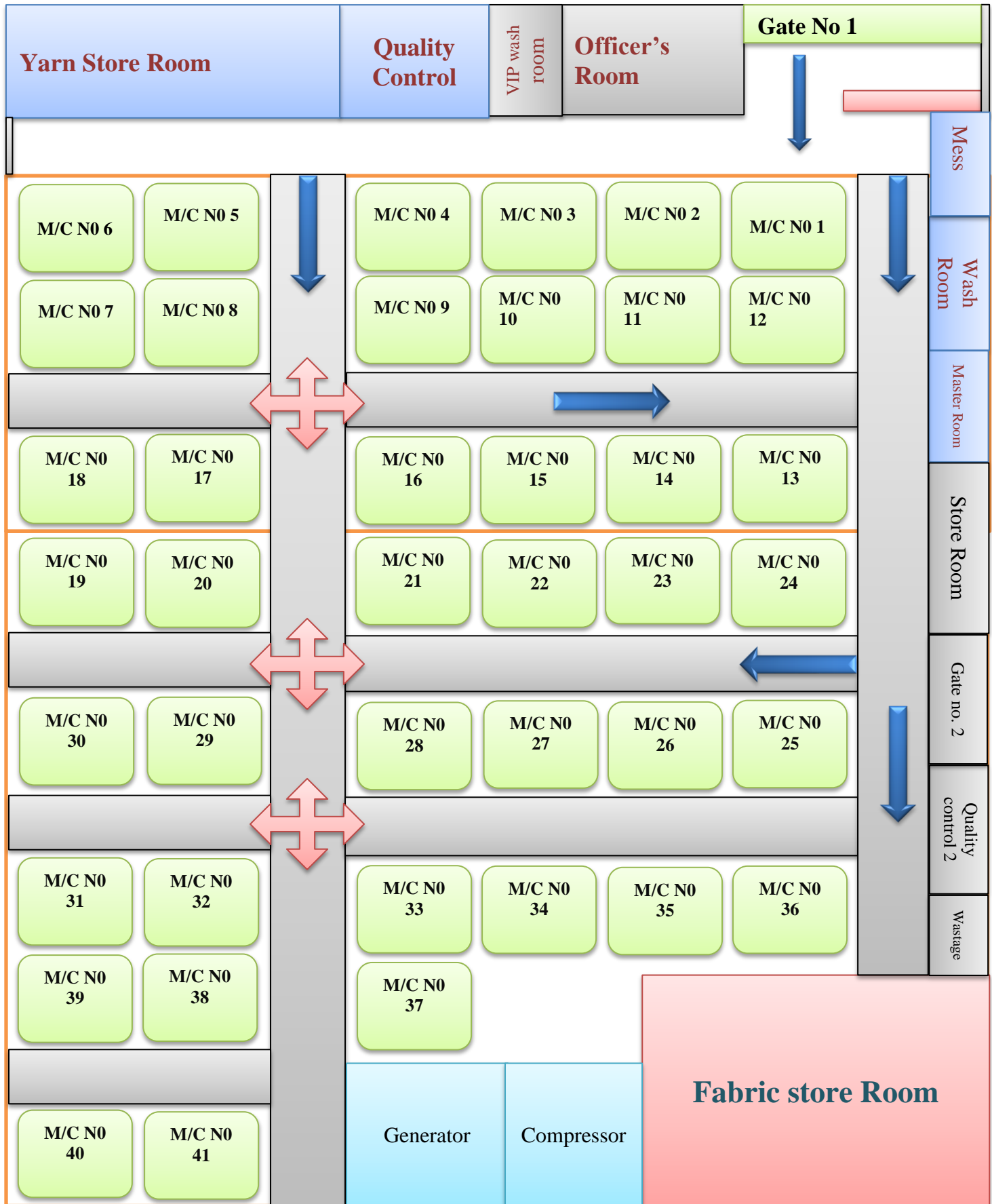


Knitting Section

5.1 Organ gram of Knitting Section:

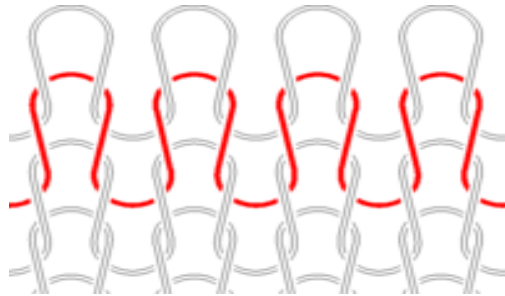


5.2 Lay out of knitting section:



5.3 Knitting:

Knitting is a method by which thread or yarn may be turned into cloth. Knitting consists of loops called stitches pulled through each other. The active stitches are held on a needle until another loop can be passed through them.

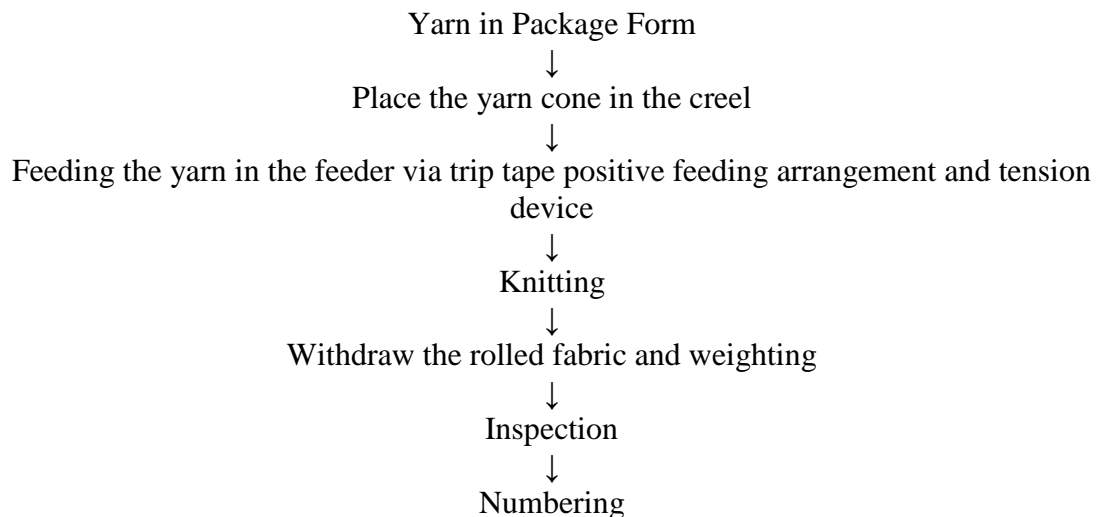


5.4 Classification of knitting section:

Knitting section is divided into three sections:

1. Flat knitting section.
2. Circular knitting section.
3. Fabric inspection section.

5.5 Process flow chart of knitting machine:



5.6 Yarn Quality Requirements:

Yarn quality parameters such as

- Breaking strength,
- Elongation,
- Twist,
- Moisture contents,
- Yarn winding,
- Yarn lubrication
- Yarn hairiness is to be considered for quality raw material feed to knitting.

5.7 Raw material use for knitting:

| Type of yarn | Count |
|---------------------------------|---|
| Cotton Yarn | 16 ^S , 20 ^S , 22 ^S , 24 ^S , 26 ^S , 28 ^S , 30 ^S , 34 ^S , 40 ^S |
| Polyester Yarn | 75D, 100D, 150D |
| Spandex yarn | 20D, 40D, 70D |
| Grey Mélange (C-90% V-10%) | 20 ^S , 22 ^S , 24 ^S , 26 ^S , 30 ^S , 34 ^S |
| PC (65% Polyester & 35% cotton) | 24 ^S , 26 ^S , 28 ^S , 30 ^S |
| CVC | 24 ^S , 26 ^S , 28 ^S , 30 ^S |

5.8 Effects of knitting Parameter in fabric production:

When a buyer orders for fabric then they mention some points related to production and quality. Before production of knitted fabric, these factors are needed to consider. Those are as follows-

a. Stitch Length

- GSM decrease with the increase of stitch length
- If stitch length increase then fabric width increase and WPI decrease.
- For deep shade stitch length should be higher and vice-versa.

b. GSM

- Gray GSM should be less than finish GSM
- GSM increase with increase of stitch length and it is adjusted by VDQ pulley
- Enzyme Level
- Color
- If shrinkage increase then GSM increase.

c. Count

- If count increase then fabric width increase
- GSM depends on yarn count

d. Gauge

- For finer gauge finer count should be use
- If machine gauge increase then fabric width decrease
- If gauge decrease then stitch length increase.

e. Feeder

- Production increase with increase of feeder no.
- Feeder is set up in case of stripe fabric.

f. Design

- Cam setting
- Set of needle
- Size of loop shape.

5.9 Relationship of knitting parameter:

Stitch length increase with the increase of GSM

1. If stitch length increase then fabric width increase and WPI decrease.
2. If machine gauge increase then fabric width also increase.
3. If yarn count increase (coarser) then fabric width also increase.
4. If shrinkage increases then fabric width decrease but GSM and WPI increase.
5. For finer gauge, finer count yarn should use.
6. Grey GSM should be less than finish GSM.

5.10 Methods of increasing production:

By the following methods the production of knitted fabric can be increased:

5.10.1. By increasing machine speed:

Higher the machine speed faster the movement of needle and ultimately production will be increased. But it has to make sure that excess tension is not imposed on yarn because of this high speed.

5.10.2. By increasing the number of feeder:

If the number of feeder is increased in the circumference of cylinder, then the number of courses will be increased in one revolution at a time.

5.10.3. By using machine of higher gauge:

The more the machine gauge, the more the production is. So using machine of higher gauge production can be increased.

5.10.4. By imposing automation:

- a. Quick starting & stopping for efficient driving system.
- b. Automatic m/c lubrication system for smoother operation.
- c. Photo electric fabric fault detector.

5.10.5. By imposing other developments:

- a. Using creel-feeding system.
- b. Using yarn feed control device.



5.11 Different types of machine:



Jiunn Long (Single jersey)



LISKY (Single jersey)



LISKY (Double jersey)

5.12 Specification of knitting m/c:

5.12.1 Turag Garments and Hosiery Mills LTD.

Table-1: single jersey circular knitting machine

Total no. of machine: 33

| No. of machine | Brand name | Origin | Machine gauge | Machine dia | No of feeder |
|----------------|------------|--------|---------------|-------------|--------------|
| 01 | LISKY | Taiwan | 24 | 36 | 216 |
| 02 | LISKY | Taiwan | 18 | 32 | 68 |
| 08 | LISKY | Taiwan | 20 | 30 | 96 |
| 09 | LISKY | Taiwan | 24 | 34 | 108 |
| 10 | LISKY | Taiwan | 20 | 36 | 114 |
| 11 | LISKY | Taiwan | 20 | 38 | 120 |
| 12 | LISKY | Taiwan | 24 | 30 | 180 |
| 13 | LISKY | Taiwan | 24 | 38 | 228 |
| 14 | LISKY | Taiwan | 24 | 26 | 84 |
| 15 | LISKY | Taiwan | 24 | 28 | 90 |
| 16 | LISKY | Taiwan | 20 | 34 | 108 |

| | | | | | |
|----|------------|--------|----|----|-----|
| 17 | LISKY | Taiwan | 20 | 40 | 126 |
| 18 | LISKY | Taiwan | 20 | 32 | 102 |
| 19 | Sunda dask | Taiwan | 20 | 30 | 90 |
| 20 | Sunda dask | Taiwan | 20 | 30 | 90 |
| 21 | Jiunn Lung | Taiwan | 20 | 32 | 96 |
| 22 | Jiunn Lung | Taiwan | 20 | 34 | 102 |
| 23 | LISKY | Taiwan | 20 | 40 | 120 |
| 24 | Jiunn Lung | Taiwan | 24 | 30 | 90 |
| 25 | Jiunn Lung | Taiwan | 24 | 32 | 96 |
| 26 | Jiunn Lung | Taiwan | 24 | 34 | 102 |
| 27 | Jiunn Lung | Taiwan | 24 | 36 | 108 |
| 28 | Jiunn Lung | Taiwan | 20 | 36 | 108 |
| 29 | Jiunn Lung | Taiwan | 20 | 38 | 114 |
| 30 | Jiunn Lung | Taiwan | 24 | 38 | 114 |
| 31 | Jiunn Lung | Taiwan | 20 | 32 | 96 |
| 32 | LISKY | Taiwan | 24 | 30 | 90 |
| 33 | LISKY | Taiwan | 24 | 34 | 102 |
| 34 | LISKY | Taiwan | 24 | 36 | 108 |
| 35 | LISKY | Taiwan | 24 | 38 | 114 |
| 36 | LISKY | Taiwan | 24 | 22 | 64 |
| 37 | LISKY | Taiwan | 24 | 22 | 72 |
| 38 | LISKY | Taiwan | 24 | 36 | 108 |
| 41 | Jiunn Lung | Taiwan | 24 | 42 | 126 |









5.12.2 Turag Garments and Hosiery Mills LTD.

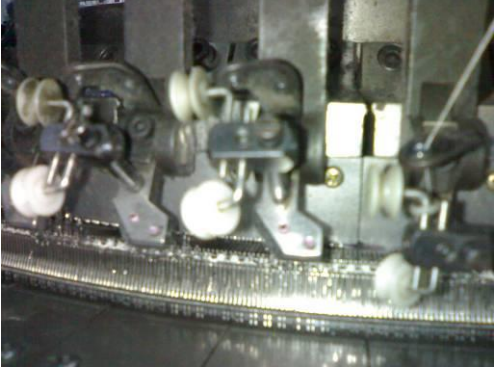



Table-2: Rib machine
Total no. of machine: 7

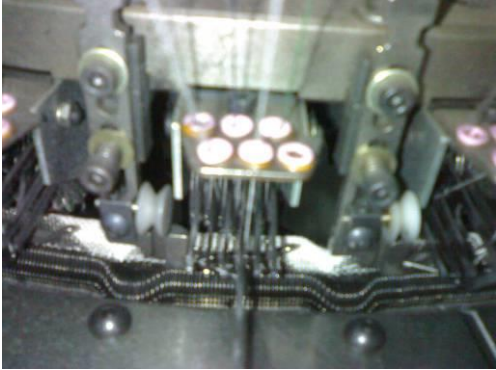
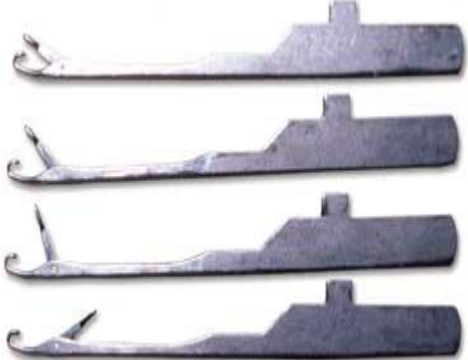


| No. of machine | Brand name | Origin | Machine gauge | Machine dia | No. of feeder |
|----------------|------------|--------|---------------|-------------|---------------|
| 03 | LISKY | Taiwan | 18 | 34 | 72 |
| 04 | LISKY | Taiwan | 18 | 36 | 76 |
| 05 | LISKY | Taiwan | 18 | 38 | 80 |
| 06 | LISKY | Taiwan | 18 | 38 | 76 |
| 07 | LISKY | Taiwan | 18 | 40 | 84 |
| 39 | LISKY | Taiwan | 18 | 36 | 76 |
| 40 | LISKY | Taiwan | 18 | 30 | 60 |





5.13 Description of Important Machine Parts:



| | |
|--|--|
| <p>Creel:</p> <p>Creel is a part of a knitting machine. Here yarn package are store and ready to feed in the machine</p> |  |
| <p>VDQ pulley:</p> <p>It is a very important part of the machine. It controls the quality of the product. Altering the position of the tension pulley changes the GSM of the fabric. If pulley moves towards the positive directive then the GSM is decrease. And in the reverse direction GSM will increase.</p> |  |



| | |
|---|--|
| <p>Pulley belt:</p> <p>It controls the rotation of the MPF wheel.</p> |  |
| <p>Brush:</p> <p>Its clean the pulley belt.</p> |  |
| <p>Tension disk:</p> <p>It confronts the tension of the supply yarn.</p> |  |
| <p>Inlet and outlet stop motion:</p> <p>It is an important part of the machine. It stops the machine instantly when a yarn is break.</p> |  |

| | |
|---|--|
| <p>Yarn guide:</p> <p>Its help the yarn to feed in the feeder.</p> |  |
| <p>MPF Wheel:</p> <p>Its control the speed of the MPF. Pulley belt gives motion to the wheel.</p> |  |
| <p>MPF:</p> <p>It's is Manager positive feed. It is also an important part of the machine. It's give positive feed to the machine.</p> |  |
| <p>Feeder ring:</p> <p>It is a ring. Where all feeders are pleased together.</p> |  |

| | |
|--|--|
| <p>Feeder:</p> <p>Feeder is help yarn to feed in to the machine.</p> |  |
| <p>Needle:</p> <p>It is a principal element of the knitting machine. Its help the yarn to create a loop. And by this way fabric are produce. Prior to yarn feeding the needle is raised to clear the old loop from the hook, and received the new loop above it on needle stem. The new loop is then enclosed in the needle hook as the needle starts to descend.</p> |  |
| <p>Needle track:</p> <p>Where all needle is placed together in a decent design.</p> |  |
| <p>Sinker:</p> <p>It is most important element of the machine. Its help to loop forming, knocking over and holding down the loop.</p> |  |

| | |
|---|--|
| <p>Sinker ring:</p> <p>Sinker ring is a ring. Where all sinkers are pleased together.</p> |  |
| <p>Cam box:</p> <p>Where the cam are set horizontally</p> |  |
| <p>Cam:</p> <p>Cam is device s which converts the rotary machine drive in to a suitable reciprocating action for the needles and other elements.</p> |  |
| <p>Lycra Attachment: Lycra is placed hear. And feeding to the machine.</p> |  |

| | |
|--|--|
| <p>Lycra stop motion:</p> <p>It is one kind of stop motion to stop the machine when the Lycra is break.</p> |  |
| <p>Cylinder:</p> <p>Needle track are situated hear.</p> |  |

| | |
|---|--|
| <p>Cylinder Balancer: It helps the cylinder to set in a proper alignment.</p> |  |
| <p>Screen:</p> <p>It is a digital screen. Which show the all machine information and we can give command to the machine.</p> |  |

Automatic oiler:

It's give the machine oil all the time properly and automatically.



Inverter:

It's is the heart of the circular knitting machine. Its control the speed of the machine.



Power Switch:

To give the power to the machine.



ON/OFF Switch:

It helps the m/c to start and stop.



Manual drive:

To drive the machine manually.



Machine motherboard:

All the Electronic parts are placed hear.



Production Department

5.14 Production Calculation:

We took all the necessary data which is related to calculating production (kg/hour) while machine running. And here we show how to calculate different types of fabric production.

Production Calculation for Single jersey machine:

In KG=

$$\frac{\text{Stitch Length} \times \text{Actual R.P.M} \times \text{No. of Needle } (\pi dg) \times \text{No of Feeder} \times \text{Time}}{\times \text{Efficiency}}$$

$$\text{Count} \times 10 \times 2.54 \times 36 \times 840 \times 2.204$$

In Pound=

$$\frac{\text{Stitch Length} \times \text{Actual R.P.M} \times \text{No. of Needle } (\pi dg) \times \text{No of Feeder} \times \text{Time}}{\times \text{Efficiency}}$$

$$\text{Count} \times 10 \times 2.54 \times 36 \times 840$$

Example:

$$\begin{aligned} \text{For M/C 01 Production per Shift} &= \frac{2.78 \times 12.9 \times 3840 \times 216 \times 60 \times 8 \times .90}{26 \times 10 \times 2.54 \times 36 \times 840 \times 2.204} \text{ kg} \\ &= 291.95 \text{ kg/shift} \end{aligned}$$

$$\begin{aligned} \text{For M/C 25 Production per Shift} &= \frac{2.98 \times 19 \times 2410 \times 96 \times 60 \times 8 \times .88}{28 \times 10 \times 2.54 \times 36 \times 840} \text{ lb} \\ &= 257.28 \text{ lb/hr} \end{aligned}$$

Production Calculation for Double jersey machine:

$$= \text{Production of single jersey machine} \times 2$$



5.15 Stich length GSM Control:

5.15.1 Stitch length:

The length of yarn, knitted into one stitch in a weft knitted fabric is called stitch length.

1. Measurement of stitch length:

In order to determine the stitch length, we count 100 no wales or stitch and count its length by hanging the yarn on the stitch counter. The reading is found in mm unit.

2. Effect of stitch length on color depth:

If the depth of color of the fabric is high loop length should be higher because in case of fabric with higher loop length is less compact. In dark shade dye take up% is high so GSM is adjusted then. Similarly in case of light shade loop length should be relatively smaller

5.15.2 GSM:

Gram per Square Meter a measurement system more commonly seen in paper, but also seen in t-shirts, it measures the weight of the sheet (of fabric, paper, etc.) which will give you some indication of its thickness. There are two formulas for calculating the GSM of knitted fabric:-

$$\text{GSM} = \frac{\text{Course per inch} \times \text{stitch length} \times 39.7 \times 39.7 \times \text{Tex}}{1000 \times 1000}$$

$$\text{GSM} = \frac{\text{WPI} \times \text{CPI} \times \text{SL} \times 0.9155}{\text{Count}(Ne)}$$

5.15.3 Changing of GSM:

- Major control by VDQ pulley
- Minor control by stitch length adjustment
- Altering the position of the tension pulley changes the G.S.M. of the fabric.
If pulley moves towards the positive direction then the G.S.M. is decrease and in the reverse direction GSM will increase.

5.16 Type of fabric produce:

- Single jersey
- Lycra Single jersey
- Single Lacoste
- Double Lacoste
- (1×1) Rib
- (2×2) Rib
- Stripe Single
- Double PK



5.17 Production Parameter:

1. Machine Diameter
2. Machine rpm (revolution per minute)
3. No. of feeds or feeders in use
4. Machine Gauge
5. Count of yarn
6. Required time (M/C running time)
7. Machine running efficiency

5.18 Design analysis and machine setting:

Stitch notation, cam arrangement & needle repeat of some knitted fabric.

Fabric name: Single Lacoste

Stitch Notation:

| | | | |
|---|---|---|---|
| x | x | x | x |
| x | o | x | o |
| x | x | x | x |
| o | x | o | x |

| |
|--------------|
| x = Knit cam |
| o = Tuck cam |
| K = Knit cam |
| T = Tuck cam |

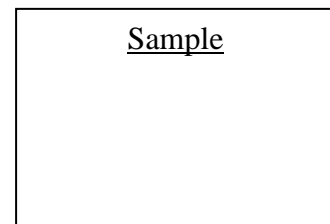
| |
|-------------------|
| 1 = 1 Butt Needle |
| 2 = 2 Butt Needle |
| 3 = 3 Butt needle |
| 4 = 4 Butt Needle |

Cam arrangement & Needle arrangement:

i) Using two truck cams:

| | | | |
|---|---|---|---|
| T | K | K | K |
| K | K | T | K |

| | |
|---|---|
| 1 | |
| | 2 |



ii) Using three track cams:

| | | | |
|---|---|---|---|
| K | K | K | T |
| K | T | K | K |
| K | K | K | T |

| | | |
|---|---|---|
| 1 | | |
| | 2 | |
| | | 3 |

iii) Using four track cams:

| | | | |
|---|---|---|---|
| K | K | K | T |
| K | T | K | K |
| K | K | K | T |
| K | T | K | K |

| | | | |
|---|---|---|---|
| 1 | | | |
| | 2 | | |
| | | 3 | |
| | | | 4 |

Figure: Cam arrangement

Figure: Needle arrangement



Fabric name: Double Lacoste

Stitch Notation:

| | | | |
|---|---|---|---|
| x | x | x | x |
| x | o | x | o |
| x | o | x | o |
| x | x | x | x |
| o | x | o | x |
| o | x | o | x |

| |
|--------------|
| x = Knit cam |
| o = Tuck cam |
| K = Knit cam |
| T = Tuck cam |

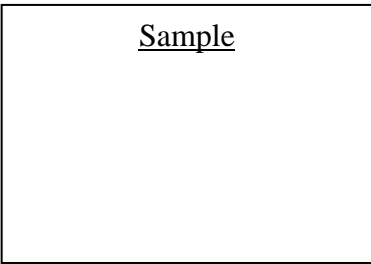
| |
|-------------------|
| 1 = 1 Butt Needle |
| 2 = 2 Butt Needle |
| 3 = 3 Butt needle |
| 4 = 4 Butt Needle |

Cam arrangement & Needle arrangement:

i) Using two truck cams:

| | | | | | |
|---|---|---|---|---|---|
| K | K | K | K | T | T |
| K | T | T | K | K | K |

| | |
|---|---|
| 1 | |
| | 2 |



ii) Using three track cams:

| | | | | | |
|---|---|---|---|---|---|
| K | K | K | K | T | T |
| K | T | T | K | K | K |
| K | K | K | K | T | T |

| | | |
|---|---|---|
| 1 | | |
| | 2 | |
| | | 3 |

iii) Using four track cams:

| | | | | | |
|---|---|---|---|---|---|
| K | K | K | K | T | T |
| K | T | T | K | K | K |
| K | K | K | K | T | T |
| K | T | T | K | K | K |

| | | | |
|---|---|---|---|
| 1 | | | |
| | 2 | | |
| | | 3 | |
| | | | 4 |

Figure: Cam arrangement

Figure: Needle arrangement

Fabric name: Single jersey

Stitch Notation:

| | | | |
|---|---|---|---|
| x | x | x | x |
| x | x | x | x |
| x | x | x | x |
| x | x | x | x |
| x | x | x | x |
| x | x | x | x |

| |
|--------------|
| x = Knit cam |
|--------------|

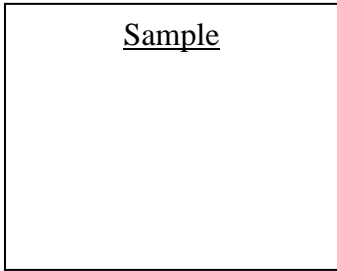
| |
|-------------------|
| 1 = 1 Butt Needle |
| 2 = 2 Butt Needle |
| 3 = 3 Butt needle |
| 4 = 4 Butt Needle |

Cam arrangement & Needle arrangement:

i) Using two truck cams:

| | | | | |
|---|---|---|---|---|
| K | K | K | K | K |
| K | K | K | K | K |

| | |
|---|---|
| 1 | |
| | 2 |



ii) Using three track cams:

| | | | | |
|---|---|---|---|---|
| K | K | K | K | K |
| K | K | K | K | K |
| K | K | K | K | K |

| | | |
|---|---|---|
| 1 | | |
| | 2 | |
| | | 3 |

iii) Using four track cams:

| | | | | |
|---|---|---|---|---|
| K | K | K | K | K |
| K | K | K | K | K |
| K | K | K | K | K |
| K | K | K | K | K |

| | | | |
|---|---|---|---|
| 1 | | | |
| | 2 | | |
| | | 3 | |
| | | | 4 |

Figure: Cam arrangement

Figure: Needle arrangement

5.19 Sample of various types of knitted fabric:

| Fabric Type | Sample |
|---------------------|--------|
| Single jersey | |
| Lycra Single jersey | |
| Single Lacoste | |

| | |
|-----------------------|--|
| Double Lacoste | |
| Fleece | |
| Terry | |
| Double PK | |
| (1*1) Rib | |
| (2*2) Rib | |



| | |
|----------------------|--|
| Stripe Single jersey | |
|----------------------|--|

5.20 Faults, Causes & Their remedies in knitting:

5.20.1 Hole Mark

Causes:

- Holes are the results of yarn breakage or yarn cracks.
- During loop formation the yarn breaks in the rejoin of the needle hook.
- If the yarn count is not correct on regarding structure, gauge, course and density.
- Badly knot or splicing.
- Yarn feeder badly set.

Remedies:

- Yarn strength must be sufficient to withstand the stretch as well as uniform.
- Use proper count of yarn.
- Correctly set of yarn feeder.
- Knot should be given properly.

5.20.2 Needle Mark

Causes:

- When a needle breaks down then needle mark comes along the fabrics.
- If a needle or needle hook is slightly bends then needle mark comes on the fabrics.

Remedies:

- Needle should be straight as well as from broken latch.

5.20.3 Sinker Mark

Causes:

- When sinker corrodes due to abrasion then sometimes it can't hold a new loop as a result sinker mark comes.
- If sinker head bend then sinker mark comes.

Remedies:

- Sinker should be changed.

5.20.4 Star

Causes:

- Yarn tension variation during production.
- Buckling of the needle latch.
- Low G.S.M fabric production.



Remedies:

- Maintain same yarn tension during production.
- Use good conditioned needles.

5.20.5 Drop Stitches

Causes:

- Defective needle.
- If yarn is not properly fed during loop formation i.e. not properly laid on to the needle hook.
- Take-down mechanism too loose.
- Insufficient yarn tension.
- Badly set yarn feeder.

Remedies:

- Needle should be straight & well.
- Proper feeding of yarn during loop formation.
- Correct take up of the fabric & correct fabric tension.
- Yarn tension should be properly.

5.20.6 Oil stain

Causes:

- When oil lick through the needle trick then it pass on the fabrics and make a line.

Remedies:

- Ensure that oil does not pass on the fabrics.
- Well maintenance as well as proper oiling.

5.20.7 Rust stain

Causes:

- If any rust on the machine parts.

Remedies:

- If any rust on the machine parts then clean it.
- Proper maintenance as well as proper oiling.

5.20.8 Pin hole

Causes:

- Due to break down or bend of the latch, pin hole may come in the fabric.

Remedies:

- Change the needle

5.20.9 Grease stain

Causes:

- Improper greasing
- Excess greasing



Remedies:

- Proper greasing as well as proper maintenance

5.20.10 Cloth fall- out

Causes:

- Cloth fall- out can occur after a drop stitch especially when an empty needle with an empty needle with closed latch runs into the yarn feeder and remove the yarn out of the hook of the following needles.

Remedies:

- Make sure all the latches of needle are closed with feeding yarn after a drop stitch.

5.20.11 Barriness:

A fault in weft knitted fabric appearing as light or dark course wise (width wise) Stripe.

Causes:

- This fault comes from yarn fault.
- If different micro near value of fiber content in yarn.
- Different luster dye affinity of fiber content in yarn.
- During spinning different similar classes of fiber is mixed specially in carded yarn & these fibers have similar characteristics.
- In draw fame different similar classes sliver is mixed and make one sliver.

Remedies:

- We can use this fabric in white color.

5.20.12 Foreign yarn contamination:

Causes:

- In knitting section too much lint is flying to and fro that are created from yarn due to low twist as well as yarn friction. This lint may adhere or attaches to the fabric surface tightly during knit fabric production.

Remedies:

- Blowing air for cleaning and different parts after a certain period of time.
- By cleaning the floor continuously.
- By using ducting system for cleaning too much lint in the floor.

5.20.13 Yarn contamination:

Causes:

- If yarn contains foreign fiber then it remains in the fabric even after finishing,
- If lot, count mixing occurs.

Remedies:

- By avoiding lot, count mixing.
- Fault less spinning.

5.20.14 Yarn Faults:

- Neps.
- Slubs.
- Yarn count variations.
- Thick/Thin place in yarn.
- Hairiness.

5.21 Different types of knitting faults:

| Fault Name | Sample |
|--------------------|--------|
| Hole | |
| Pin Hole | |
| Drop Stitch | |
| Lycra out | |
| Oil line | |



| | |
|--------------------|--|
| Needle mark | |
| Star mark | |

Chapter: 6
MAITENANCE



Maintenance Section

6.0 Maintenance:

Maintenance is a procedure by which we can maintain active functioning in operation according to the behavior and utility of a particular element. In engineering, we use this terminology for maintaining smooth and uninterrupted performance of machines, tools and metallurgical characteristics in practical uses.

6.1 Objective of maintenance:

- * To keep the factory plants, equipment, machine tools in an optimum working condition.
- * To ensure specified accuracy to product and time schedule of delivery to customer.
- * To keep the downtime of machines to the minimum thus to have control over the production program.
- * To keep the production cycle within the stipulated range.
- * To modify the machine tools to meet the need for production.

6.2 Three types of maintenance are performed in Turag Group.

1. Preventive Maintenance.
2. Routine/ Schedule Maintenance.
3. Breakdown Maintenance.

6.2.1 Preventive Maintenance: Actions performed periodically (or continuously) prior to functional failure to achieve the desired level of safety and reliability for an item. These actions are performed to prevent or reduce consequences of failures.

6.2.2 Schedule maintenance: It is time-based maintenance and pre-planned to perform on machine and equipment. This plan usually made on monthly basis.

6.2.3 Breakdown maintenance: In this type of maintenance when the machine remains stop that time the maintenance is done.

6.3 Maintenance Tools, Equipment & their functions:

| Name of Tools | Function |
|---------------|---|
| Hammer | To give shape |
| Slide Wrench | Tightening and opening bolt |
| Spanner | Tightening and opening bolt |
| Pliers | Cutting, Holding, Joining, wire, Gripping |
| Hacksaw | Cutting |
| Pipe Wrench | Tightening, opening, gripping pipe |
| Chisel | Shaping, Cutting |
| File | Shaping |
| Clamp | Gripping |



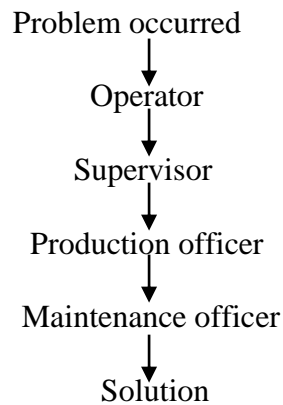
| Name of Equipment | Function |
|-------------------|-------------------|
| Grinding m/c | Grinding |
| Cutting m/c | Cutting |
| Drill m/c | Drilling |
| Shaping m/c | Shaping |
| Lathe m/c | To make something |
| Bending m/c | Bending |

6.4 Maintenance Procedure:

Preventive Maintenance: They always follow preventive maintenance.

Breakdown Maintenance: When a problem occurred the operator informed the supervisor, then the supervisor informed the production officer, then the production officer called the maintenance officer. The maintenance officer visits the problem and takes necessary steps to solve the problem.

6.5 Flow chart of maintenance:



6.6 Remarks:

Their maintenance procedure is very good & effective as a result they have a good efficiency.



Chapter: 7
UTILITY



7.1 Utility facilities available:

The following utility facilities are available in Turag group.

- Gas
- Electricity
- Water
- Steam
- Compressed Air

7.2 Generator house

7.3 The list of machine:

1. Generator
2. Panel
3. Distribution Board
4. Generator Control Panel

1. Generator:

To generate the power (volts & amps) for every section in the factory.

2. Panel:

To store the power (volts & amps) from the generator for every section in the factory.

There are two types of panel:

- PFI (Power Factor Improvement) panel
- LT panel

PFI panel:

To store the power (volts & amps) from the generator for the boiler house, finishing section & dyeing section in the factory. Supply AC current 4 Amps & 400 volts.

LT panel:

To store the power (volts & amps) from the generator for the boiler house, finishing section & dyeing section in the factory. According there need. Supply AC current 4 Amps & 400 volts.

3. Distribution:

To supply the power (volts & amps) for the light, AC, fan etc. in the different section. Supply AC current 4 Amps & 400 volts.

4. Generator control panel: To control the generator for generate power.

7.4 Source of utility:

| | | |
|----------------|---|-----------------|
| Electricity | : | PDB & Generator |
| Gas | : | TITAS |
| Water | : | Pumps |
| Compressed air | : | compressor |
| Steam | : | Boiler |

7.5 Pictures of utility section:



Fig: Boiler (Revothem)



Fig: Steam Delivery Chamber

Chapter: 8
CONCLUSION



Conclusion

8.1 Conclusion:

There is large difference between the theoretical knowledge and practical experiences. This is truer in case of the study of Textile Engineering. Industrial attachment or, Industrial training is an essential part for textile education because it minimizes the gap between theoretical and practical knowledge. This Industrial training increases our knowledge though a lot about textile engineering. It also helps us to know a lot about industrial production process, machineries, and industrial management and made us suitable for industrial life. Besides it gives us the first opportunity to work in industry. So we can say industrial attachment prepare us for the expected destiny of practical life.

We have completed our industrial attachment from **Turag Garments & Hosiery Mills Ltd** during our two-month long industrial training at **Turag Garments & Hosiery Mills LTD**. We got the impression that this factory is one of the modern export oriented composite knit garments industry of our country. This factory does not compromise in case of quality. So, they have established on-line and off-line quality control of each product. Besides, they also use the good quality yarn, dyes and chemicals in their production process. Due to this, it has earned a “very good reputation” in foreign market for its quality product over many other export oriented textile mills. It has very well educated and technically experienced manpower to get rid of any defect in production process. It has also a good organizational hierarchy.

8.2 Limitations of the Report:

- ✘ Because of secrecy act, the data on costing and marketing activities have not been supplied.
- ✘ We had a very limited time. In spite of our willing to study more it was not possible to do so.
- ✘ Some points in different chapters are not included as these were not available.
- ✘ It is not possible to hold the whole thing of a textile industry in such a small frame as this report. So, try our hard to summarize all the information that we are provided.

Lastly, we are lucky enough that we have got an opportunity to get industrial training at Turag Garments & Hosiery Mills LTD. We received enough co-operation and support from the authority and all the personnel of knitting sections. Here, all the officers and the stuffs are very cordial and very much devoted to their duties, which is also learning for us.