



Faculty of Engineering

Department of Textile Engineering

REPORT ON

Industrial Attachment

At

Meghna Knit Composite Ltd.

Gilarchala, Sreepur, Gazipur

Course Title: Industrial Attachment

Course Code: TE-431

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This Report Presented in Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science in Textile Engineering.

Advance in Apparel Manufacturing Technology

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INDUSTRAIL TRAINING REPORT 2022



Meghna Knit Composite Ltd.

Gilarchala, Sreepur, Gazipur, Bangladesh

Declaration

We sincerely declare that:

This Industrial Attachment has been done by us, We also declare that neither this Industrial Attachment nor any part of this Industrial Attachment has been submitted elsewhere for award of any degree or diploma.

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Faculty of Engineering
Department Of Textile Engineering
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Approval Sheet

This Industrial Report entitled "**Report on Industrial Attachment At Meghna Knit Composite LTD**" At Daffodil International University in December, 2022 prepared and submitted by Md. Muzaffor Ahmed, Muhit Limoon and Md. Abu Raihan In partial fulfillment of the requirement for the degree of BACHELOR OF SCIENCE IN TEXTILE ENGINEERING has been examined and hereby recommended for approval and acceptance.

Supervisor

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Dedication

At first we want to dedicate this Industrial Training report to almighty Allah for giving us a better opportunity to prove ourselves. Without his help nothing is possible.

We also dedicate this report to **Md. Mominur Rahman**, Assistant Professor (Head in charge) of Daffodil International University who helps us to complete this report.

And our parents who give us chance to study in Textile Engineering and support us all time.

Specially dedicate this report to **Md. Muzaffor Ahmed** Deputy Marketing & Merchanding Manager of Meghna Knit Composite Ltd. And all the people who have helped us in the Meghna Knit Composite Ltd. To complete this report.

Acknowledgement

At first our gratefulness goes to Almighty Allah to give us strength and ability to complete our two months long industrial training and this report.

Now we wish to take this opportunity to thank a lot of people who have assisted and inspired us in completion of our training period.

Md. Mominur Rahman, Assistant Professor (Head in charge) of Daffodil International University our supervisor, to whom we are extremely indebted for his tremendous support and guidance throughout our training period. Being working with him we have not only earned valuable knowledge but also inspired by his innovativeness which helped enrich our experience to greater extent. His idea and way of working was truly remarkable.

We are also expressing our gratitude to Prof. **Dr. Mominur Rahman** Head, Department of Textile Engineering, for his support and continuous guidance throughout our long journey in Daffodil International University and industrial training.

We should like thank the management of Meghna Knit Composite Ltd, for giving us opportunity to do the industrial training successfully and also their valuable suggestions.

It's a great pleasure to express our satisfaction to The Meghna Knit Composite Ltd. Authority for their sincere and cordial co-operation and we are very much indebted to **Md. Muzaffor Ahmed** Deputy Marketing & Merchandising Manager, for his association in completion of our training successfully. Our training would never been completed without his convenient helps and supports.

Finally, we must acknowledge our Parents with due respect for their constant support, patients and believe on our ability which drives us in the successful completion of this report.

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1. Executive Summary

This report is titled ‘**Report on Industrial Attachment at Meghna Knit Composite Ltd**’. By achieving practical knowledge from the industrial attachment, it is possible to apply the theoretical knowledge in the technical field. For any technical education, practical experience is almost equally necessary in association with the theoretical knowledge. The industrial attachment is the most effective process of achieving the practical experiences. It provides us sufficient practical knowledge about Production Management, Productivity, Evaluation, Work Study, Efficiency, Industrial Management, Production Planning & Controlling, Utilities and Maintenance of Machineries and their Operation Techniques etc. Meghna Knit Composite Ltd is a modern textile industry based on knit garments production. Our approach was to know and work with all the parameters of each section and practice with technical experts. As our academic advance study was in Garment Manufacturing Technology our emphasis was in understanding and learning of Weaving. Industrial attachment is an essential part of four years B.Sc. in Textile Engineering course of Daffodil International University. We had the opportunity to perform the industrial attachment with Meghna Knit Composite Ltd. During 2 Months long attachment, we studied the Man, Machine, Material and Planning, Grey Fabric Inspection, Finished Fabric Inspection, According to our studies in the whole chain of the factory we have prepared the following report and would like to present as our internship report. B.Sc. in Textile Engineering is the combination of theoretical knowledge and the practical experiences. The main objective of this training is to comprehend our theoretical knowledge along with the practical knowledge. It also enabled us to orient ourselves with the practical environment which is our place of future work.

2. Information about 2. Information about factory

2.1 Introduction:

Meghna knit composite Ltd. instigated its journey in the last quarter of 2006, with a vision of becoming the most recognized knitwear manufacturer of the country as well as to make the widely known reputation of bangladesh as a global clothing leader to a new height by offering the best blend of quality and efficiency. Meghnaknit composite Ltd (MKCL) is equipped with the most advanced textile technology from the US, Europe, Hong Kong, and Japan. We have not only ensured the best ever technology but also a band of highly skilled, professionally dedicated industrial manpower and management team to excel in tune with our technology. This built-in composition is to ensure quality in producing levit textiles for onward manufacturing of ready-to-wear knit garments and knit fabrics-all under one roof.

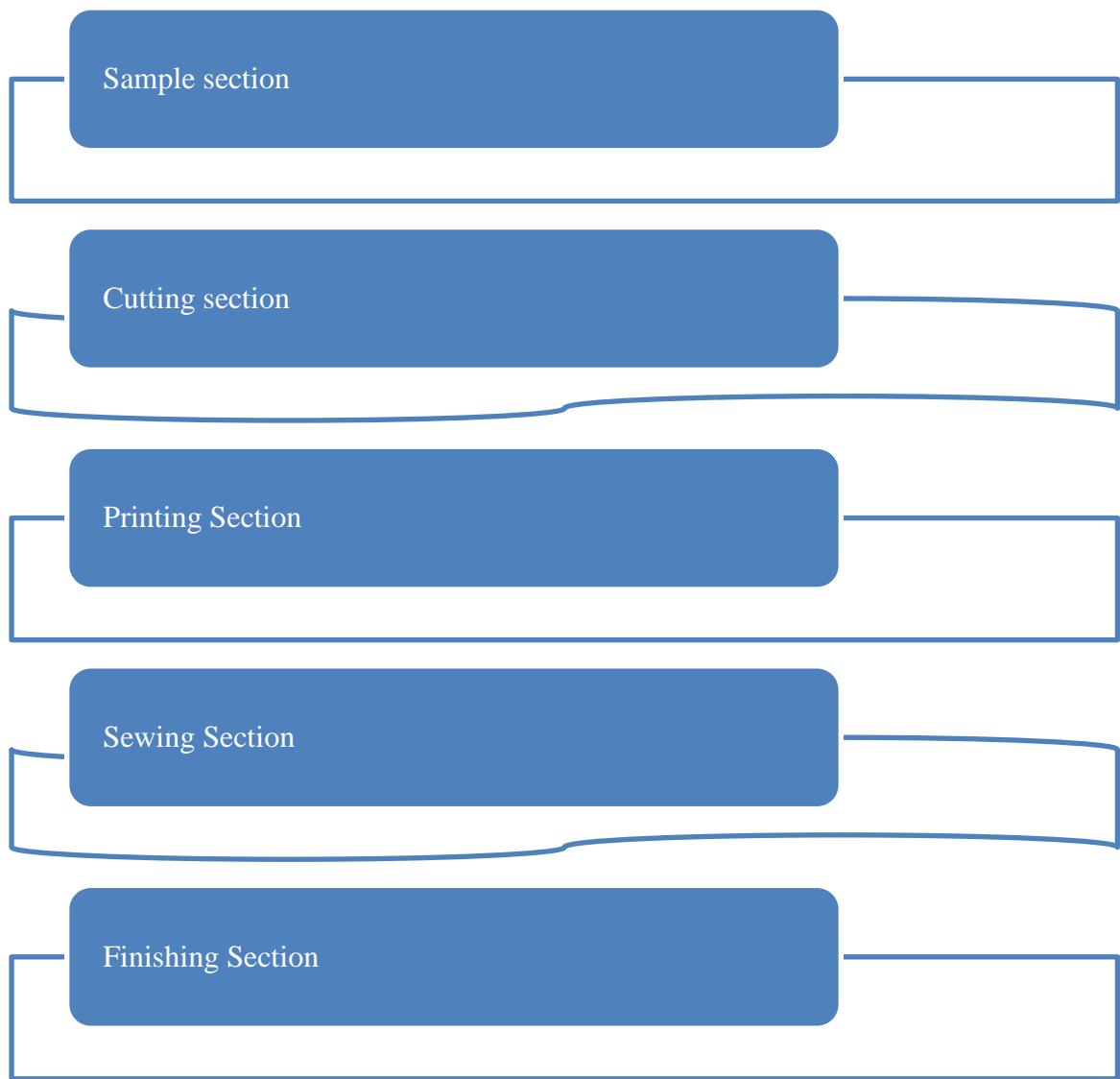
2.2 Positioning:

Focusing solely in knitwear apparel lines, MKCL has adopted a structure by reengineering its value chain to deliver high quality products in shorter lead time with flexibility in order size. Moreover, having endless efforts to ensure internationally accepted employment practice, our clients recognize us as a partner to protect their value system and images among final consumer.

2.3. General information about factory

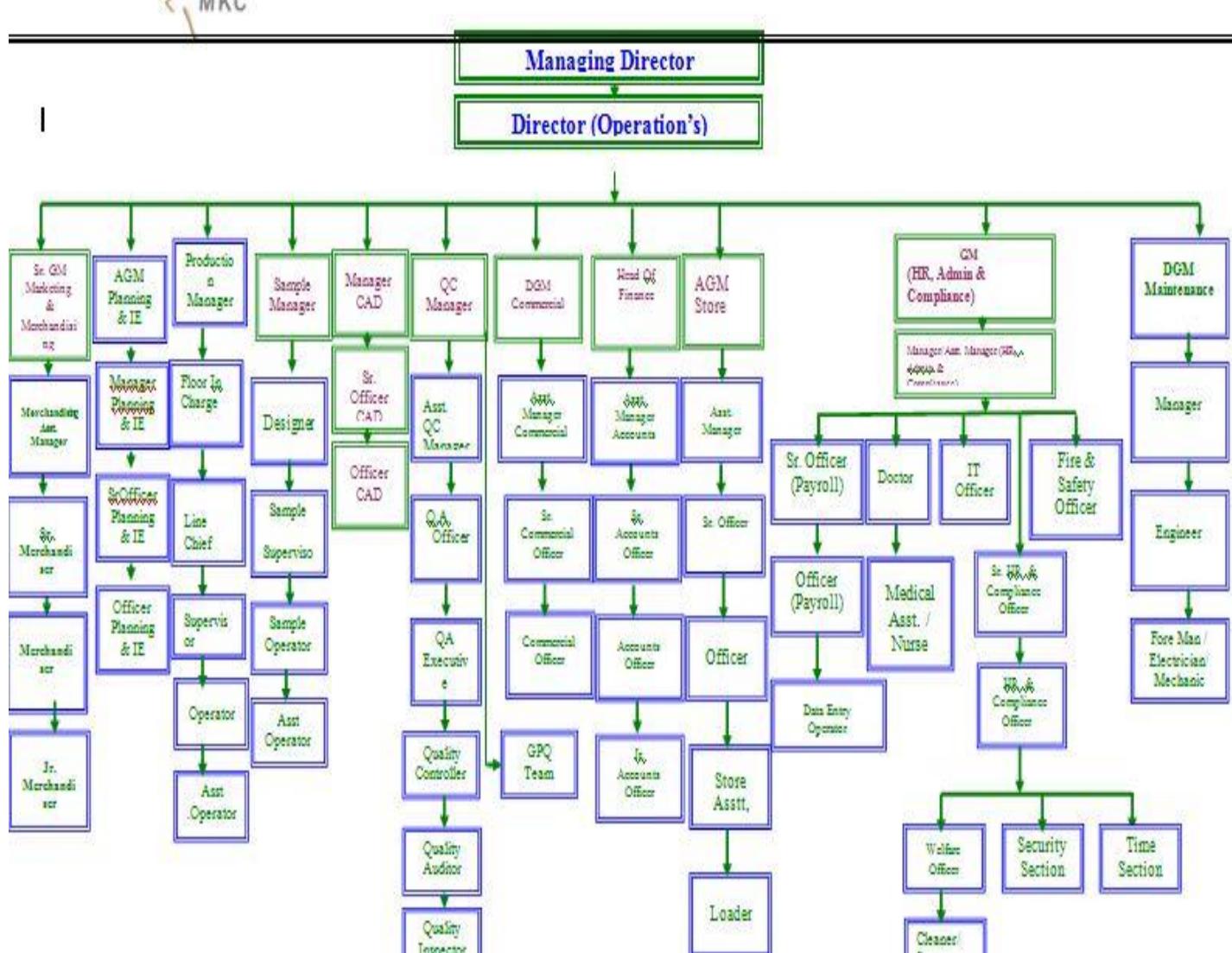
Company Name	Meghna knit Composite Ltd.
Legal Status	Private Limited Company
BKMEA Membership Number	834
Membership Type	Ordinary Member
Year of Establishment	2006
Head office address	House.49,Sharwardy Avenue Block-k,Gulsan-Baridara Dhaka-1212 Phone : +880-2-9854591-6, Fax : +880-2-9854597 E-mail : info@meghnagroup-bd.com Web : www.meghnagroup-bd.com
Factory Address	Gilarchala, Sreepur, Gazipur, Bangladesh
Factory Area	3,50,000 sq. ft.
Name of the Banker	1) Prime Bank Limited. Principal Branch. 82, Motijheel Commercial Area, Dhaka-1000, Bangladesh. 2) United Commercial Bank Ltd. Principal Branch. 58, Motijheel C/A, Dhaka-1000, Bangladesh.
Nature of Business	Completely 100% export oriented knitwear manufacturing & exporting Industry. Also have the permission to import materials related with export
Contact Person	M Moklasur Rahman pinto - Managing Director Mohammad Monjur Hasan – Director (Marketing & Business Development)
Manpower	3070
Machinery setup	Complete sewing & stitching setup for 32-lines. Complete setup for producing 6.00 MT knit fabrics (finish) per day. Computerized Embroidery setup for own garments production. Complete Screen Printing setup with latest curing machine for own production.
Export Market	UK, USA, Central Europe, Spain, Sweden
Product wise capacity	High Fancy/Polo shirt = 2.40 Million Pcs. (Annually) Basic knit/T-shirt & others = 6.00 Million
Annual Export Turnover	USD 40.00 million

2.4. Layout



2.5. Organogram

MEGHNA KNIT COMPOSITE LTD.



2.6. Sister Concerns

Meghna group's concerns.....

- **BI CYCLE DIVISION**

Meghna are the largest in Bangladesh exporting bicycles to Europe.

- Transworld Bicycle Co. Ltd.
- Uniglory Cycle Industries Ltd.
- M&U Cycles Ltd.

- **BI CYCLE COMPONENTS**

Meghna have 5 bi cycle components of factories.

- Uniglory Cycle components Ltd.
- Meghna Rubber Industries Ltd.
- Abrar Steels Ltd.
- Uniglory Wheels Ltd.
- Meghna Bearing Ltd.

- **AUTOMOBILE DIVISION**

Meghna represent two car brands.

- Executive Motors (BMW)
- Meghna Automobiles Ltd. (KIA)

- **CEMENT INDUSTRY**

- Producing Elephant brand White Cement under the license from Siam Group of Thailand. A joint venture with Siam Group.

- **MEGHNA MAINETTI LTD.**

- Joint venture project with Mainetti of Italy producing hangers for export oriented garment industry of Bangladesh.

- **UNIGLORY PACKING LTD.**

- Automated corrugated carton manufacturing unit.

- **BETA PACKAGING LTD.**

- Automated corrugated carton manufacturing unit.

- **M&U PACKAGING LTD.**
 - Poly bag & carton manufacturing unit
- **CYCLE LIFE**
 - Sole distributor of Raleigh bikes from UK and Phoenix Bickes of China in Bangladesh.
- **EXECUTIVE MACHINES**
 - Sole agent of Apple computers
- **EXECUTIVE TECHNOLOGIES**
 - Sole agent of Acer computers from Taiwan.

2.7. Product mix

- ❖ Men/Ladies/Girls/Boys/Infants Knitted Fancy T-shirt
- ❖ Polo Shirt
- ❖ Long pant
- ❖ Short pant
- ❖ Sweater
- ❖ Skirts
- ❖ Trouser
- ❖ Tank Dress with quality prints
- ❖ Hand works
- ❖ Embroidery etc.

2.8. Brief profile (numbers of worker, area, total machineries, etc)

Total Manpower Summary

Section	No of Manpower
Accounts Section	03
Management & stuff	03
HR & Admin, Compliance	23
Marketing & Merchandising	28
Production Stuff	73
Work study	18
Knitting Section	147
Batch Section	53
Dyeing Lab	18
Dyeing Section	82
Dyeing quality & R&D	44
Finishing Section (Dyeing)	135
Cutting Section	159
Sample Section	37
Sewing Section	928
Sewing helper	248
Input man	30
Finishing Section	353
Quality (garments)	346
Store (Garments & Textile)	112
Embroidery section	52
Maintenance	44
Medical	4
IT	2
Driver	13
Security	38
House keeper	76
Total	=3070

Machinery list:

Cutting section

1. Fabric Inspection machine	3	Thailand
2. Fabric spreader machine	5	China
3. Fabric cutter machine (Auto)	2	France
4. Band knife	1	China
5. Hand knife/Straight knife	5	Japan

Sewing Section

6. Plain machine	420	Japan, China
7. Over lock machine	345	Japan, China
8. Flat lock machine	193	Japan, China
9. Button Hole machine	10	Japan
10. Button Stitch machine	10	Japan
11. Bar-take machine	6	Japan
12. Feed off the Arm Hole machine	26	Japan
13. Multi thread chain stitch machine	3	Japan
14. Rib cutter machine	8	
15. Thread cutter	31	

Finishing Section

16. Thread sucker machine	6	China
17. Metal detector machine	2	China
18. Iron	80	
19. Electric Boiler	5	

Printing Section

20. Auto printing machine	3	Europe
21. Curing machine(gas, Stream)	2	Poland
22. Heat press machine	3	Local
23. Dryer	2	Local

Embroidery Section

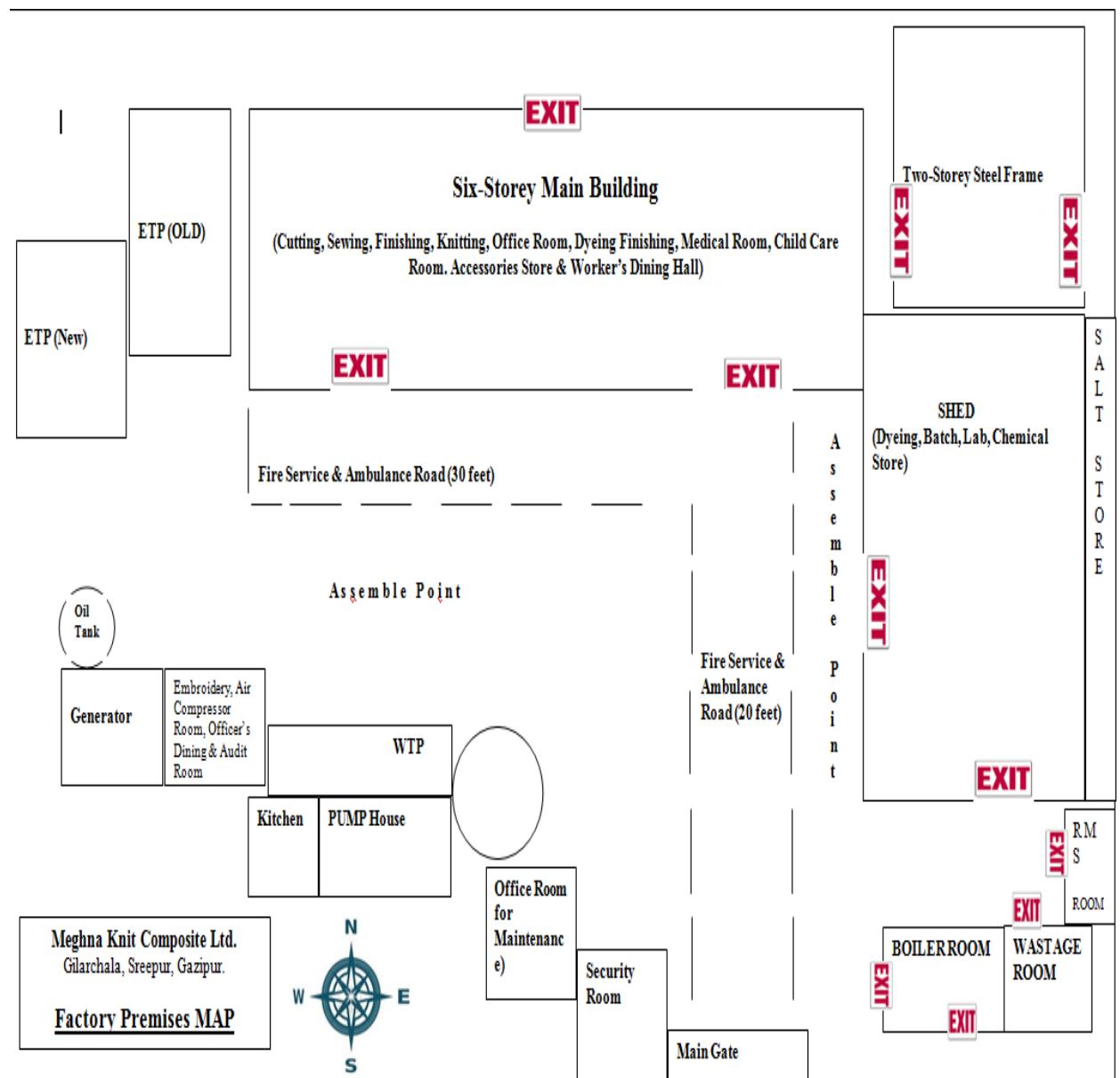
24. Embroidery machine with 20 head	5	Korea
25. Embroidery machine with 20 head	1	Korea

Utilities

26. Gas Generator (1030 KW)	1	USA
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27. Diesel Generator (800 KW)	1	USA
28. Diesel Generator (500KW)	1	USA
29. Boiler (7.8 ton)	1	USA
30. Air Compressor	1	Korea
31. Water pump	1	Local
32. Sub station	1	Local

2.9. Plant Layout



2.10. Major buyers with their Logo

Buyer Name	Major Markets	Logo
H&M	Sweeden	
M&S	UK	
Next	UK	
Mayoral	Spain	
Tesco	UK	
Cubus	UK	
Perry Ellis	UK	
Gymboree	USA	
P&C	Germany	
Dressmann	Norway	
Decathlon	France	

2.11. Mission and Vision of Meghna

From 2006 till now, Meghna Group always expands itself. Meghna group offers a proficient production facility, even for smaller volume orders which attached an overall efficiency to serve both volume customers as well as upper class buyers. Meghna's products export in different countries such as Japan, Italy, France, Sweden, Norway, Finland, UK & Canada. Our production management is **ISO 9001:2000** certified and our fabrics quality is **Oeko-Tex** certified. Day-by day our production has been increased along with our experience. We always give priority to hard work perseverance, which bring us today in this admirable and viable position.

- Ultimate satisfaction through providing on-time delivery with correct Quality Products & Services.
- Excellent working environment in compliance with national & international rules.
- Building a strong relationship.
- Reaching the highest level.

Vision:

The main vision of Meghna Group is to provide the best service with quality product. With a slogan of 'From yarn to the ultimate garments' Falcon is developing step by step through its honesty, integrity and hard work. Till-to-date, the top management intensively supervises & keeps in touch with the production, merchandising & sourcing, which often comes handy for our buyers. The communication with buyers is strongly maintained by us that develop as bond of reliance.

3. Description of the Attachment

3. Description of the Attachment

3.1 Sample Section

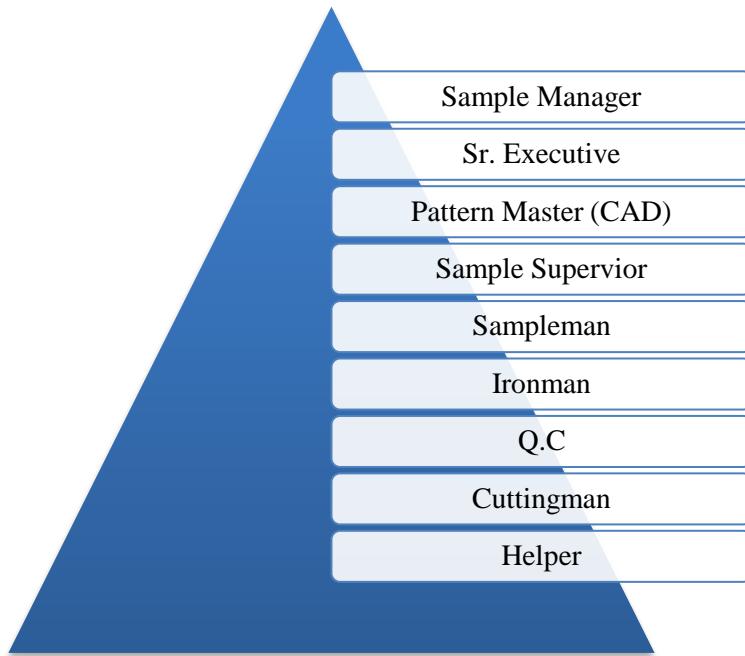
In garments industry, the sample which is come from buyer and it is followed for bulk production called sample. Garment samples are inevitably important and are developed tested before starting the bulk production. It means making a sample of the garment /fabric which requires to be sold. Sampling is one of the main processes in Garment Industry and it has a vital role in attracting buyers. Because the buyers generally places the order after they are satisfied with the quality of the samples.



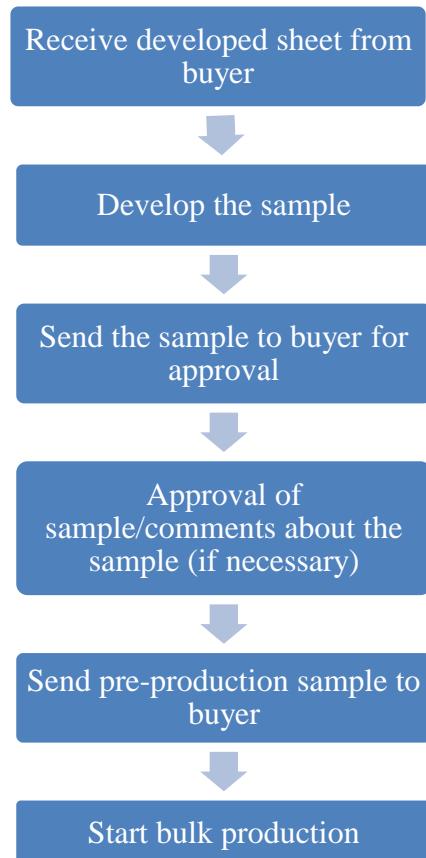
3.1.1 Layout



3.1.2 Organogram



3.1.3. Flow sequence of sample section



3.1.4. Types of Sample produce

1. Design development:

- This is the first sample which is made for any style by most of the buyer.
- Design development is either done by buyer or factory
- The main purpose is to take the decision to proceed with the same line or not.

2. Proto sample:

- Proto sample is developed at very initial stage and normally order is confirmed to the factory based on proto sample only.
- Normally, buyer send proto sample request to 2-3 factories.
- The factory which submits the good quality and optimum price will get confirmation from buyer.
- Proto sample are normally prepared in similar fabric if actual fabric is not available.
- Substitute Trims can be used on proto.
- As proto sample is given first time to the factory to buyer, so to develop the proto sample buyer need to provide necessary information along with the proto request. These are: Specification Sheet (Tech Pack), Bill of Material, Development sample (optional), Paper patterns (optional), Sample of novelty trims, Sample of fabric yardage (it may be send by buyer or asked to develop), Details of Print or Embroidery, if any.
- Generally proto request is responded within the 7-10 days by merchandiser.
- Factory need to submit at least 4 proto samples (quantity may change buyer to buyer)
- If buyer does not approve the proto sample, factory needs to submit the 2nd proto sample to get approval.
- Once proto get approved buyer asks to start working on fit sample.

3. Fit sample

- Fit sample is made and send to conform the fit of the garment on live models or on dummy and for approval of construction details.

At this stage of sampling, buyer makes sure that factory understands thoroughly the construction and quality details and standards .The sample sent mostly in medium and large sizes mentioned by the buyer.

- The fabric used for fit sample production is the actual fabric which is going to be used for bulk production or sample yardage fabric is used.

4. Ad or photo shoot sample:

- In order to promote the new style in the market normally buyer asks for AD sample for photo shoot.
- Buyer uses this photo for marketing purpose either on catalogue or various media like, print, TV or websites to see the response of the consumer.
- This sample mainly sends in medium to large or sizes specified by buyer.

5. Sales man / Marketing /Showroom sample:

- The main purpose of salesman sample is to collect the order from the retailers.
- In Sales man sample actual accessories, actual fabric is used.
- The quality of the sample should be up to the mark of the buyer; hence merchandiser should aware and make sure that product development team is well aware about the sample quality parameters.

- The cost of sample production is given by buyer.

6. Size set sample / Back seal Sample:

- The main purpose of size set sample is to check the factory's capability to make the sample in all sizes.
- The size set sample should be made in the actual fabric and trims.
- The samples can be made in the sampling room or actual production floor, as required by the buyer.
- Bulk cutting of fabric for production should start only after size-set sample get approved.
- Normally, 1-2 samples (or quantity specified by buyer) of each size need to send to buyer.

- If sizes are more in number then buyer may ask to skip some sizes, called jump size set sample.

7. GPT sample (Garment Performance Test):

- The main purpose of GPT is to perform the physical and chemical testing on garment to ensure the performance of the garment.
- The tests done on garments are: Shrinkage, Color Fastness, Seam performance etc.
- Garments for GPT sample can be done along with Size Set sample.
- Normally, GPT Sample is sent to 3rd party inspection and results are sent to both factory as well as buyer.
- If same style is having 3-4 different colours then only one color sample is tested completely and other colours samples are tested only with colour way test i.e. only colour fastness tests are conducted.

8. Pre- production sample: (PP sample)

- PP sample is considered to be a contract between the buyer and the factory.
- It has to be made in original fabric and trims.
- Washing, embroidery and printing should match to actual.
- PP Sample is the standard for production and bulk production garments should be identical to PP sample.
- The factory can start the production of bulk garment only after the approval of preproduction sample.
- PP sample sends in only one size 1-2 samples or specified by buyer.

9. Wash sample:

- Wash sample is made and submitted to buyer for assessment of feel and handle of fabric after washing of Denim or shirt washing program, hence either at size set stage or PP stage washing sample is sent to buyer for approval and carry forward of washing program.
- If sample is not approved or approved with comments, factory needs to submit 2nd sample to get approval.
- After feel assessment buyer may suggest the changes in washing program.

10. TOP sample (Top of Production):

- The top of production is sent to the buyer as soon initial pieces are come out of sewing line with suggestion of QA department.
- In TOP sample Buyer tries to evaluate the actual manufacturing of the style.
- Buyer check whether bulk production is as per submitted sample or not.
- TOP sample also checked by the buyer for the packaging.

11. Shipment sample:

- Few buyers may ask for the shipment samples which factory needs to pull form the actual shipment and sent to buyer.
- The main purpose of this sample is to assure buyer about the actual shipment dispatch.

3.2. CAD Section

- In CAD section at first the pattern put on the digitizer to take clear image of the pattern part inside the CPU.
- After making all required size patterns using the software pattern parts are aligned in the mini marker. Then it is sent to CPU of CAM section for approval and checking the length & width of marker and pattern parts alignment.
- After getting approval from CAM section then Printer is used to print out the whole real marker then this marker as well as min marker is provided to the CAM section for cutting the fabric.

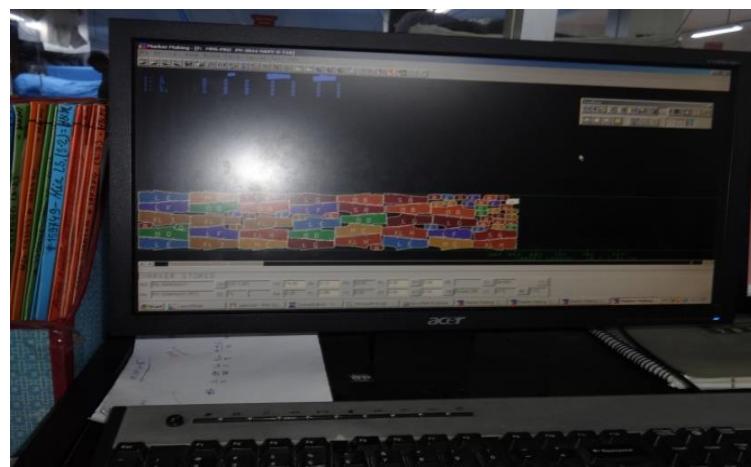


Fig: CAD Section

3.2.1 Working sequence of CAD section

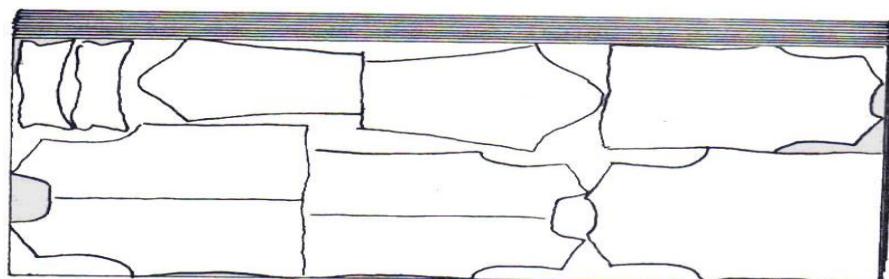
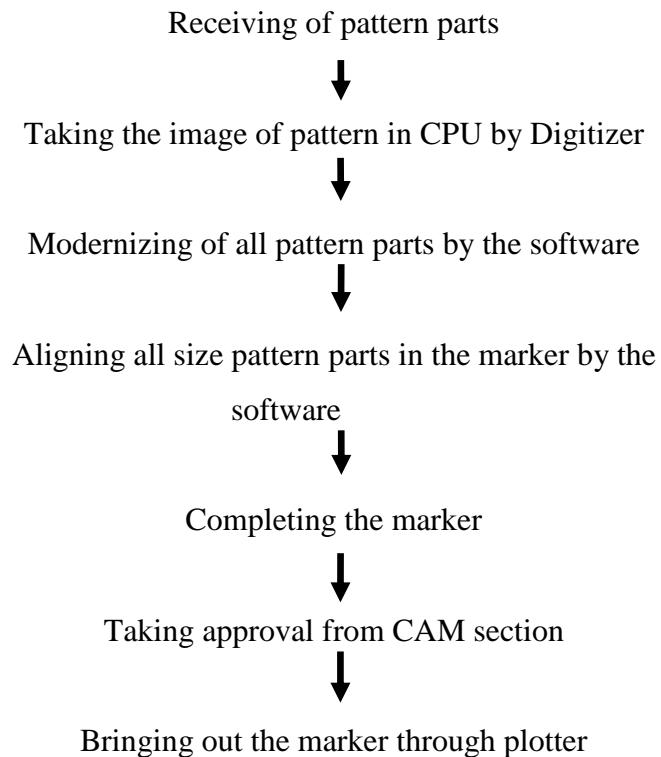


Fig: Computerized Marker Making

3.2.2 Pattern making

After receiving an order in most cases buyer gives them a complete pattern and they make sample according to given pattern. But in some cases they prepare the pattern by own when buyer don not give any pattern.

3.3 Cutting Section

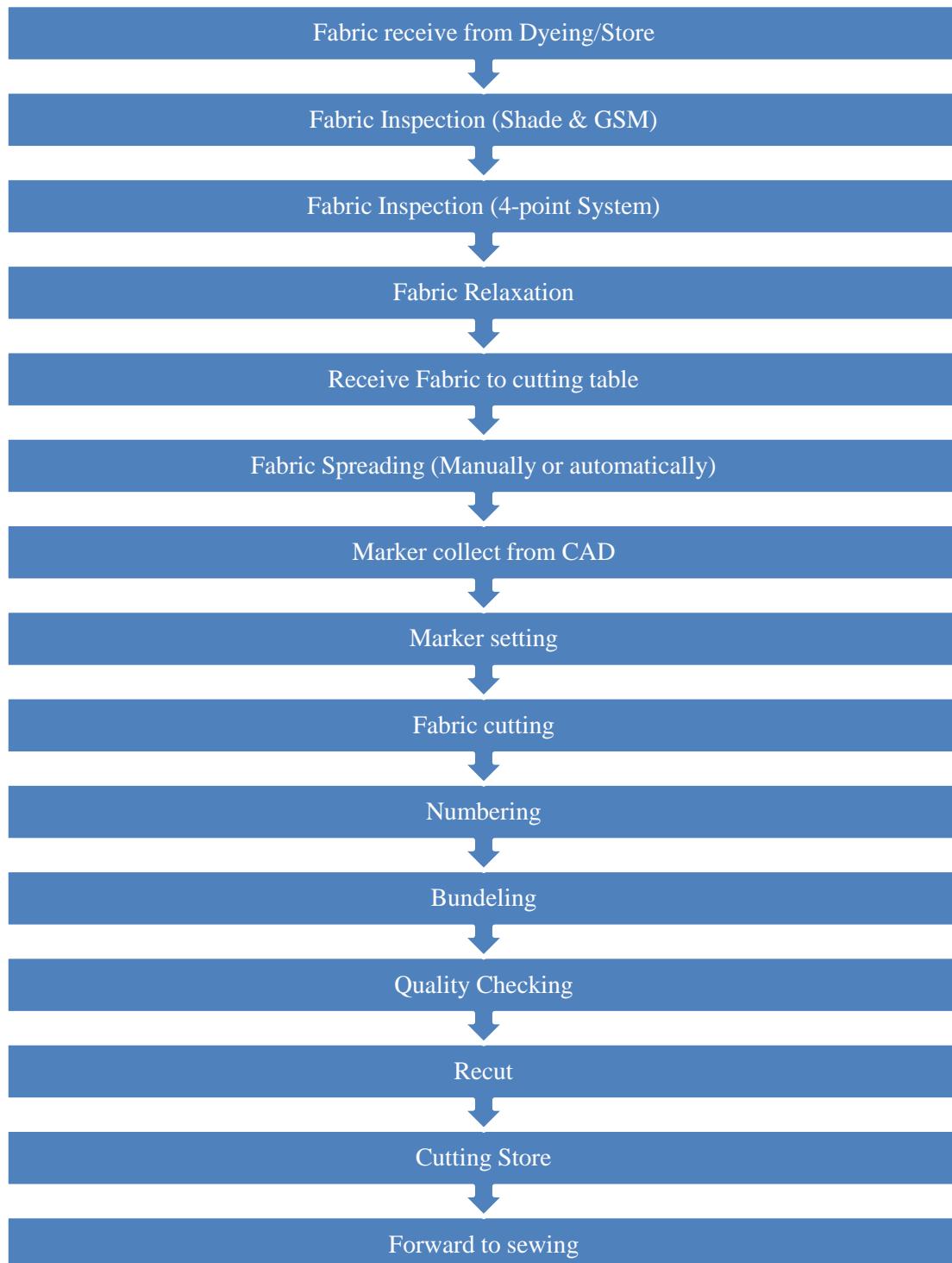
The definition of cutting is very complex. In garments industries fabric is cut from lay and spreading with accuracy and properly which is termed as fabric cutting. Marker outline is used to cut the fabric. Fabric cutting is very important as if something is cut in wrong way, cannot be rectified.



3.3.1 Layout



3.3.2 Process Sequence of Cutting Section



3.3.3 Fabric inspection



Fig: 4 – point system inspection



Fig: GSM inspection

3.3.4 Fabric Relaxation



➤ **Fabric Relaxation time**

Types of Fabric	Relaxation time
100% Cotton single jersey, pique, 1x1 Rib, Interlock	24 hours
Lycra single jersey, Lycra pique, Lycra Rib, Lycra Interlock	36 hours
Any kind of viscose	36 hours
Terry , Fleece	12 hours
Polyester fabric	36 hours

3.3.5 Fabric Spreading

Spreading means the smooth laying out of the fabric in superimposed layers of specific length. The cutting marker paper is laid in the top of the fabric layer. During spreading number of the plies should be not more than three hundreds but it depends on the thickness of the fabric and the height of the cutting knife.

For example: if the thickness of the fabric is higher than the number of plies mentioned above would not valid and in case of straight knife cutting instrument the maximum lay height should be 70% of the blade height.

3.3.6 Types of Fabric Spreading

- 1) Automatic Spreading

2) Manual Spreading

Specification of Auto fabric spreading machine

- Brand name : Gerber
- Model : XLS-502400
- Origin : China
- Maximum loading : 50 kg



Fig: Auto Spreading



Fig: Manual spreading

3.3.7. Ideal Lay height

Fabric type	No. of ply	Lay height
Single jersey	90-100	3"
Rib	60-70	2.5"
Lycra	80	2.5"-3"
Viscose	70	1.5"
Fleece	55-60	3"
Pique	70-80	2.5"-3"

3.3.8. Requirements of fabric spreading

Spreading must achieve a number of specific objectives:

- ✓ Alignment of fabric plies.
- ✓ Correct ply tension.
- ✓ Elimination of fabric faults.
- ✓ Correct ply direction and adequate lay stability.
- ✓ Elimination of static electricity.
- ✓ Avoidance of fusion of plies.
- ✓ Avoidance of distortion in spread.
- ✓ Easy separation of the cut lay into bundles.
- ✓ Fabric must be flat.
- ✓ Matching checks or strips.

3.3.9. Spreading system in factory

- ❖ Manual spreader group: 3 groups.
- ❖ Gerber Spreader: 5 pcs.

3.3.10. Marker making

Marker is a thin paper which contains all the pattern pieces of a garment. It is made just before cutting and its purpose is to minimize the wastages. The width of a marker is equal to the width of the fabric and it should not be greater than the width of the fabric i.e. the width of the marker is kept less than or equal to the width of

the Fabric. The pattern pieces should be placed very carefully in such a way that it will obviously minimize wastages.

3.3.11. Objects of marker making

- To reduce cost.
- To improve the quality of the garments.
- To reduce the cutting time.
- To facilitate large scale production.

3.3.12. Types of marker making

Generally there are two methods by which marker can be made –

a. **Manual Method of Marker:**

The man performs it by himself using his hands. It is a conventional system and requires more time. Manually two types of marker are made –

1. Full size marker:

Full size marker is made for production purpose.

2. Miniature type marker:

Miniature type marker is sometime made and its purposes are to plan or schedule and learn or study i.e. for planning and learning purposes.

3. **Computerized Method:**

Now the commonly used system of marker making is computerized method. In this system, a man performs it by himself using computer software (CAD and CAM) and it requires considerably less time than manual system. Two types of marker are generally made using computerized system –

1. Full size marker:

Using Digitalizing Board the pattern pieces are input into the computer. Computer uses software and a marker paper is printed out that will be used in the production.

2. Miniature type marker:

Only for learning, practicing, and planning purposes this type of marker is printed from the computer. To get the optimum efficiency of markers as well as to minimize fabric wastage they done marker by computerized marker making system (VEITH). It has the digitizer by which the patterns are make grade and with the help of the software as well get output as marker with the plotter. The VEITH system is discussed in below.

Specification of Marker making machine

Number of machine : 02

Machine name : Cindy Inkjet Plotter machine

Brand name : Gemini Plotter

Model : PE185-2

Origin : China



Fig: Plotter machine

3.3.13. Factors considered during marker making

The important factors considered during marker making are –

1. Nature of the Fabric:

The fabric may be either symmetric or asymmetric. Thus the nature of the fabric should be considered during marker making.

2. Lay planning of patterns:

Improper lay planning of patterns may create more wastage. Thus it should be taken under consideration.

a. Alignment of the pattern pieces according to the grain line:

b. It is also another important factor that must be considered. The warp direction of a fabric is very much important for a garment and the grain line indicates the warp or wale direction.

c. Requirements of cutting:

Before placing the pattern pieces on to the marker or during marker making the cutting allowances are considered where necessary and where is not. It may produce more wastage and may reduce the dimensions of patterns.

d. Production planning:

Different types and sizes of garments manufacturing may go on at a time in an industry. So during marker making it should be considered.

e. Size of marker:

During marker making we have to think about the table size, length of the fabric, etc.

f. Marker Efficiency:

The ratio between the total areas of the pattern pieces to the total area of the marker paper is technically termed as Marker Efficiency. It is expressed in percentage. If it is denoted by the symbol η then –

Marker Efficiency (η) = (Total areas of the pattern pieces/Total area of the Marker paper) $\times 100$

3.3.14. The factors which influence the Marker Efficiency

- Manufacturers of the marker.
- Size of pattern pieces.
- Length of the marker.

- Pattern Engineering.
- Nature of the fabric.
- Method of marker making.
- Marker width.
- Kinds or design of garments

3.3.15. Marker collection from CAD section



3.3.16. Marker Setting

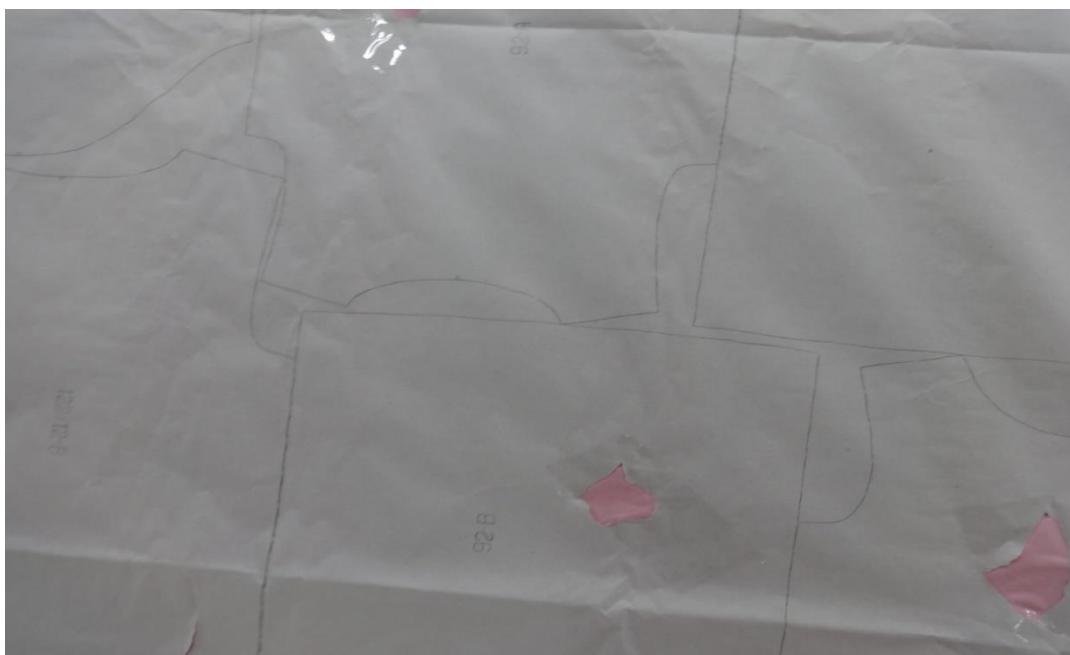


Fig: marker setting

3.3.17. Fabric Cutting



3.3.18. Methods of Fabric Cutting

Fabric cutting methods are as follows:

Manual Method:

- ✓ Scissor.
- ✓ Straight knife.
- ✓ Band knife.
- ✓ Round knife.
- ✓ Die cutting.
- ✓ Notcher.
- ✓ Drill etc.

Computerized Method:

- ✓ Straight knife cutting (GERBER Cutter).
- ✓ Water jet cutting
- ✓ Laser beam cutting, and
- ✓ Plasma torch cutting etc.

Mainly three methods of manual cutting are used in factory

- Auto cutter machine (GERBER Cutter)
- Straight knife
- Scissor

3.3.19. Different Types of Cutting Machine

- Specification of Cutting machine

Auto cutter machine

- Number of machine : 2
- Brand name : Lactra
- Model : VT-FA-Q80-88
- Origin : China



Fig: Auto cutter machine

Straight knife cutting machine

- Machine name : K.M company cloth cutting m/c
- Model : K.M KS_AUV
- Origin : JAPAN

- Type : Heavy duty industrial cloth cutting m/c self Sharpening
- Dimension : 8 inch width × 11 inch length × 24 inch height
- Weight : 33.5 lb
- Current : A.C (3.3/2.6 amps)
- Speeds : 3000/3600



Fig: Straight knife cutting machine

Machine parts of Straight knife Cutting machine

- Base plate
- Terminal block
- Plug
- Clamp washer
- Pressure foot
- Blade
- Sharpener pulley
- Pulley spring
- On/off switch

Features of Straight knife cutting machine

- ✓ Possible to cut pattern pieces directly from the fabric lays
- ✓ Could be used to cut for higher depth of fabric
- ✓ High cutting speed
- ✓ Sharp and heavy corners can be cut
- ✓ Blade could be sharpened by attaching grinding facilities.
- ✓ Blade height 10 to 33 cm.
- ✓ Blade stroke 2.5 to 4.5 cm.
- ✓ Special attachment such as sew edge or serrated edge can be provided for heavy fabric such as canvas or denim.

Advantages of straight knife

- Comparatively cheap and can be transferred easily from one place to another.
- Higher lay of height can be cut very easily.
- Round corners can be cut more precisely than even round knife.
- Production speed is very good as up to 10 heights can be cut at a time.
- Garment components can be directly separated from fabric lays.
- Fabric can be cut from any angle.

Disadvantages of straight knife

- Sometimes deflection may occur due to the weight of the motor.
- Knife deflection is high in risk, when lay height is too high Sometimes accident may happen.

3.3.20. Numbering

In this stage sticker is attached with all part of cutting part for shade matching. The sticker number maintains cutting number, size number, serial number.

Striker machine: 10 pcs.



Fig: Numbering

3.3.21. Bundling

Prepare bundling card according to fabric lay report this card maintain

- ❖ Date
- ❖ Style No
- ❖ Size Number
- ❖ Card Serial
- ❖ Quantity
- ❖ Color
- ❖ Lot Number

Feature of a bundle card

490- BE (Style No.)

C-4 (Cutting No.)

B-29 (Bundle No.)

L-29 (Large size, 29 pcs)

638-657 (20 pcs in Bundle no. 29)

FR-6985 (Front part, batch no.)

Bundling according to card no.

In this stage all number parts are bundled according to serial number.

❖ **Quality Check (Panel check)**

- Oil spot
- Dirty spot
- Crease mark
- Needle mark
- Foreign yarn
- Slub
- Contamination
- Hole

Then same numbers of sticker are matched fold & bundled.

Cutting store

After cutting all bundles are put in the input rack then send to sewing section.

3.3.22. Machine & Equipment used in cutting section

SL No.	Machine & Equipment Name
01	Straight Knife Machine
02	Bend Knife Machine
03	Auto cutter machine
04	Spreading Machine
05	Drilling Machine
06	Inkjet Printers
07	Cutting Table
08	Cutting Gloves

3.3.23. Limitation of Cutting Section

1. Input problem
2. There is may be no group for any table
3. Preparing the bundle cards by writing on a piece of fabric.
4. Check, variegated rib fabric lay quantity may be excess. As a result reject percentage may be increase.
5. Fabric spreading

3.4. Sewing Section

The process of joining of fabrics by the use of needle and sewing thread or by other techniques is called sewing.

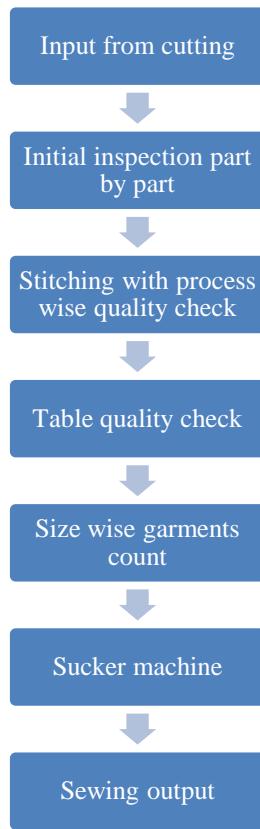


Fig: Sewing Section

3.4.1. Lay out of sewing floor



3.4.2. Flow chart of sewing section



3.4.3. Element of sewing

- ❖ Sewing thread
- ❖ Needle and
- ❖ Sewing machine

3.4.4. Sewing thread

Almost all garments produced have one component in common, the sewing thread. Whilst sewing thread is usually a relative a small percentage of the cost of garments, it has an extremely significant influence on the appearance and durability of the finished product, the production of sewing thread is an extensive and complex subject.

Sewing thread used in factory

- Cotton
- Flaming thread
- Elastic thread
- Lorex thread

3.4.5. Sewing needle

A sewing needle is long slender tool with a pointed tip. The first needles were made of bone or wood, modern ones are manufacturing from high carbon steel wire, nickel or gold plated for corrosion resistance. The highest quality embroidery needles are made of platinum. Needle size is denoted by a number on the packet. The convention for sizing is that the length and thickness of a needle increases as the size number decreases. For example, a size 1 needle will be thicker and longer, while a size 10 will be shorter and finer. The action of needle has a direct effect on seam strength and garments performances.

Function of a needle: The functions of a sewing needle are –

- To produce a hole in the material for the thread to pass through without causing any damage to material.
- To form a loop that will be picked up by the hook of bobbin case.
- To pass the needle thread through the loop formed by the looper mechanism on machines other than lock stitch.

Parts of a Sewing Needle

The different parts of a needle and their functions are mentioned below:

- **Butt**
It is the truncated conical shape at the top end of the needle which is needed to attach the needle with needle bar or clamp.
- **Shank**
Shank is the upper part of the needle which locates within the needle bar. It may be cylindrical or flat at one side.
- **Shoulder**
Shoulder is the section intermediate between the shank and the blade.
- **Blade**
It is the longest portion of the needle from the shoulder to eye. This part is responsible for the most amount of friction between needle and fabric.

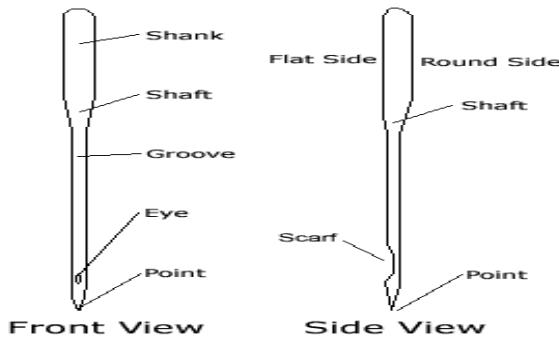


Fig: Needle parts

➤ **Long Groove**

There is a fine slot in the needle from its shoulder to eye. The needle thread remains at this slot when the needle penetrates the fabric and goes up and down.

➤ **Short Groove**

Short groove is the slot on the side of the needle towards the hook or looper. It assists in forming the loop of needle thread.

➤ **Eye**

Needle eye is a hole at the tip of the needle through which the sewing thread passes. It prevents the sewing thread from damage during sewing.

➤ **Scarf**

Scarf or clearance cut is the portion across the whole faces of the needle just above the eye. Its purpose is to enable a closer setting off the hook or looper to the needle.

➤ **Point**

It provides the best penetration of material according to its nature and the appearance that has to be produced.

➤ **Tip:** Tip is the keen extreme end of the point.

3.4.6 Sewing machine

Types of sewing machine

- ❖ Plain m/c (S/N)
- ❖ Double needle m/c (D/N)
- ❖ Over lock m/c
- ❖ Flat lock m/c

- ❖ Button hole m/c
- ❖ Button stitch m/c
- ❖ Bar-take m/c
- ❖ Feed off the Arm
- ❖ Kanshai m/c

3.4.7. Different Sewing Machine

Name of m/c : Plain machine.

Brand name : Juki.

Origin : Japan.

Model : DDL-8300SS

Needle type : DB×1

Stitch type : Lock stitch.

Motor type : servo motor.

Rpm : 400-4000

Application:

- Main label Attach
- Belt top seem stitch
- Belt joint stitch
- Loop tack stitch
- Pocket joint stitch
- Zipper joint
- Flap top stitch
- Flap joint
- Fly top stitch



- Front rise stitch

- Back rise stitch

Name of m/c: Overlock machine.

Brand name : Juki.

Origin : Japan.

Model : MO-6714S.

Needle type : DC×1, DC×11, DC×14.

Stitch type : Chain stitch.

Motor type : Servo motor.

Rpm : 400-8000.



Application:

- Edge joining.

Name of m/c: Flat lock machine.

Brand name : Pegasus.

Origin : Japan.

Model : MF-7823.,

Stitch type : chain stitch.

Motor type : clutch motor.

Rpm : 2600.



Application:

- Bottom hemming
- Sleeve hemming

➤ Zigzag stitch

➤ Loop making

Name of m/c: Button hole machine.

Brand name : Juki.

Origin : Japan.

Model : LBH-1790S

Needle type : DP×5

Stitch type : lock stitch.

Rpm : 400-8000



Application:

➤ Create button hole on the garments.

Name of m/c: Button attach machine.

Brand name : Juki.

Origin : Japan.

Model : LK-1903AN-SS.

Needle type : DP×5, DP×17.

Stitch type : lock stitch.

Rpm : 400-3600.



Application:

➤ To attached button in garment.

Name of m/c: Bar-take machine

Brand name : Juki.

Origin : Japan.
 Model : LBH-1790S.
 Needle type : DP×5.
 Stitch type : lock stitch.
 Rpm : 400-2700.
 Application:



- To created bar tack stitches in garments.

Name of m/c: Feed off the Arm

Brand name : Juki.
 Origin : Japan.
 Model : W264-01GB.
 Needle type : UY×11.
 Stitch type : Chain stitch.
 Rpm : 400-2700
 Applications:

- Back rise stitch.
- Front rise.
- Inseam stitch.
- Back yoke top seam.
- Side top seam.



Name of m/c: KANSAI (special).

Brand name : KANSAI
 Origin : Japan.

Needle : Maximum 11.

Model : FX4412P-UTC

Needle type : UO×128

Stitch type : Chain stitch.

Motor type : Clutch motor.

Rpm : 260

Application:

- Waist band top seam.

3.4.8. Thread, Needle, Looper used in different Machine

No	Machine name	Thread	Needle	Bobbin	Looper
01	Single Needle lock Stitch	1	1	1	-
02	Single Needle chain Stitch	1	1	-	1
03	Double Needle lock Stitch	2	2	2	-
04	Double Needle chain Stitch	2	2	-	2
05	Over lock machine	3	1	-	2
06	Over lock machine	4	2	-	2
07	Over lock machine	5	2	-	3
08	Flat lock machine	2	1	1	-
09	Flat lock machine	3	2	-	1
10	Flat lock machine	4	2	-	2
11	Flat lock machine	5	2	-	3
12	Button stitch machine	1	1	1	-
13	Button hole machine	1	1	1	-
14	Bar-take machine	1	1	1	-
15	Feed off the Arm	4	2	-	2
16	Multi thread chain stitch (Kansai)	4-32	4-32	-	4-32

3.4.9. Different types of sewing

Stitch Name: Single thread blind stitch

ISO Stitching Code number: 103 (Blind Stitch)

Use in process: Blind hem, belt loop etc.



Face View

Stitch Name: Lock Stitch (it is the most common stitch)



Face View



Back View (bobbin thread)

Stitch Name: Double needle Lockstitch



Face View



Back View (bobbin thread)

Stitch Name: ZigZag Lockstitch



Face view



Back View

Stitch Name: Chain stitch



Face View

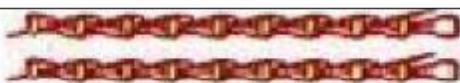


Back View (Looper Thread on bottom)

Stitch Name: 2 needle chain stitch



Face View



Back View (double looper thread on bottom)

Stitch Name: Two needle cover stitch

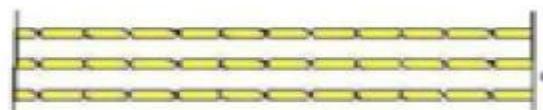


Face View



Back View (Looper thread)

Stitch Name: Three needle cover stitch



Face View



Back View

Stitch Name: Three Thread Over edge

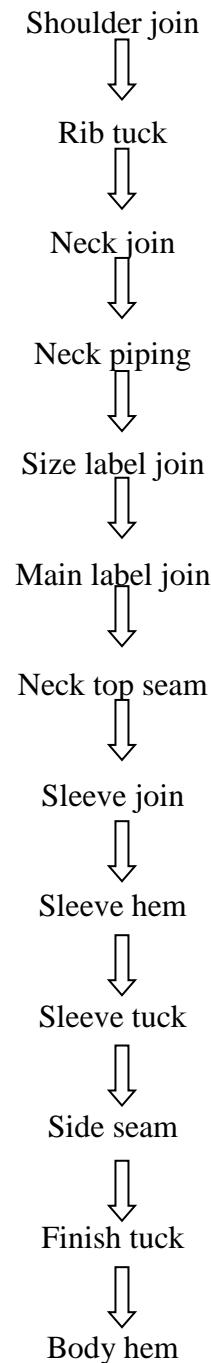


Face View

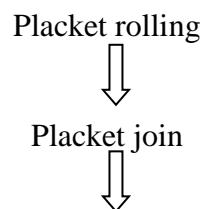


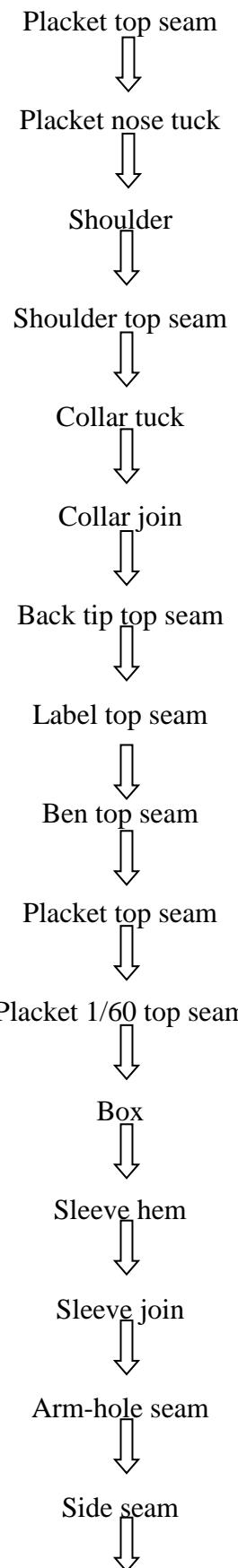
Back View

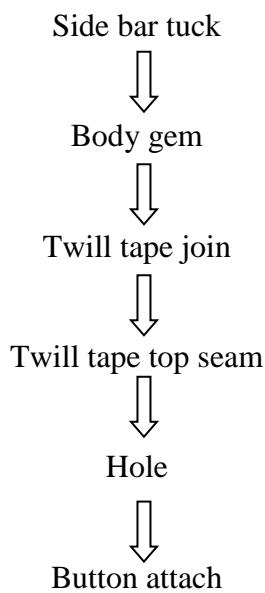
3.4.10. Layout of a T-shirt:



3.4.11. Layout of a polo shirt







3.4.12. Work Study

Work Study is the systematic examination of the methods of carrying on activities so as to improve the effective use of resources and to set up standards of performance for the activities being carried out.

3.4.13. Objectives of Work Study

- Simplify or modify the operation to reduce unnecessary work.
- Increase production and productivity.
- Setting time standards.
- Reduce cost by most effective usage of inputs.
- Improvement of conditions, which involve an element of excessive fatigue or danger.
- Improve quality.
- Evaluation of human work.

3.4.14. Basic terminology of work study

Capacity: Productive capability (output) of a plant. Machine or work centre in a given period of time.

Created from: machine, time, space, and capital, labour

Maximum Capacity: Total hours available under normal conditions for a given period of time

Efficiency Factor: A factor used to adjust the maximum capacity to a realistic level of potential production capacity.

Work Study can be best expressed in the following manner:

1. Method Study

Record to Compare

Seek best method

1. Work measurement

Time Study

Synthetics

In a crux: —Methods are developed and rate set for each operation

3.4.15. Step Involved

- Analyze each style to determine its requirement for production.
- Style Analysis is based on: -Firm's quality standards -Amount of labour required -Available equipment -Volume to be produced -Expected throughput time
- Style requirements are determined through analysis of samples and specifications
- Apparel Engineers are concerned with: -Number, complexity and sequence of Operations -Equipment Required -Time and Skill Required
- Operation Breakdown: Work in each style is broken down into operations An operation breakdown is sequential list of all the operations that involved in assembling a garment used to establish the workflow for each style
- Apparel engineers study each operation to improve its effectiveness and efficiency and to establish methods to ensure a consistent performance by operators and consistent products.

3.4.16. SMV related formula

$$\text{➤ Rating} = \frac{\text{observed rating}}{\text{Standard rating}} \times 100\%$$

- Standard Rating: The pace at which a qualified worker perform a task. (Standard Rating=100)
- S M V = Basic time + Allowances
- Basic time= Observed time × Rating
- Individual Target = $\frac{60}{SMV}$
- Line Target = $\frac{60}{SMV} \times \text{manpower}$
- Efficiency = $\frac{\text{Produced minute}}{\text{Used minute}}$
- Produced minutes = Produced quantity × SMV
- Used minutes = Manpower × Working hours × 60 min

3.4.17. Sewing Quality checking points

- ❖ Skip/Drop/Broken stitch
- ❖ Raw edge
- ❖ Size mistake
- ❖ Uneven hem
- ❖ Uneven cuff
- ❖ Uneven neck
- ❖ Uneven shoulder
- ❖ Uneven placket
- ❖ Uneven pocket
- ❖ Twisting
- ❖ Without care label
- ❖ Open tack
- ❖ Sleeve up-down
- ❖ Stripe up- down
- ❖ Open seam
- ❖ Four point up-down
- ❖ Shading etc

3.4.18. Sewing Line quality Check List

1. Buyer Approved Sample & Measurement Sheet Check.
2. Sample Wise Input Check.

3. Buyer Approved Trims Card Check.
4. Buyer Approved Sample Wise Style Check.
5. All Machine Thread Tension Check.
6. Style Wise Print & Embroidery Placement Check.
7. All Process Measurement Check.
8. All Machine Oil Spot Check.
9. All Process S.P.I Check as Per Buyer Requirement.
10. Input Time Shading, Bundle Mistake & Size Mistake Check.
11. Buyer Approved Wise Contrast Colour Check.
12. As per Buyer Requirement Wise Styling Check.
13. All Machine Stitch Tension Balance Properly.

3.4.19. Sewing Table Quality Check List

1. Style Wise Garments Check.
2. All Process Measurement Check.
3. Front Part, Back Part, Sleeve & Thread Shading Check.
4. S.P.I check for all process.
5. Print/Embroidery Placement Check.
6. Main Label, Care Label, Size Label &Care Symbol Check.
7. Size Mistake Check.
8. All Process Alter Check.
9. Any Fabric Fault /Rejection Check.

3.4.20. Sewing Defects

- ❖ Needle damage,
- ❖ Skip stitches,
- ❖ Thread Breakages,
- ❖ Broken Stitches
- ❖ Seam Grin
- ❖ Seam Puckering
- ❖ Pleated Seam

3.4.21. Sewing problems in factory

- ❖ Input problem
- ❖ Shortage of skilled operator
- ❖ To achieve the overtime, they worked slowly

1. If any problem will create during production then

- ❖ Nobody will take the responsibility,
- ❖ Nobody will give the instant decision.

2. Sewing line production may be depends on in charge.

3. Needle hole- due to friction, needle eye is too large, mistake of needle selection.

4. Measurement problem- from cutting section

5. Seam pucker

- ❖ Due to unequal tension of feed dog and pressure foot on two plies of fabric.
- ❖ Due to unequal thread tension.
- ❖ Shrinkage of either fabric or sewing thread.

6. Broken stitch

- ❖ Due to tension variation between needle & bobbin thread.
- ❖ Tension of needle thread is more.
- ❖ Low quality sewing thread.
- ❖ Needle heating or hook heating.
- ❖ Sharp edge of throat plate, hook plate, bobbin cage, needle groove etc.
- ❖ Faulty fitting of bobbin cage.
- ❖ Sharp edge of bobbin cage, looper eyes and spring.

7. Skipped/ Slipped stitch

- ❖ If the timing between needle & looper or bobbin is not proper. Needle thread loop is not picked up by bobbin thread loop when required.
- ❖ If the loop of needle becomes smaller in size, slipped stitch occurs.
- ❖ Unequal tension between sets of threads.
- ❖ Deflection or vibration of needle.

8. Variable stitch density

- ❖ If fabric cannot move forward properly due to lack of pressure of pressure foot.

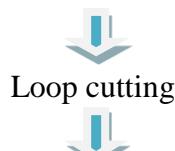
- ❖ Due to faulty feed mechanism.
- ❖

3.5. Finishing Section

Finishing is the final steps of Garments processing technology. A textile products either it is dye or printed it needs to add some finishing feathers before marketing.

3.5.1. Finishing Lay Out

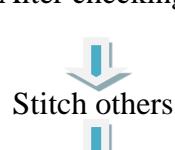
Garments wash



Loop cutting



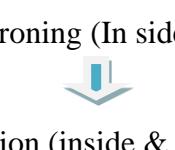
Thread trimming



Alter checking



Stitch others



Button attach



Ironing (In side)



Inspection (inside & outside)



Batch label attach



Final ironing



Joker tag attach



Needle detector check

Size tag attach



Waist belt attach



Hanger attach



Poly packing



Cartooning



Shipment

3.5.2. Garments Finishing

Garment finishing through wet processing is responsible for adding beauty to the garment. Proper finishing could provide better look to the garment, change the feel of the fabric and bring about a change to the texture of the fabric. There are various types of finishes like peach finish, anti-microbial finish, wrinkle free finish, aroma finish, UV guard finish, acid wash, enzyme wash, etc.

3.5.3. Process Flow Chart of Garment Finishing

Thread Suction (Thread Sucker M/c)



Ironing



Quality Check

(Sewing defect, Spot defect check)

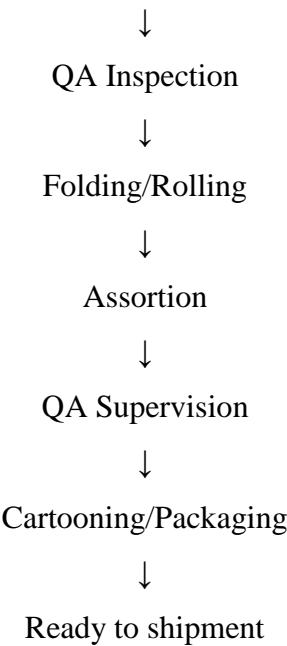


Metal Detection



Accessories Attach

(Hang Tag, Price Tag, Hanger, Sticker, Security Alarm etc.)



3.5.4 Objects of Finishing

- To enhance the suitability of the fabric for end use.
- To improve appearance and sale appeal for comfort and utility
- To give desirable qualities to the fabric like-
 1. Softness
 2. Lustre
 3. Drape
 4. Dimensional stability
 5. Crease recovery
 6. Soil repellence

3.5.5. Work flow in the Finishing Room

As mentioned earlier, workflow in the Finishing Department is shown here for reference:

- ✓ Eliminate micro-dust and residual thread from the garment;
- ✓ Press/iron garments as specified by buyer or as per requirements;
- ✓ Fold the garments as required by customer;

- ✓ Fix necessary tickets (Price tickets) or tags (hang tags),etc to the garments at this stage;
- ✓ Insert garments into poly bags;
- ✓ Divide garments as per size and color (assortment).

3.5.6. Machine Description of finishing section

Machine name	Number
1. Stream Iron	80
2. Thread sucker	06
3. Metal Detector	02
4. Neck press	02

3.5.7. Different types of Machine used

Metal detection machine:

Specification

- Brand name : OSHIMA
- Origin : China
- Model : ON-688cdII
- Motor power : 140 W



Fig: Metal detector m/c

Thread sucker machine:

Specification

- Brand name : NiSHO
- Model : NH-TS5600A
- Origin : China



Fig: Thread sucker m/c

3.5.8. Materials used in garment finishing

- ❖ Neck board
- ❖ Back board
- ❖ Collar stand
- ❖ Butterfly
- ❖ Tie placket support
- ❖ Vanishing loop
- ❖ Fit label
- ❖ M-clip
- ❖ T-clip
- ❖ Metal clip
- ❖ Cuff link
- ❖ Droop loop
- ❖ Cable tie
- ❖ Boa tie

- ❖ Full board
- ❖ Hand tag
- ❖ Tag pin
- ❖ Tissue paper
- ❖ Al pin
- ❖ Ball pin
- ❖ Elastic clip
- ❖ Hanger
- ❖ Poly bag
- ❖ Size sticker

3.5.9. Spot removing

The General Rules of Spot Removing:

1. The longer a stain remains, the tougher it is to remove.
2. Always treat a stain before laundering.
3. Blot gently — never rub; and don't ever blot with hot water

Stain Removal:

STAIN TYPE	Chemical Used (Commercial Name)
1. Oil stain	Spot lifter
2. General stain	Thinner
3. Termeric stain	MRS
4. Ink stain	MR
5. Glue stain(Polymer based)	Heat gun

3.5.10. Ironing

Ironing is the use of a heated tool (an iron) to remove wrinkles from fabric. The heating is commonly done to a temperature of 180–220 °Celsius, depending on the fabric. Ironing works by loosening the bonds between the long-chain polymer molecules in the fibers of the material. While the molecules are hot, the fibers are straightened by the

weight of the iron, and they hold their new shape as they cool. Some fabrics, such as cotton, require the addition of water to loosen the intermolecular bonds.



Fig: Ironing M/C

Basic Ironing Symbol

	Do not iron
	Cool iron (110°)
	Medium iron (150°)
	Hot iron (200°)

3.5.11. Garment Inspection

Flow Chart of Garment Inspection

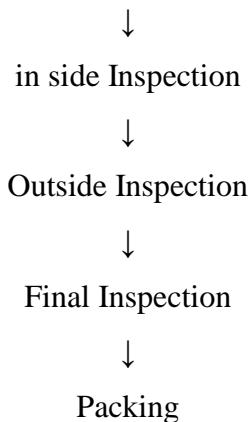
Confirmation of Quantity



Confirmation of accessories



Size specification inspection



3.5.12. Trims

Trims cover all the items used in the garment except the basic fabric. There are hundreds of items used to manufacture the garments. Proper selection of trims and its quality are very important for styling; otherwise the garment may be rejected or returned by the customers.

Following is a part of list that covers some names of the items:

Zipper/Fastener:

Teeth : Nylon, Vislon, Metal
 Color : Tape color, Teeth color
 Size : 3, 5, 8, etc.
 Length : As per requirement 18 cm, 72 cm
 End : Close End (C/E), Open End (O/E)
 Slider : One way, Reversible.

Sewing Thread:

- Shade, color fastness, etc.
- Tensile strength, Elasticity, Shrinkage, Moisture Regain, Abrasion Resistance, etc.
- 30s, 60s, 20/2, 40/9 Ne, etc.

Labels:

- Main label
- Size label
- Care label
- Content

- Price
- Patch, etc.

Button:

- Horn
- Metal buttons are very common in use.

Elastic:

- Cotton
- Polyester, etc.

Eyelet:

- Antique
- Matching, etc.

Velcro:

- Hook and Pile

String/Cord:

- Cotton
- Polyester, etc.

Tags:

- Price tags.
- Hang tags, etc.

Poly bag:

- Strength, Chemical mixture, Thickness (micron/mm; 1mm = 1000 micron).

Blister Bag:

- 0.05 mm in thickness;
- Loaded capacity is higher than poly bag.

Carton:

- 3 ply
- 5 ply
- 7 ply Size (L, W, and H).

Sticker:

- Hook and Pile.

Plastic Clip

Tag pin

Scotch Tape

Hanger

Gum Tape Etc.

3.6. Printing Section



3.6.1 Printing

Textile Printing is the process of applying colour to fabric in definite patterns or designs. In properly printed fabrics the colour is bonded with the fiber, so as to resist washing and friction. Textile printing is related to dyeing but, whereas in dyeing proper the whole fabric is uniformly covered with one colour, in printing one or more colours are applied to it in certain parts only, and in sharply defined patterns.

3.6.2 Printing System

Hand screen printing

- I. Screen Printing
- II. Automatic Flat (Revolving) screen printing

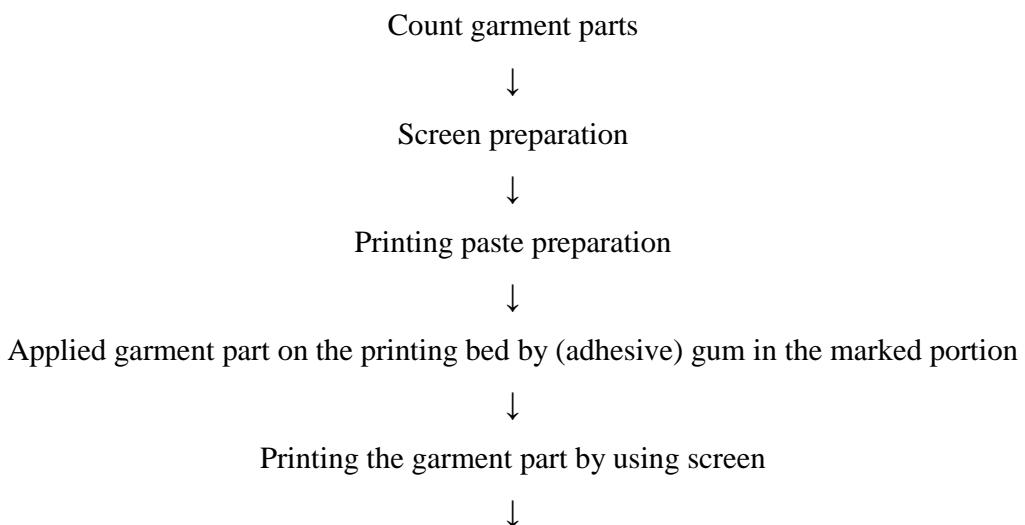


Fig: Automatic Flat screen printing

3.6.3 Types of printing

- ✓ Screen print
- ✓ Reactive print
- ✓ Discharge print
- ✓ Pigment print
- ✓ Flock print
- ✓ Foil print
- ✓ Heat transfer print
- ✓ Hi-density print

3.6.4 Sequence of printing



Drying the printed portion by hard dryer applying hot air flow



Curing the printed portion by passing through the conveyor dryer at 160° - 180°C



Inspection is done in quality control department

3.6.5 Screen Preparation

Mesh fabric tight with frame



Applied chemical TXR (sensitizing emulsion) on the mesh & dried 8 min in air.



Placed design paper under the mesh.



Light passes through the design paper & mesh fabric for 3-4 min.



Remove the colored TXR from the design area by water spraying.

Curing Process:



➤ **Curing Temp:**

- Pigment -160-170°C
- Rubber -150-170°C
- Discharge -200°C
- High density-180°C

3.6.6 Factors Affecting Cost of Printing

- ✓ Type of printing
- ✓ Size of printing
- ✓ Number of color of printing
- ✓ Any grading of size of printing from size to size
- ✓ Any restriction/selection of use of dyes and chemicals
- ✓ Lab test requirement
- ✓ Wash sustainability
- ✓ Tolerance in placement of print art-work
- ✓ Tolerance in color shade variation
- ✓ Place of printing

3.7. Embroidery Section

3.7.1 Embroidery

Embroidery is a decorative pattern superimposed on an existing fabric by machine stitching using polyester, cotton or rayon threads, or hand needlework using linen, cotton, and wool, silk, gold, or silver thread. Two types of embroidery thread dominate the machine embroidery market: polyester and rayon. Both are continuous filament threads with high luster and can carry bright colors.

3.7.2 Embroidery Machine Specification

No. of Embroidery m/c : 5 m/c of 20 head

No of Embroidery m/c : 1m/c of 8 head

Brand : Tajima

Country : Japan

Model : TFGn-920

No. of head : 20

No. of Needle per head : 9



Fig: Embroidery machine



Fig: Embroidery head

3.7.3 Embroidery stitching type

- ✓ Shirting stitch
- ✓ Tatami stitch
- ✓ Run stitch
- ✓ Motif run

3.7.4 Embroidery Faults

- ✓ Stitch gap
- ✓ Bobbin out
- ✓ Oil spot
- ✓ Miss thread
- ✓ Measurement up-down
- ✓ Needle

3.8. Quality Section

This section Control the quality of a product. It is committed to provide adequate resources in terms of good raw materials and trained personnel & continually improve / upgrade its processes and systems.

3.8.1. Quality objectives

- ✓ Overall material/product loss (Level of rejection) for the company during the production process (in a year) shall not exceed 1.5 %
- ✓ Defects during dyeing & knitting operations to reduce by 10%.
- ✓ Process capability shall be maximized by maximizing the m/c breakdown time.
- ✓ To ensure better work environment for the personnel working in the organization.

3.8.2. Machines required for quality

- ✓ Wash Fastness Tester.
- ✓ Light fastness tester
- ✓ Rubbing fastness tester
- ✓ Electronic balance
- ✓ G.S.M. cutter
- ✓ Fabric inspection table
- ✓ Light box
- ✓ Shrinkage (%) meter.

3.8.3. Inspection Area

- ✓ Shade match of fabric
- ✓ Fabric diameter
- ✓ Wash fastness
- ✓ Light fastness
- ✓ Rubbing fastness

3.8.4. Faults Found in QC Department

Dyeing faults:

- ✓ Uneven shade
- ✓ Running shade
- ✓ In fastness property

Finishing faults:

- ✓ GSM variation
- ✓ Spirality
- ✓ Shrinkage control: Length wise

3.8.5. Quality Assurance System

Quality assurance system can be divided into following steps:

1. On line Quality assurance system and
2. Off line Quality assurance system.

Again on line Quality assurance system can be divided into the following steps:

- (a) Raw material control.
- (b) Process control.

3.8.6. Online Quality control

Raw material control: Meghna Knit Composite Ltd. always very concern about the quality of the Product. So, they knit grey fabric from the best quality yarn & utilizes technical evaluation in every stage of the production, as we know the quality product

depends on the raw material quality.

Process control: The method chosen for process must be provided with the necessary accurate parameters. In the every stage pH should be maintained sincerely.

3.8.7. Off line quality control:

After dyeing the material is received by the finishing section. Before receiving the following things are checked:

1. Shade condition.
2. Wash fastness.
3. Condition of softening.
4. Condition of enzyme wash.

Before delivery the finished fabric to the customer it should be passing against the requirements. The following tests are done-

1. GSM check.
2. Shrinkage test.
3. Shade check.
4. Rubbing test.
5. Wash fastness test.
6. Color fastness to perspiration.

3.9. Merchandising Section

Merchandising department is the star of the department among all the working departments in the Export concern, because Merchandising is the only department having maximum control over the departments and total responsible for Profit and loss of the company. After LPG (Liberalization, Privatization & Globalization) the business gets more important and now merchandising is on its hot seats. So, it is necessary to understand the day to day happenings of the star department. Merchandise- means goods bought and sold; and trading of goods. Merchandising- is an activity of selling and promoting the goods.

❖ **Merchandiser in garment industries:**

In the field of marketing and services, Merchandiser is at a position of utmost importance, He is the person who co-ordinates with various departments for a uniform business.

3.9.1. Objects of Merchandising

Merchandising denotes all the planned activities to execute and dispatch the merchandise on time, taking into consideration of the 4 Rs to replenish the customer.

- **Right Quantity:** To dispatch right quantity of product what buyer ordered?
- **Right Quality:** It should be with right quality as accepted both parties.
- **Right Cost:** Everybody wants more from what they are paid.
- **Right Time:** No one wants to wait idle even in a Restaurant. Keeping delivery schedule is mandatory.

3.9.2. Flow Chart of Garments Merchandizing

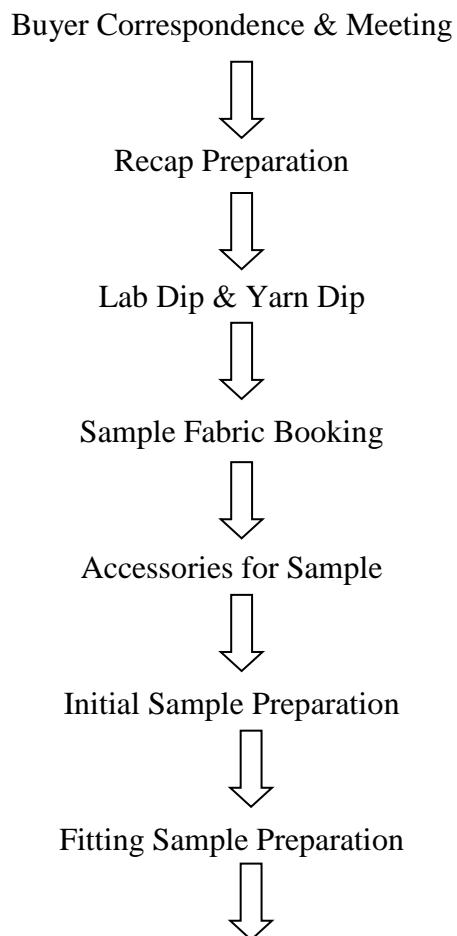
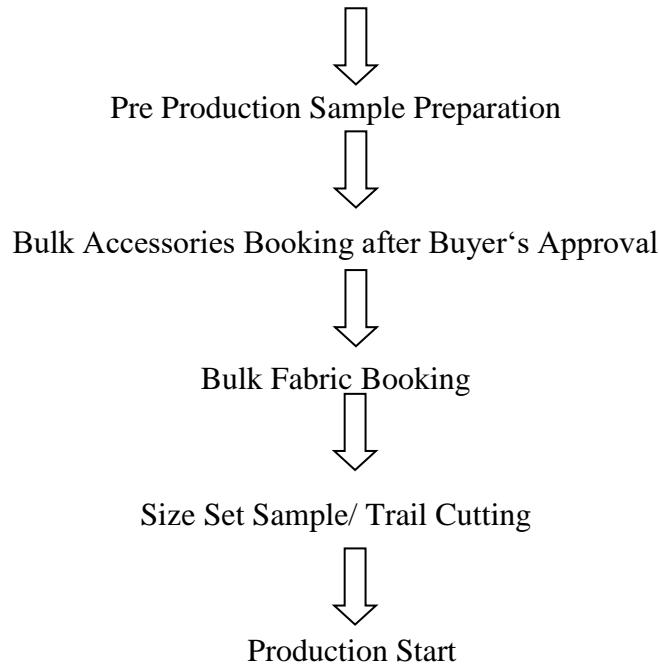


Photo Sample with actual specification



3.9.3. Merchandising Calculation:

Fabric or Body Calculation:

$$\frac{(\text{Body length} + \text{Sleeve length} + \text{Allowance}) \times (\text{Chest} + \text{Allowance}) \times \text{GSM} \times 12}{10000000} + 10\% \text{ waste}$$

= Result kg/dozen

NB:

- (BL+SL) Allowance= 10 cm. Allowance.
- When keep the chest allowance then body width, chest width and bottom width which are big (cm) with (4 cm+) Added.
- 10% overall Process Loss.
- 1 dozen= 12 pcs.

Body Consumption By Marker:

$$\text{Marker Consumption} = \frac{\text{Length} \times \text{width} \times \text{GSM} \times 12}{1000 \times 1550 \times \text{Ratio}} + 12\%$$

Dia Measurement

$$\text{Marker Dia} = \frac{\text{Chest or Bottom} + \text{Allowance}}{2.54}$$

= Dia / Result

NB:

- 1 inch = 2.54 cm.
- When I dia measurement then chest or bottom with (4-6 cm) allowance added.

Self or Rib Fabric Neck Dia Measurement:

$$\text{➤ } \frac{\text{Neck opening or Width} + \text{Neck drop} \times 2}{2.54}$$

= Result.

Pant / Trouser or Pajama Consumption:

$$\text{➤ } \frac{(\text{Length} + \text{Allowance} \times \text{dia} \times 2 \times \text{GSM}) \times 12}{10000000} + 10\% (+)$$

= Result kg. / Dozen.

NB:

- L + Allowance with self-fabric waist minimum (12 cm) Allowance added.
- Without self-fabric waist minimum (8 cm) Allowance added.
- Allowance minimum 15 cm added with Hip or Dia.
- DIA = Hip + Allowance / 2.54

Pocket Consumption:

- Length + Width + Allowance.

NB:

- Allowance minimum 5 cm added with (L+ W).

Carton Dimension:

$$\text{➤ } \frac{(\text{Length} + \text{Width} + \text{Allowance}) \times (\text{Width} + \text{Height} + \text{Allowance}) \times 2}{100 \times 100}$$

= Result / SQM.

NB:

- L + W + Allowance = 6 cm.
- W + H + Allowance = 3 cm
- 2 = Double part.

Button Ligner (Find out Formula):

- 1 GG = 144 Dozen.
- 1 GG = 1728 pcs.

- Ligner = $\frac{\text{Button Dia}}{0.61}$
 = Result / ligner.

NB:

- Always Button liner is plural number.
- As like 16,18,20,22,24

Yarn Booking:

- Fabric yarn (kg) + Process Loss. = Result / kg.

NB:

- Process loss keep the 10% added with total fabric.

Sewing Thread Consumption:

Machine Name	Thread required
Plain Machine	1" for 2.75"
Over lock (3 Thread)	1" for 14"
Over lock (4 Thread)	1" for 19"
Over lock (5 Thread)	1" for 24"
Flat lock (2 Thread)	1" for 7"
Flat lock (3 Thread)	1" for 17"
Flat lock (4 Thread)	1" for 24"
Flat lock (5 Thread)	1" for 28"
Button hole, Button Attach, Bar-take	1" for 7"
Cone Quantity = per garments thread × garments qty. × qty. in cone.	

Calculation Cubic Meter (Cbm):

- CBM = $\frac{\text{Carton length} \times \text{Carton width} \times \text{Carton height} \times \text{Carton Qty.}}{1000000}$
 = CBM / Result.

NB:

- 100 cm x 100 cm x 100 cm = 1000000
- 20 Feet = 28-31 CBM
- 40 Feet = 56-62 CBM

Marker Consumption (Formula):

- Open Dia = $\frac{\text{Marker length} \times 2.54 \times \text{Marker width} \times 2.54 \times \text{GSM}}{10000000 \times \text{Marker Pcs}} \times 12 + 10\% (+)$.
= Result kg. / Dozen
- Tube Dia = $\frac{\text{Marker length} \times 2.54 \times \text{Marker width} \times 2.54 \times \text{GSM}}{10000000 \times \text{Marker Pcs}}$
= Result kg. / Dozen

3.10. Effluent Treatment Plan

3.10.1 Functions of different Ingredients Used in E. T. P Plant:

Lime: Lime is used to change the colour of effluent and to increase the transparency of water.

Ferus Sulphate: Ferus Sulphate is used for the agglomeration of the foreign matters present in the effluent.

Poly Electrolyte: Poly Electrolyte helps to make the agglomerated materials be gummy for easy deposition below the surface of water.

Hydrochloric Acid: Hydrochloric Acid is used to sustain the required PH of the treated water.

Water quality of E.T.P:

Parameter	Permissible Concentration
BOD	<50 ppm
COD	<200 ppm
Color	Colorless
Temperature	Maximum 38® c
P ^H	6-9
Total Dissolved solid (TDS)	<2500 ppm
Total suspended solid (TSS)	<100 ppm
Dissolved oxygen (DO)	4.5-8

Capacity of ETP: 30 M³/hr.

3.11. Utilities section

- Generator
- Boiler
- Air Compressor

1. Generator:

An electrical generator is a machine that converts mechanical energy of power into electrical energy or power

- Gas generator: 1030 KW
- Diesel generator: 800KW and 500 KW

2. Boiler:

Capacity: 7.8 ton

3. Air compressor:

- Screw air compressor

Capacity: 5.8 m³ /min

- Reciprocating air compressor

Capacity: 1.5 m³ /min

3.12. Compliance

3.12.1. Compliance

Compliance means conformity of certain standard. PPC maintain a moderate working condition for their employees. Though it is well established project, there is some lacking of proper compliance issues. Here is list of compliance in which some points are maintained fully and some are partially-

- ✓ Compensation for holiday
- ✓ Sexual harassment policy
- ✓ Child labor abolition policy
- ✓ Anti-discrimination policy
- ✓ Zero abasement policy
- ✓ Working hour policy

- ✓ Hiring /recruitment policy
- ✓ Environment policy
- ✓ Security policy
- ✓ Buyers code of conduct
- ✓ Health and safety committee
- ✓ Canteen
- ✓ Equal remuneration
- ✓ National festival holiday
- ✓ Overtime register
- ✓ Labor welfare
- ✓ Weekly holiday fund
- ✓ Time care
- ✓ Accident register
- ✓ Workman register

3.12.2. Health

- ✓ Drinking water at least 4.5 L/day/employee.
- ✓ Cup availability.
- ✓ Drinking water supply.
- ✓ Water cooler, heater available in canteen.
- ✓ Drinking water signs in Bangla and English locate min. 20 feet away from work place.
- ✓ Drinking water vassal cleans at once in a week.
- ✓ Water reserve at least once a week.
- ✓ Water center in charge person with cleanliness.
- ✓ Suggestion box register.

3.12.3. Toilet:

- ✓ Separate toilet for women and men.
- ✓ A seat with proper privacy and lock facility.
- ✓ Effective water sewage system.
- ✓ Soap toilet.
- ✓ Water tap.

- ✓ Dust bins.
- ✓ Toilet white washed one in every four month.
- ✓ Daily cleaning log sheet.
- ✓ No-smoking signs.
- ✓ Ladies /gents toilet signs both in bangle and English.
- ✓ Deposal of wastes and effluent.

3.12.4. Fire:

- ✓ Sufficient fire extinguisher and active
- ✓ Access area without hindrance.
- ✓ Fire signs in both languages.
- ✓ Fire certified personal photo.
- ✓ Emergency exit.

3.12.5. Safety Guard:

- ✓ Metal glows on good conditions.
- ✓ Rubber mats & ironers.
- ✓ First aid box one.
- ✓ Ironers wearing sleepers.
- ✓ First trained employees.
- ✓ Motor/needle guard.
- ✓ Eye guard.
- ✓ Doctor.
- ✓ Medicine.
- ✓ Welfare officer.

3.12.6. Others:

- ✓ Room temperature.
- ✓ Lighting facilities.

4 Impacts of internship

4. Impacts of internship

4. Impact of internship

4.1. Sample development

- We know what type of sample produced here
- System of sample approval
- We know what type of machine here

4.2 CAD Section

- Know about working procedure of CAD
- We know about marker making process
- Know about different allowance.

4.3. Cutting

- We know about cutting fabric
- We know about method of cutting
- Defect of cutting section
- How to remove fabric wastage

4.4. Sewing

- We know about many type of sewing machine
- We know about function of sewing machine
- We know about sewing fault and their remedies
- We know about total production of this section

4.5. Finishing

- We know about total production of these garments.
- To know about Trims and Accessories.
- To know about how to quality assurance.

4.6. Printing

- We know about different types of printing process.
- Printing fault, causes and remedies.

4.7. Embroidery

- We know the types of embroidery stitches.
- Embroidery machineries.

4.8. Quality

- We gather knowledge about Quality Control system.
- We know about garments inspection procedure

4.9. Merchandising

- We know the activities of merchandising.
- How they follow up production.
- Different consumption formula.

4.10. ETP

- We know about Effluent Treatment Plant
- Know about function of different Ingredients Used in E. T. P

4.11. Utilities

- We know about Boiler
- Know about air compressor
- Know about generator

4.12. Compliance

- To know about their compliance system
- We know about medical facilities

5. Conclusion

5. Conclusion

The industrial training gives us the first opportunity to work in mills. It was a practical experience beyond the normal academic learning. This training gave us actual picture about man, machine, money, material, method and market and interdependence. We have earn the direct practical knowledge about the raw materials, actual running condition of the machine, works of technologist, administration. Industrial training is an essential part for textile education because it minimizes the gap between theoretical and practical knowledge and also increase our thinking level about textile technology. We have completed our industrial attachment from Meghna Knit Composite Ltd. We learn about Lab, finishing, store, sample, cutting, sewing, printing, section, we learned the working procedure of various section and their activity