UGC & Govt. Approved
Sonargaon University (SU)
সোনারগাঁও ইউনিভার্সিটি (এসইউ)
WE WILL RISE UP WE WILL SHINE

Faculty of Engineering

Department of Textile Engineering

REPORT ON

Industrial Attachment

At

Standard Group

The Civil Engineers Limited.

401/B, Tejgaon I/A, Dhaka, 1208, Bangladesh.

Course Title: Industrial Attachment
Course Code: Tex-442.
Batch - 13A,

Submitted By:

Submitted By:	ID Number	Specialized
Md. Hadiuzzaman	TEX1801013118	Apparel Manufacturing
Md. Tuhin Hossain	TEX1801013020	Fabric Manufacturing
Md. Farhad Hossan	TEX1801013043	Apparel Manufacturing

Academic Supervised
Kamrul Hassan Bhuiyan
Coordinator & Lecturer
Department of Textile Engineering
Sonargaon University (SU).
146 Mohakhali, Wireless Gate. Dhaka.

This report we have presented in partial fulfillment of the requirement for the Degree of Bachelor of Science in Textile Engineering.

Duration: From 26 October 2021 to 26 December 2021.

DECLARATION

We hereby declare that, this Industrial Attachment on **The Civil Engineers Limited, of Standard Group** of Bangladesh is done by us under the supervision of **Kamrul Hassan Bhuiyan, Coordinator & Lecturer,** Department of Textile Engineering, **Sonargoan University (SU),** Dhaka. We also declare that, this Industrial Attachment report has not been submitted anywhere for award, degree or diploma. We ensure that, any part of this attachment has been presented anywhere.

Md. Hadiuzzaman
TEX1801013118

Md. Tuhin Hossain
TEX1801013020

Md. Farhad Hossan
TEX1801013102

Permission of industrial Training

UGC & Govt. Approved
Sonargaon University [SU]
সোনারগাঁও ইউনিভার্সিটি (এসইউ)

147/I, Green Road, Panthapath, Dhaka
Department of Textile Engineering

SU/Textile/Int. Letter/2021/Fall/13
Date: 26/10/2021

To
Managing Director
The Civil Engineers Limited, Standard Group
The Civil Engineers Bhaban, 69-Mohakhali C/A, Dhaka-1212

Subject: Request for permission to undertake industrial training in your industry.

Dear Sir,

It is for your kind information that, Sonargaon University (SU) is a private University approved by the Ministry of Education (MOE), & UGC of Bangladesh.

The student(s) named below with the Identification Number is very close to complete 4 years B.Sc. in Textile Engineering of Sonargaon University (SU).

As industrial training is one of the important core courses of 4 years B.Sc. in Textile Engineering program, therefore the university seeks your kind help and cooperation in order to impart practical knowledge to our students. Duration of this program would be 12 weeks and it is advised to accommodate the students at your production unit from 26th October, 2021.

SL No.	Student Name	Specialized	Student ID	Contact No.
01	Md. Hadiuzzaman	Apparel Manufacturing	TEX.1801013118	01795607273
02	Md. Farhad Hossan	Apparel Manufacturing	TEX.1801013043	01558180688
03	Md. Tuhin Hossain	Fabric Manufacturing	TEX.1801013020	01876401866

Therefore, I am requesting you to provide them with opportunity to conduct the industrial training in your well reputed industry. It will also be highly appreciated if you kindly consider them for training in your Industry.

Your Co-operation will be highly appreciated.

Thanking you

Kamrul Hassan Bhuiyan
Coordinator
Department Of Textile Engineering. Sonargaon University (SU).
Cell Phone: 01955-529892

Copy to: For necessary information:
1. Dean, Faculty of Engineering, Sonargaon University (SU).
2. Office Copy.

LETTER OF APPROVAL

This is to certify that ***Md. Hadiuzzaman -TEX1801013118 , Md. Tuhin Hossain - TEX1801013020 , Md. Farhad Hossan – TEX1801013043*** of BSC Engineering Textile program, 13A Batch have successfully completed their Industrial Internship under my supervision. I do hereby approve their report. I also recommend accepting their report for partial fulfillment of Bachelor of Science in Textile Engineering (BSCTE) Degree.

.....

Kamrul Hassan Bhuiyan

Coordinator & Lecturer

Department of Textile Engineering

Sonargaon University (SU), Dhaka

ACKNOWLEDGEMENTS

All pleasure goes to the Almighty Allah who has given me the ability and strength to complete this project.

I am grateful to" **Kamrul Hassan Bhuiyan" Coordinator & Lecturer** of Sonargaon University (SU), Dhaka. Textile Engineering my Academic Supervisor. As well as to
"Asaduzzaman" of our factory supervisor of The Civil Engineers Limited, Standard Group. Bangladesh.

Being working with them I have not only earned valuable knowledge but was also inspired by their innovativeness which helped to enrich my experience to a greater extent. Their ideas and way of working was truly remarkable. I believe this report could not be finished if they did not help me continuously.

I would like to thanks the Chairman, General Manager, Production Manager, Sample Manager, Finishing Manager, Washing Manage, Maintenance Manager, Quality control Manager, Factory Manager & Costing Sr. Manager of Standard Group. Who has given us scope for doing industrial attachment in the factory as well as for giving scope to work in their respective section. We also would like to thanks to production **PM & APM "Md. Ruhul Amin, Md. Kamruzzaman, Md. Rafiqul, Md. Saiful with others persons"** for their proper management & taking necessary procedure about our industrial attachment.

I am also very much grateful to Standard Group Authority/ Management for giving me opportunity to do my internship work in their factory. Last but not the least, thanks go to all the workers, supervisors, Line Chief and Floor in charge who have assisted, helped and inspired me to complete this task at various stages.

ABSTRACT

For any technical education, practical experience is almost equal important in association with the theoretical knowledge. By means of practical knowledge it's not possible to apply the theoretical knowledge in the practical field.

Industrial attachment is the first step to professional life of student, especially of technical side. It's an indispensable part of study a practically running processing technology of an industrial unit for a student. 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 skills about various processing stages.

This internship provides me sufficient practical knowledge about production management, efficiency, industrial management, pattern, cutting, sampling, washing, Finishing, Costing, purchasing, inventory control, utility and maintenance of machineries and their operation techniques etc. which cannot be achieved successfully by means of theoretical knowledge only.

We were able to study on their different sections and their activities practically. Due to some limitation of the factory, we have found store section, cutting section, sewing section, finishing section and maintenance section, costing section washing section.
Here we have also found the sample section but this section isn't fully operational as here only the Development sample, size set and production samples are produced.

All the activities of this factory are performed according to the central orders of the company. This company works for Academy buyer and sometimes works for Pritha which is an own buying house of this group of company.

During my internship we got the opportunity to study on some orders, from order receive to the delivery of the order. With the help of my supervisor we have acquired the knowledge of handling an order, the production procedure and the inspection procedure to maintain the quality of these orders. We have also learnt about the office management of this factory.

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CHAPTER-01 EXECUTIVE SUMMARY

1. Executive Summary:

Industrial Training is an essential part in developing the practical and professional skills required for an Engineer and an aid to prospective employees. Our internship was carried at "**The Civil Engineers Limited, Standard Group'' of Bangladesh**". It is a comprehensive manufacturing and exporting company of Bangladesh. It has independent, sample section, cutting, sewing, finishing section, washing section, ETP, compliance, Utility & Costing section etc.

In this report we have mainly described about the Garments section of the" The Civil Engineers Limited, Standard Group". As it is a washing factory we fortunately took the opportunity to learn about other important department of the factory too like Sample Department, Garments Department, Merchandising Department, Costing Department, Quality Department, and IE &Planning Department. Sample section is used to make development samples. Sample helps the factory to get a new order for different styles. We also learnt about different samples like development samples, quotation Samples, size-set sample, counter samples, production samples. We tried to have some practical knowledge about CAD and their importance for making pattern, marker and so on.

CHAPTER-02 INFORMATION ABOUT OF FACTORY

2.1 History of the Factory:

In the year, 1969 **Engr. Mosharraf Hussain and Engr. Atiqur Rahman** made their first step into business in the field of construction and started the company named "The Civil Engineers Limited". The company made remarkable foot-marks in Bangladesh's best civil construction icons such as the Convocation hall, Indoor Stadium, 500-Bed

Hospital, Country's biggest Power Plant, Telecast Station, Open University, Biman Bhaban, Diabetic Hospital, etc.

In the year 1984, Company entered into 100% export woven RMG sector and started business in the name "**Standard Garment** Industries Ltd". The garment manufacturing factories are located at its own premises with luxuriant set up. Most modern machineries and technologies are applied in manufacturing of garments for Designing, Grading, Marker Making, Fabrics Cutting, Sewing and Finishing.

Nowadays Garments manufacturing part has become the largest manpower utilizing industry in Standard Group In the year 2001, the group started their Hong Kong office as

"Standard Sourcing HK Ltd." to have a better grip and control on quality level of materials. Today, **Standard Group** stands as one of the leading garment manufacturers in Bangladesh. Now there are 20 Woven factories, 03 Sweater factories, 03 Washing plants, 02 Packaging & 01 Accessories plants and other backward linkage business are operated under Standard Group.

Standard Group is specialized for all kinds of woven, Knit and sweater products for men's, women's, boys, girls, kids and Infant. All garments items are exported to USA, UK, EU, Japan & etc. for following Buyer: Abercrombie and Fitch, American Eagle

Outfitters, Gap Inc., Old Navy, Banana republic, Gymboree, JC penny, Kohls, Lands' End, Sears USA, Tommy Hilfiger, Eddie Bauer, Next, TCP, Uniqlo, Brice, Black

Berry, Colins, Baker Street, Hudson's Bay, Jacob, London Fog, Sears Canada,

C&A, Celio, Esprit, George Clothing, Mark's & Spencer, Oxbow, Mexx, The Stadium,

Tom Tailor & Others. Besides these, Standard Group has its diversified business in the arenas of Banking, Insurance and Real Estate, etc. Since the inception, Standard Group is operating its business smoothly and contributing in National economy and development, hence for business support and quality product Standard Group achieved various "National and Export Award" at different times. The corporate office is at its own 20-storied building named "Civil Engineers Bhaban" at 69, Mohakhali Commercial Area, Dhaka, Bangladesh.

Fig: The Civil Engineers Ltd. 401/B, Tejgaon I/A Dhaka.-1208.

Fig: Civil Engineers Bhabon 69, Mohakhali C/A, Dhaka-1212.
(Corporate office of Standard Group)

2.2. Management:

Board of Directors		
1	Engr. Atiqur Rahman	Chairman
2	Engr. Mosharraf Hussain	Managing Director
3	M. Tofazzal Ali	Executive Director
4	Hasnat Mosharraf	Director
5	Faheem Mosharraf	Director
6	Hasib Mosharraf	Director
7	H.T.M. Kader Newaz	Director

2.3. Nature of Business

Woven	Knit	Accessories /Trims	After Effect	Service
Bottom	Sweaters	Carton	Washing	Testing laboratory
Top	Pullover	Poly bag	Dry process	Soft line testing
Active & Sports wear	Cardigans	Label	Wet process	Quality Assurance testing
Inner wear	Knitted Vest	Elastic	Dyeing	Design House
Outer wear	Knitted Tank Tops	Thread	Embroidery	Consultation
Overall		Drawstring	Printing	Art Development
Coverall		Elastic drawcord	Laser print	Sample development
Woven Accessories		Gum tape		
		Cello Tape		

		Twill Tape		
		Woven Tape		
		Canvas Tape		
		Zipper		
		Hang tag		
		Plastic Button		
		Horn Button		
		Wood Button		

2.3.1. Woven

The woven division started production 1984, the company can handle various light weight fabric (Ex. 190T taffeta) to heavy weight fabric (Ex: 14.40 Oz Denim, wool, fleece etc.) State of the art machineries to make different woven products.

Also fully automated jeans product line

2.3.2. Woven –Products

Standard Group is specialized for all kinds of woven products for men's, women's, and children. Product category:

2.3.2.1. Outer wear

-Technical outerwear
-Wool coats
-Functional jacket -
Down jacket

2.3.2.2. Bottoms

-5 Pocket jeans
-Cargo pant
-Chino pant
-Skirts

2.3.2.3. Tops

-Casual shirt

-Vests

2.3.3. Sweater. Standard Group ventured into Sweater manufacturing in 2003. Within in a very short time it has acclaimed as one of the most promising new sweater manufacturer in the Industry. It is manufacturing for mostly European retailers as well as North American retailers. It also has an in house laundry facility which can handle all types of washes required for sweater.

2.3.4. Sweater –Products

Standard Group is specialized for all kinds of Sweater products for men's, women's, and children.

2.3.4.1. Product category:

-Sweaters

-Pullover

-Cardigan

-Vest

-Knitted Blouse

-Knitted bottoms

-Knitted Scarf

2.3.5. Socks

Standard Group ventured into Socks manufacturing in 2019. It is manufacturing for mostly European retailers as well as North American retailers.

2.3.6. Socks –Product: Standard Group is specialized for any kinds of Socks products for men's, women's, and children.

2.3.7 Major Clients

Abercrombie and Fitch, American Eagle Outfitters, Gap Inc, Old Navy, Republic-banana, Gymboree, JC penny, Kohls, Lands' End, Sears USA, Tommy Hilfiger, Eddie

Bauer, Next, TCP, Uniqlo, Brice, Black Berry, Colins, Baker Street, Hudson's Bay, Jacob, London Fog, Sears Canada, C&A, Celio, Esprit, George Clothing, Marks & Spencer, Oxbow, Mexx, The Stadium, MWW, Tom Tailor & Others.

2.3.8: Export Country:

Majorly to USA, UK, EU & Japan. Then in addition Australia, Argentina, Austria, Belgium, Brazil, Canada, Chile, China, Columbia, Dubai, France, Germany, Greece, Guam, Hong Kong, Hungary, India, Indonesia, Ireland, Italy, Korea, Kuwait, Lebanon, Libya, Malaysia, Mexico, Morocco, Netherland, Norway, Panama, Peru, Philippine,

Poland, Russia, Saudi Arab, Singapore, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, Ukraine, Uruguay, Vietnam, etc.

2.3.9: General Policy:

It is important for all the employees of the company to follow the duties and obligations set by the company management during his/her working tenure. This includes maintaining attendance, confidentiality, dress code, cleanliness, noise level, working hours, overtime, workplace, working tools/aids, confidentiality, interval for rest, meal and prayer, employment categories, equal employment opportunity, ID badge, smoking, sexual harassment and other etiquettes.

These policies imply that the company management not only values and recognizes the concerned issues, but it also instructs and encourages its employees to become obliged with the company rules and follow those with sincerity and integrity. These policies also imply that **STANDARD GROUP** gives high priority to morality, punctuality, congenial working environment and a prospering corporate culture by maintaining set rules with strict adherence The bindings and regulations are not to be taken lenient but would provide all the incumbents enthusiastic drive of abiding those.

The outcome of such initiatives, rulings and actions would result in motivation, retention, and development of the employees and ultimately create a high performance work environment. The company holds all rights to take necessary action in case of any negligence or violation.

2.3.10: Physical Infrastructure:

The organization shall determine and maintain the infrastructure needed to achieve conformity to product requirements, infrastructure included, as applicable Standard Group maintains its telecommunication with VOIP connection to it different Corporate zones, PABX connections and LAN connections.

It's others facilities are:

- Own Network Server,
- Own power management;
- Own utility management
- Free transport facility,
- 24- hour medical Centre,
- Free meals (Corporate office)
- Fire service facility
- Others

2.4: Company Mission:

STANDARD I GROUP is dedicated to work in partnership with stakeholders to rejoice mutual progression, embrace new technology, set industry standards and provide professional but personalized solutions that will result in the best possible outcomes for all to Provide the clothing retail market quality, price competitive and timely ready-made garments (RMG) Produced under both socially and environmentally responsible conditions by utilizing poor people of Kazipur and adjacent dwellers of river side of Serajgonj district have been struggling long against delusion effect of widest river the Jamuna.

2.5. Company Vision:

STANDARD I GROUP is committed to make the dreams of the founders a reality and will continue to operate within their strong and dynamic ethical business philosophies to be recognized as among the premier and most thriving organizations in the country.

2.5.1: Values:

- Adhere to high ethical standards that exceed compliance standards set by our customers.

- Provide equal employee opportunity to all employees;
- Encourage innovation and adopt necessary changes;
- Ensure safe & healthy working environment for all our employees;
- Abide by laws and regulations set by both our customers and the government;
- Assist all employees and their families in need;
- Keep our production environmentally friendly.

2. 5.2: Goals & Beliefs:

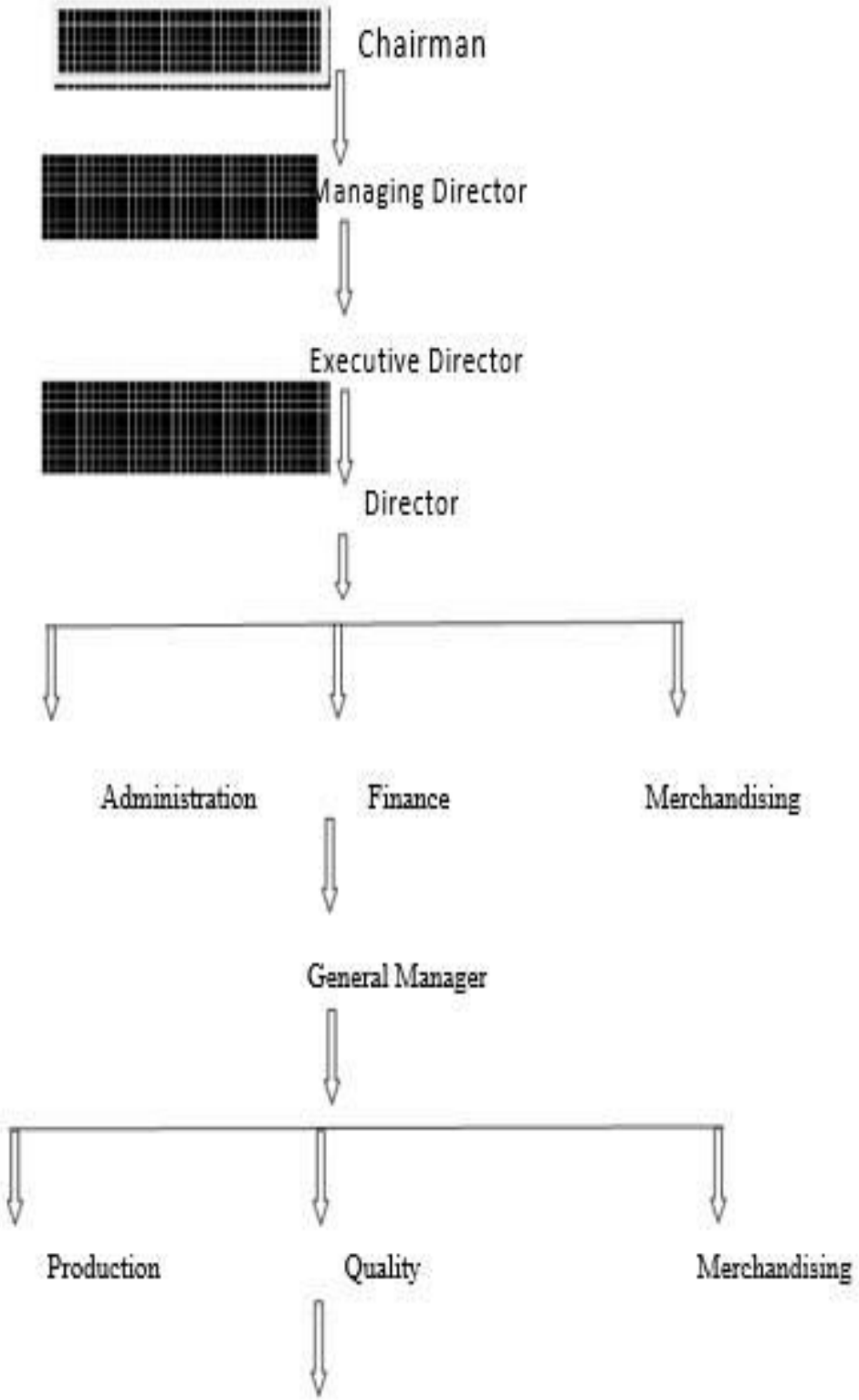
Our goal at Standard Group is simple -- extraordinary customer service as we provide our customer's needs in the fashion industry. We accomplish this by taking over the tasks which interfere with an enjoyable, leisurely lifestyle; and by partnering with organizations those have the finest reputations for quality.

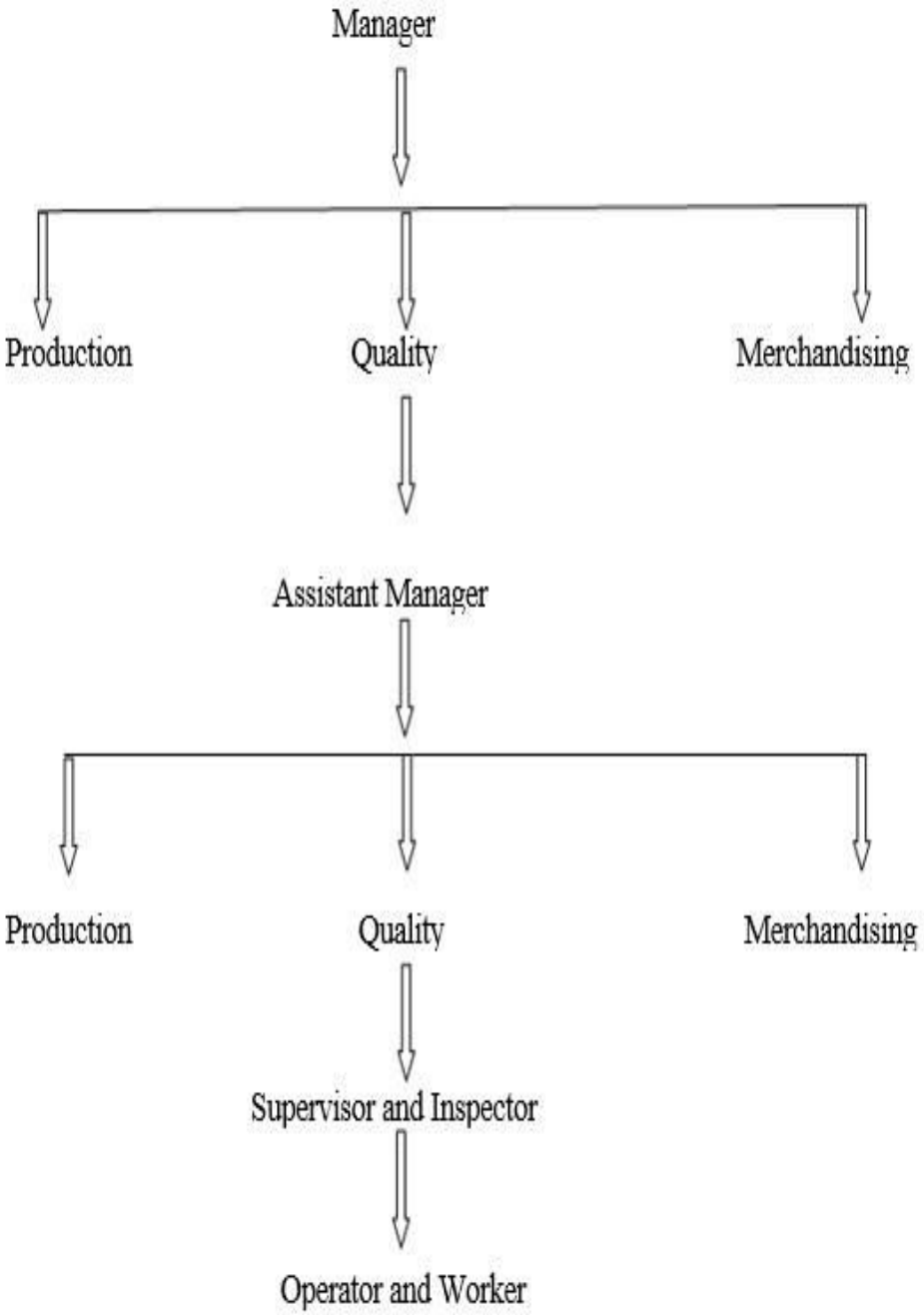
2.5.3. Major buyers with logo:

Through a wide range of high quality fashion garments for men, women and children, Standard Group has marked a distinguished presence in various countries including USA, UK, Europe and Canada.

2.5.4. How Standard I Group is different:

2.6: Organogram of Standard I Group:


Chairman
Managing Director
Executive Director
Director
Administration
Finance
Merchandising
General Manager
Production
Quality
Merchandising



2.7. Shift Change:

There are two shifts for operation personnel in this industry. So the shifts are changed at Every 12 hours. The shift timing are as below:

™ 8.00 am to 8.00 pm (“A” Shift) & ™ 8.00 pm to 8.00 am (“B” Shift)

™ Administration i.e. Management personnel work on General shift of duration 8:00 am To 5:00 pm and 6 days per week.

2.8. Responsibilities of Production Executive:

- To follow and execute the daily production plan accordingly.
- To give the right decision for the minor troubleshooting.
- To convey the proper information to the next shift.
- To maintain target productivity of every section in his shift
- To give job card to maintenance department whenever machine is not working or any other problem with the machine.

2.9. Different Section of Industry:

- Fabric store.
- Sample section.
- Lesser Section

Cutting section.

- Sewing section.
- Washing section.
- Finishing section
- ETP plant
- Maintenance
- Chemical store
- Compliance

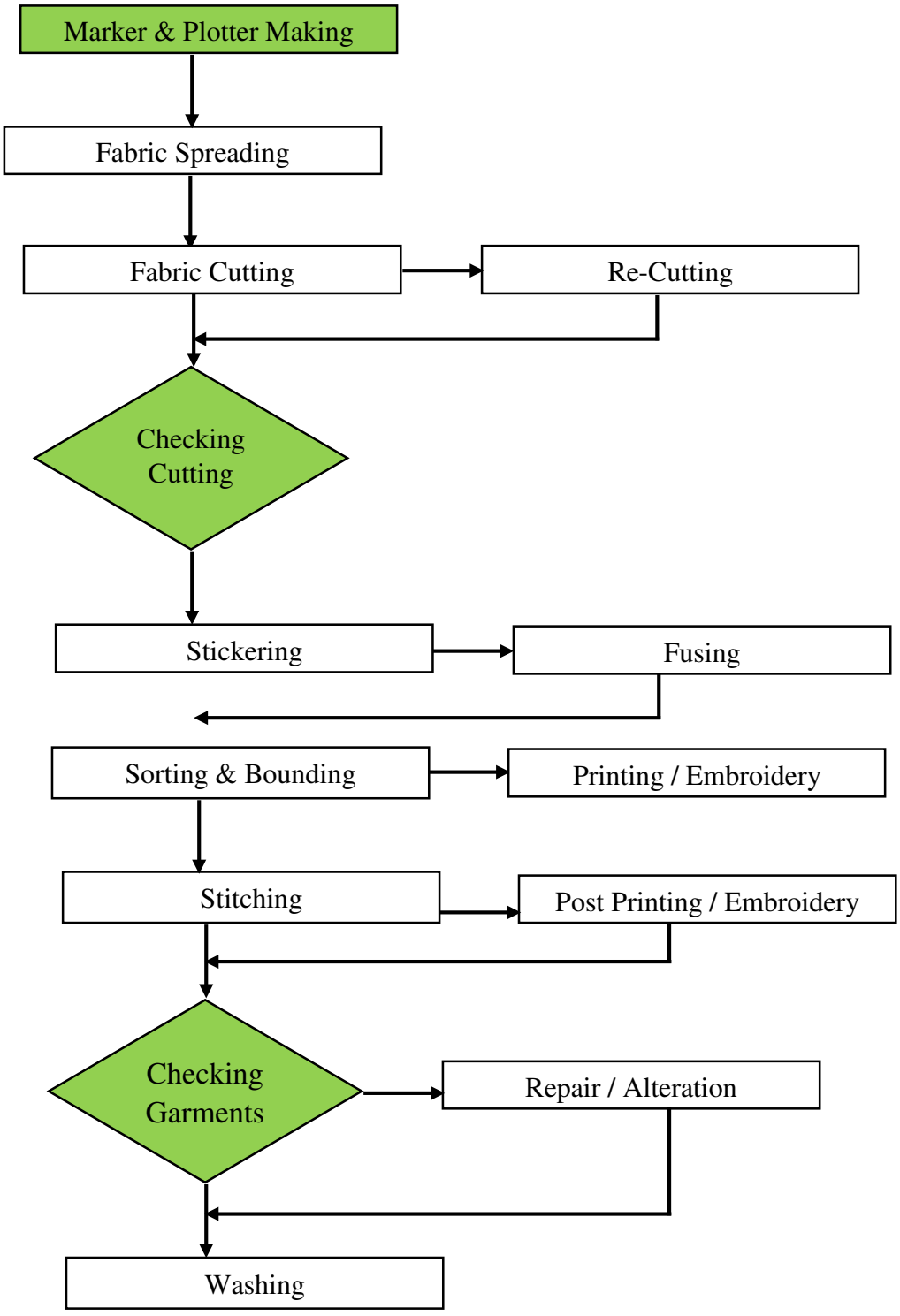
Costing

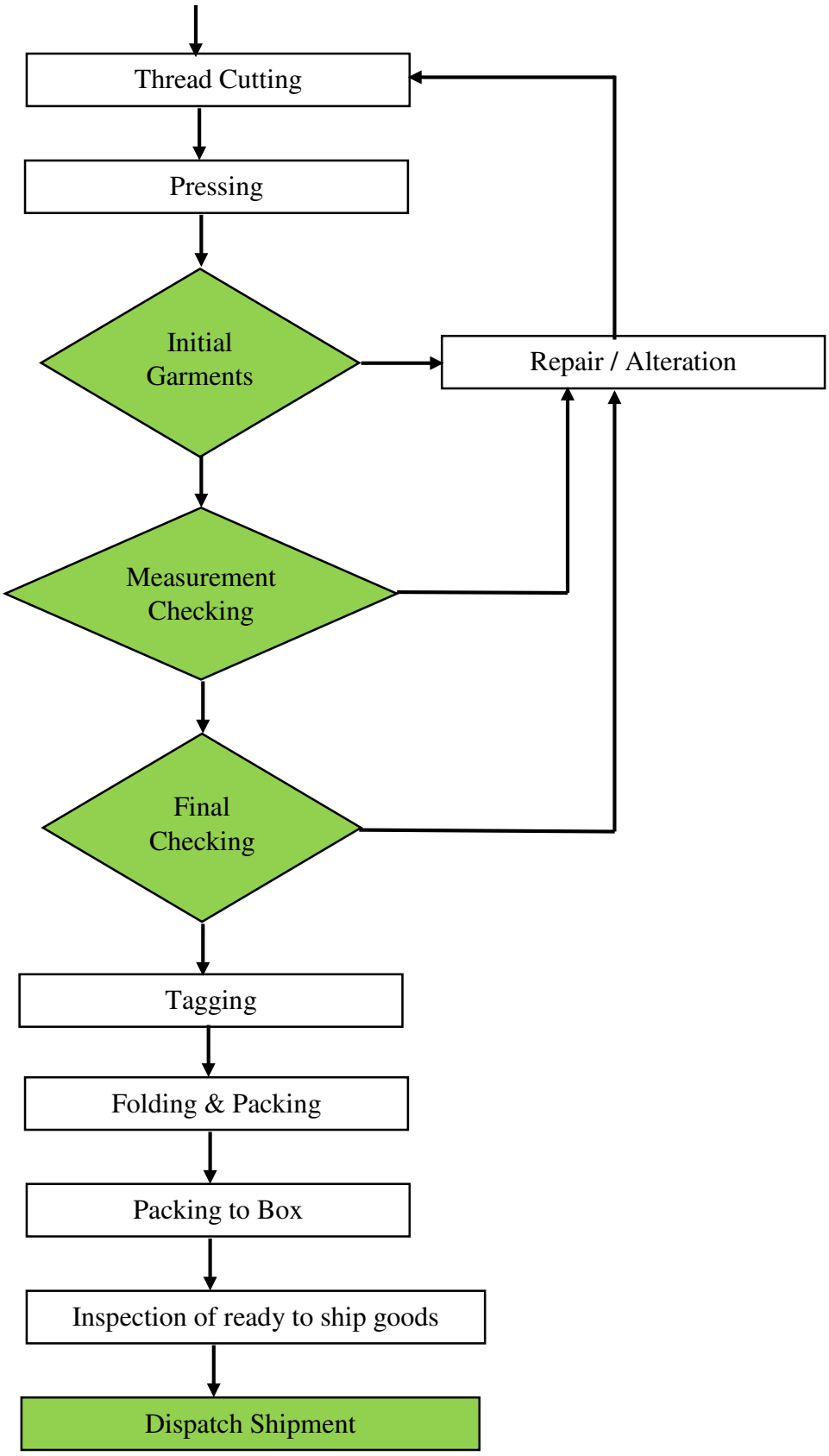
- Utility.

CHAPTER- 03 INDUSTRIAL ATTACHMENT

GARMENTS MANUFACTURING PROCESS FROM FABRIC TO FINISHED PRODUCT

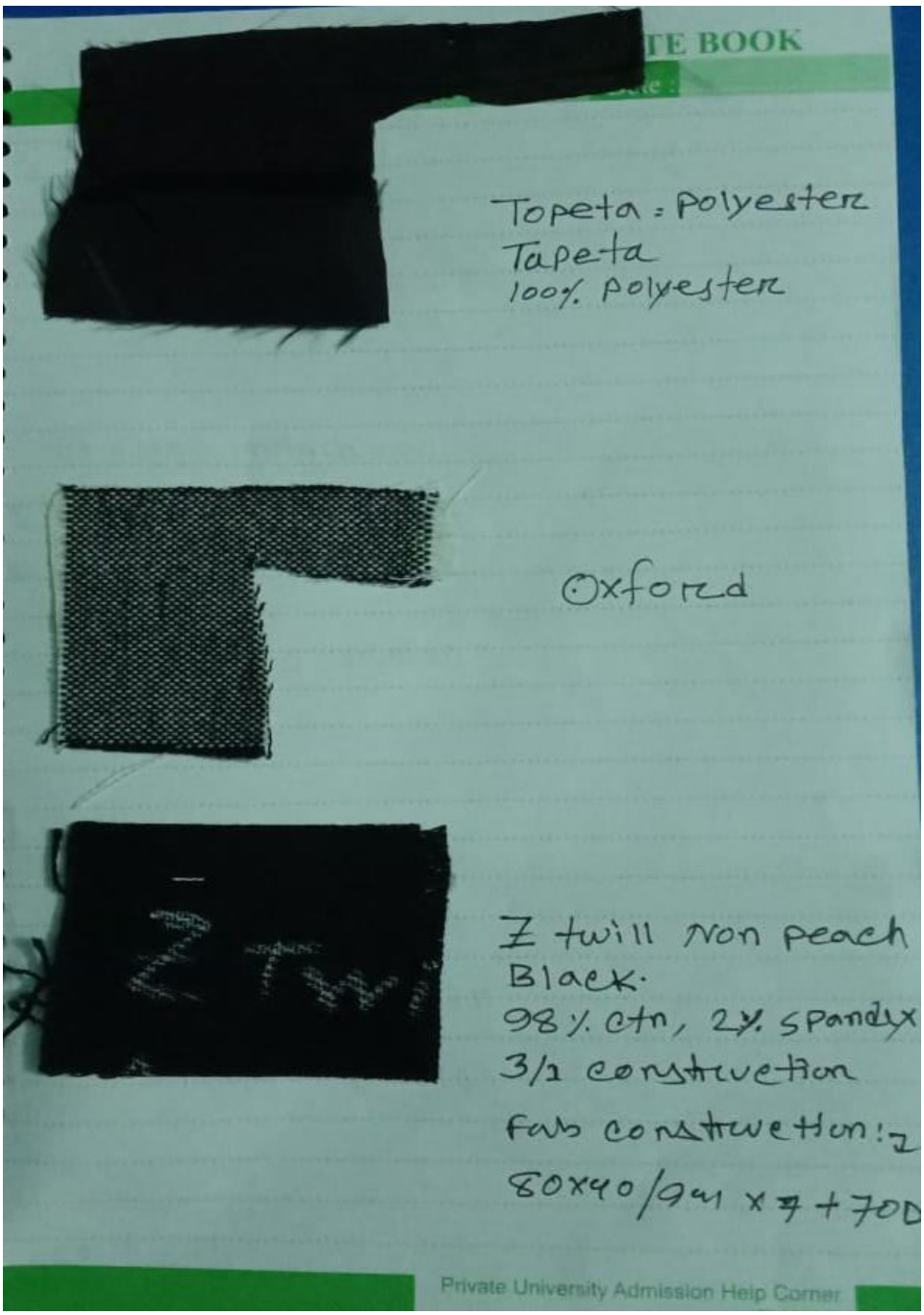
3.1: Production Process Flow for Woven Garment Manufacturing

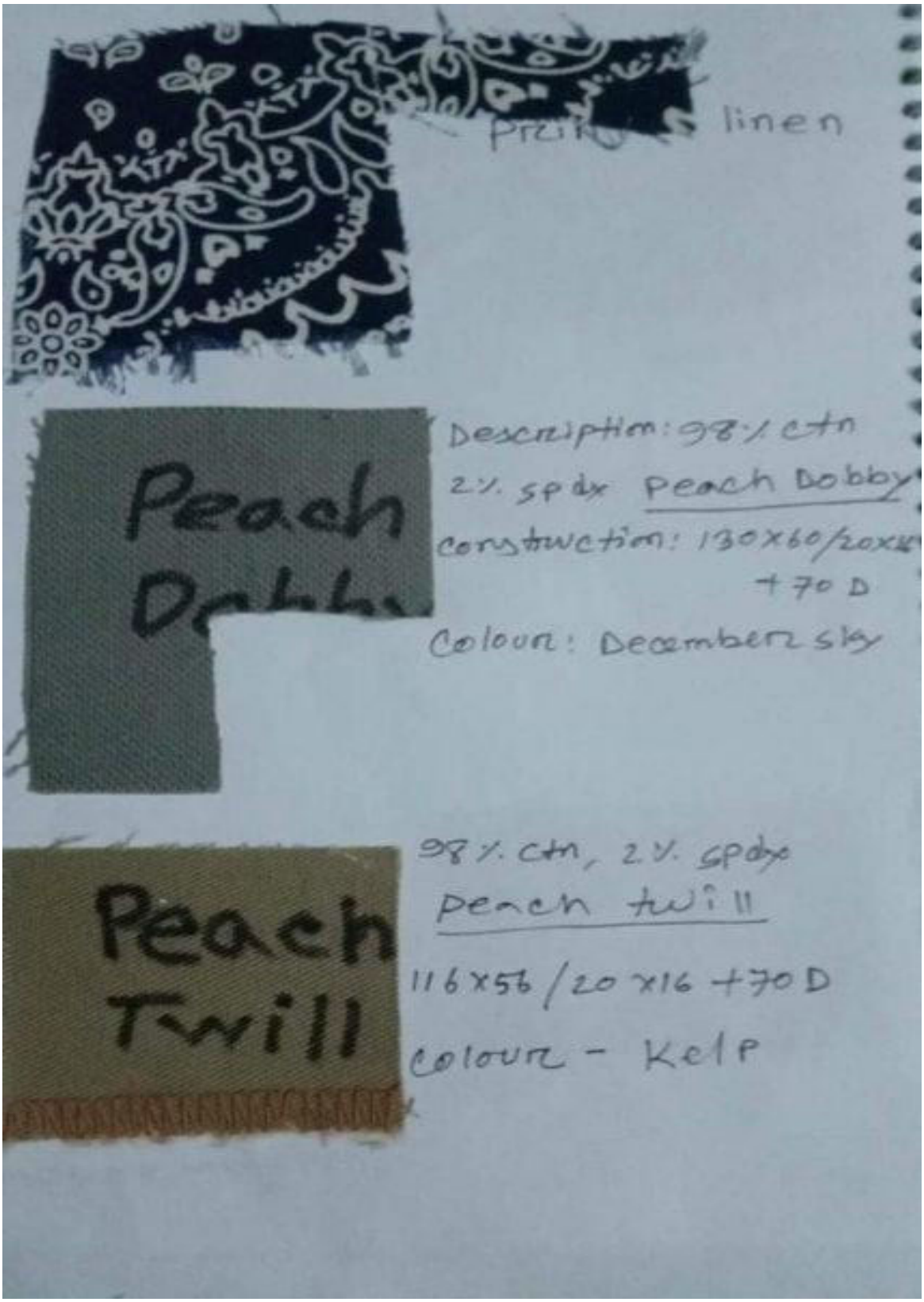



Thread Cutting
Pressing
Initial Garments
Repair / Alteration
Measurement Checking
Final Checking
Tagging
Folding & Packing
Packing to Box
Inspection of ready to ship goods
Dispatch Shipment

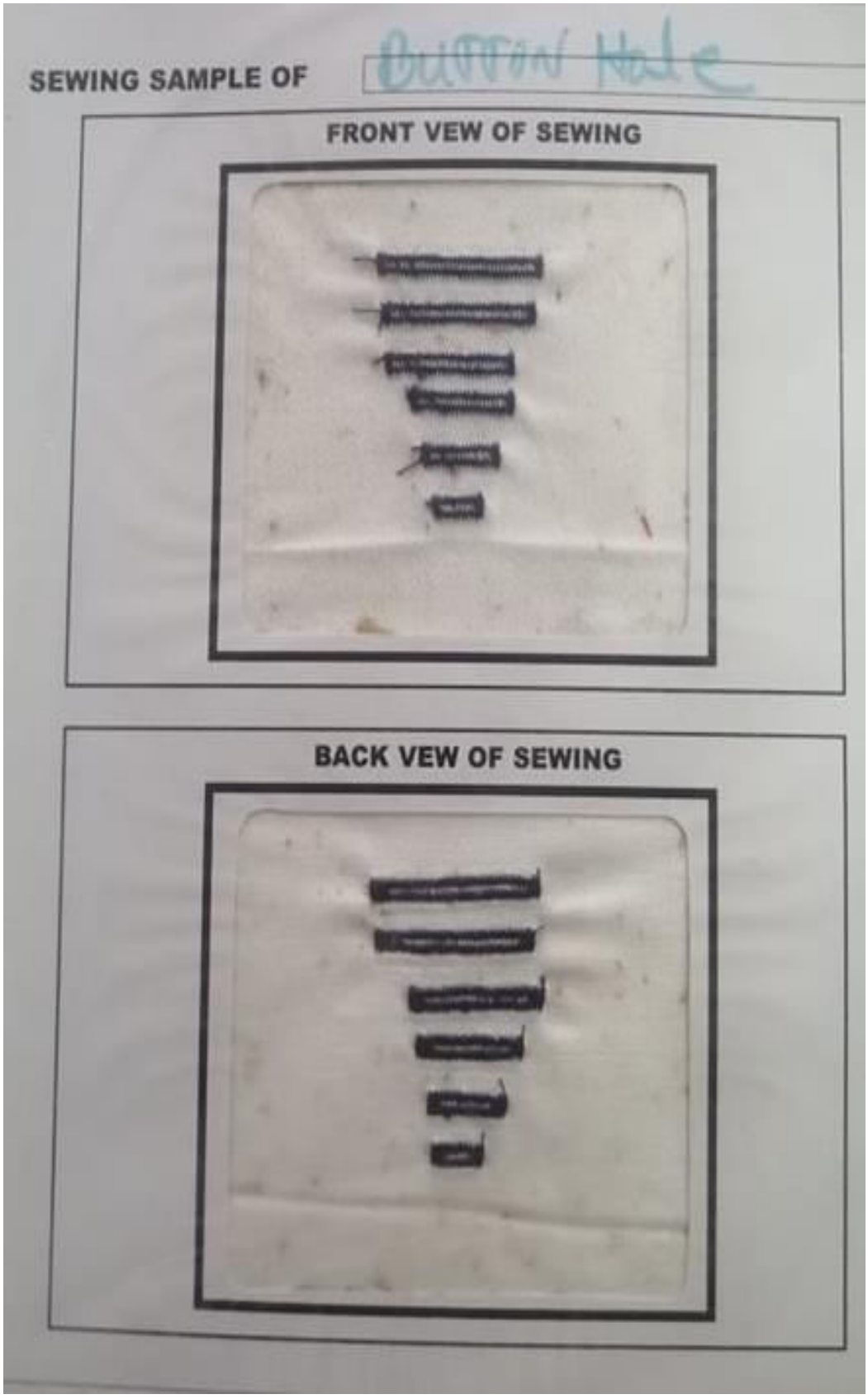
3.2. Fabric, Accessories & Trim Swatch of running production:

3.2.1: Below some various type of fabric swatch.




linen
Peach Dobby
Description: 98% ctn
2% spdx Peach Dobby
construction: 130x60/20x16
+70 D
Colour: December sky
Peach Twill
98% ctn, 2% spdx
peach twill
116x56/20x16 +70D
colour - Kelp

3.2.2: Below some various type of Accessories & Trim swatch



SEWING SAMPLE OF

FRONT VEW OF SEWING

BACK VEW OF SEWING

CIVIL ENGINEERS PAK

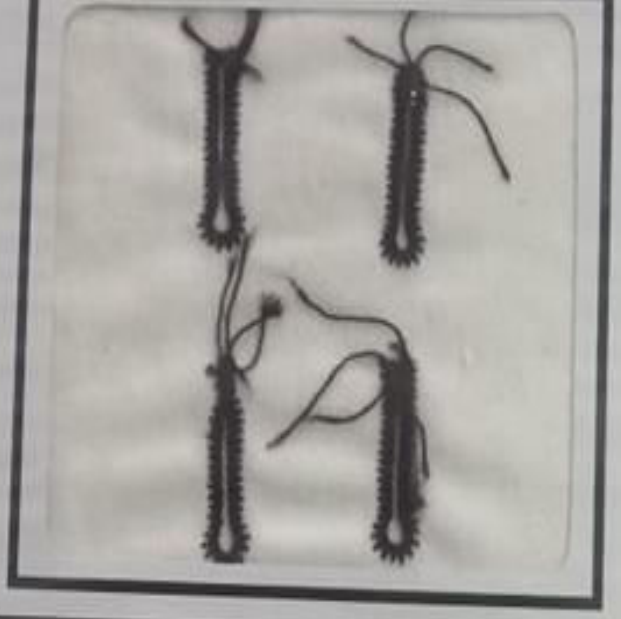
SEWING SAMPLE OF Overlock

FRONT VEW OF SEWING

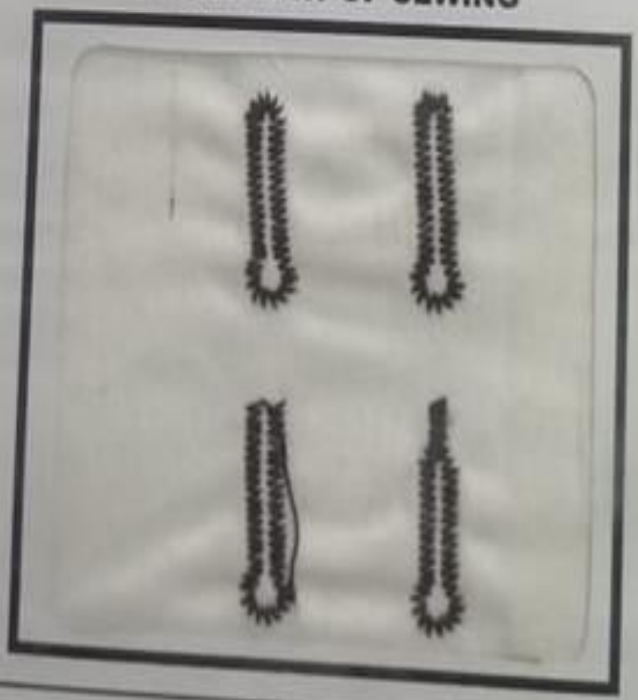
BACK VEW OF SEWING

SEWING SAMPLE OF Eyelet Hole

FRONT VEW OF SEWING

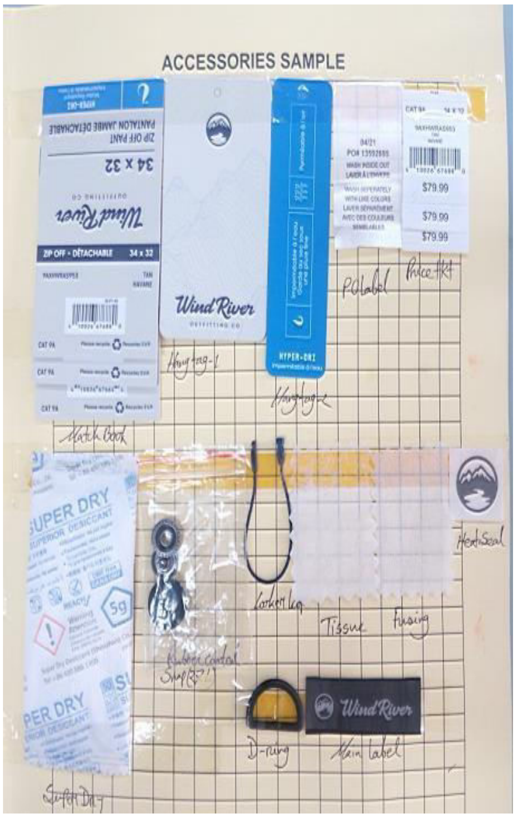


BACK VEW OF SEWING



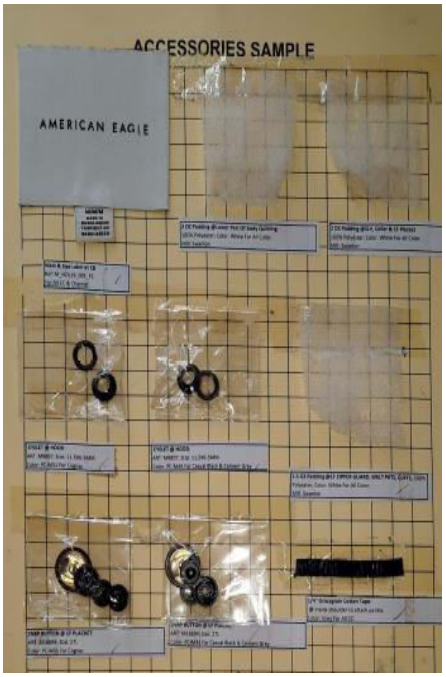

Tan
Black
DK.Olive


DENVER HAYES
34 x 32


ACCESSORIES SAMPLE
Wind River
34 x 32
$79.99
SUPER DRY


ACCESSORIES SAMPLE
STRAIGHT
DROIT
DENVER HAYES


COLOR / PATTERN
FAB. DESCRIPTION
COLOR / CODE
ORDER / QUANTITY/COL
APPROVED COPS / DTS


ACCESSORIES SAMPLE
AMERICAN EAGLE


FAB. DESCRIPTION
ORDER / QUANTITY/COL

CHAPTER- 04 INVENTORY STORE

4. Inventory:

Inventory is the stock of any item or resources used in an organization.

4.1. Fabric storage:

Fabric storage Supplied grey fabrics are first subjected to the 4 point inspection system. Only those goods are stored here which are passed from the quality control department. Defected fabrics are store in rejected area and then back to the supplier.

4.2. Types of Store:

Here exists 3 types of store.

1. General store.
2. Fabric store.
3. Accessories store.

4.3. Inventory Store:

4.3.1. Fabric inventory: Various types of fabric and accessories such as sewing thread, button, interlining, zippers, label etc are stored in a room. Here also machine parts and stationary are stored in store room.

100% of the fabrics are stored and supply to **STANDARD GROUP** from here. Washing is the most important part of the readymade garments. For innovative outlook and fashion based. Style that doing by washing especially on denim fabric. Fabric store which maintained the fabric roll and its quality. There are some employees with Worker whose are working on it first, they received the roll as per purchase order. Then it Counted by order sheet and started inspection. Main things of inspection try to find out the Fabric fault and its quality. There are different types of fault. Such as stick mark, missing Yarn, thick yarn, slub, knot, spot, and hole. Faults are detected by follow the 4 point system and strictly follow to hold the fabric quality keep the best. On the other side from each roll

22″ cut as width wise and making blanket and then it goes to washing section to measuring its shrinkage. Shrinkage% = (After wash - Before wash) ÷ before wash) ×100. After washing how much fabric shrinked from its previous size that is measuring because when they got shrinkage result then they informed about fabric

shrinking measurement.

Fig: Fabric store room

4.3.2. Accessories: The materials which are not attached with the body of garments by sewing, only used for garments finishing and packing (decorative purposes) are termed as accessories. The main difference between trimmings and accessories is, trimmings are used as functional.

4.4. Accessories inventory items:

4.4.1. Label: Labels are the most important trimmings by which customer easily know about the product. Here two types of label are available.

1. Main label: It contains the name of the buyer and country.

2. Sub label: If buyer required

a) Size label: It contains the size of the garment.

b) Care label: It contains care construction. Different types of care label are given below.

1) Washing Code
2) Bleaching Code
3) Ironing Code
4) Dry cleaning Code etc

c) Composition: It contains fiber composition of the fabric. Ex: 65% cotton, 30% polyester, 5% lycra.

4.5. Sewing Thread:

Different types of sewing threads are available in store room. Such as,

a) 20/2
b) 20/3
c) 20/9 (Used in eyelet and bar tack m/c)
d) 40/2 (Most thinnest thread).

4.6. Button:

Buttons are hardware items used in junction with buttonholes for the fastening of garments.

Purpose:

The purposes of using buttons are:

A) Functional purpose:

This referee to buttons which are used to open and close garments with security.

B) Decorative purpose:

These are buttons which are used purely for decorative purpose .for example, Sleeve vents. Types of buttons:

4.7. Zipper:

This is one kind of trimming which is use open and close of special parts of garments. Purpose:

Functional:

Functional purpose of zipper is as a part of a garment here zipper is used to open and close the openings.

Decorative purpose:

Where zipper is used as a decorative purpose, it increases the beauty of garments. Uses:

In making trousers and jackets, chain or zipper is in essential component which is used to open.

Types of zipper: According to manufacturing material there are 3 types of zipper.

1. **Metal zipper:** Metal zipper is used in trousers and shorts.

2. **Nylon zipper**: Polyester or nylon zipper are used in jackets .It is made from a continuous filament paced onto narrow fabric tape.

Slider: It is move up and down. Function of slider is to engage or disengage the teeth of opposite sides of chain. Slider mainly three types they are:-

1. Non –locking.
2. Semi-looking.
3. Full or auto locking. or close of special parts of garment.

4.8. Interlining:

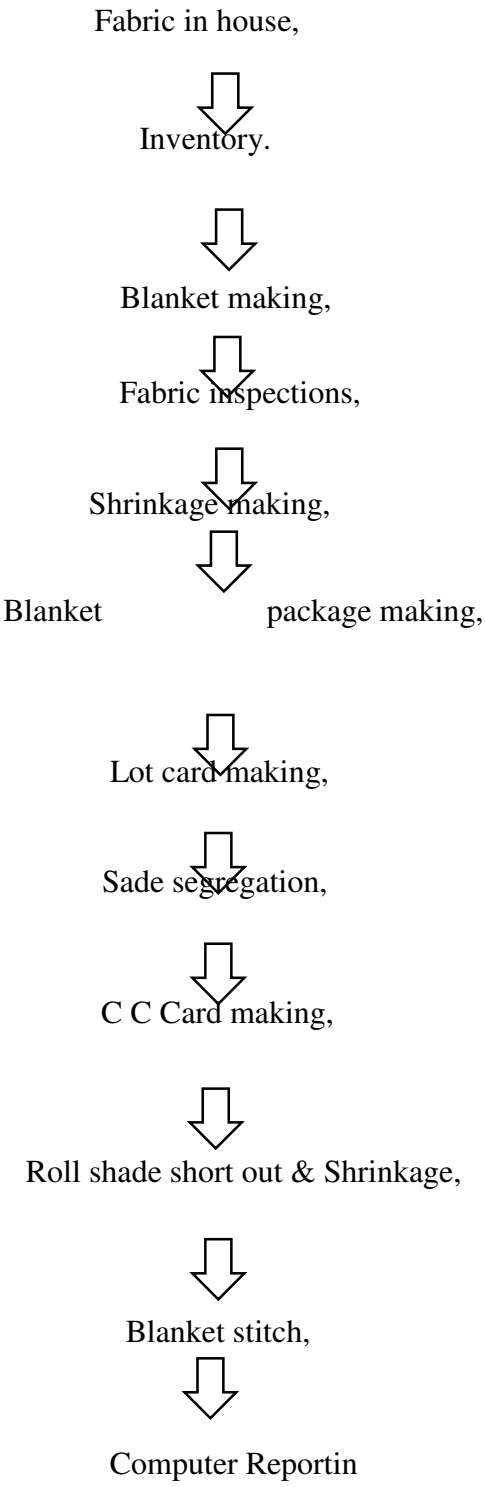
Interlining are used to support reinforce and control the shape of some areas of garments such as collar, cuffs, waist bands ,facings and in front of corts .They may be sewn into the garments or they may be attached by the fusing .Nowadays sewn interlining are hardly used and usable interlinings are widely used. Interlining is available in a wide variety of weights and constructions to Mach the fabric of garment.

They can be woven non -woven product .Woven interlining are most commonly of plain weave construction, whereas non-woven interlining are made directly from textile fibers and are held together by mechanical, chemical ,thermal or solvent means or

Combination of these.

4.9. Flow chart of fabric store:

Fabric Inspection: In here fabric are inspected. By this flow chart fabric are inspected.



CHAPTER- 05 FABRIC INSPECTION

5.0. Fabric Inspection Section:

The inspection are done to control the quality is means examining the products without any instrument. To examine the fabric, sewing, button, thread, zipper, garments measurement and so on according to specification or desired standard is called inspection. There are so many facilities for inspection in every section of garments industry. The aim of inspection is to reduce the time and cost by identifying the fault and defect in every steps of garment making.

To do success in inspection, the process can be run by maintaining following "inspection loop": `

™ Inspection.

™ Identification the defect or fault. ™ Knock the appropriate person. ™ Identify the reason of defect or fault.

™ Remove the defect or fault.

"In Standard Group"fabrics are inspected by Four-Point System.

5.1: Four-Point System:

5.1.1. Four-Point System: In this method points are found defect points are found out of 100 sq. yds of inspection. The fabric must be rejected if the defected point are >40.

Sl. No.	Defect length for warp way and weft way	Point
1.	Up to 3"	1
2.	More than 3"-6"	2
3.	More than 6"-9"	3
4.	Above 9"	4
	1''or 1''	
	Above 1''	

Note: defects points must not be more than 4 in each yard.

5.1.2. Amount to select:

Inspect at least 10% of the total rolls of the shipment. Selection of rolls; select at least one roll of each color. If more than one roll must be selected, then choose the additional roles in proportion to the total number of roles per color received. Defect classification :(four point system) Size defect penalty:

- 3 inch or less =1 point Over 3 inch or, but less than 6=2 point
- Over 6 inch or, but less than 9=3 point
- Over 9 inch=4 point

The length of defect is used to determine the penalty point. Only major defect is considered. No penalty points are assigned to minor defects. (A major defect is any defect that would cause a final garment to be considered a second).

5.2: Fabric quality inspection:

The quality of a final garment depends on the quality of a fabric when it is received as a roll. Even the most outstanding manufacturing methods can not compensate for defective material. Normally, we inspect 10% of the rolls we received and evaluate them based on a four point system. This way, we can avoid fabric related quality problems before it is put into production.

Fig: Fabric Inspection Section (Standard Group)

5.3. Major defect:

™ Major woven fabric defect include but are not limited to slub, holes, missing yarn, yarn variation, end out, soiled yarn and wrong yarn.

™ Major dye or printed defect, out of register dye spot, machine stop, color out, color smear, or shading.

5.4. Acceptance criteria and calculation:

™ 40 point per 100 yards in acceptable defect rate of points per 100 yds = # of penalty points X 100 Yds. Inspected.

5.5. Sewing thread inspection:

™ Thread inspection are able to move 140-160 km speed per hour during into the needle eye of sewing machine.

™ Strength of thread must be 2-32 due to friction between the thread and part of machine.

5.6. Criteria of sewing thread:

The following are tests done to identify thread construction.

1. Thread count.
2. Thread ply.
3. Thread number of twist.
4. Thread balance.
5. Thread tenacity.
6. Thread elongation.
7. Etc

5.7. Fabric fault:

™ Bad Selvedge: Causes: A defect in a fabric because of faulty weaving, warp ends being set too far apart for the thickness of the yarn or in finished fabric, an appearance in

Fig: Bad Selvedge defective in fabric

Which the underlying structure is not connected to the degree required.

™ Burl Mark: Causes: When a slub or extra piece of yarn is woven into the fabric, it is often removed by a "burling tool." This will usually leave an open place in the fabric.

Fig: Burl Mark in fabric

™ Drawbacks: Causes: Caused by excessive loom tension gradually applied by some abnormal restriction. When the restriction is removed the excess slack is woven into the fabric.

Fig: Drawbacks in fabric

™ Dropped Pick: filling yarn, causing the filling yarn to be woven without tension. The filling yarn appears as "kinky." There will also be areas of "end out."

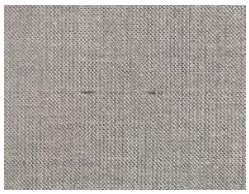


Fig: Dropped Pick in fabric

™ End out: Causes: Caused by yarn breaking and loom continuing to run with missing end.

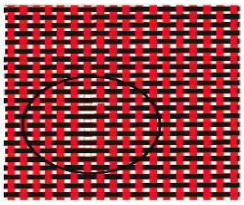


Fig: End out in fabric

™ Jerk-in: Causes: Caused by an extra piece of filling yarn being jerked part way into the fabric by the shuttle. The defect will appear at the selvage.

Fig: Jerk-in in fabric

™ Knots: Causes: Caused by tying spools of yarn together.

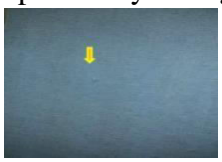


Fig: Knots in fabric

™ Mixed End (Yarn): Causes: Yarn of a different fiber blend used on the wrap frame, resulting in a streak in the fabric.

™ Mixed Filling Causes: Caused by bobbin of lightweight yarn or different fiber blend used in filling. Will appear as a distinct shade change

™ Open Reed Causes: Results from a bent reed wire causing wrap ends to be held

apart, exposing the filling yarn. Will be conspicuous on fabrics that use different colored yarns on wrap and shuttle.

™ Slub Causes: Usually caused by an extra piece of yarn that is woven into fabric. It can also be caused by thick places in the yarn. Often is caused by fly waste being spun in yarn in the spinning process.

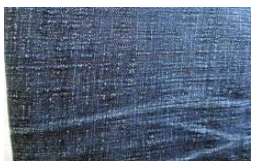


Fig: Slub Causes in fabric

™ Smash Causes: Caused by a number of ruptured wrap ends that have been repaired.

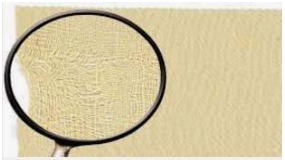


Fig: Smash Causes in fabric

™ Soiled Filling or End Causes: Dirty, oil looking spots on the wrap or filling yarns, or on package-dyed yarn.

Fig: Soiled Filling in fabric

™ Stop Mark: Causes: When the loom is stopped, the yarn elongates under tension; when loom starts again' the slackness is woven into the fabric.

Fig: Stop Mark in fabric

™ Thin Place: Causes: Often caused by the filling yarn breaking and the loom continuing to run until the operator notices the problem.

Fig: Thin Place in fabric

™ Holes: Causes: Bad needle, take down mechanism too tight, high tension on yarn, bad yarn needle too tight in their slots, dial height too low or too high, badly tied knots,

Fig: Holes in fabric

™ Improper stitch setting Drop Stitch Causes: Takedown mechanism too loose, defective needles, too loose yarn tension not sufficient, wrong needle timing set, needle tricks closed.

Fig: Drop Stitch in garments

™ Loop Distortion Causes: Bad and bent needles, bent trick walls, uneven yarn tension, needle timing set wrong, yarn carriers set wrong.

5.8. Types of fault: pad……..

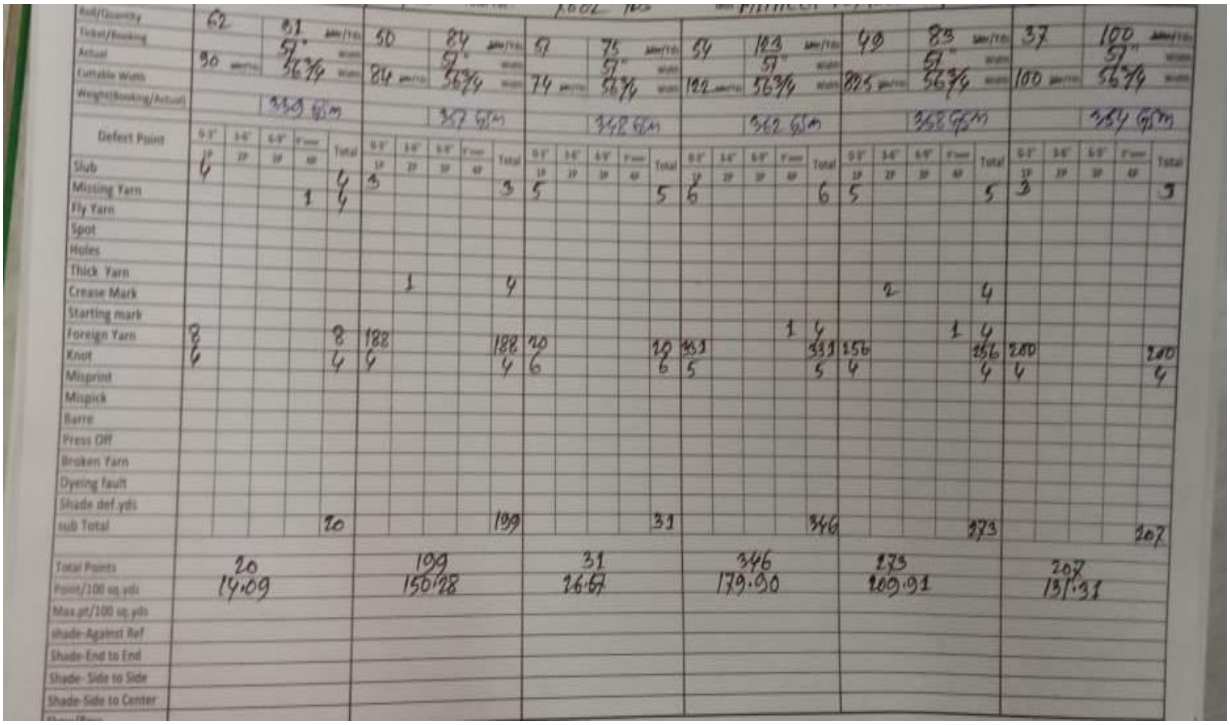


Fig: Fabric Quality Inspection Report form

CHAPTER- 06 INDUSTRIAL ENGINEERING

6.0. 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.

6.1. Method Study:

Method study is the systematic recording and critical examination of ways of doing things in order to make improvements.

6.2. Work Measurement:

Work measurement is the application of techniques designed to establish the time for a qualified worker to carry out a task at a defined rate of working.

6.3. Time Study:

Time study is a work measurement technique for recording the times of performing a certain specific job or its elements carried out under specified conditions, and for analyzing the data so as to obtain the time necessary for an operator to carry it out at a defined rate of performance.

6.3.1. Time Study Tools:

To do time study you need to arrange following tools

1. A stop watch
2. Time study format
3. One pen or pencil
4. Time Study board

6.4. Work Cycle:

A work cycle is a sequence of elements which are required to perform a job or yield a unit of production. The sequence may sometimes include occasional elements.

6.5. Rating:

Rating is the assessment of the worker's rate of working relative to the observer's concept of the rate corresponding to standard pace.

6.6. Standard Performance:

Standard performance is the rate of output which qualified workers will naturally achieve without over-exertion as an average over the working day or shift, provided that they know and adhere to the specified method and provided that they are motivated to apply themselves to their work.

This performance is denoted as 100 on the standard rating and performance scales.

6.7. SMV:

SMV is an abbreviation word; it means "Standard Minute Value". In the efficiency report SMV means the total time required for produce garments in sewing section. In sewing section SMV calculating time start from input transfer from input rack to sewing operator all the sewing process up to the final sewing process check.

For a specific process SMV calculation process include:

1. Pickup time: It means the operator when touch the parts up to starting sewing.
2. Stitching time: Is means the time when the garments passing under the needle. 3. Dispose time: Is means the time after finish the stitch the garments take off from the machine thread cutting and pass it to another process.

6.7.1. SMV factor:

- ❖ SMV factor is a numerical standard value, which is constant for a specific quantity.
- ❖ SMV always calculates on standard qualified worker.
- ❖ SMV with factor means SMV multiply by factor.

- ❖ So the capacity= $\frac{\text{Total working minutes}}{\text{SMV}}$ X Number of worker in the line

6.8. Efficiency:

Efficiency means the capacity of a person or machine or a specific process. It is the combination of different activities are-

- Standard time limit
- Consumed time.
- Number of employee
- Total input
- Total output
- Denoted variable (Percentage).

To calculate Efficiency there is a specific formula.

Efficiency for a single line= $\frac{\text{SMV} * \text{total output}}{\text{Total worker} * \text{Total working Hour} * 60}$ x100 %

Example: Say,

SMV (Standard Minute Value) = 21.70 Minutes

Specific line total output =1300pcs

Total worker in the line = 85 person

Total working hours =10 hours

1 hour = 60 minute

Efficiency for a single line = $\frac{21.70 * 1300}{85 * 10 * 60}$ x100

=55.314%

6.9. Basic Time:

Basic time is the time for carrying out an element of work at standard rating, i.e. (Observed time x observed rating)/ Standard rating

6.10. Selected Time:

The selected time is the time chosen as being representative of a group of times for an element or group of elements. These times may be either observed or basic and should be denoted as selected observed or selected basic time.

6.11. Relaxation Allowance:

Relaxation allowance is an addition to the basic time intended to provide the worker with the opportunity to recover from the physiological and psychological effects of carrying out specified work under specified conditions and to allow attention to personal needs. The amount of allowance will depend on the nature of the job.

6.12. Standard Time:

Standard time is the total time in which a job should be completed at standard performance.

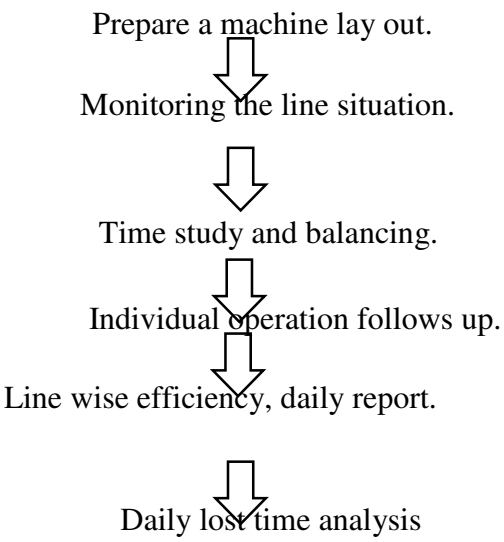
6.13. Predetermined Time:

A predetermined time standard is a work measurement technique whereby times established for basic human motions (classified according to the nature of the motion and the conditions under which it is made) are used to build up the time for a job at a defined level of performance.

6.14. Work Specifications:

A work specification is a document setting out the details of an operation or job, how it is to be performed, the layout of the workplace, particulars of machines, tools and appliances to be used, and the duties and responsibilities of the worker. The standard time or allowed time assigned to the job is normally included.

6.15. Flow chart of Working Process



6.16. Benefit of Work Study:

- It increases productivity at cheap cost.
- It is a systematic and comprehensive method of analyzing a problem. So low factor is overlook in evaluating the problem and finding out the solution.
- It can be easily and quickly implemented.
- It provokes benefit as soon as it is applied and continuous till it is in use.
- It can reduce hazard by developing made of work.
- It is the most accurate method of setting time of performance upon which effective planning and production control relies upon.
- Production quota can be determined for daily or hourly workers.

6.16.1. Work Study officer & IE Responsibilities:

- List & Inventories the entire available operator, helper & machine.
- Balance each line hourly production target.
- Prepare daily basis absent report & make a plan to balance.
- Ensure operation training scheme monthly.

CHAPTER- 07 SAMPLE SECTION

7. Sample section:

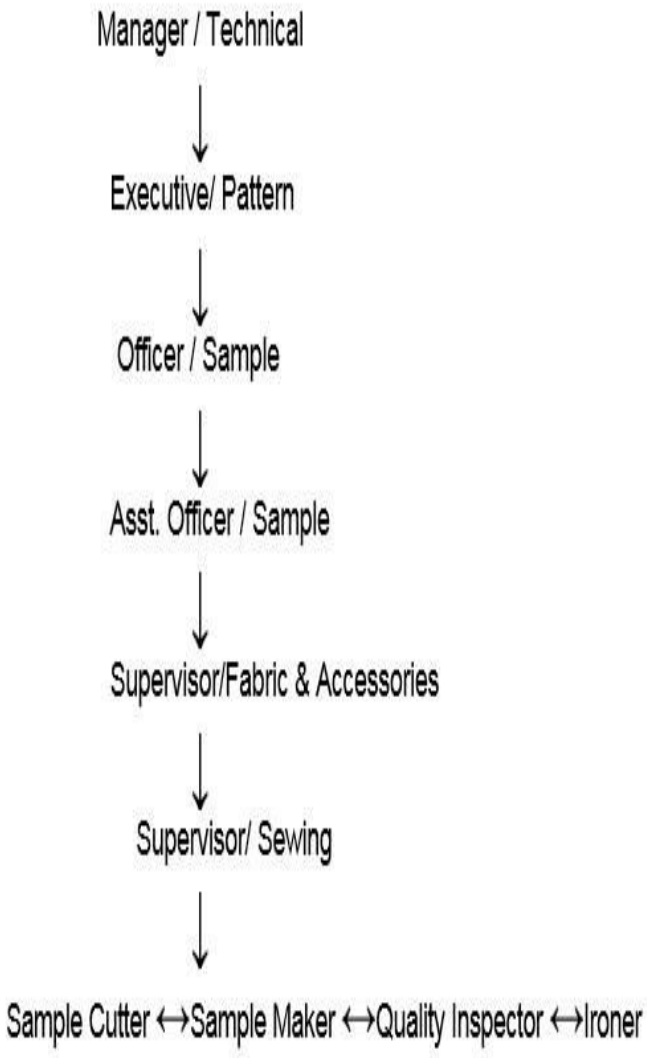
Sample section is one of the important section in apparel industry. Because Sample plays vital role in attracting buyers and confirming the order, as the buyers generally places the order once satisfied with the quality and responsiveness of the sample. Organogram of sample section in apparel industry is given here.

Fig: Garments sample section

Factories develop garment samples and take approvals on the sample from their buyers. Without sample approval, the factory is not allowed starting the bulk process. Factories need to develop various types of samples at various stages of sample development. Read about different types of garment samples. Garment manufacturers follow the product tech pack to prepare the garment sample as well as the bulk production. In the sampling stage, factory learns the garment construction details and material required for a given order. The sampling department is also work as a research and development (R&D) section for the factory. Sampling process helps

production team start the bulk production without many issues. A pre-production meeting is conducted at the factory by the merchandising team. In this meeting product design, production schedule and Responsibilities, buyer requirement in all aspect of product quality, and production completion deadline are discussed.

7.1 Organogram of Sample Section in Garments Industry



7.2 Sample & Pattern Development Section: Before going to bulk production of a sample that is trying to develop as per buyer requirement. Buyer informed different types of styles, color, shades through email, standard body or Picture. To achieve buyer requirement there have been followed different types of process. Wet process and dry process is the

main process to achieve the different types of styles and Outlook. Wet process is direct connected with washing and in dry process whisker, scraping, Laser, sand blasting, 3D, wrinkle making, grinding, tagging are followed. Sample section is the miniature of the whole bulk production. First here trial the sample and when it confirmed by the buyer then it goes to bulk production.

Fig: Sample Pattern Development Section:

7.2.1 Sample section consists of: Types of machine: (Wet)

- ™ Washing machine
- ™ Hydro extracting machine
- ™ Drying machine

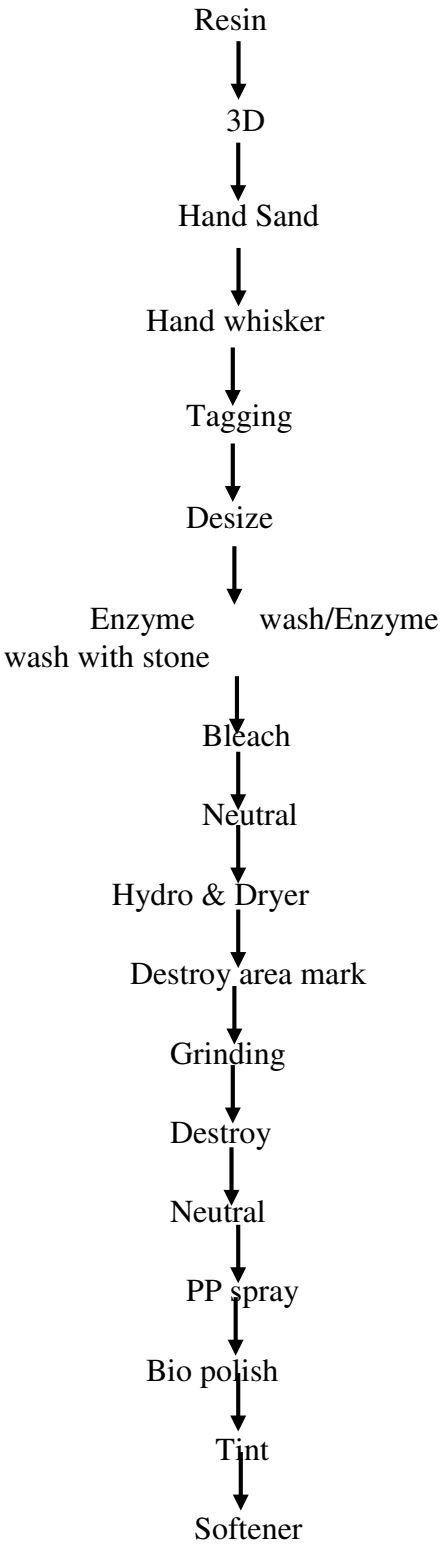
7.2.2 For dry process:

- ™ Hand whisker
- ™ Hand scraping
- ™ Destroying
- ™ Grinding
- ™ 3D
- ™ Resin spray
- ™ PP Spray

7.2.3 Types of Operation:

- ™ Sample Development
- ™ Shrinkage test
- ™ Blanket test

7.2.4 Style wise process development:



CHAPTER- 08 FABRIC DEVELOPMENT

8. Fabric Development:

Little about Fabrics: Textile fabrics are available in three main categories - knitted, woven and non-woven fabrics. Fabrics are manufactured in textile mills, and power looms sectors. Later, greige fabrics are finished as per the buyer's (garment manufacturers) requirement. The factory only needs to and the fabric(s) that is required for the style/design. The garment maker gives the fabric quality requirement to the fabric supplier

Fabric development → Fabric Lab dip preparation → Fabric approval → Pattern making →Garment sampling → Sample approval (Prototype, fit, size set, salesman's sample) →Final pattern making → Pattern grading → Fabric purchasing → Fabric inspection → Fabric shade banding → Segregation of fabrics by its widths and shade band → Fabric testing → Issue fabric for cutting section → Fabric layering →Marker making → Cutting the lay → Sorting of cut components → Layer numbering → Cut bundling and tagging → Issue to stitching floor → Stitching process → Quality checking of garment inline and end-of-the line → Garment repair → Garment washing → Garment finishing → Finished product →Product folding & Packing → Shipment inspection → Approved garments are ready ship.

for developing a new fabric design. At the fabric development stage, the negotiation of fabric price is done with the fabric vendors. Lab dip and desk loom are developed at this stage prior to bulk fabric order. Prior to bulk sourcing, fabric sample is tested

to check whether the desired quality is matched with the developed fabric or not. For yarn dyed stripes knits fabric knit-down is developed. Garment maker takes approval of bulk fabric by sending a fabric swatch to the buyer.

8.1 Diamond Design?

1) It is a derivatives of twill weave.
2) It is constructed on the basis of zigzag twill. Combination of horizontal and vertical zigzag twill.
3) The repeat number of both warp & weft threads are double of the number of warp & weft yarn of basic twill.

For example,

1) If the repeat size of basic regular twill is 6 x 6, than the repeat size of diamond design is 12x12.
2) Diamond is a reversible design.

3) It may be divided into two equal parts in both vertical and horizontal axis.
4) Pointed or V-drafting system is used to produce diamond design.

8.2 Diamond Design weave plan R.S 10X10 F.N 3/1

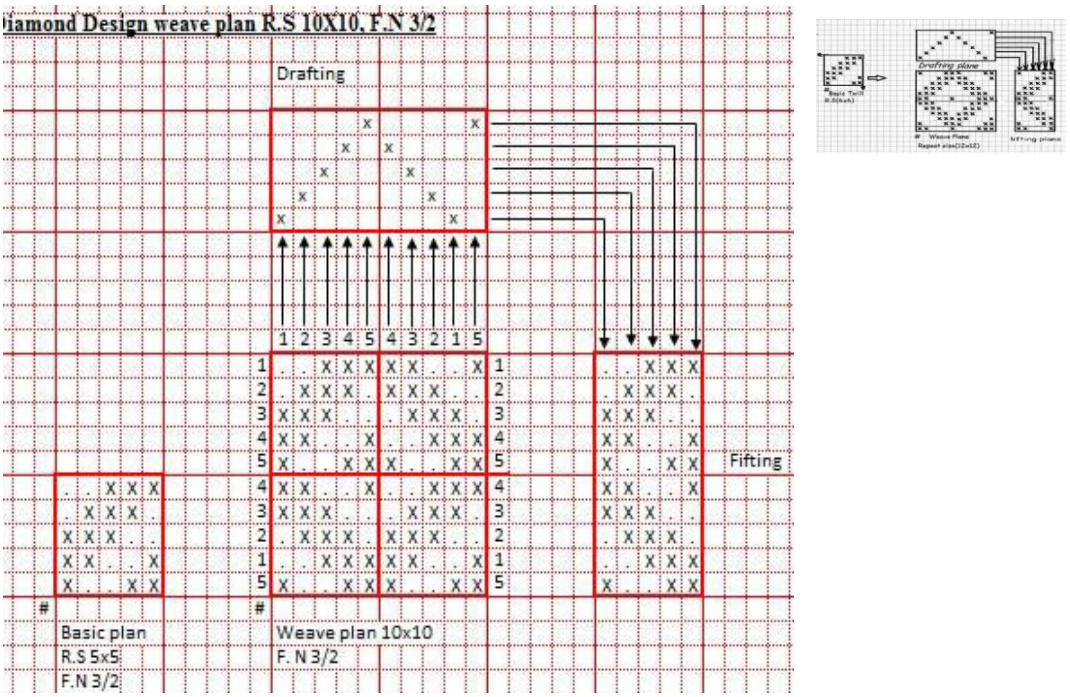


Fig. Diamond design

Features of Diamond Design

1) A diamond design at first the design repeat is selected.
2) It is the basic twill of 3 up 3 down, that is 6×6 in size, the repeat of design will be 12×12 in size.

End **Uses:** Towel, Bed cover, Table cloth, Pillow cover etc.

8.3. Selection of fabric:

There are thousands of fabric designs and fabric quality. Fabric selection is the required fabrics. Otherwise, they work with the fabric supplier to develop the desired fabric quality.

8.4. Bulk Fabric Sourcing:

Fabric sourcing: How much fabric is required for each garment? What is the average fabric consumption for bulk production? At this stage, there are few calculations on fabric consumption per garment. This work is done by pattern making department

(CAD department). Based on the fabric consumption, total fabric requirement is generated for an order and the same is sourced from the pre-approved fabric supplier. The fabrics are in-house in the factory or in a central warehouse of the company.

8.5. Fabric quality inspection:

Whether the fabrics are purchased from the buyer nominated fabric suppliers or from the open market, garment makers are not sure whether all the fabrics are without fault and defect free. So fabric checking is an important process. The fabric may be required to check 100% or can be checked randomly based on fabric quality received. For an example, 4 Point System is used by the factories for fabric inspection and fabric quality grading. Some fabric tests like fabric GSM, fabric shrinkage and color bleeding in washing are done by the factory. If the fabric shrinkage is more than the allowance, fabrics are pre-shrunk for bulk cutting. Sometimes patterns are muddied according to the fabric shrinkage which gives the correct measurement in the garment after washing.

CHAPTER- 09 CAD & PATTERN SECTION

9. Cad and Pattern Department:

Computer aided design is the use of computer technology for the design of objects, real or virtual. CAD often involves more than just shapes. As in the manual drafting of technical and engineering drawing, the output of the CAD must convey information, such as material process, dimension and tolerance according to application Specific convention. CAD may be used to design curves figure in tow-dimension space or curve surface and solid in three dimension objects.

CAD is an important art extensively used in many application, including automotive, ship building, and aerospace industries, industrial and architectural design, prosthetics and many more CAD is also widely used to produce computer animation for special effect in movies, advertising and technical manuals. The modern ubiquity and power of computer means that even perfume bottles and shampoo dispensers are designed using techniques unheard of by Crete bioengineers of the 1960s. Because enormous economic importance,

CAD has been a major driving force for research in computational geometry, computer graphics and differential geometry.

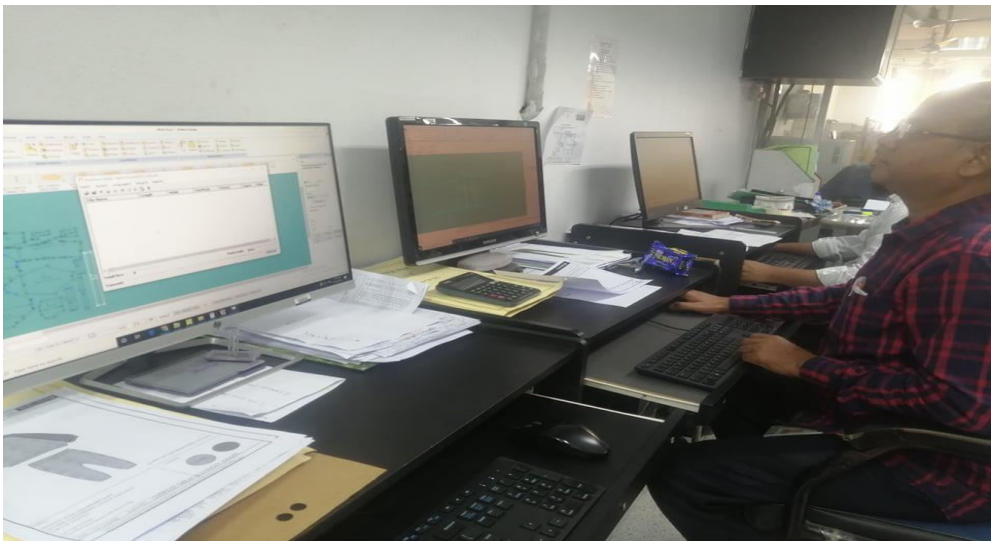


Fig: Pattern section

9.1. Pattern:

Pattern is a hard paper which is made by following each individual component for a style of garment or apparel. Actually pattern is a template from which the parts of a garment are traced onto fabric before being cut out and assembled. It is one of the most important parts of garment manufacturing industry.

Pattern making is a highly skilled technique which calls for technical ability, sensitivity for design interpretation and a practical understanding of garment construction. Pattern making is a bridge function between design and production. A basic or foundation pattern can be created by any of the two methods, namely, by drafting or by draping fabric on a model. Pattern drafting is defined as a technique or method of drawing patterns on brown paper with accuracy and precision, based on the body measurements or standard measurement chart. This is an efficient and economical method and can be manipulated to create the pattern for different styles by a technique known as flat pattern designing.

9.1.1. Types of Paper Pattern:

1. Standardized paper pattern: Paper patterns prepared using standardized body Measurements are called standardized paper patterns. This method is followed in training and tailoring schools.

2. Individual paper pattern: The measurement of a particular person is taken and a pattern is prepared using these individual measurements. The pattern prepared for a particular person will not suit another person. These are usually done at home and some tailor shops.

3. Final paper patterns: Once the individual is satisfied with the paper patterns, they are made into final paper patterns. Though, while making individual patterns all the precautions are taken, yet, there could be some minor points, which are to be considered. These minor details are corrected and finally made into permanent patterns. **4. Block paper pattern:** Normally these are made with standard sizes with thick cardboard. These are mostly used in the garment industry. The garment made out of these block patterns will fit those who have measurements equal to that of the standardized body measurement.

5. Readymade patterns: These are made using a unique type of tracing paper. These can be procured from the market and are more useful for people who can do stitching, but not drafting. These can be bought readymade and can be easily used by placing on the material and cutting and stitching accordingly.

6. Graded paper pattern: Patterns of five consecutive sizes (e.g. 30″, 32″, 34″, 35″ and 38″ chest size) are marked in one single pattern. The required size according to the individual body measurement is traced separately, cut and used.

7. Commercial paper pattern: The paper patterns for different designs are available in readymade forms. These patterns are called commercial patterns. These patterns are enclosed in an envelope along with an instruction sheet.

The instruction sheet will provide information about selection of fabric, preparation of fabric, marking, cutting, and steps for sewing. The front side of the envelope contains the front view, side view and back view of the garment design along with the body measurements.

We may also like: How to Take Body Measurements for Dress Making.

Advantages of Paper Pattern:

1. A better pattern of the appropriate size manipulated to individual requirements results in a better fit.

2. A pattern made in a thick paper or cardboard shall be maintained for a longer period of time and can be reused several times.
3. By modifying the basic pattern pieces using the flat pattern technique, it is feasible to make patterns for intricate and original designs.
4. A paper pattern of a specific size can be used to produce patterns of other sizes by means of a grading process.
5. The errors that occur during pattern drafting can be corrected in the pattern itself.
6. Patterns can be changed/modified according to the latest fashion trend.

9.2. Basic front bodice and back bodice pattern:

For children, back and front patterns can be drafted within the same rectangle as it is not necessary to make the front larger than the back (Below Figure showing).

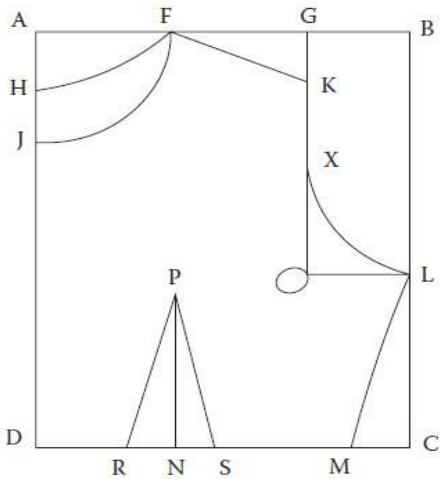


Fig-: Pattern drafting of front and back bodice

First, the rectangle ABCD has to be constructed with the following measurements:

AB = 1/4 (bust + 5″ ease allowance)

AD = BC = back waist length + 1/2″

Mark AG = 1/2 back width

AF = 1/12 chest

AH = 1″

AJ = 1/12 chest + 1/4″ = AF + 1/4″ and GK = 1″

Connect points H and F with a bold line, which is referred to as a back neck line

Connect points J and F with a dotted line, which is referred to as a front neck line

Connect points F and K with a straight line, which is referred to as a shoulder seam

Mark BL = 1/4 chest

Draw GO parallel to and equal to BL

Mark KX = 1/3 KO and XY = 1/2″

Connect points K, X, and L with a bold line, which is referred to as the back armscye lineConnect points K, Y, and L with a dotted line, which is referred to as the front armscye line Mark CM = 1/2″. Connect LM. This is the side seam For a dart, mark DN

= 1/2 DM – 1/2″ and NP = CL −1″. Mark R and S 1/2″ on either side of N and connect RP and SP.

9.2.1. Basic sleeve pattern:

Basic sleeve pattern: In Figure-3, AD is on fold and is equal to sleeve length. AB = 1/4 bust – 1/4″ (for adults, this was 1/4 bust – 1½″). Mark BE = 1/2 AB and DF = 1/2 lower arm + 1/4″. Connect AE.

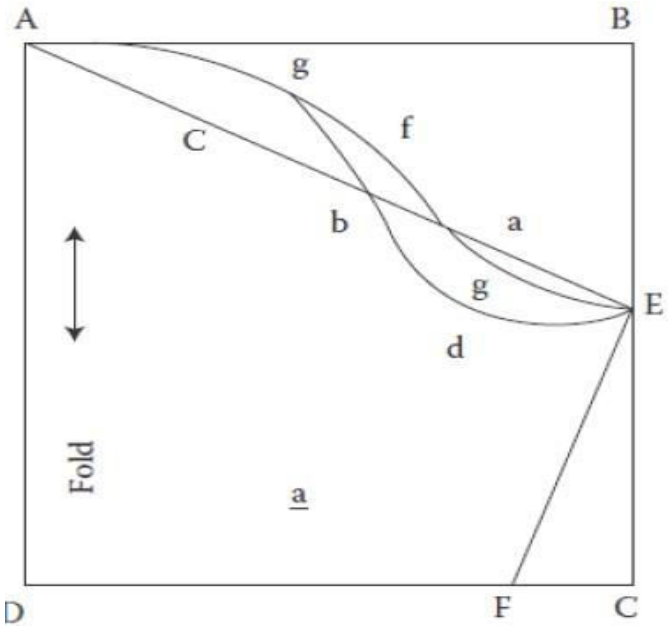
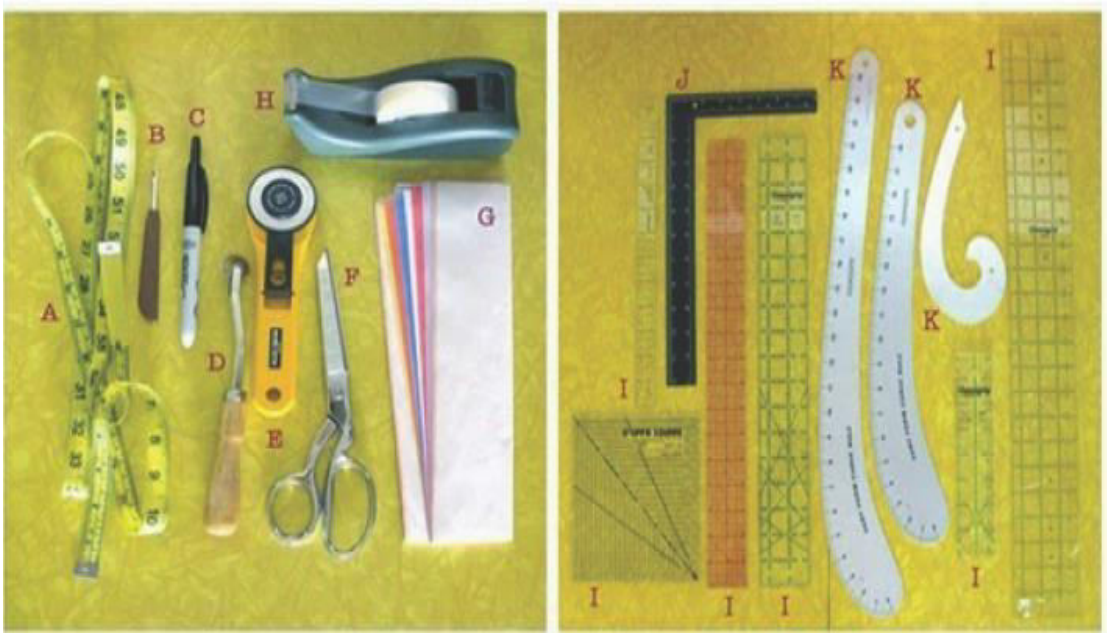


Figure- Pattern drafting of sleeve

Divide it into four equal parts and mark a, b, c. Mark CG = 1/2″, BF = 1/4″, AE = 1/4″ and AD – 1/2″. Connect AGFE (back armscye line) and AGBDE (front armscye line).

9.3. Pattern making tools:

In garment industry pattern makers use different types of tools and equipment's for pattern making. We have also published a comprehensive post on **pattern making tools**. You can see below.



10. Marker making& Marker Efficiency:

Computer aided design is the use of computer technology for the design of objects, real or virtual. CAD often involves more than just shapes. As in the manual drafting of technical and engineering drawing, the output of the CAD must convey information, such as material process, dimension and tolerance according to application Specific convention. CAD may be used to design curves figure in tow-dimension space or curve surface and solid in three dimension objects. CAD is an important art extensively used in many application, including automotive, shipbuilding, and aerospace industries, industrial and architectural design, prosthetics and many more CAD is also widely used to produce computer animation for special effect in movies, advertising and technical manuals. The modern ubiquity and power of computer means that even perfume bottles and shampoo dispensers are designed using

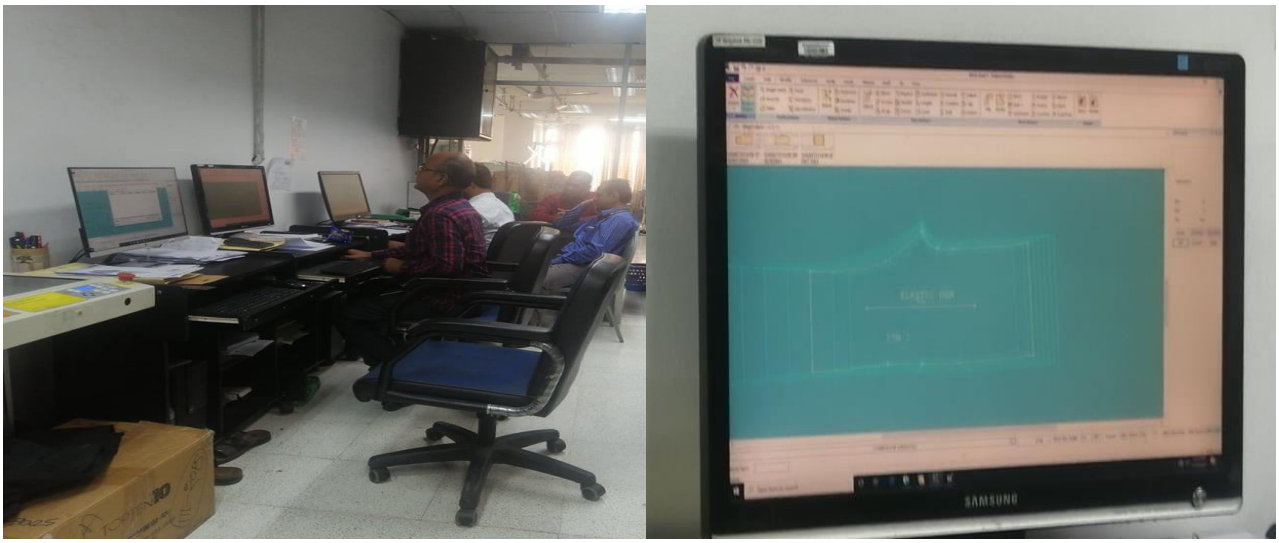


Fig: Cad Section of Standard Group

Techniques unheard of by Crete bioengineers of the 1960s. Because enormous economic importance, CAD has been a major driving force for research in computational geometry, computer graphics and differential geometry.

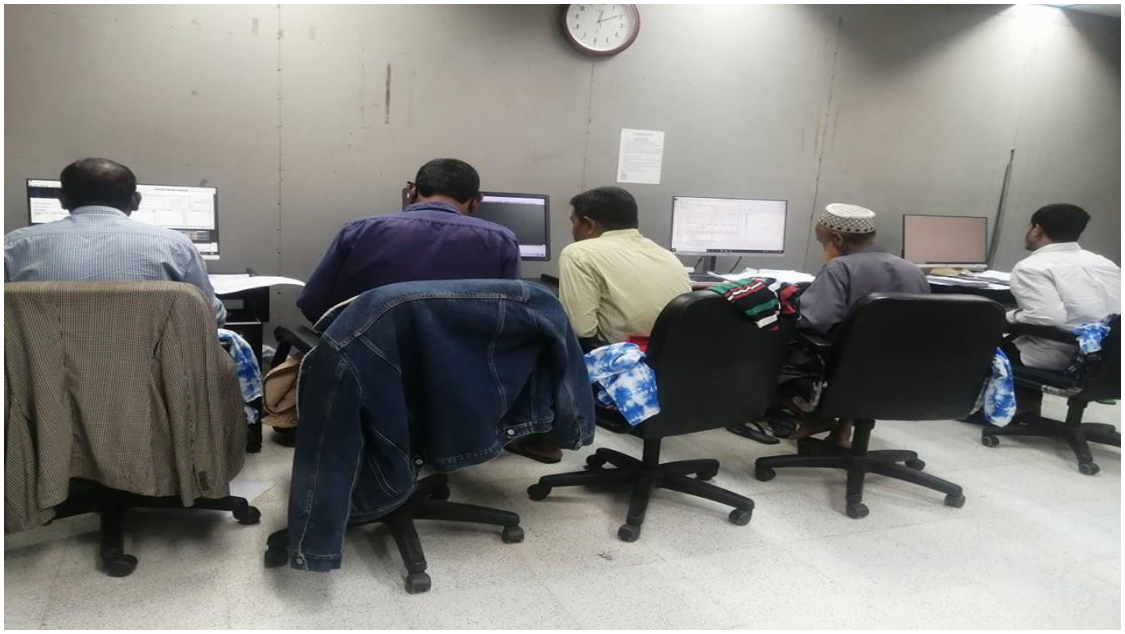
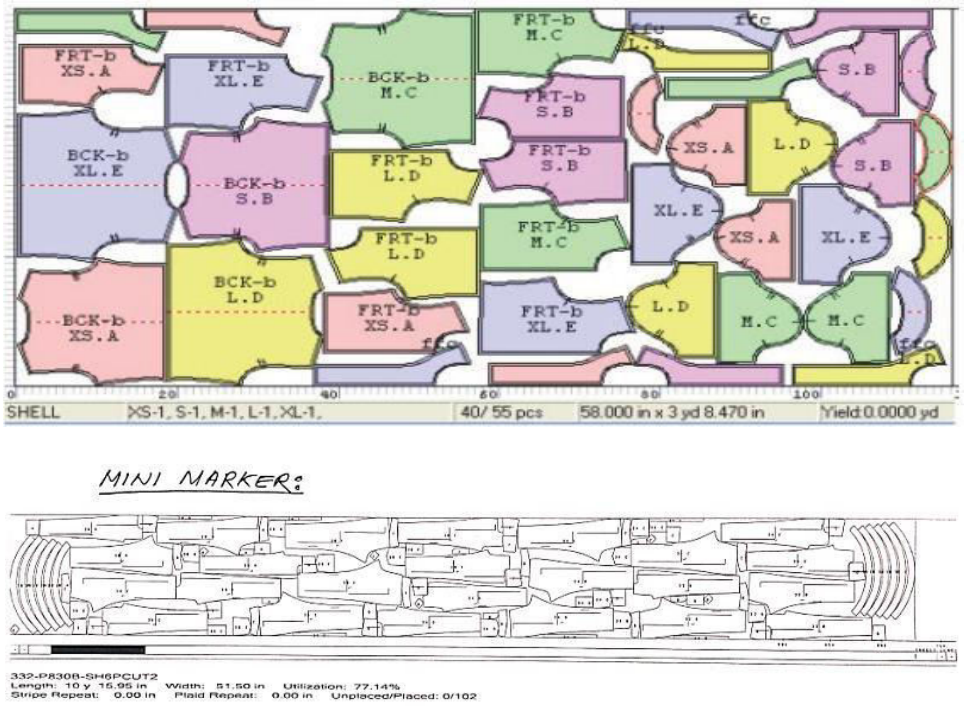


Fig: Marker Section of Standard Group



A marker and fabric lay/spread is shown in figure

Generally marker is meant to a piece of paper, on which all sizes patterns of a garment are drawn so that the required number of garments can be made using the minimum

quantity of fabrics (minimum wastage of fabrics). Marker width is taken as the minimum fabric width and the length of the marker depends on how many sizes of patterns are used for making the pattern. Some other factors are involved with marker length

- How many garments will be made with one lay of fabric?
- The length of the cutting table.
- Production planning, etc.

10.1. Marker making& Marker Efficiency:

Marker: It is thin paper which contains all the necessary pattern pieces for all sizes for particular style of garment. Marker efficiency: The marker planner measures his success by efficiency of the marker plan. The following formula is used to measure the efficiency.

$$\text{Marker efficiency} = \frac{\text{Area of the pattern in the marker plan}}{\text{Total area of the marker plan}} \times 100$$

The factors which are involved with the marker efficiency are as follows:

a) Marker maker: Marker efficiency mainly depends on the skill, effort, honesty, sincerity, experience and technical knowledge of the marker man. For making a marker, the greater the number of times the marker will be made, the higher the possibility of better marker efficiency.

b) Garment size: During marker making, the greater the number of sizes of garments are included, the higher the possibility of better marker efficiency. But if the sizes are too many then the reverse situation may happen.

c) Marker length: The marker length is involved with various factors. Greater the length of the marker, greater the chances of higher marker efficiency and the production of cutting room will also be increased. But if the marker length is too long, then reversed result may happen.

d) Pattern engineering: Marker efficiency can be increased by changing pattern designs of some of the parts of a garment or by dividing the pattern or by fragmenting any small part of a pattern.

e) Fabric characteristics: There are some fabrics which are seen as same from any side, this is called symmetrical fabric. In case of these fabrics, the greater marker efficiency can be achieved during making of marker. But the fabrics which are not symmetrical, that means which are asymmetrical fabric, there is a chance of getting less marker efficiency. Especially for matching of stripes or checks in fabrics, there is tendency of getting less marker efficiency.

f) Marker making method: Mainly there are two methods for marker making, i.e. 1. Manual marker and 2. Computer aided marker. If the computer aided marker is done, the efficiency becomes greater than manually done marker, but it takes much time. If the marker is made by experienced marker man, then in less time the greater efficiency of marker can be obtained.

g) Marker width: Generally the marker width depends on the fabric width. It has been found in study that greater the width of a marker, easier for the marker man to plan the marker. As a result there remain chances of getting greater efficiency of a marker. This logic may not be right in case of tubular fabrics.

h) Garment type: The garments where big sizes patterns are greater than small sizes patterns such as slacks of men's and ladies, overcoat, etc. less marker efficiency is obtained. Because, after placing the big sizes patterns, the small patterns are not available for placing at those gaps, so fabric wastages are big. But in the garments Where the number of small size patterns are big, comparatively the higher efficiency is obtained during making marker of these garments.

10.2. Methods of Marker Making:

After making patterns of any garments (all the required sizes) marker is made. At the very beginning of marker making, the marker width is determined. The minimum width of the fabric with which garments will be made is taken as the width of the marker. Generally marker is made on white paper or newsprint paper. First the big patterns are placed and then the small patterns are placed in the gaps of the big patterns. As a result, the marker efficiency is increased. The marker making is a very skilled and technical job. Markers are made mainly in two ways.

1. Manual marker making (with full size patterns and with small size patterns)
2. Computer aided marker making

10.2.1. Manual marker making:

in this method, markers are made with physical and mental labor. Manual marker can be done with full sizes patterns as well as with the small sizes patterns. Both methods are discussed below:

a) With full sizes patterns:

in this method, all the patterns are in full sizes as per the normal measurements. Comparatively hard patterns are placed on the papers or on fabrics. Then all the patterns are tried to place by moving in various direction in order to get the better marker efficiency. Marker making in this method is usually suitable for making the marker of small length. Because the marker man can easily see and control all the patterns within a small length. In cases where markers are made with patterns of many sizes are generally long in length, as a result for making long marker, this method is not suitable. Because it is very difficult for the marker man to place the patterns efficiently in full length. The top of the table on which the marker paper or fabrics are placed and marker is made, may be fixed or tilting. The tilting table top may be placed in various angles so that it becomes suitable for marker making. Moreover under the table top there is arrangement for making vacuum system, as a result, the patterns can be placed fixed in their own positions.

b) With small sizes patterns:

In this method also markers are made with physical labor. In the beginning, the patterns are made smaller in 1/5th scale or in 1/25th scale with the help of Pantograph. Then in 1/5th scale the marker is made in smaller table. The systematic explanation of marker making in this method is given below:

1. With the help of a pantograph the full length patterns are made smaller in the 1/5 scale. The smaller patterns made with pantograph are generally made with plastic sheet or coarse and hard board paper.

2. With the help of smaller size patterns, marker making planning is made. The table on which marker planning with smaller patterns are made, that table is generally 50cm wide,

3 meter long and it is marked with 1/5 scale on both sides. As a result, it becomes comparatively easier to place, move or plan the small patterns in the small area.

4. After making the marker, the photograph of it is taken with a camera. If time is available, again marker is made and its photograph is taken.

5. How much area of a marker has been covered by the patterns is determined with the help if a plan meter. Then the marker efficiency is determined with the marker area and patterns area.

6. The marker photograph and the concise patterns are kept well preserved in a cabinet. Seeing the photograph of the efficient marker made with reduced sizes patterns, placing the full size patterns on paper or fabrics, full size marker can be made. Sometimes reduced sizes patterns are faulty due to the faults in pantograph. When a full size marker is made seeing the photograph marker, sometimes the efficiency of the full size marker is found comparatively more efficient. For making garments on a bulk scale, this method is suitable but for making garments in smaller quantity, this is not suitable because of using much time and cost.

10.2.2. Computer aided marker making:

For making computer aided marker, first of all, the production patterns need to be stored in the computer memory. For entering the production pattern into the computer, generally digitizing or scanning methods are used. For digitizing or scanning, full size production patterns are used and in the computer memory also the full size patterns are stored, but reduced size patterns are seen in the computer screen. After entering all the production patterns, required for a garment in the computer memory, using the grade rule previously stored in the computer, the required patterns for all sizes are obtained.

The computer aided marker man generally uses computer screen, key-board and light pencil. Then the marker man gives some instructions to the computer, such as: the marker width, pattern sizes to be used, check matching and all the obstacles to marker making, which the computer will always maintain during marker making. In this process the computer itself can make the marker, also the marker man can make the marker with the help of the computer. If a computer does the marker itself, then it is called the automatic marker making. In case of automatic marker making, if the computer is provided with some preplanned required instructions, then based on it, the computer make the marker itself. In this process the most efficient marker is obtained, but computer takes much more time to make the marker, because computer makes the marker using permutation and combination methods.

When the marker man makes the marker with the help of a computer, it is called the interactive making apparel marker. In this method all the pieces of patterns are seen in Smaller dimension on the top part of the computer screen. In the middle of the screen two horizontal parallel lines are seen which indicates the width of the marker. A vertical line remains at the left side of the horizontal parallel lines which indicated the beginning or starting of the marker and initially the right side remains open. There remains some data below the horizontal parallel lines,

For example: identification of the marker, marker length, marker efficiency (which changes regularly) etc. For making marker in interactive method, a data pen is used

and a tablet is used for removing the pattern. Generally tablets represent the display screen. There is a pointer in the data pen which has pressure sensitive point. Using this pen, patterns can be placed in any place of the standard and efficiency of the marker made in computer is far better than the manually made marker.

In computer the marker can be obtained fastest and the number copies of the marker can be obtained as much as per wish. In a word, computer aided marker has many positive sides. But in this method of computer, the initial investment is high.

Computer aided marker can save at least 2% of fabrics. Screen. The pattern to be removed will be marked with the help of the cursor of the screen. For removing the marked pattern, the pen is lightly pressed on the tablet and then the pen is moved on the tablet, as a result the pattern comes on the screen and it is placed in the suitable place in the marker by moving the pen. Again if the pen is lightly pressed it leaves the pattern, this means the pattern takes its prescribed place in the marker. This way, all the patterns are arranged in the marker. Within a very short time in this way an efficient marker creating is possible. If the making apparel marker is complete, below the marker in the screen, the data of marker. Efficiency, marker length, marker width, pattern count etc. are obtained instantly. If the making is complete, it is saved in the computer memory and if the print out facility is available, the print out is taken.

Fig: Lycra marker print machine

CHAPTER- 11 FABRIC LAYING

11. Fabric Lay

Spreading means the smooth laying out of the fabric in superimposed layers of specified length and after spreading the shape of fabric plies is called fabric lay. Various types of fabric lay are used in spreading. During spreading the number of plies should not be more than three hundred.

Fig: Cutting room of Fabric spreading

Fig: Cutting room of fabric spreading (Table 2)

11.1 There are two types of fabric Lay:

A) According to construction:

B) According to the direction of spreading

11.1.1. A) According to construction:

According to construction are two types as below- 1.

Straight lay:

In straight lay each ply of fabric is spread according to marker length, i.e. all plies can have the same length. In that case one marker is used

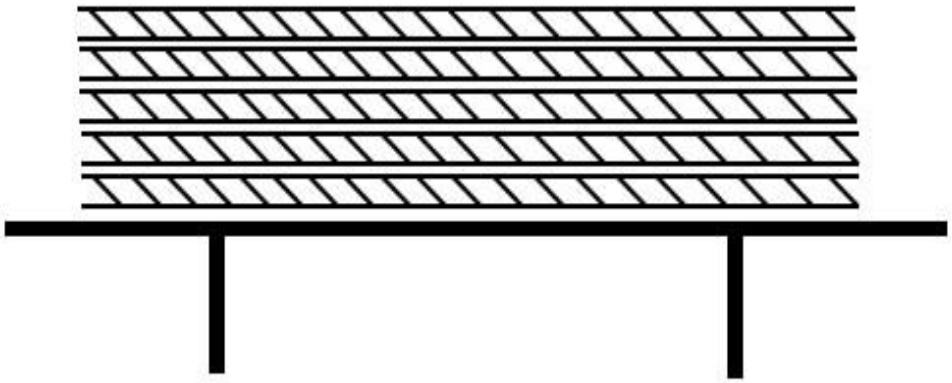


Fig: Straight lay of Fabric

2. Stepped lay:

Ply of fabric lay is not spread according to marker length, i.e. when the plies are laid up in different lengths- a step can be formed. Different types of marker are essential for different steps. Its use is very much less because of fabric wastage's and lay making if difficult as well.

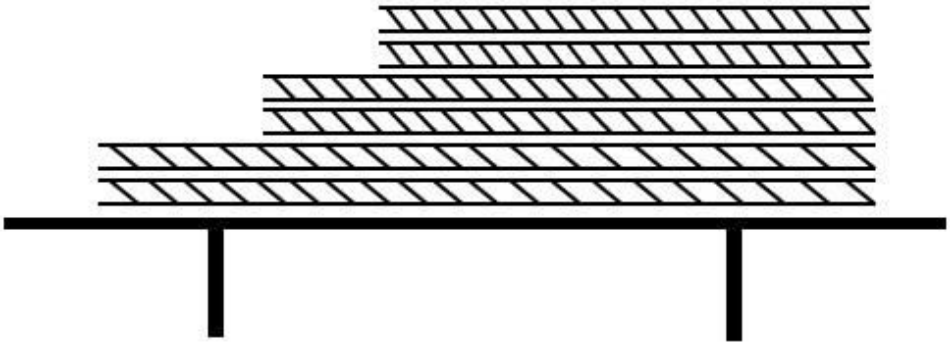


Fig: Stepped lay of Fabric

11.1.2. B) According to the direction of spreading

According to the direction of spreading are three types as below-

1. One way spreading (Face to underside):

This method is used for open fabrics. The face can lie towards the top or bottom, but always in the same direction. If spreading machines are used, one-way laying-up necessitates idle motion because the machine always begins its run at the same end of the table and must return to this position after every laying operation.

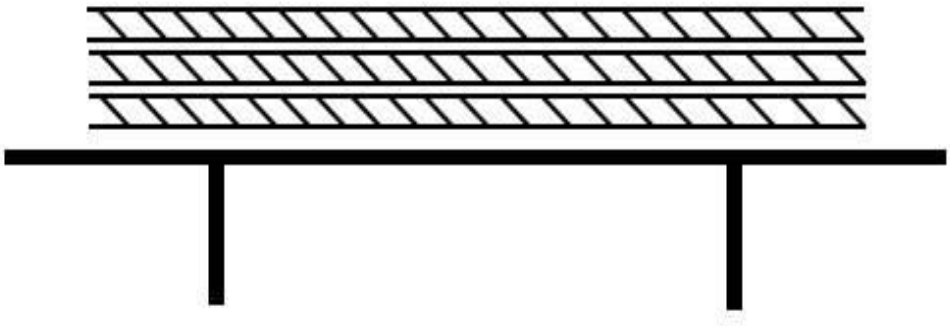


Fig: One way spreading (Face to underside):

11.2. Laying-up in pairs (Face to face):

This method is also used for open piece goods. The face side is always laid onto the previously spread face side so that- as in one way spreading- the machine returns

running idle to the working position. The roll of fabric must be turned before the next piece is laid-up. When using spreading machines, these consequently require a device to turn the roll after the fabric has been cut off at the end.

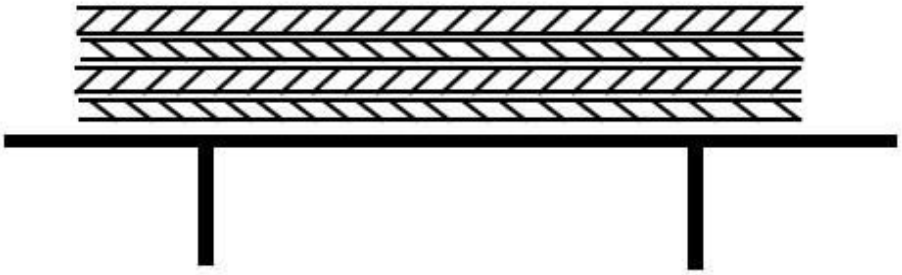


Fig: Laying-up in pairs (Face to face)

11.3. Lap (Continuous, Zigzag) lying:

This method was also developed mainly for spreading open piece goods. Contrary to one way spreading and laying-up in pairs, the pieces are not cut off at the lay end but are clamped and then continuously laid in laps. This is the easiest and most popular way of spreading.

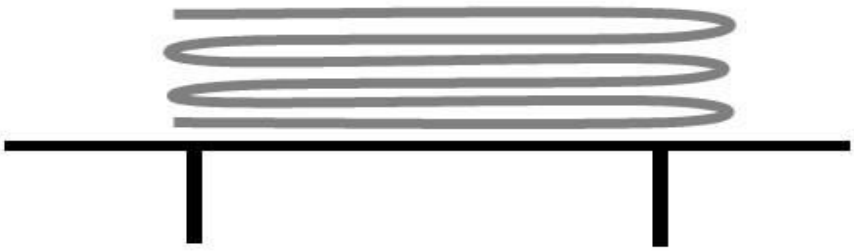


Fig: Lap (Continuous, Zigzag) lying

***Two other symbols illustrated the laying up of folded and tubular piece goods.

Fig: Folded and tubular piece goods

11.4. Difference between straight and stepped lay is as follows:

Straight lay	Stepped lay
Each ply is spread according to marker length.	Ply of fabric lay is not spread according to marker length.
Mostly used	Rarely used
Fabric wastage is less.	Fabric wastage is more
Fabric spreading is simple.	Fabric spreading is difficult.
One marker is used.	Different types of marker are used.

CHAPTER- 12 CUTTING SECTION

12. Cutting.

12.1. Fabric cutting: In garments industries fabric is cut from lay and spreading accuracy and properly which is termed as fabric cutting. Some fabric tests like fabric GSM, fabric shrinkage and color bleeding in washing are done by the factory. If the fabric shrinkage is more than the allowance, fabrics are pre-shrunk for bulk cutting. Sometimes patterns are modified according to the fabric shrinkage which gives the correct measurement in the garment after washing.

12.2. Fabric sorting and shade banding: It is a common fact that when fabrics are sourced in bulk, the fabrics are processed in different lots (batches) depending on dyeing machine capacity. So, there are chances of having shade variation of fabrics of same colors. To avoid shade variation in garments shade band is prepared by the factory.

Fig: Fabric cutting section of Standard Group

12.3. Flow chart of fabric cutting:

Marker making

(To make marker according to various parts of production pattern by using CAD)

⇩

.Fabric spreading

(To spread the fabric for cut)

⇩

Cutting

(To cut the fabric)

⇩

Bundling

(To make the bundle according to various types of garment parts)

12.4. Requirements of fabric cutting:

- In cutting
- Pressing of cutting
- Clean edge
- Infused edge
- Consistency
- Support of the lay

12.5. Methods of Fabric cutting:

There are three method of cutting follows:

12.5.1. Manual

™ Die knife

™ Drill

™Hand operated scissor.

12.5.2.. Manually operated power knife

™ Straight knife

™ Band knife

™ Round knife

12.5.3. Computerized

™ Knife

™ Laser ™ Water knife

™ Plasma torch

Straight knife cutting machine, band knife machine & computerized cutting machine are used in Standard Group.

12.6. Straight knife cutting machines:

Some advantage from other which are follows.

- ➢ Comparatively cheap.
- ➢ Can be transferred easily.
- ➢ Easily operated.
- ➢ Round corner can cut smooth easily.
- ➢ Fabric can be cut from any angle.
- ➢ Directly garments components separated from fabric lays.

12.6.1. Properties of straight knife cutting machine:

- Directly cut the pattern pieces from the fabric lay.
- Could be used to cut for higher depth of fabric.
- Cutting speed high.
- Sharp and heavy corner can be cut.
- Blade is very sharp.
- Blade height 10-33cm.
- Blade stropped 2.5-4.5 cm.

Fig: Straight knife machine

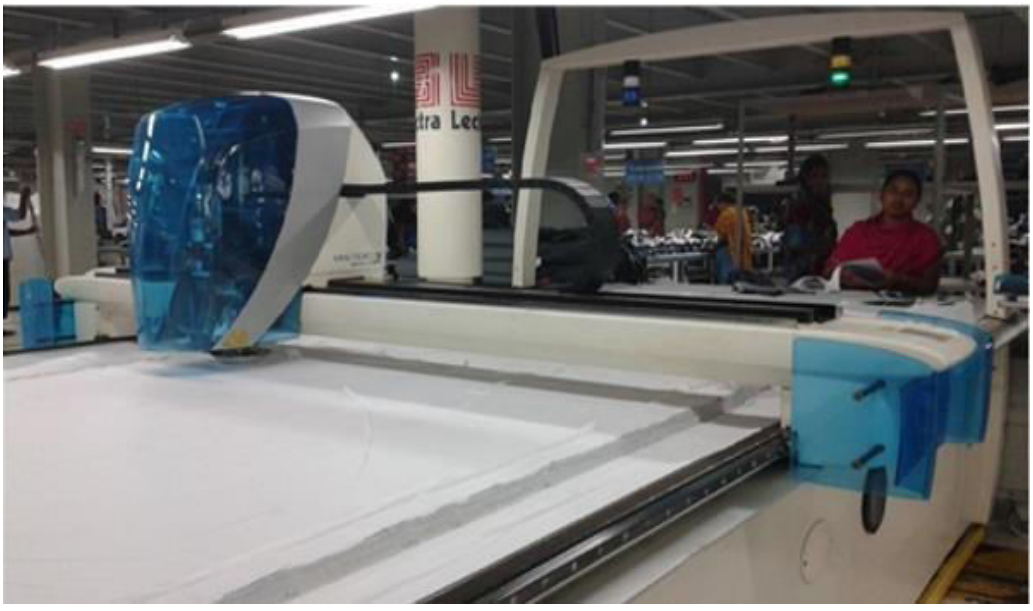


Fig: Auto cutter machine

CHAPTER- 13 SEWING

13. Sewing.

After cutting and printing process (optional process), cut components are sent to sewing department. Operators stitch and assemble garment components one by one and make the complete garment. At the time of sewing, garments are checked by quality checkers. Stitched garments are dispatched to Finishing or washing department if washing is required.

Fig: Garments sewing line of Standard group

13.1. The garment stitching process involved following sub-processes.

- ❑ Part preparation
- ❑ Marking
- ❑ Folding and pressing
- ❑ Stitching/assembling
- ❑ Quality checking

In the sewing section, operators are also provided various sewing supplies like stitching threads, sewing machine needle, trims, operation specific guides and attachments.

Parts Preparation: Before assembling the garment, individual garment parts are prepared in the preparatory section. For an example, in shirt manufacturing, shirt collars, sleeve cuffs and sleeves are prepared in the preparatory section and later loaded in the shirt assembling section. The preparatory section is introduced in the line to improve line balancing. Be noted preparatory precisely. Marking is normally done by using chalk or magic pencil by using a template or laser ray. Like in a formal shirt for button holing and button attachment, front plackets are marked manually to dene the correct location of the button positioning. The marking process helps operator deciding where the job needs to be done accurately.

Part folding and pressing: Depending on the requirement an operator may need to fold the component and press it by means of a template. Like, chest pocket is folded and pressed prior to attaching the pocket on the chest.

Assembly section: The garment components are assembled by the operators step by step in as sequence of product construction. To sew garments different types of sewing machines are used.

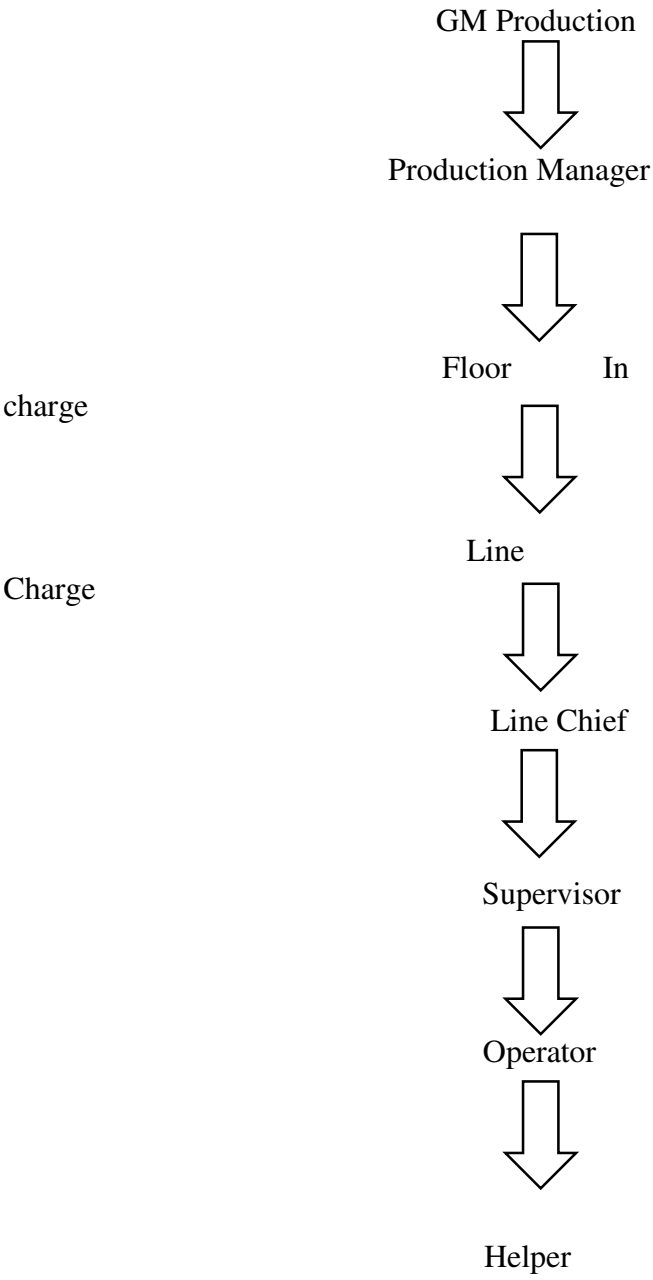
Quality inspection on the floor: On the sewing floor, stitching quality is checked by the checkers. Normally the semi-stitched garments are checked to detect the stitching faults. The checker suggests a solution to the operator who is responsible for making the defects. Inline quality inspection, roaming inspection, and end-of-line quality checking are done on the sewing floor.

Also see: Quality checkpoints in garment production

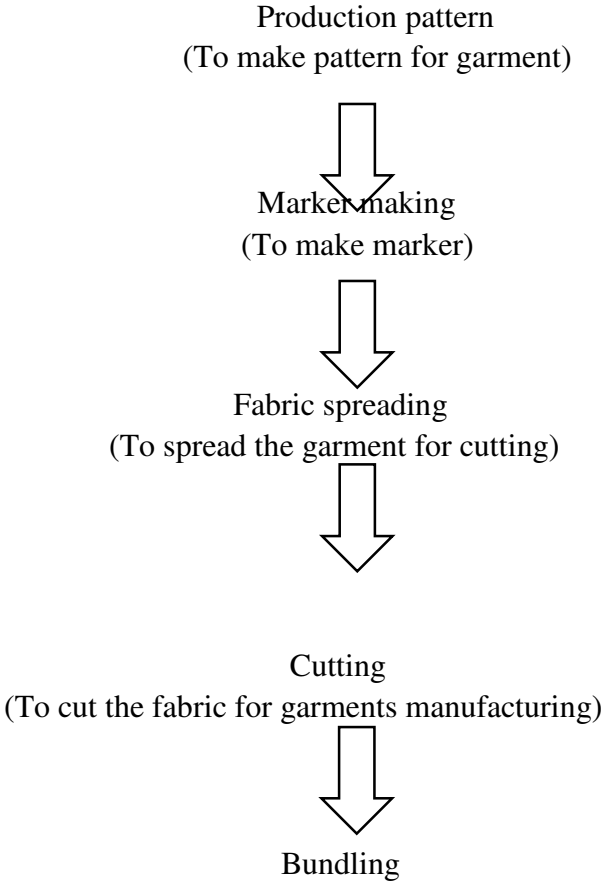
Production line set-up: The stitching floor requires a maximum number of manpower in garment production units including sewing machine operators, helpers, pressman, alteration tailor, feeder, data collection, work-study of checker, quality checker and line supervisors. In mass garment production, the production line layout and line setting are done prior to loading every new product (style). The industrial engineers prepare the operations bulletin and line

Production Reporting: Production data capturing and reporting is an integral part of the garment manufacturing. Production and quality related data are collected to track the production and monitoring the production. Various kinds of production reports are made and analyzed by factory. Apparel manufacturers prepare a report on key performance indicators (KPI) of the various production departments.

13.2. Organogram of Sewing Section:



13.3. Flow chart of sewing section for working process:



13.4. Name of the sewing machine which are used in sewing section:

- Plain m/c
- Over lock m/c
- Zigzag m/c
- Flat lock m/c
- Bar tack m/c
- Kansai m/c
- Button Holing m/c
- Chain stitch m/c
- Button attach m/c

- ➢ Vertical m/c
- ➢ Snap Button attach
- ➢ Two needle m/c
- ➢ Feed of the arm m/c
- ➢ Eye late hole m/c

13.5. Description of sewing m/c

13.5.1. Introduction of Plain m/c

A sewing machine is a machine used to stitch fabric and other materials together with thread. Sewing machines were invented during the first Industrial Revolution to decrease the amount of manual sewing work performed in clothing companies. Lock stitch sewing machine is one of the important sewing machines among all the machines. The sewing machine has greatly improved the efficiency and productivity of the clothing industry.

Properties:

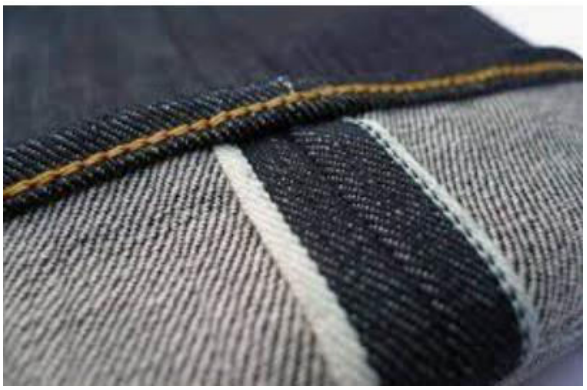
- ❖ One needle
- ❖ Two tensioners
- ❖ Three guide
- ❖ One lock
- ❖ Two thread
- ❖ One bobbin case
- ❖ One magnate guide

Fig of Plain m/c

Application:

1. Bottom hemming
2. Belt top seem stitch
3. Belt joint stitch
4. Loop tack stitch
5. Pocket joint stitch
6. Zipper joint
7. Flap make
8. Flap top stitch
9. Flap joint
10. Fly top stitch
11. Flap ¼ stitch
12. Front rise stitch.

Sample Attachment of lock stitch:



Working Principle:

1) First, we plug in the power socket then we switch on the machine.
2) Then we took a woven fabric and put it onto the presser foot of the sewing machine.
3) After that we down the presser foot lifter to press the fabric.
4) We press the foot and needle make the stitch in the fabric continuously.
5) Then we cut the extra thread by a thread cutter.

13.5.2. Introduction of over lock machine:

Overlook stitching was invented by the marrow m/c company in 1881. An overlook stitch sew over the edge of one two piece of cloth for edging, hemming or swimming. Usually an overlook sewing m/c will cut the edge of the cloth as they are fed through

some are made without cutter. The inclusion of automated cutter allows overlook m/c to create finished seam easily and quickly. Over lock, sewing is used to form over lock stitch. It is used for knitted and woven fabric. Side seam, armhole, the sleeve of the shirt and inseam and side seam of pant also done by over lockstitch machine. Over lock sewing machines usually run at high speeds, from 1000 to over 9000rpm, and most are used in industry for edging, hemming and seaming a variety of fabrics and products. Over lock, stitches are extremely versatile, as they can be used for decoration, reinforcement, or construction.

Properties:

- 5 thread
- 4 tension
- 2 knife
- 2 needle for 5 thread
- 1 needle for 3 thread
- 3 looper 5 thread
- 2 looper 3 thread

Fig of over lock m/c:

Application:

❖ Over lock stitch.

Working principle:

1) At rst, we keep the bobbin on the thread stand.
2) Then we passed the four thread according to their passing path.

3) We also maintain the thread tension.
4) We set up the machine properly and also ensure that thread pass through the needle.
5) Then we power on the machine for sewing a fabric.
6) At last, we over-locked some fabric.

Sample Attachment of over lock:

13.5.3. Introduction of bar tack machine:

Bar tacking is accomplished by sewing a very tight zigzag stitch across the width of the manufacturer may go over the bar tacking again, causing the stitch to have an x like form. Usually, very strong threads are chosen for bar tacking so that they will stand up to high pressure. When done correctly, bar tacking can help support loads of up to 400 pounds almost 200 kilograms. Many backpacking companies in particular pride themselves on the number of bar tacks integrated into their products, claiming that they will wear harder and longer than the competition.

Fig: Bar tack Machine

Applications:

To created bar tack stitches in garments. Bar tacking is a specialized sewing stitch designed to provide immense tensile strength to the garment or equipment it is used on. Bar tacking is commonly used on backpacks, tents, tactical gear, and other heavy wear sewn items where normally sewn stitches might give way at a crucial moment. In general bar tacking is a sign of good quality although the rest of the product should always be looked over carefully as well. When a sewing pattern calls for bar tacking, it indicates that the designer feels that section of the pattern is a critical area that needs extra reinforcement and following areas it can used.

- Loop attach
- Fly make
- Pocket side
- Front side

Stitch Description:

Stitch class: 300, Group: lock stitch type. In this machine there is two source of thread one is needle thread, another is bobbin thread. By interlacement of this two thread stitch is formed. Bobbin threads stored in a bobbin which is placed under the needle bed of the machine. The needle of this machine moves a little front and back to form

the stitch in a limited length of stitch in a heavy dense stitch to increase the seam strength on that point.

Sample Attachment of Bar tack:

Working principle:

At first, this machine produces tack stitches in a small length (1-2 cm) and then sews Covering stitches over and at right angles to the first stitches. The variables are the Number of tacking stitches and the number of covering stitches. Typical uses are closing the ends of buttonholes, reinforcing the ends of pocket openings and the bottoms of fees and sewing on belt loops. The adjustment points of this machine are needle, pressure feed, stitch length, stitch density.

13.5.4. Introduction of Flat lock machine:

I want to know what kind of flat lock sewing machine is used in t-shirt manufacturing. When I searched for a flat lock machine I get non-apparel sewing machines or decorative stitching machines. The flat lock machine is one of them. The technical name of the flat lock sewing machine is cover stitch machine. Also known as interlock sewing machine. The t-shirt construction required cover stitch seam in bottom hem and sleeve hem operations. For neck piping, flat lock machine is also required. Another use of cover stitch machine is decorative stitch on the t-shirt side seam. Shoulder seam etc.

Fig: Flat lock machine

Properties:

- 4 tensioner
- 3 thread
- Contain a holder
- 2 needle

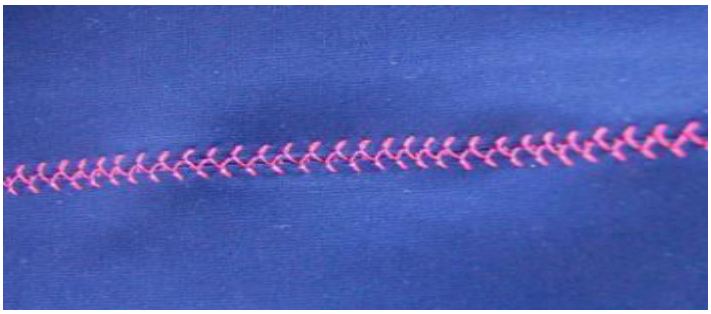
Application:

- Zigzag stitch
- Knit hemming
- Loop making

Different parts of Flat lock machine:

1) Thread stand
2) Thread guides
3) Disc type tensioner
4) Pressure feed lever
5) Thread take-up lever
6) Needle
7) Looper

Sample Attachment of Flat lock machine:



Working principle:

This machine may be of flat bed or cylinder bed type. It machine can be is cylinder bed type. Flat bed is used for sewing body cloth and cylinder bed is used for sleeve cloth. In this machine 4 needles may also be used and sewing may be done using from 4 to 9 threads. Sewing with flat lock machine the most quantity thread is needed. For example for sewing 1 inch cloth up to 32 inches thread is needed. The SPM of this type of machine is usually 6000 and 8-16 stitches may be done per inch. It is a very expensive machine and is used for mainly sewing knifed goods but also used for making woven cloth.

13.5.5. Introduction of Kansai machine:

Kansai sewing machine is suitable for zigzag sewing, embroidery abutted seam on light and medium material. It has excellent performance ratio and is conveniently arranged. It has bobbin winder integrated in the arm cover with in operators view. It is suitable to sew underwear, waist sections of ladies body suits, and swim suits.

Fig: Kansai machine

Parts of a Sewing Machine:

Parts of a sewing machine is mentioned here. kansai sewing machine parts list is given below- 1. Cone stand

2. Feed dog
3. Pressure foot
4. Needle bar
5. looper
6. Paddle
7. Slide plate
8. M/C pulley
9. Tensioner guide **Properties:**

- 2 needle
- 4Thread
- 21 looper point
- 8 tensioner

Application:

- Back yoke stitch
- Back belt stitch

Sample Attachment of Kansai machine:

13.5.6. Introduction of Chain Stitch Machine:

Chain stitch is a sewing and embroidery technique in which a series of looped stitches form a chain like pattern. Chain stitch is an ancient craft examples of surviving Chinese chain stitch embroidery worked in silk thread have been dated to the warring states period 5^{th}-3^{rd} century be handmade chain stitch embroidery does not require that the needle pass through more than one layer of fabric. For he is reason the stitch is an effective surface embellishment near seams on finished fabric. Because chain stitches can form flowing. Curved lines they are used in many surface embroidery styles that mimic drawing in thread.

Fig: Chain Stitch Machine

Machine Parts name of Chain Stitch Machine:

1) Thread stand: There is four thread stand which holds the bobbin.
2) Thread guide: Which indicates the way of the thread.
3) Tension post: Four needle thread tension post and four looper thread tension post to give uniform tension.
4) Needle thread guide: To guide the way of needle thread.
5) Needle thread take-up lever: To pull the tread after each stitch.
6) Needle clamp: To hold the needle with needle bar.
7) Presser foot: To press the fabric surface.
8) Feed dogs: To move the fabric forward by a distance equal to the stitch length.
9) Roller set up: To pass the fabric forward.
10) Looper: To form loop formation.
11) Throat plate: Helps the fabric to move forward.
12) Looper thread take-up lever: To pull the looper thread back.

Other Information Chain Stitch Machine:

1) Machine R.M.P=2850
2) Power = 250 watt
3) Voltage = 220V

4) HP= 3/4 HP

Properties:

- 2needle
- 4 lopper
- 4 thread
- 4 tensioner

Application:

- Back rise stitch
- Back yoke stitch
- Top sin ¼ stitch

Working principle Chain Stitch Machine:

1) At first, we keep the bobbin on the thread stand.
2) Then we passed the thread according to their passing path.
3) We also maintain the thread tension with the help of tension post. 4) Thread passing through into the needle and looper by setting up machine Properly.
5) Then we power on the machine for sewing a fabric.
6) After that, we did the sewing of denim fabric by the P.M.D chain stitch sewing machine.

Sample Attachment of Chain Stitch Machine:

Front Side

Back Side

13.5.7. Vertical m/c:

Properties:

- 2 thread
- 1 needle
- Contains magnate guide
- 1 tensioner
- Contains a knife

Application:

- Pocket making
- Fly making
- Facing joint with pocketing
- All types of round stitching

13.5.8. Introduction of Double needle sewing machine:

Double needle lockstitch sewing machine works in same principle of single needle lockstitch sewing machine. But in this case 2 needles and 2 bobbins are used and thus resulting in two parallel rows of lockstitch. This technique of twin needle of sewing is also popularly known as double needle sewing. Double needle **lockstitch** sewing machine is used to sew box pockets in jackets, light jeans, pajamas and many more. 2-needle lock stitch sewing machine with bottom feed, needle feed and alternating feet, electromagnetic thread trimmer, and electro pneumatic seam backtracking and sewing foot lift, DLC coated needle bar, walking foot bar and presser foot bar.

The sewing model integrated many excellent technique to perform the professional sewing skills. It is especially suitable for handbag, suitcase, sofa, glove, camping materials, shoes, auto internal decoration, and leather materials. To integrate with bottom, needle and alternating top feed. Suitable for medium-weight applications.

Fig: Double needle sewing machine

Machine Specification:

1. Model No: LH-3188
2. Stitch Group: lock Stitch (Interlacement)
3. Manufacturing Company/Brand: Juki
4. Country of origin: Japan
5. Stitch per Minute (S.P.M): 4000-5000
6. Needle Size: 9, 11, 14, 16, 18, 21,
7. Thread per inch (T.P.I): 5″
8.
9. Bobbin No: 2
10. Seam class: Supper imposed /Bound
11. Stitch Class: 300
12. Machine Bed: Flat-Bed
13. Needle Name: DP×5
14. No of Needle: 2 needles **Properties:**

- ✓ 2 thread
- ✓ 2 tensioner
- ✓ 2 bobbin
- ✓ 2 needle
- ✓ 1 magnate guide

Application:

- Front rise stitch
- Side top sin

Sample Attachment of Double needle sewing machine

13.5.9 Introduction of Feed of the Arm Machine:

The machine which practices stitches by the loop of one group of thread links with the loop of other group of thread by the process of interloping is called the industrial feed of the arm machine.

There are two types of thread one is called “needle thread” and another one is called “looper thread” both of two this comes from large package of cone and stitch is formed by interloping technique. As both thread comes from cone package so there is no problem for thread storage in the time of stitching.

By this machine multithread chain stitch can be produced on garments.

This machine is frequently used in stitching on heavy fabrics like denim or jeans. It has opportunity of stitching by folding the fabrics. Different sizes of needle can be used in this machine depending on thickness of fabrics.

Fig: Feed of the Arm Machine

Main Parts of feed of the arm sewing machine:

1) Thread stand 2) Cone cas
3) Thread guide 4) spring tensioner post box
5) Thread take-up lever 6) Needle 7) Needle bar 8) Folder (lapped) 9) Feed dog 10) Throat plate Looper
11) Presser foot bar 12) Presser foot 13) Needle plate throat plate
14) Stitch density regulator 15) Presser foot lever 16) Motor

Properties:

- 2 needle
- 2 Looper
- 4 thread
- Contain t and magnetic guide
- 3 tensioner

Application:

- Back rise stitch
- Inseam stitch

- ❖ Back yoke top sin
- ❖ Side top sine

Working Principle of Feed of the Arm Sewing Machine:

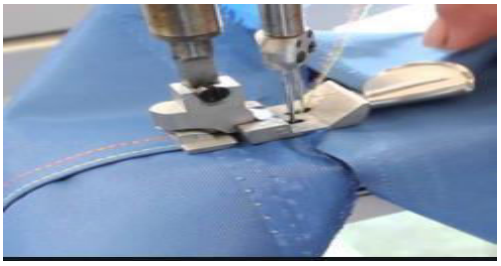
For the formation of multithread chain stitch, two threads that means one needle reaches to its lowest bottom designation entering into the fabric with “needle thread”. Then it stays a little upper. As a result a loop of needle thread is formed. At the sometimes the thread take-up lever also continuous to go downwards resulting the decreasing of the tension of the needle thread and it helps in formation of the loop of the needle thread. Just the moment of formation of the needle thread loop, the looper from behind the needle enters into the just produced needle thread loop with looper thread and goes formed a little. Then, the needle goes upward with needle tread, the fabric also goes forward a step with the help of feed dog and the looper comes in front of the needle. The movement of the looper is controlled by avoiding motion. The tension of looper thread is controlled by changing the passage of thread.

Stitch Description of Feed of the Arm Sewing Machine:

Stitch Class-400, Multi-tread chain stitch group of stitch is chain stitch.
In this machine, there are two types of thread one is called “needle thread” and another one is called “looper thread” both of two this comes from large package of cone and stitch is formed by interloping technique.
Uses of Industrial Feed of the Arm Machine:

1. For making garments of jeans fabric
2. Used in long seam of trousers
3. Frequently used for joining lace
4. Used for joining braid and elastic in the garments.

Sample Attachment of Feed of the Arm Sewing Machine:



13.5.10 Button Holing Machine:

Buttonholes are holes in fabric which allow buttons to pass through, securing one piece of the fabric to another. The raw edge of a button holes are usually finished with stitching. This may be done either by hand or by a sewing m/c. some of button, such a Mandarin button, uses a loop of cloth or rope instead of a button holes.

Properties:

- 2 thread
- 1 needle
- 2 tensioner
- Contains bobbin case, hook knife

Application:

- To attach button in garments.

Sample Attachment of Button Holing Machine.

13.5.11 Snap button Attach Machine:

Snap fastener attaching machine, one of the important fastening processes of fastener is the well-made mechanical devices which has functions to perform attaching metal button to various of the clothes. It is used to finish sewing process, such as stitching trademark, label, cap, etc

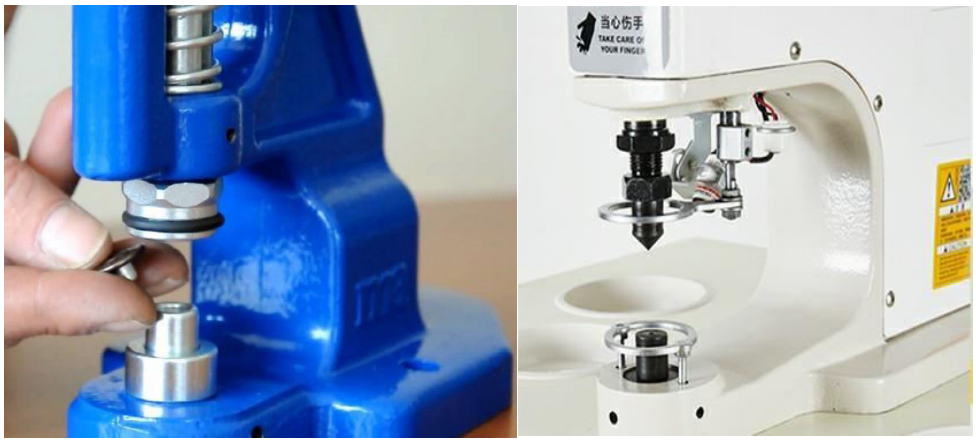


Fig: Snap button Attach Machine

Properties:

- ❖ Not use any types of thread and needle
- ❖ It has button attach stage.
- ❖ Snap stage has two parts

Application:

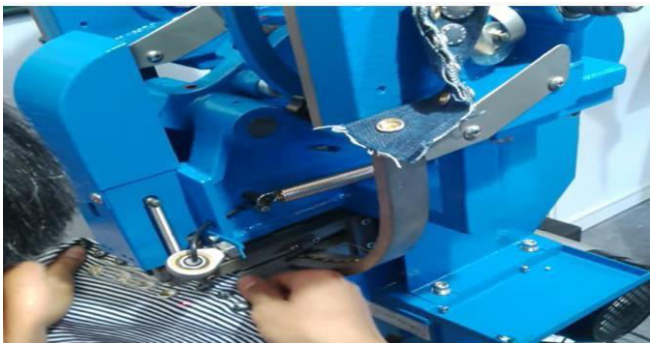
- ❑ To attach snap button in garments Eye late button holing m/c:

Properties:

- ✓ 3 thread or 4 thread
- ✓ 1 needle
- ✓ Contain bobbin
- ✓ 2 looper
- ✓ Contain a hammer **Application:**

❖ To make eye late in garments

Sample Attachment of Snap button Attach Machine



13.5.12 Button Stitching machine,

This machine is applied to the industries of clothing in attaching buttons. Specially used for attaching the polo shirt and woven shirt buttons. Sewing equipment is available in store house of Juki, Janome, Elna, pfaff & Bernina

Fig: Button stitching machine

Features of Shirt Buttons Stitching Machine:

The features of shirt buttons machine is specified here shortly –

It is a simple automatic m/c.

 Button positioning can be automatic.

 Sewing is according to the hole in button & may be cross or parallel.

 Automatic feeding of the shirt buttons

 Stitch type: lock stitch or chain stitch may use.

Parts of Button Stitching Machine:

The general parts of this type of machine is listed below –

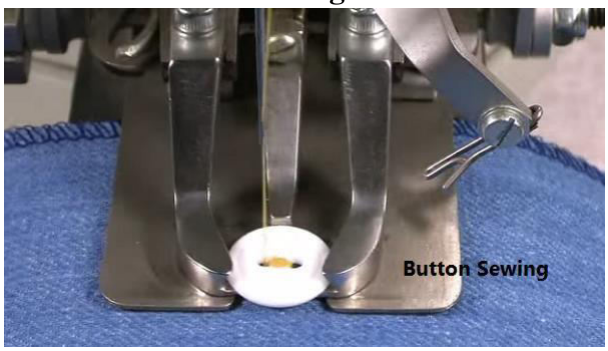
1) Pulley 2) Button clamp 3) Operation panel
4) SD card slot 5) Control box 6) Work clamp
7) Power switch 8) Eye guard
9) Side cover 10) Cone stand
11) Thread take up cover 12) Finger guard

Button Attaching With Press Button: Attachment of press buttons and eyelets

- Press buttons and eyelets MUST be correctly attached, not too tight and not too loose.

- Fabric, where press button will be applied, Must be strong/thick enough. Double layers and woven interfacing must be used whenever needed to prevent press buttons and eyelets from destroying the fabric or from coming off.
- Fabric where a press button or an eyelet is applied must have uniform thickness to prevent the coming off or malfunction of the press buttons.

Sample Attachment of Button stitching machine.



Sewing faults:

- Slipped or skipped stitching
- taggered stitching
- Unbalance stitching
- ariable stitch density
- Frequent thread breakage
- Puckering
- Mechanical Damage
- Needle heating damage etc.

CHAPTER-14

TEXTILE TESTING AND QUALITY CONTROL

14.Introduction of Textile Testing & Quality Control (TTQC

Textile Testing & Quality Control (TTQC) is very important work or process in each department of export oriented industry. Buyers want quality but not quantity. In every department of textile industry quality maintained of each material. Because one material's quality depend on another's quality. For example, if qualified fiber is inputted then output will be good yarn.

14.1. What is textile testing?

Textile testing is checking the quality and suitability of raw material and selection of material. It is an important part for textile production, distribution, and consumption. Though it is an expensive business but essential too. There are some reasons for textile testing; such as, checking raw materials, monitoring production, assessing the Final Product, investigation of faulty material, product development and research.

Fig: Output Garments checking

14.2. What is quality control?

Quality controls is a process by which entities review the quality of all products in an industry. It refers to ways of ensuring the quality of a service or product. Actually quality control is a system for verifying and maintaining a desired level of quality in an existing product or service by careful planning, use of proper equipment, continued inspection, and corrective action as required.

14.3. Testing: Testing means checking, examine and verification of some items. On the other way we can define testing as; it is the process or procedure to determine the quality of a product. **15.3.1. Object of testing:**

- Research
- Selection of raw material
- Process control
- Process development
- Product testing
- Specification test
- Testing is governed by 5M, which are: Man, Machine, Material, Method and Measurement.

14.4.Quality: The term quality refers the excellence of a product. When we say the quality of a product is good. We mean that the product is good for the purpose for which it has been made.

14.5.Control: To check or verify and hence to regulate.

14.5.1. Quality Control: Quality control is the synthetic and regular control of the variable which affect the quality of a product. It is the checking, verification and regulation of the degree of excellence of an attribute or property of something.

The operational techniques and activities that sustain the quality of a product or service in order to satisfy given requirements. It consists of quality planning, data collection, data analysis and implementation and is applicable to all phases of product life cycle; design, manufacturing, delivery and installation, operation and maintenance.

- Objects of Quality Control: To produce required quality product.
- To fulfill the customer's demand.

- To reduce the production cost.

- To reduce wastage.
- To earn maximum profit at minimum cost.

14.6. Quality Control in Garment Manufacturing Process

Quality is a relative term. It means customer needs is to be satisfied. Quality is of prime importance in any aspect of business. Customers demand and expect value for money. As producers of apparel there must be a constant endeavor to produce work of good quality. In previous article, I discuss about quality control system in garment industry. Now I will give a short description of Quality Control in Garment Manufacturing Process.

The various Steps of Garments manufacturing where in-process inspection and quality control are done are mentioned below-

1) In Sample making section
2) In- Marker making section
3) Inspection in fabric spreading section
4) Inspection in fabric cutting section
5) Inspection in fabric sewn section
6) Inspection in pressing & Finishing section

14.6.1. Quality Control in Sample Section:

1. Maintaining buyer Specification standard
2. Checking the sample and its different issues
3. Measurements checking
4. Fabric color, gsm, Fastness etc. properties required checking
5. SPI and other parameter checking

14.6.2. Quality Control in Marker Making:

1) To check notch or drill mark
2) Fabric width must be higher than marker width
3) Fabric length must be higher than marker length
4) Matching of green line
5) Check pattern size and dimension
6) Matching of check and stripe taking into consideration
7) Considering garments production plan
8) Cutting table length consideration
9) Pattern direction consideration

14.6.3. Quality Control in Fabric Spreading:

1. Fabric spreading according to correct alignment with marker length and width
2. Maintain requirements of spreading
3. Matching of check and stripe
4. Lay contains correct number of fabric ply
5. Correct Ply direction
6. To control the fabric splicing
7. Tension control

14.6.4. Quality Control in Fabric Cutting:

1) The dimension of the pattern and the cut piece should be same and accurate
2) Cut edge should be smooth and clean
3) Notch should be cut finely
4) Drill hole should made at proper place
5) No yarn fraying should occur at cut edge

6) Avoid blade deflection
7) Maintain cutting angle
8) More skilled operator using

14.6.5. Quality Control in Sewing Section:

1. Input material checking
2. Cut panel and accessories checking
3. Machine is in well condition
4. Thread count check
5. Special work like embroidery, printing panel check
6. Needle size checking
7. Stitching fault should be checked
8. Garments measurement check
9. Seam fault check
10. Size mistake check
11. Mismatching matching of trimming
12. Shade variation within the cloth
13. Wrong placement of interlining
14. Creased or wrinkle appearance control

14.6.6. Quality Control in Finishing Section:

1) Proper inspection of the garments including measurement, spot, dirt, impurities
2) Water spot
3) Shading variation check
4) Smooth and unfold in pocket
5) In secured or broken chain or button
6) Wrong fold
7) Proper shape in garments
8) Properly dried in after pressing
9) Wanted wrinkle or fold in lining
10) Get up checking
11) Collar closing

12) Side seam

13) Sleeve placket attach

14) Cuff attach

15) Bottom hem

16) Back yoke

17) Every parts of a body

14.7. Quality Control of Sewing Thread and Zipper

15.7.1. Quality Control of Sewing Thread:

A slender, strong strand or cord, especially one designed for sewing or other needlework. Most threads are made by plying and twisting yarns. A wide variety of thread types are in use today, e.g., spun cotton and spun polyester, core-spun cotton with a polyester filament core, polyester or nylon filaments (often bonded), and mono filament threads.

14.8. Sewing thread

Following Features of Sewing Thread are considered: 1)

Thread Construction/Ticket number

- ❖ Thread count
- ❖ Thread Ply
- ❖ Number of twist ❖ Thread balance
- ❖ Thread Tenacity
- ❖ Thread Elongation

2) Sew ability

3) Imperfection

4) Thread finish

5) Thread color

6) Package Density

7) Winding

8) Yardage

14.9. Quality Control in Zipper:

A zipper, zip, or zip fastener, is a commonly used device for temporarily joining two edges of fabric. It is used in clothing (e.g., jackets and jeans), luggage and other bags, sporting goods, camping gear (e.g. tents and sleeping bags), and other items.

14.9.1. Zipper

Following Factors are considered in Zipper:

1) Proper dimension of zipper
2) The top and bottom end should correctly sewn
3) The tape and color of zipper should be uniform
4) Slider has to be locked properly
5) The slider should move properly

14.10. Quality Control System:

1) **On- line quality control system**
2) **Of line quality control system**

14.10.1. On Line Quality control System:

This type of quality control is carried out without stopping the production process. During the running of production process a setup is automatically performs and detect the fault and also takes corrective action. Online quality control comprises with the raw material quality control and the process control.

14.10.2. Raw Material Control:

As the quality product depends on the raw material quality so we must be provided with the best quality raw material with an economical consideration. The fabric must be without fault, with proper absorbency, whiteness as per requirement of the subsequent process. The Grey inspection report gives the condition of the raw fabric.

14.10.3. Process Control:

The method chosen for the process must be provided with the necessary accurate parameters. Here the specific gravity, water level, residual hydrogen per oxide etc. at each stage is checked.

14.10.4. Laboratory:

Lab is the head of the textile industries. Higher precision lab can aid easily to achieve the goal of the organization. Before bulk production a sample for the approval from industry is sent to the buyer. As per the requirement of the buyer the shade is prepared in a lab considering the economic aspects.

14.10.5. Lab Line:

1) Standard sample: The buyer to the industry gives the standard sample. The sample is measured by the CCM to get the recipe.

2) Lab trial: Getting the recipe the lab officer produce lab trial and match with standard according to buyer requirement. Lab trial is made by the AHIBA dyeing machine. There are some programs for dyeing. The programs are given below.

14.11. Off line Quality Control System:

Performed in the laboratory and other production area by stopping the production process consisting of fabric inspection and laboratory and other test. Correction steps are taken according to the test result.

Off-Line Tests: All the Off-Line tests for finished fabrics can be grouped as follows:

1) **Physical tests**
2) **Chemical tests**

14.11.1 Physical Tests:

1. GSM test
2. Shrinkage test
3. Spiraled test
4. Tensile strength
5. Abrasion resistance
6. Pilling resistance
7. Button Strength Testing
8. Crease resistance
9. Dimensional stability 10. Bursting strength test

14.11.2. Chemical Tests:

1) Color Fastness to washing.
2) Color Fastness to light.
3) Color Fastness to heat.
4) Color Fastness to Chlorinated water.
5) Color Fastness to water spotting.
6) Color Fastness to perspiration.

7) Color Fastness to Seawater.
8) Fiber analysis.
9) PH test.
10) Repellency

14.12. Importance of Textile Testing | Reasons for Testing of Textile

The testing of textile products is an expensive business. A laboratory has to be set up and furnished with a range of test equipment. Trained operatives have to be employed whose salaries have to be paid throughout the year, not just when results are required. Moreover all these costs are nonproductive and therefore add to the final cost of the product. Therefore it is important that testing is not undertaken without adding some benefit to the final product. There are a number of points in the production cycle where testing may be carried out to improve the product or to prevent sub-standard merchandise progressing further in the cycle.

14.12.1. Importance of Textile Testing:

The primary objective of textile testing is to assess the product properties and predict its performance during use. The information obtained may be used for the following:

1. Research and development
2. Selection of raw materials/inputs
3. Process development
4. Process control
5. Quality control
6. Product testing
7. Product failure analysis
8. Comparative testing and bench marking
9. Conformity with government regulations and specifications

14.12.2. Reasons for Textile Testing

1) Checking Raw Materials
2) Monitoring Production
3) Assessing the Final Product
4) Investigation of Faulty Material
5) Product Development and Research

14.12.3. Checking Raw Materials

The production cycle as far as testing is concerned starts with the delivery of raw material. If the material is incorrect or sub-standard then it is impossible to produce the required quality of final product. The textile industry consists of a number of separate processes such as natural fiber production, man-made fiber extrusion, wool scouring, yarn spinning, weaving, dyeing and finishing, knitting, garment manufacture and production of household and technical products. These processes very often carried out in separate establishments, therefore what is considered to be a raw material depends on the stage in processing at which the testing takes place. It can be either the raw fibre for a spinner, the yarn for a weaver or the finished fabric for a garment maker. The incoming material is checked for the required properties so that unsuitable material can be rejected or appropriate adjustments made to the production conditions. The standards that the raw material has to meet must be set at a realistic level. If the standards are set too high then material will be rejected that is good enough for the end use, and if they are set too low then large amounts of inferior material will go forward into production.

14.12.4. Monitoring Production

Production monitoring, which involves testing samples taken from the production line, is known as quality control. Its aim is to maintain, within known tolerances, certain specified properties of the product at the level at which they have been set. A quality product for these purposes is defined as one whose properties meets or exceeds the set Specifications. Besides the need to carry out the tests correctly, successful monitoring of production also requires the careful design of appropriate sampling procedures and the use of statistical analysis to make sense of the results.

14.13. Assessing the Final Product

In this process the bulk production is examined before delivery to the customer to see if it meets the specifications. By its nature this takes place after the material has been produced. It is therefore too late to alter the production conditions. In some cases selected samples are tested and in other cases all the material is checked and steps taken to rectify faults. For instance some qualities of fabric are inspected for faulty

places which are then mended by skilled operatives; this is a normal part of the process and the material would be dispatched as first quality.

14.14. Final Inspection of Garments:

Final inspection in the readymade garments industry has been done after completing all the required processes of garments manufacturing. Here, an inspection can be done by the buyer's Q.C (Quality controller). The quality of garments is insured here whether it is perfect for shipping or not. Mainly total inspection of a garment is done during the Final inspection because there is no facility to do the total inspection before this. This is most important to the buyer's point of view. Mainly size, form-fitting, and other defects of a garment are inspected in the final inspection The size i.e. size of apparel given to the label of the garment is most important. If the garment is not made with the proper size followed by the garments specification sheet then the garment will be useless or rejected by the buyer. There is a standard body measurement for both gents and ladies. When the garments are made against this measurement, there is needed to make tolerance of that apparel. It is inspected for the making of garments according to the acceptable tolerance chart. The following table shows the measurements and tolerance of full sleeve shirt of gents.

Fig: Final Inspection of Garments of Standard Group

To understand and point out the measurements, there is given a figure of Trouser

14.15. Sketch of Approved sample for Bulk Production

Fig; 1/2 Elasticated Regular Fit Trouser

14.16. Measurement chart of Approved sample for Bulk Production

Pack ID:	12182509	Purchase Company:	ASDA STORES LTD	Department:	24	Brand Contact:		Season:	UK - Spring/Summer 2018
Buyer:	CGALBRA	Style:	BSW TR05 (2PK)	Brand:	GEORGE SCHOOLWEAR	Package Description:	2PK 1/2 ELASTICATED REGULAR FIT TROUSER	Range:	
Product Description:	2PK 1/2 ELASTICATED REGULAR FIT TROUSER	Component Description:	AW20 2PK 1/2 ELASTIC TRS - GREY	Component:	1 OF 1				

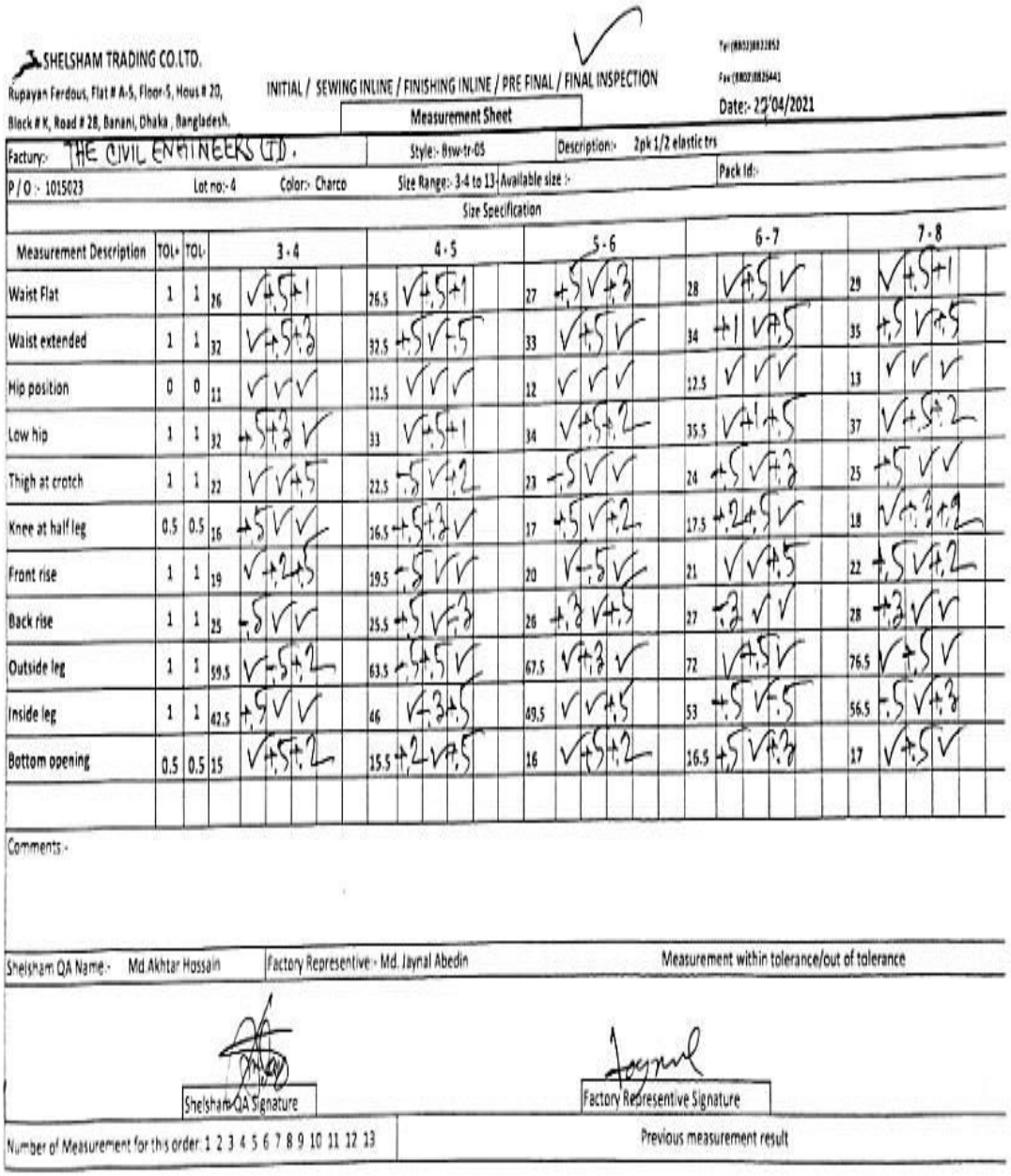
Size Specification

Style #	BSW TR05 (2PK)	Product Description	1 - 2PK 1/2 ELASTICATED REGULAR FIT TROUSER	Component Description	- AW20 2PK 1/2 ELASTIC TRS - GREY
Available Sizes:	3-4 YRS, 4-5 YRS, 5-6 YRS, 6-7 YRS, 7-8 YRS, 8-9 YRS, 9-10 YRS, 10-11 YRS, 11-12 YRS, 12-13 YRS, 13-14 YRS, 14-15 YRS, 15-16 YRS,				

Product Area	SCHOOLWEAR	Size Range	BOY SCHOOL	Component		UOM	CM
Reference Pattern #							

POM Ref	POM Description	Pos. Tol..	Neg. Tol..	3-4 YRS	4-5 YRS	5-6 YRS	6-7 YRS	7-8 YRS	8-9 YRS	9-10 YRS	10-11 YRS	11-12 YRS	12-13 YRS	13-14 YRS	14-15 YRS	15-16 YRS
	WAIST FLAT	1.00	-1.00	26.00	26.50	27.00	28.00	29.00	30.00	31.50	32.75	34.00	35.25	36.50	38.00	39.50
	WAIST EXTENDED	1.00	-1.00	32.00	32.50	33.00	34.00	35.00	36.00	37.50	38.75	40.00	41.25	42.50	44.00	45.50
	LOW HIP	1.00	-1.00	32.00	33.00	34.00	35.50	37.00	38.50	40.00	41.50	43.00	44.75	46.50	48.25	50.00
	LOW HIP POSITION FROM CF WAIST	0.50	-0.50	11.00	11.50	12.00	12.50	13.00	13.75	14.25	14.75	15.50	16.00	16.50	17.25	17.75
	THIGH AT CROTCH	0.50	-0.50	22.00	22.50	23.00	24.00	25.00	26.00	27.00	27.75	28.50	29.25	30.25	31.25	32.25
	HEM SWEEP AT ANKLE	0.50	-0.50	15.00	15.50	16.00	16.50	17.00	17.50	18.00	18.50	19.00	19.50	20.00	20.50	21.00
	KNEE WIDTH	0.50	-0.50	16.00	16.50	17.00	17.50	18.00	18.50	19.00	19.50	20.00	20.50	21.00	21.50	22.00
	OUTSIDE LEG - WAIST TO HEM AT ANKLE	1.00	-1.00	59.50	63.50	67.50	72.00	76.50	81.00	85.00	89.00	92.50	96.00	99.00	102.00	103.00
	INSIDE LEG	1.00	-1.00	42.50	46.00	49.50	53.00	56.50	60.00	63.50	67.00	69.00	71.00	73.00	76.00	76.00
	FRONT RISE	1.00	-1.00	19.00	19.50	20.00	21.00	22.00	23.00	24.00	24.50	25.00	25.50	26.00	26.50	27.00
	BACK RISE	1.00	-1.00	25.00	25.50	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00
	WAISTBAND DEPTH	0.50	-0.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	FLY LENGTH	0.50	-0.50	9.00	9.00	9.00	9.00	11.00	11.00	11.00	11.00	11.00	13.00	13.00	13.00	13.00
	POCKET OPENING WIDTH	0.50	-0.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	POCKET OPENING LENGTH	0.50	-0.50	12.00	12.00	12.50	12.50	12.50	13.00	13.00	13.00	13.50	13.50	13.50	14.00	14.00
	ZIP LENGTH	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	2.00	2.00	4.00	4.00	4.00	4.00

15.17. Final Inspection report (Failed)



SHELSHAM TRADING CO.LTD.

Rupayan Ferdous, Flat # A-5, Floor-5, Hous # 20, Block # K, Road # 28, Banani, Dhaka , Bangladesh.

INITIAL / SEWING INLINE / FINISHING INLINE / PRE FINAL / FINAL INSPECTION

Measurement Sheet

Date:- 22/04/2021

Factory:- THE CIVIL ENGINEERS LTD.

Style:- Bsw-tr-05

Description:- 2pk 1/2 elastic trs

P / O :- 1015023 Lot no:- 4 Color:- Charco Size Range:- 3-4 to 13 Available size :- Pack Id:-

Size Specification

Measurement Description	TOL+	TOL-	3-4		4-5		5-6		6-7		7-8	
Waist Flat	1	1	26	√+.5+1	26.5	√+.5+1	27	+.5√+.3	28	√+.5√	29	√+.5+1
Waist extended	1	1	32	√+.5+.3	32.5	+.5√+.5	33	√+.5√	34	+1√+.5	35	+.5√+.5
Hip position	0	0	11	√√√	11.5	√√√	12	√√√	12.5	√√√	13	√√√
Low hip	1	1	32	+.5+.3√	33	√+.5+1	34	√+.5+.2	35.5	√+1+.5	37	√+.5+.2
Thigh at crotch	1	1	22	√√+.5	22.5	-.5√+.2	23	-.5√√	24	+.5√+.3	25	+.5√√
Knee at half leg	0.5	0.5	16	+.5√√	16.5	+.5+.3√	17	+.5√+.2	17.5	+.2+.5√	18	√+.3+.2
Front rise	1	1	19	√+.2+.5	19.5	-.5√√	20	√-.5√	21	√√+.5	22	+.5√+.2
Back rise	1	1	25	-.5√√	25.5	+.5√+.3	26	+.3√+.5	27	-.3√√	28	+.3√√
Outside leg	1	1	59.5	√-.5+.2	63.5	-.5+.5√	67.5	√+.3√	72	√+.5√	76.5	√+.5√
Inside leg	1	1	42.5	+.5√√	46	√+.3+.5	49.5	√√+.5	53	+.5√-.5	56.5	-.5√+.3
Bottom opening	0.5	0.5	15	√+.5+.2	15.5	+.2√+.5	16	√+.5+.2	16.5	+.5√+.3	17	√+.5√

Comments :-

Shelsham QA Name :- Md.Akhtar Hossain

Factory Representive :- Md. Jaynal Abedin

Measurement within tolerance/out of tolerance

Shelsham QA Signature

Factory Representive Signature

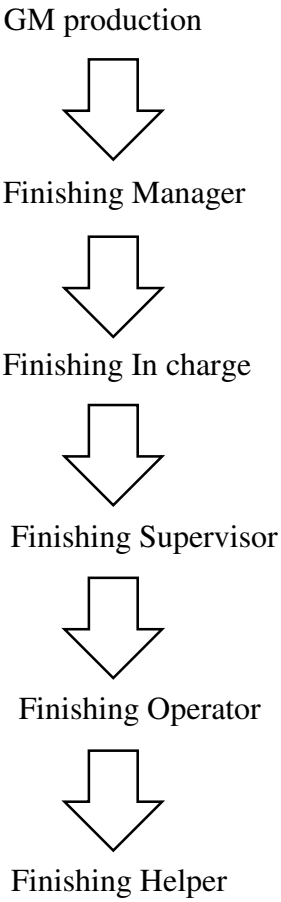
Number of Measurement for this order 1 2 3 4 5 6 7 8 9 10 11 12 13

Previous measurement result

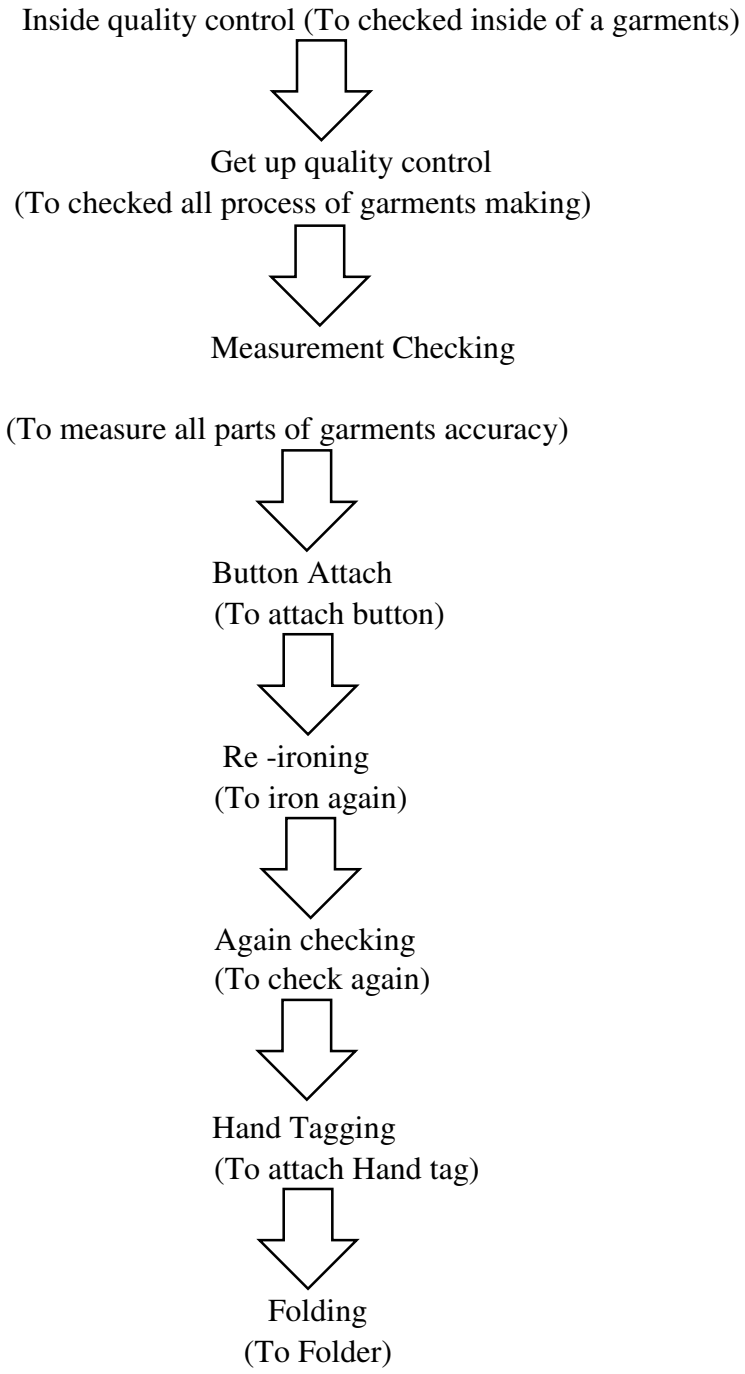
CHAPTER- 15
FINISHING SECTION

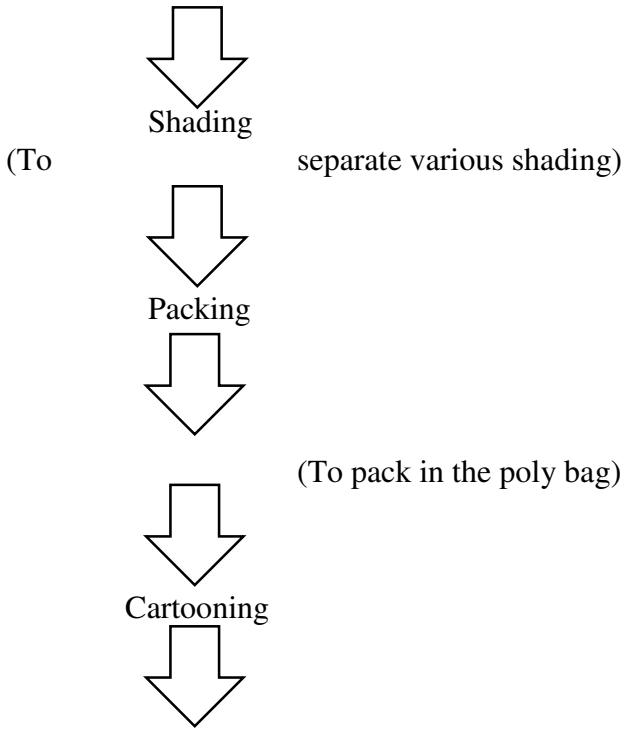
15.Finishing section:

15.1.Organogram of Finishing Section



15.2.Flow chart of Working Processes In finishing Section:





(To keep on carton on buyer requirement)

15.3. Garments Finishing

Garment Finishing: All the clothing articles are finished prior to sending to customers. Even a tailoring shop does finishing of tailored shirt and pants. So what activities are normally done at the garment finishing stage? Here is a brief list of garment finishing processes. The process by which unwanted crease and crinkle are removed with view of increasing smoothness, brightness and beauty of the garment is called pressing. In the garments industries it is called ironing. This process plays an important role to grow attractiveness to the buyers.

Fig: Garments finishing section

15.3.1.Machine used in garment finishing:

- ➢ Mattel Detector
- ➢ Blow air machine
- ➢ Sucking machine
- ➢ Tag machine
- ➢ Sewing machine
- ➢ Button Attaching machine
- ➢ Eyehole machine
- ➢ Iron etc

15.3.2. Materials used in garments finishing:

- ➢ Neck board
- ➢ Back board
- ➢ Full Board
- ➢ Hand Tag

- Tag pin
- Tissue paper
- Al pin
- Ball pin
- Elastic Clip
- Hanger
- Poly bag
- Size Sticker
- Jucker
- Gun tap
- Inner box
- Pp belt
- Blister

15.4. The Following are the matters must be inspected during pressing:

- Inspected for fused area or fused stain if any.
- Inspected for water spot if any .
- Inspected for shade variation area if any.
- Inspected for broken chain or button if any .
- Inspected for correct folding.
- Inspected for crinkle area.
- Inspected for stretched garment during Pressing.
- Inspected for unexpected area in lining.
- Inspected for proper shape.

15.5Thread trimming:

Thread trimming: In case garments contain uncut threads – left by stitching operator during stitching, threads are cut at this stage. Uncut threads can be trimmed by manual trimmer or thread trimming machine.

Removing the sticker and loose threads: I have mentioned above that in cutting department, all the garment components are labeled by paper stickers. Those stickers are removed manually by a team of workers.

15.6.Initial garment checking:

Initial garment checking: This checkpoint is placed prior to ironing the garments. Visual Checkers also check for stitching defects in seams, fabric defects in the garment and any other kind of defects those need to be repaired. So, at this stage checkers segregate the defective garments and defective garments are sent to the repair section. All stitching defects are sent to a repair tailors. Defect like stains and hard stains, defective garments are given to stain removers. Small jobs like thread trimming and removing of stickers are done by the checker.

15.7..Garment pressing

Garment pressing: The garment pieces are pressed by an iron. Normally steam iron is used for processing cotton garments. In this process, creases and wrinkles in unfinished garments are removed and give a fresh look to the apparel products. Different types of pressing equipment are available for garment pressing. Depending on the product and production volume, the right pressing equipment is used.

15.8.Final garment checking:

Final garment checking: The pressed garments are rechecked for measurement and visuals inspection. Shade variation, correct labeling of size and content labels are check in this stage. Any defective garment detected at this stage is sent back for repairing.

15.9.Garment folding and packing Folding:

Garment folding and packing Folding: The finished garments are then folded in a speciec dimension. Folding can be done by using a template too. The price tags, hang hags and any other kind of tags are attached to garment after folding. The garment folding types varied depending on the article and buyers requirement. Sometimes the whole garment is packed in a hanger without folding. This is also informed that, the temperature, pressure of pressing head and time during pressing must be inspected.

Fig: Finishing section of standard Group

15.9.1. Folding:

Standard Group followed several folding style.

™ Flat folding.

™ Roller folding.

™ Crunching folding.

15.9.2. Packing:

Packing The folded garment is packed into a poly bag to keep it fresh till it reached to the retail showroom. Different types of packing accessories are used to keep the garment in a desired shape. Some products are packed into paperboard cartons

directly without packing it into a poly. Packing is very important step in garment industry.

The Standard Group use following several types of packing system.

™ Solid color and solid size.

™ Solid color and assort size.

™ Assort color and assort size.

™ Assort color and solid size.

15.10. Cartooning:

Cartooning is very important every production manufacturing company for final production shipment. Types of cartoon:

1. Depend on paper:

™ Brown cartoon.

™ Duplex cartoon.

™ Box cartoon.

2. Depend on stitching.

™ Stitching cartoon.

™ Gum pasting cartoon/metal free cartoon.

3. Depend on ply:

™ 3 ply cartoon.

™ 5 ply cartoon.

™ 7 ply cartoon.

4. Depend on liner

™ Both side liner Carton ™

Outside liner Carton

5. Depend on size

™ Master Carton

™ Iron Carton

15.11.Internal Audit:

Internal Audit: The packed garments are then inspected for quality assurance of the outgoing finished products. This process is followed for internal quality audit and to ensure that no defective garments are packed into the cartons.

Fig: Finishing floor

15.11.Finished and ready product

Finished and ready product: Finally the garments are ready for the shipment and ready for the end consumers.

Finishing garment in a retail store

CHAPTER-16

ETP

16.ETP:

16.1.Feature ETP Plant:

- State chemical bonding.
- Eye wash and first aid station for ETP operators.
- Firefighting equipment stand by.
- 24 hours emergency medical assistant.
- Biological ETP.
- Chemical doser and metering pump.
- Clarifier's lamella.
- Drinking water purities on top.
- Filter-midgrade/multimedia.
- Constant monitoring system on ph color, turbidity total suspend, solid, chemical and biological and oxygen demand, dissolved oxygen demand.
- Easy and economy operation.

16.2.Chemical of ETP Plant:

- Sodium thiosulphate.
- Deform.
- Decolorizing.
- Poly acrylamide.
- Poly aluminum chloride.

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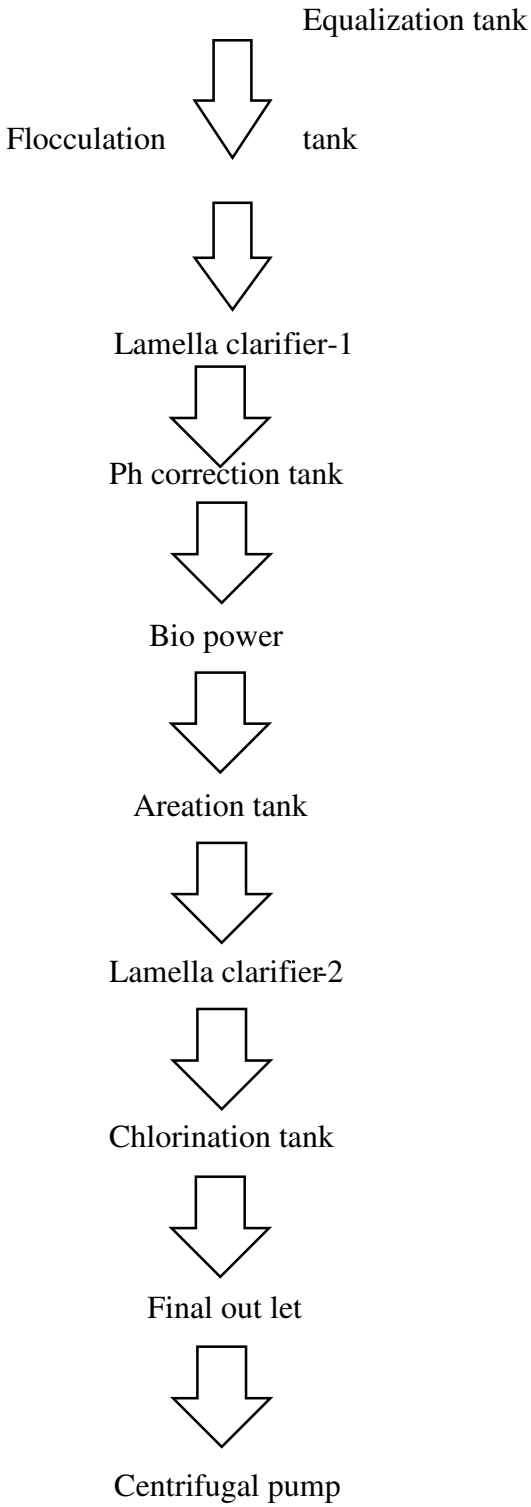
16.2.Flow chart of ETP Plant:



16.2.Process description ETP Plant

Equalization tank:

Equalization tank- Laundry drawing water comes first with blower it make artificial wave to transfer the sediment to flocculation tank and to take it got 24 hours running with capacity of. **Flocculation tank:**

Flocculation tank- De-coloring using poly aluminum chlorite chemical to separate the sediment and water, sediment drop on the bottom and goes to sludge's tank, water transfer lamella clarifier-1. Lamella clarifier-1: separate the water from sludge and the sludge goes bottom and sludge pit water transfer to ph correction by passing the different filter.

Ph correction tank:

Ph correction tank- Maintained ph value of water. Ph is measure of the acidity or basicity of a solution. Pure water is said to be neutral, with a PH close to 7.0 at 25 C using HCL.

Bio power:

Bio power- PH tank water moves here and goes through the sprinkle contain biological suspended system with the media filter to the Aeration.

Aeration tank:

Aeration tank- Bio tower transfer water to aeration tank bacteria grows with the cow dung and bacteria sucks all chemical from the water.

Lamella clarifier-2:

Lamella clarifier-2- Water received from aerations tank and it filter sludge and water moves to tank and water moves to chlorination tank.

Chlorination tank:

Chlorination tank- chemical dosing and clean the water and goes to the final outlet.

Sedimentation Tank:

Sedimentation Tank- In this tank sludge is settled down. Effluent is discharged from plant through a fish pond. Sludge is passed to the sludge thickening unit.

Fig: Discharge to sedimentation tank

Final outlet:

Final outlet -Water goes to governmental cannel in the future we are planning to recycle water from this point.

Disperse Unit:

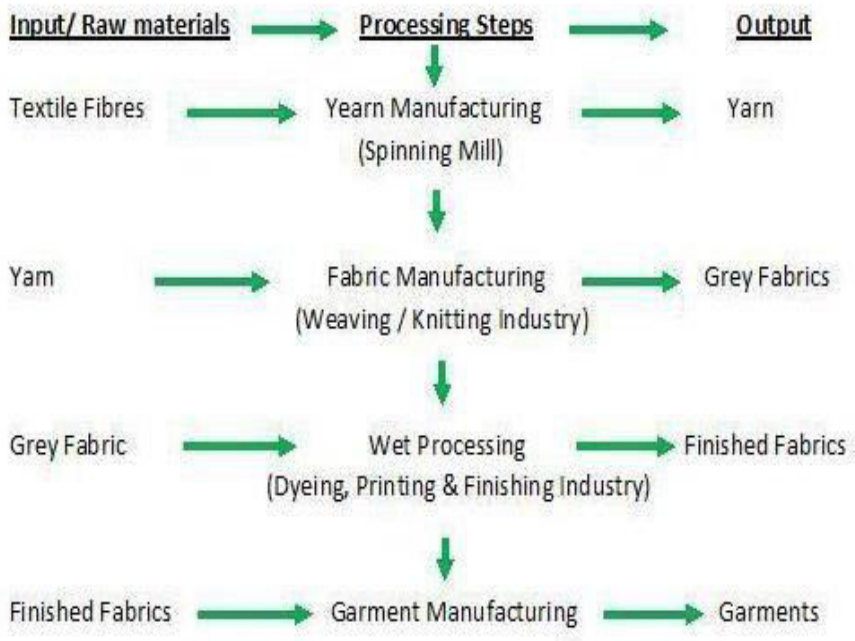
Disperse Unit -Disperse tank mixes the sludge coming from recycle tank with waste water for to proper aeration.

Fig: Sludge from recycle tank

Centrifugal pump:

Centrifugal pump -With the centrifugal feed pump all sludge move up to make dry cake to pack sludge property.

16.5. Textile production flow diagram



16.6. Water consumption in textile industries

Fabric	Water Consumption Kg/Kg
Cotton	250-350
Wool	200-300
Nylon	125-150
Rayon	125-150
Polyest :r	100-200
Acrylic	100-200

16.7. Process wise water consumption in textile industries

Process	Water Consumption (%)

Bleaching, g Finishin	38
Dyeing	16
Printing	8
Boiler house	14
Humidification nning) (Sp	6
Humidification aving) (we	9
Sanitary, Domestic	9

16.8. Effluent characteristics from typical textile industry

Process	Consumption	Nature
Sizing	Starch, waxes,ıyI cellulose, carboxymet polyvinyI alcohol	High in BOD & COD
Desizin ş	Starch, waxes,ıyI cellulose, carboxymet polyvinyI alcohol	High in BOD. COD. Suspended solids, dissolved solids
Scouring	Caustic soda, waxes, greas:, soda ash, sodium silicate, fibres, ıctants, sulf sodium phosphate.	Dark colored. High Ph. COD. dissolved solids
Bleaching	Hypochlorite. Caustic soda. Sodium silicate. Hydrogen peroxide. Surfactants. Sodium phosphate.	Alkaline suspended solids
Mercerizing	Caustic soda	High Ph, low COD, high dissolved solids.
Dyeing	Various dyes, mordents, reducing agents, acetic acid soap.	Strongly colored high COD. dissolved solids, low SS

Printing	Pasted, starch. Gums, oil. Mordents. Acids, soaps.	Highly –colored. High COD. oily appearance. SS
Finishing	Inorganic salts	Slightly Alkaline, low BOD.

Permissible Standard in India

Sl. No.	Parameter	Permissible limits (disposal to inland surface water)
1.	pH	5.5 to 9.00
2.	TSS	□100mg/1
3.	Oil & Grease	□10mg/1
4.	BOD	□30mg/1
5.	COD	□250mg/1

16.9. Important Characteristics of Wastewater from Textile Industry

Parameter	Range
pH	6-10
Temperature (*C)	35-45
Total dissolved soli ls (mg/L)	8000-12000
BOD (mg/L	80-6000
COD (mg/L	150-12000
Total suspended soli ds (mg/L)	15-8000
Total Dissolved solids (mg/L)	2900-3100
Chlorine (mg/L)	1000-6000
Free Chlorine (mg/L)	□10
Sodium (mg/L)	70%
Trace elements(mg/L)	

Fe	10
Zn	10
Cu	10
As	10
Ni	10
B	10
F	10
Mn	10
V	10
Hg	10
PO_4	10
Cn	10
Oli & grease (mg/L)	10-30
TNK (mgl)	10-30
NO_3-N (mg/L)	5
Free ammonia (mg/L)	10
SO_4 (mg/L)	600-1000
Silica (mg/L)	15
Total Kjeldahl Nitrogen (mg/L)	70-80
Color (P_t –Co)	50-2500

CHAPTER- 17 MAINTENANCE

17. Maintenance.

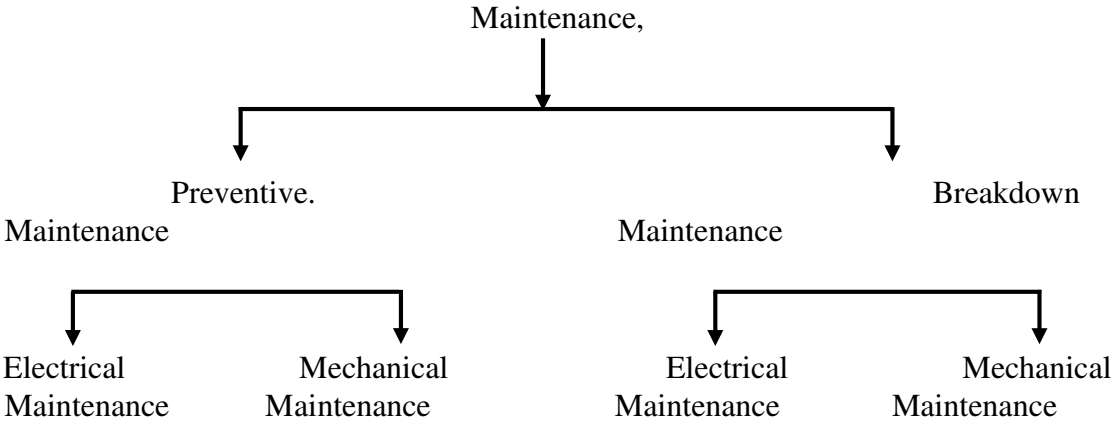
Maintenance of machinery is very essential mechanical effort for achieving smooth running of different machines. Maintenance is a process by which equipment is looked after in such a Way that trouble free. Services and increased machine life can be ensured and specific product Quality required by the customers is sustained. On time maintenance increase m/c lifetime & ensures trouble free services.
There are two types of maintenance are done.

1. Break down maintenance
2. Preventive maintenance But at Standard Group followed Breakdown maintenance.

17.1 Object 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 me downtime of machines to me minimum must to have Control Over production program. To keep the production cycle within the stipulated range

17.2.Types of maintenance:



17.3.Maintenance Tools, Equipment's & their function:

Name of Tools Functions

1. Hammer To give shape
2. Slide Wrench Tightening & opening bolt
3. Spanner Tightening & opening bolt
4. Pillar Cutting Holding, Joining Wire Hacksaw Cutting
5. Pipe Wrench tightening, opening, gripping pipe Chisel Shaping, and cutting
6. File Shaping
7. Clamp Griping

17.3.1. Name of Equipment's Functions:

1. Grinding machine Grinding
2. Cutting machine Cutting
3. Drill machine Drilling
4. Lathe machine to make something
5. Shaping machine c Shipping
6. Shaping Bending

17.4. During maintenance period following points should be checked:

Below listed Items need to be checked & serviced

1. Grease the machine bearing.
2. Complete cleaning of machine
3. Cleaning of drain valves, replace seals if required.
4. Check air supply filters, regulators auto drain seals.
5. Clean filters element & blow out.
6. Greasing of unloading roller bearing.
7. Checking of oil level and bolts unloading roller gearbox.
8. Checking of unloading roller coupling and packing.
9. Checking and cleaning(if required) of main vessel level indicator
10. Check the oil level of pump bearing and refill if required.
11. Check the function of heat and cool modulating valvas. Check all door seals.

17.5. Maintenance: electrical-machine: dyeing machine below items need to be checked & serviced

1. Check& clean fluff & dirt at dirt at all motor fan covers.
2. Check all motors terminals.
3. Check main panels (by using compressed air).
4. Check panel cooling fun and clean its filter.
5. Clean main pump invertor and its cooling fun.
6. Check all circuit breaker, magnetic conductors and relays.
7. Check current setting of all circuit preacher and motor over load.
8. Visual checking of all power and control cables.
9. Check all pressure switches.
10. Check calibration of main vessel and all addition tank.
11. Check all pneumatic solenoids.
12. Check calibration of heating or cooling modulating valve.
13. Check setting of tangle sector.
14. Check setting and operation of lid safely switches.
15. Check all emergency switches.
16. Check all on/off switches.

17. Check all indicating lamps.

18. Check all signal isolators.

17.6.Maintenance System used in Standard Group:

Maintenance-

- Preventive Maintenance Breakdown Maintenance
- Mechanical Maintenance
- Electrical Maintenance
- Mechanical Maintenance
- Electrical Maintenance

17.7.Some details about Breakdown Maintenance.

Breakdown maintenance: Breakdown maintenance is basically the run it till it breaks Maintenance mode. No actions or efforts are taken to maintain the Equipment as the Designer originally intended to ensure design life is reached.

Low cost and Less Staff. Increased cost due to unplanned downtime equipment. It is critical piece of equipment that needs to be back on line quickly, have to pay Maintenance overtime cost.

17.8.Chemical & Accessories Store:

Dyes and Chemicals: There is a different store for dyes and chemicals. Different types of chemicals are stored here according To dyes and chemicals companies. Different types of chemicals are listed in a sheet. In the sheet, the stored quantity of chemicals is also included. Every day the sheet is updated and a copy of this Sheet is supplied to the Production manager.

CHAPTER- 18
UTILITY SERVICE

18.Utility services.

Utility services include telecommunications, electrical utilities, natural gas, certain transportation services, and also water and wastewater treatment services provided by private companies. The Division does not represent consumers of water and wastewater services provided by city and county government agencies.

18.1.Power & Utilities Section

Description of machine	No of machine	Capacity
Prime power generated , Cruascar Gas Generated Model: FGLD 480 Origin : Spain	1 Unit	636KW
Stand by : Diesel Generator, Puma Origin : England	1 Unit	140KW
Sub station		1000kAV
Total connected load		1776kw
Air Compressor		
Kaiser Screw Compressor, Model: AS44,30 KW,4M3/MIN. each	2 Unit	8M3 /MIN
Omgersp: Rand Reciprocating Compressor Model: SSR ML 5057.5kW CAPACITY of air discharge	1 Unit	8M3 /MIN
Ingersol Rand Reciprocating Compressor Model : 3000.22 kW	2 Unit	4.40 M3/MIN
SWAN Reciprocating Compressor, Model: C4080,10 kW		1 M 3/MIN
Total air discharge capacity		251.4M3/MIN

18.2Water Pump

Description of machine	No of machine	Capacity
Centrifugal pump for water supply to dyeing & others Section	1 Unit	100 m^3/h
20HP pedrollo pump each pump, 1000L/min flow rate	4 Unit	4000L/min
20HP pedrollo pump each pump,600L/min min flow rate	1 Unit	600 L/min
5.5HP pedrollo pump each pump,350L/min min flow rate	1 Unit	350 L/min
Spare Pump motor Pedtollo 20HP	1 Unit	1 L/min 000
Boiler		
Ciever Brooks Boiler 10 tons/hr	1 Set	

CHAPTER- 19
COMPLIANCE

19.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
- Zero amusement
- Working hour
- Hiring/recruitment
- Environment
- Security
- Buyers code of conduct
- Health care and safety committee
- Canteen
- Equal remuneration
- National holiday
- Overtime register
- Labor welfare
- Weekly holiday fund
- Time care
- Accident register
- Workman register
- Leave with wag
- Children Day Care

19.1.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 clean at once in a week
- ❖ Water center in charge person with cleanliness
- ❖ Suggestion box register

19.2.Toilet:

- Separate toilet for woman 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

19.3Fire:

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

19.4.Safety Guard:

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

19.5.Others with Figure

- Room temperature
- Lighting facilities

Fig: First Aid Box

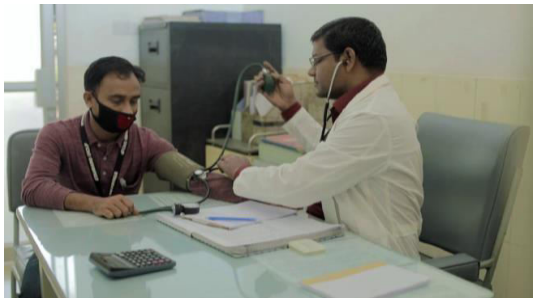


Fig: Medical section of Standard Group

Fig: Fire Training

20. Costing.

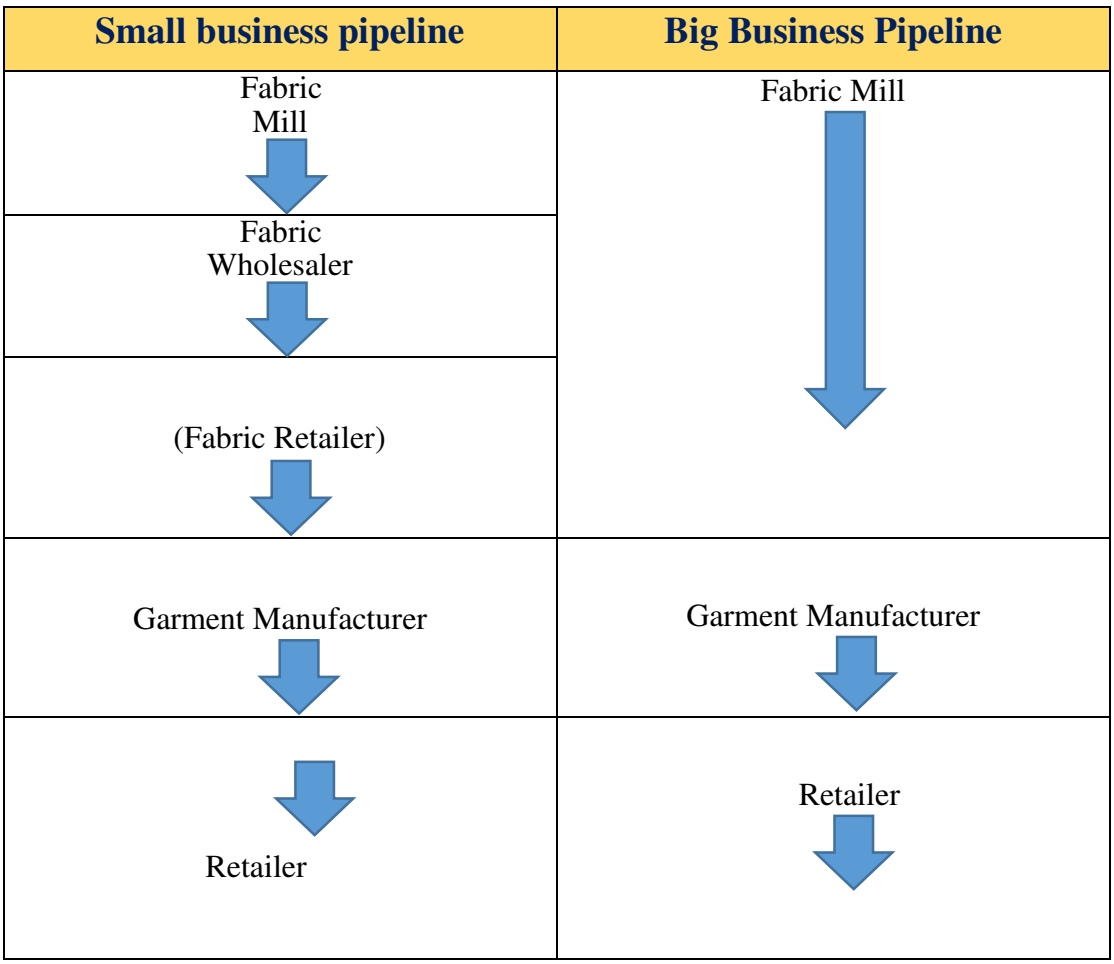
This Costing Workshop is aimed at employees in the clothing and textile value chain involved in the costing process as well as those who make decisions that influence product costs

20.1: Introduction:

In order to have a successful profitable business, where the business survives and grows, accurate costing is required.

Costs and the final price of a product are influenced by the number of processes that are involved in the making of the product. The more processes, the more cost is added.

Costing and pricing is also affected by what is happening in the "pipeline". The "pipeline" will look different for small businesses and big business



Customer	Customer
	

The more middlemen involved in the pipeline, makes for a more expensive end product, as each person will be adding on their own profit percentage. Something that influences the fabric cost will have an impact on the final product, for example bad weather and droughts may cause poor yield of cotton crops, and therefore the price of cotton sold to the textile mill will be more expensive. Thus a price increase on the fabric price will be imminent. This will affect the cost of the garment. It is very important to remember all the little costs involved in make a product. Forgetting to cost a label that costs R0.03 is not much when making one garment, but if your factory is making a number of garments per day, the R0.03 can quickly add up to large amounts of money being lost.

This means lost profit.

20.2. Terminology:

Profit	Positive difference between cost and price - making money
Loss	Negative difference between cost and price - losing money
Break-even point	The point where you are bringing in enough income to cover your costs, but are not as yet making a profit
Turnover	Total value of sales for a week, a month, a year.
Cost	The total amount of money invested in a product
Price	The amount you ask somebody to pay for a product (including your mark up)
Costing	The process of estimating the total amount of money required to design, sell and manufacture a product at a profit.
Pricing	Determining the market value of the product.
Direct Cost	Cost that is directly related to how many products you make, for example a shirt with 5 buttons, at a cost of R0.10 per button - the buttons cost will be R0.50.

Indirect Cost	A cost that is more difficult to calculate, because there is not a definite amount per product, for example we will not know exactly how many needles will be used in making a product, or how many phone calls will be made to the buyer during the production process. These costs are often combined in the overhead costs.
Overheads	**Overhead** expenses except for direct labour, direct materials and direct expenses eg outwork charges. **Overhead** expenses include advertising, insurance, interest, indirect labour, rent, repairs, supplies, taxes, telephone bills, travel expenditures, electricity, water etc

20.3. Pre- Costing and Post-Costing

Two aspects of costing are important in the garment costing scenario –

A) Pre-Costing

B) Post-Costing

20.3.1. A) Pre-Costing:

- Is done at Concept / Sample Stage of production
- Is done before bulk production is made
- It is an estimated or budgeted costing, based on estimated quantities of raw materials, labour, outwork and overheads used for the production process.
- A pre-cost is used to "sell" the style to the retail buyers and is necessary for ❖ "made to order" products,

20.3.2. B) Post-Costing:

- Is done after bulk production is made.
- It will be based on actual / real costs of what was spent on producing the specific style.
- A post-cost can be used for "make to stock" products, and give a very accurate costing.
- A post-cost exercise should be done even where pre-cost figures are used, as this will give you a realistic picture of actual costs and profits made. It is very important for future estimations to be more accurate.

20.4. Bottom up and top down Costing

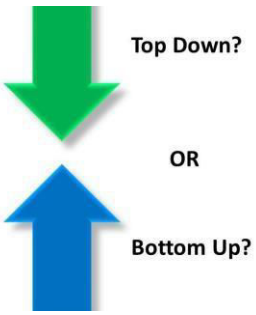
Two methods of costing to consider when you are trying to be competitive are Bottom up and Top down costing.

20.4.1. Bottom Up:

- This is the traditional method of costing which starts with calculating the raw materials, then labor, overheads etc and finally adding on a profit %.
- This will sometimes result in a product that is too expensive to be competitive

20.4.2. Top down:

- This is done looking at what your competitor is selling a similar product for and thus works using the selling price as a starting point.
- This assists with trying to be more competitive.
- It also helps you to guide what you are able to afford to spend on raw materials, labor and overheads, without overspending and making a product too expensive.



20.5. Main Cost Categories

I. Raw Materials Cost (Fabric and Trims)
II. Outwork
III. Direct Packaging
IV. Direct Labour / CMT Costs
V. Overheads
VI. Manufacturer Mark-ups
VII. Retail Profit %

20.6. Raw Materials Costing

20.6.1. Fabric cost.

In order to calculate the fabric cost per product, you need to know what the rating is. The rating is the quantity of fabric (usually in meters or yds) required to make one product. Net rating (NR) (Consumption) is the rating without any wastage allowances and the Bulk Rating (BR) consumption includes usage allowances. The usage allowance is usually between 2 to 5 %. The BR is usually used for costing purposes as it gives a more realistic costing. You also need to know what the fabric cost is per meter or yds. The formula to calculate fabric cost is: Fabric Cost = BR X Fabric Cost per Meter/yds

Here, Fabric Consumption (NR) – 0.75 meter

Usage Allowance – 5%

Fabric Price – $1.25/ Meter

BR= 0.75 + 5% = 0.79 Meter

Fabric Cost: BR x fabric price

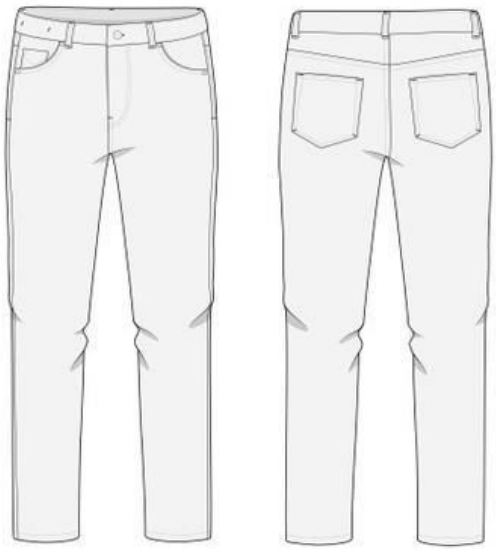
: 0.79 Meter X 1.25 = $ 0.99

This would need to be repeated for each type of fabric used.

Sometimes fabrics are sold per kilogram, particularly knit fabrics. This means that from your kilogram cost you need to work out how many meters are in a kilogram and then work out a cost per meter. The number of meters in a kilogram is called yield and is influenced by the weight of the fabric as well as the width.

20.7. Trims cost:

Trims costs are a little more complicated to calculate. Some trims will be ordered in meters, some per kg, and some in units. It is best to show you how it is done using an example



From this Sketch, we can assume that this Men's 5Pkt pant has the following Trims:

20.7.1. External Trims

1. Metal Shank Button= 1 Pc/Gmt
2. Metal 5# Zipper = 1 Pc/Gmt
3. Metal Revit = 5 Pcs/ Gmt

20.7.2. Internal Trims

4. Main /Brand Label = 1 Pc/Gmt
5. Wash care Label = 1 Pc/Gmt
6. Size Label = 1 Pc/Gmt

20.7.3. Finishing Trims

7. Hang Tag= 1 Pc/Gmt

8. Barcode sticker = 1 Pc/Gmt
9. Price Ticket= 1 Pc/Gmt
10. Gum / Cello Tape = 25 Inch= 0.69 yds Pc/Gmt
11. Carton

S.N	Unit Name	Unit Price	Per Unit cost	TTL Unit/Gmt	Ttl Price
1.	Metal Shank Button	$6.00/144 pcs	$0.041	1	$0.041
2.	Metal 5# Zipper	$ 10/100 pcs	$0.100	1	$0.100
3.	Metal Revit	$3.00/144 pcs	$0.020	5	$0.100
4.	Main /Brand Label	$0.50/12 pcs	$0.041	1	$0.041
5.	Wash care Label	$0.40/12 pcs	$0.033	1	$0.033
6.	Size Label	$0.24/12 pcs	$0.020	1	$0.020
7.	Hang Tag	$0.50/12 pcs	$0.041	1	$0.041
8.	Barcode sticker	$0.12/12 pcs	$0.010	1	$0.010
9.	Price Ticket	$0.12/12 pcs	$0.010	1	$0.010
10.	Gum / Cello Tape	$1.25/50 Yds	$0.025	0.69	$0.017
11.	Carton	$1.75/20 Pc Ctn	$ 0.088	1	$ 0.088

20.8. Screen printing.

Once again it is easier to show the calculations using an example. The floral design below will be used for both Embroidery and Screen-printing

This floral design has three colors: green, orange and red. This is important to identify as charges are usually per color

Screen printing:

Eg: Artwork charge – R $4.118 (once off charge)

Order qty - 1500 units

First color – R$0.040

2nd, 3rd etc color – R $0.030 each

Screen charge per color: R $0.850 each

20.8.1. Individual print cost.

Artwork:	$4.118 / 1500	= $ 0.003
Screen:	(0.850 x 3) / 1500	= $ 0.002
1st color:	1 x r $0.040	= $ 0.040
2nd and 3rd col:	2 x r $ 0.030	= $ 0.060
Total:		**= R $0.105 per print/ Gmt**

Total invoice R $0.105 x 1500 units = R $157.50 USD

Sometimes surcharges are added on for Edge to edge prints (E2E), metallic, glitter etc. This is usually an extra charge per print.

20.9. Embroidery.

Eg: artwork charge – R $2.95 (once off charge)

Order qty - 1500 units

First colour – R $0.050

2nd, 3rd etc colour – R $0.030 each

20.9.1. Individual embroidery cost:

Artwork: 2.95 / 1500	= $0.002
1st colour: 1 x R $0.050	= $0.050
2nd and 3rd col: 2 x R $0.030	= $0.060
Total:	**= R $0.112 per embroidery /Gmt**

Total Invoice R $0.112 X 1500 units = R $168.00

Some embroidery stitches are an outline (runner stitch) and some designs the embroidery is a dense stitch covering an area. This type of stitch may be more expensive. The use of metallic threads may also incur surcharges per embroidery.

20.10. Garment washing / dyeing.

Because washing and dyeing costs are usually per kilogram, it is important to first establish what the garment weighs. The formula for this is:

NR x Marker Efficiency (ME) x Grams per Linear Metre (Glinm). Garment weight is always given per metre squared. This needs to be converted to the weight of a linear metre based on the fabric width.
You then need to calculate the Yield (how many garments will fit in a kilogram: 1000 grams / garment weight. You can then divide the per kg cost by the yield.

Eg: Washing / Dyeing Per Kilogram – R $ 1.500 Per Kg
NR = 0.75m
ME = 83% (Marker efficiency)
Fabric Weight = 325gm2
Fabric Width = 150 cm

20.10.1. Individual wash / dye cost.

GLINM: 325G/100CM X 150CM = 488 glinm
GMT Weight: (0.75 X 488) X 83% = 303.78 grams
YIELD: 1000g / 303.78 = 3.29 gmts per kg
Wash / Dye Cost: R $1.500 /3.29 = **R $0.460 per unit/Cost**
Total Invoice R $0.460 X 1500 units = R $690.00

20.11. Direct Packaging Cost

Some packaging is used to pack each individual garment according to how it will be displayed in a retail store, eg hangers, poly bags etc. This is called direct packaging. These costs can be included as a separate line item on the cost sheet. Other packaging will be used to pack bulk, eg a box that contains 1000 units. This would be indirect packaging and would come under overhead costs. Using the men's' short as an example from the Trims cost example, see the table below:

S.N	Unit Name	Unit Price	Per Unit cost	TTL Unit/Gmt	Ttl Price
1.	Poly Bag	$50.00/1000 pcs	$0.050	1	$0.050
Total Direct Packaging Cost Per Garment					$0.050

20.12. Labor Costing.

All operators who work directly with adding value to the product are direct workers, eg machinists. The finance department will work out an average cost per minute based on their wages. Indirect workers are those who assist the direct workers, but do not actually change the product, for example supervisors, quality controllers etc. Their wages and salaries will be worked into the overhead cost. If we look at the example below, it has a huge amount of styling detail and topstitching. This will take longer to make. If the

Standard Minute Value for this garment is $ 29.30 minutes and the labor cost per minute is R 1.75, the direct labor cost will be, R $51.28.

Design centers that make use of CMT's to produce their bulk production, will have a CMT cost rather than a labor cost. The Design center and CMT will agree on a cost per garment, based on how labor intensive the style is, and also the size of the order. A contract will be signed between the two parties, agreeing to the CMT price per unit, it may also state what the CMT is responsible for eg thread, polybags, and what the design house needs to supply eg fabric, trims, size tags, wash care etc.

20.13. Overhead costing.

These are all the other costs involved in making a product that have not been discussed already, for example:

- Rent
- Lights and water
- Phone
- Consumables (paper, board, pens, thread, needles, oil, boxes etc)
- Indirect salaries and wages
- Transport
- Machinery and maintenance etc.

These costs are the most difficult to calculate as they may vary from one month to the next. If you are making products that are similarly priced, the easiest is to look at what your overheads are on average and divide by the total number of products you expect to make. This could be calculated for a year, a month, a week etc.

Example 1: Equal Overhead Allocation

Overheads per Month: BD 20000000 TK =$235294 No
of Units Prod per Month: 41600

Overhead cost per unit:

$235294 / 41600 = **$5.65 per Unit**

Example 2: Overhead Cost of Sales Ratio Cost

Cost of Sales for the Month: BD 50000000 TK = $588235.29

Overheads per Month: BD 20000000 TK = $235294

Overhead cost per unit:

$235294 / $588235.29 X 100 = 40%

Product 1: COST = $750.000

$750.000 x 40% = $300.00 overhead cost

Product 2: COS = $700.00

$700.00 X 40% = $280.00 overhead cost

20.14 Calculate the CM of A Garments.

Who's are still confused regarding the CM (cost of making) of a knit items (garments). To find out the CM of a item you must need the following 06 (six) ii. Qty of running Machine of your factory of the following month (which total expenditure we have consider here). Suppose - 100 machines

iii. Number of machine to complete the layout for the following Items (which CM we are calculating). Suppose - 25 machines

iv. Production target/capacity of the following items, per hour from the existing layout, excluding alter & reject. Suppose - 200 pcs per hour

v) Total working day of the followings month,(though the house rent, commercial expenses, machine overhauling & some other cost remain same) Suppose- 26 days.

v. If you want to calculate the CM in US$ (dollar) then pls input present dollar conversation rate BDTk. Suppose - $1 = 85 taka.

Now you should put the following information in the following form, which you will get here http://cmcostofaknitgarments.blogspot.com/

Otherwise you may follow the below rule:

20.15. Cost of Making (CM)

= {(Monthly total expenditure of the following factory / 26) / (Qty of running Machine of your factory of the following month) X (Number of machine to complete the layout)} / [{(Production capacity per hr from the existing layout, excluding alter & reject) X 8}] X 12 / (Dollar conversion rate)

= [{(2,0,00,0000 / 26) / (100) X (25)} / {(200) X 8}] X 12 / 85

= [{769230.76 / (100) X (25) } / 1600] X 12 / 85

= (192307.69 / 1600) X 12 / 85

= 120.19 X 12 / 85

= 1442.30 / 85

= $16.97 / dozen (this is the making cost (12 pcs) of the following items)

= $ 1.42 CM/Pc Gms

20.16. Profit / Mark-Up Percentages

Once you have calculated the cost of your product, you would add on your mark-up %. This could differ significantly from one business to another and also if you are a manufacturer or a retailer. Manufacturers might add a 40% mark up onto cost price,

while retailers will add 300%. It will also depend on your competition, who your market is, how exclusive your product is and how many middlemen are involved in the pipeline.

20.17. Additional Costs

Specific **additional costs** may need to added to certain styles. Once the manufacturer has established the cost price of a garment there are a few additional items to bear in mind. These factors are applicable on specific orders only and should not be generalized when doing a costing exercise.

1. **Markdowns** - the possibility of a markdown is most common on instant, or 'make to stock' ranges.
2. **Special delivery** - a direct delivery is far more expensive than a delivery to one warehouse. An additional 2-3% on the cost should cover this expense. This is only for negotiated pre-costing. Emergency upgrading of delivery costs due to late deliveries comes out of potential profit.
3. **Terms of payment** - a customer taking 90 days to pay an account has cost you +7,5% extra when compared to a cash customer.
4. **Quantity Discounts or Minimum order surcharges**- the quantity ordered by a customer also has cost implications. Small runs cost substantially more in terms of planning, setting and managing, than long runs.
5. **Commission** - the agent or representative gets different commissions according to the range or customer concerned. Approximate agent commission rates:

* Large volumes:- 0,5 to 1,5%.

* Group merchandise:- 3 to 7%
* Open range for independents: - 10 to 15 %.

6. **Commission fabric finishing or CMT out garments** - when a company has all or some of their products made “outside” - ie buying-in of products or services, it is necessary to divide overhead costs into two categories:

* **Factory overheads** - have to be recovered only on those products which are made inhouse.
* **Administrative Overheads** - have to be recovered on **all** the products sold by the company.

7. **Co-operative Advertising** - The manufacturer's share of the advertising costs must be included in the costing.
8. **Value Added Tax (VAT)** Businesses with a turnover of greater that R1 million pa must register for VAT. This means they will not pay VAT on input expenses and will not charge VAT on outputs unless selling to a non VAT registered dealer / consumer.
9. **Inflation**
10. **Import duties**
11. **Transportation shipping and insurance (FOB and CIF)**
12. **Confined designs**
13. **Quality (poor quality increases usage allowance)**
14. **Color weighting of costs**

20.18 Costing Break Down Of 5pkt Pant

Buyer Name: Tommy Hilfiger

Style# C88 150888,

Order qty: 1500 Pcs **Average production /Hour -200 Pcs Ship Date: 25-May-2021** **Size Range: S-2XL**

S. N.	Unit Name	Unit Price	Per Unit cost	TTL Unit/Gmt	Ttl Price
1.	**Shell:** 100% Cotton Denim Cw 59''	1.25/Yds	$1.25	0.75	**$0.925**
2.	**Pockting** : 65% Cotton 35% Poly Cw 42''	$0.50/Yds	$0.50	0.25	**$0.125**
3.	Metal Shank Button	$6.00/144 pcs	$0.041	1	**$0.041**
4.	Metal 5# Zipper	$ 10/100 pcs	$0.100	1	**$0.100**
5.	Metal Revit	$3.00/144 pcs	$0.020	5	**$0.100**
6.	Main /Brand Label	$0.50/12 pcs	$0.041	1	**$0.041**
7.	Wash care Label	$0.40/12 pcs	$0.033	1	**$0.033**
8.	Size Label	$0.24/12 pcs	$0.020	1	**$0.020**
9.	Thread	$1.50/Cone 3000 mtr	$ 0,0005	250	**$0.125**
10.	Hang Tag	$0.50/12 pcs	$0.041	1	**$0.041**
11.	Barcode sticker	$0.12/12 pcs	$0.010	1	**$0.010**
12.	Price Ticket	$0.12/12 pcs	$0.010	1	**$0.010**
13.	Gum / Cello Tape	$1.25/50 Yds	$0.025	0.69	**$0.017**
14.	Poly Bag	$50.00/1000 pcs	$0.05	1	**$0.05**
15.	Carton	$1.75/20 Pc Ctn	$ 0.088	1	**$ 0.088**
16.	Screen Printing	3 Color	$ 0.105	1	**$ 0.105**
17.	Embroidery	All Process	$0.112	1	**$0.112**
18.	Wash Cost	All Process	$0.460	1	**$0.460**
	Total Cost				**$2.400**
	CM w profit				**$1.42**
	FOB				**$3.82**
	Com. Rate 5%				**$0.191**
	TOTAL FOB/pc				**$4.011**

CHAPTER- 21 CONCLUSION

21. Conclusion.

STANDARD GROUP has now established in the world as a manufacturer of reputed fabric and capable of producing value added products and executing difficult orders at very short lead time. The Planning, organizing, controlling, designing, creativity, the technical skill and above all the Quality conscious have cemented the base of this leading textile industry. With highly advanced Technology and an emphasis on developing local human resources, its seems to be

Clear that Standard Group of textile has the potential to make an important contribution to the Nation growing readymade, garments export sector and makes an example for others.

We have found ourselves fortunate to have our industrial training at Standard Group. It has a huge Production capacity with a very efficient production team. Standard Group. Has very well, well Equipped and modern Machineries and producing a wide range Product. During our training Period we have noticed that Standard Group is very concern about their quality and they rarely have any quality complain. The management of Standard Group is very organized, pre-active and Co-operative.

At the end of the day we realized that industrial training make our knowledge's application practically and make us confident to face any problem of our job sector.

LIMITATIONS

- I have started industrial attachment from 26 October 2021 to 26 December 2021.
- Above few times for industrial attachment is not enough time to property complete industrial attachment. If I get more time I will know lot and complete it more effectively. .
- Not all operators can provide complete or accurate information because he works beyond the limits.
- It is not possible to reporting full information for some limitation. So, we tried our best to summarize all the information.

The End