



# Participant Handbook

Sector  
**Apparel / Made-Up's and  
Home Furnishing**

Sub-Sector  
**Apparel**

Occupation  
**Sewing Machine Operator (Knits)**

Reference ID: AMH/Q0305, Version 3.0  
NSQF level: 3



## Sewing Machine Operator (Knits)



<https://youtu.be/umuDaSxGieA>  
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**Shri Narendra Modi**  
Prime Minister of India

“ Skilling is building a better India.  
If we have to move India towards  
development then Skill Development  
should be our mission. ”



# Certificate

## COMPLIANCE TO QUALIFICATION PACK - NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the  
APPAREL, MADE-UPS & HOME FURNISHING SECTOR SKILL COUNCIL  
for the

### SKILLING CONTENT : PARTICIPANT HANDBOOK

Complying to National Occupational Standards of  
Job Role/Qualification Pack: Sewing Machine Operator Knits  
QP. No. AMH/Q0305 NSQL LEVEL 3

Date of Issuance: 30 September 2021

Valid up to: 30 September 2024

\*Valid up to the next review date of the Qualification pack  
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Chief Executive Officer  
APPAREL MADE-UPS & HOME FURNISHING  
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## About this book

This Participant Handbook is designed to enable training for the specific Qualification Pack(QP). Each National Occupational (NOS) is covered across Unit/s.

Key Learning Objectives for the specific NOS mark the beginning of the Unit/s for that NOS.

- AMH/N0102: Maintain work area, tools and machines
- AMH/N0104: Comply with industry, regulatory and organizational requirements and Greening of Job roles
- AMH/N0305: Plan and Prepare for process of sewing of knit fabrics as per plan received from stitching/line supervisor
- AMH/N0306: Stitch knitted fabrics as per plan
- AMH/N0307: Maintain health, safety and security in the production line with Gender and PwD Sensitization

The symbols used in this book are described below:

## Symbols Used



Key Learning Outcomes



Steps



Time



Tips



Notes



Unit Objectives




Exercise

# Table of Content

S. No.	Modules and Units	Page No.
1.	<b>Introduction and Orientation</b>	<b>1</b>
	Unit 1.1 - Introduction to Sewing and Apparel Sector	3
	Unit 1.2 - Role and Responsibilities of Sewing Machine Operator (Knits)	8
2.	<b>Plan and Prepare for Sewing of Knit Fabrics (AMH/N0305)</b>	<b>11</b>
	Unit 2.1 - Basic Materials for Sewing of Knits	13
	Unit 2.2 - Machine and Equipment for Sewing Knits	31
3.	<b>Stitch Knitted Fabrics (AMH/N0306)</b>	<b>65</b>
	Unit 3.1 - Stitch Components to Produce Apparels	67
	Unit 3.2 -Contribute to Achieve Product Quality in Stitching Operations	91
	Unit 3.3 -Stitching a T-Shirt	116
4.	<b>Maintain Work-Area, Tools and Machines (AMH/N0102)</b>	<b>125</b>
	Unit 4.1 - Maintain Work Area, Tools and Machines	127
5.	<b>Maintain Health, Safety and Security in the Production Line with Gender and PwD Sensitization (AMH/N0307)</b>	<b>137</b>
	Unit 5.1 – Maintain Health, Safety and Security at Work Place	139
	Unit 5.2 – First Aid & CPR	155
	Unit 5.3 – Sensitivity towards People with disability and Gender Equality	166
6.	<b>Comply with Industry, Regulatory and Organizational Requirements (AMH/N0104)</b>	<b>173</b>
	Unit 6.1 - Comply with Industry, Regulatory and Organizational Requirements	175
7.	<b>Soft Skills and Communication Skills</b>	<b>185</b>
	Unit 7.1 - Introduction to the Soft Skills	187
	Unit 7.2 - Effective Communication	189
	Unit 7.3 - Grooming and Hygiene	192
	Unit 7.4 - Interpersonal Skill Development	194
	Unit 7.5 - Social Interaction	198
	Unit 7.6 - Group Interaction	200
	Unit 7.7 - Time Management	202
	Unit 7.8 - Resume Preparation	204
	Unit 7.9 - Interview Preparation	206



## Table of Content

S. No.	Modules and Units	Page No.
8.	<b>Employability Skills</b>	<b>209</b>
	Unit 8.1 - Employability Skills – 30 Hours	211
	 <a href="https://eskillindia.org/Home/ebook_downloadPdf/1718/0">https://eskillindia.org/Home/ebook_downloadPdf/1718/0</a>	
9.	<b>Annexure-Resources</b>	<b>213</b>





# 1. Introduction and Orientation

Unit 1.1 - Introduction to Sewing and Apparel Sector

Unit 1.2 - Role and Responsibilities of Sewing Machine Operator (Knits)





## Key Learning Outcomes

**At the end of this module, participants will be able to:**

1. Familiarise with apparel industry.
2. Identify the role and responsibilities of sewing machine operator in knitting.

## UNIT 1.1: Introduction to Sewing and Apparel Sector

### Unit Objectives



At the end of this unit, participants will be able to:

1. Familiarise with apparel industry.
2. Describe the home furnishing and made-ups sub sectors.

### 1.1.1 Introduction to Sewing

Sewing is the craft of fastening or attaching objects using stitches made with a needle and thread. Sewing is the craft of using needle and thread to attach or fasten objects. It is one of the oldest existing crafts in the world.

Sewing was originally a handmade craft for many years. It was the invention of the sewing machine in the 1800s and the growth of technology and computerization in 1900s that increased the mass production of machine made objects. However, sewing by hand is still a globally popular practice. In areas like haute couture fashion, custom dress creation and such, fine hand sewing is an ongoing demand. Fine hand sewing is thus pursued by hobbyists and textile artists equally.

### 1.1.2 Apparel Sector – Industry Overview

The apparel and textile industry is one of the most booming industries. Apart from providing one of the basic necessities of life, it also plays an important role through its contribution to industrial output, employment generation, and the export earnings of the country. With Indian apparel and textile being among the world's largest producers, the country is also the 5th largest exporter of apparel and textile across the globe with US\$ 36.4 billion. (source: Annual T&A industry report 2021 by Wazir Advisors)

The textile industry is one of the oldest business options in India since the ancient age. Different types of textile fibers are produced in India, among which cotton, jute, silk, and wool are the major ones. Both skilled laborers and unskilled officials are needed to run this business smoothly. Thus, the textile and apparel industry serves as the platform offering a huge number of employment opportunities to eligible people in India. A brief on complete supply chain for apparel industry is shown as below.



Fig.1.1.1.1: The AMH Value Chain (Source: PwC Analysis 2021)

The apparel and textile industry contributes 5 percent to the country's GDP from the domestic sector, whereas 7 percent is contributed from the industrial output in value terms and the export earnings of the country acquire a contribution of 12 percent from the apparel and textile industry.

Exports of AMH products stood at US\$ 21.5 billion in the year 2019-20 and have grown at a CAGR of 3 per cent since 2009-10. Top exported Apparel and Home Textiles commodities include T-shirts, kitchen & toilet linen, bed linen, men's shirt, women's top. India's domestic AMH market is also expanding rapidly, and domestic consumption stood at US\$ 81 billion growing at a CAGR of 10 percent, between 2005-06 to 2018-19.

The Indian textile sub-sector has traditionally been contributing significantly to the economy and manpower as well as to the structural changes in the manufacturing sector. Several factors that would contribute to the growth would include:

- Rising income levels are expected to increase the demand for home textiles and garments from domestic Consumers.
- Free trade agreements provide India a comparative advantage in the export segment as compared to its competitors – China, Bangladesh and Pakistan – as they create opportunities for manufacturers to supply to potential markets in East Asia.
- Low production cost continues to be an advantage for the sector and, consequently, demand from existing foreign markets continues to increase.
- Structural changes in the sector, with a shift from vertically disintegrated to integrated large firms, with automated machines for yarn and fabric production.
- Increased spending on research and development to enter the specialized fabrics and technical textiles sector.
- Favorable policy environment to support domestic and foreign investments and the implementation of schemes to enhance the production capacity and improve technology.

### Ready Made Garments

The ready-made garments segment comprises men's, women's and kid's clothing, which may be used for either private (home/office wear) or commercial (uniforms for school, waiters and flight crew) purposes. The ready-made garments section has grown rapidly in the last few years. Both exports and domestic demands shall drive sector growth in future.

- Men's wear is the biggest segment in the ready-made garment segment, comprising about 43 percent of its share in the total revenue generated. This is followed by women's wear, with a share of 38 percent; 10 percent share of boys wear and 9 percent for girls wear in the total revenue generated by the ready-made garment segment.
- Changing lifestyles and consumption patterns are expected to drive the sector's supply of casual wear with an 11 percent growth, which would drive demand for workforce with specialized skills in western formals design, blended fabrics and increased application work on clothes.

### Departments in a Garment Factory

Pre-Production	Production	Auxiliary
<ul style="list-style-type: none"> <li>• Marketing and business development</li> <li>• Design</li> <li>• Merchandising</li> <li>• Sampling</li> <li>• Production Planning and Control</li> <li>• Pattern Making</li> <li>• Fabric Store and fabric sourcing</li> <li>• Trims and Accessory Store</li> <li>• Fabric Testing Lab</li> </ul>	<ul style="list-style-type: none"> <li>• Cutting department</li> <li>• Sewing department</li> <li>• Quality Control department</li> <li>• Machine Maintenance department</li> <li>• Garment Washing department</li> <li>• Finishing department</li> <li>• Printing department</li> <li>• Embroidery department</li> <li>• Packing</li> </ul>	<ul style="list-style-type: none"> <li>• Industrial Engineering Department</li> <li>• EDP / IT department</li> <li>• Accounting Department</li> <li>• Human Resource and Administration</li> <li>• Shipping and documentation</li> </ul>

Fig.1.1.2: Apparel production department

### 1.1.3 Made-ups and Home Furnishings

The made-ups sub-sector is growing at a steadily increasing pace in the country. The wide variety of products that come under this sub-sector are not only include necessities but also functional and luxury products. Made- ups sub-sector is divided into three (3) broad categories:

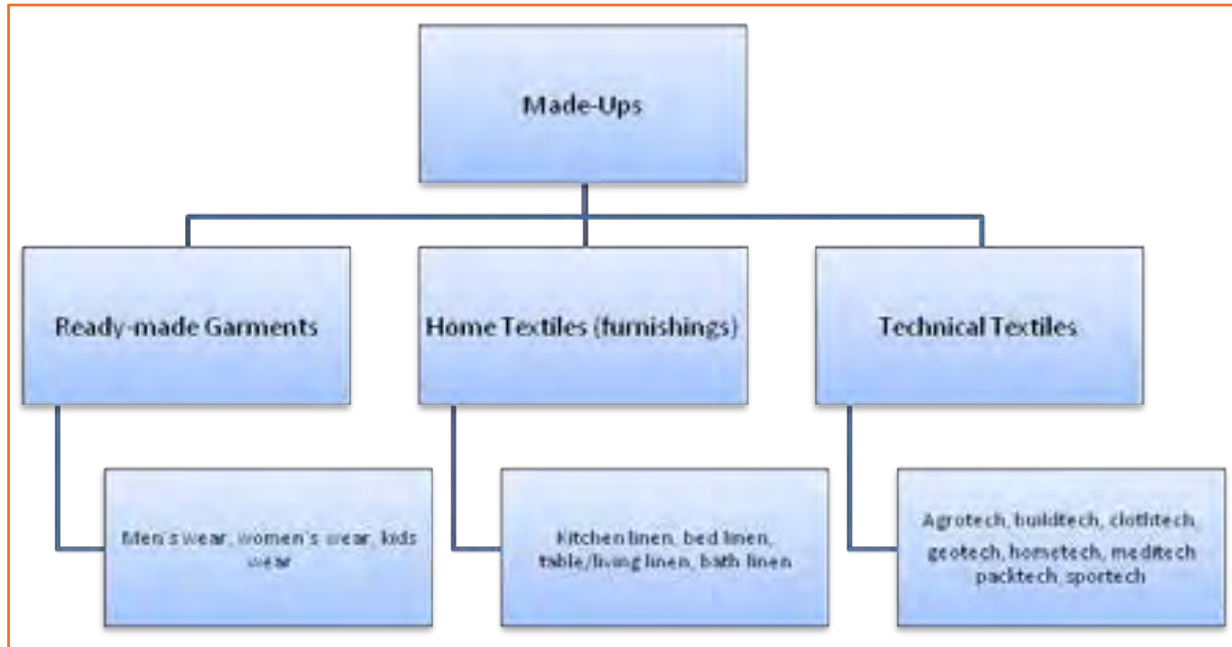


Fig.1.1.3: Made-ups and Home Furnishing Sub-sector

Indian is among one of the biggest exporters in Apparel and Made-ups industry. In Home Textiles India is second only to China in global exports, whereas in apparels, India is among the top 10. , India is fast becoming one of the leading global players in the Home Furnishings/ Textile. Home Furnishings industry offers wide varieties of products like bedspreads, furnishing fabrics, curtains, rugs, cushion covers etc.

The Indian Home Furnishing industry provides a unique blend of modern technology and ethnic techniques to bring out products that are one of the best in the world. The increase in the spending power of the Indian working class is also expected to contribute in the growth of domestic consumption of made-ups and home furnishings industry.



Fig.1.1.4: Home Furnishing

With increased demand and completion from countries like China, the demand of skilled workforce/kaarigars in the Home Furnishings industry is bound to increase in coming years

#### Size of Indian Textile and Apparel Industry

In India, the Apparel industry is spread across the country. However, the distribution of the clusters depends on the availability of raw material as well as the manufacturing. Cotton based units can be seen in all parts of the country, while the synthetic and woolen based industries are mainly concentrated in Maharashtra, Gujarat, Punjab, Jammu & Kashmir, Haryana, Madhya Pradesh and Uttar Pradesh. The silk-based industry finds concentration in Andhra Pradesh, Karnataka and Tamil Nadu while, jute clusters are largely located in Bihar and West Bengal.

Most of the apparel exporters (approx. 95%) are based out of Delhi NCR, Tamil Nadu Punjab, Rajasthan, Maharashtra and West Bengal. Rest of the India accounts for remaining 5% of the apparel exporters.

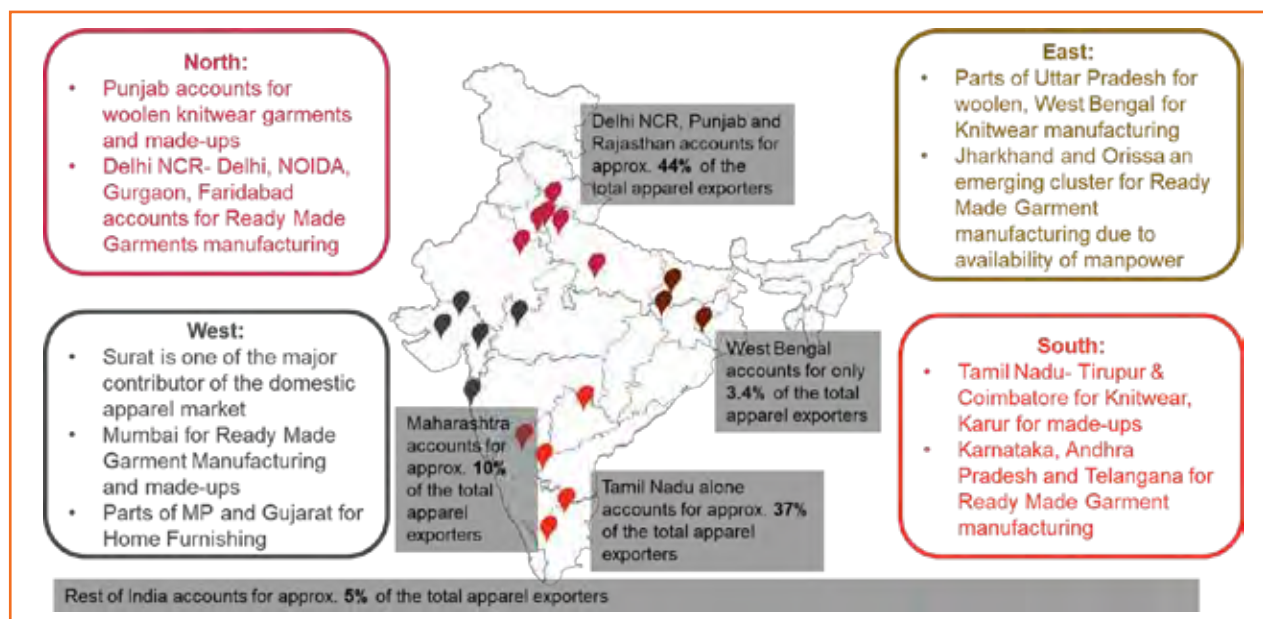


Fig.1.1.5: Major Apparel, Made-ups and Home Furnishing Clusters in India

### 1.1.4 Skill Development Policy

Indian government runs more than seventy skill development schemes at central, state and district level. The government has launched the Skill India flagship program to empower youth of the country by imparting employable skills to them. Under this initiative, the government has set up Ministry of Skill Development and Entrepreneurship (MSDE) to bring all the skill initiatives of the government under one umbrella and lead skill development ecosystem in the country. The ministry also launched a comprehensive Skill Development Policy in 2015 in which, detailed skill set requirement, courses offered, and roles and responsibilities of different stakeholders were defined. Further, sector wise skill gap analysis was also undertaken to understand sector specific skill requirement.

Pradhan Mantri Kaushal Vikas Yojana (PMKVY) and Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY) are the flagship schemes which offer a variety of courses in the AMH sector. Among other skill development programmes, Integrated Skill Development Scheme (ISDS) was the main program run by the Ministry of Textiles, Government of India, introduced in XIIth Five Year Plan (FY 12-17).

The scheme had a target to train 1.5 million people for the T&A industry. As continuation of the scheme, the ministry has launched Scheme for Capacity Building in Textile Sector (SCBTS) also known as SAMARTH in 2018 with a target to train 1 million people in the sector.

ISDS has helped the industry by supplying skilled workforce, which, in turn, has helped the manufacturers in improving productivity and quality. Overall, it has helped in reducing cost, wastage and improving competitiveness that resulted in better business performances.



### 1.1.5 Employment Scenario in the Sector

Indian Garment Industry is closely connected to the fashion industry and grows hand in hand. Apparel Made-up & Home furnishing (AMH) is one of the largest employments generating sector in India, constituting about 60 per cent share of the total Textile and Apparel (T&A) exports. The Indian textile sub-sector has traditionally been contributing significantly to the economy and manpower as well as to the structural changes in the manufacturing sector. As per the latest round of Periodic Labor Force Survey (2018-19), the total workforce in India is estimated to be about 479 million. The share of labor working in the manufacturing sector was around 12.2 per cent (about 59 Million). Direct employment in the AMH sector primarily comes under manufacturing and the service sectors. The AMH sector employs about 35.8 million labour out of which 47% are engaged directly through the core manufacturing and trade of AMH product and 53% are engaged indirectly through the ancillary sector activities.

India is among the very few countries which have presence across the entire supply chain, from natural and synthetic fibers right up to finished goods manufacturing. It has presence in organised mill sector as well as decentralised sectors like handloom, power loom, silk, etc.

Incremental human resource requirement in core AMH sector, including manufacturing and trade is estimated to be about 35 Lakh for upcoming five years period between 2021-22 and 2025-26. Of the total incremental human resource demand, 89 per cent demand is projected to be in manufacturing of AMH products and 11 per cent demand is projected to be in trade related activity. Incremental labour demand in ancillary sector is estimated to be about 52 Lakh. Thus, the total incremental labour demand in AMH sector is about 87 Lakh.

Total incremental supply at all skill level, during the 2021-25 period, is projected to be of 18.4 Lakh. With the incremental demand of 31 Lakh, the skill gap in AMH - manufacturing is projected to be of 12.6 Lakh.

## UNIT 1.2: Role and Responsibilities of Sewing Machine Operator (Knits)

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Know who is SMO in knitting.
2. Understand the roles and responsibilities of SMO.

### 1.2.1 Sewing Machine Operator (Knits)- Job Description

Sewing Machine Operations involves stitching of components of garments together using a sewing machine. The role of a sewing machine operator is very critical to the industry as it enhances the quality of the product.

Fabric Sewing Machine Operator (Knits), also termed as 'Machinist or Stitcher' is an important job-role in the Apparel, Made-Ups and Home Furnishing as well as their manufacturing sector making knit garments. The chief duty of a sewing machine operator (knits) is to stitch knit fabrics with due care to convert them into garment and apparel.



*Fig 1.2.1: SMOs on the Job*

#### Personal Attributes

A SMO (Knits) necessitates few definite characteristics job so that the task at hand can be completed in a proficient manner. Some important personal attributes are:

- Good vision
- Eye-hand-leg synchronization
- Motor skills
- Good interpersonal skills,
- Open to learning
- Basic appreciative knowledge of measurements

### 1.2.2 Roles and Responsibilities




The key roles and responsibilities of a Sewing Machine Operator - Knits are:

- Understand and identify different types of fabrics used in knitting
- Identify and work with various threads and needles used in knitting operation
- Operate various knitting machines and sewing machines used for knitting
- Ensure that tool/equipment and raw material are available as required
- Ensure proper storage of tools and equipment
- Perform basic maintenance of tools and machines
- Carry out various stitches required to perform knitting
- Identify various defects in fabrics and final garments
- Perform repair of basic defects
- Keep the supervisor informed about any problems or discrepancies in the sewing process
- Ensure that the product conforms to the design specification

### Resources



Scan the QR codes or click on the link to watch the related videos.

Descriptions	QR Codes
Apparel industry in India	 <a href="https://youtu.be/tN5oLGSjepQ">https://youtu.be/tN5oLGSjepQ</a>
Role and Responsibilities of Sewing Machine Operator	 <a href="https://youtu.be/aHo2Kp2LeiY">https://youtu.be/aHo2Kp2LeiY</a>
Fabric Knitting	 <a href="https://youtu.be/wdcFhc5ULkc">https://youtu.be/wdcFhc5ULkc</a>

## Exercise

1. When was sewing machine invented?
  - a) 20th century
  - b) 19th century
  - c) 18th century
  - d) 17th century
2. Increasing size of Domestic market is not good for Industry.
  - a) TRUE
  - b) FALSE
3. Sewing machine operators also responsible for cleaning and maintaining hazard free environment.
  - a) TRUE
  - b) FALSE
4. A Sewing Machine Operator, is responsible for producing quality product confirming quality standards given by buyer.
  - a) TRUE
  - b) FALSE
5. \_\_\_\_\_ scheme is governed by Ministry of Textiles.
  - a) PMKVY
  - b) Samarth
  - c) NULM
  - d) DDUGKY
6. Cutting Department is a part of:
  - a) Pre Production
  - b) Production
  - c) Post Production
  - d) None of the above
7. Full Name of MSDE is:
  - a) Ministry of short distance education
  - b) Ministry of Skill education
  - c) Ministry of Skill development and entrepreneurship
  - d) None of the above
8. Any \_\_\_\_\_ in stitching should be avoided by closely observing the operations.
  - a) Communication
  - b) Defect or Fault
  - c) Machine Fault
  - d) None of the above



## 2. Plan and Prepare for Sewing of Knit Fabrics

Unit 2.1 - Basic Materials for Sewing of Knits

Unit 2.2 - Machine and Equipment for Sewing Knits



AMH/N0305



## Key Learning Outcomes

**At the end of this module, participants will be able to:**

1. Understand the difference between machines according to instructions
2. Ensure machine parts like needles, foot, spools etc. are properly working
3. Ensure tools and material required for sewing of knit fabrics is available
4. Select appropriate material for the process
5. Inform supervisor in case any clarification is required
6. Recognize the different types of industrial sewing machines.
7. Familiarize with the feed mechanisms.
8. Determine the basic list of material and tools required for stitching.
9. Check the equipment is safe and set-up in readiness for use.
10. Recognize about the different types of threads, needles and fabrics.

## UNIT 2.1: Basic Materials for Sewing of Knits

### Unit Objectives

At the end of this unit, participants will be able to:

1. Understand the differentiation between Knit and Woven and various Knitting terms.
2. Comprehend the common knitting terminologies.
3. Recognize the different types of industrial sewing machines.
4. Familiarize with the feed mechanisms.
5. Determine the basic list of material and tools required for stitching.
6. Explain commonly used knit fabrics.
7. Recognise the equipment used for sewing knits.
8. Various Industrial Sewing Machines.
9. Selection of needles for sewing of knits.

### 2.1.1 Basics of Knit Fabric- Definition

Knit fabric is a textile made by interloping of a set of yarn. Knit fabric properties are different from woven fabric in that, it is more flexible and can be more easily constructed into small pieces, because it is constituted of simple rolled up thread in the form of loops by curling on itself. Woven fabric, is composed by criss-cross of two sets of yarn called warps and wefts.

### 2.1.2 Difference of Woven and Knitted Fabric

Woven	Knits
<ul style="list-style-type: none"> <li>• Two types of threads are used</li> <li>• Long process</li> <li>• Yarn movement is restricted</li> <li>• Strong fabric</li> <li>• Less comfortable</li> <li>• Wrinkles easily</li> <li>• Ironing is necessary</li> <li>• Thinner fabric</li> <li>• Less extensible</li> <li>• Cutting waste cannot be reduced</li> <li>• Stable fabric</li> <li>• Examples are Twill Chiffon, Denim, Poplin</li> </ul>	<ul style="list-style-type: none"> <li>• One type of thread is used</li> <li>• Short process</li> <li>• Yarn movement is not restricted</li> <li>• Weaker fabric</li> <li>• More comfortable</li> <li>• Highly crease resistant</li> <li>• Requires no ironing</li> <li>• Thicker fabric</li> <li>• More extensible</li> <li>• Cutting waste can be minimized</li> <li>• Less stable fabric</li> <li>• Examples are simple jersey, Interlock, pique, rib</li> </ul>

Fig 2.1.1: Difference of Woven and Knitted Fabric



Fig 2.1.2: Difference of Woven and Knit material

### 2.1.3 Common Knitting Terms

Do not be confusing if you hear a few fervent knitters talking among themselves about “To cast on” or “Dropping a stitch”. As you get ready, to start your days of knitting, you perhaps are quite officious about what other knitting jargon exists.

#### Alternate

In Knitting, Alternate means ‘every other row’. When you have to bind off stitches, you cannot do that at the end of the row. So you do it in the beginning of the row.

#### Bind Off

To finish or close off-line sews by finishing with a final row. By knitting two stitches; slipping the first stitch over the second stitch; recapping with every two stitches, till the one last stitch remains; and cutting yarn and coiling it from side to side to the last stitch.



Fig 2.1.3: Bind Off

#### Cast on

To begin by creating the leading stitch, or to add a stitch/ stitches—by making a slip loop over left needle, placing right needle through the loop, passing yarn over and under right needle, illustrating yarn through loop, and moving loop to left needle.

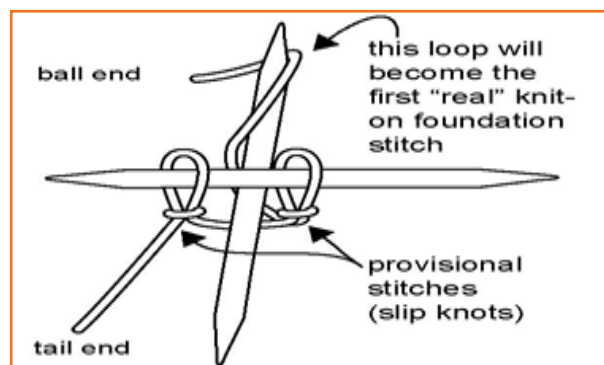


Fig 2.1.4: Cast on

### Course

A course is a row of loops, shaped by adjacent needles during the same knitting cycle. In weft knitted cloths, a course is made of yarns derived from a single supply and the length of the yarn to knit a course is known as a **COURSE LENGTH**. In warp knitting each loop in a course is composed of a separate yarn.

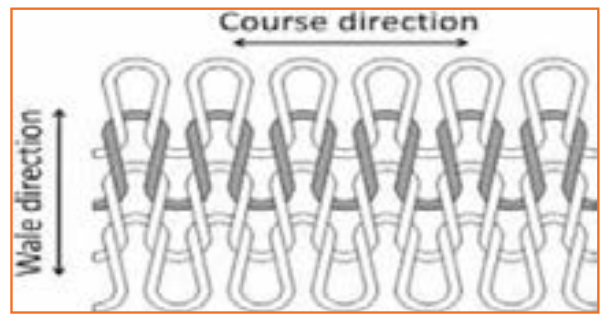


Fig 2.1.5: Course



Fig 2.1.6: Count

### Count

The number of wales measured along the width of the fabric is called wale count or wale density. Wale count is articulated as number of wales per inch or per centimetre (wpi/wpc). The number of course slowed along the length of the fabric is called course count or course density. In other words, it is the number of course per inch or per centimetre (cpi/cpc).

### Decrease

To work fewer stitches conferring to instructions for shaping or giving a structure to a piece—most typically by a) knitting stitches together; or b) slipping a stitch and passing over the slipped stitch while knitting the following stitch.



Fig 2.1.7: Decrease



Fig 2.1.8: Garter Stitch

### Garter Stitch

A pattern using knit for every stitch and every row.

### Gauge

Gauge is a term used to describe the needle spacing, which is the number of needles per unit length. If two sets of needles are used, as in rile or interlock, the second set of needle is not taken into consideration in determining the gauge.

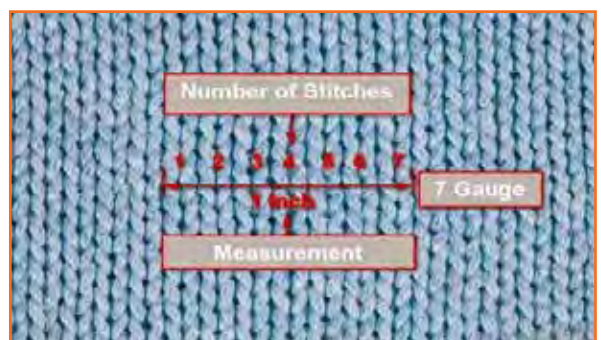


Fig 2.1.9: Gauge



## Increase

To work extra stitches according to instructions—usually by a) creating two stitches from one stitch by knitting twice into the same stitch; b) creating two stitches from one stitch by purling twice into the same stitch; or c) using the right needle to pick up the yarn, place it on the left needle, and knit an additional stitch into the back of the new loop created.



Fig 2.1.10: Increase



Fig 2.1.11: Knit

## Knit

The deed of knitting, but also the most common stitch. In patterns, knit is shortened as K and is followed by the number of stitches needed: K4 = knit four stitches.



Fig 2.1.12: Make 1

## Make 1

To work additional stitches according to pattern directions—commonly performed to shape a piece; or to create a hole and extra stitch (for a lacy pattern).



Fig 2.1.13: Moss Stitch

## Moss Stitch

The alternating of one knit stitch and one purl stitch in every row.

## Purl

Purl is the second most common stitch. Though, in a knit stitch you put the right needle from side to side the stitch from behind, in the purl stitch you place the right needle into the front of the left needle stitch.

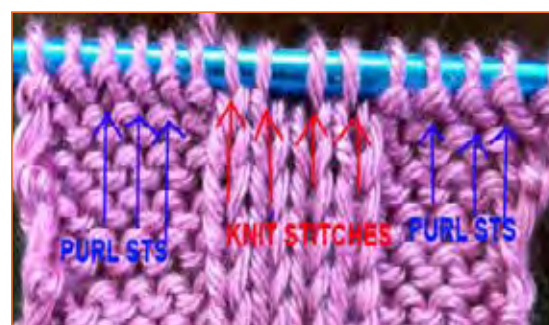


Fig 2.1.14: Purl



### Pass Slipped Stitch Over

The procedure comprises of slipping one stitch, then knitting the following stitch (yarn under then over right needle and yarn pulled through); then slipping stitch off left needle—so that slipped stitch and knitted stitch are now on right needle. Lastly, the slipped stitch is lifted up and over the knit stitch and off the right needle.

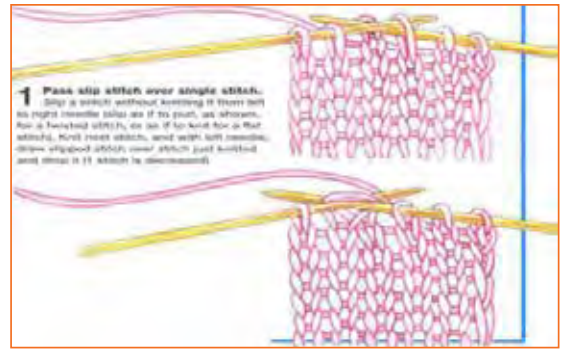


Fig 2.1.15: Pass Slipped Stitch Over

### Repeat

To do the same step or stitch as just previously instructed. If the instructions read [repeat], do the same action as you just did in the [previous bracketed instruction] step.

### Reverse Shaping

The act of working the second side of the piece's shape at the opposite end from where it was worked for the first side. The process typically includes binding off.

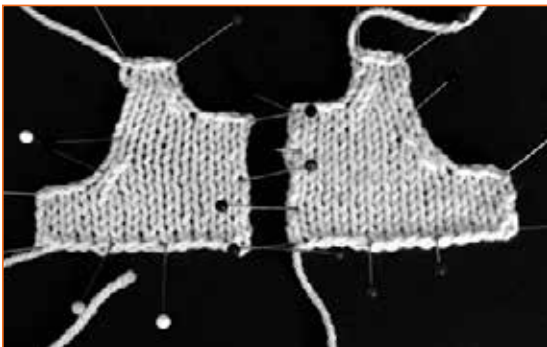


Fig 2.1.16: Reverse Shaping

### Row

The completed series of stitches worked from one needle to the other, thereby making it time to transfer needles accordingly: from left hand needle in left hand to right hand, and right hand needle (with row) to left hand.

### Slip

To transfer a stitch from left needle to right needle without adding yarn.



Fig 2.1.17: Slip

### Stocking Stitch

A stitch pattern made by alternating one row of knit and one row of purl throughout.

### Through the Back of the Loop

The act of knitting or purling into the back of the loop on left needle, creating a twisted stitch.

### Together

On a knitting row, the needle pointing left to right, works with the next two stitches on the left needle, while the yarn is put under right needle, brought over the top, and pulled through both stitches at the same time; then the two stitches are dropped. On a purling row, the process is done in parallel fashion but with purling actions—right needle is put from side to side of the front of left needle stitches; and yarn is brought over the top of right needle point.

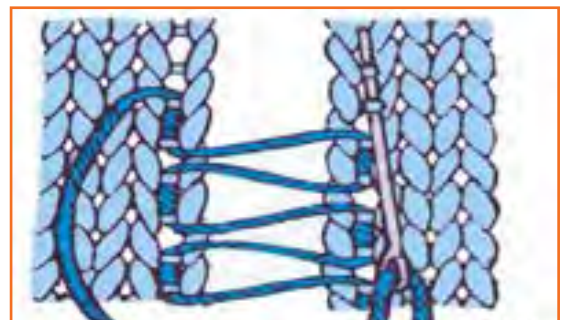


Fig 2.1.18: Together

### Wale

A wale is a perpendicular column of loops produced by the same needle knitting at consecutive knitting cycle. In weft knitting fabrics, a wale is composed of diverse yarns. In warp knitting a wale can be formed from the same yarn if a warp guide laps around the needle at following needle cycle. Wales are joined to each other by the sinker loops in weft knitted fabrics and by the underlaps in warp knitted fabrics.

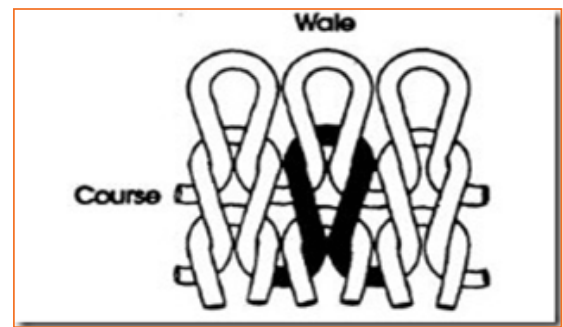


Fig 2.1.19: Wale

### Yarn Back

The act of putting front-sitting yarn to back, between the two needles.

### Yarn Forward

The act of bringing back-sitting yarn to the front, under the right needle.

### Yarn Front

The act of leaving the previously front-sitting yarn at the front instead of moving it back for a back-sitting yarn stitch—an action which will instead build a loop or hole.

### Yarn 'Round Needle

The act of preceding the next stitch by casing yarn around the right needle point, yarn starting and finishing at back for a knit stitch, yarn starting and finishing at front for a purl stitch—thereby creating a hole and an extra stitch.

## 2.1.4 Commonly Used Knit Fabrics

### Types of Knits

Knit Fabrics can be classified as follows:

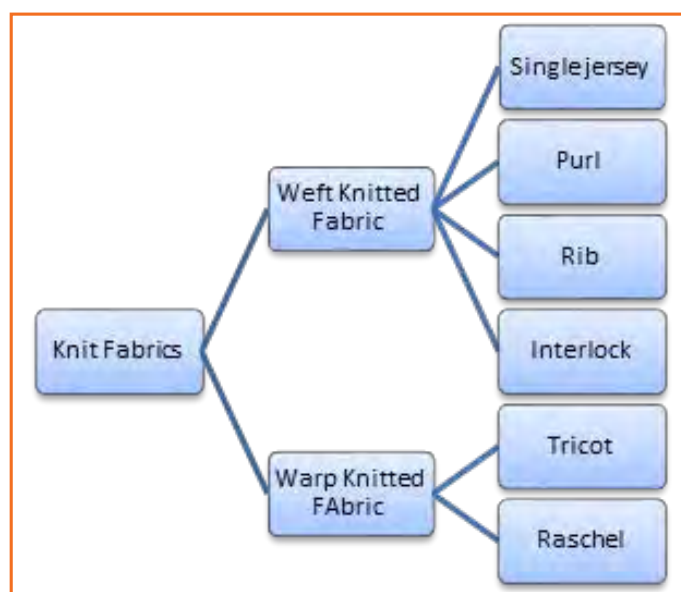


Fig 2.1.20: Types of Knits

### Single Jersey

This particular fabric can be very stretchy, single knitting and usually lightweight jersey with one flat side and one piled side. When this is made with a lightweight yarn, the fabric is most often, used to make T-shirts.



Fig 2.1.21: Types of Knits

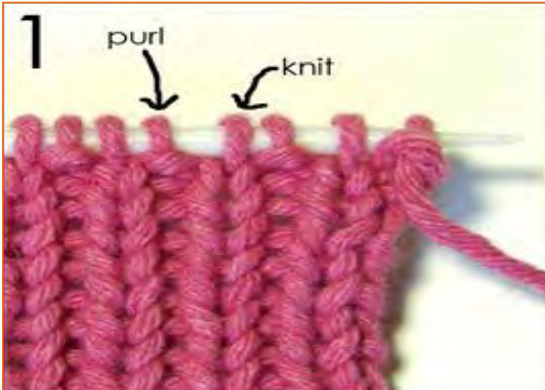


Fig 2.1.22: Purl

### Purl

In purl-knitted fabrics, both face and back stitches occur in at least one wale, and sometimes in all of the wales. Purl fabrics are usually fairly chunky and, when they are not extended lengthwise, they often show only back loops on both the face and reverse of the fabric.

### Rib

Ribbing is a pattern in which vertical stripes of stockinet alternate with vertical stripes of reverse stockinet stitch. The two types of stripes may be separated by other stripes in which knit and purl stitches alternative perpendicularly; such plissé stripes add width and depth to ribbing but not more elasticity.



Fig 2.1.23: Rib



Fig 2.1.24: Interlock

### Interlock

Similar to a jersey knit except both front and back of the fabric look identical. Double knit read more » construction makes this a thicker knit fabric. Interlock is the snugest knit, gives the evenest surface and the finest hand. The fabric is particularly soft, firm and permeable.

### Tricot

Tricot is a special case of warp knitting. The yarn Zig-zags perpendicularly, following a single column ("wale") of knitting. Tricot and its relatives are very resistant to runs, and are commonly used in lingerie.

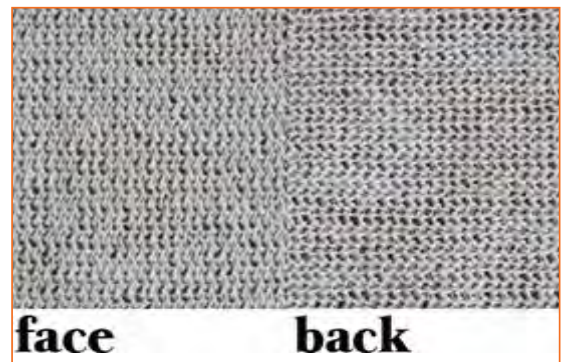


Fig 2.1.25: Tricot



### Raschel

All warp-knit fabrics are resistant to runs and relatively easy to sew. Raschel lace— a common type of machine made lace—is a warp knit fabric but using many more guide-bars (12+) than the usual machines which mostly have three or four bars.



Fig 2.1.26: Raschel

## 2.1.5 Commonly Found Defects in Knit Fabrics

- **Skewed or Bias:** Condition where courses are not square with wale lines on knit. This basically happens when the fabric is loosely knitted. The balancing of course and wales are not at perpendicular. This normally leads to a lot of problems to follow the grain matching during cutting. Bias happens essentially in tube-like fabrics during processing.
- **Barre:** Occurs in circular knit. Caused by mixing yarn on feed into machine. Fabric will appear to have horizontal lines. In Barre we can see, diverse types of yarns which is running on the circular knits. Barre happens due to mixing of yarn lots. It can happen due to thick and thin in the yarn or mixing of dyed or differently coloured yarns.
- **Birdseye:** Caused by accidental tucking from malfunctioning needle. Usually two small distorted stitches, side by side.
- **Bowing:** Typically caused by finishing in knits the coarse lines lie in an arc across width of goods. Critical on stripes or patterns and not as critical on solid colour fabrics. Bowing is seen in loose knits and low GSM fabric, egg. If the fabric needs a GSM of 140gms, in 20s count knitted 20-gauge machine, the chance of bowing is more than 15%, so there is a possibility of the rejection of the fabric due to bowing. Also bowing can be visible when the TPI of the yarn, which is more than 16, is the maximum for the knitted yarn.
- **Broken colour pattern:** This kind of fabric defect is usually caused by colour yarn out of place on frame.



Fig 2.1.28: Crease Streak



Fig 2.1.27: Broken colour pattern

- **Crease Streak:** Occurs in tubular knits. Results from creased fabric passing through squeeze rollers in the dyeing process.

- **Drop stitches:** Results from malfunctioning needle or Jack which appear as holes, or missing stitches.
- **Hole:** Caused by broken needle.

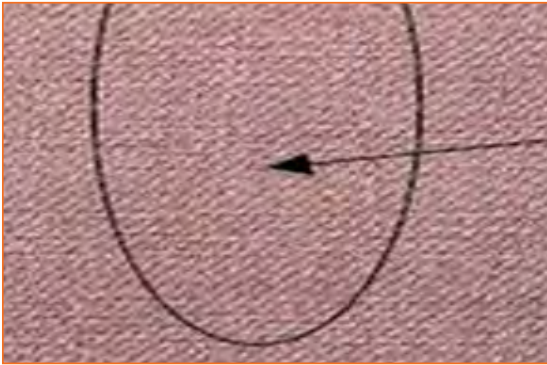


Fig 2.1.30: Missing Yarn

- **Needle Line:** It is caused by bent needle forming distorted stitches usually vertical line.



Fig 2.1.32: Pin Holes



Fig 2.1.29: Drop stitches

- **Missing Yarn:** Occurs in warp knit. Results from wrong fibre yarn (or wrong size yarn) placed on warp. Fabric could appear as thick end or different colour if fibres have different affinity for dye.

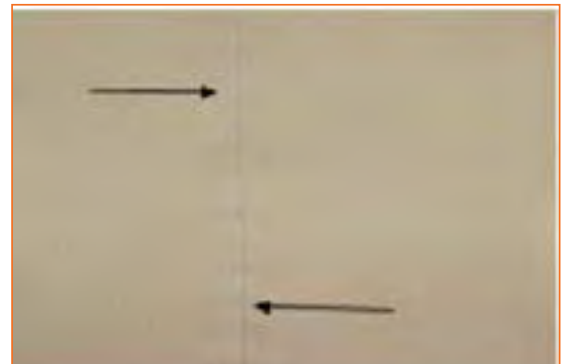
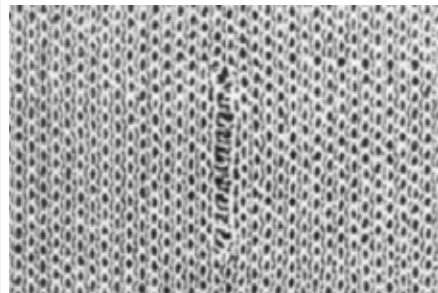






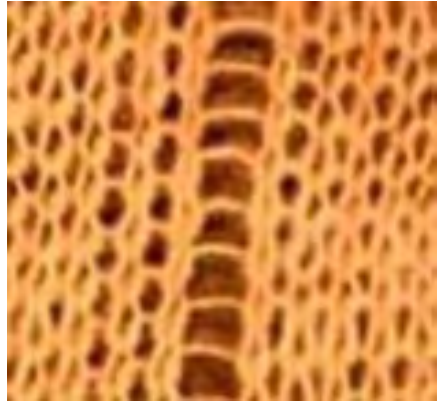
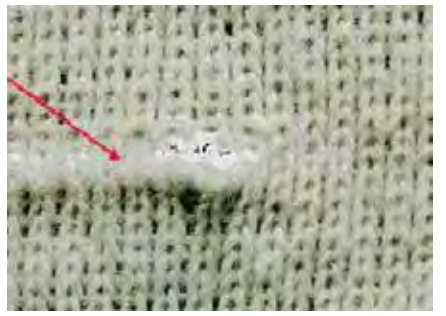
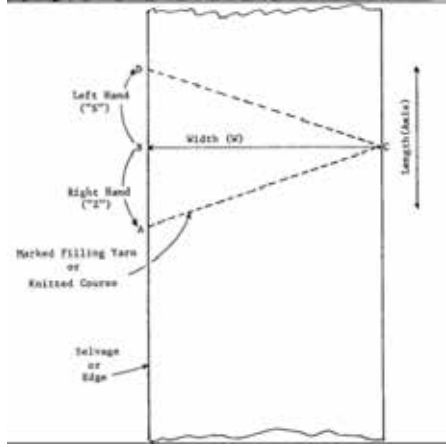
Fig 2.1.31: Needle Line

- **Pin Holes:** Holes along selvage caused by pins holding fabric while it processes through stenter frame.

- **Press-Off:** When all or some of the needles on circular knitting fail to function and fabric either falls off the machine or design is completely disrupted or destroyed. Many knitting needles are broken and have to be replaced when bad press-off occurs. Bad press-off usually starts a new roll of fabric.
- **Runner:** Usually caused by broken needle, will appear as vertical line. (Most of the machines have a stopping device to stop machine when a needle breaks)
- **Slub (knit Fabric):** Usually caused by thick or heavy place in yarn, or by lint getting onto yarn feeds.
- **Straying End:** Caused when an end of yarn breaks and the loose end strays and is knit irregularly into another area.

**Knit Fabric Defects**

Defect	Explanation	Severity	Photograph
<b>Defects of Knitted Fabric</b>			
Drop Stitches	Results from malfunctioning needle or jack. Will appear as holes or missing stitches.	Major	
Hole	Caused by broken needle.	Major	
Missing Yarn	Occurs in circular knit. Caused by one end of yarn missing from feed and machine continuing to run.	Major	
Mixed Yarn	Occurs in wrap knit. Results from wrong fiber yarn (or wrong size yarn) placed on wrap. Fabric could appear as thick end or different color if fibers have different affinity for dye.	Major	

Needle Line	Caused by bent needle forming distorted stitches. Usually vertical line.	Major or Minor	
Runner	Caused by broken needle. Will appear as vertical line. (Most machines have a stopping device to stop machine when a needle breaks.)	Major	
Slub	Usually caused by a thick or heavy place in yarn, or by lint getting onto yarn feeds.	Major or Minor	
Skewed or Bias	Condition where filling yarns are not square with wrap yarns on woven fabrics or where courses are not square with wale lines on knits.	Major or Minor	



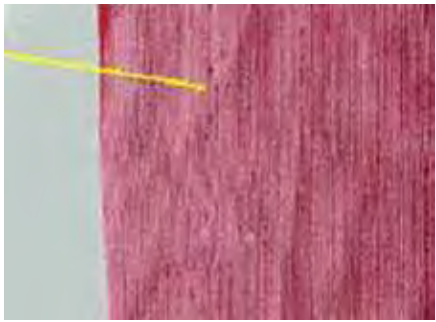
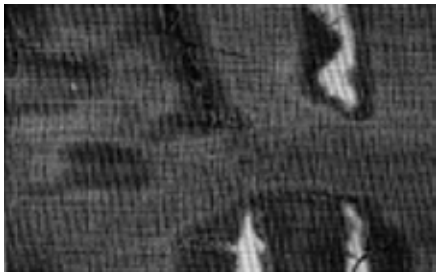

Pin holes	Holes along selvage caused by pins holding fabric while processes through stenter frame	Major if extends into body of fabric	
Straying End	Caused when an end of yarn breaks and loose end strays and is knit irregularly into another area.	Major	
Bowing	Usually caused by finishing in knits ,the course lines lie in an arc across width of goods.	Major on stripes or patterns Minor on Solid color	

Fig 2.1.33: Knits Defects

### Roughness in Fabric

There are several defects related to fabrics. It is said that approximately 70% of the apparel industry's cost is spent on getting an excellent or a good quality standard fabric to meet client expectations and market reputation or competition. Commonly found defects are mismatch in threads, or using an incorrect stitching technique, improper creasing of any garment etc, similarly a garment can also be called faulty when it has color defect or size difference. Sizing defect must be handled carefully as it can deteriorate a garment where they can't be repaired and has to send for a re-making of the product which could be time and cost consuming for the industry. Hence it is very important to look for the material carefully. The material to be used should be free from the following faults:





Fig 2.1.34: Abrasion Mark

- **Abrasion Mark:** Abrasion mark is the mark which is formed where the fabric has been damaged on the outside due to friction that has occurred because of damaged operation through which it has been passed.

- **Misprinting:** misprinting is a common fault found in the making of a garment. It could be that, the garment is misprinted, or partially printed or over-lapped. For e.g. as highlighted in the Fig on the left, the circles printed are not of the same size and shape hence it's a misprint.



Fig 2.1.35: Misprinting



Fig 2.1.36: Double Pick

- **Double Pick:** Double pick can be explained as 2 yarns which are running concurrently, and regularly in the weft yarn. Refer to the image on the left to see the example of two yarns running parallel.

- **Oil Stains:** As shown in the Fig on the left, oil marks are something that leaves stain on the fabric making it look ugly, and must be treated immediately as the fabric with oil stains can't be left unattended. It should be sent for the replacement.

Hole or a Bow can be caused due to faulty needles like bent or dull needle, hence make sure to check needles and if there are any bent or rusty, dull needles they should be the first thing to be replaced.



Fig 2.1.37: Oil Stains



Fig 2.1.38: Skew

- **Skew:** Deformation or twist in the construction of the fabric i.e. in yarn that comprise the fabric. The picture shows how skew is identified.
- **Dye Stain:** An area of discoloration which occurs because of unequal absorption of dye hence, always make sure to check that the material you are about use should not have any sort of discoloration. If so, then make sure to get it replaced.

## 2.1.6 Sewing Thread

A small diameter yarn or twisted strand usually treated with a surface coating or lubricant or both, intended to be used to stitch one or more pieces of material or an object to material are referred to as sewing thread.

### Knowledge of Sewing Thread

Natural fibers like cotton and silk has been used in sewing thread before Now a day however, chemical fibre products such as polyester thread, nylon thread, etc. are largely used in accordance with materials and applications. These threads are different from one another in construction and manufacturing. Spun thread (Cotton thread, Synthetic spun thread) Short staple fibers produced by a series of twist applied to the staple (Short fiber) is known as spun thread.

Mono filament thread this thread is just the same as long fibre that is spun by melting and a long yarn without twist.

### Different type of Threads

1. **Rayon:** Rayon is the most popular fiber used for embroidering. Its shine and softness makes it a cheaper alternative for silk. Stitches made with rayon threads are smooth and are responsible for higher quality embroidery. However, using rayon is disadvantageous because over time, its quality deteriorates and is quite high in maintenance in that regards.



Fig 2.1.39: Rayon



Fig 2.1.40: Polyester

2. **Polyester:** Polyester is a fiber produced from the synthetic processing of polymer resins. It can be made to have a matte finish or a high shine finish, similar to silk. Unlike rayon, polyester does not fade or shrink when washed. It is economical and suitable for all type of sewing. Its color, fastness and strength are the major reason why it is the most preferred medium of stitching.



Fig 2.1.41: Nylon

3. **Nylon:** This is additional unnaturally produced thread with good strength. However, the disadvantages are many, like, not being heat resistant, not colourfast (becomes yellow over time) and also become brittle through washing and exposure.

4. **Cotton:** This is the only 100% natural fiber thread made for high speed machine. These threads perform beautifully in machines and have a soft sheen. Embroidery floss is made up of 6 strands that can either be separated or kept together.



Fig 2.1.43: Wool



Fig 2.1.42: Cotton

5. **Wool:** A popular animal fiber, wool has a very soft look when it is stitched. While it is not very reflective, it has a soft texture and a soft look when stitched.

### Basics of Thread construction

All conventional sewing threads begin their production cycle as simple yarns. These basic yarns are produced by twisting together relatively short fibres or fine continuous filaments.

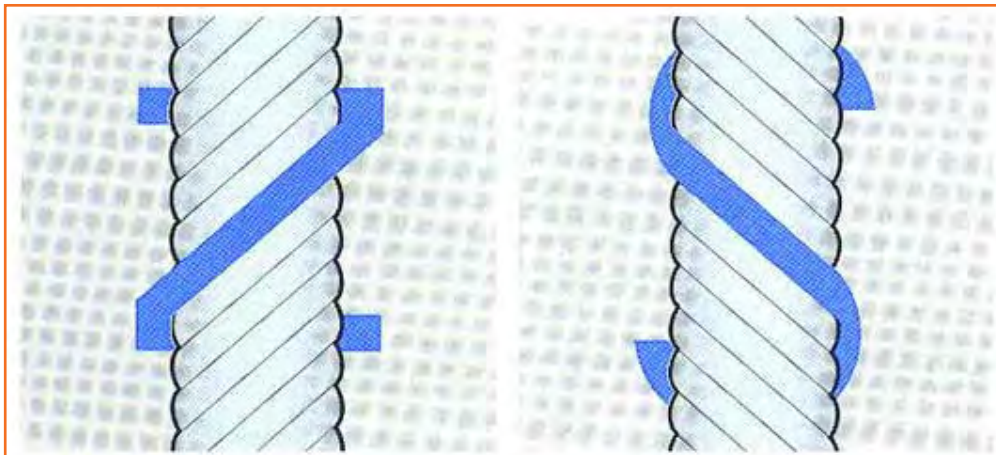


Fig 2.1.44: Basics of Thread construction

### Some terms used in the context of thread construction are:

- **Twist:** The 'twist' of a thread means, the number of turns per unit length required to hold the fibers together to give the yarn the required strength and flexibility. A thread with an excessive twist is also likely to give trouble while sewing due to 'twist liveliness'. This can cause snarling, loops, knots and possible spillage that prohibit stitch formation.
- **Twist direction:** Direction of twist is identified as 'S' for left twist and 'Z' for right twist. Most single needle lock stitch and other machines are intended for 'Z' twist threads. 'S' twist thread untwists during stitch formation.

**Ply and cord:** Yarns with many components are twisted together to form ply thread. Most commonly used are 2, 2 or 4 ply threads. Threads are twisted together to give corded thread. used are 4, 6 or 9 cord.

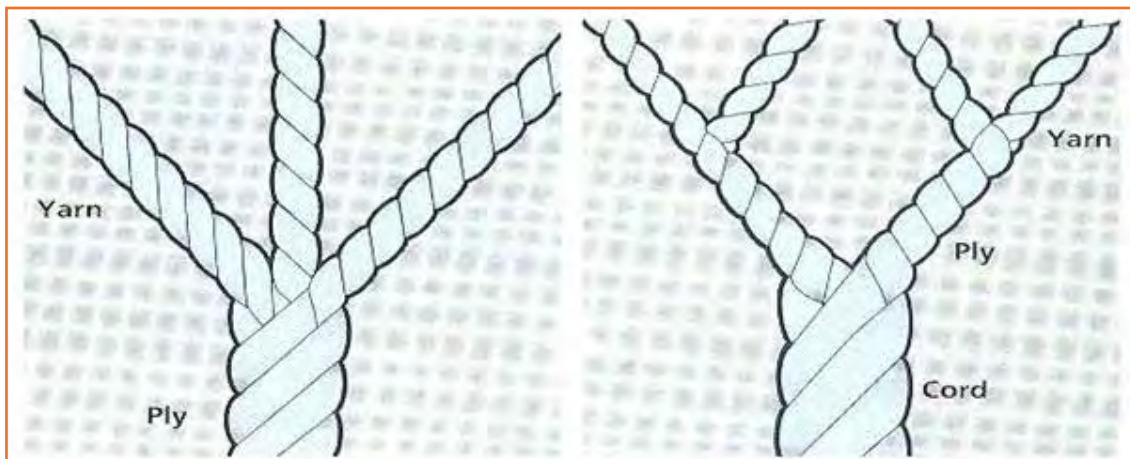


Fig 2.1.45: Ply and cord

**Sewing Thread Numbering:** The thickness of sewing threads is defined by Tex. or Tkt. (Ticket). And these two thread numbering terms are widely used.

**Tex Numbering:** Tex is a metric system of textile yarn and thread numbering. Tex is defined as weight of 1000 meters' thread in grams. For example, Tex 50 means a length of 1000 meters of thread will give 50 grams of weight.

## 2.1.7 Recommended Threads for Knits of Different Types

Type of Knits	Recommended Sewing Thread
<b>Light Weight Apparels :</b>	
<b>Intimate-Panties</b>	<b>All operations</b> - Polyester/polyester core spun T-24 ( <i>* Spun polyester T-21</i> )  <b>Alternative overedge &amp; coverstitch</b> - Textured (bulkied) polyester T-18 ( <i>* T-18, T-24</i> )
<b>Pants - Stretch (Women)</b>	<b>Zig-zag Lockstitch</b> - Polyester / polyester core-spun T-24 ( <i>Same</i> )  <b>Alternative overedge &amp; coverstitch</b> - Textured (bulkied) polyester or nylon T-24, T-35 ( <i>Textured "bulkied" polyester T-18, T-24</i> )
<b>T-Shirts</b>	<b>All operations</b> - Spun polyester core T-21 ( <i>Same</i> )  <b>Alternative overedge &amp; coverstitch</b> - Textured (bulkied) polyester T-18 ( <i>Same</i> )
<b>Underwear - "A" Undershirt</b>	<b>All operations</b> - Spun polyester T-21 ( <i>Same</i> )
Contd.....	
<i>* Sewing threads shown in bracket and in italic are to be considered for stitching where cost reduction is also an important factor.</i>	

Fig 2.1.46(a): Threads for Knits



<b>Underwear - Briefs</b>	<b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester T-18 <i>(Same)</i>
	<b>All operations</b> - Spun polyester T-21 <i>(Same)</i>
	<b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester T-18 <i>(Same)</i>
<b>Light to Medium :</b>	
<b>Activewear like Lycra Pants, Shorts, Shirts</b>	<b>All operations</b> - Polyester/polyester core spun T-24 <i>(Same)</i>
	<b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester or nylon T-24, T-35 <i>(Textured "bulked" polyester T-18, T-35)</i>
<b>Activewear-Tops (Women)</b>	<b>All operations</b> - Polyester/polyester core spun T-24 <i>(Spun polyester T-21, T-27 or T-30)</i>
	<b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester T-18, T-24 <i>(Same)</i>
<b>Dresses or Skirts</b>	<b>All operations</b> - Polyester/polyester core spun T-24 <i>(Spun polyester T-27, T-30)</i>
	<b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester T-18, T-35 <i>(Same)</i>
<b>Intimates - Camisoles, slips, Pajamas</b>	<b>All operations</b> - Polyester/polyester core spun T-24 <i>(Spun polyester T-21)</i>
	<b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester T-18 <i>(Same)</i>
<b>Intimates - Bras/ Foundations</b>	<b>Zig-zag Lockstitch</b> - Polyester/polyester core spun T-24, T-30 <i>(Spun polyester T-27, T-30)</i>

Fig 2.1.46(b): Threads for Knits

<b>Shirts - Polo &amp; Golf</b>	<b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester or nylon T-24, T-35 <i>(Textured "bulked" polyester T-18, T-35)</i>
	<b>All operations</b> - Polyester/polyester core spun T-24 <i>(Spun polyester T-21, T-27 or T-30)</i>
	<i>(Alternative overedge &amp; coverstitch - Textured "bulked" polyester T-18)</i>
<b>Sleepwear - Night Gown</b>	<b>All operations</b> - Polyester/polyester core spun T-24 <i>(Spun polyester T-21, T-27 or T-30)</i>
	<b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester T-18 <i>(T-18, T-24)</i>
<b>Sweaters</b>	<b>Most operations</b> - Sweater looping yarn <i>(All operations - Spun polyester T-27, T-30)</i>
	<b>Other operations</b> - Polyester/polyester core spun T-24, T-30 <i>(Alternative overedge &amp; coverstitch - Textured "bulked" polyester T-35)</i>
<b>Swim wears - Men &amp; Boys</b>	<b>Top stitch or Zig-zag</b> - Polyester/polyester core spun T-24, T-40 <i>(Zig-zag lockstitch - Spun polyester T-40)</i>
	<b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester or nylon T-24, T-35 <i>(Textured "bulked" polyester T-24, T-35)</i>
<b>Swim wears - Women</b>	<b>Top stitch or Zig-zag</b> - Polyester/polyester core spun T-24, T-40 <i>(Zig-zag lockstitch - Spun polyester T-40, T-45)</i>
	<b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester or nylon T-24, T-35 <i>(Textured "bulked" polyester T-24, T-35)</i>

Fig 2.1.46(c): Threads for Knits

<b>Terry Bath Robes</b>	<p><b>All operations</b> - Polyester/polyester core spun T-24 (<i>Spun polyester T-21, T-27 or T-30</i>)</p> <p><b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester T-24, T-35 (<i>Same</i>)</p>
<b>Medium Weight :</b>	
<b>Fleece - Sweat shirts/pants</b>	<p><b>All operations</b> - Polyester/polyester core spun T-24 (<i>Spun polyester T-27, T-30 or T-40</i>)</p> <p><b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester T-24, T-35 (<i>Same</i>)</p>
<b>Sports wear - Jersey</b>	<p><b>All operations</b> - Polyester/polyester core spun T-40 (<i>Spun polyester T-40 or T-45</i>)</p> <p><b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester T-35 (<i>T-24, T-35</i>)</p>
<b>Underwear - Thermal</b>	<p><b>All operations</b> - Polyester/polyester core spun T-24 (<i>*Spun polyester T-27 or T-30</i>)</p> <p><b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester T-24, T-35 (<i>*Same</i>)</p>
<b>Heavy Weight :</b>	
<b>Sports wear - football Pants</b>	<p><b>Zig-zag Lockstitch</b> - Polyester / polyester core spun T-40, T-60 (<i>Polyester T-40, T-45 or T-60</i>)</p> <p><b>Alternative overedge &amp; coverstitch</b> - Textured (bulked) polyester or nylon, T-35 (<i>Textured "bulked" polyester T-24, T-35</i>)</p>

Fig 2.1.46(d): Threads for Knits

## UNIT 2.2: Machine and Equipment for Sewing Knits

### Unit Objectives



**At the end of this unit, participants will be able to:**

1. Describe the industrial sewing machine and its types.
2. Explain the feed mechanisms.
3. Select the needles for sewing of knits.
4. Recognise basic list of material and tools required for stitching.
5. Visit the sewing line.
6. Report to line supervisor in case of any query or mishap.

### 2.2.1 Industrial Sewing Machines



*Fig 2.2.1: Industrial Sewing Machine*

The industrial sewing machine is a heavy duty version of a standard home sewing machine, and it is used in the clothing and other related industries, such as upholstery. One of the common uses for the industrial sewing machine is to perform the mass production sewing that involves heavy volumes, industrial sewing machine is a key requirement. These machines are designed to sew multiple layers of knits together along with handling of stretch in them.

### 2.2.1.1 Types of Sewing Machines Based on Stitch

#### Lock stitch Machine

The Single Needle Lock Stitch machine is the most popular and versatile sewing machine in the industry. It is designed to produce consistent results in sample and production rooms. The Lockstitch forms precise and secured straight stitches on the top and the underside of the fabric the needle thread and the bobbin thread lock each other each time the needle passes through the fabric.

##### Features:

- The lock stitch machine produces the tightest and the most secured stitch.
- It has same appearance on both sides.
- A complete garment can be sewn on a lockstitch machine.



Fig 2.2.2: Lockstitch Machine



Fig 2.2.3: Chainstitch Machine

#### 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. Handmade chain stitch embroidery does not require that the needle pass through more than one layer of fabric.

##### Applications:

- For sewing light to medium weight fabrics, knits and denim.
- Suitable for such operations as lap seam felling, hemming, binding, joining and plain stitching
- Designed for sewing stretchable seams
- For stitching such products as blouses, shirts, suits, knitted goods, ladies and children's dresses and skirts, coats, pants, uniforms, pajamas, work clothes, etc.

##### Features:

- Automatic lubrication
- Dial-type stitch length regulation
- Cam-type take-up lever minimizes tension on the lower threads to allow stitches to stretch
- Stitches per minute; up to 5000+ \*
- Moving presser foot eliminates slippage and puckering

##### Specifications:

Number of Needles	1 (Single)
Feeding Mechanism	Drop Feed



Workspace	Standard Workspace
Standard or Full Function	Standard Functions
Stitch Type	401
Speed, Max (S.P.M.)	5600
Max Stitch Length	5-1/2 s.p.i. (4.7mm)
Needle Bar Stroke	1-3/16" (30mm)
Needle Used	149x17
Work Space	10" (258mm)
Bed Size	7"x18-7/8" (178x478mm)
Clearance Under Foot	5/16" (8mm)
Two Needle	1/4 " Standard
Needle Distances	1/8"-1/2" on request 5/16" and 3/8" on request



Fig 2.2.4: Multi needle Sewing Machine

#### Multi needle Sewing Machine

It is a flatbed, multi-needles, double chain stitch machine with horizontal looper movement mechanism. It is used in lap seaming, attaching waistbands and line tapes, and inserting elastic.

### 2.2.1.2 Special Machine for Knits

**Overlock Machine:** The overlock machine is designed to stitch over the edge of one or two pieces of fabric to produce neat edging that will not fray. Usually an overlocker will cut off the untidy rough fabric edges as they stitch.

An overlock / overedge machine is a high speed sewing machine. This is the quickest performing machine for today's sewer. Its speed far exceeds that of other sewing machine plus it adds a non-fraying finish and sews seams at the same time.



Fig 2.2.5: Overlock Machine

**Three Thread Overlock Machine:** Stitch formed by interaction between vertical of needles and horizontal movement of two loopers.

- Stitch looks the same on both sides.
- To make a 504 stitch, the needle-thread stitches and flies together when it interlocks with the upper looper thread on the underside and upper looper thread on the top side.
- Used for finishing edges as a narrow, decorative, rolled edge on the napkin and scarves.
- Most useful for sewing knits and woven.
- Used for finishing edges as a narrow, decorative, rolled edge on the napkin and scarves.
- Most useful for sewing knits and woven.
- Stitch type 504, most common over edge stitch



Fig 2.2.6: Three Thread Overlock Machine



Fig 2.2.7: Four Thread Overlock Machine

**Four Thread Overlock Machine:** This machine stitches a chain stitch or a safety stitch and overcasts seams. Four-thread overlock machine has two needles and two loopers and this can be converted to both two and three thread overlock. All 4 threads are necessary to sew a serged seam. This type of machine is used for sewing blouses, shirts, skirts, dresses, pants, lingerie, action wear, swimwear, and even sleepwear.

It stitches chain stitch or a safety stitch as it stitches and overcasts seams.

- Two needles and two loopers.
- This can be converted to both two and three thread overlock.
- All four threads are necessary for sewing a serged seam.
- Suitable for sewing blouses, skirts, shirts, dresses, pants, swim-wears, action-wears, lingerie and even sleepwear. All kinds of knits.
- It is stitch type 514. (Refer to Types of Stitches Section in Unit-3)

**Five-Thread Over lock Machine:** This type of machine is used to stitch a 2-thread chain stitch combined with a 3-thread over lock. This machine has 2 needles and 3 loopers. In this sewing machine the left needle and lower looper form a 2-thread chain stitch. The seam is very durable, particularly for wovens. A very wide seam width is created when the chain is serged with 2 or 3 thread stitch.

- A two- thread chain stitch combined with a three- thread overlock
- Two needles and three loopers
- The left needle and the lower looper form a 2-thread chain stitch

- The seam is very durable, particularly for wovens
- A very wide seam width is created when the chain is serged with 2 or 3 thread stitch
- This stitch type is 516. (Refer To Types Of Stitches Section in Unit-3)



Fig 2.2.8(a): Five-Thread Overlock Machine



Fig 2.2.8(b): Five-Thread Overlock



Fig 2.2.9: Flatlock Machine

**Flat lock Machine:** Flat lock machines are specialized, high speed machines. These machines are extremely fast and efficient. In this machine the stitch is formed by two or more needle threads passing through the material, inter looping on the underside and interlocking on the upper side. These are mainly used for knits.

- It is high speed, and makes seams stretchy, flat and smooth.
- Provides extensibility and flexibility to the seams, with low bulk that can be worn comfortably against the skin.

**Multi-Thread Flat Lock:** Flatlock stitching is the stitching that looks like overlocking on both sides of a seam and is often used in swimwear, sportswear, on baby's clothes, or just as a decorative exposed seam. It creates a seam that is flat and has the same appearance both inside and out.



Fig 2.2.10: Multi-Thread Flat Lock



Fig 2.2.11: Coverstitch

#### Applications and Seam Appearances:

(Coverstitch) Often called a flat lock or flat seam stitch is used primarily on knits and lingerie. These stitches are referred to as top and bottom cover stitches and are commonly used to cover both sides of the seam.



Fig 2.2.12: Button Attach Machine

**Button Attach Machine:** Clothes are held together by buttons, a button is one of the most basic elements of fashion. Button sewing work requires a machine, which provides flexibility (in terms of button design, fabric variation, thread thickness etc.) as well as a consistently good sewing performance.

- This machine sews on buttons at high speeds, with accuracy thus saving time and fatigue.
- It can be used for attaching neck wraps and labels as well.

### 2.2.1.3 Parts of a Sewing Machine

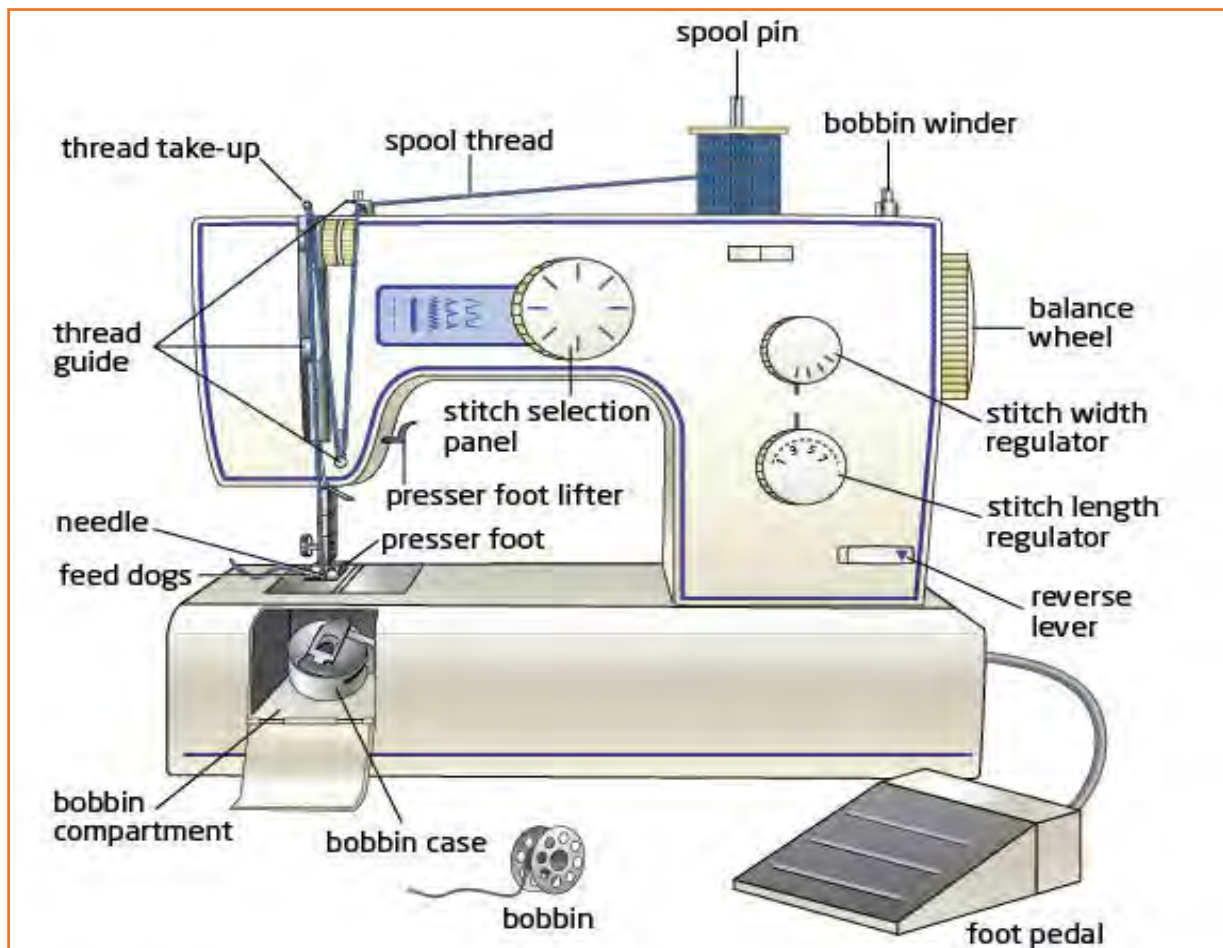


Fig 2.2.13: Parts of a Sewing Machine



**Needle:** is one of the most important part of the machine, it carries thread through the fabric to the bobbin and completes stitch formation.



Fig 2.2.14: Needle



Fig 2.2.15: Hook

**Hook:** set is a devise in which bobbin and bobbin case can be fitted.

**Bobbin Case:** holds the bobbin and controls the thread tension.



Fig 2.2.16: Bobbin Case



Fig 2.2.17: Bobbin

**Bobbin:** holds the lower thread or the bobbin thread.



Fig 2.2.18: Throat Plate

**Throat plate:** or needle plate forms a smooth surface over which fabric can move, it has a hole and sometimes also a markings to guide the seam allowance.

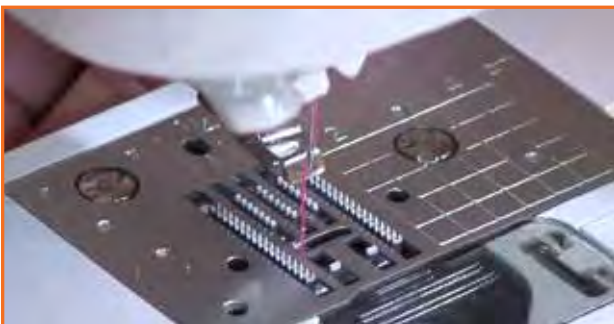


Fig 2.2.19: Feed Dog

**Feed dog:** moves the fabric through a predetermined distance.



Fig 2.2.20: Presser Foot

**Presser foot:** holds the fabric firmly against throat plate, and teeth of the feed dog, it prevents the fabric from rising and falling with the needle.

**Reverse feed lever:** is used for backtack or back tacking.



Fig 2.2.21: Reverse feed lever



Fig 2.2.22: Finger guard

**Finger guard:** is a safety device that prevents an operator's finger getting trapped or hurt by the needle.

**Presser Bar:** holds the presser foot.



Fig 2.2.23: Presser Bar



Fig 2.2.24: Tension post

**Tension post:** provides correct tension to the needle thread.

**Presser foot regulator:** is used to adjust the pressure depending on the type of the fabric.



Fig 2.2.25: Presser foot regulator

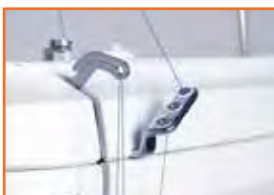


Fig 2.2.26: Thread take up lever

**Thread take up lever:** gives tension to the thread.

**Oil sight window:** indicates the presence of lubricating oil.



Fig 2.2.27: Oil sight window

**Thread stand:** used for supporting the thread package like spool bobbin etc.



Fig 2.2.28: Thread stand



Fig 2.2.29: Knee Lifter

**Knee Lifter:** is used to lift the presser foot with the use of knee.

**Hand Lifter:** is used to lift the presser foot.

**Bobbin Winder:** is used to wind thread in empty bobbin. It may be located differently in different types of machines.



Fig 2.2.30: Bobbin Winder



Fig 2.2.31: On-Off Switch

**On-Off Switch:** these are two switches, which are used to on and off the machines. The RED button is for switching the machine OFF and the BLACK/GREEN button is for switching the machine ON. Pedal: The machine does not start unless the pedal is depressed, it is majorly used for controlling the speed of the machine.

### 2.2.1.4 Part of OVERLOCK Machine

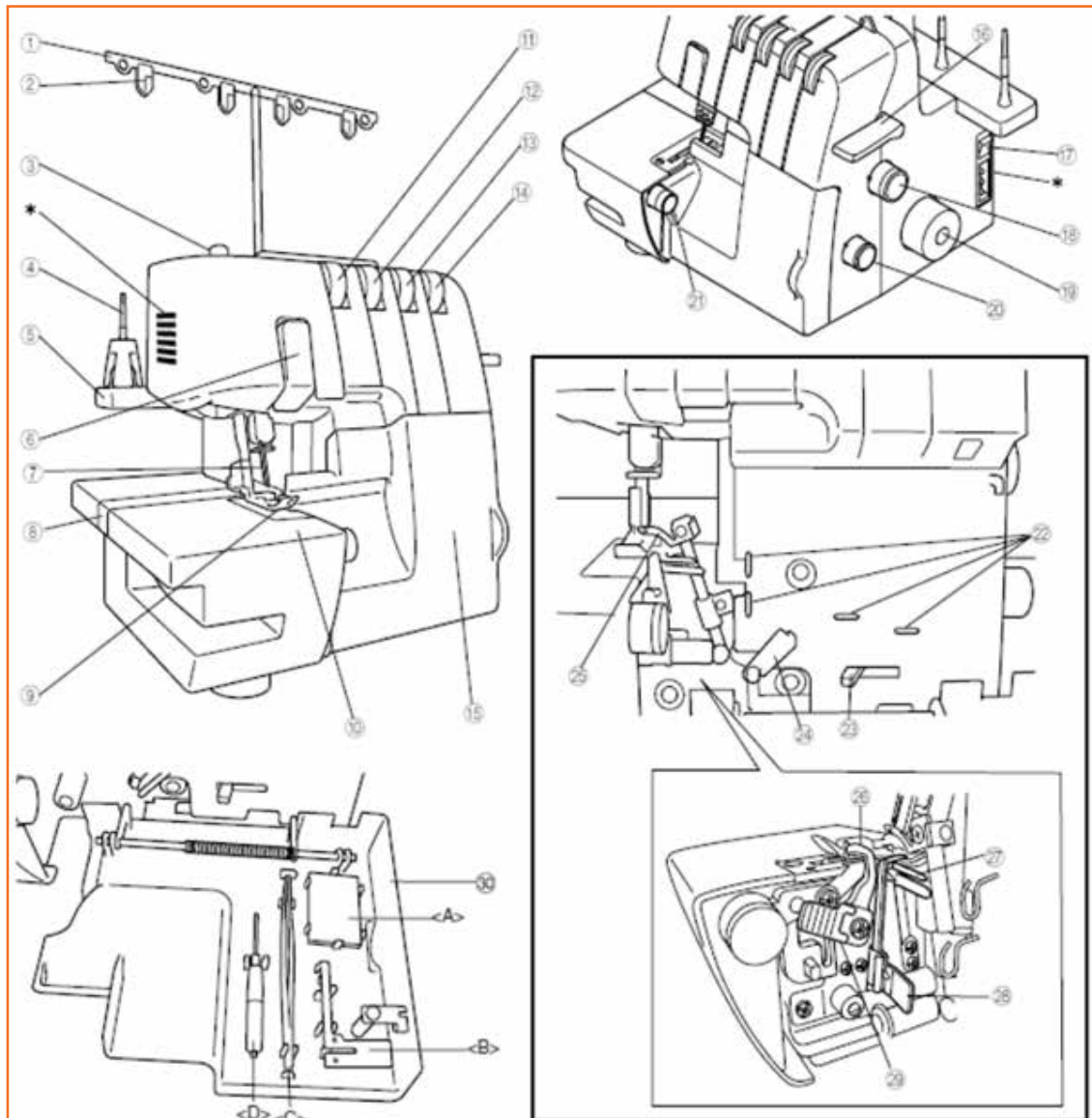


Fig 2.2.32: Part of OVERLOCK Machine

- |   |                                      |
|---|--------------------------------------|
| 1. Thread tree                            | 10. Material plate cover             |
| 2. Needles                                | 11. Left needle thread tension dial  |
| 3. Thread plate                           | 12. Right needle thread tension dial |
| 4. Presser foot pressure adjustment screw | 13. Upper looper thread tension dial |
| 5. Spool pin                              | 14. Lower looper thread tension dial |
| 6. Spool support                          | 15. Front cover                      |
| 7. Thread take-up cover                   | 16. foot lifting lever               |
| 8. Bed extensions                         | 17. power and light switch           |
| 9. Presser foot                           | 18. Stitch length adjustment dial    |



19. Hand wheel
20. Differential feed ratio adjustment dial
21. Stitch width dial

#### Inside of the front cover

22. Thread guide
23. Lower looper threading lever
24. Thread take up for loopers
25. Upper looper
26. Upper knife
27. Lower looper

28. Stitch finger
29. Knife lever
30. Front cover compartment

You can hold the included accessories and the removed Stitch finger in this front cover compartment.

- <A>: Needle set
- <B>: Stitch finger
- <C>: Tweezers
- <D>: Hexagonal driver

Threading has to be done in the following order.

1. Lower looper
2. Upper looper
3. Right needle
4. Left needle

#### Threading of lower looper

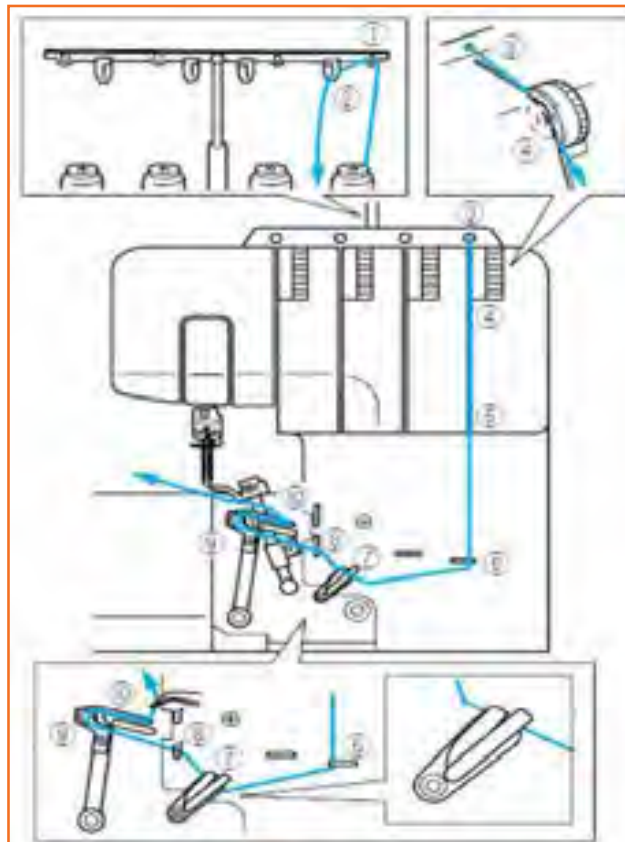


Fig 2.2.33: Threading of lower looper

## Threading of upper loop

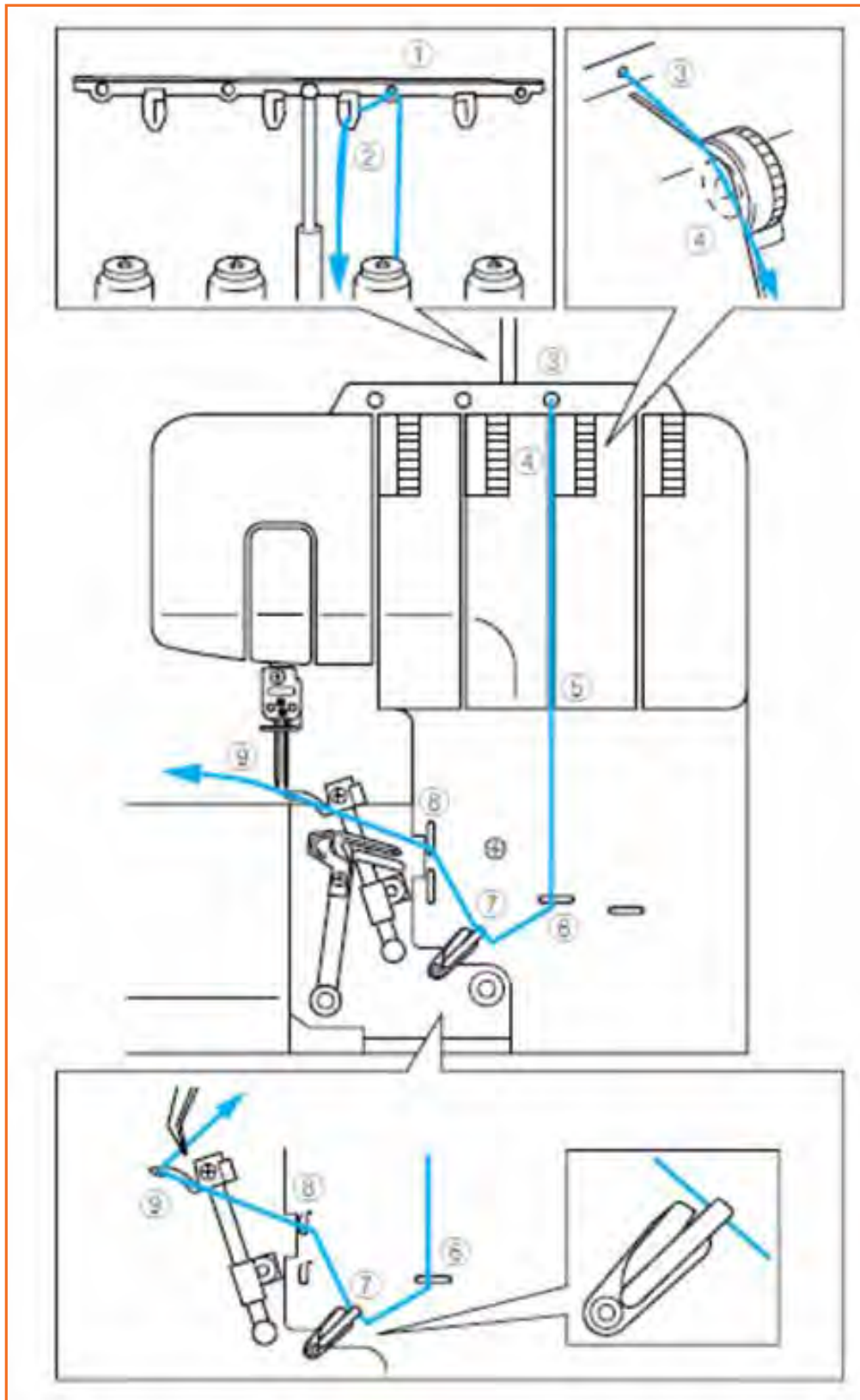


Fig 2.2.34: Threading of upper loop

## Threading of right needle

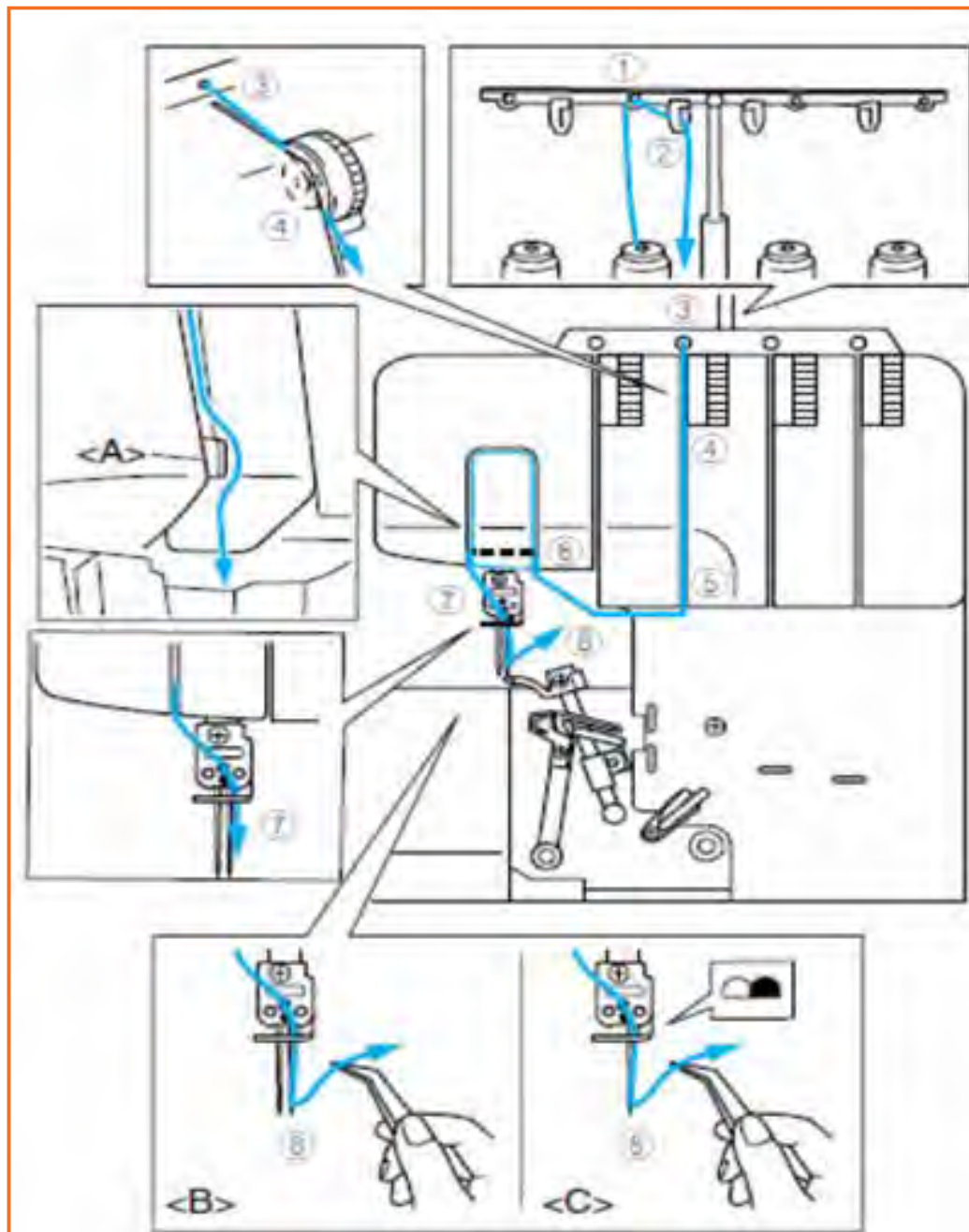


Fig 2.2.35: Threading of right needle

## Threading of left needle

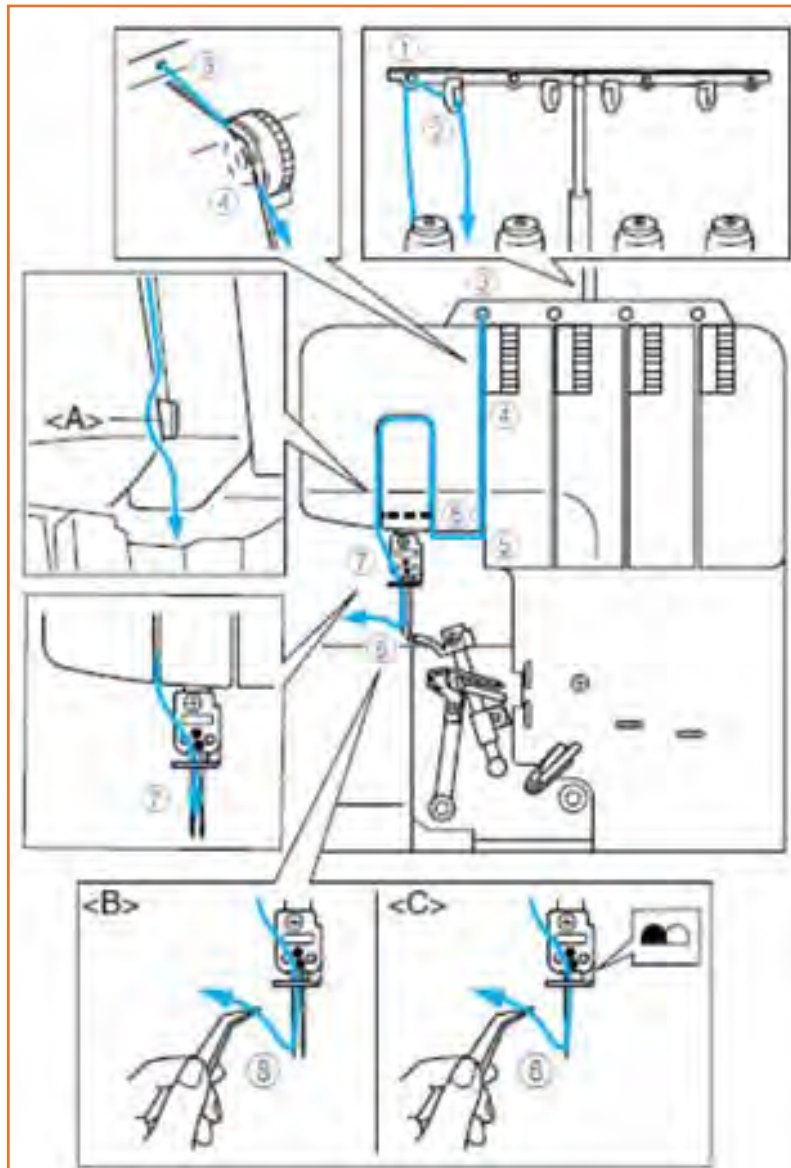


Fig 2.2.36: Threading of left needle



Step-1



Step-2





Step-3



Step-4



Step-5

### 2.2.1.5 Feed of Arm Machine (Suitable for Jointing Tubular Knit Fabrics)



Fig 2.2.37(a): Feed of Arm Machine

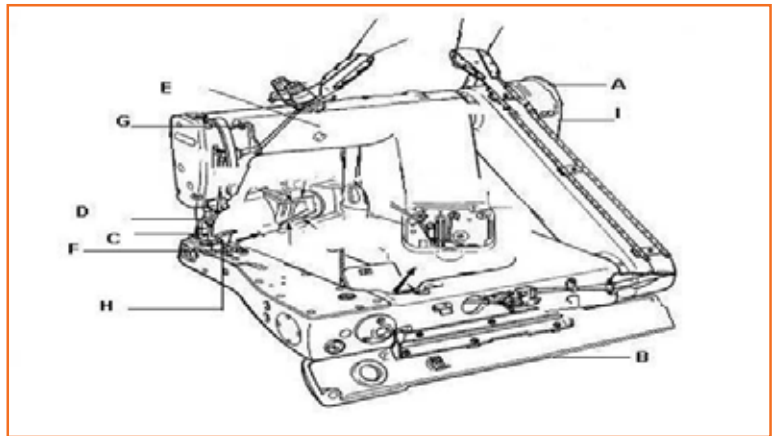


Fig 2.2.37(b): Feed of Arm Machine

#### Name of major parts

A Machine Pulley	B Front cover	C Presser foot
D Needle bar	E Upper thread guide	F Lapper
<b>Safety devices</b>		
G Thread take up lever	H Finger guard	I Pulley cover

Fig 2.2.38: Name of major parts Feed of Arm Machine

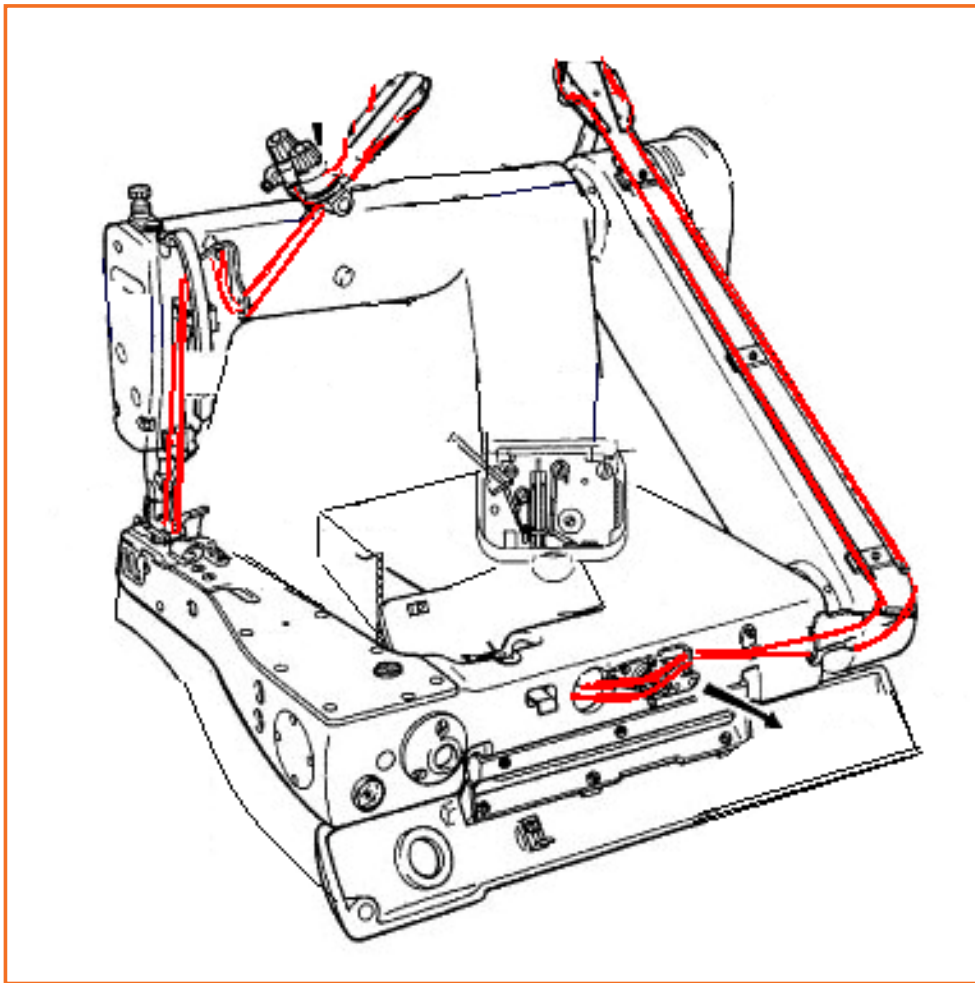


Fig 2.2.39: Threading of feed of the arm

### 2.2.1.6 Flat Lock Machine

Flatlock stitching is the stitching that looks like over locking on both sides of a seam and is often used in swimwear, sportswear, on baby's clothes, or just as a decorative exposed seam. It creates a seam that is flat and has the same appearance both inside and out.

#### Elements in Stitching

- Needle
- Looper
- Spreader

Multi needle machine may have more than three needles.

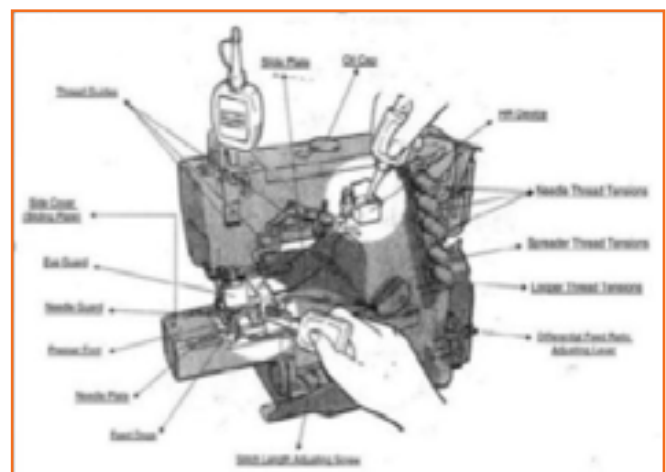


Fig 2.2.40: Flat Lock Machine

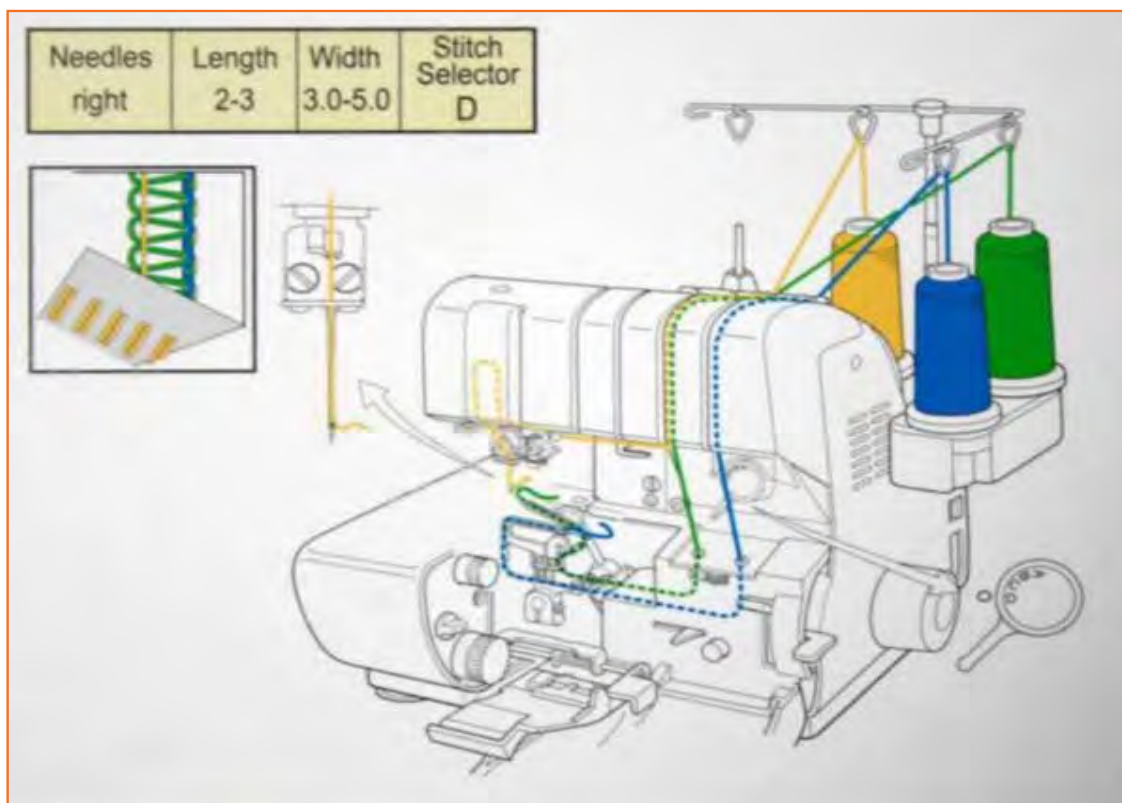


Fig 2.2.41: Threading in Flat Lock Machine

### Threading of flat lock



Step-1



Step-2



Step-3



Step-4





Step-5

### 2.2.1.7 Button Stitch Machine

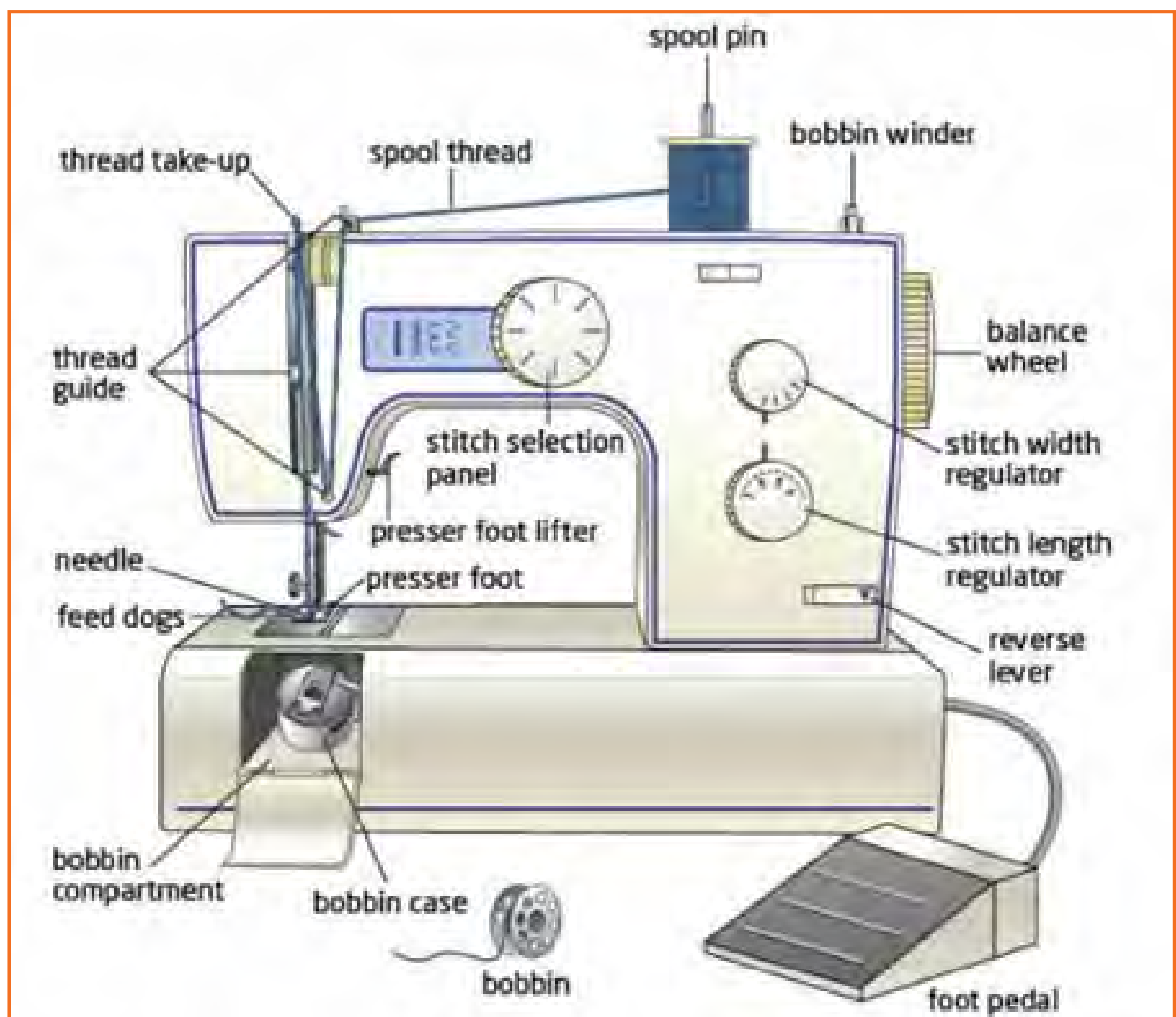


Fig 2.1.42: Button Stitch Machine

### 2.2.1.8 Feed Mechanisms

Feed mechanisms is the basic motion of needles, loopers and bobbins, the material being sewn must move so that each cycle of needle motion involves a different part of the material. This motion is known as feed, and sewing machines have almost as many ways of feeding material as they do of forming stitches. Often, multiple types of feed are used on the same machine. The types of the feed mechanism are as follows:

1. Drop feed mechanism.
2. Differential bottom feed mechanism.
3. Adjust top feed mechanism.
4. Needle feed mechanism.
5. Unison feed mechanism.
6. Puller feed mechanism.

#### Drop Feed Mechanism

The simplest feed system of sewing of sewing machine still most common. It is also known as regular feed. Main components of drop feed mechanism are throat plate, feed dog and presser foot.

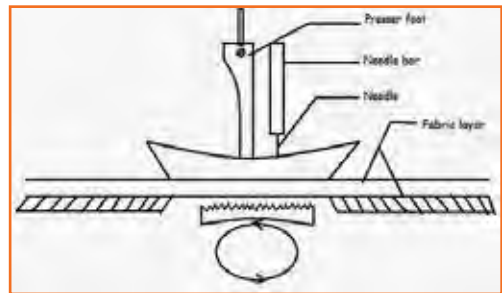


Fig 2.2.43: Drop Feed Mechanism

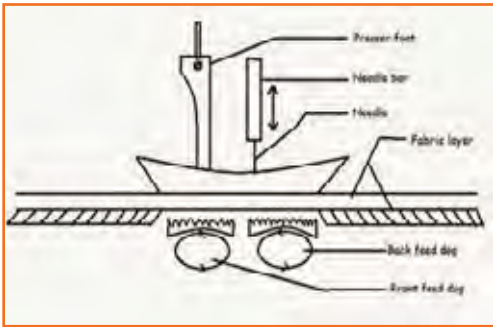


Fig 2.2.44: Differential Bottom Feed Mechanism

#### Differential Bottom Feed Mechanism

This is modification of the drop feed system. In the feed mechanism the feed dog consists of 2 section one at back & one at front of the needle. Mechanism of each section of feed dog is like the drop feed system. But the speed of each part can be adjusted separately. Extensively used for stretchy materials.

When the speed of the front feed dog is higher than the back feed

dog. "The bottom ply is pulled by the back feed dog but this will over come by the greater speed of the front feed dog. So less possibility of shifting".

When the speed of the front feed dog is less "we get lacy effect because the feeding speed is grater than the delivery speed". Stretching and gathering of fabric can be done by this system.

#### Adjustable Top Feed System

In general arrangement the presser foot is in two section. One holding the fabric in position while the needle form the stitch and the other having length on the lower side & moving or waking in such a w ay that the top ply is taken along, positively while needle is out of the materials.

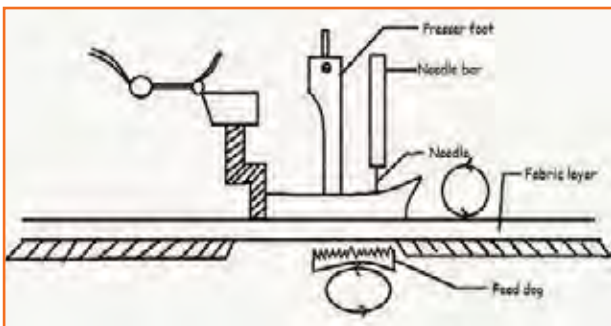


Fig 2.2.45 (a): Differential Bottom Feed Mechanism

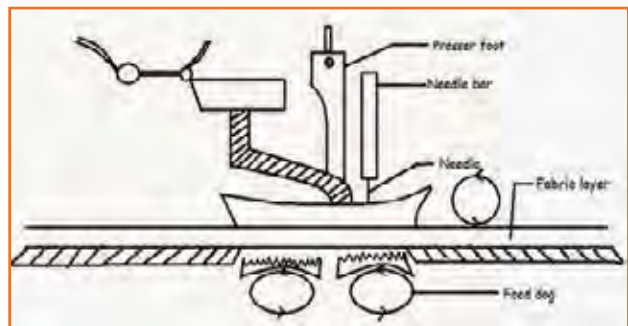


Fig 2.2.45 (b): Differential Bottom Feed Mechanism

In sewing machine, the feed mechanism can be used with both drop feed & differential bottom feed. Combination of adjustable feed & differential bottom feed can make top ply gathering or the gathering of bottom ply.

### Needle Feed System Mechanism

Another name of needle feed mechanism is “Compound feed”. Needle itself moves forwards & backward.

Needle penetrates the fabric enters into the notch of the feed dog & for the advance movement of 1 stitch length of fabric feed dog & needle pass the same distance at the same time. Then needle rise up & moves to form the next stitch with one step advance. Practically useful in bulky sewing situation such as when quilting through the fabric, wadding & for slapping fabrics. For the change of stitch length, setting of both needle & feed dog should be changed.

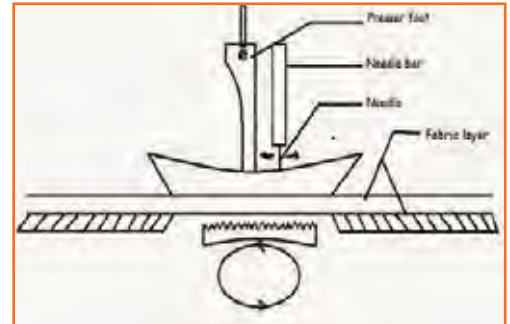


Fig 2.2.46: Needle Feed System Mechanism

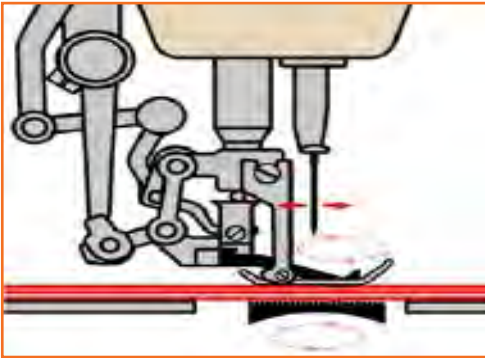


Fig 2.2.47: Unison Feed Mechanism

### Unison Feed

Unison feed is a further combination of feeding mechanisms, which provides needle feed in addition to positive top and bottom feeding.

### Puller Feed Mechanism

This mechanism is modification of the drop feed system. It is a pair of rollers used. These rollers give a pulling motion on the fabric behind the presser foot.

Top roller is generally driven by machine whilst the lower one moves due to control & pressure of the top roller. The surface speed of puller roller is slightly higher than the feed dog speed to prevent fabric shifting or rapping.

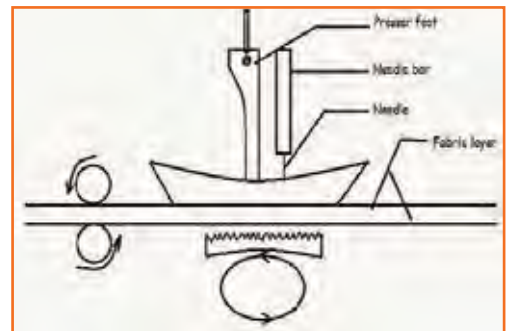


Fig 2.2.48: Puller Feed Mechanism

## 2.2.2 Selection of Needles for Sewing of Knits

Selecting the right needle is just as important as selecting the fabric, Stabilizer and thread. There are diverse sizes and types of needles for a variety of fabric. The European metric sizing system for sewing machine needles is numbered from 60 to 110. The American sizing system is numbered from 8 to 18. For both sizing systems, the lower the number the finer the needle and the higher the number the larger the needle. Most needle companies show both sizes on the package.

An easy way to remember is, the lighter the fabric the smaller the needle size and the heavier the fabric the larger the needle size. Many times the thread you will be using for your sewing assignment will also determine the type of needle you choose. For example, when using a fine, delicate thread, be sure to use a slightly smaller needle size.

### 2.2.2.1 Sewing Machine Needles for Knits

#### Parts of a sewing machine needle

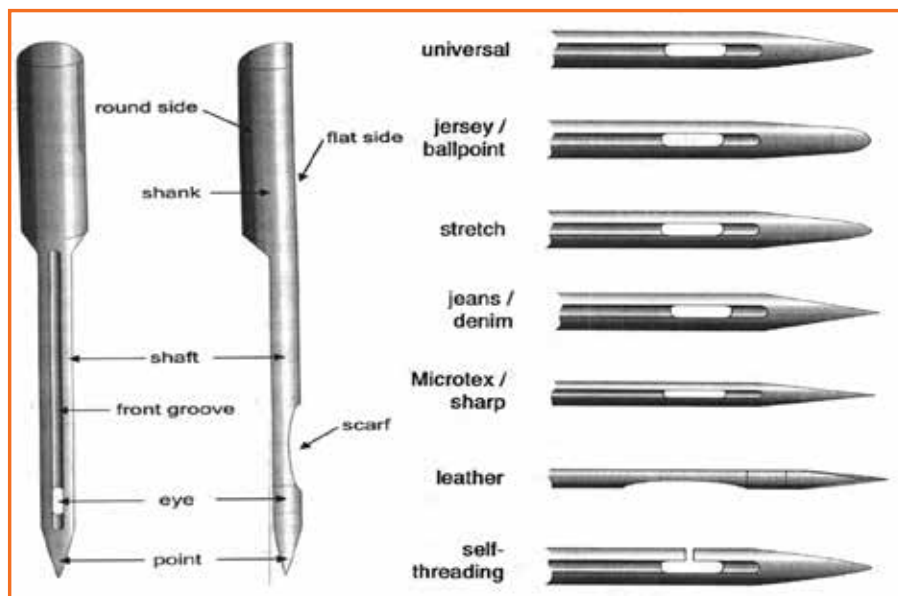


Fig 2.2.49: Parts of a sewing machine needle

- **Shank:** Top of needle that inserts into machine; most often has round needle in right position.
- **Shaft:** Body of needle below shank. Shaft thickness determines needle size.
- **Front groove:** Slit above needle eye, should be large enough to “cradle” thread.
- **Point:** Needle tip that penetrates fabric to pass thread to bobbin-hook and form stitch. Shape of point varies among needle types.
- **Scarf:** Indentation at back of needle. A long scarf helps eliminate skipped stitches by allowing bobbin hook to loop thread more easily.
- **Eye Hole:** Eye Hole in end of needle through which thread passes. Needle size and type determine size and shape of eye.



















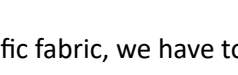

Tip point	Symbol	Shape of the needle tip	Shape of point	Application and feature
Sharp and slim type point	Spi			Light-weight fabrics, light-weight leather
Regular type point	R			General fabrics Mainly for button sewing Slim shape and J point at needle tip, for high gauge knit
Butt type point	But			
Slim point	S			
J ball point	J			For general knit, suitable for standard material as well
B ball point	B			
U ball point	U			For relatively coarse knit, ball is Ø 1/3 trunk For elastic materials ball is Ø ½ of trunk
Y ball point	Y			
Flat tip shape	LL			45° twisted type knife needle mainly for leather goods 45° reversely twisted type knife needle mainly for leather goods
	LR			

Fig 2.2.50: Types of Needle Points

### Selection of needles

When we select the needle for a specific fabric, we have to decide on two things:

- Needle thickness
- Point shape

### Choice of Needle Thickness

We sew some rough cloth using different needles and check the seams. If the needle is not right, we can see the damage to the cloth by pulling it slightly.

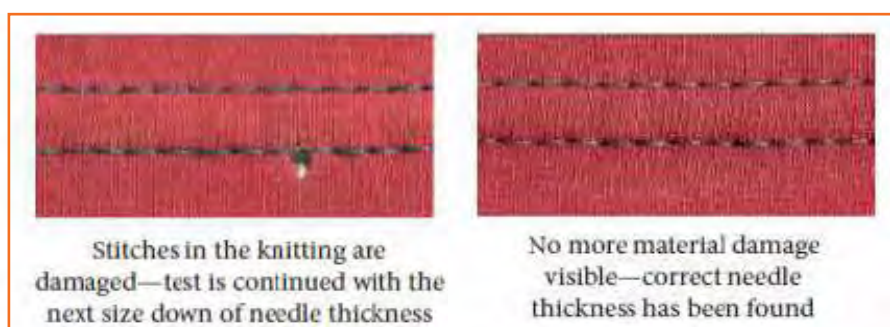


Fig 2.2.51: Choosing Needle Thickness

### Choice of Needle Point

The needle points are of 2 types, cut points and cloth points.

1. **Cut points/Sharp point:** These points have a sharp tip to cut through the cloth. These are used for stitching leather products and clothes.





Fig 2.2.52: Cut Point of Needle

**2. Cloth points:** These have a slightly rounded tip and can cut through the cloth without damaging it. The cloth points can be round or ball points.

- » Round points: These are rounded at tip but are thin and sharp. Such points are used for woven fabric so that the needle can get through the fibers inside the weaves.



Fig 2.2.53: Round Point of Needle

- » Ball points: Used for knitted fabrics, these points are thicker and more rounded at the tip. They shift the yarns and pass through, avoiding holes and fabric damages.



Fig 2.2.54: Ball Point of Needle

### Needle Numbering System

There are two number systems associated with sewing machine needles:

- 1. European labelling system:** European sizes range from 60 to 120, 60 being a fine needle and 120 being a thick heavy needle.
- 2. American labeling system:** The American system uses 8 to 19, 8 being a fine needle and 19 being a thick heavy needle.

American	European
8	60
9	65
10	70
11	75
12	80
14	90
16	10
18	110
19	120

Fig 2.2.55: Sew Machine Needle Size

NEEDLE	SPUN THREAD	FILAMENT THREAD	CLOTH MATERIAL
No.5	No. 120	No. 100	Glossy silk, Synthetic ultralight weight (satin etc.)
No. 7 to No. 8	No. 100	No. 80 to No. 100	Same as above
No. 9 to No. 10	No. 80	No. 60 to No. 80	Light-weight silk, satin, crepe de chine, georgette, voile, knit 20G to 26G
No. 11 to No. 12	No. 60	No. 50 to No. 60	Light-weight calico, broadcloth, light-weight wool, knit/double 16G to 20G

No. 13 to No. 14	No. 40 to No. 50	No. 50	Normal broadcloth, wool cloth, general fabric
No. 16	No. 30 to No. 40	No. 40	General heavy-weight fabric (overcoat, etc.) water-proof cloth
No. 18	No. 20 to No. 30	No. 20 to No. 30	Bed-clothes, bags, vinyl shoes
No. 19	No. 10 to No. 20	No. 10 to No. 20	Leather shoes, sheets
No. 20 to No. 21	No. 10	No. 8 to No. 10	Leather shoes, tents
No. 23 to No. 24	No. 8	No. 8	Extra heavy-weight materials, tent, sheet.

Fig 2.2.56: Materials to be sued as the product specification

### 2.2.2.2 Basic List of Material and Tools Required for Stitching

**Scissors:** Scissor are utilized for cutting the fabric and has a handle which is aligned with the blade which helps you do the cutting steadily by keeping the scissors even.



Fig 2.2.57: Scissors



Fig 2.2.58: Rotary cutter

**Rotary cutter:** The rotary cutter is something which has a blade to cut easily and smoothly through fabric. It's very efficient to be used to all different kinds of projects, however it is especially good for quilting. All you require is a rubbercutting mat and a rotary ruler so that when you are using a rotary- cutter the surface of the Fig can be prevented from getting cut. Also, keeping a mat helps in cutting a fabric in straight.

**Thread:** Various sort of threads are available, they are available in rainbow colors, including clear ones. For most of the sewing machines all you need is a need a spool of thread. The cone shaped threads are also used however they are for different kind of machine called a serger.



Fig 2.2.59: Threads



Fig 2.2.60: Measuring tape

**Measuring tape:** Measuring tape used for sewing to make it softer than that used for construction projects so that it can be used to fit clothing to the body.

**Needles:** A sewing machine requires diverse needles than which are used for hand-sewing. Machine needles have a bigger, blunter tip where they fit into the machine. Various types of needles are used on various kinds of projects.

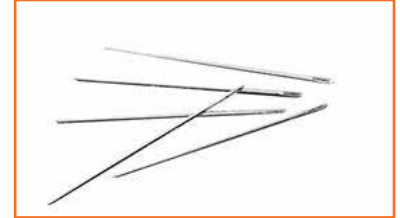


Fig 2.2.61: Needles



Fig 2.2.62: Fabric

**Fabric:** As different projects have different types of needle or thread requirements similarly as per the requirement different types of fabrics are also needed with different project for sewing.

**Pins:** Pins are used to hold fabric together where it's supposed to be sewn and to be adjusted as per the required fitting during alterations.

**Pincushion:** Pincushions are very useful in keeping the pins in order and in place, it is usually in apple's pumpkin's or tomato's shape.



Fig 2.2.63: Pins and Pincushion



Fig 2.2.64: Iron and Ironing Board

**Iron and Ironing Board:** An iron is used to press fabric, seams open and make darts. Your everyday iron is fine.

**Seam ripper:** The name says it all: It's used to rip seams. Especially comes in handy when you're a beginning sewer.



Fig 2.2.65: Seam ripper



Fig 2.2.66: Pinking Shears

**Pinking Shears:** Pinking shears cannot be used like normal scissors since they will lead to inaccurately cut lines of fabric. They are, however, crucial for finishing seams, hem edges etc.



Fig 2.2.67: Cutting Table

**Sewing Gauge:** A 6 inch gauge with a movable indicator convenient for measuring short lengths.



Fig 2.2.69: Hem Gauge

**Yardstick/Meter stick:** Is use to measure fabric and to check grain line. It can be used in marking a long straight lines and in measuring hemlengths.



Fig 2.2.71: Hip Curve

**L-square:** It is useful in constructing perpendicular lines with divisional parts located in longer and shorter arms.



Fig 2.2.73: Tailor's Chalk

**Cutting Table:** A flat board placed on a table where the fabric is laid out and cut. The fabric can be pinned securely to the cutting board/table to prevent it from slipping.



Fig 2.2.68: Sewing Gauge

**Hem Gauge:** A measuring device marked with various depths and hemline folds. It is practical when hemming straight on grain edges.



Fig 2.2.70: Yardstick/Meterstick

**Hip Curve:** The Hip Curve is used in connecting or shaping slightly curve points. It has a measure of inches at the front and centimeters at the back part.



Fig 2.2.72: L-square

**Tailor's Chalk:** A thin piece of hard chalk used in tailoring for making temporary alteration marks on clothing.

**Novelty Yarns:** Novelty yarns include a wide variety of yarns made with unusual features, structure or fiber composition such as slubs, inclusions, metallic or synthetic fibers, laddering and varying thickness introduced during production.



Fig 2.2.75: Masking Tape

**French Curve:** A French curve is a template usually made from metal, wood or plastic composed of many different curves. It is used in manual drafting to draw smooth curves of varying radii. The shapes are segments of the Euler spiral or clothoid curve.



Fig 2.2.77: Hand Needle

**Punch Needle:** A Punch needle is an easy to use tool that opens up a delightful world of dimensional needle art. It quickly and easily produces one-level or exciting three dimensional designs.



Fig 2.2.79: Frame, Round



Fig 2.2.74: Novelty Yarns

**Masking tape:** Also known as sticky tape, is a type of pressure-sensitive tape made of a thin and easy-to-tear paper, and an easily released pressure-sensitive adhesive. It is available in a variety of widths. It is used mainly in painting, to mask off areas that should not be painted.



Fig 2.2.76: French Curve

**Hand Needle:** Hand sewing needles are available in varying sizes with varying points. They guide the thread through fabric when you are hand sewing.



Fig 2.2.78: Punch Needle

**Frame, round:** Used for creating designs through hand stitch.



**Pattern making paper:** Used for practising cutting and creating patterns.

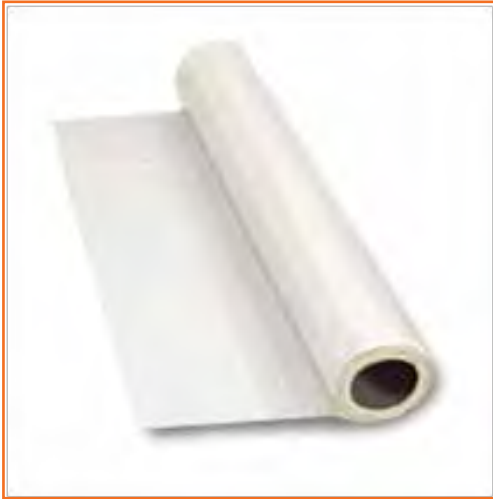


Fig 2.2.81: Tracing paper



Fig 2.2.80: Pattern making paper

**Tracing paper:** Tracing paper is paper made to have low opacity used for creating designs.

**Hand held thread trimmer:** Used for thread trimming.



Fig 2.2.83: Bent neck, metallic Tweezer

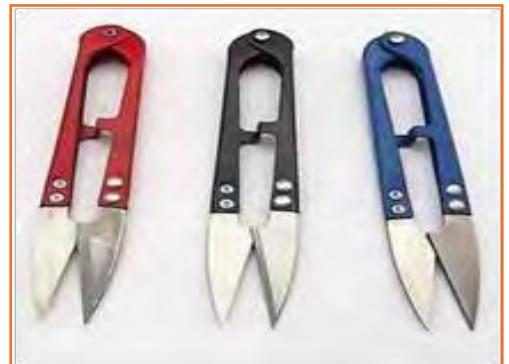


Fig 2.2.82: Hand held thread trimmer

**Bent neck, metallic Tweezer:** Tweezers are small tools used for picking up objects too small to be easily handled with the human hands

**Pencils (HB, 2B, 4B):** The graphite grading scales used to measure the hardness of a pencil's graphite core. The higher the number the harder the writing core and the lighter the mark left on the paper.



Fig 2.2.85: Pick glass



Fig 2.2.84: Pencils (HB, 2B, 4B)

**Pick glass:** Handy Reed Pick glass helps in checking the reed pick of the fabric. It also helps in checking the weaving, dyeing & printing defects in the fabric if any is made.

**Needle threader:** A needle threader is a device for helping to put thread through the eye of a needle. Many kinds exist, though a common type combines a short length of fine wire bent into a diamond shape, with one corner held by a piece of tinplate or plastic.



Fig 2.2.86: Needle threader



Fig 2.2.87: Nonwoven Non-fusible Backing Paper

**Nonwoven Non-fusible Backing Paper:** It is made of man-made fibers bonded together to form a paper-like sheet. SFig nonwovens (no stretch) are best for medium- to heavyweight fabrics with a slight to very crisp hand. Nonwovens with a crosswise or all-direction stretch can be used for soft to moderate shaping. Fusibles today are fast, secure and easy to use.

**Hand embroidery book:** Used for learning hand embroidery.



Fig 2.2.89: Fabric Glue



Fig 2.2.88: Hand embroidery book

**Fabric Glue:** It provide temporary or permanent ways to attach fabric without sewing.

**Surface ornamentation material (Beads, Sequins):** Decorative material used for decoration of clothes.



Fig 2.2.90 (a): Beads



Fig 2.2.90 (b): Sequins

**Buttons:** are attached to garment by hand stitching or machine stitching



Fig 2.2.92: Hooks

**Trims:** Trim or trimming in clothing and home decorating is applied ornament, such as gimp, ribbon, ruffles.

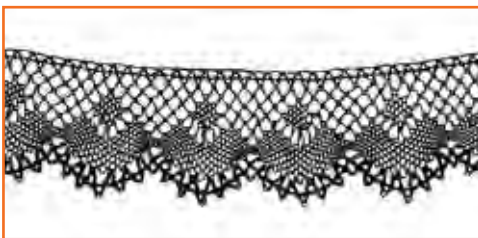


Fig 2.2.94: Lace

**Zipper:** Attached in lower garments.



Fig 2.2.96: Pant Hooks



Fig 2.2.91: Buttons

**Hooks:** are attached to garment with the help of needle and thread



Fig 2.2.93: Trims

**Lace:** A fine open fabric of cotton or silk, made by looping, twisting, or knitting thread in patterns and used especially for trimming garments.



Fig 2.2.95: Zipper

**Pant hooks:** Attached in lower garments.

**Sewing Mannequin:** it is a type of a doll used by Sewing machine operators or tailors to display or fit clothing.



Fig 2.2.98: Greyscale

**Greyscale:** It is used for matching colors in the sewed garment against the specifications.



Fig 2.2.97: Sewing Mannequin

**Thimble:** It is a small hard cup worn for protection on the finger that pushes the needle in sewing



Fig 2.2.99: Thimble



Fig 2.2.100: Piping

**Piping:** Piping is a form of embellishment or trim that consists of a strip of folded fabric forming a pipe that is inserted into a seam. The piping defines the edges or style lines of a garment. Generally the piping fabric strip is made from either the same fabric as the garment/object to or made by using contrasting fabric. At times leather is also used to create piping.

Commonly, piping is used on home furnishing items like pillows, but it is also used on clothing.

**Rib Collar:** Rib Collar is a form of fabric construction used for sleeve and neckbands. Rib collars are highly elastic and retain their shape. These are generally used in polo t-shirt collars.



Fig 2.2.101: Rib Collar



**Techpack:** A techpack is informative sheet that has all the specifications of the requirements before starting the garment making process. It has all the details of specific style of the garment. A Techpack is generally made by the designer and finalized in discussion with the merchandisers, and then forwarded to the production department for the reference.

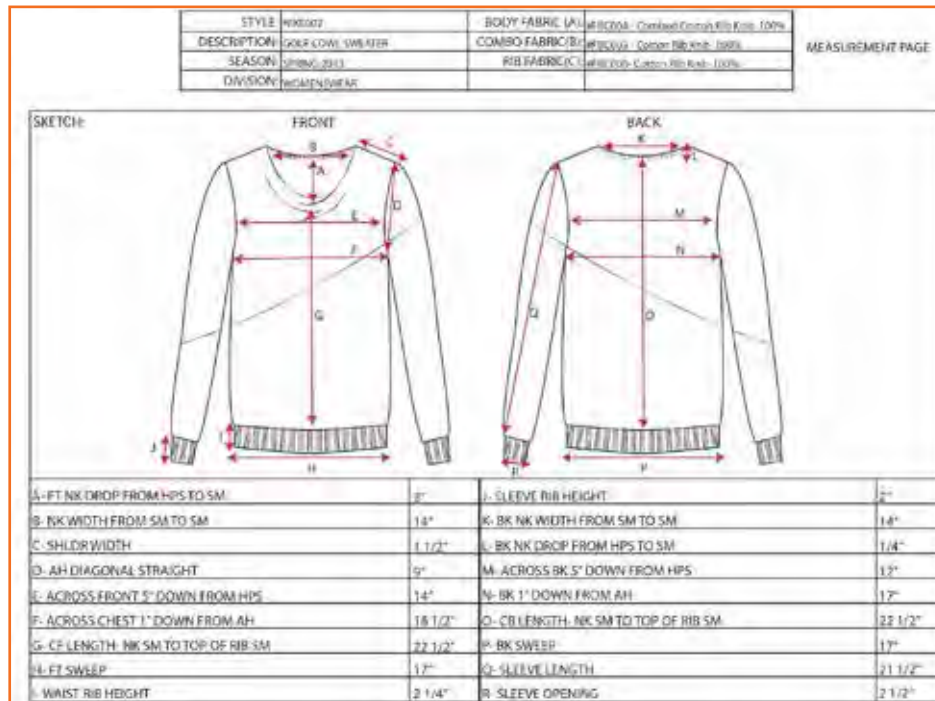


Fig 2.2.102: Techpack

## Resources



Scan the QR codes or click on the link to watch the related videos.

Descriptions	QR Codes
Types of sewing machines	 <a href="https://youtu.be/nwQLVcOCd18">https://youtu.be/nwQLVcOCd18</a>
Parts of a sewing machine	 <a href="https://youtu.be/al_hc7DoKXk">https://youtu.be/al_hc7DoKXk</a>



## Exercise

1. Full name of SNLS machine is \_\_\_\_\_
  - a) Single Needle Latch Step Machine
  - b) Super Needle Lock Step Machine
  - c) Single Needle Lock Stitch Machine
  - d) All the above
2. In SNLS machine thread comes from:
  - a) Bobbin
  - b) Hook
  - c) Needle
  - d) A & C Both
3. Sharp point needle is used for knit fabrics:
  - a) True
  - b) False
4. Feed off the arm machine makes:
  - a) Lock stitch
  - b) Chain stith
  - c) Multi thread chain stitch
  - d) None of the above
5. Seam class IV is:
  - a) French seam
  - b) Flat seam
  - c) Decorative Seam
  - d) Bound Seam
6. Stitch class 300 is:
  - a) Lock Stitch
  - b) Chain Stitch
  - c) Oveedge chain stitch
  - d) None of above
7. Fold the bottom of right trouser leg 1 cm inside. Again fold the fabric to the required width and put 2 or 3 stitches, this is the last step of Bottom Hemming using Folder.
  - a) TRUE
  - b) FALSE

8. Patch pocket is a part of a formal trousers?
  - a) TRUE
  - b) FALSE
9. Notches are used to align 2 pieces of garment components.
  - a) TRUE
  - b) FALSE
10. Which of the followings are the steps of Pocket Making and Stitching:
  - a) Locate the notch mark
  - b) Stitch the inner side of the pocket mouth using edge stitch
  - c) Take the ready pattern given and place it over the pocket
  - d) All the above
11. Main lable is stiched on \_\_\_\_\_ in format shirts?
  - a) Sleeve
  - b) Back Yoke
  - c) Side Seam
  - d) Pocket
12. In men's shirt right front overlaps the left front.
  - a) TRUE
  - b) FALSE
13. \_\_\_\_\_ is a flat bed machine?
  - a) Single needle Lock Stitch Machine
  - b) Feed off the Arm Machine
  - c) Overlock Machine
  - d) None of above
14. Feed dogs are used to run \_\_\_\_\_ through machine.
  - a) Fabric
  - b) Thread
  - c) Both A & B
  - d) None of above
15. Superimpose seam is used for:
  - a) Neck Finishing
  - b) Pocket attach
  - c) Side seam
  - d) None of above



## 3. Stitch Knitted Fabrics

Unit 3.1 - Stitch Components to Produce Apparels

Unit 3.2 - Contribute to Achieve Product Quality in Stitching Operations

Unit 3.3 - Stitching a T-Shirt



## Key Learning Outcomes

**At the end of this module, participants will be able to:**

1. Adjust the machine.
2. Estimate the expected length of time for the process.
3. Perform a test sew run.
4. Recognise the different types of stitching and seam.
5. Selection of correct machinery as per the garment or made –ups and home furnishing product plan like single needle machine, top and bottom feet, differential feet, etc.
6. Selection of appropriate attachments according to the garment requirements like binder, folder, essential mechanism tools, etc.
7. Optimize positioning and layout of materials to ensure smooth and productive working.
8. Stitch the correct materials in the right sequence as required by the product specification as per the specified stitch type (stitch classes), hems and seams.
9. Perform complex stitching operations with precision and accuracy.
10. Ensure stitched product meets specification as per the techpack and in terms of stitch per inch, labels and trimmings.
11. Ensure stitched product conforms to shape and size requirement.
12. Check the stitched components meet as per the standards and specifications mentioned in the job card.
13. Make adjustments promptly to ensure the stitching work matches the Specification.
14. Maintain the required productivity and quality levels.

## UNIT 3.1: Stitch Components to Produce Apparels

### Unit Objectives



At the end of this unit, participants will be able to:

1. Adjust the machine.
2. Estimate the expected length of time for the process.
3. Perform a test sew run.
4. Recognise the different types of stitching and seam.

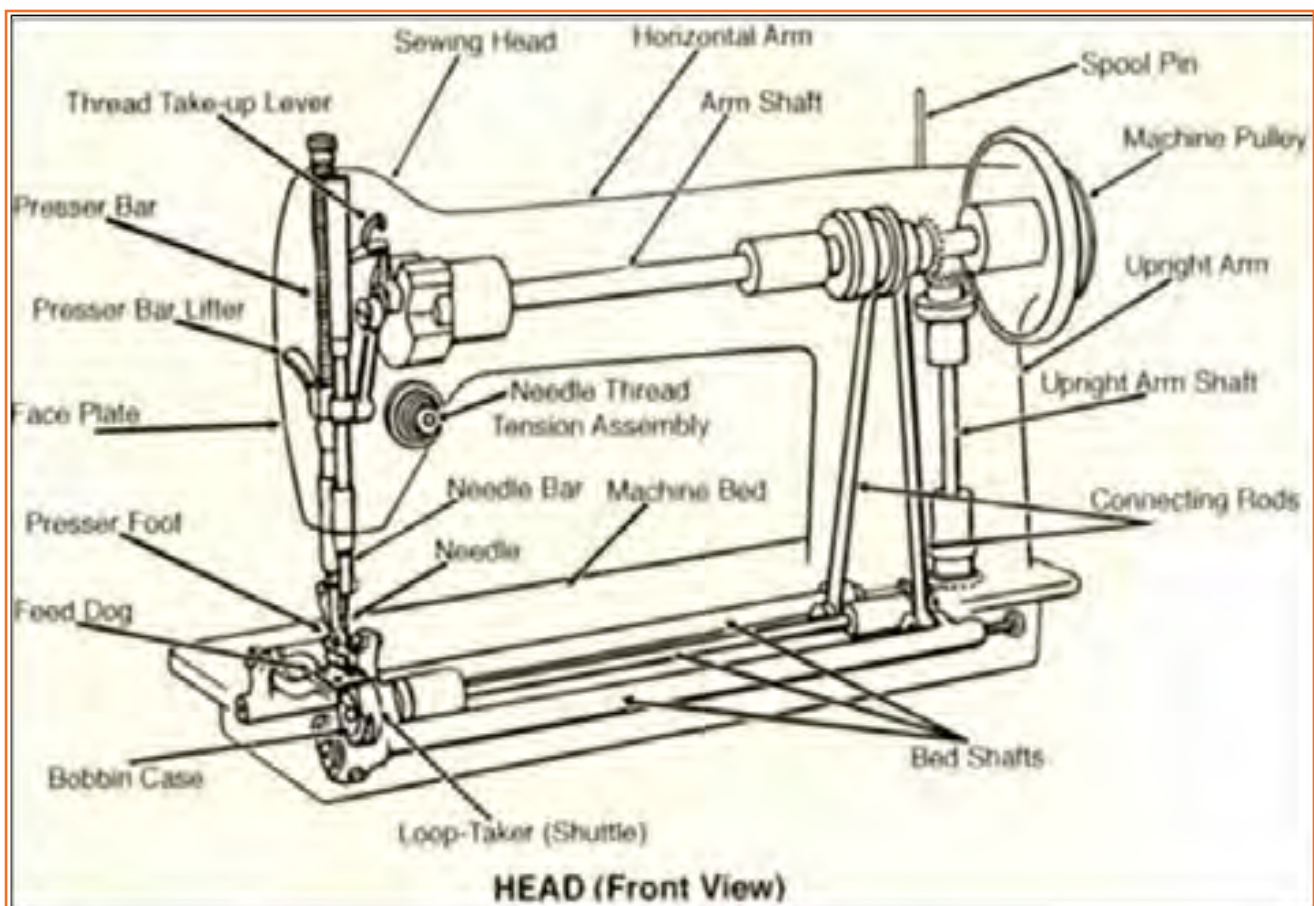


Fig 3.1.1: Sewing Machine - knits (Front View)

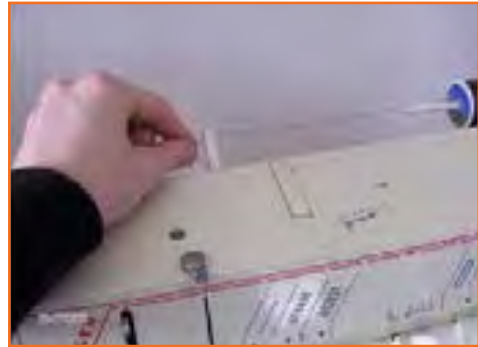


### 3.1.1 Adjusting the Machine

#### 3.1.1.1 Threading



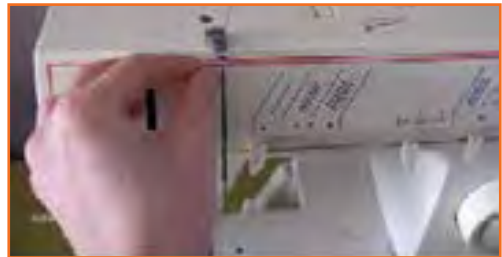
**Step 1:** This is where the thread goes. If you have a cap or stopper put it on after you put the thread on. Also put the side of the thread with the little cut to the back or bottom.



**Step 2:** Allow the string to unwind and put it through this hoop. Mine can also snap in from the back but usually with older machines this is a hoop.



**Step 3:** This can also be a loop but mine slides in through the back.



**Step 4:** From the tension bring the thread up and from right to left put it through the hole here.



**Step 5:** Then bring it down from the take up lever into the coiled thread guide.



**Step 6:** Then into the next thread guide.



**Step 7:** Then thread the needle front to back or right to left depending on your machine. Pull enough thread through so that it does not pull out when the needle moves 5-10 inches.

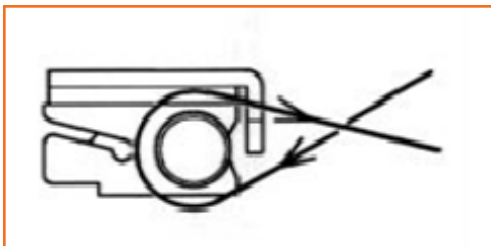


**Step 8:** Insert the bobbin.



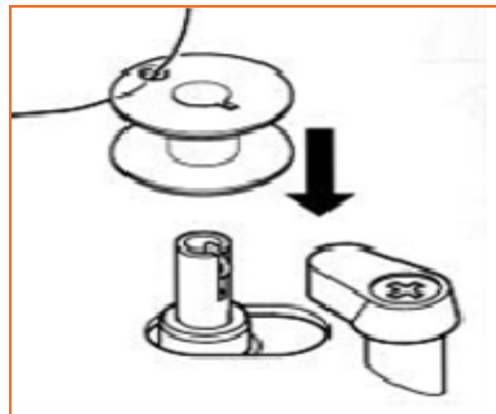
**Step 9:** Pull the string out tight and set the bobbin into the tray. Insert the thread into the metal notch and pull back.

### 3.1.1.2 Using the Bobbin Winder

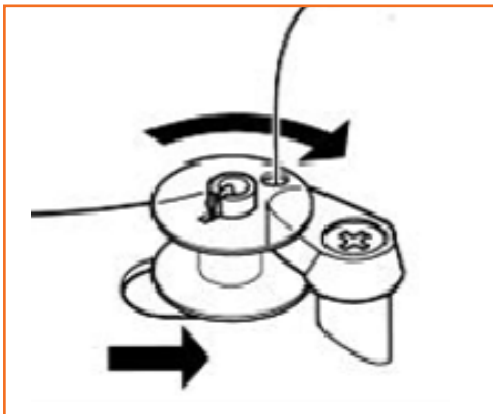


**Step 1:**

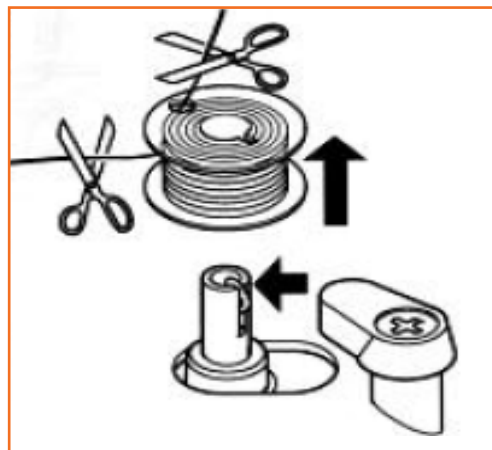
- Place spool of thread on spool pin.
- Slide spool pin holder/cap firmly over rim of spool to prevent thread from tangling.
- Push bobbin winder pin to far left if it is not already there.
- Pass the thread from spool through thread guide



**Step 2:** Pass thread end, from inside, through small hole in rim of bobbin



- Step 3:**
- Place bobbin onto pin.
  - Push bobbin winder pin to the right. This will stop the needle from moving.



- Step 4:**
- Holding thread end, step on speed controller to run machine until desired amount of thread is wound.
  - Cut thread; push bobbin to the left and remove it from bobbin winder pin

### Treadles

A treadle is a part of a machine which is operated by the foot to produce reciprocating or rotary motion in a machine such as a weaving loom (reciprocating) or grinder (rotary). Many of the early machines were powered by a treadle mechanism. The treadle was operated by pressing down on it with a foot, or both feet, to cause a rocking movement. This movement spins a large wheel on the treadle frame, connected by a thin leather belt to a smaller driving wheels on the sewing machine.

### Tension adjustment

To make a basic adjustment, adjust the bobbin spring; tighter if the bobbin thread shows on the upper layer, and looser if the needle thread shows on the under layer.



Fig 3.1.2: Bobbin Case



Fig 3.1.3: Bobbin

### Adjusting the needle

Needle is chosen and adjusted as per the requirement, i.e. it depends on what thread and what material is been used. While selecting and adjusting needle for specific fabric, two things must be considered:

1. Thickness of a needle
2. Point-shape

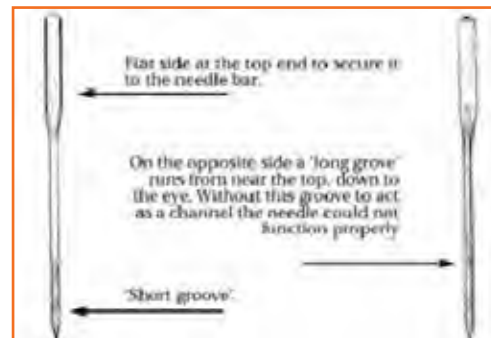


Fig 3.1.4: Adjusting the needle

### Choice of needle point

- **Cut Points:** These points have sharp tips to cut through the cloth therefore they are used for stitching leather products and clothes.
- **Cloth Points:** They have slight round shape and can cut through the cloth without damaging it. Suitability of thread and needle is also based on cloth material for e.g. for light weight silk, satin or crepe cloth point needles can be used as they cut through the cloth without providing them any damage.

### 3.1.1.3 Replacing a Needle

It always happens. You're pushing that fabric through, pushing that pedal to the grindstone, and it happens. You hear the loud pop and feel a tiny prick against your face or arm. You've broken a needle. But there's no use crying over a broken needle. They're fast and easy to replace, as long as you have some back up needles around. Nowadays, sewing machines use universal needles, which will fit just about every machine.



**Step 1:** Hold the needle with your left hand and undo the screw at the top of the needle with your right hand.



**Step 2:** Remove the needle by pulling down and away from the needle clamp.



**Step 3:** With the flat side towards the back, push the new needle up inside the needle clamp as high as it will go.



**Step 4:** Use your fingers initially and then your tool of choice to tighten the needle clamp screw. The tighter you can make this, the better. A loose clamp may leave the needle down in the fabric you are sewing.



**Step 5:** Re-thread your needle, pushing the thread from front to back.

### Stitch Formation

The lock stitch uses two threads, an upper and a lower. Lock stitch is so named because the two threads, upper and lower, "lock" (entwine) together in the hole in the fabric which they pass through. The upper thread runs from a spool kept on a spindle on top of or next to the machine, through a tension mechanism, through the take-up arm, and finally through the hole in the needle. Meanwhile the lower thread is wound onto a bobbin, which is inserted into a case in the lower section of the machine below the material.

To make one stitch, the machine lowers the threaded needle through the cloth into the bobbin area, where a rotating hook (or other hooking mechanism) catches the upper thread at the point just after it goes through the needle. The hook mechanism carries the upper thread entirely around the bobbin case, so that it has made one wrap of the bobbin thread. Then the take-up arm pulls the excess upper thread (from the bobbin area) back to the top, forming the lock stitch. Then the feed dogs pull the material along one stitch length, and the cycle repeats.

## 3.1.2 Pre-sewing Activities

Before sewing a garment, the sewing machine operator should:

- Ensure the materials used meet the specification matching. Go through the spec sheet /Tech Pack and make sure the materials meet the specifications provided by the buyer.

**Techpack:** A techpack is an informative sheet that has all the specifications of the requirements before starting the garment making process. It has all the details of specific style of the garment. A Techpack is generally made by the designer and finalized in discussion with the merchandisers, and then forwarded to the production department for the reference.

- Check that equipment is safe and set up in readiness for use. Perform a machine, needle and spool check. Do a sample run to check thread tension.
- Check that the materials to be used are free from faults. Go through all the material required for constructing the garment. Do fabric, thread and trims checking before sewing.
- Check and understand the material properties and type of construction required.



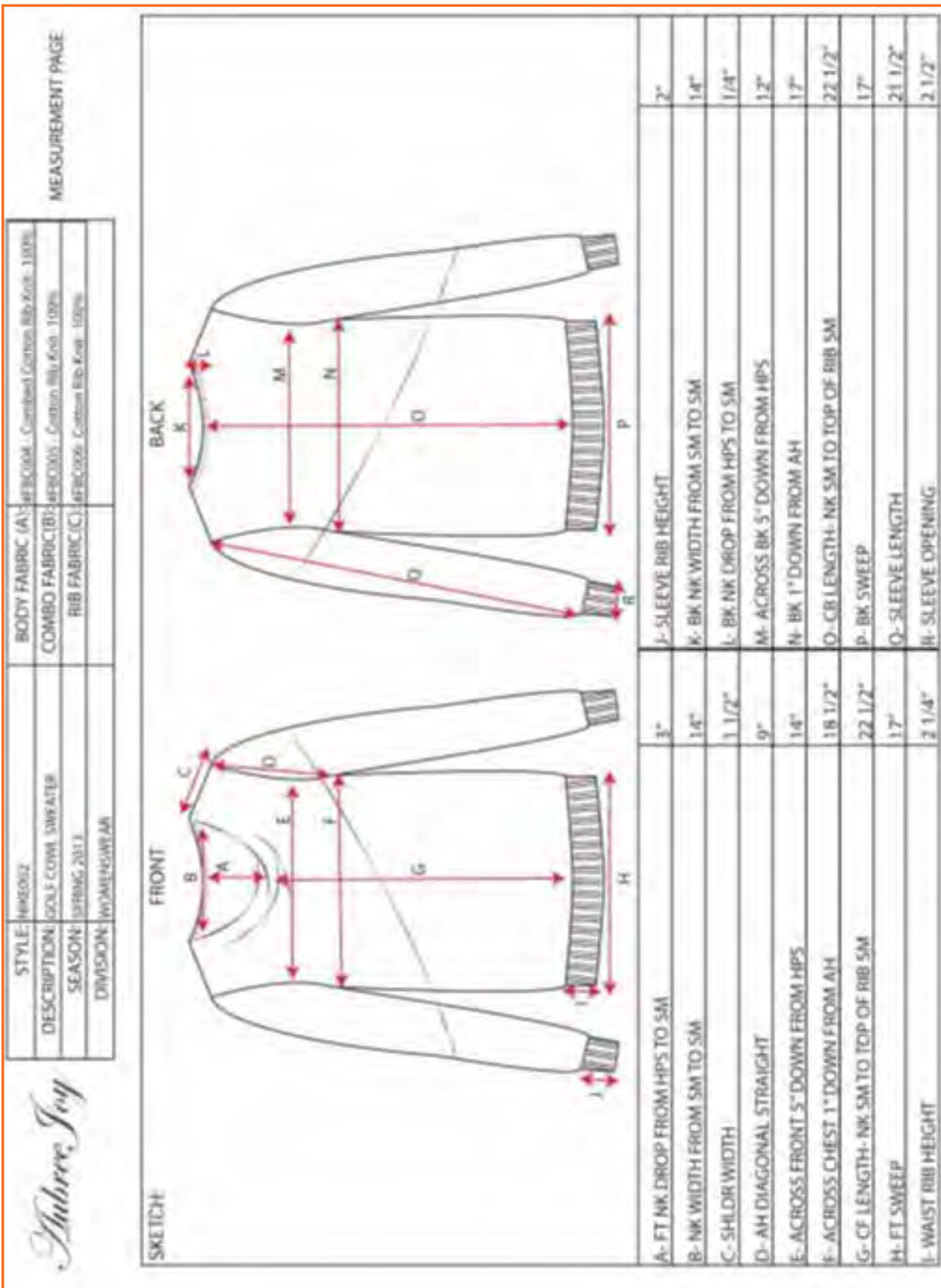


Fig 3.1.5: Techpack

### 3.1.2.1 Properties of Knit Fabric and Its Handling

- The pattern of Knit fabric is relatively complex: The yarn that has been knitted follows a looped path along its row, the loops of one row is pulled through the loops of the row below it.
- Since there is no single straight line of yarn anywhere in the pattern, a knitted piece of fabric can bounce in all directions. This elasticity is all but unavailable in woven fabrics which only stretch along the bias.
- The basic knitted fabric has a definite "right side" and "wrong side". On the right side, the visible portions of the loops are the verticals connecting two rows which are arranged in a grid of V shapes. On the wrong side, the ends of the loops are visible, both the tops and bottoms, creating a much more bumpy texture sometimes called reverse stockinette.
- The most common texture for a knitted fabric is that made by the flat stock inet stitch—as seen, though very small, in machine-made stockings.

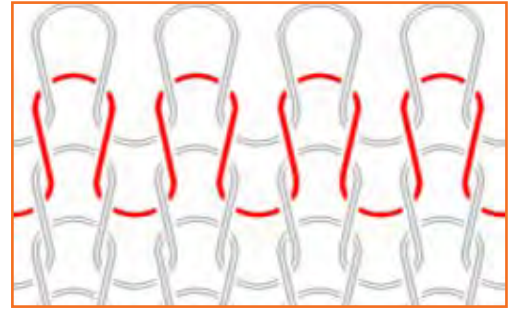


Fig 3.1.6: Properties of Knit Fabric and Its Handling

#### Stitching of knits

Because of the high stretch in knits, knit garments are seamed with stitches that offer the best seam elasticity and coverage of the raw edge of the fabric. Therefore the over edge and/or cover stitch seam constructions should be done on these. If the stretch is not properly handled, the problem that is common is the "broken stitches" or "stitch cracking" when the seam is stretch.

The sample sewn with the wider the needle spacing (1'4") has more elasticity the seam sewn with the narrower needle spacing (1/8") because it has more thread in the stitch. Therefore, when a narrow needle spacing is desired on high-stretch fabrics, the sewing machine should be set for more stitches per inch to minimize thread failure in the seam.

### 3.1.3 Ask Questions to Obtain More Information

Ask questions to obtain more information on tasks when the instructions are unclear and finalize the stitching option with supervisor in case of queries:

- It is important to ask questions rather to act like a dumb or a super heroic figure to the group or the team at your work place.
- It is important to pay attention, while demonstration or details are been given/taught on how to perform your certain job role, however even if you haven't been told or maybe you were unable to understand at once, it's always suggested.
- As a sewing machine operator it is very important for you to be proactive at all times like pro-active in learning or asking things you aren't sure about and pro-active and swift in working as well.
- Flawless working can be attained only if you put in endless efforts of practicing or clearing all your doubts when and wherever you require.
- Even if you think it's the silliest thing ever which I have not understood or people would make fun of; ignore that thought right then and there. Ask! It's much better to ask rather to keep quiet.

- When you are not clear about the instructions like what and how you have stitch any particular garment it's always suggested to look for a team leader or a supervisor for guidance and help on the subject.
- If you feel hesitant in directly approaching your supervisor tell them to make you sit with someone who is efficient in the work so that you can learn from one of the group mates at your ease.
- More you ask, more efficient you become.
- Asking the query of any sort of doubt like non-understanding of the subject or any un-cleared / confusing statements can also help using the resources right way and not just wasting them trying rather than asking the expertise.
- It is okay to ask even after the training period if you are un-sure about any statement related to your role in the industry / company.

### 3.1.4 Estimate the Expected Length of Time for the Process

#### SAM

Standard Allowed Minute is used to measure work content of a fabric. This tenure is extensively used by manufacturing units and fabrication people in the garment manufacturing industry in sewing operations. For the calculation of the cost of making an apparel, SAM is very eminent. The researches were done by Fabric experts and apparel technicians, on how much time to be allowed to do a job when one follows standard method during performing the task. According to the research study minute value has been defined for each measure needed to achieve a job. Synthetic data is available for each movement.

#### Method 1: Calculation of SAM Using Synthetic Data

In this method, Predetermined Time Standard-PTS code is used to establish "Standard Time" of the sewing products.

- **Step 1:** Choice one process for which you want to calculate SAM.
- **Step 2:** Understand the motions of that process. Stand by the operator and see how he/she is doing it.
- **Step 3:** Make a list of all motions consecutively. State the synthetic data for Time Measuring Unit values. For synthetic data, you can refer GSD (without license use of GSD code prohibited but for personal use and study one can refer GSD code and TMU values) or Sewing Performance Data table (SPD).
- **Step 4:** Estimate SAM by summing up the bundle allowance and personal allowance to the basic time.

Standard allowed minutes (SAM) = (Basic minute + Bundle allowances + machine and personal allowances).

#### Method 2: Calculation of SAM through Time Study

- **Step 1:** Choose one operation for which you want to calculate SAM.
- **Step 2:** Take a stop clock. Stand next to the operator. Check the set time for that operation. (cycle time is the total time taken to do all the tasks, needed to complete one operation, i.e. time from pick up part of the first piece to next pick up of the next piece).
- **Step 3:** Presentation rating. Now, rate the operator at what performance level the operator was doing the job seeing his/her movement and work speed. Suppose that operator performance rating is 80%. Suppose cycle time is 0.60 minutes. Basic time =  $(0.60 \times 80\%) = 0.48$  minutes.
- **Step 4:** Calculate SAM by the following formula:

Standard allowed minutes (SAM) = (Basic minute + Bundle allowances + machine and personal allowances).

### Off Standard Time

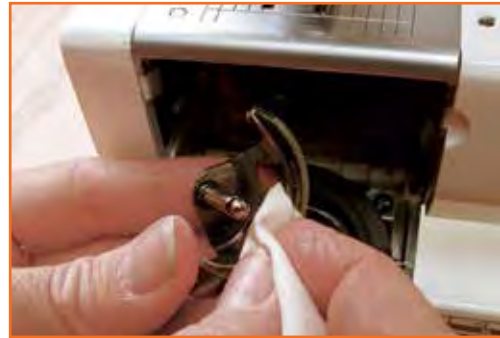
Time is considered off standard when operator is not able to work due to:

- Unavailability of work
- Power Failure
- Machine Breakdown

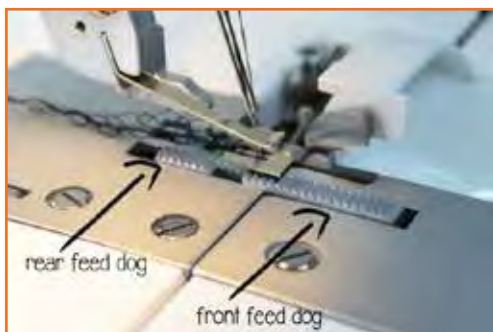
In simpler terms the amount of time in a day when the standard conditions are not provided to operator for working is called off standard time.

### 3.1.5 Perform a Test Run

Perform a test run if the sewing machine is running smoothly and with full efficiency. If not, then check the following and adjust the machine:



**Step 1:** Cleaning and oiling: Check if the machine is been cleaned and oiled properly. With the presser foot up, try to run the machine at full speed for one minute. If you hear a noticeable discrepancy in speed then the machine surely needs some lubrication. Remove the top cover (if machine has one.) If not, you should be able to find holes on top of it. Apply only a drop of SEWING MACHINE OIL (not 3 in 1 oil or any other kind of oil or rust inhibitor). Next, reach the bottom of your machine. After removing any dust, lint, broken needles debris and straight pins, apply a drop of oil to each moving part. By turning the hand wheel slowly (always towards you for 98% of them), you will see all the moving parts joints that needs to be oiled. Many parts already have a small hole especially for oiling.



**Step 2:** Check feed dogs: Remove the feed dog, clean the feed dogs. Try to pass a rag under them and with an old needle or narrow tool, remove the lint inside the feed channels. Put back the needle plate. If your machine is equipped with a FEED DROP, be sure the feeds are set at UP position. By turning the hand wheel (towards you), check to see if the feeds make their movement.



**Step 3: Look for upper tension:** Most sewing machine problems are caused by thread tension. Learn this basic principle right now: the upper tension determines your UNDER stitch. And the bobbin (bottom) tension determines your UPPER stitch. Unless you are experimented to dismantle the upper tension unit or if it's explained in your manual, follow this simple technique. Tension discs are often disrupted by pieces of broken thread, lint and dust. This cause a gap between the tension discs and no pressure is applied to the thread resulting of thread loops underneath. Take an 8" length of thread and make 3 to 4 knots in it (as pictured below). Thread your tension system with this piece of thread a few times in all directions. This will remove any lint residue between the tension discs. Try it for the first time with the presser foot UP and then with the presser foot DOWN. When the presser foot is down and the tension dial set at number 4, you should be able to feel a tension when pulling the thread. If so, the upper tension system is working properly.



**Step 4: The bottom bobbin:** Check also for the condition of the bobbin winder rubber tire. If you can see cracks and worn flat surfaces, replace it. This very popular item is available at any sewing shop for a dollar or so. When winding a bobbin, check to see of the thread winds evenly from each side of the bobbin. Then check the bottom of your bobbin case. Remove any lint pancake. Install your bobbin in it. By pulling the thread, you should feel a very soft tension on the thread. If not, some clogged lint may be laying between the small tension spring and the bobbin case itself.

Now perform the test run (Again) and must experience the following observations to make sure the machine is working properly.

- Firstly, run the machine at mediums peed for the first stitch row.
- Check underneath: the stitch should be identical to the top one. No loops, only a tight stitch. If any loops are found underneath, raise the upper tension slightly and make a second stitch row.
- Try also the reverse stitch a few times while sewing (do not stop to engage the reverse). Make sure the thread does not break. Check also for loops underneath on the stitches made with the reverse.
- If everything is good so far, run the machine at full speed making a few stitch rows. If your machine is equipped with the zigzag, try it. The zigzag stitch should be the same on top and bottom.



### 3.1.6 Check That the Material is Free from Faults

It is important to go through and inspect every garment which is produced in the garment factory. Stitching operations one of the important aspects of the garment factories and every single thing should be very minutely checked before sending for the final finishing or displaying. Any part of the machinery or the garment which you would be required to work on, should be checked that the material about to be used is fault-free. Any faulty material found, should be reported to the responsible authority immediately, it should be sent for replacement. While using the material the commonly seen faults are in: faulty needle, unusual thread, wrong stitching pattern however fabric defect over shadows all as it the most important of all in first place hence should be checked very clearly and thoroughly before making it in use.

### 3.1.7 Seam

Seam is a joint consisting of a sequence of stitches uniting two or more pieces of material(s) and is used for assembling parts in the production of sewn items.

#### Seam Classes

**Class 1** – Superimposed seam

**Class 2** – Lapped seam

**Class 3** – Bound seams

**Class 4** – Flat seams

**Class 5** – Decorative/Ornamental stitching

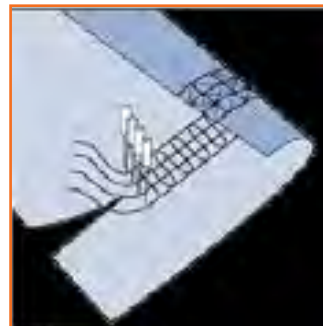
**Class 6** – Edge finishing/neatening

**Class 7** – Attaching of separate items

**Class 8** – Single ply construction

#### Types of Seam

**Flat Seams:** These seams, sometimes called Butt Seams, two fabric edges, flat or folded, are brought together and over sewn with a zig-zag lockstitch, chainstitch or covering stitch (Class 600). The purpose is to produce a join where no extra thickness of fabric can be tolerated at the seam, as in under wear or in foundation garments.



*Fig 3.1.7: Flat Seam*



Fig 3.1.8: Superimposed Seams

**French Seam:** French seaming involves 2 stitching operations with an intervening folding operation - a flat, folded seam with only one row of stitching visible on the top surface. French seaming involves 2 stitching operations with an intervening folding operation - a flat, folded seam with only one row of stitching visible on the top surface.



Fig 3.1.9: French Seam



Fig 3.1.10: Lap Felled Seam

**Lap Felled Seam:** The Lap Felled type, involves only one stitching operation - a strong seam with fabric edges protected from fraying. Commonly used for making up jeans or similar garments.

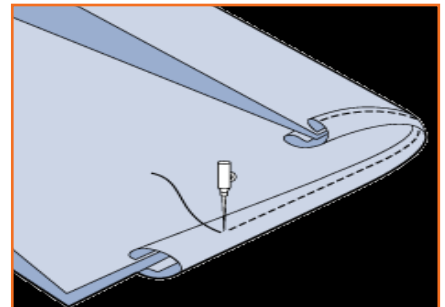


Fig 3.1.11: Bound Seams

**Bound Seams:** These are formed by folding a binding strip over the edge of the plies of material and joining both edges of the binding to the material with one or more rows of stitching. This produces a neat edge on a seam exposed to view or to wear.

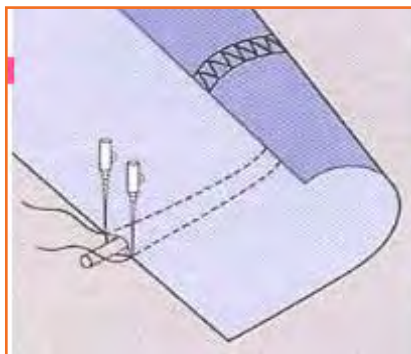


Fig 3.1.12: Decorative Stitching

### Decorative/Ornamental stitching

On a single ply of material, an ornamental stitch is created using along straight and/or curved lines or even while following an ornamental design. A more complicated process in this regard is the piping stitch, which includes many forms of producing a raised line along the surface of the fabric.

The result of using this stitch is decorative components like braiding, pin tucks etc. This seam is comprised of a minimum of one component.

### Edge finishing/neatening

Edge finishing involves folding or covering a single ply of the material with a stitch.

Its applications include serging trouser panels, flies, facings, etc.

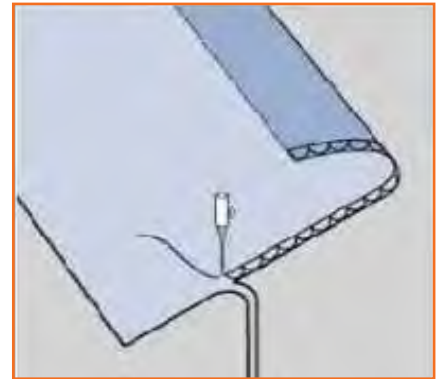


Fig 3.1.13: Edge finishing

## 3.1.8 Stitches

A Stitch is one unit of conformation of thread resulting from repeatedly passing a strand or strands and/or loop or loops of thread into or through a material at uniformly spaced intervals to form a series of stitches. Stitch classification is based on structure of the stitch and method of formation.

### Stitch properties:

- Stitch size has three dimensions: length, width, and depth.
- Stitch length is specified as the number of stitches per inch (spi) and can be an indicator of quality. High spi means short stitches; low spi means long stitches. Generally, the greater the spi, the more the holding power and seam strength.
- Stitch width refers to the horizontal span (bight) covered in the formation of one stitch or single line of stitching. Stitches that have width dimensions require multiple needles or lateral movement of thread carriers such as the needle bars, loopers or spreaders. Stitch depth is the distance between the upper and lower surface of the stitch. It is a factor for blind stitches.

### Overlock Stitch Application in Knit Garments

They require more thread in the stitch formation, but they also have more stretch. Over lock stitch used for knits are highly extensible and therefore makes an excellent seam for knit garments.

**Four Thread Over lock Stitches:** Are sometimes called “mock safety stitches”. They are 4 thread over edge stitches that are formed with two needle threads and two looper threads. Some Mock Safety stitches are stronger and more elastic and can be used for seam.

**Five Thread Overlock Safety Stitch:** Are the “Safety Stitches”. These are combination of an over edge stitch and chain stitch. Chain stitch is used for closing the seam and is backed by another row of “tight” over edge stitches. This type of stitching is widely used by manufacturers of shirts, jackets, blouses and jeans.



Fig 3.1.14: Standard Stitching Patterns

**Stitch classification:** Stitch classification is based on structure of the stitch and method of interlacing.

**100 Class stitch(Single thread chain stitch ) :** Using one needle thread and one blind looper.



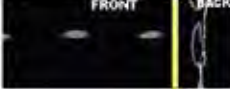
Diagram	Stitch class	Thread count	Typical uses
	101 Class	One thread	Basting, or light construction
	103 Class	One thread	Blind stitch for hemming
	104 Class	One thread	Blind stitch for hemming

Fig 3.1.15: 100 Class stitch

**200 Class stitch(Hand Stitch) - Single thread hand sewn stitch:** Using one needle thread.



Diagram	Stitch class	Thread count	Typical uses
	202 Class	One Thread	Basting, tacking or repairs
	205 Class	One Thread	Pick stitch - topstitching

Fig 3.1.16: 200 Class stitch

**300 Class stitch( Lock Stitch) - Two or more thread lock stitch:** Using Needle Thread(s) and One Bobbin Hook Thread.



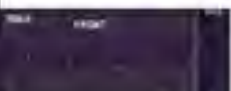

Diagram	Stitch class	Thread count	Typical uses
	301 Class	Two threads	Seaming multiple plies
	304 Class	Two thread	Zig-zag stitch; a stretch lockstitch
	306 Class	Two thread	Blind stitch
	315 Class	Two threads	Three step zig-zag

Fig 3.1.17: 300 Class stitch

**400 Class stitch(Chain Stitch)** - Multi-thread chain stitch: Using one or more needle threads and one or more looper threads.

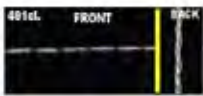

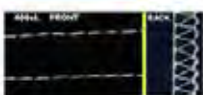
Diagram	Stitch class	Thread count	Typical uses
	401 Class	Two threads	Seaming multiple plies with moderate stretch
	404 Class	Two threads	Topstitching or seaming with stretch
	406 Class	Three threads	"Bottom cover stitch; a (greater) stretch chain stitch"

Fig 3.1.18: 400 Class stitch

**500 Class Stitch(OverEdge Stitch)** - Multi-thread over edge chain stitch: Using needle thread(s) and looper thread(s).









Diagram	Stitch class	Thread count	Typical uses
	501 Class	One thread	One needle over edge stitch for serging / "blanket stitch"
	502 Class	Two thread	One needle over edge stitch for serging
	503 Class	Two thread	Over edge stitch for serging with crossover on edge of fabric
	504 Class	Three thread	Over edge stitch for serging and light seaming
Diagram	Stitch class	Thread count	Typical uses
	512 Class	Four Thread	Mock safety stitch for seaming with wide bite and greater stretch for knits
	514 Class	Four Thread	Over edge stitch for seaming with wide bite and greater stretch for knits
	515 Class	Four Thread	True safety stitch for seaming with good stretch for wovens and knits
	516 Class	Five Thread	True safety stitch for seaming with good stretch for wovens and knits

Fig 3.1.19: 500 Class Stitch - Multi-thread over edge chain stitch



### 600 Class Stitch(Flat Stitch) - Multi-thread cover stitches:



Diagram	Stitch class	Thread count	Typical uses
	602 Class	Four thread	Cover stitch or seaming knits
	605 Class	Five thread	Cover stitch
	607 Class	Six thread	Wide cover stitch

Fig 3.1.20: 600 Class Stitch - Multi-thread cover stitches

### Stitches Per Inch for Woven Garments

The stitch length is measured by measuring the number of lengths of thread found within one inch. As you can see here, there are approximately 9 SPI sewn in this seam.

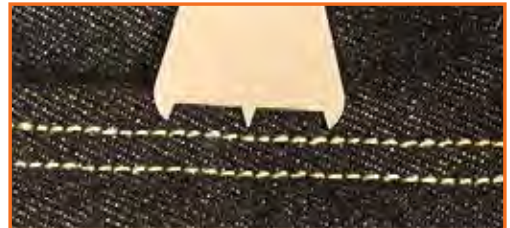


Fig 3.1.21: Stitch length measurement

When stitching knit fabrics, you should always check for unnecessary “seam beaming” of the seam; and also check for “stitch cracking”. “Seam grinning” happens when thread stitch balance is too slack letting the seam to open up too much when stress is applied to it. “Stitch cracking” is checked by putting force on the seam in the stitching direction. If the thread strains are too tight or if you are not using enough stitches per inch, the threads will break as stress is applied on the seam. Therefore, the following recommendations have been made for the number of stitches per inch to be used on the following garments.

### Knit Garments

Garments	SPI	Comments
Jersey T's/Polo	10-12	Using more SPI increases the chance of needling cutting.
Fleece	10-12	More SPI are required to provide the proper seam coverage on fleece.
For Middle-Heavy Sweaters	8-10	The more elastic the seam, the more SPI that should be used to minimize stitch cracking
Stretch Knit	14-18	More stitches per inch are required to provide the proper seam elasticity

Fig 3.1.22: Stitch length measurement table

### 3.1.9 Types of Pockets, Plackets and Sleeves

**Pockets:** A pocket is a bag- or envelope-like receptacle either fastened to or inserted in an article of clothing to hold small items



Fig 3.1.23: Types of Pockets

**Plackets:** A placket is an opening in the upper part of trousers or skirts, or at the neck or sleeve of a garment. Plackets are almost always used to allow clothing to be put on or removed easily

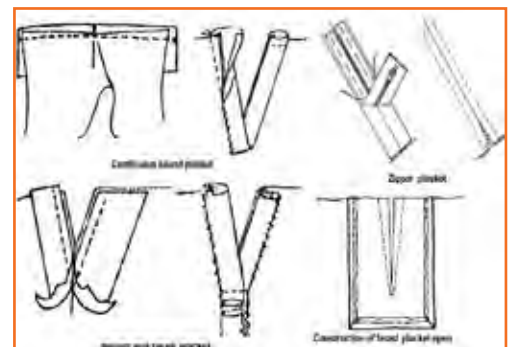


Fig 3.1.24: Types of Plackets



Fig 3.1.25: Types of Sleeves

**Sleeves:** Sleeve is the part of a garment that covers the arm, or through which the arm passes or slips.

### 3.1.10 Carryout Test Sews

In order to be very good at stitching, one needs to practice it. Hence it is important to carry out stitching tests and practices time to time until reached perfection. Here are some of the most common and important types of stitching i.e. lock and chain stitch. Below are the steps which show how to work on a sewing machine by following simple steps given in the activity.

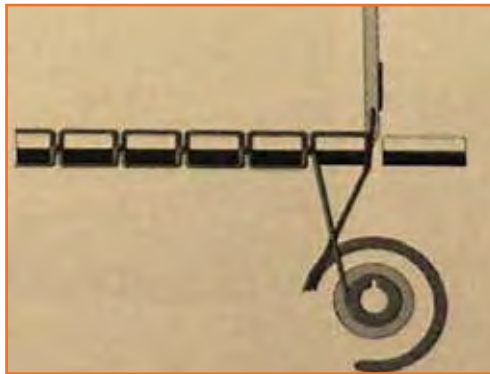
**There are two main stitch types**

1. Lock stitch
2. Chain stitch

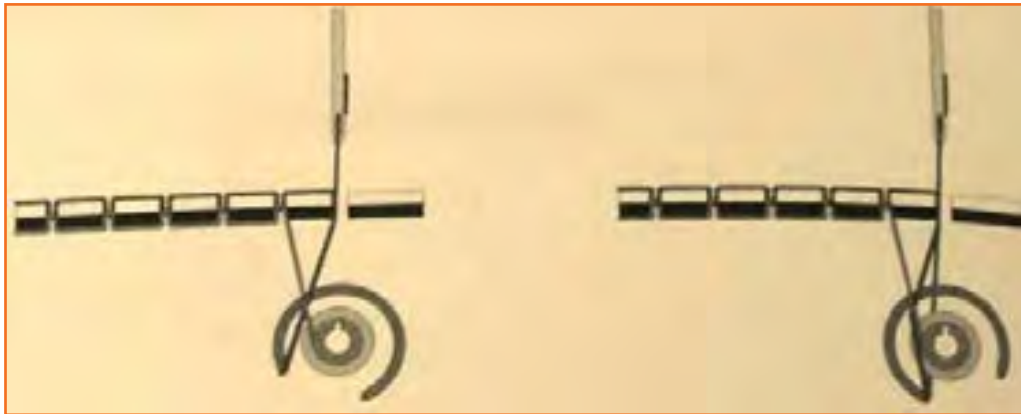
### 3.1.10.1 Steps for Lockstitch



- Step 1:**
- Keep the slide plate open so that the hook-set is visible.
  - Bring needle to its lowest position into the hole through which it reaches the bobbin by slowly moving the hand-wheel.
  - Now, move the needle up using the hand-wheel
  - Needle-thread (Upper-thread) becomes loose when the needle goes up from this lowest position.
  - Blade point of outer hook of the bobbin assembly catches the loop-shaped upper thread and pulls it.
  - Upper thread is then separated at the inner hook thread separating portion.
  - So the needle-thread is taken up by the opposite (or rear) inner hook.
  - At the same time needle-thread on cloth side is separated to the right side of inner hook.

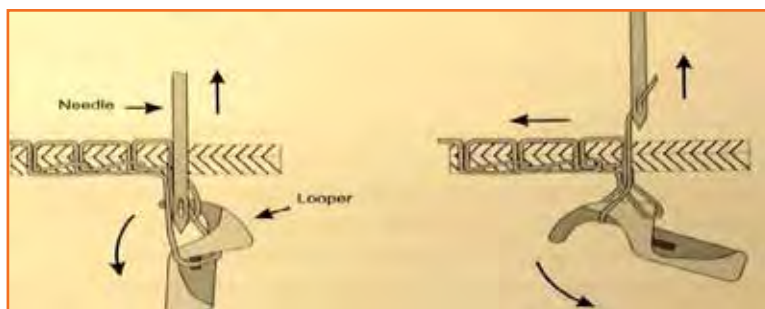


- Step 2:**
- Keep the slide plate open so that the hook-set is visible.
  - Bring needle to its lowest position into the hole through which it reaches the bobbin by slowly moving the hand-wheel.
  - Now, move the needle up using the hand-wheel
  - Needle-thread (Upper-thread) becomes loose when the needle goes up from this lowest position.
  - Blade point of outer hook of the bobbin assembly catches the loop-shaped upper thread and pulls it.
  - Upper thread is then separated at the inner hook thread separating portion.
  - So the needle-thread is taken up by the opposite (or rear) inner hook.
  - At the same time needle-thread on cloth side is separated to the right side of inner hook.



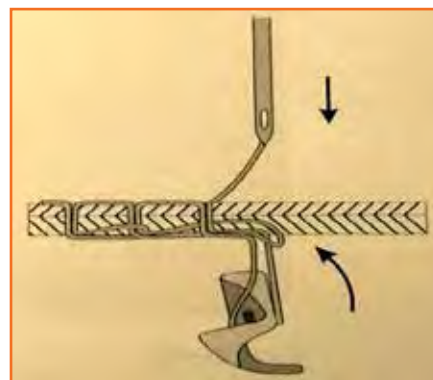
- Step 3:**
- Thus the upper thread is lock-stitched (interlaced) with the lower thread.
  - Stitch formation is completed when the upper thread lifts the lower thread.
  - The feed dog pushes the unstitched portion of the cloth under the presser foot.
  - The needle comes down and goes inside the cloth to repeat from step 1 to 14.

### 3.1.10.2 Steps for Chain Stitch

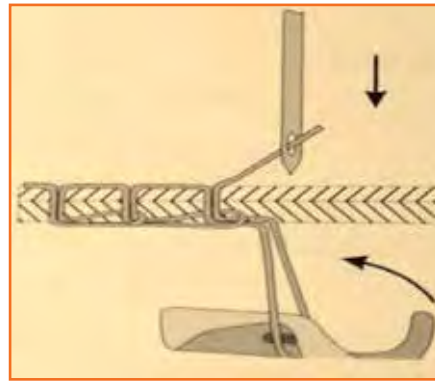


- Step 1:**
- Needle is the lowest position.
  - Upper thread becomes loose when needle goes up from its lowest position.
  - Needle-thread (upper thread) becomes like a loop then the looper catches the needle thread.
  - The needle enters the loop of needle-thread which is widened by the looper.

- Step 2:**
- The needle moves up and comes out of the cloth and the unstitched portion of cloth is pushed forward to form a stitch.
  - The looper rotates and removes the loop of the needle-thread it had caught.
  - Also the looper keeps pulling in the needle-thread as it rotates.
  - Needle-bar goes up and needle-thread take-up lever lifts the thread up along with it.



- Step 3:**
- Looper keeps rotating and pulls thread towards its own centre
  - Thread take-up lever tightens the earlier loop of thread which the looper removed in step 6.
  - Cloth feed is finished (feed dog has finished one cycle of feeding) and a stitch is formed
  - Needle again pierces into the cloth and continues to form the next stitch repeating all the step.



### 3.1.10.3 Stitch at the Normal Speed

The above activity was to conduct tests sews for lock stitch and chain stitch. Now let's see how to stitch at the normal speed:

- **Step 1:** Attach needle and thread the machine – needle-thread and bobbin-thread.
- **Step 2:** Adjust thread tension using a rough fabric.
- **Step 3:** Put the fabric sample at the left end of the machine.
- **Step 4:** Note the start time to start sewing exercise.
- **Step 5:** Pull the fabric sample with the left hand.
- **Step 6:** Raise the presser foot using the knee lifter.
- **Step 7:** Place the fabric sample under the presser foot such that the start point of the fine line is exactly below the needle point. (Fig 3.1.47)
- **Step 8:** Lower the presser foot.
- **Step 9:** Press the pedal down with the toe of the right foot.
- **Step 10:** Continue to press the pedal down with more force such that machine runs at normal speed (i.e. high speed).
- **Step 11:** Guide the sample with your hands as it moves forward.
- **Step 12:** maintain stitching line along the marked straight line.
- **Step 13:** Stop sewing-machine at the stop mark.
- **Step 14:** Press the back part of the pedal down with the heel of the left foot.
- **Step 15:** Raise the presser foot and pull the sample out.
- **Step 16:** Hold the trimmer in the right hand and trim the threads.
- **Step 17:** Practice by repeating from step 6 to 16 for all 10 lines on the sample.
- **Step 18:** After completion, remove the sample from the machine to the left side. (Fig 3.1.48)
- **Step 19:** Note the end-time.

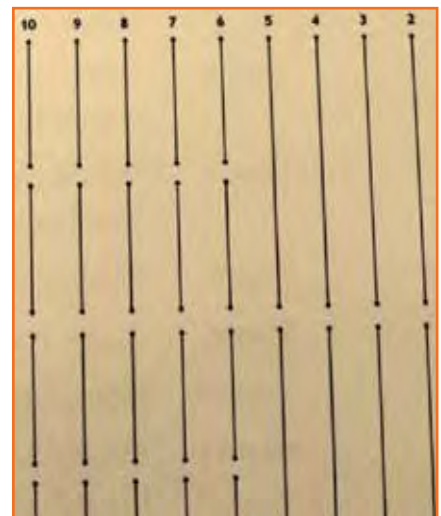


Fig 3.1.26: Stitching at normal speed



### 3.1.11 Practicing Corner Stitch and Curve Stitch

#### 3.1.11.1 Corner Stitch



- **Step 1:** Attach needle and thread the machine- needle-thread and bobbin- thread.
- **Step 2:** Adjust thread tension using a rough fabric.
- **Step 3:** Put the fabric sample at the left end of the machine.
- **Step 4:** Note the start time to start sewing exercise.
- **Step 5:** Pull the fabric sample with the left hand.
- **Step 6:** Raise the presser foot using the knee lifter.
- **Step 7:** Place the fabric sample under the presser foot such that the start point of the fine line is exactly below the needle point.
- **Step 8:** Lower the presser foot.
- **Step 9:** Press the feed control lever (Reverse stitch lever) to its lowest position.
- **Step 10:** sew 2-3 reverse stitches at low speed.
- **Step 11:** Stop stitching.
- **Step 12:** Release the reverse stitch lever so that the machine can do regular sewing (forward direction).
- **Step 13:** Start sewing at normal speed i.e. high speed.
- **Step 14:** keep stitching along that line.
- **Step 15:** Slow down the speed when the corner comes near.
- **Step 16:** Stop sewing at the corner point.
- **Step 17:** Lower the needle at the corner.
- **Step 18:** Raise the presser foot.
- **Step 19:** keeping the needle in dropped position or lowest position (pierced inside the fabric sample), turn the fabric sample.
- **Step 20:** Align the fabric sample such that the stitching line drawing (after the corner stop point) is in line with the needle point and stitching line.
- **Step 21:** Lower the presser foot.
- **Step 22:** Sew straight stitches.
- **Step 23:** Repeat Step 14-22 at every corner. (Fig 3.1.49)
- **Step 24:** Stop sewing at the sewing end symbol.
- **Step 25:** Press the back part of the pedal down with the heel of the left foot.
- **Step 26:** Raise the presser foot and pull the sample out.

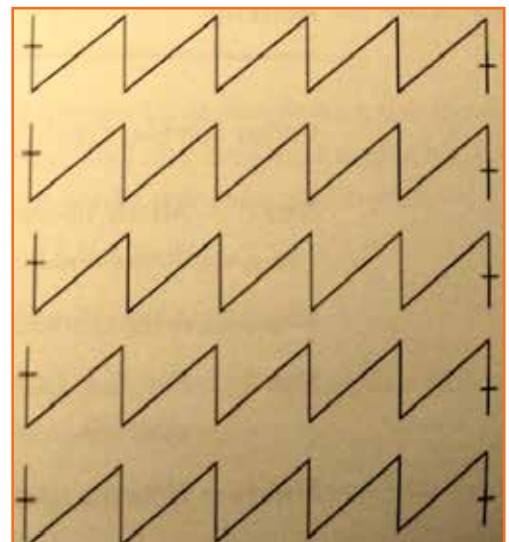


Fig 3.1.27: Corner Stitch

### 3.1.11.2 Curve Stitching (Left Curve and Right Curve)

- **Step 1:** Attach needle and thread the machine- needle-thread and bobbin- thread.
- **Step 2:** Adjust thread tension using a rough fabric.
- **Step 3:** Put the fabric sample at the left end of the machine.
- **Step 4:** Note the start time to start sewing exercise.
- **Step 5:** Pull the fabric sample with the left hand.
- **Step 6:** Raise the presser foot using the knee lifter.
- **Step 7:** Start sewing at the outermost semicircle of the curves on the left.
- **Step 8:** Place the fabric sample under the presser foot such that the start point of the first line is exactly below the needle point.
- **Step 9:** Lower the presser foot.
- **Step 10:** Press the pedal down with the toe of the right foot.
- **Step 11:** Continue to press the pedal down with more force such that machine runs at a normal speed (high speed).
- **Step 12:** Guide the sample with your hands as it moves forward to keep the stitching on the drawn curve.
- **Step 13:** maintain stitching line along the marked curve.
- **Step 14:** Stop sewing-machine at the stop mark.
- **Step 15:** Press the back part of the pedal down with the heel of the left foot.
- **Step 16:** Raise the presser foot and pull the sample out.
- **Step 17:** Hold the trimmer in the right hand and trim the threads.
- **Step 18:** Practice by repeating from step 6 to 16 for all 7 curves on the sample.
- **Step 19:** Now, practice sewing along the outermost right curve on the worksheet by repeating step 6 – 16 for all 7 right curves.
- **Step 20:** Note the hand movement that helps guide the fabric which must change according to the change in the direction of curve.
- **Step 21:** After completion, remove the sample form the machine to the left side. (Fig 3.1.50)
- **Step 22:** Note the end time

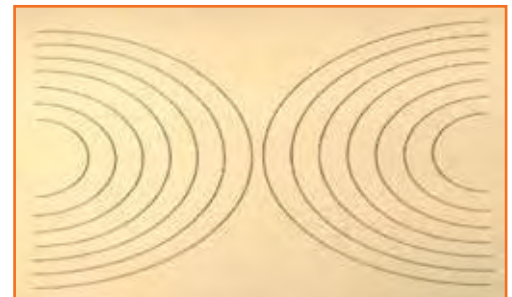


Fig 3.1.28: Curve Stitching

## Industry Visit

The purpose of visiting an apparel manufacturing unit is to get hands on knowledge about various processes involved in the work of an SMO. During the visit you have to interact with Sewing Machine Operators and supervisors to understand how work is done in industry. Make sure that you keep a notebook handy and note down any important points that come up during your interaction at the apparel manufacturing unit. When you go to an apparel manufacturing unit, you should:

- Analyze how an SMO adjusts sewing machine for sewing like, threading a machine, attaching bobbin to machine and replacing needle etc.
- Understand the different types of stitches and which type of stitch suits to different fabrics.
- Ask questions to SMOs/supervisors if you have any query.

## Exercise

- \_\_\_\_\_ Stitches are usually caused due to needle defects
  - Staggered
  - Skipped
  - Both a and b
  - None of the above
- The amount of time in a day when the standard conditions are not provided to operator for working is called off standard time
  - True
  - False
- What are the types of Seam?
 

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.....
- How to use Bobbin Winder?
 

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- Elaborate on types of seams preferred for knit
 

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- Elaborate on what is SPI?
 

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## UNIT 3.2: Contribute to Achieve Product Quality in Stitching Operations

### Unit Objectives



At the end of this unit, participants will be able to:

1. Familiarize with the product quality.
2. Coordinate with seniors and others.
3. Understand the sewing process flow.
4. Learn about the production system.
5. Inspect stitched products against specifications.
6. Identify, mark and place rejects in the designated locations.
7. Carry out alterations.
8. Sew and apply trims by hand and machine.
9. Maintain work flow and meet production target.
10. Familiarize with the quality department and its role in production.
11. Understand the inspection and possible defects.

### 3.2.1 Product Quality

What is quality? If a product fulfills the customer's expectations, the customer will be pleased and consider that the product is of acceptable or even high quality. If his or her expectations are not fulfilled, the customer will consider that the product is of low quality. This means that the quality of a product may be defined as "its ability to fulfill the customer's needs and expectations".

Quality needs to be defined firstly in terms of parameters or characteristics, which vary from product to product. For example, for a mechanical or electronic product these are performance, reliability, safety and appearance. For pharmaceutical products, parameters such as physical and chemical characteristics, medicinal effect, toxicity, taste and shelf life may be important. For a food product they will include taste, nutritional properties, texture, shelf life and so on.

#### Fixing product specifications

A specification is the minimum requirement according to which a producer or service provider makes and delivers the product and service to the customer. In setting specification limits, the following should be considered:

- The user's and/or customer's needs.
- Requirements relating to product safety and health hazards provided for in the statutory and regulatory requirements.



Fig 3.2.1: Product quality process

- Requirements provided for in national and/or international standards.
- The competitor's product specifications, in order to gain marketing advantages.
- In designing the product, the capacity of processes and machines should be kept in mind.
- It is also necessary to maintain a balance between cost and value realization. The clearer the specification, the better the possibility of creating and delivering quality products. Preparing product design.
- The specifications and drawings produced by the designer should show the quality standard demanded by the customer or marketplace in clear and precise terms.
- Every dimension should have realistic tolerances and other performance requirements.
- Product quality should have precise limits of acceptability so that the production team can manufacture the product strictly according to specification and drawings.

To achieve the above, those responsible for design, production and quality should be consulted from the sales negotiation stage onwards. The overall design of any product is made up of many individual characteristics. For example these may be:

- Dimensions, such as length, diameter, thickness or area.
- Physical properties, such as weight, volume or strength.
- Electrical properties, such as resistance, voltage or current.
- Appearance, such as finish, colour or texture; Functional qualities, such as output or kilometre per litre.
- Effects on service, such as taste, feel or noise level.

Manufacturing drawings and specifications are prepared by the designers and these should indicate to the production team precisely what quality is required and what raw materials should be used. Preparation for manufacture After the design, including the manufacturing drawings, has been reviewed and finalized, it is time to plan for manufacture.

### This will include the following steps

1. **Deciding on the method of manufacture:** Methods must be devised that permit the operators and processes to make the product in the quickest, easiest and most foolproof way, including preparation of manufacturing instructions, setting up procedures, listing various operations and so on.
2. **Providing the necessary machines, plant, tooling and other equipment:** Everything that is required for manufacture must be selected, taking care that all the elements are capable of achieving the standard of quality demanded.
3. **Obtaining satisfactory raw materials:** No one can make a good product from unsatisfactory raw materials, so every material must have a precise written buying specification so that the purchasing department can buy exactly what is required. Often purchasers are expected to buy from suppliers who have been assessed and approved by them and when supplies arrive the goods should be checked before acceptance into stores. Quality requirements and manufacturing processes should be discussed with the suppliers, as well as the inspection activities to be carried out by the purchaser on the goods on arrival.
4. **Obtaining and training operators:** Operators who are willing and able to do the work in a satisfactory manner must be chosen and given whatever training they need.
5. **Planning inspection and shop floor quality control:** Plans for inspection activities should be prepared, proper workplaces provided for inspection staff, written inspection.



### 3.2.1.1 Guidelines

A guide for small and medium-sized enterprises procedures prepared, inspection equipment provided, checking and calibration of inspection equipment planned for, inspection personnel selected and trained and prepilot and pilot runs carried out. One should never attempt to solve a quality problem by carrying out more inspections. The manufacturing can begin only when the design and planning have been completed. If the planning is carried out systematically, things should run smoothly. During manufacture the following are the most common factors that can affect quality:

- **Set-up:** Some processes, such as punching, cutting, printing and labelling, are so consistent that, if the initial set-up is correct, the whole lot will conform to the specifications. However, the initial set-up has to be checked by carrying out first-piece inspection.
- **Machines and tools:** From time to time changes can occur in machine or tool settings, which can then lead to defects. Processes of this type include machining, resistance welding and filling. Here it is necessary to carry out periodic checks by patrol inspection.
- **Operator:** There are some processes where the result depends on the skill and attention of the operator, such as welding, hand soldering and painting processes. For such processes it is necessary at the manufacture planning stage for the operator's working methods to be decided upon.
- **Materials and components:** It is important to ensure the quality of raw materials and components by undertaking regular checks on the suppliers' processes and also where necessary by carrying out incoming inspection.

**Correction of quality deficiencies:** Rework and scrap are a by-product of human effort, sometimes because quality cannot be attained. This could be caused by errors in quality planning and possibly during the manufacturing process. It is crucial that these errors are located and correctly diagnosed in a way that they don't happen again. The following are obvious possibilities:

- The shop-floor operators had no clear idea what standard of quality was required.
- The method was such that it was very difficult to get the job right, but very easy to get it wrong.
- The machine and equipment were incapable of achieving the tolerances required.
- The incoming materials and components were unsatisfactory.
- The operators were untrained and not up to the job; Shop-floor quality control was either not properly planned or not properly executed, or both.

### 3.2.1.2 Coordination

It is obvious from the above steps that everybody in the company, that is, the salesmen, designers, purchasing, stores and methods staff, plant engineers, jigs and tool personnel, production planning and production staff, operators, inspection and testing staff, packaging, dispatch and so on, are responsible for product quality. Indeed, quality is everybody's business. Unfortunately, if care is not taken, it ends up being nobody's business. It is therefore important to ensure that everyone is quality-conscious and that they all work together on matters related to quality.

### 3.2.2 Sewing Department

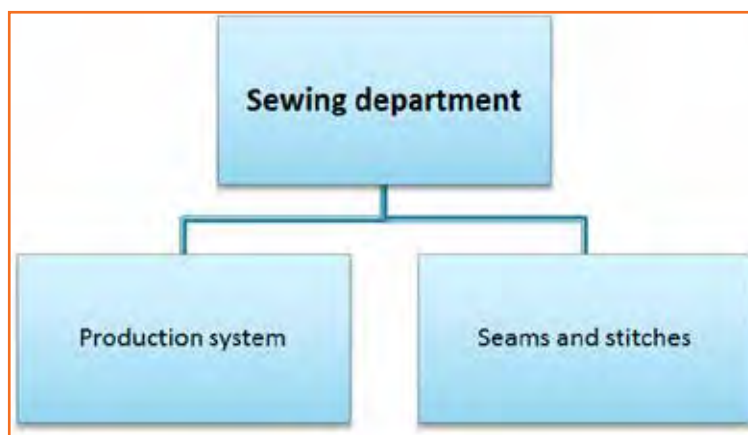


Fig 3.2.2: Sewing Department

#### 3.2.2.1 Sewing Process Flow

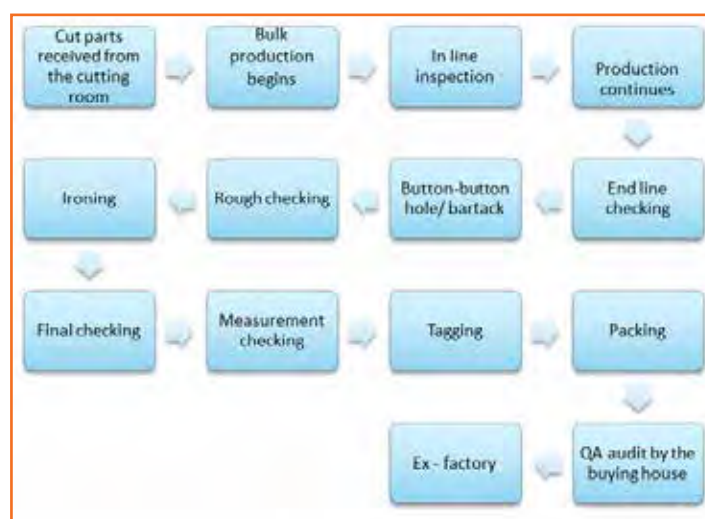


Fig 3.2.3: Sewing process flow

### 3.2.3 Ensure Stitched Products meet Specification

It is essential to analyse the meet specification in terms of labels and trimmings. There should be various quality check points and before sending the product for final finish it should be thoroughly crosschecked that it has correct labels them. The stitched products should be checked in sewing section and well as printing, labeling or finishing section as well.

Trimmings & labels play an important role in making a good quality garment. Usually trims are randomly inspected. It is usually inspected against standards on the following parameters. Please note that these parameters may differ in other trims.

- **Matching Shade:** It is essential that the trims' color should match with base fabric rather than color code or pantone card. Also, the trims those are with Dye to Match requirement is checked after attaching trims on the fabric swatch. Check shade of the trims whether shade is matched or not. This test is always required for shade matching of sewing threads, embroidery threads, etc.
- **Shrinkage:** If the shrinkage percentage of the trims differs from the fabric's (base material) shrinkage percentage, then it is definitely going to cause a defective garment. Trims such as tapes, laces must be tested for its shrinkage percentage.
- **Color bleeding:** Dyed trims like Buttons, sewing threads, dyed tapes and laces are checked for color bleeding. In this test, trim samples (one by one) are washed with white fabric for a number of cycles as mentioned in testing methods. If the white fabric is got tainted with trims color then these trims should not be used in production. Prior to use, trims must be processed for color fixing to stabilize the color.
- **Width & Thickness:** Measure width of the trims such as tapes, elastics, laces etc. It would be good if you take measure after wash.
- **Size & Numbers:** Thread numbers, button size, length of zippers etc. need to check against standards.

#### Labels and tags

Texts printed in the trims for e.g. hang tags, price tags, brand labels, case labels etc. play a vital role. It is very important to make sure that all the information and details must match with the fabric type, the fabric type and the label should not mismatch. Also, the content or text used should be only the one which is approved by the concerned authority. Also, the fibre content printed in care label must match with test report made for fibre content.

### 3.2.4 Principle of Inspection (Inspection Loop)

Inspection can be defined as the visual examination or review of raw materials, partially finished components of the garments and completely finished garments in relation to some standards, specifications, or requirements, as well as measuring the garments to check if they meet the required measurements.

#### How much to inspect ?

- No inspection

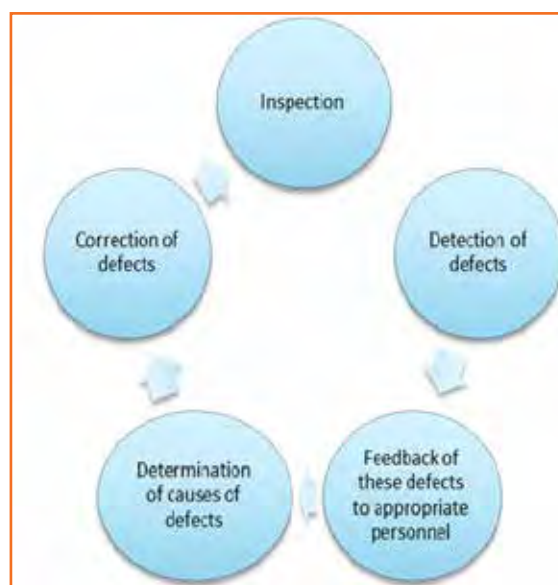


Fig 3.2.4: Inspection Process

- 100% inspection
- Spot checking- inspecting random shipments
- Arbitrary sampling-10% sampling
- Statistical sampling or acceptance sampling-flexibility with regard to the amount of inspection to be performed

#### Inspection terms

- **Sample:** A sample consists of one or more units of a product drawn from a lot or batch, the units of the sample being selected at random without regards to their quality. The number of units of a product in the sample is the sample size.
- **Lot or batch:** Means 'Inspection lot' or 'Inspection Batch', that is a collection of units of a product from which a sample is to be drawn and inspected.
- **Lot or batch size:** The lot or batch size is the number of units of a product in a lot or batch:

$$\text{Percent defective} = \frac{\text{Number of defectives} \times 100}{\text{Number of units inspected}}$$

#### Identification of defects

- **Major Defect:** A defect that, if conspicuous on the finished product, would cause the item to be second.
- **Minor Defect:** A defect that would not cause the product to be termed as a second either because of severity or location.
- **Second:** A 'Second' is a garment with a conspicuous defect that affects the saleability or serviceability of the item.

These faults have to reported immediately to the supervisor .In case of not reporting, the defects will not be rectified and result is rework.

#### Make sure to check the garment thoroughly

- There should be no stain like oil stain, or any other stain on the fabric.
- Always assure and check that the finest quality of thread for embroidery (if needed) is used.
- The product should have proper finish, there should be no loose or uneven threads or any other faults should be there in the stitching of the fabric.
- Make sure to look promptly that everything is in the place labels, tags, warning tags, instructions or price tags.
- There shouldn't be any non-conformity in the stitching in context with particular measurements if any, replace the product if it is not matching the given (suggested) dimension or if the fitting is not accurate in context with notches or unmatched seams i.e. armhole, sleeve head or neck band etc.
- Look for any sort of distorted grading .
- Look for any puckering, shrinkage seams.
- Make sure there isn't any shade defect in the stitched fabric, if there isn't the color matching the base fabric then it should be sent for replacement. There should be no skipped stitches, uneven stitches or shrinkage.

### 3.2.5 Identify Mark and Place Rejects in the Designated Locations

- Always examine your working surroundings and then the work station where you are working. Inspect if there are any unwanted hazardous materials scattered around your work station or the work area.
- Keep the work area clean and tidy all the time, once this is accomplished look for any unwanted or faulty item.
- While looking for a faulty item make sure to identify it properly, mark it clearly and label it promptly as rejected.
- Place the rejected item in the assigned or designated locations only.
- Place the fabric or other rejected items which are torn, damaged broken, stained etc in the rejection box (designated area) of the work-place.
- If we talk about garments in particular then it can be said that the garment can be rejected after been tested and declared failed in terms of conformance and specifications.
- Always check the raw-materials to identify if there are any signs of discoloration or if there are any other defective signs present in the raw material, if yes label it as reject and take it to the designated location for all rejects and place it there.
- Examine garments at different stages of production for correct positioning of parts appearance.
- Tag items as rejected items so that if possible, they can be reworked on.
- Items tagged as rejects, should be disposed if they can't be re-worked on.
- Always maintain inspection records to compute level of quality control achieved.

### 3.2.6 Carry out Alterations

Making a product which is of customer's choice and expectations is one of the best ways to run the business or any industry successfully. Hence, it is important to make sure that the material used for making a product should be compatible with that product's specification. Product's accuracy and finishing always depends on what materials are been used on it, what quality fabric is it and are these matching the product's specification or not? This defines the brand.

Make sure to carry out alterations if they are not meeting the specification as per the customer requirements. Many a times alterations are required when the fabric is not been stitched properly i.e. it contains missing stitches also known as skipped stitches or staggered stitches etc. below, some of the common issues discussed where the alterations might be required if they are not meeting the customer's requirements.

Some of the common defects which are found during the stitch are as - Puckering, Seam Grin, Seam Slippage, Skipped Stitches, Unbalanced Stitches, Uneven SPI. After identifying the defects it is important to carry out alterations, without a delay. Reworking on the defects is important however it is more important to understand why the defects occurred, so that it can be avoided in future.

**Skipped Stitches:** Skipped Stitches are usually caused due to needle defects like bent needle or incorrect sewing tension in the needle or under thread or poor loop formation hence it can be avoided by using a reinforced needle, also make sure to check needle clearance and reset the needle guard. Adjust thread tension to avoid problems occurred due to needle defects.

**Staggered Stitches:** They are caused when the needle isn't working properly, i.e. if the needle is side-tracked or not sharp enough to work. Or size of the needle & thread are not compatible with one another.



CAUSES	SOLUTIONS
Needle vibrating or deflecting	<ul style="list-style-type: none"> <li>• Increase needle size</li> <li>• Use reinforced needle</li> </ul>
Incorrect or blunt needle point	<ul style="list-style-type: none"> <li>• Change needle</li> </ul>
Incorrect needle-to-thread size relationship	<ul style="list-style-type: none"> <li>• Change needle thread size to appropriate size</li> </ul>

Unbalanced or variable stitches: Incorrect sewing tensions or incorrect threading path can lead to unbalanced or uneven stitches on the cloth. One should check for the right thread path and do the stitching according. Before starting to stitch always check for the needle points, thread and the spring, make sure that everything is set up accurately in its place and then the stitching shall begin.

CAUSES	SOLUTIONS
Incorrect sewing tensions	<ul style="list-style-type: none"> <li>• Adjust top or bottom thread tension as necessary for balanced stitches</li> </ul>
Incorrect threading	<ul style="list-style-type: none"> <li>• Check for correct thread path</li> </ul>
Variable thread tension	<ul style="list-style-type: none"> <li>• Check for correct thread path</li> <li>• Make sure spring is properly set</li> <li>• Check thread lube consistency</li> </ul>

### 3.2.7 Pass the Stitched Item to the Next Stage after Validation

Once the garment is been stitched and prepared it is necessary to send it further for manufacturing process once it is been validated. Usually, after the garment is been stitched and completely prepared it checked for fabric quality like no loose threads or uneven stitches and labelling (or tags). It is important to have all tags in place i.e. price tag, warranty tag (if any) washing instructions, brand label etc. should all in intact and be at their specific place. The content displayed should be the one approved by the concerned authority, there should be no false statement or mismatch in the language or misprinting. Once they are checked, confirmed and validated then the garment is been sent for the finishing-process of the garment where it is washed, cleaned, pressed. Any activities related to the garment was left un-finished in the previous process i.e. left or missed by any chance it is done at this stage. After finishing it is packed, and distributed to their respective retail stores through the appropriate logistics system and network.

### 3.2.8 If Stitching Items do not Meet Production Specification

While stitching, many a times there are unwanted and unknown faults which are not good for garments. Hence they are also needed to be rectified so that the garments can be sold or displayed flawlessly. Here are some of the faults which are found while stitching.

**Seam Grin:** Seam Grin is when two pieces of fabric are pulled at right angles to the seam, a gap is revealed between the two pieces of fabric revealing the thread in this gap. As shown in the image below.

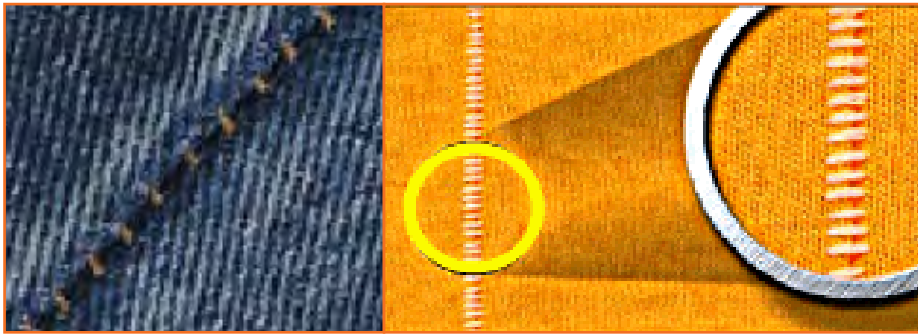


Fig 3.2.5: Seam Grin

Now as shown in the above picture, there is a gap between the two pieces of fabric however this can be avoided by taking the corrective measures. I.e. if you will increase stitching tensions and use a higher stitch rating seam grin in the garments can be avoided.

**Seam Slippage:** Seam slippage is a fabric related issue which occurs in fabrics which are with low number of warp and weft yarns. The fabric on either side of the seam distorts as the fabric yarns slide away resulting in the permanent gap as shown in the image below.

Once you increase seam allowance, use a higher stitch density and opt for a lapped fell seam.

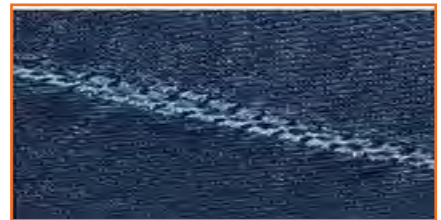


Fig 3.2.6: Seam Slippage

#### Seam Pucker:

Bad tension

Bad feet

Fabric Thread instability

- Uneven shrinkage during finishing
- Thread bloat from washing

Structural jamming/ inherit pucker

- Tight weaving does not have enough room between yarns for thread
- Sewing caused yarns to be pushed out of place

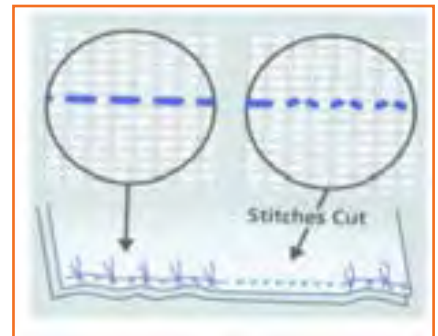


Fig 3.2.7: Seam Pucker

As shown in the images above, seam pucker usually occurs when synthetic threads are used. After sewing the threads recover from the stretched state pulling the fabric with it. This can be avoided if thread tensions are kept as low as possible.

**Feed Pucker:** Feed pucker usually takes place while very fine fabrics are sewed. The piles of fabric tend to slip over each other which results in uneven feed hence it leads to pucker. The image below shows Normal and correct pattern of a stitch. However feed pucker can be avoided by opting for advanced types of feed systems like compound.

**Shrinkage Pucker:** Shrinkage pucker occurs during the process of washing the thread in the seam, shrinks, pulling the fabric with it. Usually it takes place while using cotton threads. Shrinkage Pucker can be avoided by using threads with low shrinkage properties.

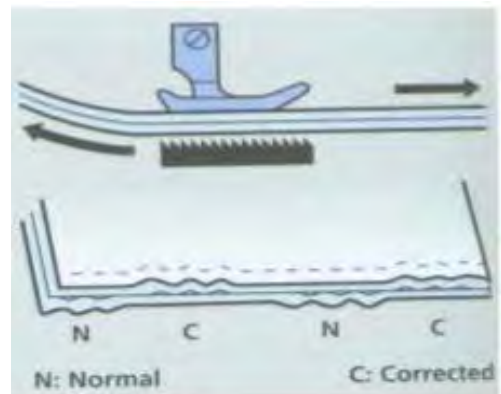


Fig 3.2.8: Feed Pucker



Fig 3.2.9: : Shrinkage pucker occurs during the

### 3.2.9 Sew and Apply Trims by Hand and Machine

Trims can be applied either by hands or by machines however it is important to check when to use hand trim for e.g. for fixing a button or to use a machine trim for e.g. modifying the stitch.

- Always choose the right method of repairing the production and make sure to re-make it as per the requirement and specification of the customer and of a company.
- Check if the machines are set up and are in good working conditions. To attain production targets machines should be working efficiently all the time.
- Sometimes, Hand sewing is required when there is a need repairing re-welting or piece welting. You need to know whether the repair is to be made by hand or machine, the main equipment used and their capabilities and what problems may occur when undertaking the repair and how to prevent/ rectify them. As adhesives will be used you need to know how to use and store them safely.



Fig 3.2.10: Seam Pucker

### 3.2.10 Maintain Workflow and Meet Production Target

Here are some of the tips with which work should be carried out so that the work flow can be maintained and production target can be achieved:

- Fabric's pieces and lining must be pinned or sewn together as per the requirement and they should be set in such a way that they are ready for assembly.
- One production's work flow should not affect the work flow of other production, handling of material should be very careful to keep away material from the risk of damage.
- All the production sections should work in synchronization with each other i.e. trimming should work in a way that spreading and cutting can work in sync with stitching and stitching can maintain coordination with embroidery, printing and so on. By doing so, a production target and quality products can be produced.
- Working in sync can improve efficiency in work.
- Always sort your work in such a way that it is in readiness for assembly.
- Each production should sort and place their work in such a way that it can be easily used at the next stage of production for e.g. if you are working at embroidery section then the fabric's embroidery should be placed in such a right order that it should not be a problem for a person in a stitching operation to arrange and stitch the fabric.

- One must be thoroughly aware about the tools, settings and equipment that are required to work on and how to handle materials without damaging them. They should know what a finished product looks like, so that they can have perfection in their working.
- Make sure to check the materials available in the stock, if it is not sufficient inform the concerned department to arrange one; it should not disrupt the work flow of other production.



Fig 3.2.11: Work flow at work place

### 3.2.11 Defects

#### Classification of defects

Certain defects are acceptable to some while unacceptable to others. Fabric for curtain inner lining may not generally be judged with stringent dealings. Whereas that for high grade dress wear may be rejected on the basis of a minuscule imperfection.

- Classification is the categorization of defects into major and minor. Defects have been classified depending on several factors. In some cases defects may not be defects in the first place. For instance: Barre in knitting appears in the form of sequential horizontal lines on the fabric. This could easily be used as an effect and usefully incorporated in products. Laddering can be achieved as an effect by deliberately deactivating a needle in the bed.
- Sometimes the classification depends on the frequency of the defect. A small hole in the fabric may not cause problems but repeated small holes will obviously be problematic and thus a major defect.

The classification of defects depends on degree of visibility. For instance registration issues can be ignored if there is only minor misalignment. Variation in matching of dyed shade is acceptable within certain limits. Defects are classified as under:

1. **Major Defect:** A defect that, if conspicuous on the finished product, would cause the item to be second.
2. **Minor Defect:** A defect that would not cause the product to be termed as a second either because of severity or location.
3. **Second:** A 'Second' is a garment with a conspicuous defect that affects the saleability or serviceability of the item.

These faults have to be reported immediately to the supervisor. In case of not reporting, the defects will not be rectified and result is rework.



### Marker Making Defects

- Size Mixing. Components not correctly labelled in marker.
- Patterns facing incorrect direction on napped fabrics.
- Patterns facing in different direction (either way) on a one-way fabric.
- Garment Components omitted during marker making
- Patterns misaligned with respect to the fabric grain.
- Line definition poor (e.g., too thick chalk, indistinctly printed line) leading to inaccurate cutting.
- Mismatched checks and stripes.



Fig 3.2.12: Marker Making Defects



Fig 3.2.13: Plies misaligned

### Common Spreading Defects

#### Plies misaligned:

- Incorrect tension of plies
- Fabric spread too tight or too loose, causing parts not to fit in sewing and finished garments not to meet size tolerances.
- Spread distorted by the attraction or repulsion of plies caused by excessive static electricity.
- Plies not all facing in correct direction (whether —one way|| as with nap, or —one way either way as with some check designs)
- UnacceptFig damages situated in garment parts

### Common Cutting Defects

- **Inaccurate cutting:** Distorted garment parts. Top and bottom plies of different size
- **Notches:** Misplaced, too deep, or omitted
- **Drill marks:** Misplaced not perpendicular through the spread
- **Frayed edges, fused edges:** Caused by a faulty knife not sharp enough, or rotating at too high a speed
- Marker incorrectly positioned on top of spread
- Slits opened inaccurately or omitted
- Mixed plies resulting in Shaded Garment parts when assembled
- Mixed Size parts resulting in uneven appearance
- Inconsistent Grain and Surface of the Skin



Fig 3.2.14: Cutting Defects

### Bundling and Ticketing

Numbering or Pasting of a number sticker on all the components of all the garments. The number acts as the identification of the component and the lot from which the component is cut.



- **Bundling:** Assembling the cut components in small batches of pre-defined number as per the requirements of production system.
- **Ticketing:** The process of attaching a ticket to all the bundles that provides basic information about the bundle and the components in the bundle.

#### Important Points

- Numbering should be done on wrong side of fabric only.
- Number stickers should be checked for glue
- Numbering of a ply twice or skipping of a ply should not occur
- The information on bundle tickets must be accurate
- Care must be taken to avoid mixing of components of different sizes in a bundle
- Sewn on shade marking tickets falling off, damaging fabric, omitted, misplaced or wrongly numbered
- Adhesive shade marking tickets falling off or sticking too hard , omitted, misplaced, wrongly numbered
- Bundles or boxes not stacked in box, or rolled in correct order in bundles or rolled or folded too tightly causing creases
- Work tickets, coupon payment tickets or progress tickets omitted , misplaced or mixed makes both quality and quality control difficult
- Wrong Size , Wrong Shade, wrong type of trimmings put in Bundle



Fig 3.2.15(a): Unmatched Trimmings



Fig 3.2.15(b): Matched Trimmings

#### Common Problems of Fusing

- Discoloration after fusing - The temporary or permanent change in shade, color of a fabric caused by the action of heat on certain dyes during fusing.



Fig 3.2.16(a): Normal Fabric



Fig 3.2.16(b): Discoloration after fusing

### Strike through

- Strike through means that the adhesive resin appears on the outer face of the fabric being fused



Fig 3.2.17(a): Ideal fusing in fabric



Fig 3.2.17(b): Strike through in a fabric



Fig 3.2.17(c): Interlining shrinking

### Strike Back



Fig 3.2.18(a): Ideal fusing



Fig 3.2.18(b): Strike Back

### Shine / Glazing and Discoloration

- The temporary or permanent change in shade, colour of a fabric caused by the action of heat on certain dyes during fusing.



Fig 3.2.20: Fusing distortion



Fig 3.2.19: Glazing and Discoloration

### Fusing distortion

- Fusing distortion means garment panels are distorted during the fusing process. This problem should be prevented as distorted garment panel after fusing cannot be corrected other than discarded as waste.

### Fusing delamination

- Fusing delamination, sometimes appear as bubbling or rippling is the complete breakdown of bond between fusible interlining and fabric surface. It is normally found after the garment has been dry cleaned or washed.



Fig 3.2.21(a): Ideal fusing




Fig 3.2.21(b): Fusing delamination

### Accessories Defect

Zippers	
Slider defect	<p><b>Won't Lock:</b> Not apparent without testing by placing Zipper slider in locked position and applying tension.</p> <p><b>Faulty Dimension:</b> Not readily apparent. May cause either a hard or a loose operating zipper. Either condition may result in zipper failure before garment is worn out.</p> <p><b>Crushed Slider:</b> May be due to improper garment pressing or due to padding or compensating springs in the presses not being in best condition.</p> <p><b>Tarnished:</b> Does not generally interfere with operating qualities but is a matter of appearance only. Judging" this as a defect depending upon degree of tarnish. Burn or Rough Spots Not immediately apparent. Can cause snagging and early wear on the upper tape. Lock Prong Interferes Indicated by pull-tab not staying in locked position or slider not moving freely after being released from locked position.</p> <p><b>WeakSliderBodies:</b> Can best be determined with proper testing equipment. However, manifests itself by slider becoming compressed or crushed under minimum pressure or becoming distorted enough to create hard operation.</p>




Chain or Teeth Defect	<p><b>Improper Dimensions:</b> Not always apparent unless slider works with great difficulty or operates too easily. Zipper' may give initial satisfactory operation but fail after only moderate use and especially after laundering or dry cleaning.</p> <p><b>Miss meshed and Unmeshed Teeth:</b> Readily visible, particularly in large. Usually results in inoperable zipper. Missing Teeth: Readily visible, will result in early failure of the zipper.</p>	
	<p><b>Misplaced Teeth:</b> This refers to a tooth being out of position, and occasionally may involve two or three teeth. Seriousness ranges from trifling to almost as serious as a missing tooth depending upon the degree of misplacement and general design of zipper.</p> <p><b>Off color:</b> This defect is quite apparent. Zipper manufacturers normally carry a complete range of tape colors. Due to similarity of different colors, one may be mistaken for another. It is also possible, because of color similarities or difference in dye lots that the two halves of the zipper will have two different shades of tape.</p> <p><b>Humpy Chain:</b> Readily noticeable by its waviness. Causes difficulty at sewing operation and distorts finished garment's appearance.</p> <p><b>Cord not Attached to Tape:</b> Due to skipped stitches during operation of sewing cord to tape. Not readily apparent but under strain, cord and teeth will rip away from tape and render zipper and garment unusable. Length: Improper zipper length for given opening.</p>	





Top or Bottom Stop Defects	<b>Missing Top or Bottom Stop:</b> Readily apparent and will result in zipper failure. If facilities for attaching a top or bottom stop are not available, then the entire zipper should be replaced. In some instances, bottom stops are attached at garment plant. An improperly or poorly attached bottom stop may be result of carelessness on part of the operator or of improper functioning of the bottom stop machine.	
<b>Snap Fasteners</b>		
Hard Action	In light-weight goods this may result in stud or socket pulling through the material. The snap fastener manufacturer can be of help in recommending proper tension of stud in socket for weight of garment material.	
Light Action	Snap fastener does not stay closed because of lack of proper tensions. Same comment applies as for tight closure.	
Hooks & Eyes	<p><b>Improperly Applied:</b> This is usually caused by a careless operator or improperly adjusted attaching equipment, and corrections are usually simple when apparent.</p> <p><b>Improper Alignment:</b> Gauges are available for attaching equipment to assure proper alignment in positioning. This is a necessary if garment is to have a properly tailored look. If the top of the zipper is extended into the waistband of the trouser, than the hook and eye should be offset to prevent it from hitting the zipper material.</p> <p><b>Poor Finish:</b> May be the result of improper finishing or pocking of the metal surface and, while this defect dose not interferes with the functional operation, it may not leave the desired finished appearance of the garment.</p>	

Fig 3.2.22: Knit fabric defects



	<b>Tight/Loose Closure:</b> Attaching equipment ill fitted with an adjustable feature permitting secure application of hook and eye to either light or heavyweight goods. If closures seem too tight, then one should immediately check the attaching equipment for proper adjustment.	
<b>Buttons</b>		
<b>Rough or Dull Surfaces</b>	This is not a serious fault except in cases of extreme roughness or poor surface appearance.	
Non-Uniform. Inaccurately Spaced Chipped or Blocked Sew Hole:	This type of defects cannot be noted during the garment manufacturing operation and can slip inspection unnoticed but it frequently causes needle breakage or cut thread.	

**Stitch and Seam Defects**

Type of Defects	Description	Photograph
Broken stitches	Caused due to: <ul style="list-style-type: none"> <li>• Too thick/ too thin a thread for the needle</li> <li>• Needle heat</li> <li>• Operator working non-rhythmically</li> <li>• Too tight tension</li> </ul>	
Skipped stitches	Caused due to: <ul style="list-style-type: none"> <li>• Hook irregularly failing to pick up the loop of thread from a needle's eye</li> </ul>	

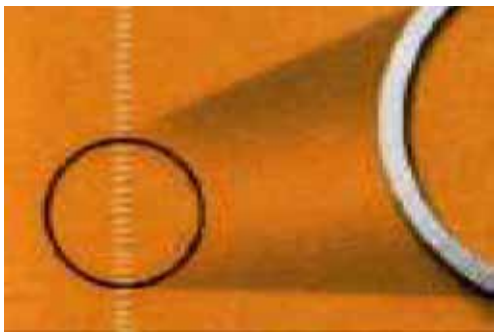






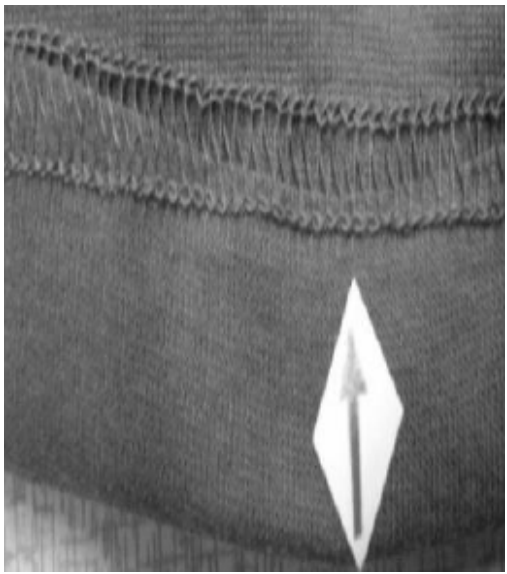

Seam Grinning	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• The Seam itself may open and produce a Gap between two pieces of fabric</li> <li>• Arising from too loose a tension or too large stitch length or use of a wrong stitch type.</li> </ul>	
Unbalanced stitch	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Arising from unbalanced tension of needle thread and bobbin/looper thread.</li> </ul>	
Improperly formed Stitches	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Bad thread tension</li> <li>• Ill fitting machine components</li> </ul>	
Irregular or incorrect shape of sewing line	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Badly set guide,</li> <li>• Handling error</li> </ul>	

Fig 3.2.23: Woven fabric defects

Twisted seams	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Improper alignment of fabric parts,</li> <li>• Mismatched notches, components off grain</li> </ul>	
Mismatched stripes or checks	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Mishandling by operator</li> <li>• Incorrect cutting</li> </ul>	
Insecure stitching back	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Rows do not cover the first row of stitching-Manual error</li> </ul>	

Uneven width of inlay	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Bad handling by operator</li> <li>• Incorrectly set guide, incorrectly set folder</li> </ul>	
Linings too full, too tight.	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Operator twisted or stretched extensively during Sewing</li> </ul>	
Uneven Stitch Density	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Operator causing the machine to snatch and does not allow the machine to control fabric feeding.</li> </ul>	
Wrong Stitch density	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Too high SPI give rise to jamming and rupture of fabric</li> <li>• Too low SPI give rise to weak seams and seam grinning</li> </ul>	
Mismatched seams	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Edges of the upper and lower fabric parts not matched during sewing, causing the seams to shift</li> </ul>	

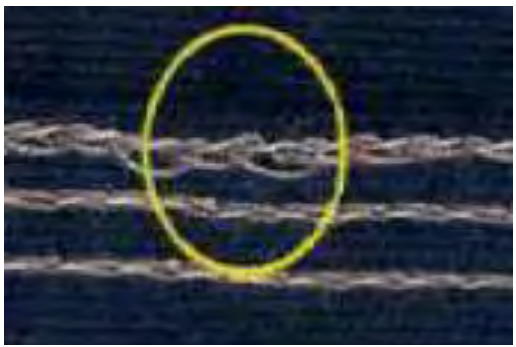

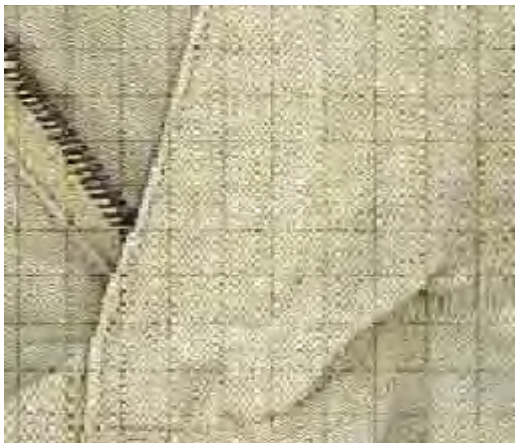



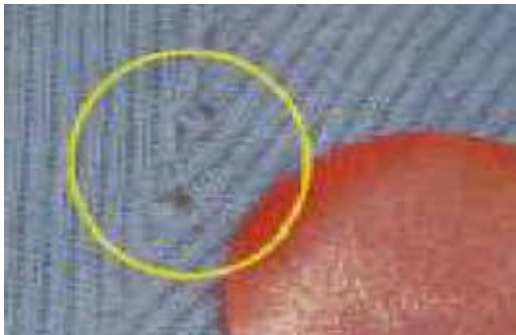
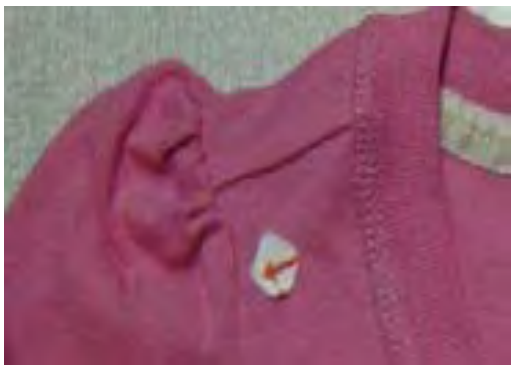
Loose Stitch	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>Unbalanced seam sewing thread tension not set properly</li> </ul>	
Extraneous part caught in the seam	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>Handling error</li> </ul>	
Garment parts Cockling, Pleated, Twisted, Showing Bubbles	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>Handling error</li> <li>Usage of wrong interlining/fusing under improper conditions</li> </ul>	
Components of features wrongly positioned or misaligned	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>Incorrect marking</li> <li>Incorrect sewing not following the marker</li> </ul>	

Fig 3.2.24: Accessories defects



Seam Slippage	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Insufficient thread tension</li> <li>• Low count, unbalanced weave and filament yarns.</li> </ul>	
Thread Breakage	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Improper m/c settings</li> <li>• Incorrect threading</li> <li>• Excessive needle heat</li> <li>• Incompatible needle, thread and fabric, damaged machine parts</li> </ul>	
Yarn Severance	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Incorrect needle point</li> <li>• Damaged needle</li> <li>• High machine speed</li> </ul>	
Puckering	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>• Tension pucker</li> <li>• Feed pucker</li> <li>• Puckering due to differential shrinkage</li> <li>• Puckering due to structural jamming</li> </ul>	



Ragged Edges	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>Knives on automatic sewing machine not dipping smoothly.</li> </ul>	
Uncut thread	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>Operators' negligence</li> <li>Malfunctioning thread trimmer in automatic machines</li> </ul>	
Oil stains	<p>Caused due to:</p> <ul style="list-style-type: none"> <li>Malfunctioning machines</li> </ul>	

Fig 3.2.25: Seam and Stitch defects

**Processes to Rectify Few Defects**

Defects	Rectification
Restitched Seams / Broken Stitches	<ul style="list-style-type: none"> <li>Using better quality sewing threads</li> <li>Ensure proper machine maintenance</li> </ul>
Open Seam – Seam Failure – Stitch	<ul style="list-style-type: none"> <li>Better quality threads</li> <li>Proper size thread for application</li> <li>Proper tension</li> </ul>
Seam Slippage	<ul style="list-style-type: none"> <li>Change seam type if possible</li> <li>Increase seam width</li> <li>Optimize the stitches per inch.</li> </ul>
Excessive seam Puckering	<ul style="list-style-type: none"> <li>Correct thread type and size.</li> <li>Sew with minimum sewing tension to get a balanced stitch</li> <li>Machine needle, bobbin and threads are set properly according to the fabric to be sewn.</li> </ul>

Knits & Stretch woven puckering	<ul style="list-style-type: none"> <li>• Set the machine properly according to the fabric</li> <li>• Minimum pressure foot pressure</li> </ul>
Improper Stitch balance	<ul style="list-style-type: none"> <li>• Use quality thread</li> <li>• Properly balance the stitch so that the needle and bobbin threads meet the middle of the seam. Always start by checking bobbin tension to make sure it is set correctly, so that minimum thread tension is required to get a balanced stitch.</li> </ul>
Raggedged/Inconsistent Edge	<ul style="list-style-type: none"> <li>• Make sure the sewing machine knife are sharpened and changed often</li> <li>• The knives should be adjusted properly in relationship to the “stitch tongue” on the needle plate to obtain the proper seam width.</li> </ul>

Fig 3.2.26: Processes to Rectify Defects

## Industry Visit

The purpose of visiting an apparel manufacturing unit is to get hands on knowledge about various processes involved in the work of an SMO. During the visit you have to interact with Sewing Machine Operators and supervisors to understand how work is done in industry. Make sure that you keep a notebook handy and note down any important points that come up during your interaction at the apparel manufacturing unit. When you go to an apparel manufacturing unit, you should:

- Know about the production system.
- Inspect stitched products against specifications.
- Analyze how SMOs:
  - » Inspect stitched products against specifications
  - » Carryout alterations
  - » Sew and apply trims by hand and machine
- Also Understand the inspection and possible defects.
- Ask questions to SMOs/supervisors if you have any query.

## UNIT 3.3: Stitching a T-Shirt

### Unit Objectives



At the end of this unit, participants will be able to:

1. Prepare to stitch a T-shirt for men
2. Stitch a T-shirt

### 3.3.1 Preparations

- Keep in mind that the Strathcona Henley has 5/8" seam allowances on all seams. Some t-shirt patterns may have smaller seam allowances than this – make sure to check your pattern!
- Insert a ballpoint needle into your machine and test your stitch style (check out this post if you are wondering how to choose a stitch style)
- Reduce the pressure on your presser foot if your sewing machine provides this option – if you are unsure whether it does, make sure to take the time to check your manual. Reducing the pressure will make handling your knit fabric much easier since it will not become stretched out as you sew.
- Whenever you start sewing a seam, start with the needle in the “down position” so that it is lowered into the fabric. This will reduce the risk of the first needle motion punching the fabric into the needle plate of the sewing machine.

### 3.3.2 Sew the Shoulders



**STEP 1:** If you decide to stabilize, you can use rayon seam binding (as seen above), clear swimsuit elastic, a thin woven fabric strip, or even the selvedge of your knit fabric (you will notice that the selvedge isn't as stretchy as the rest of your fabric). The goal here is to choose something that doesn't stretch much and isn't very bulky.



**STEP 2:** Place the t-shirt front and back with right sides together. Place the stabilizer along the wrong side of the back of the t-shirt. You will notice that the back shoulder is wider than the front shoulder – it is drafted this way to accommodate for men's muscular and rounded shoulders! Stretch the shirt front to match the shirt back at the shoulder seam as you sew.



**STEP 3:** If you are using a very a stabilizer that does not allow any stretch at all, you might as well use a straight stitch for this seam. The shoulder seams do not need to stretch and they are quite visible so a tidy straight stitch can produce an attractive seam. If you choose to use an elastic or knit selvedge as a stabilizer you will still want to use a stretch stitch since all of your materials contain stretch!



**STEP 4:** Press the seam allowances towards the back to cover your stabilizer (it is also possible to press your seam allowances open if you would like to reduce bulk).



**STEP 5:** If you would like, you can finish your seam allowances using another row of zig zag stitching. This will stop any potential fraying (which may or may not occur depending on the style of knit you choose).



**STEP 6:** Trim the 5/8" seam allowance to reduce bulk.

### 3.3.3 Sew the Neckline



**STEP 1:** Now that the shoulder seams are sewn, you will have a neck hole that is ready to finish with binding!



**STEP 2:** With right sides together, join the narrow edges of the neckline binding. Sew this using a straight stitch (this short seam doesn't need to stretch either).





**STEP 3:** Trim the seam allowance and press the seam allowances open.



**STEP 4:** Finish preparing the binding by folding it in half lengthwise so that the raw edges meet. Press along the folded edge.



**STEP 5:** Arrange the t-shirt body with right sides facing you. Place the binding circle on top of t-shirt, align all of the raw edges. I like to match the binding seam to one of the shoulder seams but you could also align this seam with center back if you prefer.



**STEP 6:** If you are using the Strathcona Henley pattern, ignore all the notches on the neckline binding (they are intended for the Henley variation of the pattern). Pin the binding to the neckline so that it is stretched evenly around the neckline – it might take some fiddling to get this evenly stretched. I tend to use 8 pins spaced evenly.



**STEP 7:** Stitch the binding to the neckline using a zig zag (or other stretch stitch). I used to place the t-shirt with the binding facing up on the sewing machine but recently switched my technique. I now place the t-shirt facing up and stretch the t-shirt with my fingers as I sew. Try out both ways and see what works best for you! I find that my new method reduces the risk of creating little tucks in the t-shirt neckline (they are super annoying to stitch rip!!!).



**STEP 8:** Press the finished neckline.



**STEP 9:** If you would like, you can finish the neckline by adding a line of stitching around the shirt 1/8" from the neckline seam to lock the seam allowance in place. I used a zig zag stitch here but you can up your game for really professional results by using a twin needle (or you can skip this step altogether if your fabric presses well and you don't think your seam allowance will tend to flip upwards – I often avoid stitching when I am sewing with crisp and thin cotton jerseys but find it is necessary when sewing with thicker cotton interlocks).



**STEP 10:** Trim the neckline seam allowance.

### 3.3.4 Sew the Sleeves



**STEP 1:** Place the t-shirt and sleeve with right sides together.



**STEP 2:** Line up the shoulder seam with the middle sleeve notch.



**STEP 3:** Place a pin where each notch meets.



**STEP 4:** Sew the sleeve seam using a zig zag stitch (or other stretch stitch). You will need to adjust often (with the needle down so that the fabric doesn't slip out of the way) to avoid creating any tucks and wrinkles.



**STEP 5:** Finish the sleeve seam allowance with a second row of zig zag stitching and trim.



**STEP 6:** Press the sleeve seam. Press the seam allowance towards the sleeves – this is the classic direction to place sleeve seams (as seen on tailored garments). Try both ways to see which way fits best on the recipient's shoulders! Press the sleeve seam on a tailor's ham or on the narrow curve of the end of an ironing board so as to keep the rounded shape of the seam.

### 3.3.5 Sew the Side Seams



**STEP 1:** Pin the sleeve and side seams – make sure that the underarm seam meets. Stitch using a zig zag stitch or other stretch stitch.



**STEP 2:** Finish the seam allowance with another row of zig zag stitching and trim the seam allowance.



**STEP 3:** Press the seam allowances towards the back – your shirt is almost finished!

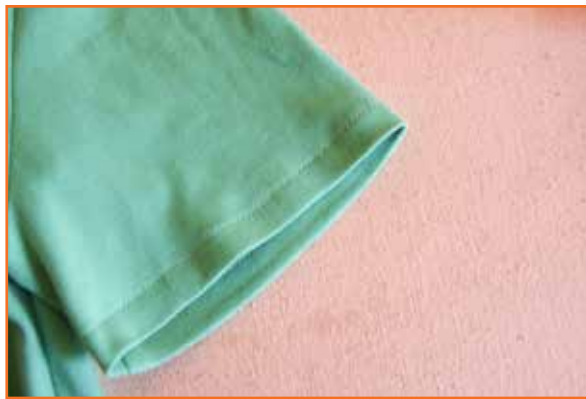
### 3.3.6 Sew the Hems



**STEP 1:** You can finish the hem as you normally would – by pressing the raw edge up and then pressing upwards again – but you might find that this creates too much bulk for your knit t-shirt to sit nice and casually (it could look fairly stiff with a thick hem). Alternatively, you could finish the edge by pressing up once at the hem notch.



**STEP 2:** Once pressed and pinned in place, stitch the single layer hem in place using a twin needle, or, as photographed, with a simple zig zag stitch. Try your very best to keep the knit relaxed – refrain from stretching in any way!







**STEP 3:** Repeat this hemming step for the sleeve hems.

A nice basic, classically shaped crew-neck menswear t-shirt is ready to wear!

## Resources



Scan the QR codes or click on the link to watch the related videos.

Descriptions	QR Codes
Types of stitching	 <a href="https://youtu.be/NtmiZU1dkZM">https://youtu.be/NtmiZU1dkZM</a>
Sewing a pant	 <a href="https://youtu.be/Q3Y5Q_iW1Ao">https://youtu.be/Q3Y5Q_iW1Ao</a>
Attaching belt in a pant	 <a href="https://youtu.be/7Biev39gR2k">https://youtu.be/7Biev39gR2k</a>
Categorization of garment defects	 <a href="https://youtu.be/SPtD6mAZ0GU">https://youtu.be/SPtD6mAZ0GU</a>



## Exercise

1. Quality Plays important role in bulk garment production:
  - a) TRUE
  - b) FALSE
2. Skip stitch is a defect created by:
  - a) Mis handling material by operator
  - b) Fault in Machine
  - c) Wrong type of stitch used on fabric
  - d) All of above
3. Puckering defect occurs due to:
  - a) Tight Bobbin Thread
  - b) Tight Needle Thread
  - c) Incorrect pressure foot
  - d) All of above
4. 100% Inspection is the cheapest option for garment inspection:
  - a) TRUE
  - b) FALSE
5. 4 thread overlock Machine carries:
  - a) 3 needles & 1 Looper
  - b) 1 needles & 3 Looper
  - c) 2 needles & 2 Looper
  - d) None of the above
6. Feed off the arm machine used to finish \_\_\_\_\_ of shirts:
  - a) Cuffs
  - b) Back Yoke
  - c) Side Seam
  - d) Collar
7. Which is not a component of Shirt:
  - a) Collar
  - b) Fly
  - c) Pocket
  - d) Yoke

8. Stitch 101 is made by using:
  - a) 1 Thread
  - b) 2 Threads
  - c) 3 Threads
  - d) 4 Threads
9. Covering chain stitch is used for:
  - a) T Shirt Bottom hem fold
  - b) T- Shirt Sleeve hem fold
  - c) Both A & B
  - d) None of the above





## 4. Maintain Work-Area, Tools and Machines

### Unit 4.1 - Maintain Work Area, Tools and Machines



## Key Learning Outcomes

**At the end of this unit, participants will be able to:**

1. Practice the machine safety and maintain machines properly.
2. Carry out basic maintenance of machine.
3. Maintain tools and equipments and handle them safely.
4. Use materials to minimize waste.
5. Carryout running maintenance within agreed schedules.
6. Carry out maintenance and/or cleaning within one's responsibility.
7. Work in a comfortable position with the correct posture.
8. Use cleaning equipment and methods appropriate for the work to be carried out.
9. Dispose of waste safely in the designated location.
10. Store cleaning equipment safely after use.
11. Carryout cleaning according to schedules and limits of responsibility.

## UNIT 4.1: Maintain Work Area, Tools and Machines

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Practice the machine safety and maintain machines properly.
2. Carry out basic maintenance of machine.
3. Maintain tools and equipments and handle them safely.
4. Use materials to minimize waste.
5. Carryout running maintenance within agreed schedules.
6. Carry out maintenance and/or cleaning within one's responsibility.
7. Work in a comfortable position with the correct posture.
8. Use cleaning equipment and methods appropriate for the work to be carried out.
9. Dispose of waste safely in the designated location.
10. Store cleaning equipment safely after use.
11. Carryout cleaning according to schedules and limits of responsibility.



### 4.1.1 Introduction

Machines are essential to modern production. However, along with increased productivity, they have brought hazards into the workplace. Proper control of machine hazards has traditionally been seen as costly and a constraint on productivity. In general, the garment manufacturing industry is considered to be less dangerous than other industrial sectors and, therefore, safety policy is a low priority in many enterprises. For example, it has been observed that some workers remove guards protecting belts from sewing machines, and manual cutting machines are operated with naked hands.

Machine breakdown is a common cause of production delay affecting delivery schedules. Considering the importance of meeting delivery dates, a competitive enterprise cannot afford penalties for delay due to machine breakdown. Thus, proper maintenance of machines to prolong their economic life, reduce breakdowns, prevent defective outputs and ensure safe operation should be given more importance. Protecting workers against pollution from the frequent use of solvents for cleaning and the existence of cotton or other fibers in the environment should also be taken into consideration. Maintenance and safety measures to eliminate these hazards and increase machine productivity, together with low-cost techniques for environmental control, are discussed below.

### 4.1.2 Maintain Machines Properly

A poorly maintained machine can be inefficient, if not dangerous. It will also have frequent breakdowns and quality problems. Proper maintenance is not lost production time; it is an investment for higher productivity and lower repair costs. Yet in many companies, machines are maintained only when they break down. This is due to a number of reasons:

- Machines are owned by the contractors or they are leased.
- No maintenance personnel are available.
- No time to maintain machines is allocated under production time.
- There is a strong belief that maintenance means cost.
- Some machines are not easy to maintain.

Machine down-time affects production and causes delays. Defects are also produced causing quality and productivity problems. Machine maintenance should, therefore, be planned and coordinated with supervisors and workers. Diagnose common problems in the machine based on visual inspection, sound, temperature etc. Report any unsafe or damaged equipment and other dangerous occurrences to the authorized personnel or line supervisor. Workers should be involved in machine maintenance and should be supplied with a basic tool kit to include tweezers, small screwdriver, machine brush, oil can and cloth wipes. One of the basic training skills is to train workers to do routine machine maintenance such as:

- Removing lints
- Cleaning the tension assembly
- Cleaning the feed dog assembly
- Cleaning the bobbin area
- Lubricating the machine

### 4.1.2.1 Removing Lint

**Lint:** With proper care, a sewing machine can last for many, many years. Fabric and thread are a combination that is going to produce lint. Lint can build up in unseen areas of machine leading to wear and tear. To keep the sewing machine running smoothly, good quality thread should be used and simple maintenance should be performed regularly. One of the most important things is to clean out the pieces of lint leftover from bits of thread and fuzzy fabric. Sewing with thick, furry fabrics (such as polar fleece), will need cleaning of the sewing machine frequently. One should open all areas that can be cleaned and clean the lint out of the machine. Usage of brush should be done to remove lint in cracks and crevices and from under the bobbin case.

**Requirements: Sewing machine**

- Lint brush
- Small soft brush
- Clean lint free cloth
- Compressed air (optional but helpful)
- Light source
- Screw drivers

### 4.1.2.2 Cleaning the Bobbin Area

- **Step 1:** Turn off and unplug the sewing machine.
- **Step 2:** Remove the bobbin cover and the bobbin.
- **Step 3:** Using a small lint brush (many machines come with one), carefully remove any lint from the bobbin area. Be especially sure to remove any lint from crevices and tight places, since compacted lint can actually stop the machine from running.
- **Step 4:** Using the lint brush or canned air, remove the lint from the area around the needle, the presser foot and the thread guides.
- **Step 5:** Remove any lint from the inside of the doors and lids of the sewing machine.
- **Step 6:** Replace the bobbin and the bobbin cover.
- **Step 7:** Plug the sewing machine back in and turn it on.

**Note:** Make sure to check that after cleaning all the machine parts are properly placed and tightened. It should be safe for using it the next time.



Fig 4.1.1: Cleaning the bobbin and case

### 4.1.2.3 Cleaning the Tension Assembly

Maintaining the machine is important to keep it in good condition and to avoid unnecessary service costs. Keeping the tension assembly clean is one of the maintenance procedures that, if performed on a regular basis, can help ensure that your stitching is accurate and precise. The following steps assist the cleaning of the sewing machine tension assembly.

- **Step 1:** Clean your machine often. Each stitch is precise and even a bit of lint collected on the tension assembly can cause problems. Make it a habit to clean your sewing machine after any large project.
- **Step 2:** Raise the pressure foot to release the tension on the disks. Gently run the folded edge of a clean piece of lint free cloth through the tension disks. Compressed air will also dislodge any bits of thread or lint.
- **Step 3:** Remove all lint along the thread guides using a small brush or clean cloth.
- **Step 4:** Check the bobbin area of the machine. The bobbin controls the lower tension and can be a source of built up lint. Depending on the type of machine you have, the bobbin consists of the bobbin, case and on some models a removable hook race. Remove these according to your instruction manual and clean with a cloth or small brush.
- **Step 5:** Do a final check to make sure the tension is correct and that the bobbin assembly is in place properly before you begin your next project.

### 4.1.2.4 Cleaning the Feed Dog Assembly

The feed dogs on a sewing machine help move the fabric underneath the needle. If they are not working properly, damage to the machine or fabric can occur. Feed dog assembly maintenance is critical to good sewing. Use the steps below to guide you through the procedure.

- **Step 1:** Unplug the machine and examine the feed dogs. The newer machines have metal feed dogs, but older models may have rubber ones, which often need replacing. Examine the feed dogs and check for damage.
- **Step 2:** Remove the throat plate, which is the covering over the feed dogs, and clean it with a soft cloth. Use a small soft brush to clean the feed dogs. Make sure to remove all lint and thread from the grooves of the teeth. Some machines have an adjustment that lowers the feed dogs for specific sewing procedures. They should be in the raised position for better viewing during the cleaning process.
- **Step 3:** Clean the area around the feed dogs with a soft brush. Compressed air is a good choice to use in the small tight areas.
- **Step 4:** Wipe down all areas with a clean, lint free cloth before replacing the throat plate.
- **Step 5:** Prepare to clean the feed dogs and all other areas that lint may accumulate on, after every project. Your sewing machine will last longer and need fewer repairs if kept clean and lint free.

### 4.1.3 Steps in lubricating machine

In order to ensure that your sewing machine enjoys the long life it was built for, it's important to upkeep it regularly using proper maintenance techniques. One of the easiest things you can do to keep your sewing machine running smoothly is to lubricate it using sewing machine oil. Sewing machine oil is not something you borrow from the garage. It is clear white oil. Be sure to use the proper oil. Refer to your owner's manual for the proper spots to oil. Some of the older machines have these areas marked.

After oiling your machine run stitches on some scrap fabric before you tackle your project. This allows oil to escape on to the scraps, if it's going to, instead of the project you are working on. Oiling the machine not only lubricates your moving parts, to prevent wear, it reduces the risk of rust. Rust forms rapidly with any dampness, even just the humidity in the air. Surface rust can act just like loose sand granule in your machine, and create excess wear.

- **Step 1:** Purchase a high-quality brand of sewing machine oil from a sewing store or other specialty retailer. Higher quality generally comes with a higher price tag, but the price of good sewing machine oil is favorable to the costs involved with repairing or replacing an entire sewing machine.
- **Step 2:** Unplug your sewing machine. Make sure its power switch is set to 'off.' Because you will be dealing with fluid, it is especially important to make absolutely certain any power supply is disconnected.
- **Step 3:** Drop a single drip of sewing machine oil onto the mechanism that drives the sewing needle. If you purchased quality sewing machine oil, more than one drop will generally not be necessary.
- **Step 4:** Repeat Step 3, applying a single drop of oil to every part of your sewing machine that moves. Consult your sewing machine owner's manual if you need instruction on how to access any moving parts that may be contained beneath the casing of the machine.
- **Step 5:** Allow the oil to absorb by letting your sewing machine stand for a few minutes. Most experts suggest that 15 to 30 minutes is a good window of time to let your machine stand while the sewing machine oil works its magic.
- **Step 6:** Plug your sewing machine back in. When you have safely done so, turn the power switch to 'on.'
- **Step 7:** Feed some scrap fabric through the sewing machine, running its moving parts at a slow but constant rate. This will allow the oil to spread evenly throughout the parts that require lubrication to maintain optimal performance.

#### Tips & Warnings

- Never lubricate any of your sewing machine's electrical parts. This may cause irreparable damage to your sewing machine, and could potentially result in an electric shock.

### 4.1.4 Machine Guards

There are different safety guards given in the sewing machine which are important to use and it is also essential to check that the correct safety guard is in place as per the requirement. Below are given the machine guards of a sewing machine.

- **Finger guard:** while guiding the fabric under the presser foot the fingers may accidentally cross into the path of the needle. Hence, finger guard is attached to the presser foot to avoid such accidents. This is very important safety feature.



Fig 4.1.2: Finger Guard

- **Eye guard:** Eye guard is important in cases where the operator is working on the fabric which has many fibers, hence eye guard protect eyes from getting tired. It also helps in protecting them against any little cloth fabric like that of wool or dust fibers. Eye guard is also used as a protection against needle-breakage in high speed sewing machines.
- **Belt guard:** Belt guard is a cover attached to the belt pulley assembly and the ad wheel. In industrial sewing machines the pulley and the belt move at very high speeds. Hence there is always a risk of hand or hair getting caught in the belt pulley therefore it is important to have a belt guard as it protects the operator from such accidents.



Fig 4.1.3: Eye Guard

- **Motor pulley guard:** Motor pulley guard is attached to the motor under the Fig, like the belt guard, motor pulley guard protects our body Parts from getting caught in the wheel and belt attached to the motor below the Fig.

### 4.1.5 Troubleshoot Common Machine

In many cases machine problems are due to the worker not having received correct training in basic machine maintenance. This causes problems which have to be rectified by a qualified mechanic/technician. All garment enterprises suffer from such problems to varying degrees. Some common causes are:

- Incorrect needles
- Incorrect machine settings for the fabric
- Inexperienced workers
- Inexperienced mechanics/technicians
- Fabric finishes.



On-the-job training sessions may be organized for beginners as part of their training period. Enlist the help of senior operators with teaching skills. Group work can provide good opportunities for these training sessions. Sessions should include acquiring the basic sewing skills and troubleshooting sewing problems.

#### 4.1.6 Carry out Basic Maintenance of Machine

It is important to carryout basic maintenance of own machine and surroundings. While operating a sewing machine we can keep a check of these two maintenances by keeping an eye on the needle point i.e.

- Must check the needle point and stitch quality while working. Be attentive and look for any kind of oil leakage is found, replace (or inform) immediately. For hazard free environment always keep the hook area clean and tidy.
- **Routine Maintenance:** This covers sub kinds of maintenance i.e.
  - » **Daily maintenance of the machinery:** While carrying out the daily maintenance one must look for whether the machine and its area is clean, look for threading of the machine, quality and quantity of the oil.  
Make sure to switch off the machines after operation this is one of the most important part of daily maintenance. Keep a check on needle tip and needle bend it should not be dull or rusty at all.
  - » **Weekly maintenance:** Consists of checking up the oil level and oil color in the machine. Make sure to remove the presser foot, throat plate and the feed dog too and clean them all thoroughly. Hook timing and clearance is also adjusted weekly so that the machine can work efficiently.
  - » **Monthly maintenance:** While keeping an eye on monthly maintenance of the machinery it is very important check oil flow in the pipeline, refill the oil up to its maximum level for efficient and flawless performance.

#### 4.1.7 Sewing Machine Safety Tips

Sewing machines do involve electricity, moving parts and sharp needles, so safety is a concern. Some sewing machine safety tips are as follows:

- Keep your fingers away from the needle. Experienced sewists might even be more apt to do this than beginners. About 60% of the sewing machine related injuries treated in a hospital each year are puncture wounds from needles.
- Minimize distractions, and don't operate your sewing machine when you are tired or under the influence of alcohol. Sewing is a lot easier when you're feeling rested and relaxed, and it's also safer.
- Turn off and unplug your sewing machine when you are away from it for more than a few minutes. Sewing machines can generate considerable heat when left on, and a lightning strike when a sewing machine is plugged in can cause irreversible damage. Consider getting a surge protector to plug your machine into, just in case.



Fig 4.1.4: Advanced Sewing Machine

- Be mindful of cords. Try to keep cords towards the back of the machine and not draped across the floor where you (or someone else!) is likely to trip over them. If they do need to run across the floor, consider taping them down-- or just find somewhere else to work.
- Have your machine serviced regularly. Not only will this keep your machine in top working order, potentially dangerous repairs are more likely to be noticed before they cause a problem.
- Always unplug the machine and use caution when replacing parts such as lightbulbs.
- Don't sew over straight pins. At the very least this will bend the straight pins and compromise your stitch quality, but the straight pins are also susceptible to breaking, and very likely could end up in your finger (or worse).
- Don't force your machine to sew through thick or tough material. You could damage your machine or cause injury to yourself. Your project might require an industrial strength sewing machine.
- Consider the ergonomics of your sewing Fig and chair. If your sewing machine is too high it will cause strain on your back. Your feet should be flat on the floor and your elbows bent at a 90 degree angle while you are sewing.
- Wear shoes while operating your machine. This one might seem a bit silly, but your foot pedal could break, and if you are wearing shoes, your feet will be protected. Stepping on stray needles, or dropping needles, scissors or a rotary cutter on your foot while sewing is also a possibility while sewing.
- Use care when disposing of used sewing machine needles. Prescription bottles or a mint tin are perfect for this. Just be sure you mark it clearly so you don't mistake it for your good needles.
- Your sewing area should be well lit. This will reduce strain on your eyes and help you avoid leaning in unnecessarily close to your machine.

#### 4.1.8 Waste

##### What is Waste?

Waste is any material or substance that is unwanted or undesirable. Depending on the sort of material, it is also known as garbage, trash, garbage, or junk.

##### Waste Management


Human advancement, both technologically and socially, is indivisibly related to waste. The contents of various wastes have changed over time and place, with waste products being directly connected to industrial development and innovation. Plastics and nuclear technology are two examples. Some waste components have monetary value and can be recycled if properly collected. Waste pollution is a severe problem as it adversely affects the environment.

Recycling waste raw materials is one approach, and it can also be used to generate revenue. The surplus garments can also be recycled into usable products. The garment companies sell all sorts of waste raw materials, including cut-pieces of clothing, zippers, buttons, thread, elastic fasteners, discarded plastic packets, broken cloth hangers, empty bobbins, and rejected pants, shirts, and t-shirts. The first stage of recycling is sorting, which is often done by colour, fabric type, and condition. Unusable components and clothing that are excessively shredded are recycled into waste cotton. These recycled clothing and processed cotton are used to make mattresses, pillows, cushions, seat filling and cushioning in cars, public buses, and rickshaws. The products which are not able to reuse or recycle, dispose them off safely in the designated location.

## Resources



Scan the QR codes or click on the link to watch the related videos.

Descriptions	QR Codes
Maintenance of single needle sewing machine	 <a href="https://youtu.be/6iE2DT6LVpg">https://youtu.be/6iE2DT6LVpg</a>

## Industry Visit

The purpose of visiting an apparel manufacturing unit is to get hands on knowledge about various processes involved in the work of an SMO. During the visit you have to interact with Sewing Machine Operators and supervisors to understand how work is done in industry. Make sure that you keep a notebook handy and note down any important points that come up during your interaction at the apparel manufacturing unit. When you go to an apparel manufacturing unit, you should:

- Know about the production system.
- Understand the machine safety and maintenance rules of industry.
- Analyze how SMOs:
  - » Maintain machines properly.
  - » Carry out basic maintenance of machine.
  - » Maintain tools and equipment and handle them safely and use materials to minimize waste.
  - » Work in a comfortable position with the correct posture.
  - » Dispose of waste safely in the designated location.
  - » Store cleaning equipment safely after use.
- Ask questions to SMOs/supervisors if you have any query.



## 5. Maintain Health, Safety and Security in the Production Line with Gender & PwD Sensitization



Unit 5.1 – Maintain Health, Safety and Security at Work Place

Unit 5.2 – First Aid & CPR

Unit 5.3 – Sensitivity towards People with disability and Gender Equality





## Key Learning Outcomes

**At the end of this unit, participants will be able to:**

1. Comply with health and safety related instructions applicable to the workplace.
2. Use and maintain personal protective equipment as per protocol.
3. Maintain a healthy lifestyle and guard against dependency on intoxicants.
4. Follow environment management system related procedures.
5. Identify and correct if possible) malfunctions in machinery and equipment.
6. Report any service malfunctions that can not be rectified.
7. Store materials and equipment in line with manufacturer's and organizational requirements.
8. Safely handle and move waste and debris.
9. Minimize health and safety risks to self and others due to own actions.
10. Seek clarifications, from supervisors or other authorized personnel in case of perceived risks.
11. Monitor the workplace and work processes for potential risks and threats.
12. Carryout periodic walk-through to keep work area free from hazards and obstructions, if assigned.
13. Report hazards and potential risks/threats to supervisors or other authorized personnel.
14. Participate in mock drills/ evacuation procedures organized at the workplace.
15. Undertake first aid, fire-fighting and emergency response training, if asked to do so.
16. Take action based on instructions in the event of fire.
17. Follow organization procedures.
18. Analyze the First Aid & CPR

## UNIT 5.1: Maintain Health, Safety, and Security at Work Place

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Identify methods to be vigilant for potential risks and threats associated with the workplace.
2. Handle tools and equipment in work area.
3. Check the workplace and work processes for risks like fire, electric shocks, etc.
4. Demonstrate the use of personal protective equipment.
5. Analyze sanitary facility in work place.
6. Analyze the work related facilities and benefits.
7. Explain about safety sign in working area.

### 5.1.1 Introduction

Features in garment industry that could be improved to prevent injuries include; communication, involvement of employees in decision making, education and training of employees and management on prevention strategies, and the ergonomic conditions at the plant.

The clothing industry is usually considered as a safe place to work. Compared to other industries, there are fewer serious risks in clothing factories. The hazards in clothing industry are different from others. The major health risks in this industry come from more subtle hazards whose effect build up over time.

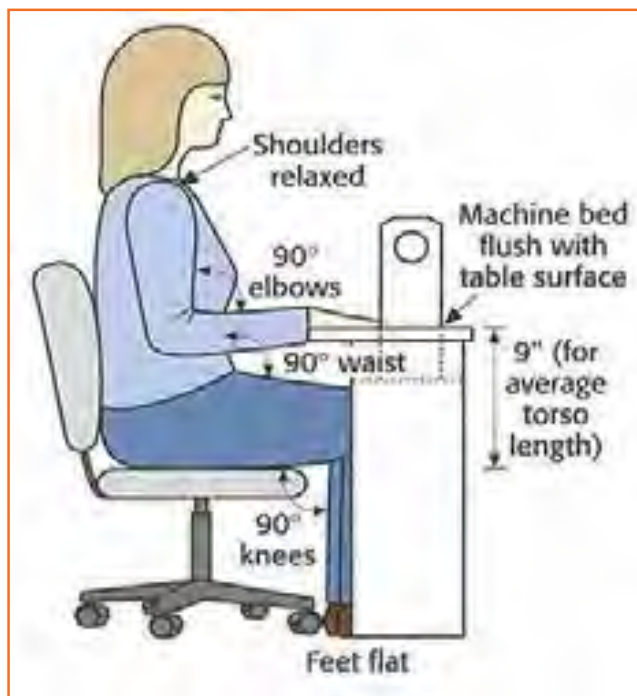


Fig.5.1.1: Body Posture

Workers in this industry face a substantially higher risk of muscle pain and injury than workers in other jobs. Studies also show that frequency of neck and shoulder injuries increases with years of employment. These injuries have a long-term effect on workers' health.

The physical requirements of a job are an important risk factor related to muscle pain and injury. The risks for Pressman have been linked to conditions such as improper work area design, including sitting arrangements.



Fig.5.1.2: Body Posture

Factors like repeated motions, force, body-posture are associated with higher risks and rate of injury. There are other factors are linked to injuries. Some of these factors include improper height of work pace, excessive workload, lack of support from co-worker, overall work environment etc. The factors that lead to reduction in injury rates include empowering workforce, following safety protocol, good housekeeping practices and increased support from top management.

### 5.1.2 The 'Ergonomics'

Ergonomically-designed job ensures that an employee who is tall is given a comfortable space in or near his/her workspace so that the work efficiency is not hindered. Similarly, an employee who is shorter is able to reach all of his or her tools and products without upsetting comfort and safe assortment.

Workers are usually compelled to work in the confinement of the job or workstation that previously was designed with no dynamism or change when they are hired. This leads the workforce to work in difficult postures and positions, all of which may result in work-related injuries/disorders.

The work-place related injuries often start as minor aches and pains but can develop into incapacitating injuries that affect everyday activities. Ergonomics aims at preventing injuries by monitoring the risk factors such as force, repetition, posture and vibration that can cause injuries to develop.

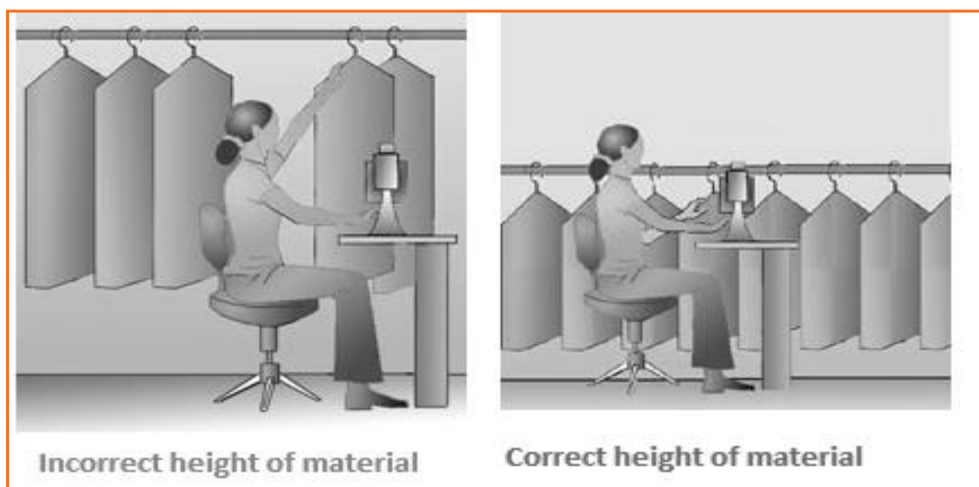


Fig.5.1.3: Situating the material

### Injuries and illnesses among textile and apparel workers

- 81% complained CTDs to the wrist.
- 49% of workers is suffering from neck pains.
- 35% report obstinate lower back pain.
- 25% have suffered a compensable increasing trauma disorder.
- 14% reported CTDs to the elbow.
- 5% reported CTDs to the shoulder.
- Absenteeism increases as working conditions worsens.
- High employee turnover is associated with detrimental working conditions.
- Embroidery tasks are associated with pain in the shoulders, wrists, and hands.
- Ironing by hand is associated with elbow pain.
- Fitting fabric in frames like of work, are associated with CTDs of the hands and wrists.

Some fundamental ergonomic principals that should be followed in our workplaces are:

- **Proper tools:** Tools and equipment provided at work place should be appropriate for the specific tasks being performed. The apparatus should allow the workers to keep their hands and wrists straight – the position they would be in if they were droopy relaxed at your side. The workers should bend the tool– not the wrist. The tool should fit easily into the hand. If the grip size is too large or too small, it will be uncomfortable and will increase the risk of injury. Tools should not have sharp edges.
- **Keep repetitive motions to a minimum:** Workstations can be restructured to avoid the number of health hazards which chances due to repetitive motions that must be performed. Using a power-driven screwdriver or tools with a notch device can decrease the number of twisting motions with the arm. Work stations should have enough space for the given tasks and provide proper chairs. For deterrence of ergonomic injuries, the labour force should be encouraged to change work and take frequent but short breaks. Some tasks can be mechanical or reformatted to eliminate musculoskeletal injuries. Manufacturing tools and equipment should integrated ergonomic design codes and should not require an extreme amount of force to operate.
- **Avoid awkward postures:** The industry is such that the workforce's job should not require you to work with your hands above shoulder height on a regular basis. Arms should be closer to the body and not raised too high. Bending of their wrists, back and neck should be avoided.
- **Use safe lifting procedures:** The employee should avoid lifting objects that are too heavy. Use more than one person or a mechanical device to reduce the load. The workstation should not require lifting objects above the head or twisting his/her back while lifting. One must keep the load close to his body. Heavy and often lifted objects should be kept between knee and shoulder height and not on the floor or above the head level.
- **Get proper rest:** It is imperative to take frequent breaks to rejuvenate the body and mind so that they don't get injured. The workforce should be groomed to understand that they should take a break from the work not just mentally but physically too. If a person has errand which doesn't allow him to sit, he must take intervals from his work to relax his leg muscles. If he is doing a sitting job, he must go for a walk whenever his work permits.



Fig.5.1.4: Cleaning the Tools

For example, if you stand all day, while performing your job you should sit down to rest your legs and feet during your breaks. If you sit down, when working you should stand up and walk around during your breaks to give your back a rest and to increase circulation in your legs. By doing this the musculoskeletal injuries can be prevented.

- **Other things to consider:** Chemicals also have a part in garment manufacturing. Dyes, enzymes, solvents and other chemicals are used to create different fabric finishes and provide durability to the product. Proper ventilation and personal protective equipment are important for protection of workers engaged in chemical processing. Similarly, for workers who handle the finished material and may be exposed to excess chemicals and off-gassing, protective equipment should be used.

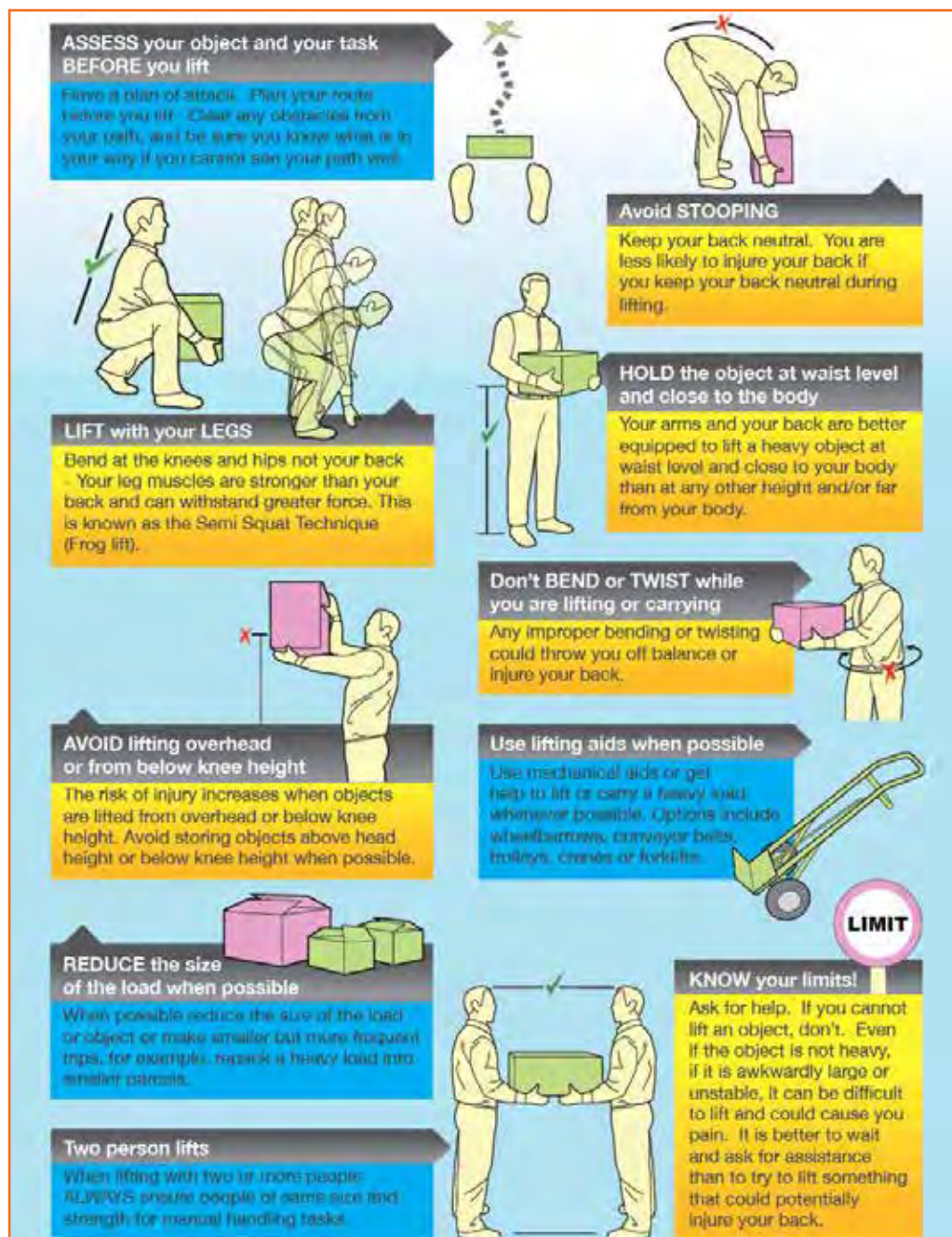


Fig.5.1.5: Do's and Don'ts in material handling



### 5.1.3 Environmental Control Measures

Hazardous substances in one form or another can be found in almost all small and medium-sized enterprises. The garments industry generates a lot of dust from fabrics being cut and sewn. Some fabrics release chemicals which saturate the air causing difficulties in breathing and eye irritation. Solvents used for cleaning fabrics and garments may cause fatigue, headache and dizziness. Dust and solvents, when breathed, can lead to lung diseases and are very dangerous. Not only will this affect the well-being of your workers, it will also result in a reduction of productivity and product quality, increased absenteeism and turnover of staff. High levels of dust interfere with efficient production and require cleaning operations that may spoil materials and finished products. Improved conditions usually mean increased output, higher productivity and quality. There are simple and inexpensive ways to control most of the environmental problems. Improvements often result in cost savings, productivity benefits and increased safety of workers. The following rules provide a series of low-cost measures for sound environmental control.

#### 5.1.3.1 Clean Regularly and Properly - Don't Spread Dust

Dust originates from fabrics and threads, from cutting and sewing to packing operations. Thus, it is very common to see small clothing enterprises with ceilings and walls full of dusty cobwebs. Even machines which are not regularly cleaned could be full of dust which may cause them to break down.

Dust increases wear and tear on machinery, necessitating more maintenance. It also negatively affects the quality of raw materials and finished products. Dust entering the respiratory system can damage the worker's lungs. Some dust can also cause allergies. Dust should be removed regularly and eliminated from the source. More comprehensive cleaning should be carried out as often as necessary. This cleaning should also include walls, ceilings, storage racks and other areas where dust accumulates. Dust on windows, walls and lamps will significantly reduce the lighting in the workplace.



*Fig.5.1.6: Cleaning the Shop Floor*

One low-cost cleaning method is sweeping the floor carefully with an appropriate broom and accompanying dust pan to prevent dust from spreading. Spraying water on the floor before sweeping will avoid dust remaining airborne. When dust is moistened it can be easily removed with a broom. More effective methods of controlling dust include using a vacuum cleaner or a wet mop.

### 5.1.4 Make Local Ventilation Cost-effective

Local ventilation should only be considered as a means of reducing chemical hazards when other means have failed. There are cost-effective ways of improving ventilation.

#### Use proper fans

Apart from those used for ventilating workstations, fans may be utilized to remove dangerous substances from the workplace. Contaminated air can be pushed or blown outside by having more open windows. A few points should be considered:

- There should be no obstacles between the fan and opening. Anything in the way significantly reduces the desired effect.
- The air speed should be low to reduce turbulence. In the garment industry, different fans are used; some use industrial fans or wall fans as shown in Fig. There are advantages and disadvantages for these types of fans. Industrial fans are so powerful that workers near them may be affected. Ceiling fans of the rotary type may lift the cloth being sewn, hence speed should be controlled.
- Contaminated air should not be blown in the direction of other workers on the way to the opening.



Fig.5.1.7: Using Fans

- Care should be taken that air expelled from the workplace does not affect people outside the enterprise.
- A fan may not be sufficient to remove vapours from hazardous fumes such as those sometimes used in silkscreen printing. Extractor systems to remove dust and hazardous chemicals should be installed. These systems may be quite expensive and it may be more economical to replace the hazardous chemicals.

### 5.1.5 Good Lighting for Quality Products

Good lighting does not mean more light bulbs and more use of electricity. Natural lighting is usually a better option than the bulbs. But if there is a difficulty in arranging for a natural lighting through windows and ventilators, its important that the bulbs and other elements of artificial lights should be well-maintained. A good lighting arrangement is directly proportionate to an efficient workforce.

80% of the absorption of information from our surroundings are from our eye as a sense organ. Bad lighting means wrong or lesser absorption of information, leading to lower productivity. Eye strain in low light can lead to head ache and again decreases the productivity level of the worker.

It is imperative to understand the ways in which we can arrange for a good lighting without increasing the electricity bills. First of all one has to identify if at all you need to work upon the existing brightness level in the work place. Lighting requirements are reliant on three main features:

- The environment of the working area
- The nature of the task
- The sharpness of the worker's eyesight

A sewer needs focused light at needle point, so needle lights should always be fitted. A worker packing garments requires more largely lighting. In many situations, packers work on special tiered work tops, where lights are built into the station. The age group of the workforce is also important factor to determine this. Which means, an older worker may need twice as much light as a younger one. Another way to identify the gap, in lighting problem is going around the workplace, observing the workers and asking them about their visual problems. The plan of improvements may not have much impact if the workers' eyesight is insufficient. An eyesight test for all employees should be carried out. Even if some workers do not follow advice about obtaining glasses. One will be aware of the problem and a possible reason for low efficiency and decreased productivity.

#### 5.1.5.1 Use of Daylight

It is very unfortunate that many corporations undermine the fact that natural light is the best and the cheapest source of illumination. One had to gauge the surface area of the work area and measure the windows and skylights. Ideally the open space that includes the windows, ventilation windows and door should be one-third of the total area of work.

However a determinant of choosing the natural light is the heat that is emitted in the work place.



*Fig.5.1.8: Use of daylight*

If there is too many machinery omitting heat, it isn't a great idea to allow the natural heat to come in and add up to the temperature.

The higher the window, the more light is in. Skylights can double the light of a low light but if made in a lower level, it faces obstacles and is blocked by the machineries and storage containers. If the factory doesn't have a skylight, one must consider to replace the opaque roofs with translucent or transparent plastic rooftops.

It is important to paint the walls in lighter shades which not just give a sense of space to a room, but the workstation would look illuminated. It enhances the visual conditions and a pleasant cheerful environment is encouraged.

The matt finish of whitewash is a great idea. Many enterprises are implementing white tile ceilings. To avoid harmful glare, one should avoid gloss paint for walls. Pale colours are better than white. A slightly dimmer colour below eye level is accommodating. But one should maintain cleanliness, since lack of regular cleaning can result in the loss of at least 10 to 20 per cent of light. Special care should be taken to clean skylights, which are sometimes difficult to reach.

These colours are much better than the black formerly used for the bodies or chrome finish for the Figs, which reflect more glare. An unsatisfactory circulation of natural light over the work area, particularly in embroidery rooms, is a problem. Considering the fact, one must change the layout of benches and machines in order to minimize shadow zones. Workstations with high lighting requirements should be moved closer to the windows and possibly be assembled together for the provision of additional lighting. However, if the workstation layout



responds well to your production needs, you may instead reorganize the delivery and height of the lamps or add needle lights which are good options.



*Fig.5.1.9: Sunlight in the Shop Floor*

### 5.1.6 Reporting an Accident and an Incident

Your responsibility requires you to be aware of potential hazards and correct reporting processes. If you notice a potentially hazardous situation, eg: a client expressing violent behavior, it is important that you report it immediately to management and fill out the appropriate forms as legally required of you.

If you are injured at work you must:

- Report the injury to management as soon as possible, and certainly within 24hours.
- Seek proper treatment for your injury.

### 5.1.6.1 Accidents

Always work in a safe manner to prevent accidents from occurring in the first place. Make sure that you have been given adequate information and on-the-job training about the first aid facilities and services available in your workplace, including:

- Where to find first aid kits.
- Location of first aid rooms.
- Complete, up-to-date contact details of trained first aid officers in the workplace procedures for critical accidents – such as who should be responsible for calling.
- The ambulance/doctor/nurse and what is the best method of contact, measures for evacuation of the injured person/s.
- Emergency procedure for the elimination of life-threatening chemicals commonly used in the workplace.
- Universal precautions for the control of infection.
- Who to contact for debriefing/psychological support.

Reporting of incidents and accidents is required under the Work Health and Safety (WHS) legislation. Workplaces tend to have well developed reporting procedures in place, which aim to fully understand the accident/incident and prevent any future occurrences through investment in injury prevention, based upon accurate data. Reporting and recording should also facilitate costing and associated financial loss.

Always report an accident to management immediately. There should be a form at each workplace that you (or the person involved) and any witnesses can fill out, where possible, otherwise. The form should cover the following areas:

- **Description of the occurrence:** What was the event that occurred, which required this report to be completed?
- **Nature of injury or disease:** Select the most appropriate description from a range of options. What injury or disease happened as a result of the occurrence?
- **First aid, medical treatment or hospital admission:** This section asks for a description of what was done to treat the injury or disease.
- **Part of the body affected:** Tick off which part or parts of the body were affected as a result of the occurrence.
- **Source of injury:** What actually caused the person to be injured or acquire a disease? This could be a piece of machinery or other hazardous materials for example.
- **Probable cause or causes of injury:** How was the source listed above actually responsible for the injury?
- **Investigation:** This asks a series of questions that seek to find out why the person has been injured or has acquired a disease.
- **Notification checklist:** This checklist makes sure that everyone who should have been contacted regarding the matter has been contacted and asks whether appropriate action has been taken by the authorities.
- **Preventative action:** This asks whether or not any action has been taken to prevent the occurrence from happening again.
- **Witness details:** This part is to be filled out if someone saw the occurrence happen. It is essential if any sort of legal action is to be taken.



### 5.1.7 Mock Drills/ Evacuations

Fire safety and evacuation plans sketch staff duties and accountabilities in time of emergency. Continuing training is required to help safeguard that the employees are conscious of those duties and responsibilities. Fire fighting trainings serve as an prospect for staff members to validate, under replicated fire conditions, that they can perform those duties and responsibilities safely and efficiently. It's also a time for them to demonstration that they are aware of defend-in-place strategies and can take advantage of your facility's fire protection features and exit facilities to protect the people in their care.

Fire drills are excellent exercise designed to evaluate staff response to a replicated emergency. They are also a test of your facility's fire safety/evacuation strategies and staff training programs. It is not essential that all fire drills run smoothly. That's okay, so long as staff and the organization learns from them and correct mistakes made. It's vital, therefore, that there be a analysis of each drill so that any problems met can be addressed. Perhaps the problems are due to unfinished or outdated fire safety/emigration plans. Perhaps there's a need for additional staff training.

The two essential components of a fire preparedness plan are the following:

1. An emergency action plan, which details what to do when a fire occurs.
2. A fire prevention plan, which describes what to do to prevent a fire from occurring.



Fig.5.1.10: Fire Safety

### 5.1.8 Low-cost Work-related Welfare Facilities and Benefits

Work-related welfare conveniences and facilities are never given heed to. Who cares about toilets, first-aid kits, lunch rooms or lockers? What do they have to do with the hard authenticities of production? One answer is that workforces care. During each working day, workers need to drink water or some other beverage, eat meals and snacks, wash their hands, visit a lavatory, and rest to recover from fatigue. This can be difficult or easy, unpleasant or comfortable, a health risk or an aid to hygiene and nutrition. The essential facilities in the factory show if you care about employees more or the machines.

Another good reason is that extra efforts for better facilities are often appreciated far beyond the time and money capitalized, Work-related facilities benefit workers to overcome problems which are important to them. Let workers express their priorities for improvements and give their feedback. You may be surprised at the results. Giving a hygienic and wel-maintained workplace is indirectly showing yur employees how much you care for them.

A small enterprise can be a community where workers are loyal, with good industrial relations and high morale, It can also be a place where workers look for the first chance to leave and care little about the owner's success. Which kind of initiative do you want? The series of low-cost facilities that trails will help to retain the best staffs.

### 5.1.8.1 Essential Facilities

#### Drinking water

Drinking water is indispensable for all workers; if this is not provided, they become thirsty and gradually dehydrated. This greatly increases fatigue and lowers productivity, especially in a hot environment. Place water vessels near each group of workers, or provide taps or cascades with clean water in a central place. This will minimize the time lost in going to get a drink. However, drinking water should not be placed in washrooms or toilets, near dangerous machines or other hazards, nor in places where it can be contaminated by dust, chemicals or other substances.

If there is any doubt about contamination, water must be thoroughly boiled or properly filtered or treated. Unhealthy water will lead to illness and therefore absenteeism from work. Before starting to use a new water source for drinking purposes, it is advisable to have it tested to make sure it conforms to the national standard for drinking water. The design, construction and operation of deep wells for the extraction of ground water should be subjected to the provisions of existing water codes. Piped water should only be used when a hygienic water supply is guaranteed. A clear distinction between potable and non-potable water taps should be made and a "Safe Drinking Water" sign should be put up near to each tap.

Drinking water vessels should be made from materials that can easily be cleaned. Even if the vessels are filled with fresh water, the water inside, if kept for even a short time, can become unhygienic. It should therefore be changed frequently. It is also imperative to make sure that drinking water is cool. If a water cooler is too luxurious, the water vessels can be placed in the coolest place in the factory. It will facilitate the water to remain cool throughout the day. They should not be left uncovered, under the sun or in a hot place. Drinking fountains for production areas are very advantageous from a hygienic point of view. They can be fitted with a jet or bubbler outlet and/or goose-neck or other outlet for filling drinking cups. The fountain should be free from sharp angles and designed to prevent unnecessary splashing. Water outlets should be above the rim of overflow level so that they will not be contaminated with waste water. The water outlet should be shielded to prevent the lips of a drinker from being placed on it. Drinking water containers should be attended by a designated person. Containers should be made of impermeable materials. A cooling device would be an advantage. (Unglazed pottery can be used, due to its unique cooling effect, in dust-free places.) Containers should be provided with suitable covers, and kept in a cool place protected from the sun. The water must be changed frequently.

To avoid the possible spread of infection, it is better to use throwaway cups or to provide separate cups for each worker and to arrange for regular washing. When containers are used, it is important to clean them regularly. Cleaning and other necessary conservation tasks should be assigned to a specific person. In addition, the provision of a competence for boiling water will enable people to make coffee or other hot beverage during breaks. Hot water is required if the enterprise has a childcare facility.

### 5.1.5.2 Sanitary Facilities

There are several reasons why the provision of washing facilities is important:

- Dirt and grime can be ingested and cause sickness or disease; they are, in any case, unpleasant and demoralizing.
- Washing is a necessity when women have their monthly periods.
- Washing is required for basic hygiene after using the toilet.
- Apart from the obvious basic need, sanitary facilities are required by law. Clienteles often create an impression of an enterprise through the quality of its sanitary facilities.

- There should be a sufficient number of hygienic facilities on the work locations and each should be conveniently located to avoid long walks, waiting and hindrance. The law of the country must be monitored, but the following are the minimum requirements:
- One restroom is required for up to five men; two toilets for six to 40 men.
- One separate restroom for up to five women and two toilets for six to 30 women.
- One wash-basin for every 15 workers.



Fig.5.1.11: Signages

Ideally, there would be a separate toilet for men and women. These should be characterized as follows:

- The toilet bowl must be free from stain or odour and function properly.
- The walls of the toilet must be clean and tiles unstained.
- The ceiling of the toilet must be free from cobwebs and dust.
- Floors must be clean and safe (no broken tiles, nor slippery surface).
- Proper illumination must be provided inside the toilet.
- Toilets must have a continuous supply of water; in case water is limited in the area, water should be stocked in containers and refilled regularly.
- Mirrors and rubbish bins should be provided in the washroom.
- Soap and toilet paper should be provided.
- The washroom should provide complete privacy to users and should be fully ventilated.

### 5.1.9 Be Ready for Emergencies

Misfortunes can happen even if proper defensive measures are installed. So, always be prepared for emergencies and have readiness for disaster management, like cuts and bruises, eye injuries, burns, poisoning and electric shocks. Every enterprise should maintain a well-stocked first-aid box and assign at least one person from every shift to handle emergencies. First-aid boxes should be clearly marked and situated in a place, so that they are readily reachable in an emergency. They should not be more than 100 metres away from any place on the work site. Ideally, such kits should be near a wash-basin and in good lighting conditions. Their supplies need to be regularly checked and replenished. The contents of a first-aid box are often regulated by law, with variations according to the size and the likely industrial hazards of the enterprise. A typical basic kit may include the following items in a dustproof and waterproof box:

- Sterile bandages, pressure bandages, dressings (gauze pads) and slings. These should be individually wrapped and placed in a dustproof box or bag. Adequate quantities of the different sizes should be available at all times to treat small cuts and burns.
- Cotton wool for cleaning wounds.



Fig.5.1.12: First Aid

Ideally, there would be a separate toilet for men and women. These should be characterized as follows:

- The toilet bowl must be free from stain or odour and utility properly.
- The walls of the toilet must be clean and tiles unstained.
- The ceiling of the toilet must be free from torpors and dust.
- Floors must be clean and safe (no broken tiles, nor slippery surface).
- Proper illumination must be provided inside the restroom.
- Lavatories must have a continuous supply of water; in case water is limited in the area, water should be stocked in containers and refilled regularly.
- Mirrors and rubbish bins should be provided in the washroom.
- Soap and toilet paper should be provided.
- The washroom should give complete privacy to users and should be fully aired.

### 5.1.10 Safety Signs at Workplace

**Safety Signs:** Sign providing information or instruction about safety or health at work by means of a signboard, a colour, an illuminated sign or acoustic signal, a verbal communication or hand signal.

**Signboard:** A sign which provides information or instructions by a combination of shape, colour and a symbol or pictogram which is rendered visible by lighting of sufficient intensity. In practice, many signboards may be accompanied by supplementary text, eg 'Fire exit', alongside the symbol of a moving person. Signboards can be of the following four types:

1. **Prohibition sign:** A sign prohibiting behaviour likely to increase or cause danger (eg 'no access for unauthorised persons').



Fig.5.1.13: Prohibition sign

2. **Warning sign:** A sign giving warning of a hazard or danger (eg 'danger: electricity').



Fig.5.1.14: Warning sign

3. **Mandatory sign:** A sign prescribing specific behaviour (eg 'eye protection must be worn').



Fig.5.1.15: Mandatory sign

4. **Emergency escape, Fire and First-aid signs:** A sign giving information on emergency exits, first aid, or rescue facilities (eg 'emergency exit/escape route').



Fig.5.1.16: Emergency escape

#### Signs for emergency exits



Fig.5.1.17: Signs for emergency exits



### Signs for Fire and First Aid



Fig.5.1.18: Signs for Fire

### 5.1.11 Prevention and Management of Corona Virus

As we all know a new respiratory disease called COVID-19 is spreading across the world. India has also reported cases from states and the government is trying to contain the spread of the disease. We can play a major role in preventing its spread by follow Covid safety guidelines.

COVID-19 is a disease caused by the “novel corona virus”. Common symptoms are Fever, Dry cough, Breathing difficulty, Some patients also have aches and pains, nasal congestion, runny nose, sore throat or diarrhea



Fig.5.1.19: Prevention from COVID-19

COVID-19 spreads mainly by droplets produced as a result of coughing or sneezing of a COVID-19 infected person. To protect yourself from Covid-19, follow below guidelines.

- Maintain a safe distance from others (at least 1 metre), even if they don't appear to be sick.
- Wear a mask in public, especially indoors or when physical distancing is not possible.
- Choose open, well-ventilated spaces over closed ones. Open a window if indoors.
- Clean your hands often. Use soap and water, or an alcohol-based hand rub.
- Get vaccinated when it's your turn. Follow local guidance about vaccination.
- Cover your nose and mouth with your bent elbow or a tissue when you cough or sneeze.
- Stay home if you feel unwell.
- If you have a fever, cough and difficulty breathing, seek medical attention. Call in advance so your healthcare provider can direct you to the right health facility.

This protects you, and prevents the spread of viruses and other infections.

## Exercise

1. While working at workplace, your waist should be at:
  - a) 30°
  - b) 60°
  - c) 90°
  - d) 120°
1. We receive \_\_\_\_\_ per cent of all information through our eyes.
  - a) 75%
  - b) 60%
  - c) 70%
  - d) 80%
2. In case of fire do not use \_\_\_\_\_.
  - a) Lift
  - b) Stairs
  - c) Ladder
  - d) Window
3. The factors that lead to reduction in injury rates include:
  - a) Empowering workforce
  - b) Following safety protocol
  - c) Good housekeeping practices
  - d) Support from top management
  - e) All of the above
4. Lighting requirements are reliant on:
  - a) The environment of the working area
  - b) The nature of the task
  - c) The sharpness of the worker's eyesight
  - d) All of the above

## UNIT 5.2: First Aid & CPR

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Apply first aid on an injured person.
2. Interpret the procedure of CPR.

### 5.2.1 First Aid

First aid is the assistance given to any person suffering a sudden illness or injury, with care provided to preserve life, prevent the condition from worsening, and/or promote recovery. It includes initial intervention in a serious condition prior to professional medical help being available, such as performing CPR while awaiting an ambulance, as well as the complete treatment of minor conditions, such as applying a plaster to a cut. First aid is generally performed by the layperson, with many people trained in providing basic levels of first aid, and others willing to do so from acquired knowledge. Mental health first aid is an extension of the concept of first aid to cover mental health.



Fig.5.2.1: First aid Pyramid

There are many situations which may require first aid, and many countries have legislation, regulation, or guidance which specifies a minimum level of first aid provision in certain circumstances. This can include specific training or equipment to be available in the workplace (such as an Automated External Defibrillator), the provision of specialist first aid cover at public gatherings, or mandatory first aid training within schools. First aid, however, does not necessarily require any particular equipment or prior knowledge, and can involve improvisation with materials available at the time, often by untrained persons.

Vital Signs	Good	Poor
Heart Rate	60-100 beats per minute	Less than 60 or greater than 100 beats per minute
Respirations	14-16 breaths per minute	Less than 14 breaths per minute
Skin	Warm, pink and dry	Cool, pale and moist
Consciousness	Alert and orientated	Drowsy or unconscious

Fig.5.2.2: Vital Signs

Awareness	Assessment	Action	Aftercare
<ul style="list-style-type: none"> <li>Observe</li> <li>Stop to Help</li> </ul>	<ul style="list-style-type: none"> <li>Assess what is required to be done</li> <li>Ask yourself, 'Can I do it?'</li> </ul>	<ul style="list-style-type: none"> <li>Do what you can</li> <li>Call for expert medical help</li> <li>Take care of your and the bystander's safety</li> </ul>	<ul style="list-style-type: none"> <li>Once you have assisted the victim, stay with him/her till expert care arrives</li> </ul>

Fig.5.2.3: Four A's of First Aid

While delivering First Aid always remember:

- Prevent deterioration.
- Act swiftly, deliberately and confidently.
- Golden Hour – First 60 minutes following an accident.
- Platinum Period – First 15 minutes following an accident.
- Prevent shock and choking.
- Stop bleeding.
- Loosen victim's clothes.
- Regulate respiratory system.
- Avoid crowding/over-crowding.
- Arrange to take victim to safe place/hospital.
- Attend to emergencies first with ease and without fear.
- Do not overdo. Remember that the person giving first aid is not a doctor.

Injury	Symptom	Do's	Don'ts
Fracture	<ul style="list-style-type: none"> <li>Pain</li> <li>Swelling</li> <li>Visible bone</li> </ul>	<ul style="list-style-type: none"> <li>Immobilise the affected part</li> <li>Stabilise the affected part</li> <li>Use a cloth as a sling</li> <li>Use board as a sling</li> <li>Carefully Transfer the victim on a stretcher</li> </ul>	<ul style="list-style-type: none"> <li>Do not move the affected part</li> <li>Do not wash or probe the injured area</li> </ul>
Burns (see Degrees of Burn table)	<ul style="list-style-type: none"> <li>Redness of skin</li> <li>Blistered skin</li> <li>Injury marks</li> <li>Headache/seizures</li> </ul>	<ul style="list-style-type: none"> <li>In case of electrical burn, cut-off the power supply</li> <li>In case of fire, put out fire with blanket/coat</li> <li>Use water to douse the flames</li> <li>Remove any jewellery from the affected area</li> <li>Wash the burn with water</li> </ul>	<ul style="list-style-type: none"> <li>Do not pull off any clothing stuck to the burnt skin</li> <li>Do not place ice on the burn</li> <li>Do not use cotton to cover the burn</li> </ul>

Bleeding	<ul style="list-style-type: none"> <li>• Bruises</li> <li>• Visible blood loss from body</li> <li>• Coughing blood</li> <li>• Wound/Injury marks</li> <li>• Unconsciousness due to blood loss</li> <li>• Dizziness</li> <li>• Pale skin</li> </ul>	<ul style="list-style-type: none"> <li>• Check victim's breathing</li> <li>• Elevate the wound above heart level</li> <li>• Apply direct pressure to the wound with a clean cloth or hands</li> <li>• Remove any visible objects from the wounds</li> <li>• Apply bandage once the bleeding stops</li> </ul>	<ul style="list-style-type: none"> <li>• Do not clean the wound from out to in direction</li> <li>• Do not apply too much pressure (not more than 15 mins)</li> <li>• Do not give water to the victim</li> </ul>
Heat Stroke/Sun Stoke	<ul style="list-style-type: none"> <li>• High body temperature</li> <li>• Headache</li> <li>• Hot and dry skin</li> <li>• Nausea/Vomiting</li> <li>• Unconsciousness</li> </ul>	<ul style="list-style-type: none"> <li>• Move the victim to a cool, shady place</li> <li>• Wet the victim's skin with a sponge</li> <li>• If possible apply ice packs to victim's neck, back and armpits</li> <li>• Remove any jewellery from the affected area</li> <li>• Wash the burn with water</li> </ul>	<ul style="list-style-type: none"> <li>• Do not let people crowd around the victim</li> <li>• Do not give any hot drinks to the victim</li> </ul>
Unconsciousness	<ul style="list-style-type: none"> <li>• No movement of limbs</li> <li>• No verbal response or gestures</li> <li>• Pale skin</li> </ul>	<ul style="list-style-type: none"> <li>• Loosen clothing around neck, waist and chest</li> <li>• Check for breathing</li> <li>• Place the victim's legs above the level of heart</li> <li>• If victim is not breathing, perform CPR</li> </ul>	<ul style="list-style-type: none"> <li>• Do not throw water or slap the victim</li> <li>• Do not force feed anything</li> <li>• Do not raise the head high as it may block the airway</li> </ul>

Fig.5.2.4: First Aid for different types of injuries

1st Degree Burn	2nd Degree Burn	3rd Degree Burn	4th Degree Burn
Will recover itself in a few days. <b>Action Required:</b> Place under running water.	Serious but recovers in a few weeks. <b>Action Required:</b> Place clean wet cloth over the burnt area.	Very Serious and will require skin grafting. <b>Action Required:</b> Place a clean dry cloth over the burnt area.	Extremely Serious and requires many years with repeated plastic surgery and skin grafting, is life threatening. <b>Action Required:</b> Leave open and prevent infection.

Fig.5.2.5: Degree of Burns



## 5.2.2 Splints and Aids of Torso

A splint is a bandage that immobilizes a broken bone. Sometimes this is done by using rigid objects such as sticks or boards. For some injuries, however, this isn't possible and the only option is to tie the broken limb to the body.

### 5.2.2.1 Splints

During the application of a splint, it is important to not attempt to straighten the break. This will lead to more injury and pain for the affected. Instead, the splint should be applied to the break the way it was.

#### When using rigid material

Always use long enough pieces to reach the joints beyond the break. For example, when splinting a forearm, the material should be long enough to touch both the wrist and the elbow. This helps keep the material in place and prevents too much pressure from being applied to the wound.

- Always put padding between the rigid material and the body to keep the victim comfortable.
- Knots should be tied between the body and the rigid material. This is an easier option when it comes to untying them. However, if this can't be carried out, the knots should be tied over the rigid material.
- Padding should always be used between the body and the rigid material in order to provide a comfortable setting to the affected.

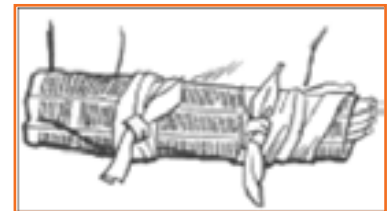


Fig.5.2.6: Splint the Forearm

- Splint the wrist in the same way. The entire forearm should be immobilized.



Fig.5.2.7: splint the Wrist

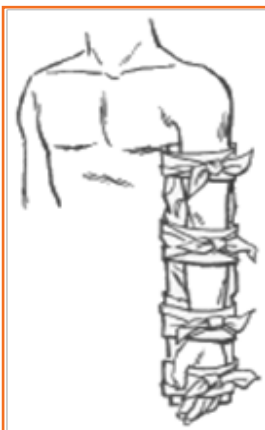


Fig.5.2.8: Splint the Elbow

- To splint the elbow, use enough rigid material to go from the armpit to the hand. The entire arm should be immobilized. Do not attempt to straighten or bend the elbow; splint it in position.
- To splint the upper leg, use long pieces of rigid material that will reach from the ankle to the armpit. Above the hips, tie long straps around the torso to hold the top of the splint in place.



Fig.5.2.9: Splint the Upper Leg

- The pieces used should be long enough to reach the joint beyond the break. For instance, when a forearm is splinted, the material should be long enough in such a way that it includes both the wrist and the elbow. This helps in preventing too much pressure to the wound and also helps in keeping the material in place.



Fig.5.2.10: Splint the Lower Leg

### 5.2.3 CPR

Basic life support (BLS) is a level of medical care which is used for victims of life-threatening illnesses or injuries until they can be given full medical care at a hospital.

First aid is as easy as ABC – airway, breathing and CPR (cardiopulmonary resuscitation). In any situation, apply the DRSABCD Action Plan.

**DRSABCD stands for:**

- Danger:** Always check the danger to you, any bystanders and then the injured or ill person. Make sure you do not put yourself in danger when going to the assistance of another person.
- Response:** Is the person conscious? Do they respond when you talk to them, touch their hands or squeeze their shoulder?
- Send for help:** Call ambulance.
- Airway:** Is the person's airway clear? Is the person breathing? If the person is responding, they are conscious and their airway is clear, assess how you can help them with any injury.

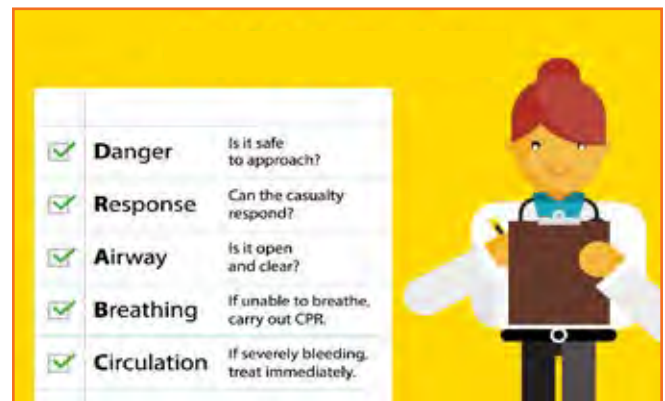


Fig.5.2.11: Basic life support chart

If the person is not responding and they are unconscious, you need to check their airway by opening their mouth and having a look inside. If their mouth is clear, tilt their head gently back (by lifting their chin) and check for breathing. If the mouth is not clear, place the person on their side, open their mouth and clear the contents, then tilt the head back and check for breathing.

- Breathing:** Check for breathing by looking for chest movements (up and down). Listen by putting your ear near to their mouth and nose. Feel for breathing by putting your hand on the lower part of their chest. If the person is unconscious but breathing, turn them onto their side, carefully ensuring that you keep their head, neck and spine in alignment. Monitor their breathing until you hand over to the ambulance officers.
- CPR (cardiopulmonary resuscitation):** if an adult is unconscious and not breathing, make sure they are flat on their back and then place the heel of one hand in the centre of their chest and your other hand on top. Press down firmly and smoothly (compressing to one third of their chest depth) 30 times. Give two breaths. To get the breath in, tilt their head back gently by lifting their chin. Pinch their nostrils closed, place your open mouth firmly over their open mouth and blow firmly into their mouth. Keep going with the 30 compressions and two breaths at the speed of approximately five repeats in two minutes until you hand over to the ambulance officers or another trained person, or until the person you are resuscitating responds.
- Defibrillator:** For unconscious adults who are not breathing, an automated external defibrillator (AED) is applied. An AED is a machine that delivers an electrical shock to cancel any irregular heart beat (arrhythmia), in an effort get the normal heart beating to re-establish itself. Please ensure that a trained person is there

to apply the AED. If the person responds to defibrillation, turn them onto their side and tilt their head to maintain their airway.

## 1. Airway

Once you have assessed the patient's level of consciousness, evaluate the patient's airway. Remember, if the patient is alert and talking, the airway is open. For a patient who is unresponsive, make sure that he or she is in a supine (face-up) position to effectively evaluate the airway. If the patient is face-down, you must roll the patient onto his or her back, taking care not to create or worsen an injury. If the patient is unresponsive and his or her airway is not open, you need to open the airway. Head-tilt/chin-lift technique can be used to open the airway.

### Head-tilt/chin-lift technique

To perform the head-tilt/chin lift technique on an adult:

- Press down on the forehead while pulling up on the bony part of the chin with two to three fingers of the other hand.
- Tilt the head past a neutral position to open the airway while avoiding hyperextension of the neck.

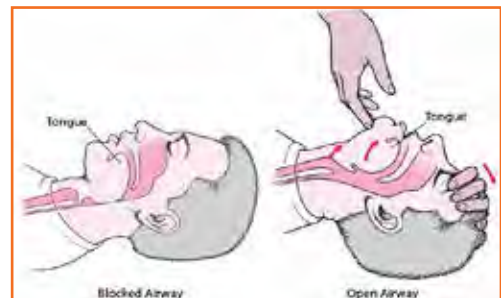


Fig.5.2.12: Airway

## 2. Cardiopulmonary resuscitation

Cardiopulmonary resuscitation circulates blood that contains oxygen to the vital organs of a patient in cardiac arrest when the heart and breathing have stopped. It includes chest compressions and ventilations as well as the use of an automated external defibrillator.



Fig.5.2.13: CAB

- **Compressions:** One component of CPR is chest compressions. To ensure optimal patient outcomes, high-quality CPR must be performed. You can ensure high-quality CPR by providing high-quality chest compressions, making sure that the:
  - » Patient is on a firm, flat surface to allow for adequate compression. In a non- healthcare setting this would typically be on the floor or ground, while in a healthcare setting this may be on a stretcher or bed.
  - » The chest is exposed to ensure proper hand placement and the ability to visualize chest recoil.
  - » Hands are correctly positioned with the heel of one hand in the center of the chest on the lower half of sternum with the other hand on top. Most rescuers find that interlacing their fingers makes it easier to provide compressions while keeping the fingers off the chest.

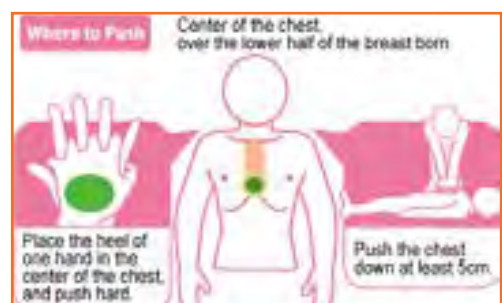


Fig.5.2.14: Compressions

- » Arms are as straight as possible, with the shoulders directly over the hands to promote effective compressions. Locking elbows will help maintain straight arms.
- » Compressions are given at the correct rate of at least 100 per minute to a maximum of 120 per minute, and at the proper depth of at least 2 inches for an adult to promote adequate circulation.
- » The chest must be allowed to fully recoil between each compression to allow blood to flow back into the heart following the compression.
- » For adult co-workers, CPR consists of 30 chest compressions followed by 2 ventilations.
- **Ventilations:** Ventilations supply oxygen to a patient who is not breathing. They may be given via several methods including:

#### **Mouth-to-Mouth**

- Open the airway past a neutral position using the head-tilt/chin-lift technique.
- Pinch the nose shut and make a complete seal over the patient's mouth with your mouth.
- Give ventilations by blowing into the patient's mouth. Ventilations should be given one at a time. Take a break between breaths by breaking the seal slightly between ventilations and then taking a breath before re-sealing over the mouth.

#### **Pocket mask**

CPR breathing barriers, such as pocket masks, create a barrier between your mouth and the patient's mouth and nose. This barrier can help to protect you from contact with a patient's blood, vomitus and saliva, and from breathing the air that the patient exhales.

- Assemble the mask and valve.
- Open the airway past the neutral position using the head-tilt/chin-lift technique from the patient's side when alone.
- Place the mask over the mouth and nose of the patient starting from the bridge of the nose, then place the bottom of the mask below the mouth to the chin (the mask should not extend past the chin).
- Seal the mask by placing the "webbing" between your index finger and thumb on the top of the mask above the valve while placing your remaining fingers on the side of the patient's face. With your other hand (the hand closest to the patient's chest), place your thumb along the base of the mask while placing your bent index finger under the patient's chin, lifting the face into the mask.

### **5.2.4 Performing CPR for an Adult**

- **STEP 1: Check the scene for immediate danger:** Make sure that you are not compromising your own safety by administering CPR to someone else. Is there a fire? Is the person lying on a roadway? It is important to do whatever is necessary to move yourself and carry the other person to safety.
- **STEP 2: Assess the victim's consciousness:** Gently tap his or her on their shoulder and ask, "Are you OK?" If the person responds in affirmative in a loud or clear voice, CPR is not required. Instead, one should undertake basic first aid and take measures to prevent or treat shock and assess whether there is a need to contact emergency services. If the victim is not responsive, the following steps should be undertaken.
- **STEP 3: Do not check for a pulse:** Unless you're a trained medical professional, odds are you'll spend too much valuable time looking for a pulse when you should be doing compressions.

- **STEP 4: Check for breathing:** Make sure that the airway is not blocked. If the mouth is closed, press with your thumb and forefinger on both cheeks at the end of the teeth and then look inside. Remove any visible obstacle that is in your reach but never push your fingers inside too far. Put your ear close to the victim's nose and mouth, and listen for slight breathing. If the victim is coughing or breathing normally, do not perform CPR.



Fig.5.2.15(a): Performing CPR for an Adult

- **STEP 5: Place the victim on his or her back:** Make sure he or she is lying as flat as possible-this will prevent injury while you're doing chest compressions. Tilt their head back by using your palm against their forehead and a push against their chin.

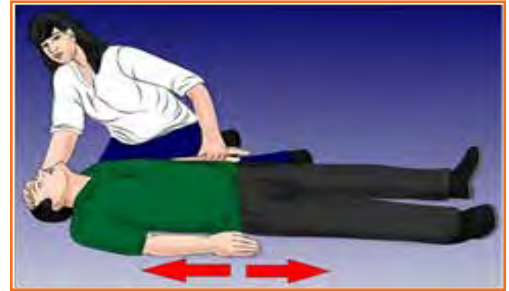


Fig.5.2.15(b): Performing CPR for an Adult

- **STEP 6:** Place the heel of one hand on the victim's breastbone, 2 finger-widths above the meeting area of the lower ribs, exactly in the middle of the chest.



Fig.5.2.15(c): Performing CPR for an Adult

- **STEP 7:** Place your second hand on top of the first hand, Palms-down, interlock the fingers of the second hand between the first.



Fig.5.2.15(d): Performing CPR for an Adult

- **STEP 8:** Position your body directly over your hands, so that your arms are straight and somewhat rigid. Don't flex the arms to push, but sort of lock your elbows, and use your upper body strength to push.



Fig.5.2.15(e): Performing CPR for an Adult



- **STEP 9:** Perform 30 chest compressions. Press down with both hands directly over the breastbone to perform a compression, which helps the heart beat. Chest compressions are more critical for correcting abnormal heart rhythms (ventricular fibrillation or pulseless ventricular tachycardia, heart rapidly quivering instead of beating). You should press down by about 2 inches (5 cm).



Fig.5.2.15(f): Performing CPR for an Adult

- **STEP 10:** Minimize pauses in chest compression that occur when changing providers or preparing for a shock. Attempt to limit interruptions to less than 10 seconds.



Fig.5.2.15(g): Performing CPR for an Adult

- **STEP 11:** Make sure the airway is open. Place your hand on the victim's forehead and two fingers on their chin and tilt the head back to open the airway. If you suspect a neck injury, pull the jaw forward rather than lifting the chin. If jaw thrust fails to open the airway, do a careful head tilt and chin lift. If there are no signs of life, place a breathing barrier (if available) over the victim's mouth.



Fig.5.2.15(h): Performing CPR for an Adult

- **STEP 12:** Give two rescue breaths (optional). If you are trained in CPR and totally confident, give two rescue breaths after your 30 chest compressions. If you've never done CPR before, or you're trained but rusty, stick with only chest compressions.



Fig.5.2.15(i): Performing CPR for an Adult

- **STEP 13:** Repeat the cycle of 30 chest compressions. If you're also doing rescue breaths, keep doing a cycle of 30 chest compressions, and then 2 rescue breaths; repeat the 30 compressions and 2 more breaths. You should do CPR for 2 minutes (5 cycles of compressions to breaths) before spend time checking for signs of life.

### 5.2.5 CPR Using AED

- **STEP 1:** Use an AED (automated external defibrillator). If an AED is available in the immediate area, use it as soon as possible to jump-start the victim's heart. Make sure there are no puddles or standing water in the immediate area.
- **STEP 2:** Fully expose the victim's chest. Remove any metal necklaces or underwire bras. Check for any body piercings, or evidence that the victim has a pacemaker or implantable cardioverter defibrillator (should be indicated by a medical bracelet) to avoid shocking too close to those spots. Make sure the chest is absolutely dry and the victim is not in a puddle. Note that, if the person has a lot of chest hair, you may need to shave it, if possible. Some AED kits come with razors for this purpose.
- **STEP 2:** Attach the sticky pads with electrodes to the victim's chest. Follow the instructions on the AED for placement. Move the pads at least 1 inch (2.5 cm) away from any metal piercings or implanted devices. Make sure no one is touching the person, when you apply the shock.
- **STEP 8:** Press analyse on the AED machine. If a shock is needed for the patient, the machine will notify you. If you do shock the victim, make sure no one is touching him or her.
- **STEP 9:** Do not remove pads from the victim and resume CPR for another 5 cycles before using the AED again. Stick on adhesive electrode pads are intended to be left in place.



Fig.5.2.16(a): Performing CPR for an Adult



Fig.5.2.16(b): Performing CPR for an Adult



Fig.5.2.16(c): Performing CPR for an Adult



Fig.5.2.16(d): Performing CPR for an Adult

### 5.2.6 Chain of Survival

Chain of Survival is a sequential process for providing treatment to victims of SCA outside of a hospital setting. More people can survive SCA if the following steps occur in rapid succession:

- Cardiac arrest is immediately recognized and the emergency response system is activated.
- Early cardiopulmonary resuscitation (CPR) is started with an emphasis on chest compression.
- Rapid defibrillation occurs.
- Effective advanced life support is begun.
- Integrated post-cardiac arrest care is provided.
- Quick execution of each step is critical because the chances of survival decrease 7 to 10 percent with each passing minute.

## UNIT: 5.3: Sensitivity towards People with disability and Gender Equality

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Elaborate the details about PWD Sensitization.
2. Explain gender sensitization and equality.

### 5.3.1 What is sensitization?

The process of becoming highly sensitive to specific events or situations (especially emotional events or situations) Sensitization doesn't always mean feeling the same pain the other person is feeling. It means knowing that the pain exists and there is a different way of living. Despite how the person lives, he or she has a right to exist in a society. It's an attitudinal change and very much required in current time.

#### **Sensitivity to People with Disability**

According to the Oxford Dictionary, a disability could be described as an impairment which can be Intellectual, limitations, cognitive, improvement, sensory, exercise or the mixture of all these. Incapacity impacts a person's activities and may happen at birth. Sometimes, it could happen in adulthood. In the medical model, individuals with certain physical, intellectual, psychological and mental impairments are taken as disabled. According to this, the disability lies in the individual as it is equated with restrictions of activity with the burden of adjusting with environment through cures, treatment and rehabilitation.

People with disabilities are subject to multiple deprivations with limited access to basic services, including education, employment, rehabilitation facilities etc. To work towards an inclusive, barrier free society by raising awareness and policy actions, there is a need to have comprehensive reliable statistics on people with disability and their socio-economic conditions

The Constitution of India ensures equality, freedom, justice and dignity of all individuals including persons with disabilities and mandates an inclusive society for all.

The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation Act, 1995) came into force on February 7, 1996. This was an important landmark and was a significant step in the direction of ensuring equal opportunities for persons with disabilities and their full participation in the nation building. The Act provides for both preventive and promotional aspects of rehabilitation like education, employment and vocational training, job reservation, research and manpower development, creation of barrier-free environment, rehabilitation of person with disability, unemployment allowance for the disabled, special insurance scheme for the disabled employees and establishment of homes for persons with severe disability etc.

In order to give focused attention to Policy issues and meaningful thrust to the activities aimed at welfare and empowerment of the Persons with Disabilities, a separate Department of Empowerment of Persons with Disabilities (Divyangjan) (DEPwD) under Ministry of Social Justice & Empowerment was set up in May 2012.

Empowerment of persons with disabilities is an inter-disciplinary process, covering various aspects namely, prevention, early detection, intervention, education, health, vocational training, rehabilitation and social integration.

The disability community is very diverse. Some individuals with a disability may be employed, while others may rely on public benefits as their main sources of income. Some of the public benefits they receive might have limitations. Income, resource and savings limits often prevent individuals from enhancing their financial wellbeing and self-sufficiency as they concentrate efforts on retaining their benefits

Rather than charities, disabled people need sensitivity of the society and initiatives to make their life easy.. New and existing programs are available to help people with disabilities develop skills in financial management and self-sufficiency. Government keeps trying to support in every possible manner so that they can earn their livelihood.

We learn so many virtues from disabled people like patience, courage, positive thinking etc .Hence; this gives us all the more reasons to have a developmental approach towards them. With so many technological breakthroughs happening all over the world, the Governments have spent in Research and development and innovations which would make the life of disabled people happier and easier.

For example, the invention of artificial limbs caused a revolution. They are available to the most disabled people and they can reap benefits from them.

Also, educating them and giving them jobs based upon their physical condition will make them feel a “sense of achievement” and increase their happiness quotient.

Also, disabled people should be trained by specialists in their fields so that they can try and overcome their shortcomings to the maximum extent possible and lead a life which is satisfactory and happy.

### 5.3.1.1 Myths and Stereotypes

We are all individuals with commonalities and differences and that is true for persons with disabilities as well. As an instructor, it is important to remember to not show pity or put an individual up on a pedestal – everyone should be treated as equals regardless of one’s abilities. When working with people with disabilities, it is important to avoid stereotypes. To debunk common stereotypes and myths, below are some key items to note about persons with disabilities:

- Persons with disabilities are all ages, come from diverse cultures and financial backgrounds.
- People with disabilities work.
- People with disabilities have families.
- Not all persons with disabilities are on or receive benefits such as ESI, Medicaid, etc.
- People with disabilities have goals and dreams.
- All people with disabilities do not necessarily want or need assistance.
- People who are blind or have low vision may wear glasses.
- People who are deaf may use their voice and may be able to read lips, but not all.
- Not all people who use wheelchairs are completely paralyzed – some may be able to walk short distances.
- Delayed or slow speech is not necessarily a sign of a slowed mental process.
- Persons with learning disabilities can be highly intelligent individuals; they simply have a different way of learning.



### 5.3.1.2 People's first language

Positive language empowers people and helps them feel respected and important. When writing or speaking about people who have a disability, it is important to put the person first, usually addressing them by name or including them as a member of a group, such as a student or co-worker. Group designations such as "the blind," "the retarded" or "the disabled" are inappropriate because they do not reflect the individuality, equality or dignity of people with disabilities.

Here are some general tips to keep in mind:

- **Offer to shake hands when introduced.** People with limited hand use or an artificial limb can usually shake hands and offering the left hand is an acceptable greeting.
- **Treat adults as adults!** Address people with disabilities by their first names only when extending that same familiarity to all others.
- **Ask First.** If you offer assistance (always ask before assisting someone), then wait until the offer is accepted. Then ask the individual with a disability for instructions on how you may assist them.
- **Relax.** Don't be embarrassed if you happen to use common expressions such as, "See you later" or "Did you hear about this?", that seem to relate to a person's disability
- **Give them respect** as any other individual.

### 5.3.2 Gender Sensitization

#### What is Gender?

The socially constructed and culturally defined roles, responsibilities, attributes, and entitlements assigned to people based on their sex assigned at birth in a given setting, along with the power relations between and among the assigned groups.

Gender equality is the concept that all human beings, irrespective of their sex or gender identity, are free to develop their personal abilities and make choices without the limitations set by stereotypes, rigid gender roles, or discrimination.

#### What is Gender Bias?

- Gender bias is the tendency to make decisions or take actions based on preconceived notions of capability according to gender. People with disabilities have families.
- Not all persons with disabilities are on or receive benefits such as ESI, Medicaid, etc

It is the process of raising awareness and inculcating empathy about one's own and the other gender. Since one of the most common area of discrimination is based on gender, there is a great need to sensitize the youth on gender related issues. This would strongly contribute in ensuring that equal roles, responsibilities, opportunities, and expectations are assigned to both men and women. Training on gender sensitization will help break the stereotypes around job roles, women's participation in particular trades, and would support in equal participation of men and women in the decision-making process.

#### 5.3.2.1 Why is the Need for Gender Sensitivity

##### Couple communication and decision-making

The role of men and women in household decisions about finances, food consumption, childcare, healthcare or travel often reflect power relations in the home. When power relations are unequal, it results in not only

one sided biased decision but also can increase risky sexual behavior and intimate partner violence. While it is important for women to play a larger role in important household decisions, such as financing, men should also become more involved in healthcare and household decisions around health. Couple communication and joint decision-making have a positive impact on health outcomes.

#### Access to opportunities and resources

Gender-related factors also affect health outcomes through differential access to opportunities and resources like education, employment and healthcare.

- **Education:** Gender roles often restrict both boys' and girls' access to education which can have long-term effects on health outcomes. For example, more educated women and formally employed women are more likely to use family planning, which reduces the risk of unwanted pregnancy and potentially, the need for abortion
- **Employment:** In many contexts, women's traditional responsibilities are primarily domestic and they do not work outside the home. When they do, they are often part of the informal economy, in lower-paid and less-skilled jobs without opportunities to join unions or trade organizations that advocate for better pay or rights
- **Healthcare:** Women's mobility may limit their access to health services and existing programs intended to increase knowledge of family planning or other health information. Men often do not go to health clinics for their own care or with their partner because pregnancy and child health are seen as a "woman's domain."

#### Social, cultural and gender norms

Norms related to gender, such as gender preference, masculinity and fertility, also influence health outcomes.

- **Gender Preference:** In India, China, and to a certain extent in some African countries, there is a gender bias in child healthcare. Preference for boys can lead to financial resources for education and other services, like healthcare, being differentially allocated within households. Reasons for this preference vary, and include the perception that boys will financially support their parents when they are older, and that families are obliged to pay dowries when their daughters marry.
- **Fertility:** In many areas, a woman's value is often measured by her ability to have children. This can lead women to put their own health or the health of their family at risk by starting pregnancy too early, when not yet physically matured, and giving birth without proper spacing or having more children than the household can support. For couples facing fertility issues, women often bear the brunt of household and community-level stigma and abuse for failing to conceive.
- **Masculinity:** Masculine ideas associating men with strength, virility, dominance and power may increase the number of sexual partners and inhibit the use of condoms, thereby increasing the risk for unwanted pregnancy or the transmission of STIs or HIV through unprotected sex or sexual violence. These masculine norms also may promote or normalize violence against women

#### Summary of Need for Gender Sensitization

- To provide balance to the society
- To provide equal opportunities to women and men
- To gauge views of all sections of society
- To distribute resources evenly
- To allow same personal freedom for men and women
- To even out the gender bias present in the society

### How to stop gender bias

- Education that helps create attitudinal shifts towards gender bias and activities to spread awareness.
- Continuous efforts towards breaking myths and stereotypes around gender.
- Ensuring State accountability to implement various schemes, policies, laws, constitutional guarantees and international commitments.
- Institutionalizing gender sensitive processes within various systems such as law and programmes.
- Encouraging community ownership in preventing violations based on gender discrimination.

Sexual harassment at workplace is an extension of violence in everyday life and severely affects. Women's right to work in a safe and secure environment. While it is the responsibility of every employer to ensure safety of women at the workplace, it is also important for the trainees, both men and women, to be aware of all aspects of sexual harassment at the workplace. Skill training for both male and female trainees and professionals in the skilling ecosystem is centered around the following issues:


- What constitutes workplace sexual harassment?
- Where can the aggrieved complain about the same?
- What are the rights of the aggrieved?
- What is the redressal mechanism?
- Which are the bodies involved in addressing these complaints?
- What are the possible actions that can be taken against the accused?

## Resources



Scan the QR code or click the link to access the videos or e-book.

Description	QR Code
Health related threats in apparel industry and control on them	 <a href="https://youtu.be/POlQ27GQZp0">https://youtu.be/POlQ27GQZp0</a>
First aid	 <a href="https://youtu.be/DQ7JPNgU8Wg">https://youtu.be/DQ7JPNgU8Wg</a>

Gender sensitization	 <a href="https://youtu.be/Wi1exdO1lig">https://youtu.be/Wi1exdO1lig</a>
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## Industry Visit

The purpose of visiting an apparel manufacturing unit is to get hands on knowledge about various processes involved in the work of a Pressman. During the visit you have to interact with SMO and supervisors to understand how work is done in industry. Make sure that you keep a notebook handy and note down any important points that come up during your interaction at the apparel manufacturing unit. When you go to an apparel manufacturing unit, you should:

- Know about the production system.
- Understand the machine safety and maintenance rules of industry.
- Analyze how SMOs:
  - » Use and maintain personal protective equipment as per protocol.
  - » Maintain a healthy lifestyle and guard against dependency on intoxicants.
  - » Follow environment management system related procedures.
  - » Identify and correct (if possible) malfunctions in machinery and equipment.
  - » Store materials and equipment in line with manufacturer's and organizational requirements.
  - » Minimize health and safety risks to self and others due to own actions.
  - » Monitor the workplace and work processes for potential risks and threats.
  - » Carryout periodic walk-through to keep work area free from hazards and obstructions, if assigned.
  - » Report hazards and potential risks/threats to supervisors or other authorized personnel.
  - » Participate in mock drills/ evacuation procedures organized at the workplace.
  - » Take action based on instructions in the event of fire.
- Ask questions to SMOs/supervisors if you have any query.

## Exercise

1. Heart rate of a healthy person should be:
  - a) 40-60 beats per minute
  - b) 70-110 beats per minute
  - c) 80-100 beats per minute
  - d) 60-100 beats per minute
1. What is not in Four A's of First Aid:
  - a) Awareness
  - b) Assessment
  - c) Action
  - d) Attitude
2. The symptoms of fracture:
  - a) Pain
  - b) Swelling
  - c) Visible bone
  - d) All of the above
3. Which degree of burn is explained as; Extremely Serious and requires many years with repeated plastic surgery and skin grafting to heal?
  - a) 1st Degree Burn
  - b) 2st Degree Burn
  - c) 3st Degree Burn
  - d) 4st Degree Burn
4. .... is a level of medical care which is used for victims of life-threatening illnesses or injuries until they can be given full medical care at a hospital.
  - a) Basic life support (BLS)
  - b) CPR
  - c) ABC
  - d) All of the above



## 6. Comply with Industry, Regulatory and Organizational Requirements and Greening of Job Roles



Unit 6.1: Comply with industry, regulatory and organizational requirements and Greening of Job roles



## Key Learning Outcomes

**At the end of this module, participants will be able to:**

1. Carryout work functions in accordance with legislation and regulations, organizational guidelines and procedures.
2. Seek and obtain clarifications on policies and procedures, from your supervisor or other authorized personnel.
3. Apply and follow these policies and procedures within your work practices.
4. Provide support to your supervisor and team members in enforcing these considerations.
5. Identify and report any possible deviation to these requirements.
6. Explain the effect and importance of Greening of Job roles.

## UNIT 6.1: Comply with Industry, Regulatory and Organizational Requirements

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Carryout work functions in accordance with legislation and regulations, organizational guidelines and procedures.
2. Seek and obtain clarifications on policies and procedures, from your supervisor or other authorized personnel.
3. Apply and follow these policies and procedures within your work practices.
4. Provide support to your supervisor and team members in enforcing these considerations.
5. Identify and report any possible deviation to these requirements.
6. Explain the effect and importance of Greening of Job roles.
7. Apply conscious and sustainable decisions that help reduce, reuse, and recycle the company resources.

### 6.1.1 Defining Compliance for Your Organization

According to Merriam Webster the dictionary definition of compliance is as follows:

1. The act or process of complying to a desire, demand, proposal, or regimen, or to coercion.
2. Conformity in fulfilling official requirements.
3. A disposition to yield to others.
4. The ability of an object to yield elastically when a force is applied.



Fig.6.1.1: Regulatory Compliance

Supervisory compliance for industries, world- wide falls under the second definition. There are many managers, general councils, and policy officers that would consent in agreement at any of the other definitions as well. Let's discuss, what is compliance? Whether an organization is confronting an external regulatory compliance from a government agency, or seeks to comply with its own organizational mandates, policies or procedures, compliance in actuality means conforming to requirements and a proof that your organization has done so. This is usually attained by the scheming and development of managerial policies that will map out the projected code of conduct.

From a policy's point of view, there are many aspects that impact an organization's policies, including legislative and regulatory requirements, organizational best practices, and the market demands. If we look at government/ public sector agencies, financial service businesses, and healthcare providers - we find that they are controlled and must develop internal policies in order to ensure compliance. The actual trial comes from the juncture of practice with the laid policy.

After that, they must adopt ways to enforce those policies and measure their effectiveness. Initially this may seem to be an easy and convenient task. But the dilemma is creating a policy – without any mechanism, may it be manual, automated, or third-part, to measure and monitor compliance of the policies is very difficult. In order to build effective policies, we must not only have an understanding of the statutory requirements that will shape

the policy within our organizations, but how these policies relate to the business practices, the workforce, the methodologies of operations and the technologies within the corporation.

Irrespective of the requirements to which an organization must obey, a well-planned model is essential which will be one that assimilates strategies with their people, processes, and technology. This includes education, monitoring, and enforcement. Organizations should look to use machineries and to develop procedures that make it easier to do the right thing or to simply disregard the policy all together. In conducting performance audits, an assessment should be made of compliance with applicable laws and regulations when necessary to satisfy the audit objectives. The auditor should design the audit to provide reasonable assurance of detecting illegal acts that could significantly affect audit objectives. The auditor also should be alert to situations or transactions that could be indicative of illegal acts that may have an indirect effect on the audit results.

### 6.1.2 Significance of Compliance in Indian Garment Industry

Compliance is the standard for the product which ensures that it is aligned to its industry's qualitative demands. This also includes audits and inspections which are crucial to a proper and formal work environment. Compliance and its demand is rapidly growing in today's industrial scene since globalization of manufacturing standards has also created a demand for ethically created products. This standard of compliance is crucial because of the increase in export of garments from India.

#### Social Compliance

The treatment of the employees by its business constitutes social compliance. This also includes their environment and their personal perspective on social responsibility as an employee. The treatment of employees regarding wages, work conditions and working hours. A compliance audit is necessary in order to determine if the company meets standard environmental laws.

#### Compliance Audit

Process Safety Management, Risk Management Programs, and Process Security Management are all organised and provided by audits and assessments. Compliance and its verification is carried out with audits that focus particularly on these policies and procedures. The design and implementation of these audits ensures this compliance. Additionally, all sorts of deficiencies can be addressed and solved through corrective action.

In India, compliance audit consists of a thorough examination of orders, regulations, rules and directions for dealing with prudence, legality, transparency and adequacy. It is the job of auditors to collect information by reviewing documents, visually observing the site and staff interviews. This data is cross checked with applicable regulations and permits to ensure how well the operation is when sieved through applicable and required legalities.

There are three main phases of compliance audit in India:

1. **Pre-audit:** It includes planning and organising the audit; establishing the audit objectives, scope and etiquette; and reviewing the design of the program by inspecting documentation
2. **On-site audit:** It includes conducting personnel interviews, reviewing records, and making observations to assess program implementation
3. **Post-audit:** It includes briefing the management on audit findings, and preparing a final report

Therefore, Indian apparel manufacturers need to follow Government guidelines, and social compliance standards not only within their sphere of operations, but also insist their vendors, distributors, and other collaborators involved in the supply chain to do the same.

### 6.1.2.1 Core Labour Standards

International labour standards have grown into a wide-ranging system of gadgets on work and social policy, backed by a administrative system intended to address all sorts of complications in their submission at the national level

- Removal of Discernment in Employment and Occupation
- Freedom of Association
- Right to Collective Bargaining
- Elimination of all Forms of Forced or Compulsory Labour
- Effective Abolition of Child Labour

Apparel industry players would ensure that labour contractors don't involve forced labour or child labour and get the supply chain of the suppliers audited. Apparel Export Promotion Council (AEPC), a top organization of Indian apparel exporters, has envisioned a garment factory compliance program 'Disha' -Driving Industry towards Sustainable Human Capital Advancement. The prime objective of this body is to make India a global benchmark for social compliance in apparel Industrial. This Common Compliance Code design will prepare the Indian apparel industry on a mutual platform towards a more social and ecologically compliant industrial atmosphere.

### 6.1.3 India Adopting Universal Standards on Child Labour

The compliance level of garment factory is very high for Indian exporters. To ensure that all standards are being complied with, the big international companies, mindful of their branding, often generate and follow their own compliance standards. Numerous U.S. companies have incorporated "child labour" in their code of conduct, due to tenacious signal of child exploitation in the industry.

#### 6.1.3.1 Common Compliance Code

There is a compliance exhaustion in the Apparel Industry,. Although they are trading with the global brands, the apparel sellers still don't consent that compliance is an integral management practice. The Indian apparel export industry has been indisputable to implement zero tolerance on child labour and cleanse the supply chain.

"This common compliance code will not only give the opportunity for the industry to negate international claims against child labour promotion in the garment industry, but will also help to improve the image of the industry and win more international businesses," as per PremalUdani, Chairman, Apparel Export Promotion Council (AEPC).

### 6.1.4 Role of AEPC in Indian Garment Industry

The apparel industry of India is one of the significant export segments. It enjoys a good global ranking because of its quality and price affordability. But there is an emerging need to increase effectiveness in the social domain as the industry faces various labour, compliance and background situations.

Being a labour rigorous industry, social compliance is becoming an integral issue for this sector. The apparel export promotion council of India (AEPC) under the textiles ministry is plateful domestic textile trade to follow the global norms through development and application of tools to help workshops certify, monitor and improve universal standards.



Fig.6.1.2: AEPC Logo



**AEPC's assistance to garment exporters**

AEPC brings about invaluable backing to Indian garment exporters and also the international buyers who select India as their favoured trading terminus for garments. The body today has grown-up to become the most powerful connotation for promotion and facilitation of garment exports. With an objective of structuring a strong ground for Indian exporters, AEPC is devoted to provide various podiums which would help in increasing garment exports.

**Role of Apparel Export Promotion Council in India**

In India, the Apparel Export Promotion Council (AEPC) is committed to legal compliance and principled business Practices. It encourages members/exporters to comply with all applicable laws and regulations of the country to meet international compliance standards. Further, the council has designed a garment factory compliance program 'Disha' (Driving Industry towards Sustainable Human Capital Advancement) that aims to spread awareness regarding the importance of compliance among garment exporters.

**6.1.5 Indian Garment Industry and Social Responsibility**

The apparel industry of India, is one of the biggest segments among the various industries existing. It is also one of the oldest and an eminent industry in terms of output, investment and employment. A sector which has a global market share and has earned reputation for its permanence, worth and magnificence. The industry is growing at a fast pace with change in customer taste and inclinations. There are numerous factors impacting a change in customer preferences. Few of them are here:

- Rise in disposable incomes
- Government policy focused on fast-track growth
- Convenience of shopping at departmental stores and shopping malls
- Increasing demand for branded apparels and fashion accessories
- Boom in the retail industry

**6.1.5.1 International Labour Standards**

The Indian apparel industry had established itself substantially not just in the domestic but global market too. The improved density from international apparel buyers to comply with labour principles and rights in Indian garment factories has resulted into a vast number of labels and code of conduct.

**6.1.5.2 Corporate Social Responsibility**

Corporate social responsibility (CSR) fundamentally connotes that the establishment should work in a principled way. It should work in the best interest of the parties associated with it. The notion of social accountability and responsibilities in Indian apparel sector is fastening acceptance. Increasing number of companies are tiring to work in a mode to defend the interests of the workforce, clients, contractors and the society.

### 6.1.5.3 Social Responsibility in the Garment Industry

Garment firms have social responsibility associated with workforce and the surroundings. Social responsibility in the global clothing industry gives a deep examination of labour practices and values. But the ways by which the various organisations take up to accomplish their social accountability may be different. A garment factory can fulfil its social responsibility in the following manner:

- By creating and providing a challenging environment to the workforce.
- Creation and provision of fair book of policies for any kind of employee dispute, if any.
- Affirm a safe and positive working environment for the employees.
- Prohibit child labour and abolish any kind of child abuse.
- Provision of equal opportunities to the employees to voice their feedback and have an effective policy for the solution of dispute.
- Ensure ethical recruitment, training, remuneration, appraisal and other policies.

### 6.1.6 Indian Apparel Trade and Compliance Standards

With the increasing globalisation, a lot of prominence has been placed on global compliance standards in the garment industry. Factories involved in the international trade must keep a proper check of the garment factory compliance at regular interludes. Therefore, every apparel export business needs to have a proper understanding of compliance rules for foreign trade.

#### 6.1.6.1 Why Code of Ethics is Required

The code of ethics is concerned with the quality of the products and services from the workstations along with the working environment that should meet the provisions of audits and assessments. If followed sincerely, these ethics will result into:

- Cumulative national affordability in terms of social compliance.
- Growing competitiveness of small scale industrialists.
- Dropping burden on manufacturers.

Some of the compliance codes in Indian garment industry are listed below.

#### 6.1.6.2 Working Hour & Wage Rate Compliance

- Garment workshops should ensure a confirmation that employees should get minimum wages as per the domestic law and according to their working hours spent by them in the industry.
- Employer should confirm an equal wages to both men and women employees who are performing the same work or work of a similar nature.
- Workforce employed for more than nine hours on any day or for more than 48 hours in any week, shall be qualified to wages at premium legal rates for such overtime work.
- Every employee must be entitled to one holiday in a week. Whenever a worker is required to work on a weekly holiday, he is to be allowed a compensatory holiday for each holiday so lost.

### 6.1.6.3 Workplace & Work Environment Compliance

- Businesses units should see that they are providing a proper clean, hygienic, well-ventilation, sufficient light and air to provide the workforce with standard work environment. A comfortable workstation with a clean and neat workplace is a mandate.
- Indian garment industries should ensure that the workers are given a comfortable sitting chair with back support and proper leg space.

### 6.1.6.4 Non-discrimination Compliance

Under federal and state laws, it is in contradiction of the law for proprietors to differentiate staffs and job applicants and/or harassment to occur with their organizations. It is also against the law to treat people unethically or bother them because of the age, disability, homosexuality, marital or domestic status, race, sex or transgender status of any relative, friend or colleague of a job applicant or employee. Employers, managers and supervisors must treat all their job applicants and employees on the basis of their individual merit and not because of irrelevant personal characteristics. They must also do their best to make sure that their employees are not harassing any other job applicant or employee.

### 6.1.6.5 Social Compliance in India

Religion, community, culture or belief characteristics should never be the basis of distinction among employees by the organisation. All the terms and conditions of employment should be based on a person's ability to do the job. The mandate for social compliance is growing every day. One can accomplish a dynamic and vigorous compliance system only when the workforce is provided with an equal stand to voice their concern and have consultative instrument at the workplace.

The Apparel Export Promotion Council of India (AEPC), a summit framework of Indian apparel exporters, runs all social compliance services to meet international global standards. This council trains and monitors industrial unit to upgrade the factory conditions and labour values and standards.

### 6.1.7 Health and Safety Compliance in Indian Garment Industry

Apparel industry has won increased attention from consumers, social workers, welfare organisations and trademarked international buyers. Many global players are demanding that their "code of conduct" should be complied to, before entering into an agreement. Nowadays, continuous observance to quality standards and employee contentment have become significant bounds for gauging the company's performance.

Apart from the growing quality of outputs that meet transnationally recognised standards, it is essential for the suppliers to improve safety and health compliance code and provide proper working atmosphere in their work locations.

Numerous overseas countries have established various international compliance standards on safety and health compliance. Exporters should follow these codes to live on in the global market. One should not under-estimate the benefits drawn from regular drilling of compliance codes of conduct which can bring higher price of yields, less employee turnover rate, smooth trade relation as well as global image & status.

### 6.1.7.1 Need for Compliance Codes

There is prominent impact of social compliance on company's economic outcomes. Companies should adopt compliance code to protect their goodwill and brand name in the market. The Indian apparel industry needs to be hard-hitting on compliance rather than opposing with other developing countries manufacturing low-cost garments.

### 6.1.7.2 Compliance Code Guidelines

Apparel factories ought to contemplate the below mentioned guidelines when complying with safety and health compliance code standards:

- Trades should comply with international standard code, such as ISO or importing countries standard code to become competitive in international markets.
- It is necessary for workers involved in loading and unloading operations.
- Young adults (between 15 to 18 years) are not allowed to work on any dangerous machine without sufficient training and supervision.
- Ear plugs or muffs should be given in places with excessive sound such as generator rooms and embroidery rooms.
- Factories should have effective fire extinguisher with proper usage instructions.
- Eye-wear and face shields should be a must, providing in areas with danger of flying objects, sparks, glare, hazardous liquids and excessive dust.

#### Code to protect their goodwill in the market

This industry needs to be tough on compliance rather than challenging with other developing countries manufacturing inexpensive garments. In India, the Apparel Export Promotion Council (AEPC) is committed to legal compliance and ethical business practices and encourages members/exporters to comply with all applicable laws and regulations of the country to meet international compliance standards.

The council has designed a garment factory compliance program 'Disha' (Driving Industry towards Sustainable Human Capital Advancement) that aims to spread awareness regarding the importance of compliance among apparel exporters.

### 6.1.8 Compliance Code Guidelines for Indian Garment Industry

The Indian apparel industry supports considerably to India's export earnings. India has industrialised as a major following destination for various buyers. The USA and the EU endure to be the most domineering markets for Indian apparel industry, bookkeeping for about two-third of India's textiles exports. These countries have been demanding upon compliance to certain social, environmental and safety standards and norms by the manufacture units involved in export business. Corporate codes of conduct that discourses labour standards vary from corporation to corporation and location to location. Some of the common Indian Garment industry compliance code guidelines are:

- Exporters must not be intricate in unfair labour practices but limited to interferences in matters regarding freedom of association.
- Exporters shall recompense workforce for all hours operated. Workers on a piece rate payment scheme or any other incentive scheme should be paid according to that.

- Exporters shall not illogically restrain the liberty of movement of workers, including movement in canteen during breaks, using toilets, accessing water, or to access necessary medical attention, as a means to maintain work discipline.
- Exporters are about to offer workers with paid annual leaves as required under local laws, guidelines and processes. Exporters shall not impose any undue limitations on workers' use of annual leave or taking any type of sick or maternity leave.
- There shall be no alterations in workers remuneration for work of equal value on the basis of gender, race, religion, age, nationality, sexual orientation, social political opinion, disability or ethnic origin.
- Exporters shall not threaten female workers with firing or any other employment conclusion that adversely distresses their service status in order to avert them from getting married or becoming pregnant.
- Exporters shall confirm that proper ventilation systems are installed within their premises to prevent airborne exposures which may affect the health of workers.
- Members shall not custom any form of physical or mental, emotional violence, threats, harassment, or abuse against workers seeking to form organisations or participating in union activities, including strikes.
- Workers shall be permitted to at least 24 successive hours of rest in every seven-day period. If workers must work on a rest day, another successive 24 hours rest day must be provided.
- Exporters shall pay workers at least the legal minimum wage or the usual industry wage, the one that is Higher. This indeed is the most essential code of compliance for Indian Industry.
- Garment exporters must ensure that the minimum age requirement to unsafe employment shall not be less than 14 years. This is the most significant concern in the country. Each worker has the right to enter into and to terminate their employment freely. Indian apparel makers need to follow all the compliance rules to comply with global standards. Often companies adopt industry compliance codes to project a positive image and protect their goodwill in the market. The Indian garment industry needs to be strong on compliance instead of competing with other developing countries manufacturing inexpensive garments.

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### 6.1.9 India Complying with International Standards on Child Labour

Child labour has been a grave crime in India. It still exists. Children are in poverty, ignorance, and corruption due to illiteracy. Child labour superfluities under many conditions such as discernment (based on gender, ethnic, or religious issues), inaccessibility of educational and other substitutes, weak enforcement of child labour laws, etc. Large global firms, conscious of their image, often set up their own compliance standards for the exporters to ensure that all standards are being complied with.

Various companies of U.S originality have included child labour in their code of conduct, due to tenacious evidence of child exploitation in the industry. In worldwide market, the buyer's compulsory requirement is to have an audit. As India is a leading garment exporter, the level of garment factory compliance is very high for Indian exporters. The child labour issue is one of the very important aspect that the audit checks. Therefore, all the export units must be highly compliant on issues related to child labour.



### 6.1.9.1 Code of Conduct for Garment Exporters

- Garment exporters must safeguard that the bottom limit of the age requirement to non-hazardous employment should not be less than 14 years. Moreover, all young workers (between 14 to 18 years) must be sheltered from doing any work that is likely to be dangerous or that may be injurious to their health and physical, mental, social, or moral development. Exporters must detect all legal necessities for work being performed by lawful young workers.
- Further, the trainees or occupational students shall not be under the legal age for employment (as provided under the applicable laws). They cannot be used on regular production lines as long as they are trainees and unless their pay and other benefits are at par with the regular workforce.
- A proper process is followed for checking the age of the workers. The minimum certification and credentials required to be maintained shall include- proof of age certificates by registered/ licensed dentists, birth certificate, school leaving certificate, national identity like passport, driving license, voter card etc. or any other document required under the applicable laws.

Apparel industry players would now make sure that labour contractors don't engage child labour and get the supply chain of the suppliers audited. Apparel Export Promotion Council (AEPC) has intended a garment factory compliance program 'Disha' (Driving Industry towards Sustainable Human Capital Advancement) to make India a global benchmark for social acquiescence in apparel manufacturing and export. This Common Compliance Code project will prepare the Indian apparel industry on a mutual platform towards a more social and environmentally accommodating industrial environment.

### 6.1.10 Green Jobs

*"Green jobs' are defined as jobs that reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable."*

Green jobs can produce goods or provide services that reduce environmental impact, such as green buildings or clean technology adoption. An important section of green jobs lies in sustainable or clean manufacturing. India has already begun preparation towards a green transition by institutionalizing capacity buildings for green jobs through jobs, including legal regulations and skill mapping. The country is accelerating the expansion of green jobs in large industries like automotive, textile, brick manufacturing, power sector, and green buildings. It is gradually expanding its coverage to hard-to-abate sectors such as steel, thermal power plants, and manufacturing SMEs.

India will soon be the most populous country in the world – and home to one of the youngest populations. India is the world's third-largest energy consuming country, with 80 per cent of demand met by coal, oil and solid biomass. Despite its efforts, India is predicted to be among the top three emitters by 2030. Millions of Indian households are set to buy new appliances, air conditioning units and vehicles.

Rapid growth is expected in building stock, other infrastructure, and construction materials. In recent years, India created a massive expansion in renewable energy. India's efforts at promoting LED lighting are a huge success story. Over 367 million LED bulbs, 7.2 million LED tube lights and 2.3 million energy efficient fans have been distributed. This has brought big savings in power use, greenhouse gas emissions and household bills.

India has also taken steps to control plastic pollution, including bans on single-use plastic and strengthening extended producer responsibility. India has also committed to restoring 26 million hectares of degraded land by 2030. But India, like every nation, must do more. And doing more is in the best interests of the entire nation. A recent World Economic Forum estimate suggests that India's decarbonization journey represents a USD 15 trillion economic opportunity by 2070. This journey could create as many as 50 million net new jobs.



Fig.6.1.3: Diversified green jobs

### About sustainability and sustainable workplace

Sustainability, greening the corporation, environment management are gradually becoming a part of the corporate vocabulary. The way the natural resources are extracted and consumed from earth, it is going to be very difficult to replenish them timely. It is often discussed in various forums that for generating the resources we spend in one year; earth takes around 1.5 years for the re-generation. Hence, it can be assumed that there will a requirement of the capacity of almost two Earths by 2030 to keep pace with the present natural resource consumption, and the requirement will be of three planets by 2050.

The current requirement is towards developing long-term, meaningful relationships, and self-discipline for attaining effective results. Thus, the design of the workplace is such that supports the basic and core idea in a more accommodating and comprehensive manner.

A Green workplace is an eco-friendly and focused organisation and leans towards the adoption of business practices that are justifiable in nature, energy efficient, and well suited to the complex as well as the ever changing world of business. It advocates the model based on 3Rs — reduce, reuse, recycle. It encompasses green competencies, green attitude, and green behaviour, which is combined synergistically to help the organisation become green or sustainable. Values are the essential characteristic that both employees and organisations uphold and operate at multiple levels (societal, organisational and personal), thus playing a fundamental role in shaping the organisation's culture with regard to a shift towards greater sustainability.

The idea of introducing green initiatives into the workplace can feel a little daunting at first. And while it may feel overwhelming trying to figure out where to start, there are actually lots of ways we can be more green in the office without bringing the whole forest inside, without huge cost implications and with long-term benefits to the company, employee well-being and future spend. Implementing a few simple changes for a more sustainable, green workplace can be really effective in reducing your business' impact on the environment.

Sustainability is now counted as one of the major pillars of apparel export business and a growth tool. Though its key areas involve saving of energy, water, more greenery in the factories, maximum use of natural resources, green factories, there are many other initiatives which are being taken by various companies as per their need, priorities, and with the changing sustainability landscape, bench marks and issues are also evolving. All these efforts are generating great results, bringing buyers closer to them and creating a sense of profitability and responsibility amongst the companies towards the people and the planet.

#### A few green workplace initiatives

1. Discourage food and water wastage
2. Switch off the lights or power when not in use
3. Switch off the sewing machine when not in use
4. Stop using Single use Plastic
5. Segregate waste as per waste management/disposal policy
6. Any sort of wastages like empty glasses/bottles/plastics/containers etc should be kept in a specific area to be recycled
7. Throw waste only in the allocated basket or trolley
8. Minimise use of paper
9. Use of LED lights
10. Installation of solar panels

Encourage similar practice at home also.



## 7. Soft Skills

Unit 7.1 - Introduction to the Soft Skills

Unit 7.2 - Effective Communication

Unit 7.3 - Grooming and Hygiene

Unit 7.4 - Development of Interpersonal Skill

Unit 7.5 - Social Interaction

Unit 7.6 - Group Interaction

Unit 7.7 - Time Management

Unit 7.8 - Resume Preparation

Unit 7.9 - Interview Preparation



## Key Learning Outcomes

**At the end of this module, participants will be able to:**

1. Interpret the basic meaning of Soft Skills, their components and their benefits.
2. Interpret Work Readiness and its significance.
3. Explain communication process.
4. Explain about verbal and non- verbal communication.
5. Explain about the barriers in communication process.
6. Maintain cleanliness and hygiene.
7. Identify specific uniform guidelines
8. Maintain positive body language while speaking.
9. Interpret good eating habit and their impact on health.
10. Develop a positive attitude and behavior.
11. Explain team dynamics.
12. Explain how to manage relations.
13. Learn about Stress and anger management skills.
14. Learn to develop leadership qualities.
15. Explain about what is social interaction and what are social interaction behaviors.
16. Practice Self introduction in public.
17. Participate in group discussions in the class.
18. Identify the importance of team building and team work.
19. Explain about the time management.
20. Develop time management skills.
21. Learn about effective time planning.
22. Interpret the importance of resume.
23. Learn how to prepare a resume.
24. Explain the procedure of interview.
25. Practice mock interview.
26. Identify how to present themselves during an interview.

## UNIT 7.1: Introduction to the Soft Skills

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Interpret basic meaning of Soft Skills, their components and their benefits.
2. Explain the components and their benefits.

#### 7.1.1 What is a Soft Skill?

Soft skills are personal attributes that describes an individual's ability to interact with others. Soft skills is a term often associated with a person's EQ, the cluster of personality traits, social graces, communication language, personal habits, friendliness and optimism that characterise relationship with other people. Soft Skills complement hard skills which are occupational requirements of a job and many other activities. They are related to feelings, emotions, insights and an inner knowing.

Soft skills have more to do with who we are than what we know. As such soft, skills encompasses, the character traits that decide how well one interact with others and are usually a definite part of one's personality.

According to a survey the long term success in job is 75 % due to soft skills and 25 % due to technical knowhow. Soft skills also determine how satisfied and happy one remains in professional and personal situations.



Fig.7.1.1: Soft skills

#### 7.1.2 Components of Soft Skills

- Adaptability
- Emotional Strength
- Leadership Quality
- Team Playing Ability
- Decision Making
- Interpersonal Communication
- Negotiation Skills



### 7.1.3 Benefits of Soft Skills

Some of the benefits of Soft Skills are as:

- Increased credibility with customers.
- Increased customer satisfaction.
- More productive employees.
- Out service the competition.
- Recognition from the industry, employer and peers.
- New employment opportunities.
- Increased ability to perform on the job.

## UNIT 7.2: Effective Communication

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Explain the meaning of Communication and process of communication.
2. Elaborate about the types of communication.
3. Identify the barrier in effective communication.

### 7.2.1 Introduction

In the information age we have to send, receive and process huge number of messages everyday. But effective communication is more than just exchanging information, it also about understanding the emotion behind the information. Effective communication can improve relationship at home, work, and in social situations by deepening our connections to others and improving teamwork, decision making and problem solving.

*Effective communication skill is a learned skill, it is more effective when it's spontaneous than formula.*

### 7.2.2 The Communication Process

The process of conveying information through the exchange of thoughts, ideas, feelings, intentions, attitude by speech, gesture, writing etc. is known as communication. It is the meaningful exchange of information between two or more participants.

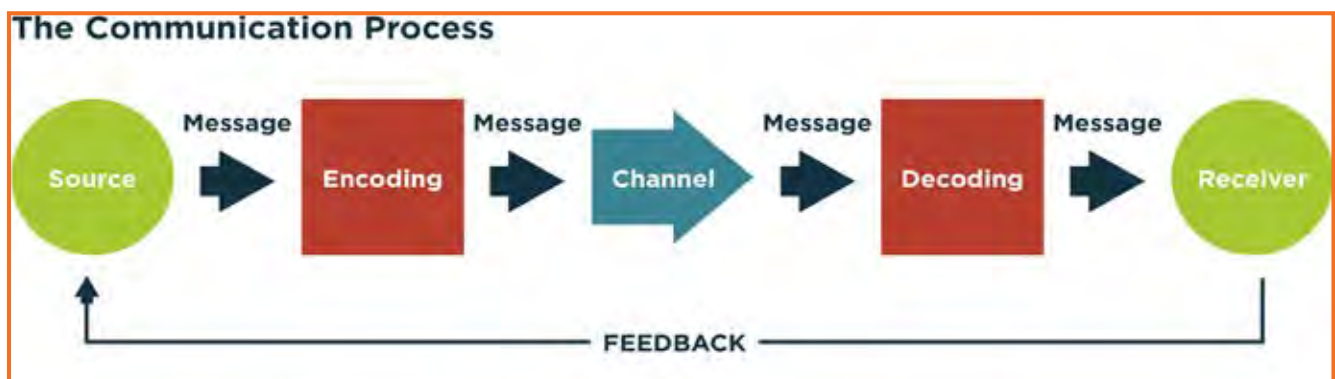


Fig.7.2.1: The Communication Process

Communication requires a sender, a message, a medium and a recipient. Communication process is complete only when a receiver understands the sender message.

Communication with other involves three steps:

1. **Message:** First information exists in the mind of the sender. It can be a concept, idea, formation and feeling.
2. **Encoding:** A message is sent to the receiver in words or other symbols.
3. **Decoding:** Lastly the receiver translates the words or symbols into a concept or information that a person can understand.

### 7.2.3 Verbal and Non-Verbal Communication

Communication can be categorized into three basic types. These include:

1. **Verbal Communication:** It means you listen to a person to understand their meaning. Verbal communications have the advantage of immediate feedback, are best for conveying emotions and can involve storytelling and crucial conversations.
2. **Written Communication:** letters, books, newspapers are printed messages in which you read their meaning. They are asynchronous, can reach many readers and are best for conveying information.
3. **Nonverbal Communication:** It means you observe a person and infer meaning. Both verbal and written communications convey nonverbal communication and are also supported by body language, eye contact, facial expression, posture, touch and space.

### 7.2.4 Communicating Effectively Identifying Barriers

There are many reasons why communications fail. These failures are the result of barriers in communication which may occur at any stage in the communication process. Barriers may lead to one's message becoming distorted and therefore risk wasting both time and money by causing confusion and misunderstanding. Effective communication involves overcoming these barriers and conveying a clear and concise message.



Fig.7.2.2: Barriers in Communication

A skilled communicator must be aware of these barriers and try to reduce their impact by continually checking understanding or by offering proper feedback.

#### Dealing with Barriers

- Use simple, easily understood word. Overcomplicating makes things confusing
- While speaking in other language always prepare beforehand
- Always give or take feedback to ensure the effectiveness of communication
- Be alert to cues
- Listen, listen, listen ...

### 7.2.5.1 Some Tips for Active Listening

- Concentrate what the person is talking about and not on noise or other external distractions.
- Understand his emotions and you get it all right. Is the speaker angry, happy or plainly inquisitive?
- When the speaker is saying or telling something, don't break the chain of his thoughts.
- Don't avoid completing sentences of the speaker. Let them speak and speak only after they finish.
- It's alright if you haven't understood at first chance. Request to repeat the information.
- Practice makes a man perfect. Listen intently, focus and ignore other noises. Listen more and talk when required.

It takes a lot of concentration and determination to be active listener. Old habits are hard to break and if you're listening habits are not good then you have to break those. Start listening deliberately and remind yourself frequently that your goal is to hear truly what the other person is saying.

## UNIT 7.3: Grooming and Hygiene

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Maintain cleanliness and hygiene.
2. Keep their dress clean and tidy.
3. Maintain positive body language while speaking.
4. Enable to perform more of the do's than the don'ts.
5. Avoiding bad things such as gutkha and alcohol.

### 7.3.1 Personal Grooming

Personal Grooming is the term for how people take care of their body appearance. Once you enter your store/ department you need to be dressed in full uniform as per company norms, and also properly groom yourself as per the service standards.

Personal grooming not only makes us presentable to other people but good personal hygiene is essential for good health. Habits that are considered personal grooming include, bathing, dressing, applying makeup, hair removal and taking care of one's teeth and skin.

### 7.3.2 Positive Body Posture and Language

- Clean hands at all times as they mostly will be handling merchandise and customers.
- Avoid biting nails on the floor.
- Manage body odour & bad breath to be under control as they are offensive to the customer.
- Maintain straight & upright posture on the shop floor.
- Slouching on the floor, hands in pockets, hands on the hips are not courteous to the customer.
- Keep your hands out of your pocket
- Don't Fidget. Fidgeting is a clear sign of nervousness
- Keep your eyes forward. This indicates that you are interested in communication with other.
- Stand up straight with your shoulders back. It communicates confidence.
- Don't cross your arms when meeting other persons.

### 7.3.3 Personal Hygiene

Personal Hygiene is the set of practices to follow to preserve one's health. Maintaining a high level of personal hygiene will help to increase self-esteem while minimizing the chances of developing infections. Poor personal hygiene can have significant implications on the success of job applications or chances of the promotion.



### 7.3.4 Physical Fitness

Apart from following these hygienic practices, one should also be physically fit. Physical fitness is an outcome of regular exercise. Exercise may be of many different forms. Jogging, morning-walk, weight-lifting, gym, swimming, cycling, yoga and many more.

#### **Things to be avoided**

There are certain habits that have severe ill-effects on one's health. Such habits should be avoided for a healthy life.

- Alcoholism
- Tobacco / Smoking
- Gutkha

## UNIT 7.4: Development of Interpersonal Skill

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Develop a positive attitude and behaviour.
2. Describe the goal setting.
3. Motivate for team participation at work.
4. Practice relations and stress management at work.
5. Develop leadership qualities.

### 7.4.1 Introduction

Interpersonal skill development is the blend of different traits of day to day life that play an important role in creating our impression in other's mind. It starts from inside. The role of interpersonal skill development is to help us understand how to make choices about our attitudes and actions.

**These include various traits like:**

- Positive Attitude
- Motivation
- Goal Setting
- Team Work
- Managing Relations
- Etiquette
- Stress and Anger Management
- Conflict Resolution

### 7.4.2 Goal Setting

Goal setting is a powerful process for thinking about your ideal future. The process of setting goals helps you to choose where you want to go in life.

Goal setting involves establishing specific, measurable, achievable, and realistic and time targeted goals. Goal setting helps people work towards their own objectives. Goals are a form of motivation that sets the standard for self-satisfaction with performance. Achieving the goal one has for oneself is a measure of success and being able to meet job challenges is a way one measures success in the workplace.

1. Financial
2. Education
3. Family
4. Health
5. Public Service

### 7.4.3 Team Dynamics

A team comprises a group of people associated for a common purpose. Teams are especially appropriate for conducting complex tasks. A team is a special instance of a group in which shared goal is the common thing. This creates a dynamic between team members and because they are dependent on each other for success. For example a sports team wins or loses as a whole.

#### Factors of Team Dynamics

- Tolerance and Cooperation
- Set aside feelings of caste, creed, profession
- Put up with each other
- Identify strengths of each
- Who can do what

### 7.4.4 Managing Relations

We all have different personalities, different wants and needs, and different ways of showing our emotions which affects people around us.

70% of the workplace learning is informal, when people talk to each other at work they actually are learning to do their job better. Friendlier workers are effective communicators, more productive and trusted more by employers and co-workers.

#### Stress and Anger Management

Anger is a normal and a healthy emotion. Managing anger can be a problem for some people who find it difficult to keep their anger under control. There are many health issues related to a unresolved anger such as high blood pressure, heart attack, depression, anxiety, colds and flu and problems related with digestion.

#### Always remember:

- Avoid unnecessary stress, learn to say no and take control of your environment.
- Express your feelings instead of boiling them up.
- Accept the things you can't change.
- Learn to forgive.
- Don't react immediately.
- Post pone for a few seconds whatever you wish to say or do.
- Take a deep breath.
- Speak when you have calmed down.

### 7.4.5 Etiquette

Etiquette are the customs or rules governing behaviour regarded as correct or acceptable in social and official life. It includes:

- Making Positive Impression
- How you treat with people
- Communicating at Workspace
- Work Ethics
- Discipline
- Commitment to work:
- Punctuality
- Ownership and responsibility
- Striving to excel:

### 7.4.6 Conflict Resolution

#### What is a Conflict?

A problem or a situation that may be difficult to understand or to deal with.

#### Why do we need to resolve conflicts?

- If a problem is not solved or addressed at the right time it may blow out of proportion
- An unsolved problem can be like Cancer which spreads and translates itself into all other areas in life
- Unsolved problems may lead to increased levels of bitterness and frustration
- It may foster bad habits like back-biting, gossiping, etc.
- Persons involved in conflict may lose focus and target each other's character instead of the specific behavior to be modified.

#### How to work out Conflicts?

- **STOP** - before you lose control of your temper and make the conflict worse.
- **SAY** - what you feel is the problem. What is causing the disagreement? What do you want?
- **LISTEN** - to the other person's ideas and feelings.
- **THINK** - of solutions that will satisfy both of you.

If you still can't agree, ask someone else to help you work it out.

### 7.4.7 Leadership Skills

The ability to lead effectively is based on a number of key skills. These skills are highly sought after by employers as they involve dealing with a number of people in such a way as to motivate, enthuse and build respect. Some of the qualities that every good leader should possess are:

- Honesty

- Ability to delegate
- Ability to take initiative
- Good communications skills
- Confidence
- Commitment
- Positive Attitude
- Creativity
- Be decisive
- Focus on the big picture

## UNIT 7.5: Social Interaction

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Analyze the social interaction.
2. Define duties and responsibility.
3. Explain about the team work.

### 7.5.1 Social Interaction

Social interaction is the process by which we act and react to those around us. It includes those acts people perform toward each other and responses they give in return. Social interaction includes a large number of behaviours. They are:

- Exchange
- Competition
- Cooperation
- Conflict
- Coercin

### 7.5.2 Self- Introduction

Everyone in their lifetime, have to introduce themselves to the audience or a class. It is a speech which lies around 3 minutes to 5 minutes. It is very important that it gives the first impression to other about us. It has a great impact on your self-esteem and self-confidence. It's helpful in:

- Feeling better about yourself
- Boosting your confidence
- Building your self esteem
- Making friends
- Feeling in control

#### Points for Self Introduction

- |                 |                               |
|-----------------|-------------------------------|
| • Wishes        | • Location                    |
| • Purpose       | • Hobbies/Habits              |
| • Name          | • Life Aim                    |
| • Father's Name | • Achievements                |
| • Family        | • Favourite Person's or Ideal |
| • Profession    | • Your Strengths and Weakness |



### 7.5.3 Cooperation

Cooperation is the process of groups of organisms working or acting together for their mutual benefit. Cooperation among family members, friends and peers is very common and healthy. It is the backbone of any society.

Family cooperation provides an avenue for a family to come closer. It increases coping skills and decision making.

**Experiential Knowledge:** contributes to solving problems and improving quality of life.

- **Emotional support:** Esteem, attachment and reassurance
- **Instrumental Support:** Material goods and services.

#### How to be a cooperative person

For being a cooperative person following things needs to be done:

- Listen carefully to others and be sure you understand what they are saying.
- Share when you have something that others would like to have.
- Take Turns when there is something that nobody wants to do, or when more than one person wants to do the same thing.
- Compromise when you have a serious conflict.
- Do your part the very best that you possibly can. This will inspire others to do the same.
- Show appreciation to people for what they contribute.
- Encourage people to do their best.
- Make people needed. Working together is a lot more fun that way.
- Don't isolate or exclude anyone. Everybody has something valuable to offer, and nobody likes being left out.

## UNIT 7.6: Group Interaction

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Participate in group discussions in the class.
2. Give speech in the public.
3. Paraphrase the importance of team building and team work.

### 7.6.1 Group Interaction

Every day we meet with groups of people socially and professionally. How we interact plays a large role in the impressions we create. Interaction that occurs while a group completes a cooperative task describes how the group works.

Everything you do in a group setting makes an impression on everyone in the group. Don't ever think something doesn't matter. Everything matters. Take every opportunity to take part in informal and formal group interactions. Start by making small contributions to discussion, prepare a question to ask or agree with another person's remark. Ask for other persons opinion.

#### Dos and Don'ts of Group Interaction

Do's	Don't
<ul style="list-style-type: none"> <li>• Speak pleasantly and politely to the group.</li> <li>• Respect the contribution of every speaker.</li> <li>• Remember that a discussion is not an argument. Learn to disagree politely.</li> <li>• Think about your contribution before you speak. How best can you answer the question/ contribute to the topic?</li> <li>• Try to stick to the discussion topic. Don't introduce irrelevant information.</li> <li>• Be aware of your body language when you are speaking.</li> <li>• Agree with and acknowledge what you find interesting.</li> </ul>	<ul style="list-style-type: none"> <li>• Lose your temper. A discussion is not an argument.</li> <li>• Shout. Use a moderate tone and medium pitch.</li> <li>• Use too many gestures when you speak. Gestures like finger pointing and table thumping can appear aggressive.</li> <li>• Dominate the discussion. Confident speakers should allow quieter students a chance to contribute.</li> <li>• Draw too much on personal experience or anecdote. Although some tutors encourage students to reflect on their own experience, remember not to generalize too much.</li> <li>• Interrupt. Wait for a speaker to finish what they are saying before you speak.</li> </ul>

Fig.7.6.1: Dos and Don'ts of Group Interaction

### 7.6.2 Teamwork

Teamwork is a very important part of working life. They can have a big impact on:

- The profitability of an organisation
- Whether people enjoy their work
- Staff retention rates
- Team and individual performance

#### **Importance of Team Building**

Team building activities not only boost morale of the team members, but it can also increase the success rate of the teams. Team building is an important activity as it:

- Facilitates better communication
- Motivates employees
- Promotes creativity
- Develops problem-solving skills
- Breaks the barrier

## UNIT 7.7: Time Management

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Describe the concept of time management.
2. Develop time management skills.
3. Explain effective time planning.

### 7.7.1 Time Management

Time management is the act of process of planning and exercising conscious control over the amount of time spent on specific activities, especially to increase effectiveness, efficiency or productivity. It is an activity with the goal to maximize the overall benefit of a set of activities within the boundary condition of a limited amount of time.

#### Some effective time management

- Delegate tasks.
- Identify time wasters.
- Combine activities – Plan for them.
- Break down big tasks down to the smallest task possible.
- Accomplish them one by one.
- At the end of the day conduct a simple analysis to see which activity took time.

### 7.7.2 Pareto Analysis

- According to this 80% of the tasks can be completed in 20% of the time. The remaining 20 % of the tasks take 80 % of your time. And the task which should fall in first category should be given a higher priority.
- Time also depends on the method adopted to complete the task. There are always simpler and easier ways to complete the task. If one uses complex ways then it will be time consuming. One should always try to find out alternate ways to complete a task.

#### Urgent Important Matrix

1. The Urgent and Important Tasks	2. The Non Urgent but Important Tasks
<b>DO NOW</b> <ul style="list-style-type: none"> <li>• Emergencies, complaints and crisis issues</li> <li>• Demands from superiors</li> <li>• Planned tasks or project work now due</li> <li>• Meetings with superiors/colleagues</li> </ul>	<b>PLAN TO DO THEM</b> <ul style="list-style-type: none"> <li>• Planning, preparation</li> <li>• Scheduling</li> <li>• Designing, testing</li> <li>• Thinking, creating, modelling the data</li> </ul>

3. The Non Important but Urgent Tasks	4. The Non Important and non-Urgent Tasks
<b>REJECT AND EXPLAIN</b> <ul style="list-style-type: none"> <li>• Trivial requests from others</li> <li>• Apparent emergencies</li> <li>• Misunderstandings appearing in work</li> <li>• Pointless routines or activities</li> </ul>	<b>RESIST AND CEASE</b> <ul style="list-style-type: none"> <li>• Comfort' activities, computer</li> <li>• Games, net surfing, excessive</li> <li>• Cigarette breaks</li> <li>• Chat, gossip, social</li> <li>• Communications</li> <li>• Reading irrelevant and useless material</li> </ul>

Fig.7.7.1: Urgent Important Matrix

**This matrix helps you understand:**

- What should be done
- What should be planned
- What should be resisted
- What should be rejected

The simplest method of managing time is to create a general to do list. Prioritize the task list:

- A daily list of things to do, numbered in the order of their priority
- Start with the most unpleasant and difficult task first latter will completed easily and quickly.
- Map out everything while making a task list
- Learn to say "No" to unimportant things
- Strikeout the things completed so that you are familiar what have been completed and what needs to be completed.

Prioritize the above mentioned activities in the following heads.

Important Tasks	Unimportant Tasks	Urgent Tasks	Not Urgent Tasks

## UNIT 7.8: Resume Preparation

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Explain the importance of resume.
2. Discuss basic steps for the preparation of a resume.

### 7.8.1 Introduction

A resume is a self-advertisement that, when done properly shows how your skills, experience and achievements match the requirement of the job you want. The resume is a tool with one specific purpose to win an interview. It convinces the employer that you have what it takes to be a successful in the new career or position.

It also establishes you as a professional person with high standards and excellent writing skills based on the fact your resume is written well. It also helps you clarify your direction, qualifications and strengths, boost your confidence or to start the process of committing to a job or a career change.

**One must know about a resume that:**

- Your resume is to get you an interview not a job
- Your resume will be screened by an employer for just 15-20 seconds. That's all the time your resume has to make an impact.

There are different sections on the resume in the same order as mentioned under:

Section	What is the employer looking for
Header	Your identity and to contact you
Objective	To check if their requirement and your objective match
Education	To check if you have the basic qualification for the job/ internship you are applying for
Practical Experience/Projects	To see if you have done anything that reflects your potential capability. Also to see how different you are from your peers.
Skills	How equipped you are in terms of your personality traits as well as occupational skills
Interests	Professional aspects apart, how meaningful is your life?
Other	Is there anything else significant and relevant you want to showcase, that will add value to your resume.

Fig. 7.8.1: Different sections on the resume



### 7.8.2 Points to Remember

- Make sure that the length of your resume does not exceed 2 pages.
- Do a thorough recheck and make sure there are absolutely no errors in your resume. No grammatical errors, no spelling mistakes, no punctuation errors.
- Run through your resume time and again for to make improvements and wording sentences better.
- Choose a professional font in a size 11 or 12. You can use multiple fonts for different parts of resume, but try to limit it maximum of two fonts. Instead changing between fonts, try making specific sections bold or italicized instead.
- The font size of your header and the introduction to a section may be a size 14 or 16.
- Your text should always be printed in solid black ink. Make sure to deactivate any hyperlinks so that they don't print in blue or other contrasting colour.
- Your page should have one inch margin all the way around with 1.5 or 2 point line spacing. The body of your resume should align left and your header should be centred at the top of the page.

## UNIT 7.9: Interview Preparation

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Explain the procedure of an interview.
2. Prepare for interview.

### 7.9.1 Interview

An interview is a conversation between two or more people (the interviewer(s) and the interviewee) where questions are asked by the interviewer to obtain information from the interviewee. An interview is the first and last hurdle you need to cross in order to get a job.

#### Common Types of Interview

1. **Traditional HR Interview:** Most interviews are face to face. The most traditional is a one-on-one conversation with the HR Executive where the candidate's focus should be on the person asking question. You are advised to maintain good eye contact, listen keenly and answer promptly.
2. **Panel Interview:** In this situation, there is more than one interviewer. A panel ranging from two to ten members may conduct this part of the selection process. This is an ideal chance for you to display group management and group presentation skills.
3. **Technical interview:** The objective of this interview is to basically evaluate technical knowledge. Majority of the questions will be based on the skills sets mentioned in the candidate's resume.
4. **Telephone Interview:** Telephone interviews may also be used as a preliminary interview for candidates who live far away from the job site.

Before going for an interview, it is important to have clarity of the role you are applying for. It's also important that you know where you are applying and who will you be talking to. Your answers should tell the employer that you are the match they are looking for.

This requires you to do a small research on the following fields:

- Company & Field
- Job Description
- Yourself (Skills, Values & Interests)
- Resume (Experience)

It is important that you dress professionally. It is a proven fact that the way we dress makes a huge difference in the way we are perceived. 90% of the way you communicate with other people is through body language (gestures, expressions, etc.) and the first Impression we make. It is very simple to make a great first impression.

For a good first impression it is important those we:

- Smell good
- Have a professional appearance

- Pay attention to your grooming
- Make eye contact
- Know what and how you speak
- Our overall personality contributes to our complete perception.

#### How to dress for Interview

Men	Women
Long-sleeved buttoned shirt (clean and pressed)	Conservative pump, no stilettos
Dark shoes (cleaned and polished) and dark socks	Jewellery -One set of earrings (preferably knobs)
Get a haircut (short hair is always best)	No bangles
No Jewellery (chains, earrings, piercing)	Minimal use of makeup
No beards or Tattoos	

Fig.7.9.1: Dress for Interview

### 7.9.2 The Do's and Don'ts in an Interview

Some of you might have faced an interview and some of you might not have. However, by now, you definitely have a better understanding what are the accepted standards of a professional behaviour. Read the sentences given and mark them as do's or don'ts, in relation to an interview:

Sentence	Do's	Don'ts
Be yourself		
Burp while talking!!!		
Just out from a 'powder factory' ( worn too much make-up)		
Reach just about the right time for the interview		
Just barge in the cabin/ office		
Forget to greet the receptionist/ don't respond		
Think before you speak		
Do your homework- Visit the company website		
Take time to think (TTTT)		
Wear bright colour clothes on the D-day		
Emphasis on your strengths		
Argue/ Debate with the interviewer		
Chew gum during the interview.		
Review your educational and work experiences		
See your documents flying out of the file (Being clumsy)		
Thank the interviewer		
Have the 'they need me' attitude		

Maintain eye contact and good body language		
Only give monosyllabic answers(depends on the kind of questions asked...in-between)		
Carry a copy of your resume		

Fig.7.9.2: Do's and Don'ts in an Interview

### 7.9.3 During the Interview

- Be confident, not arrogant
- Sell yourself - Keep your energy up
- Maintain your posture
- Be positive, don't complain
- Know your resume and accomplishments.

It isn't sufficient to have ideas. They have to be expressed effectively in the interview. The parameters that the candidates are assessed on during the interview are very simple. These are the parameters that this training program has prepared you for.





## 8. Employability Skills

Unit 8.1 - Employability Skills – 30 Hours



## Key Learning Outcomes

**At the end of this module, participants will be able to:**

1. Explain employability skills.
2. Paraphrase constitutional values for citizen.
3. Become a professional in the 21st century.
4. Demonstrate the basics English skills.
5. Demonstrate the communication skills.
6. Recognise the essential digital skills.
7. Identify the diversity and inclusion.
8. Interpret financial and legal literacy.
9. Illustrate the career development and goal-setting.
10. Understand the customer service.
11. Get ready for apprenticeships and jobs.



## UNIT 8.1: Employability Skills – 30 Hours

### Unit Objectives

**At the end of this unit, participants will be able to:**

1. Explain employability skills.
2. Paraphrase constitutional values for citizen.
3. Become a professional in the 21st century.
4. Demonstrate the basics English skills.
5. Demonstrate the communication skills.
6. Recognise the essential digital skills.
7. Identify the diversity and inclusion.
8. Interpret financial and legal literacy.
9. Illustrate the career development and goal-setting.
10. Understand the customer service.
11. Get ready for apprenticeships and jobs.

### 8.1.1 Employability Skills

To read the e-book on Employability Skills scan the QR Code below.



Employability Skills





## 9. Annexure-Resources



Module No.	Unit No.	Name of Subject	URL	QR Code
1. Introduction and Orientation	Unit 1.1 - Introduction to Sewing and Apparel Sector	Apparel Sector in India – Industry Overview	<a href="https://youtu.be/tN5oLGSjepQ">https://youtu.be/tN5oLGSjepQ</a>	
1. Introduction and Orientation	Unit 1.2 - Role and Responsibilities of Sewing Machine Operator (Knits)	Role and Responsibilities of Sewing Machine Operator	<a href="https://youtu.be/aHo2Kp2LeiY">https://youtu.be/aHo2Kp2LeiY</a>	
1. Introduction and Orientation	Unit 1.2 - Role and Responsibilities of Sewing Machine Operator (Knits)	Fabric Knitting	<a href="https://youtu.be/wdcFhc5ULkc">https://youtu.be/wdcFhc5ULkc</a>	
2. Plan and Prepare for Sewing of Knit Fabrics	Unit 2.1 - Basic Materials for Sewing of Knits	Types of Industrial Sewing Machines	<a href="https://youtu.be/nwQLVcOCd18">https://youtu.be/nwQLVcOCd18</a>	
2. Plan and Prepare for Sewing of Knit Fabrics	Unit 2.1 - Basic Materials for Sewing of Knits	Parts of a Sewing Machine	<a href="https://youtu.be/al_hc7DoKXk">https://youtu.be/al_hc7DoKXk</a>	
2. Plan and Prepare for Sewing of Knit Fabrics	Unit 2.1 - Basic Materials for Sewing of Knits	Classification of defects	<a href="https://youtu.be/SPtD6mAZ0GU">https://youtu.be/SPtD6mAZ0GU</a>	
3. Stitch Knitted Fabrics	Unit 3.1 - Stitch Components to Produce Apparels	निट फैब्रिक को सिलना	<a href="https://youtu.be/uANfrCEBkAQ">https://youtu.be/uANfrCEBkAQ</a>	

3. Stitch Knitted Fabrics	Unit 3.1 - Stitch Components to Produce Apparels	Sewing knitted fabric without pucker	<a href="https://youtu.be/crlp5RQShso">https://youtu.be/crlp5RQShso</a>	
3. Stitch Knitted Fabrics	Unit 3.1 - Stitch Components to Produce Apparels	Parts and Functions of Overlock Machine	<a href="https://youtu.be/eJfdLTgaY-k">https://youtu.be/eJfdLTgaY-k</a>	
3. Stitch Knitted Fabrics	Unit 3.1 - Stitch Components to Produce Apparels	Lock stitch and chain stitch	<a href="https://youtu.be/U3OTU3g0HGO">https://youtu.be/U3OTU3g0HGO</a>	
3. Stitch Knitted Fabrics	Unit 3.2 - Contribute to Achieve Product Quality in Stitching Operations	Classification of Garment Defects	<a href="https://youtu.be/SPTD6mAZ0GU">https://youtu.be/SPTD6mAZ0GU</a>	
3. Stitch Knitted Fabrics	Unit 3.3 - Stitching a T-Shirt	Stitching a T-shirt	<a href="https://youtu.be/32zNC1MA v9o">https://youtu.be/32zNC1MA v9o</a>	
4. Maintain Work-Area, Tools and Machines	Unit 4.1 - Maintain Work Area, Tools and Machines	Maintenance of single needle sewing machine	<a href="https://youtu.be/6iE2DT6LVpg">https://youtu.be/6iE2DT6LVpg</a>	
5. Maintain health, Safety and Security in the Finishing Department with Gender & PwD Sensitization	Unit 5.1 – Maintain Health, Safety and Security at Work Place	Potential risks and threats associated with the workplace in garment industry	<a href="https://youtu.be/POIQ27GQZp0">https://youtu.be/POIQ27GQZp0</a>	







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