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APPAREL MADE-UPS HOME FURNISHING SECTOR SKILL COUNCIL

Participant Handbook

Sector
Apparel, Made-ups and Home Furnishing

Sub-Sector
Apparel, Made-ups and Home Furnishing

Occupation
Stitching

Reference ID: **AMH/Q0301, Version 1.0**
NSQF Level 4

Sewing Machine Operator

Sewing Machine Operator

Participant Handbook

AMHSSC

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

Shri Narendra Modi
Prime Minister of India

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Certificate

COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

Apparel / Made-Up's / Home Furnishing

for

SKILLING CONTENT : PARTICIPANT HANDBOOK

Complying to National Occupational Standards of

Job Role/ Qualification Pack: **"Sewing Machine Operator"** QP No. **"AMH/Q0301, NSQF Level 4"**

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About this book

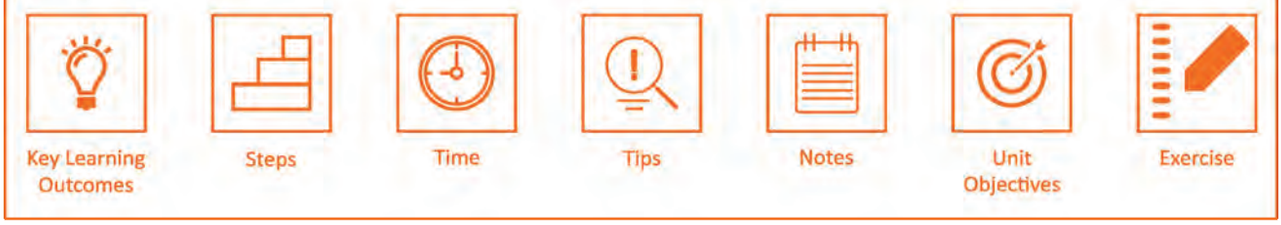
This Participant Handbook is designed to enable training for the specific Qualification Pack(QP). Each National Occupational (NOS) is covered across Unit/s.

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

- Carry out stitching activities using machine or by hand.
- Contribute to achieve product quality in stitching operations.
- The trainees will be able to stitch/sew fabrics
- The trainees will be able to stitch/sew fur
- The trainees will be able to stitch/sew synthetic materials
- The trainees are able to accurately work with the sewing machines and are able to perform hand works, operate and work accordingly to increase productivity
- The trainee are able to identify quality defects and can perform improvements to avoid defects
- The trainee are able to maintain a clean and healthy working environment.
- The trainee is able to understand the rules and regulations related to apparels in a country specific manner.

The symbols used in this book are described below:

Symbols Used



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1. Introduction and Orientation

Unit 1.1 - Introduction to Sewing and Apparel Sector

Unit 1.2 - Role and Responsibilities of a Sewing Machine Operator

Key Learning Outcomes 

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

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

UNIT 1.1: Introduction to Sewing and Apparel Sector

Unit Objectives

At the end of this unit, you 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

Indian Textile and Clothing (Apparel) industry is the second largest manufacturer in the world. The Indian textiles and clothing sector is expected to grow at 10.01 percent in the next 10 years from the current value of INR3.92 lakh crores in 2012–13 to INR10.54 lakh crores in 2021–22. Of these, the garments sector is estimated to grow at an average rate of 15.44 percent over the years, thereby accounting for about 70 percent of the total production The demand for domestic consumption for home textiles and garments is expected to increase rapidly . In fact, the garments sub-sector alone is estimated to increase by seven times from INR 51400 crores in 2012–13 to INR3.70 lakh crores in 2021–22

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 of 2012, the sector contributed 4 percent of the GDP, 32 percent of the manufacturing sector and 9 percent of total exports The sector's output is expected to grow at an annual average rate of 10 percent in the next 10 years, thereby increasing its worth to INR 10.5 lakh crores in 2022. 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 is expected to increase.
- 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.
- Favourable 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 section has grown rapidly in the last few years. Both exports and domestic demands shall drive sector growth in future.

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.

- 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 causal wear with an 11 percent growth, which would drive demand for workforce with specialised skills in western formals design, blended fabrics and increased application work on clothes.

Actual and Projected size of Indian Textile Industry

In 2011 global trade in textiles and apparel was around US$ 705 billion. This was approximately 4% of the total global trade of all commodities estimated at ~ US$ 15 trillion. During the period 2000 to 2010 the textile and apparel trade has grown at a modest CAGR of 6.4% per annum. Further, the Global Textile and Apparel, or T&A, trade is expected to grow to USD 1 trillion by 2020.

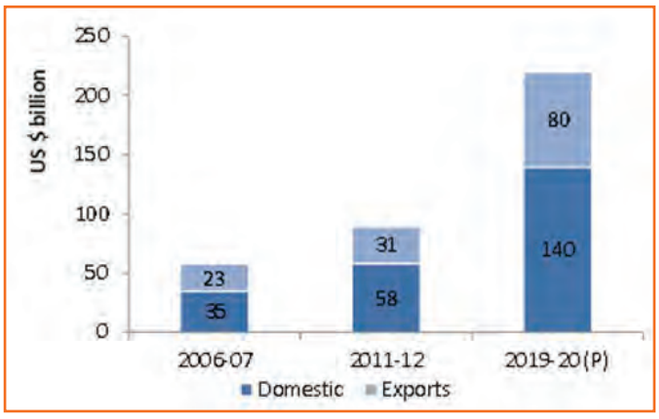

Fig.1.1.1: Major Textile Exporters to the World (% share)

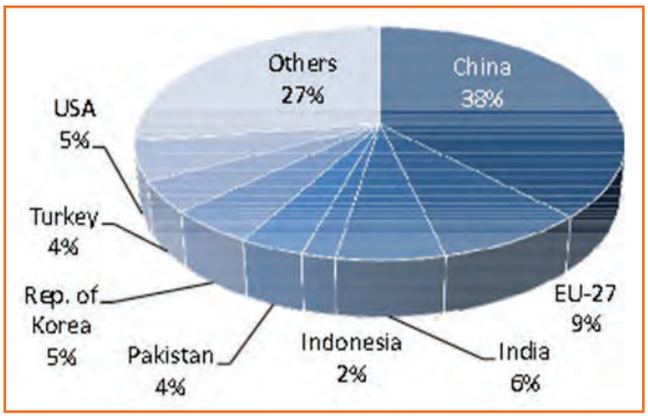

Fig.1.1.2: Major Textiles and Clothing Regions in India

Source: Office of Textile Commissioner and IMaCS Analysis

- **Gujarat and Maharashtra:** Most large companies across all sectors of the value chain, including spinning, weaving, home textiles and garments, are located here. Key players include Aravind Mills, Raymond, Welspun, Bombay Dyeing, Alok, Century Textiles.
- **Karnataka and Kerala:** Bangalore and Mysore have a few garment firms. Some major garment exporters include Gokaldas Exports and Shahi Exports.

- **Tamil Nadu:** Major cities that serve as textile hubs are Tirupur, Coimbatore, Madurai and Karur; known for apparels, spinning mills, silk and home textile units, respectively. Key players include Loyal Textiles, KG Denim, Asian Fabric. Tamil Nadu accounts for the largest textiles and clothing production of INR 761820 crores, which also employs the largest number of workers (2.63 million) in textile factories. This state is followed by Gujarat, which has an annual textile production valued at INR 49165 crores.
- **There are more than 70 textiles and clothing clusters in India** accounting for about 80 percent of the total production. There are 39 power loom clusters and 13 ready-made garment clusters in India.
- **Bhiwandi and Malegaon** are the two largest power loom clusters. Major ready-made garments clusters are located in Delhi, Mumbai, Gurgaon, Nagpur, Madurai and Salem, with annual turnover of more than INR 1000 crores since 2003. The state of Maharashtra has 10 textile clusters. Other major states in terms of the number clusters are Tamil Nadu, Andhra Pradesh, Karnataka, Kerala and Uttar Pradesh (seven clusters each).

Employment Scenario in the Sector

It also provides employment to approximately 35 million persons directly & approximately 55 million persons indirectly. 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.

Currently, 15.23 million people are employed in the textile sub-sector across yarn and fabric, home textiles, technical textiles and readymade garments. Fifty-one percent of the total workforce is engaged in the manufacturing of readymade garments, followed by yarn and fabrics with 26 percent. Human resource requirement in the sector is expected to reach.

21.54 million by 2022 translating into 6.31 million additional employment opportunities during the period 2013-22.

Sub Sector	Employment in Millions	
	2017	2022
Spinning Weaving and Finishing of Textiles	3.14	3.18
Manufacture of Other Textiles	10.64	13.78
Manufacture of Wearing Apparel	4.28	4.58
Overall	18.06	21.54

Fig.1.1.3: Sub-Sectors in Apparel Industry

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:

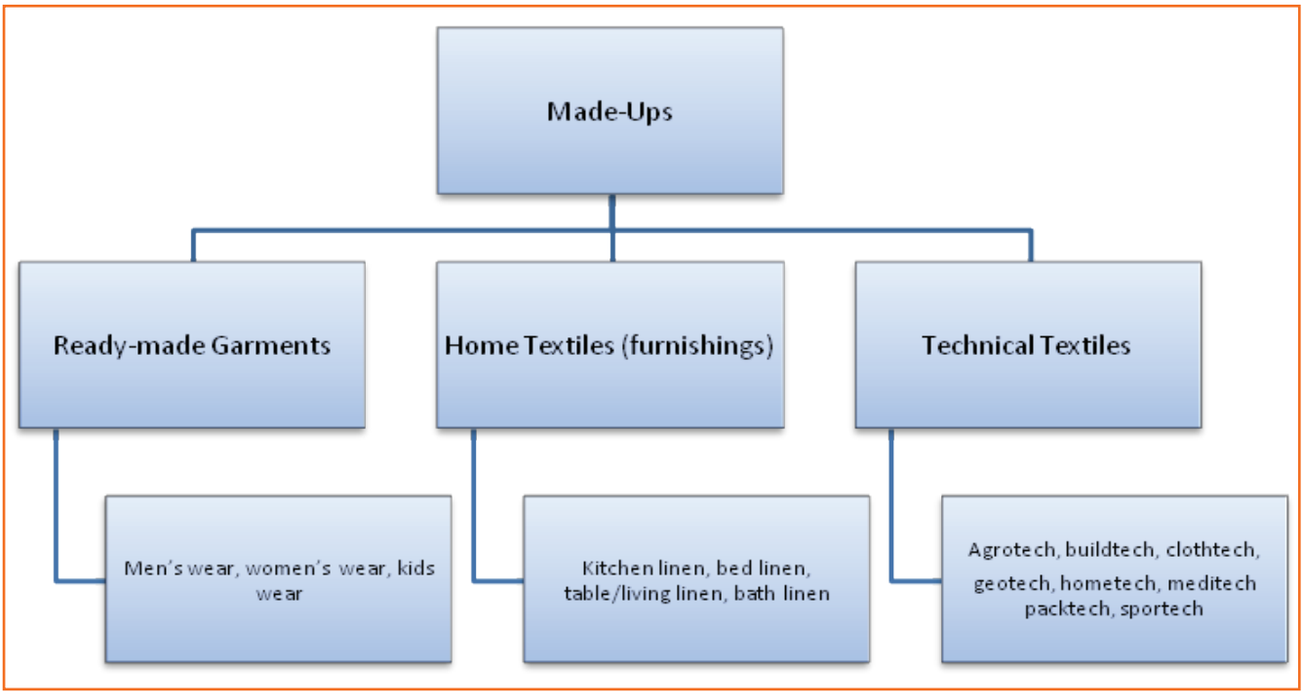

Fig.1.1.4: Made-ups and Home Furnishing Sub-sector

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.

Product	Total World Export	Major Contributor			India's Contribution		Other Competing Countries
		Country	Share & Value	Ranks	Share & Value	Ranks	
Apparel	193400159	China	6 1 2 2 4 3 6 0 (31.65%)	1	7 4 2 9 9 7 5 (3.8%)	7	Italy, Bangladesh, Hong Kong, Vietnam
Home Textiles	55921991	China	2 4 0 1 5 8 5 3 (42094%)	1	3 9 7 3 0 4 2 (7.10%)	2	

*Fig.1.1.5: Textile Exports by Major Countries and India ('000 USD) * Source NSDC Skill Gap Study – Textile & Clothing*

As evident from the Figs above, 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. Indian Home Furnishings Market is forecasted to increase at an annual growth rate (CAGR) of 8 percent over next five years. The industry will reach a value of approximately US $5.29 billion by 2018. 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

Fig.1.1.6: Home Furnishing

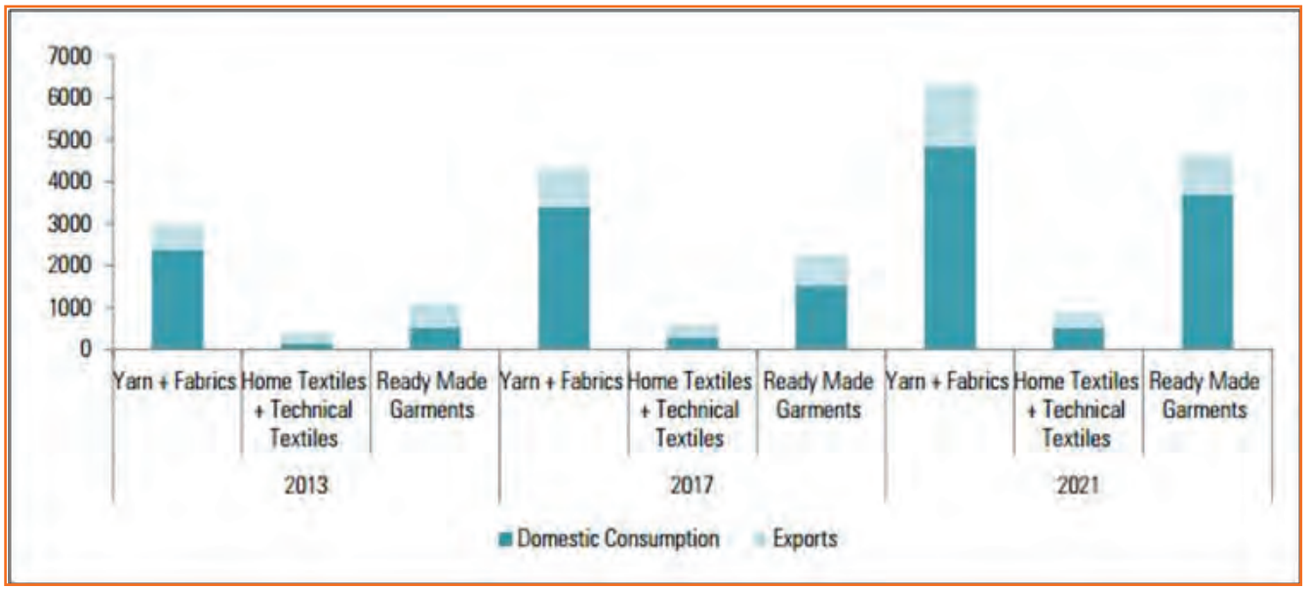

*Fig.1.1.7: Estimated Domestic Consumption of Indian Textile Production (in INR '000) * Source NSDC Skill Gap Study – Textile & Clothing*

in the growth of domestic consumption of made-ups and home furnishings industry

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.

Fig.1.1.8: Apparel Made-ups

Exercise

1. When was sewing machine invented?
   a) 20th century
   b) 19th century
   c) 18th century
   d) 17th century
2. As of 2012, the Indian textile sub-sector contributed ____ percent of the GDP, _____ percent of the manufacturing sector and _____ percent of total exports.
   a) 4,32,9
   b) 32,4,9
   c) 4,32,8
   d) 4,33,9

UNIT 1.2: Role and Responsibilities of Sewing Machine Operator

Unit Objectives

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

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

1.2.1 Sewing Machine Operator- 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.

A Sewing Machine Operator, also called a 'Stitcher or Machinist' is an important job-role associated with Apparel sector. The primary responsibility of a machinist is to stitch/ sew fabric, fur, or synthetic materials to produce apparels.

Fig.1.2.1: SMOs on the Job

Attributes: A Sewing Machine Operator is associated with the Apparel sector. His/her primary responsibility is to sew and/or stitch fabric, synthetic materials or fur to produce apparel. A Sewing Machine Operator should be visually and physically fit. This includes a strong hand-eye-leg coordination and eyesight that is perfect both in near, distance, color, peripheral vision, ability to change focus and depth perception.

1.2.1.1 Job Overview

Sewing machine operators operate and tend sewing machines in order to perform garment sewing operations. This includes joining, reinforcing and decorating garments or parts of garments. Sewing machine operators handle work on a large scale as they are required to operate and tend to industrial machineries. They mount attachments such as needles and pattern blades and adjust machines according to the specifications provided to them.

Sewing machine operators also adjust machine controls and regulate stitching speeds for every sewing project that they work on. It is important for sewing machine operators to possess in depth knowledge of sewing machinery and the garments industry. They also need to have sound hand-eye coordination and be able to cope with moderate physical effort.

1.2.1.2 Sewing Machine Operator Duties and Responsibilities

- It is important to strictly refer to the clients' orders and accordingly use the best suited material.
- Ascertain that all supplies (auxiliary and essential) and materials are ready at hand before beginning the assignment.

- The machine should be started at the beginning of the shift and test it for full functionality.
- Address any discrepancies or problems faced during the testing period
- According to the sewing project, the machine functions should be adjusted and threads should be drawn through needles.
- Materials should be placed properly and aligned under the needles to sew them together firmly.
- It is crucial to replace needles and also rethread them for other projects in the future or in case the needle needs more thread for the ongoing project.
- Any defects or faults in stitching should be avoided by closely observing the operations.
- Notify supervisors of any problems or discrepancies during the sewing process
- It is important to make sure that the product created should conform to the design demands and merchandising instructions listed in the order for the assignment.
- All excess threads and materials should be neatly cut away from the final product.
- Perform general and preventative maintenance tasks on sewing machines to ensure their longevity
- Examine finished garments for compliance and ensure that appropriate tags are sewed on them.
- Count number of garments stitched during a shift and record this information in company provided logs.

Exercise

1. Sewing machine operators also adjust machine controls and regulate stitching speeds for every sewing project that they work on.
   a) True
   b) False
2. A Sewing Machine Operator, also called a 'Stitcher or Machinist' is an important job-role associated with Apparel sector.
   a) True
   b) False
3. What are the duties and responsibilities of Sewing Machine Operator?

   .....

   .....

   .....

   .....

   .....

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2. Carry out Stitching Activities Using Machine or By Hand

Unit 2.1 - Prepare for Stitching Operations

Unit 2.2 - Stitch Components to Produce Apparels

Unit 2.3 - Stitching a Trouser

Unit 2.4 - Stitching a Shirt

AMH/N0301

Key Learning Outcomes 

At the end of the module, you will be able to:

1. Recognize the different types of industrial sewing machines.
2. Familiarize with the feed mechanisms.
3. Determine the basic list of material and tools required for stitching.
4. Check the equipment is safe and set-up in readiness for use.
5. Recognize about the different types of threads and needles.
6. Adjust the machine.
7. Ask questions to obtain more information.
8. Estimate the expected length of time for the process.
9. Perform a test sew run.
10. Know the different types of stitching and seam.
11. Stich a trouser and shirt.

UNIT 2.1: Prepare for Stitching Operations

Unit Objectives

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

1. Recognize the different types of industrial sewing machines.
2. Familiarize with the feed mechanisms.
3. Determine the basic list of material and tools required for stitching.
4. Check the equipment is safe and set-up in readiness for use.
5. Recognize about the different types of threads and needles.

2.1.1 Industrial Sewing Machine

The industrial sewing machine is a substantial duty form of a typical home sewing machine. It is used in the apparel and other industries related to it such as furnishings stitching. One of the most common uses for the industrial sewing machine is to make the mass production sewing of pockets into attires made out of heavy opus, like denim for blue jeans.

Fig.2.1.1: Sewing Machine

For sewing that involves heavy volumes, industrial sewing machine is a key requirement. These machines are designed to sew multiple layers of material tougher than cloth like canvas, leather, vinyl at the same time. It is important to learn to recognize these machines because some machines, although labeled as industrial, are for normal home sewing and cannot handle materials heavier than cloth. A standard, commercial sewing machine is not designed to handle heavy work and is too fragile. A proper industrial sewing machine is equipped with a large servo motor and a clutch.

Industrial and traditional sewing machines have several differences. Industrial sewing machines are made to last for a longer period of time. Since they have to carry out professional level work, they are made with extra durable motors and parts. Sewing machines meant for home-like capacity will have plastic and/or nylon gears whereas parts belonging to industrial level machines- like connecting rods, housings, gears and body are made of stronger material like metals, for example, aluminum and cast iron.

2.1.1.1 Types of Industrial Sewing Machines

Sewing machine based on bed type

In this types the fabric travels with respect to the bed while being sewn, and the frame of the machine is constructed for the mounting the machine. There are five types of horizontal beds namely:

1. **Flatbed:** This is the most common type of machine that resembles the traditional sewing machines. In this, the needle and the arm extend to the flat base of the sewing machine. This is used by workers to sew flat pieces of fabric together.
2. **Cylinder-bed:** A Cylinder bed is a sewing machine frame, which permits one to sew cylindrically shaped items such as Cuffs, Sleeves, Trouser legs etc. It is also used for Button sewing and bar tacking. It is also used for button tapestry and bar attaching. It is used broadly in knitted fabrics. Cylinder bed is of two types: Length and Perimeter.

Fig.2.1.2: Flatbed Sewing Machine

Fig.2.1.3: Cylender-bed Sewing Machine

- **Length Cylinder Bed:** With this bed type the cylindrical item is sewed on a line parallel to its cylinder length. As the cylindrical item is sewed, it travels onto the bed part of the machine and encompasses the bed.
- **Perimeter Cylinder Bed:** The Cylinder item is sewed parallel to the circumference of the item. The perimeter of the item travels around the perimeter of the bed arm.

3. **Post-bed:** This machine has bobbins, feed dogs and/or looper in perpendicular column that upsurges above the flat vile of the machine. This column's height ranges from 10cm to 45cm. Things that make measure to the sewing area difficult, such as fastening emblems, glove making and boot making utilize the post-bed machine.

Fig.2.1.4: Post-bed Sewing Machine

Fig.2.1.5: Raised-bed Sewing Machine

4. **Raised bed:** It enables the assemblage of pre-stitched parts and is for the fitting of the fixtures and other attachments. It is the elementary form for numerous specialized machineries.

5. **Feed off the arm:** These machines have a cylindrical bed suited for sewing goods in the tubular form. The cylindrical bed is in the form of an arm used for sewing of tubular goods like closing of sleeves, side seams, legs etc.

Fig.2.1.6: Feed - off the Arm Sewing Machine

Types of sewing machines based on stitch

Lockstitch Machine

The SNL, Single Needle Lock Stitch device is the most widespread and multipurpose sewing machine in the industry. It yields dependable results, both in production and in sample rooms. The Lockstitch arranges detailed and a straight stitches on the top and the underneath of the fabric, the needle thread and the bobbin thread locks each other, each time the needle badges through the fabric.

Fig.2.1.7: Lockstitch Sewing Machine

Features:

- The lockstitch 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.2.1.8: Multineedle Sewing Machine

Multineedle Sewing Machine

It is a multi-needle, double chain, flatbed stitch machine with parallel looper movement machinery. It is used in attaching waistband, lap seaming and line tapes, and implanting elastics.

Overlock Machine

Overlock machine is for stitching, over the edge of more than one pieces of fabric to create a neat border that is not fray. An overlocker will cut off the messy, rough fabric endings as they stitch.

This machine is a high speed sewing machine. And is the quickest performing machine todate, giving a non-fraying finish to the material.

Fig.2.1.9: Overlock Machine

Fig.2.1.10: Flatlock Machine

Flatlock Machine

Flatlock machines are high speed specialized machines. This type of machine is extremely efficient. The stitch is made by two or more needle threads passing through the fabric, inter twisting on the lower-side and interlocking on the upper-side. These are mainly used for knits.

- It is high speed, and make seams stretchy, flat and smooth.
- Delivers extensibility to the seams with a low bulk that a person can wear comfortably against the skin.

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.2.1.11: The Seam Appearances

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.

Fig.2.1.12: Button Attach Machine

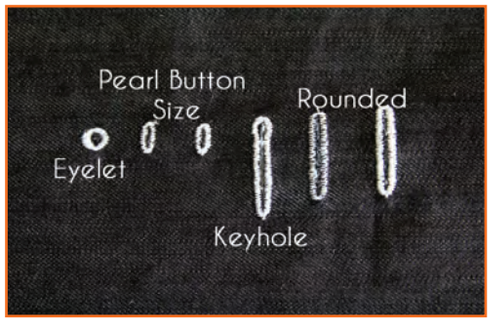


Fig.2.1.13: Different Types of Button Hole

2.1.2 Feed Mechanisms

Feed mechanisms are the basic movement of needles, loopers and bobbins. The material being stitched must move in order to facilitate, each cycle of needle movement includes a different part of the material. This movement is known as feed and sewing machines has many ways of feeding material as it does of forming stitches. Often, manifold 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.

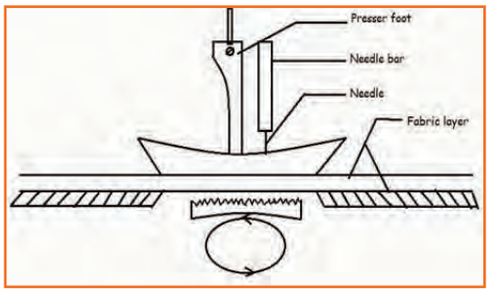


Fig.2.1.14: Drop Feed Mechanism

Drop Feed Mechanism

This humblest feed system of sewing machine is the most common. It is also called regular feed. Main apparatuses and gears of drop feed mechanism are:

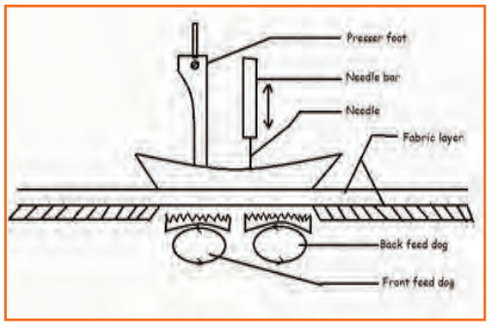


Fig.2.1.15: Differential Bottom Feed Mechanism

Differential Bottom Feed Mechanism

This mechanism is merely an amendment of the drop feed system. In the feed mechanism the feed dog consists of 2 segments. Appliance 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 strand is drawn by the back feed dog but this will overcome by the greater speed of the front feed dog. There is a lesser probability of shifting.

When the speed of the front feed dog is low, one can get lacy effect because the feeding speed in greater than the "Delivery speed". Widening and assembling of fabric can be done by this mechanism.

Adjustable Top Feed System

In a usual set-up, the presser foot is in two segment. One holding the fabric in position whereas the needle custom the stitch. The other taking length on the lower side & moving or waking in a way that the top layer is taken along. The needle is out of the materials. 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.

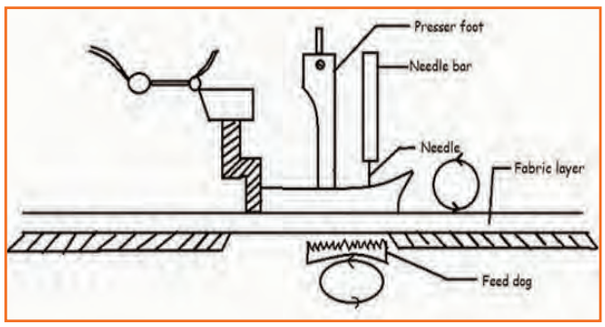


Fig.2.1.16 (a): Differential Bottom Feed Mechanism

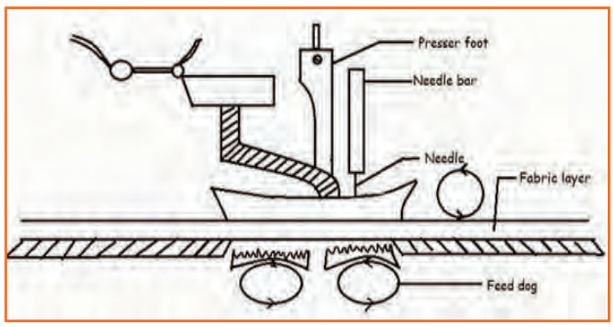


Fig.2.1.16 (b): Differential Bottom Feed Mechanism

Needle Feed System Mechanism

Needle Feed Mechanism is also known as Compound feed. Needle moves forwards & backward. Needle pierces the material enters into the note of the feed dog. For the advance movement of one stitch span of fabric feed dog and needle pass the same distance at the same time. The needle rise up & moves to form the next stitch with one step advance. This is pragmatically useful in massive sewing situation like when quilting through the cloth or padding & for cuffing fabrics. For the change of stitch length, setting of bath needle & feed dog should be changed.

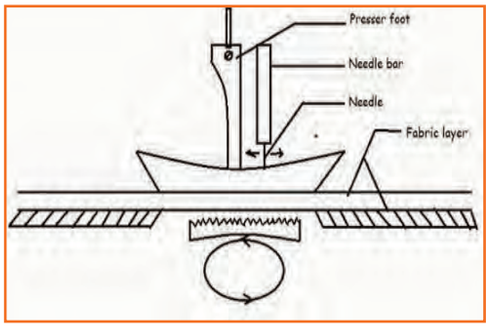


Fig.2.1.17: Needle Feed System Mechanism

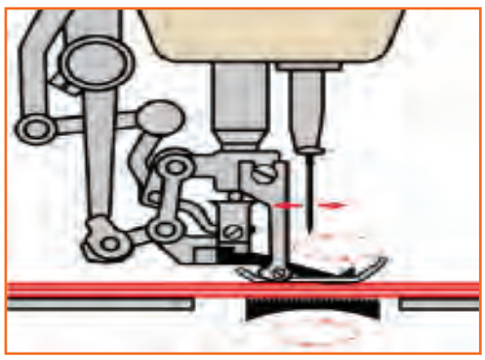


Fig.2.1.18: Unison Feed Mechanism

Unison Feed

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

Puller Feed Mechanism

This mechanism is variation of the drop feed system. These waves give a pulling movement on the fabric behind the presser foot. Top roller is driven by machine whitest the lower one moves due to control & presser of the top roller. The surface speed of puller roller is slightly higher than the feed dog speed to presser ply shifting roping.

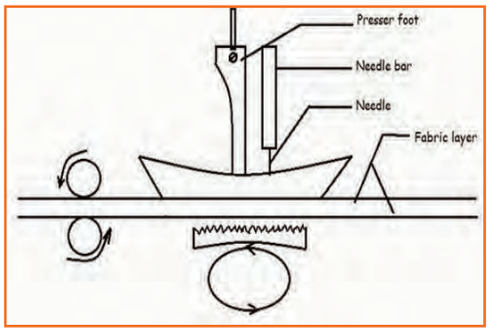


Fig.2.1.19: Puller Feed Mechanism

2.1.3 Parts of a Sewing Machine

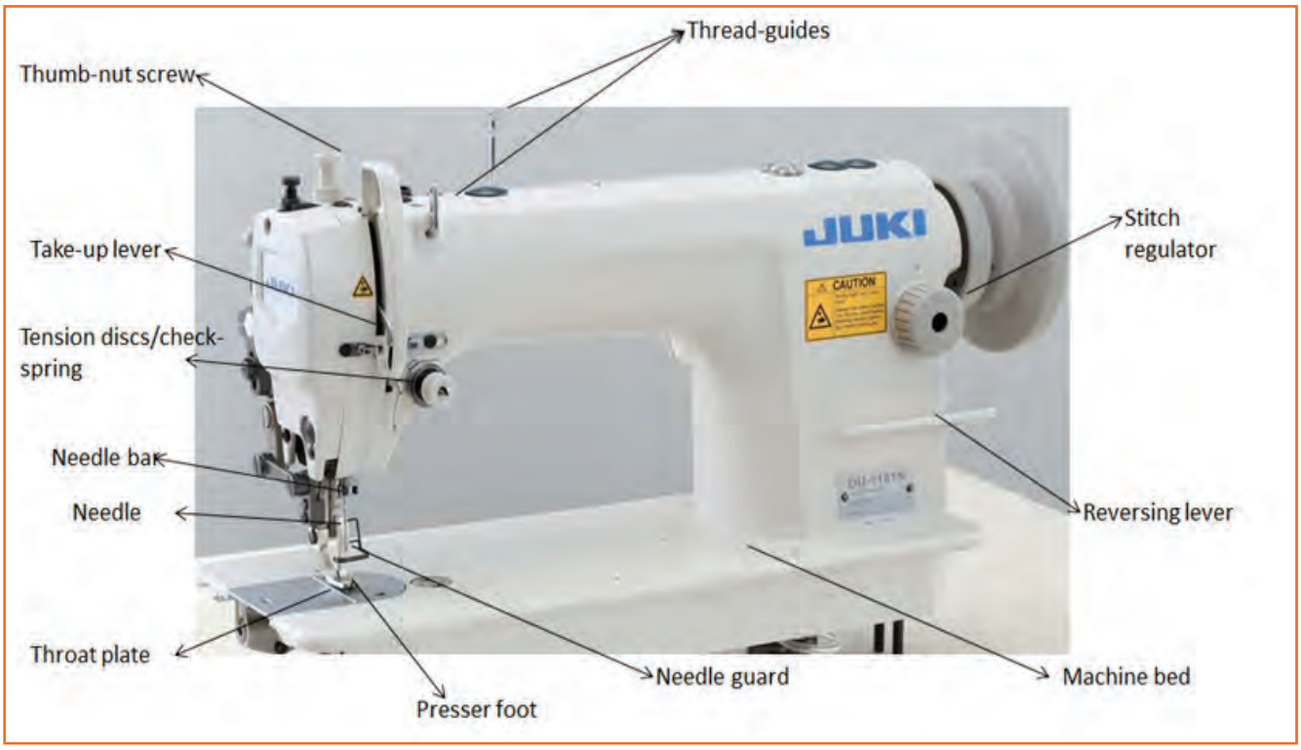


Fig.2.1.20: Parts of a Sewing Machine

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.2.1.21: Needle

Fig.2.1.22: 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.2.1.23: Bobbin Case

Fig.2.1.24: Bobbin

Bobbin: holds the lower thread or the bobbin thread.

Fig.2.1.25: Troat 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.

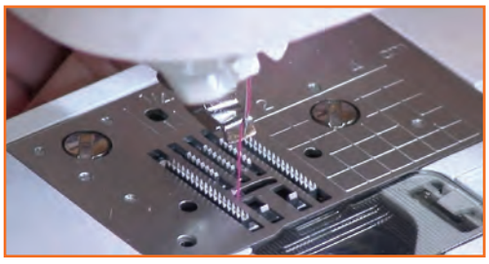


Fig.2.1.26: Feed Dog

Feed dog: moves the fabric through a predetermined distance.

Fig.2.1.27: 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.

Fig.2.1.28: Reverse feed lever

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

Fig.2.1.29: 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.2.1.30: Presser Bar

Fig.2.1.31: 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.2.1.32: Presser foot regulator

Fig.2.1.33: Thread take up lever

Thread take up lever: gives tension to the thread.

Oil sight window: indicates the presence of lubricating oil.

Fig.2.1.34: Oil sight window

Fig.2.1.35: Thread stand

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

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

Hand Lifter: is used to lift the presser foot.

Fig.2.1.36: Knee Lifter

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

Fig.2.1.37: Bobbin Winder

Fig.2.1.38: 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.

Attachments in Sewing Machines (Work Aids)

Attachments in Sewing Machine are devices which are built into machines. These are added to the sewing machine afterwards alongside and/or made use of, in whatever ways a resourceful engineer develop to increase productivity, maintain standards of quality, reduce training time and curtail tiredness for the operator.

Work Aids can be divided into the following categories:

Folders: Folders are used when fabric must be folded prior to sewing .They differ from the simple fold to extremely complex combinations of folders and indeed enable some to be achieved that would not be otherwise be possible at all. Folders are frequently used on machines having more than one needle.

Binder: Many binders are existing which add additional items of self-fabric or other material to a costume and of these, many come into the grouping are known as Binder. Fabric Edges are bound, either as a means of edge arranging or to create a embellished effect.

Fig.2.1.39: Binder

Fig.2.1.40: Hemmer

Hemmer: Folders which operate on a garment part without any additional material are knows as Hemmer.

Presser Foot and Presser feet: Presser Foot and Presser feet can be used as particular work aids, in addition to their normal function of holding the materials in contradiction of the feed dog, when the scale of the state is within the small size of foot. The function of edge guiding can be achieved in some circumstances by a special presser foot called recompensing presser foot.

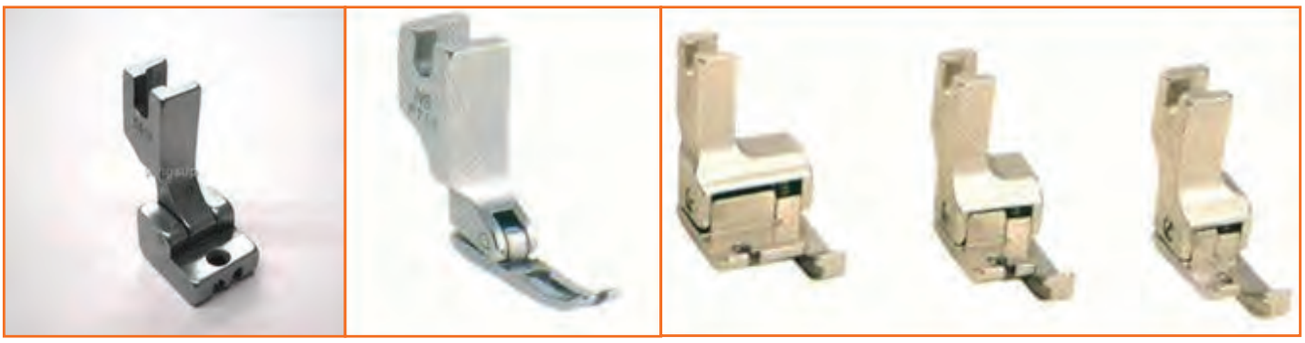


Fig.2.1.41: Presser Foot and Presser feet

Guides: Guides are used anywhere when sewing must take place in a certain spot on a garment. In their meekest form they are edge guides, forming some kind of physical fence to the edges of the fabric being joined together.

Fig.2.1.42: Guides

2.1.4 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.2.1.43: Scissors

Fig.2.1.44: 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.

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.2.1.45: Threads

Fig.2.1.46: 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.

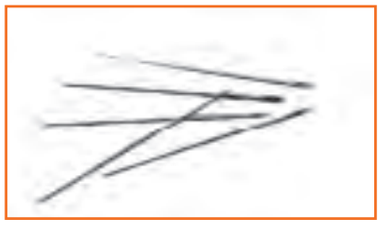


Fig.2.1.47: Needles

Fig.2.1.48: 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.2.1.49: Pins and Pincushion

Fig.2.1.50: 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.2.1.51: Seam ripper

Fig.2.1.52: 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.2.1.53: Cutting Table

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.

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

Fig.2.1.54: Sewing Gauge

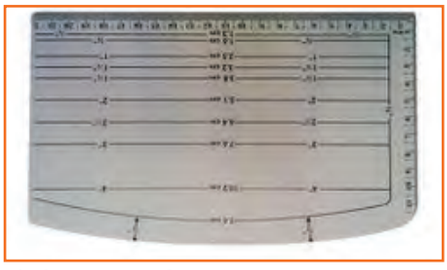


Fig.2.1.55: Hem Gauge

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

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

Fig.2.1.56: Yardstick/Meterstick

Fig.2.1.57: Hip Curve

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.

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

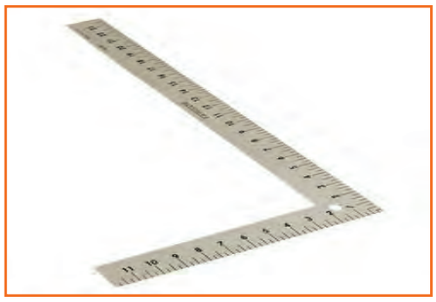


Fig.2.1.58: L-square

Fig.2.1.59: Tailor's Chalk

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.2.1.60: Novelty Yarns

Fig.2.1.61: Masking Tape

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.

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.2.1.62: French Curve

Fig.2.1.63: Hand Needle

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

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.2.1.64: Punch Needle

Fig.2.1.65: Frame, Round

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

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

Fig.2.1.66: Pattern making paper

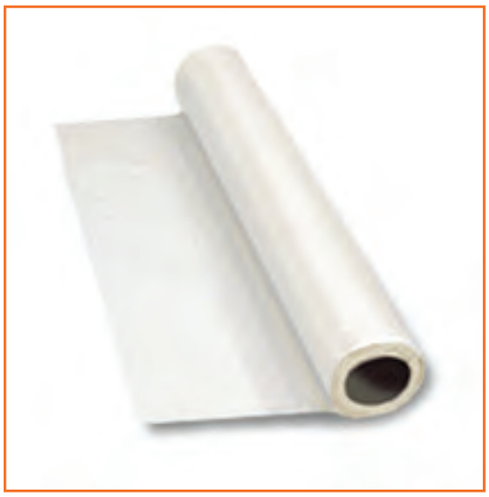


Fig.2.1.67: Tracing paper

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

Hand held thread trimmer: Used for thread trimming.

Fig.2.1.68: Hand held thread trimmer

Fig.2.1.69: Bent neck, metallic Tweezer

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.2.1.70: Pencils (HB, 2B, 4B)

Fig.2.1.71: Pick glass

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.2.1.72: Needle threader

Fig.2.1.73: 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.2.1.74: Hand embroidery book

Fig.2.1.75: Fabric Glue

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.2.1.76 (a): Beads

Fig.2.1.76 (b): Sequins

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

Fig.2.1.77: Buttons

Fig.2.1.78: Hooks

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

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

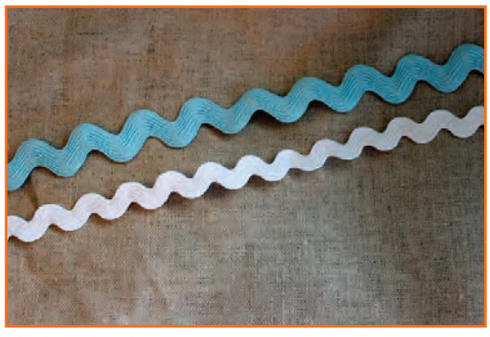


Fig.2.1.79: Trims

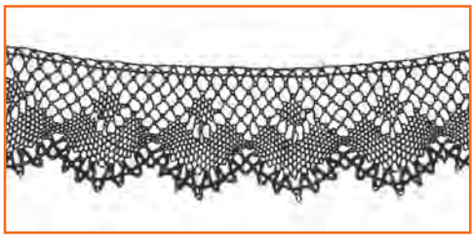


Fig.2.1.80: Lace

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

Zipper: Attached in lower garments.

Fig.2.1.81: Zipper

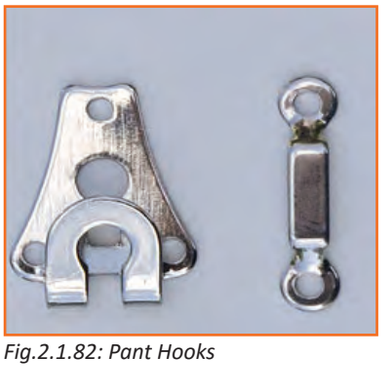


Fig.2.1.82: Pant Hooks

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.2.1.83: Sewing Mannequin

Fig.2.1.84: Greyscale

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

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

Fig.2.1.85: Thimble

2.1.5 Check the Equipment is Safe and Set-up in Readiness for Use

Keeping a check on your work area is very important. Chaotic areas can create unhealthy and unhygienic work environment leading to accidents and tragedies. Hence, it is always recommended to have a look that the equipment you are going to work on, is safe and ready to use. While working as a sewing machine operator or in such environment you might come across many electrical equipment's, tools and machineries hence here are tips you should always keep in mind before using the appliances.

- Always examine the work area and its surroundings. Never use machines or power tools when they have water on them or if they are exposed to wet conditions like water spillage (even accidentally).
- While using electrical appliances like iron etc. always carry-out a visual check before plugging-in.
- Make sure that the equipment's plugs or connectors are not damaged or are not having any broken/ loose wires.
- Before plugging in, inspect the machinery and make sure that the electric switch on the machinery is off before turning it on for use from the main switch.
- Always consult health and safety department if there are any stains or spark marks present on the equipment to make double assured that it's safe to use.

Fig.2.1.86

- Before turning on any equipment make sure to look around the area to make sure that there is no hazardous material, in order to have healthy working.
- Equipment which was not frequently used in the past should not be used immediately without any inspection, make sure to get it inspected and oiled / greased if needed.
- Always check for the damaged parts before using any product, and if any part that appears damaged should be cautiously inspected and send it for repair. Any part that is damaged should be properly renovated or replaced by a qualified technician only. Do not use if any switch does not turn on and off properly.
- Do not operate the machine without having the safety guards on it to avoid any unwanted accident at the work place.
- Make a basic checklist of your workstation and go through before starting to use the machine for e.g. look for any dull, rusty or bent needles and first replace them before using the sewing machine.
- Always look for your safety guards like eye guard or Fig.guard to avoid needle injury etc. and make sure to have them if your job requires.
- Make sure the equipment is set up in readiness for use i.e. it should be properly greased if needed and all parts and functioning efficiently.
- Before using equipment make sure to look for a label which denotes the trademark for 'safety' and you should be well aware about when was the last time a quality check was conducted on equipment. This allows the operator to understand machine's capability and its readiness for use.

2.1.6 Types of Threads

Sewing Thread

A long, thin, 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 a material are referred to as sewing threads.

Knowledge of sewing thread

Structure and manufacturing process of the sewing thread, usual textile products such as cotton thread, silk thread, etc. have been used as sewing thread before. Nowadays, however, chemical fiber products such as polyester thread, nylon thread, etc. are largely used in accordance with materials or applications. These threads are dissimilar from one another in structure and manufacturing.

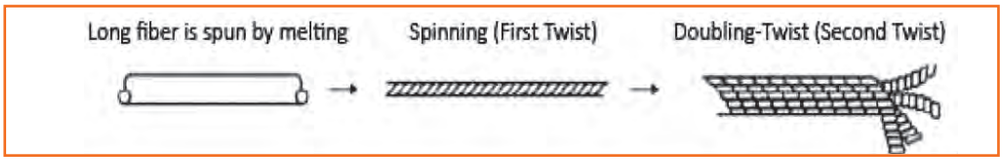


Fig.2.1.87 (a): Thread Structure

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.

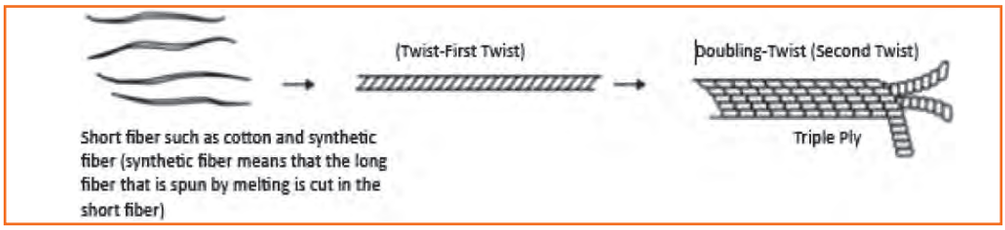


Fig.2.1.87 (b): Thread Structure

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

Different types of threads

Fig.2.1.88: Rayan Thread

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 maintenance in that regard.

Fig.2.1.89: Polyester Thread

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 as well. Unlike rayon, polyester does not fade or shrink when washed. It is economical and suitable for all types of sewing. It/s color fastness and strength are the major reason why it is the most preferred medium of stitching.

Fig.2.1.90: Nylon Thread

3. **Nylon:** This is another synthetically produced thread with good strength. However the disadvantages aremany, like, not being heat resistant, not colourfast (becomes yellow over time) and also becomes brittlethrough laundering and exposure.

Fig.2.1.91: Cotton Thread

4. **Cotton:** This is the only 100% natural fiber thread made for high speed machines. These threads performsbeautifully in machines and has a soft sheen. Embroidery floss is made up of 6 strands that can either beseparated or kept together. This is usually used for cross-stitch.

Fig.2.1.92: Wool

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 has 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 fibers or fine continuous filaments.

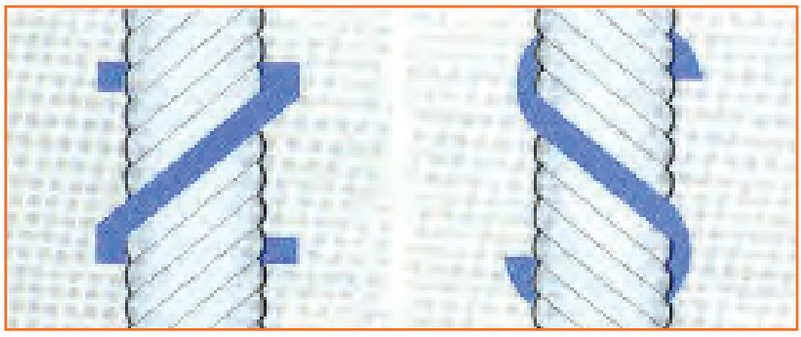


Fig.2.1.93: Basics of thread construction

Some terms used in the context of thread construction are:

- **Twist:** The 'twist' of a thread refers to the number of turns per unit length required to hold the fibers / plies together to give the yarn / thread substance the required strength and flexibility. A thread with an excessive twist is also likely to give trouble while sewing due to 'twist liveliness', which 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 designed 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, 3 or 4 ply threads. Threads are twisted together to give corded thread. used are 4, 6 or 9 cord.

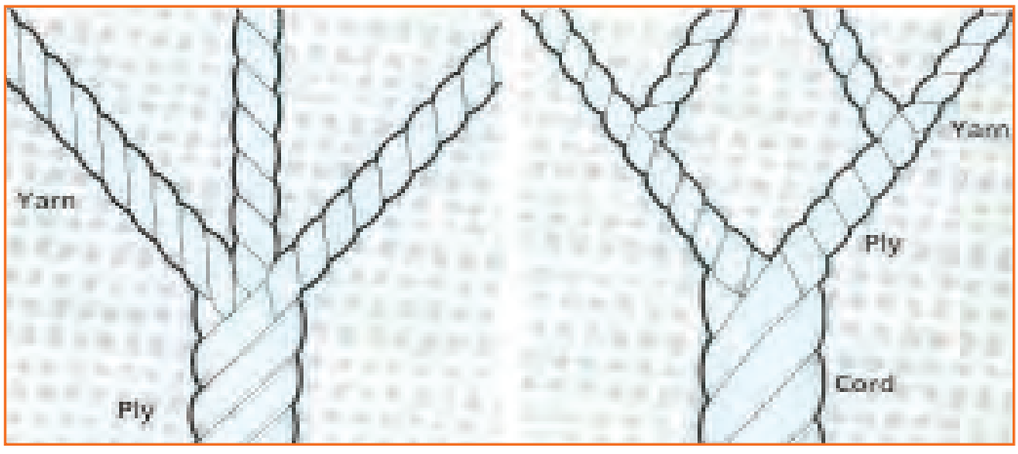


Fig.2.1.94: Ply and Cord of Thread

Sewing Thread Numbering

The thickness of sewing threads is defined by Tex. or Tkt. (Ticket). And these two thread numbering terms are widely used. A same thickness of thread will have two different Figs in these two systems.

Tex Numbering :Tex is a metric system of textile yarna 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 gives 40 grams of weight.

GENERAL GUIDELINES FOR THREAD SIZE SELECTION			
SEWING THREAD SIZES BY TEX	FABRIC WEIGHT (GSM)	FABRIC WEIGHT (oz/yd2)	GARMENT EXAMPLES
18, 24	65 - 140	2 - 4	T-shirts, Lingerie
24, 27, 30	140 - 200	4 - 6	Shirts, Dresses
30, 40	200 - 275	6 - 8	Light-Weight Bottoms
40, 60	275 - 400	8 - 12	Light-Weight Denim
60, 80, 105	400 - 500	12 - 15	Heavy-Weight Denim

Fig.2.1.95: Thread Size Selection

2.1.7 Needles

Parts of a sewing machine needle

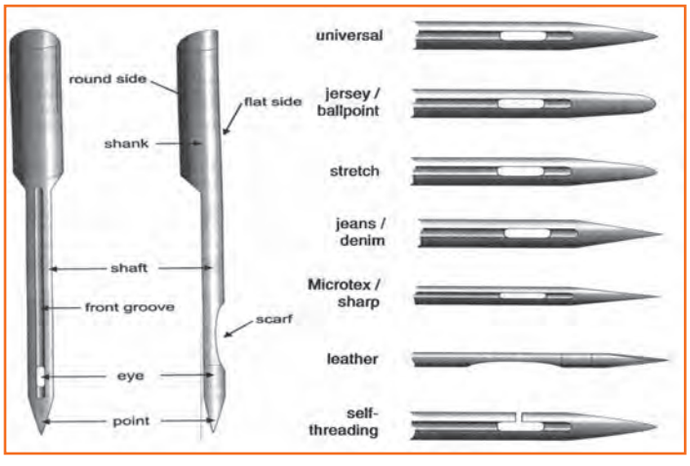


Fig.2.1.96: Parts of a sewing machine needle

- **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.2.1.97: 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.

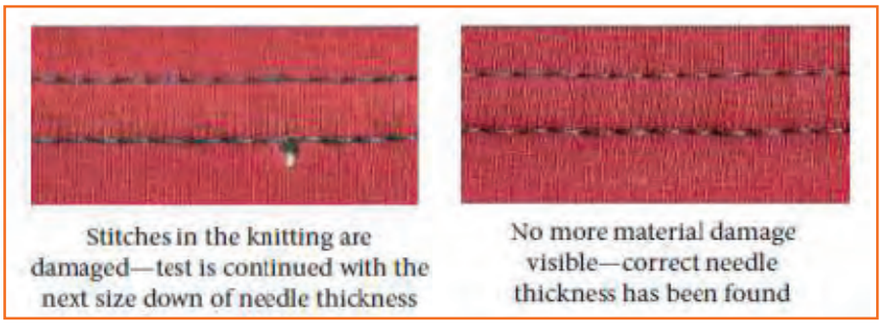


Fig.2.1.98: Choosing Needle Thickness

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.2.1.99: 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.2.1.100: 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.2.1.101: 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.2.1.102: 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.2.1.103: Materials to be sued as the product specification

Exercise

1. Which of the followings are the types of Industrial Sewing Machines?
   a) Feed off the arm
   b) Lockstitch Machine
   c) Flatlock Machine
   d) All the above
2. _____ is one of the most important part of a machine; it carries thread through the fabric to the bobbin and completes stitch formation.
   a) Bobbin
   b) Hook
   c) Needle
   d) Thread
3. What are the types of Feed Mechanism?

   .....

   .....

   .....
4. What are the materials and tools required for stitching?

   .....

   .....

   .....
5. What are the types of threads?

   .....

   .....

   .....

UNIT 2.2: Stitch Components to Produce Apparels

Unit Objectives

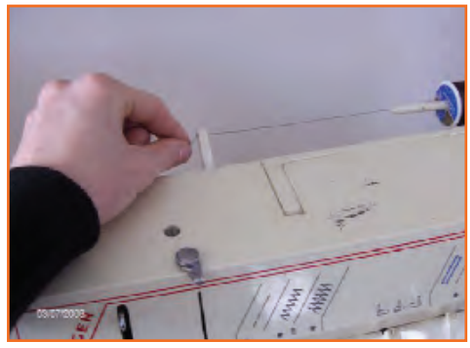
At the end of this unit, you will be able to:

1. Adjust the machine.
2. Ask questions to obtain more information.
3. Estimate the expected length of time for the process.
4. Perform a test sew run.
5. Know the different types of stitching and seam.

2.2.1 Adjusting the Machine

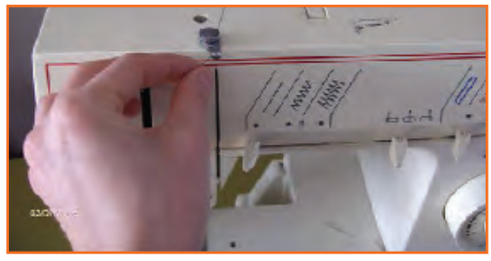
2.2.1.1 Threading

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.

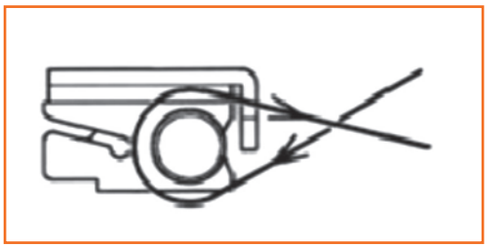
Step 6: Then into the next thread guide.

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.

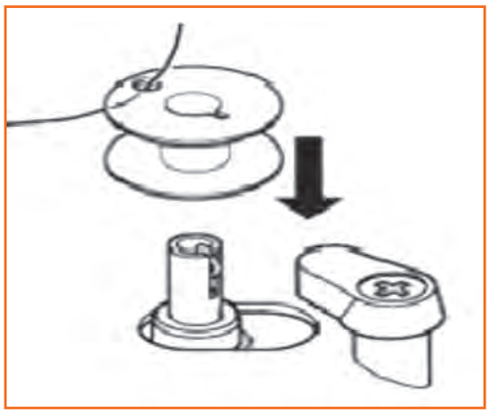
Step 9: Pull the string out tight and set the bobbin into the tray. Insert the thread into the metal notch and pull back.

2.2.1.2 Using the Bobbin Winder

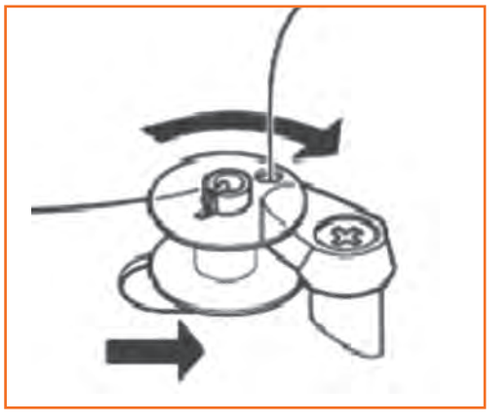


Step 1:

- 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

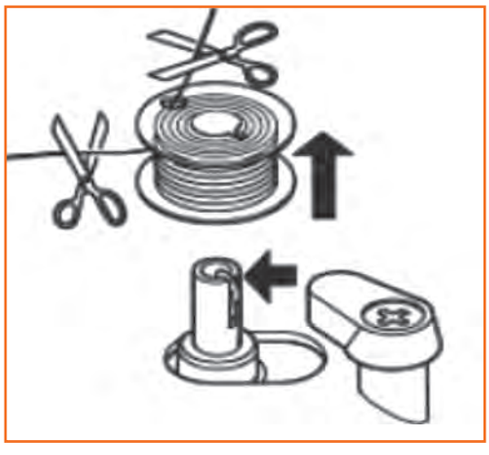


Step 2: Pass thread end, from inside, through small hole in rim of bobbin



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.2.2.1: Bobbin Case

Fig.2.2.2: 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

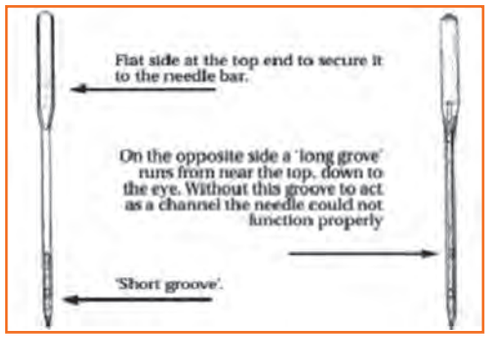


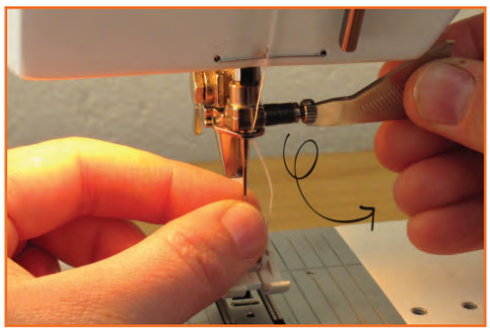
Fig.2.2.3: Adjusting the needle

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.

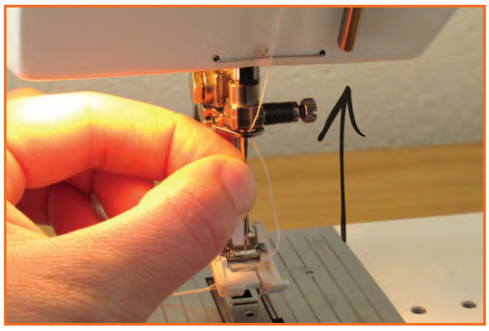
2.2.1.3 Replacing a Needle

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.

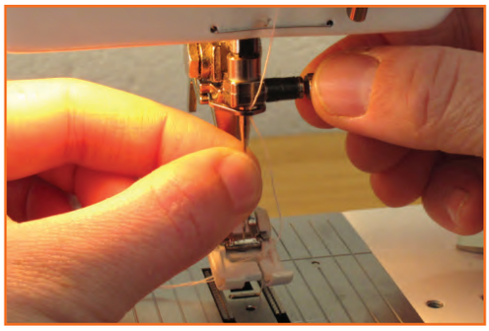


Step 1: Hold the needle with your left hand and undo the screw at the top of the needle with your right hand.

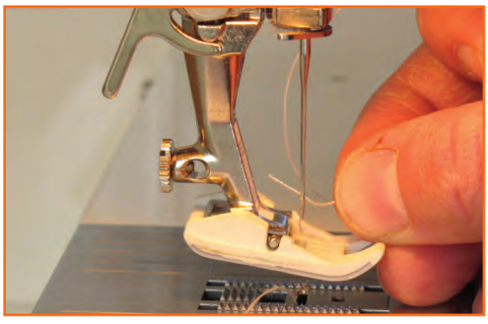
Step 2: Remove the needle by pulling down and away from the needle clamp.



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.

2.2.2 Pre-sewing Activities

Before sewing a garment, the sewing machine operator should.

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

2.2.3 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 play attention, while demonstration

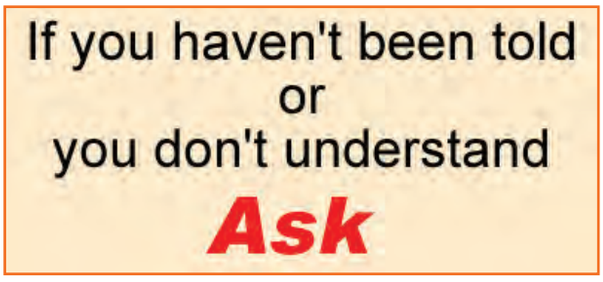


Fig.2.2.4

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.

2.2.4 Estimate the Expected Length of Time for the Process

Off Standard Time

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

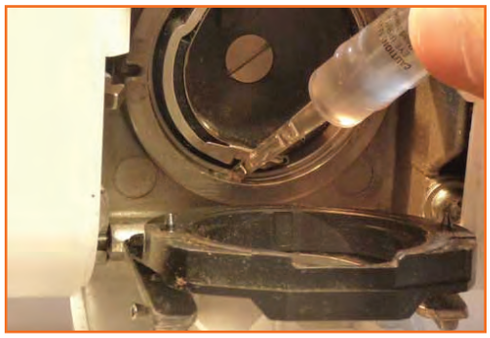
- Unavailability of work
- Power Failure
- Machine Breakdown

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

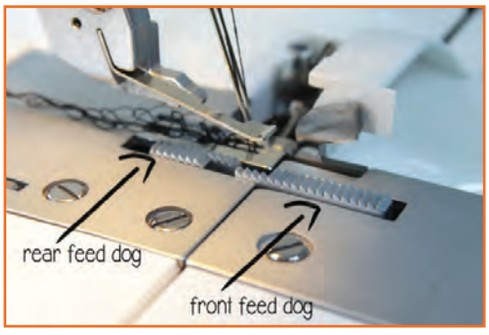
Fig.2.2.5

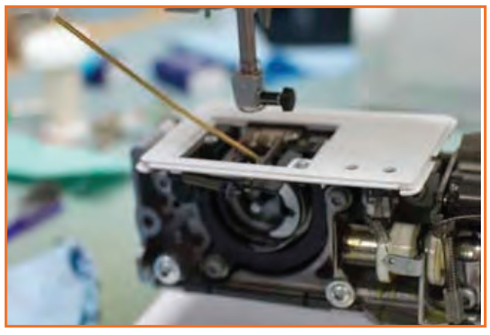
2.2.5 Perform a Test Run

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:

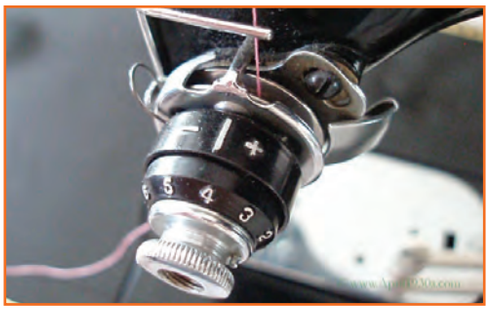


Step 1: Cleaning and oiling: Check if the machine is been cleaned and oiled properly. With the presser foot up, try to run the machine at full speed for one minute. If you hear a noticeable discrepancy in speed then the machine surely needs some lubrication. Remove the top cover (if machine has one.)If 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.

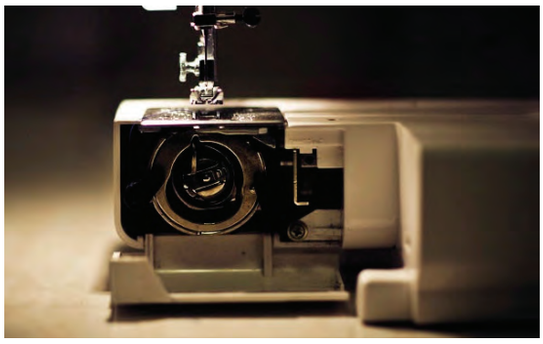




Step 2: **Check feed dogs:** Remove the feed dog, clean the feed dogs. Try to pass a rag under them and with an old needle or narrow tool, remove the lint inside the feed channels. Put back the needle plate. If your machine is equipped with a FEED DROP, be sure the feeds are set at UP position. By turning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

2.2.6 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.

2.2.7 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

Superimposed Seams: These generally start with two or more pieces of material superimposed over each other and joined near an edge, with one or more rows of stitches. There are various types of seams within the SS class. A superimposed seam can be sewn with a stitch 301 or 401 to create a simple seam. The same seam type can also be sewn with stitch class 500 (Over edge stitch) or Combination stitches (i.e. stitch class 516). The purpose is to create neat load bearing seams for lingerie, shirts, etc.

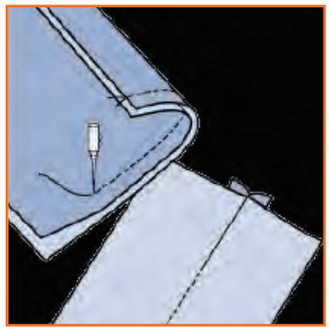


Fig.2.2.6: Superimposed Seams

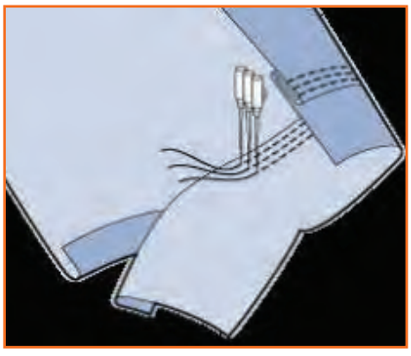


Fig.2.2.7: Lap Felled Seam

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.

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.

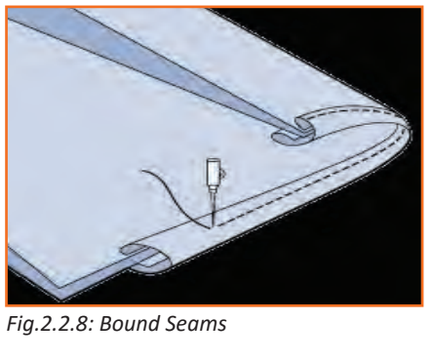


Fig.2.2.8: Bound Seams

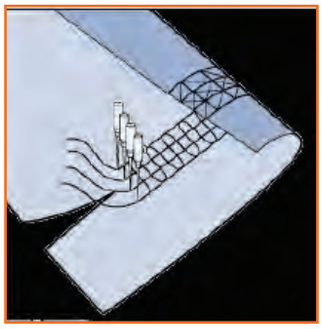


Fig.2.2.9: Flat Seam

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.

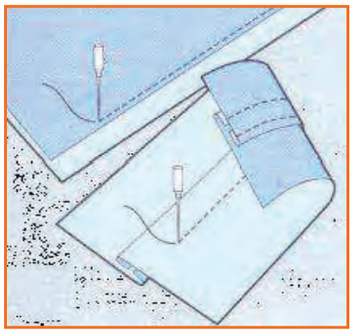


Fig.2.2.10: French Seam

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.

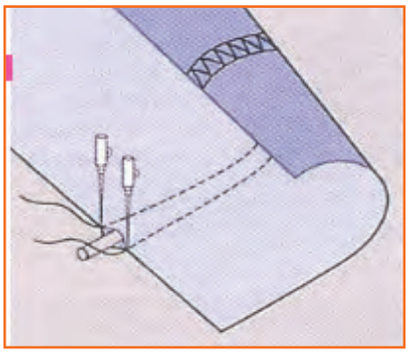


Fig.2.2.11: Decorative Stitching

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, flys, facings, etc.

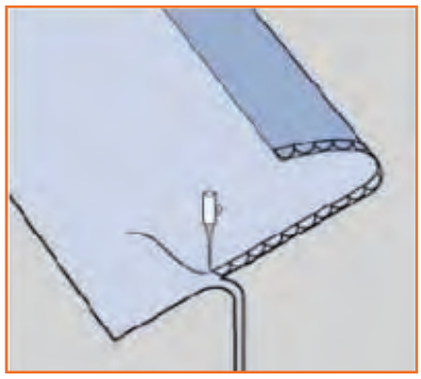


Fig.2.2.12: Edge finishing

2.2.8 Stitches

A Stitch in 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 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.

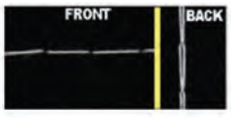
Diagram	Stitch class	Thread count	Typical uses
	101 Class	One thread	Basting, or light construction
	103 Class	One thread	Blind stitch for hemming
	104 Class	One thread	Blind stitch for hemming

Fig.2.2.13: 100 Class stitch

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

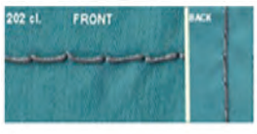
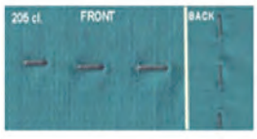
Diagram	Stitch class	Thread count	Typical uses
	202 Class	One Thread	Basting, tacking or repairs
	205 Class	One Thread	Pick stitch - topstitching

Fig.2.2.14: 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.2.2.15: 300 Class stitch

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

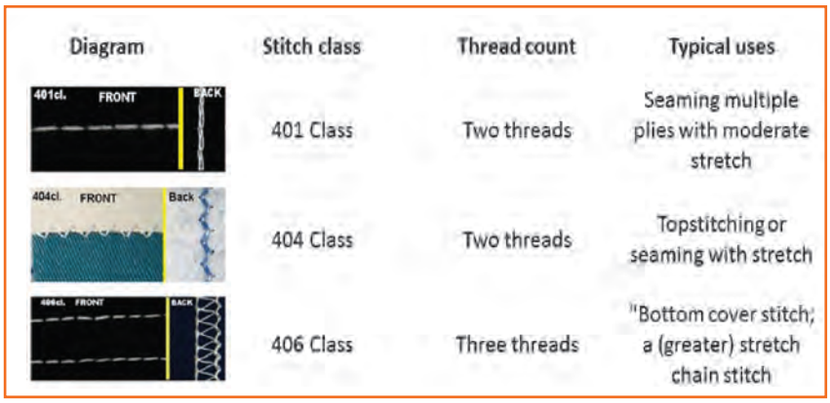


Diagram	Stitch class	Thread count	Typical uses
401cl. FRONT BACK	401 Class	Two threads	Seaming multiple plies with moderate stretch
404cl. FRONT Back	404 Class	Two threads	Topstitching or seaming with stretch
406cl. FRONT BACK	406 Class	Three threads	"Bottom cover stitch; a (greater) stretch chain stitch

Fig.2.2.16: 400 Class stitch

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

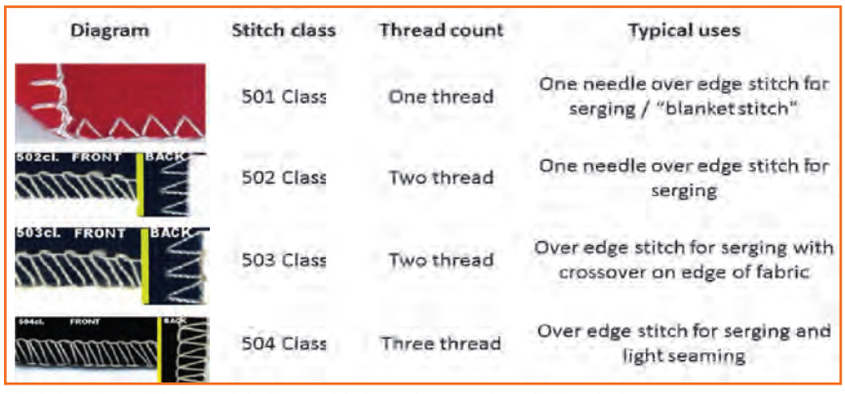


Diagram	Stitch class	Thread count	Typical uses
	501 Class	One thread	One needle over edge stitch for serging / "blanket stitch"
502cl. FRONT BACK	502 Class	Two thread	One needle over edge stitch for serging
503cl. FRONT BACK	503 Class	Two thread	Over edge stitch for serging with crossover on edge of fabric
504cl. FRONT BACK	504 Class	Three thread	Over edge stitch for serging and light seaming

Fig.2.2.17(a): 500 Class Stitch - Multi-thread over edge chain stitch

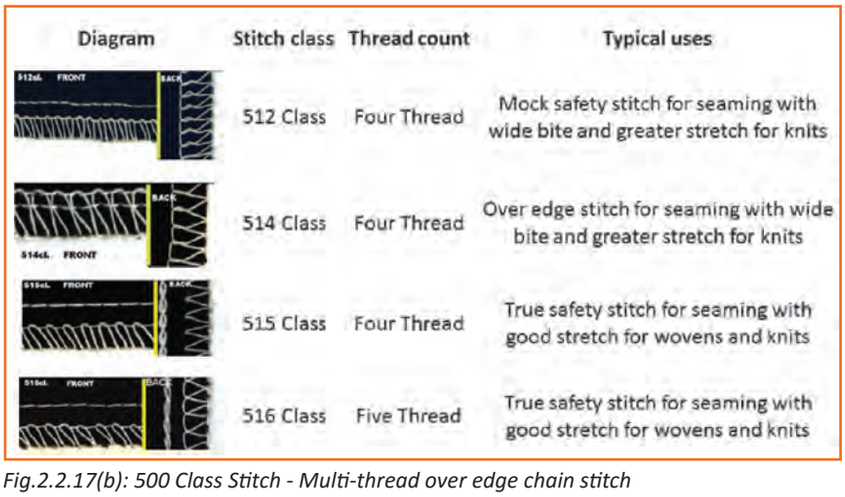


Diagram	Stitch class	Thread count	Typical uses
512cl. FRONT BACK	512 Class	Four Thread	Mock safety stitch for seaming with wide bite and greater stretch for knits
BACK 514cl. FRONT	514 Class	Four Thread	Over edge stitch for seaming with wide bite and greater stretch for knits
515cl. FRONT BACK	515 Class	Four Thread	True safety stitch for seaming with good stretch for wovens and knits
516cl. FRONT BACK	516 Class	Five Thread	True safety stitch for seaming with good stretch for wovens and knits

Fig.2.2.17(b): 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.2.2.18: 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.

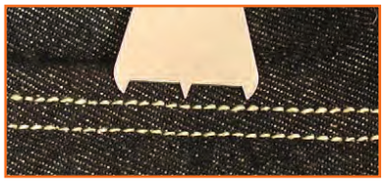


Fig.2.2.19: Stitch length measurment

Garments	SPI	Comments	Garments	SPI	Comments
Denim Jeans, Jackets, Skirts	7 – 8	Fewer stitches per inch generally will give a more contrast stitch appearance.	Children's wear	8 - 10	Usually 8 to 10 spi is adequate to provide adequate seam strength and at the same time allow for quicker cycle times .
Twill Pants or Shorts	8 – 10	More stitches per inch will help minimize seam grinning.	Dresses, Skirts	10 - 12	Due to many of the operations being lockstitch, usually 10 – 12 spi is required to provide adequate seam strength.
Trousers, Dress Pants, Slacks	10 - 12	On some operations like serge panels, it may be desirable to use a longer stitch length.	Blind stitch Operations on Slacks, Dresses, Skirts, etc.	3 – 5	A long stitch length is desirable to minimize the dimple or appearance of the needle penetration on the outside of the garment.
Dress Shirt or Blouse	14 – 20	Using more SPI allows the use of smaller diameter threads that will minimize seam puckering.	Buttonsew (4 hole button)	16	Button sew machines are cycle machines with a predetermined number of stitches per cycle.

Casual Shirts, Blouses, Tops	10 - 14	Using more SPI will give more of a tailored stitch appearance and better seam coverage when serging.	Buttonhole (1/2" purl or whip stitch)	85 - 90	Generally sewn vertically – approx. 85- 90 stitches with a lockstitch buttonhole machine.

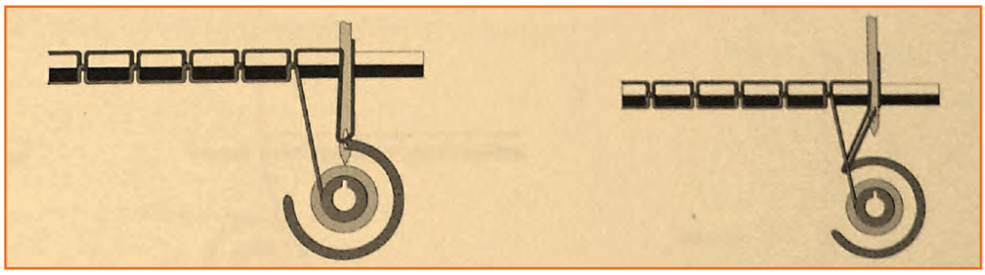
Fig.2.2.20: Stitch length measurment table

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.

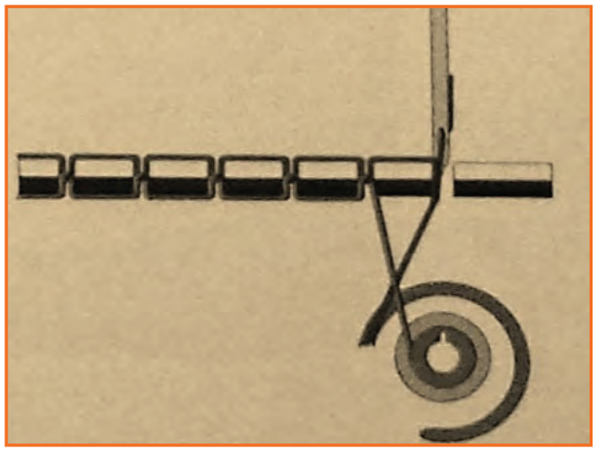
To make one stitch, the machine lowers the threaded needle through the cloth into the bobbin area, where a rotating hook (or other hooking mechanism) catches the upper thread at the point just after it goes through the needle. The hook mechanism carries the upper thread entirely around the bobbin case, 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

2.2.8.1 Steps for Lockstitch



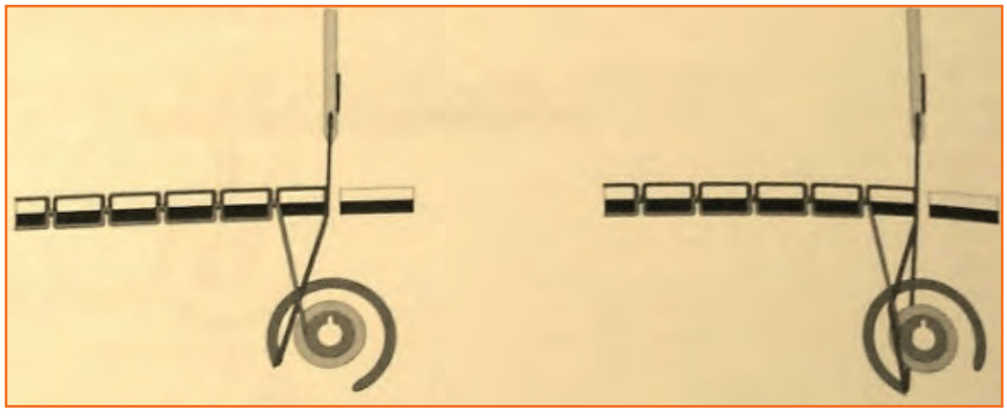
Step 1:

- 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 ad 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:

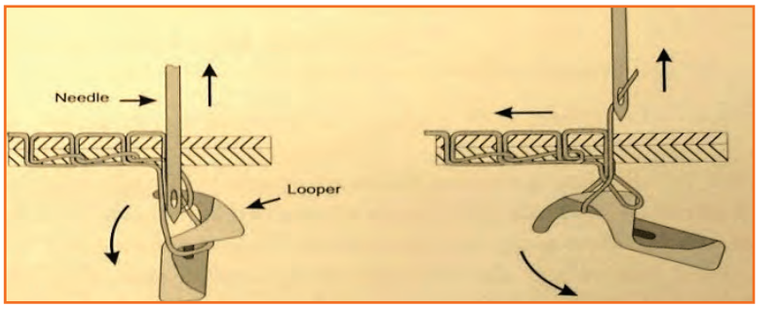
- Keep the slide plate open so that the hook-set is visible.
- Bring needle to its lowest position into the hole through which it reaches the bobbin by slowly moving the hand-wheel.
- Now, move the needle up using the hand-wheel
- Needle-thread (Upper-thread) becomes loose when the needle goes up from this lowest position.
- Blade point of outer hook of the bobbin assembly catches the loop-shaped upper thread ad 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:

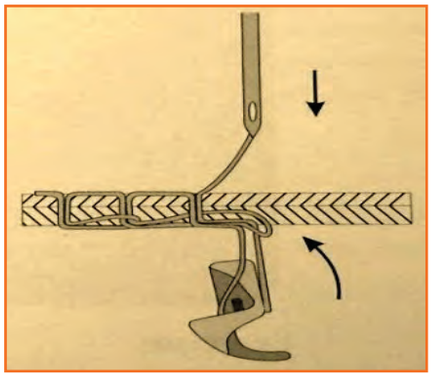
- Thus the upper thread is lock-stitched (interlaced) with the lower thread.
- Stitch formation is completed when the upper thread lifts the lower thread.
- The feed dog pushes the unstitched portion of the cloth under the presser foot.
- The needle comes down and goes inside the cloth to repeat from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

2.2.8.2 Steps for Chain Stitch



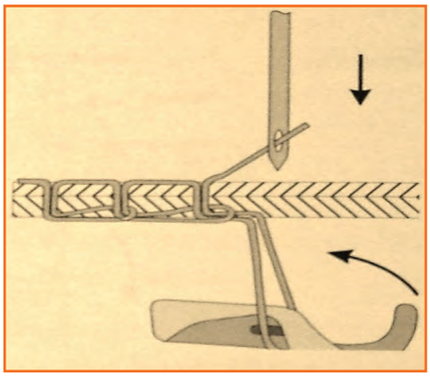
Step 1:

- 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.

2.2.8.3 Stitch at the Normal Speed

The above activity was to understand the formation of lockstitch 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.2.2.47)
- **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.2.2.48)
- **Step 19:** Note the end-time.

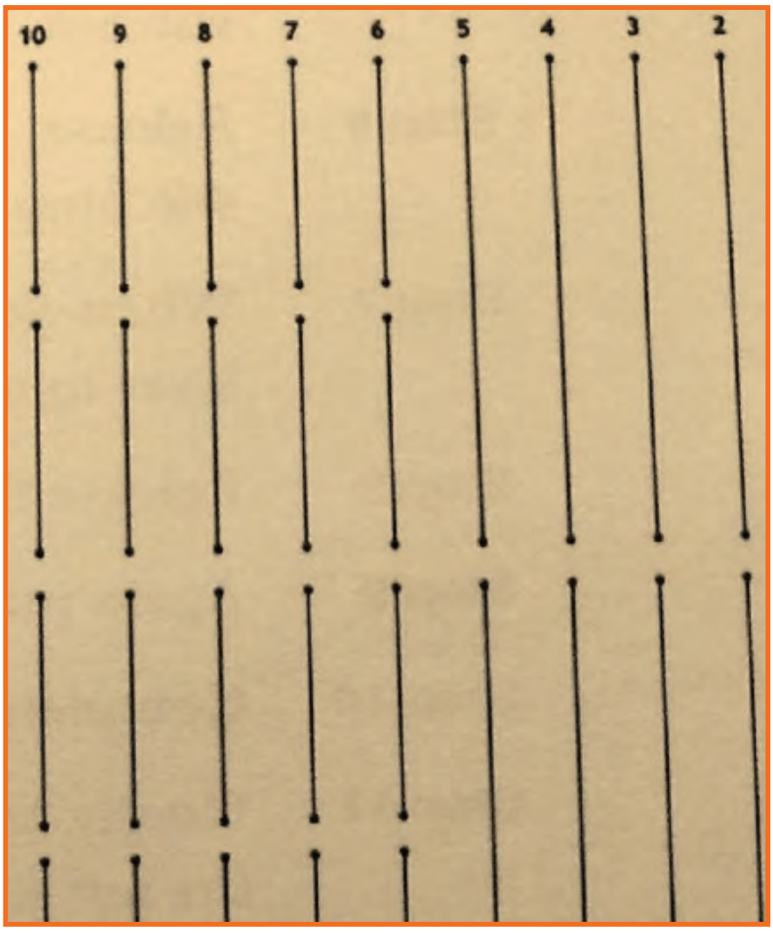


Fig.2.2.21: Stitching at normal speed

2.2.9 Practicing Corner Stitch and Curve Stitch

2.2.9.1 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 a 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.2.2.49)
- **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.

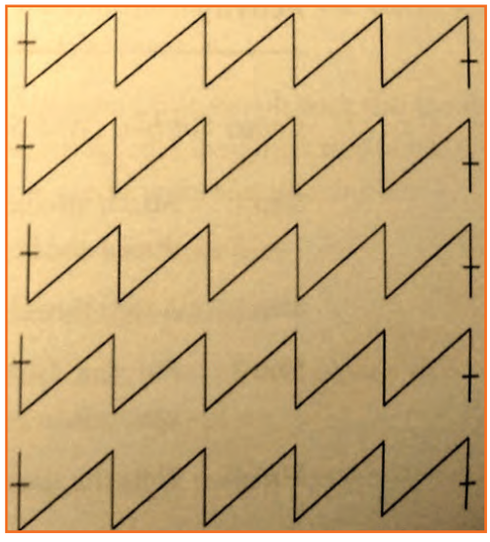


Fig.2.2.22: Corner Stitch

2.2.9.2 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.2.2.50)
- **Step 22:** Note the end time

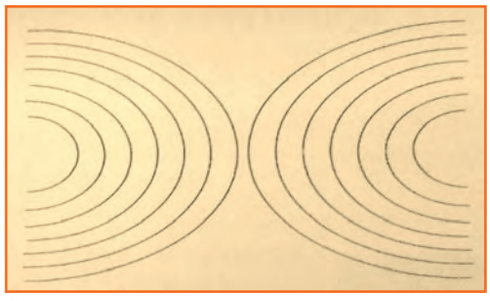


Fig.2.2.23: Curve Stitching

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

1. 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).
   a) True
   b) False
2. The amount of time in a day when the standard conditions are not provided to operator for working is called off standard time
   a) True
   b) False
3. What are the types of Seam?

   .....

   .....

   .....

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   .....
4. How to use Bobbin Winder?

   .....

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UNIT 2.3: Stitching a Trouser

Unit Objectives

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

1. Recognize the different parts of a trouser.
2. Stitch a trouser.

2.3.1 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

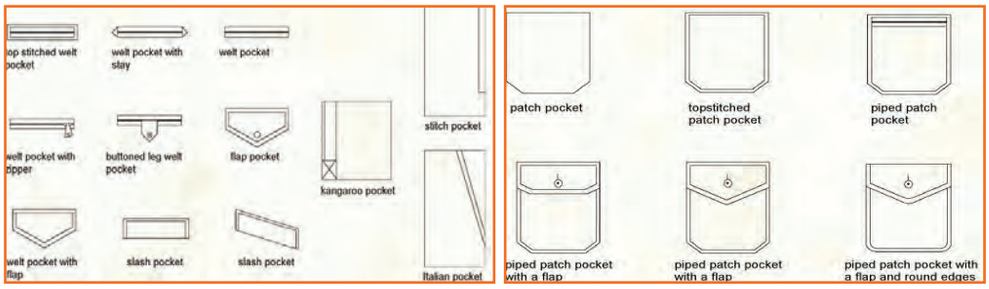


Fig.2.3.1: Types of Pockets

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

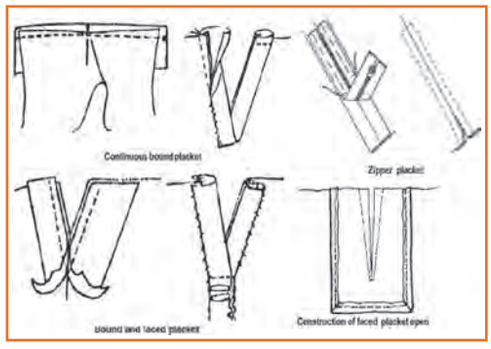


Fig.2.3.2: Types of Plackets

Fig.2.3.3: Types of Sleeves

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

2.3.2 Trouser Stitching

Parts of a trouser

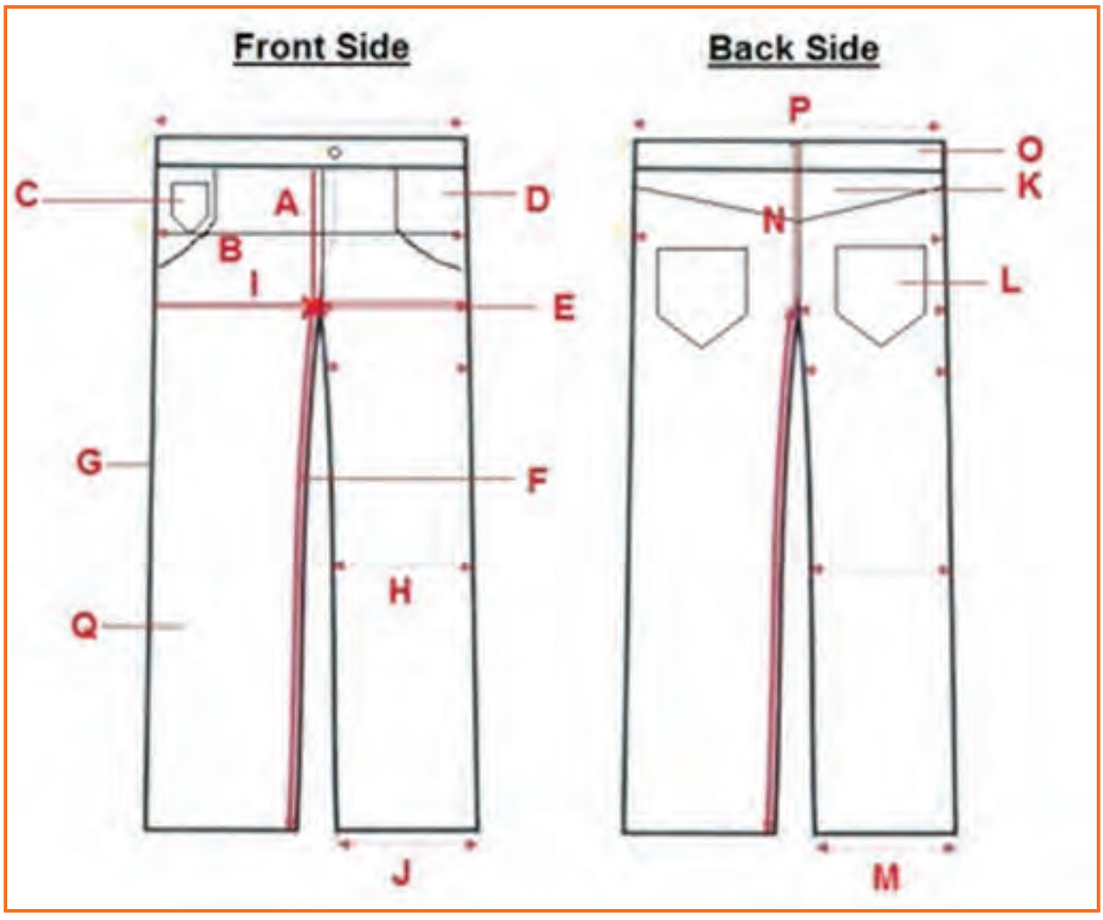


Fig.2.3.4: Parts of a trouser

A = Front Rise
B = Hips
C = Coin Pocket
D = Scoop Pocket
E = Cronch (center point)
F = Inseam
G = Sideseam
H =Knee
I = Thigh (cronch to side seam)
M/J = Leg Opening / Bottom Hem
K = Yock
L = Back Pocket
N = Back Rise
O = Waist Band
P = Waist
Q = Pannel (Back/Front)

2.3.3 Steps for Stitching a Trouser

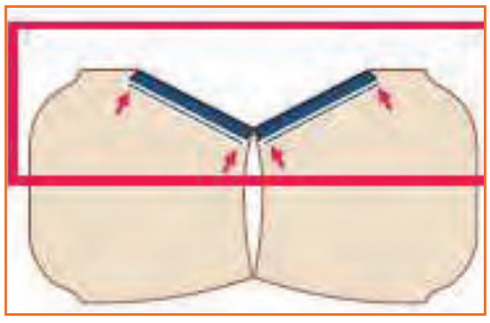
2.3.3.1 Preparation of Pocket Bag (front)

Step 1: Take both the upper facing pieces and put overlock stitch on the longer straight sides. Make sure the face side of the pieces is on top.

Step 2: Take both the lower facing pieces and put overlock stitch on the curved sides. Again, make sure that the face side of the pieces are on the top.

- Note the notch martks on the lower facing pieces.
- Note that the overlock stitch is on the curved side.

Step 3: Take both of the pocket bag pieces and both upper facing pieces. Keep the upper facing piece over the pocket bag in such a way that the overlock part is facing inside and the stitch is facing upwards.



Step 4: Put lockstitch at the edge of the overlock stitch.

Step 5: Take both the lower facing pieces and keep them over the other side of the pocket bag.

Step 6: Put the lockstitch at the edge of the overlock curved stitch.

2.3.3.2 Pocket Attaching (front)

Step 1: Take the two front pieces and keep them on the sewing Fig.with the face side up.

Step 2: Take the pocket bag and place it over the left front piece aligning with the mouth of the pocket.

Step 3: Put 6 mm stitch taking ¼ line on throat plate as guide, starting from the top to bottom.

Step 4: Turn the piece and put 4 mm stitch at the mouth of the pocket.

Step 5: Match the lower facing and upper facing at thenotch marks.

Step 6: Put 2 mm stitch starting from the waistline to the outer side of the left front piece.

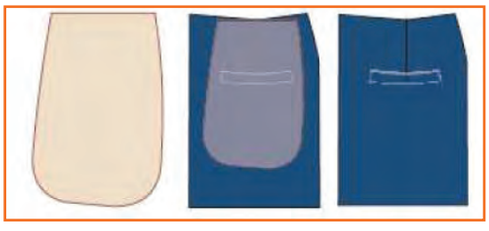
Step 7: Put 5 thread overlock stitches on the curved portion of the pocket bag.

Step 8: Take the other pocket bag and place it over the right front piece aligning with the pocket bag (face to face).

Step 9: Repeat steps 3-7 for the right hand side pocket.

2.3.3.3 Pocket Attaching (Back)

Step 1: Take a note of the notch marks and the pocket marking on the back piece.

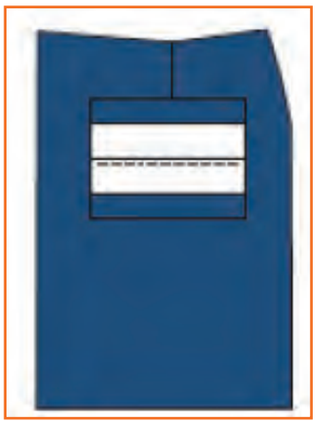


Step 3: Take one of the back pocket bags. Place it belowthe back piece in such a way that the top end of the back piece and the pocket bag are perfectly aligned. Make sure that pocket bag is aligned centrally to the dart.

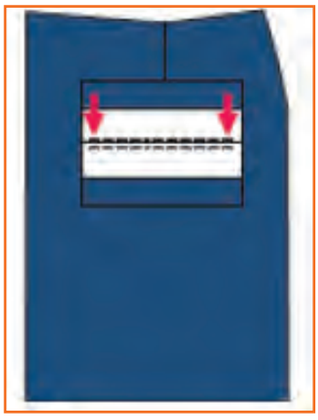
Step 2: Fold the fabric at the centre notch mark and make a dart by starting to stitch on the notch mark till the centre marking.

Step 4: Take one of the fused bone pieces and place it over the pocket markings in such a way that the top marks are visible and the bottom marks are covered by the bone pieces and are at equal distance from both sides.

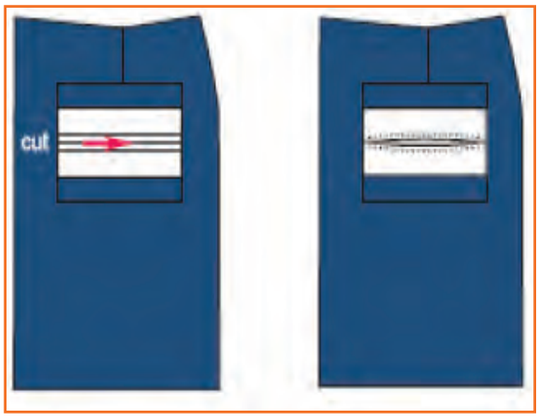
Step 5: Now put a 6 mm stitch starting from back rise side towards the side seam side. The first stitch should be at the notch mark side. Put back tack, both at the beginning and end of the stitch.



Step 6: Take the second fused bone piece and place it next to the stitched bone piece on the waist side.

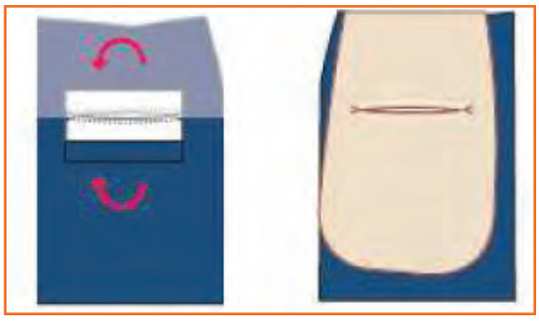


Step 7: Put 6 mm stitch starting from the side-seam side towards the back rise side.



Step 8: Cut the fabric between the two bones leaving 10–12 mm on both sides.

Step 9: Put 6 mm stitch starting from the side-seam side towards the back rise side.

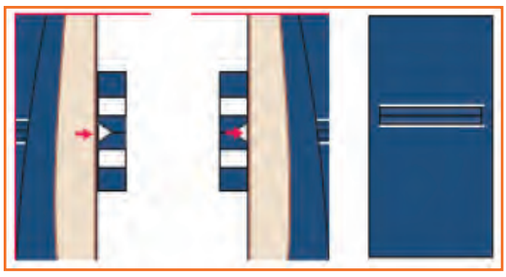


Step 10: Cut the fabric between the two bones leaving 10–12 mm on both sides.

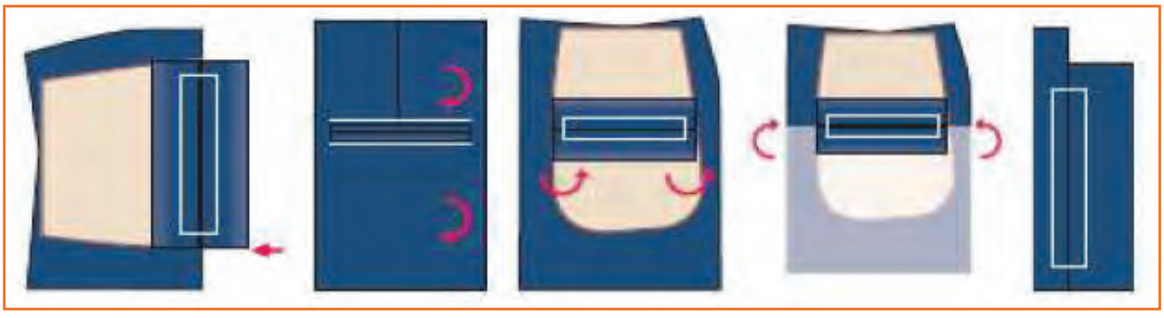
Step 11: Put a stitch on the edge of the folded portion next to the stitched portion.

Step 12: Repeat steps 10 and 11 for the other bone.

Step 13: Push the balance fabric inside.



Step 14: Put a stitch at the end of the cut portion.

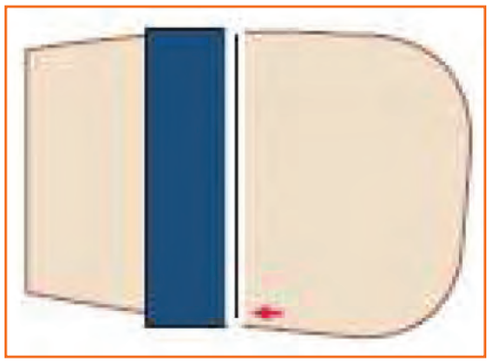


Step 15: Put overlock stitch at the loose end of the bottom bone piece.

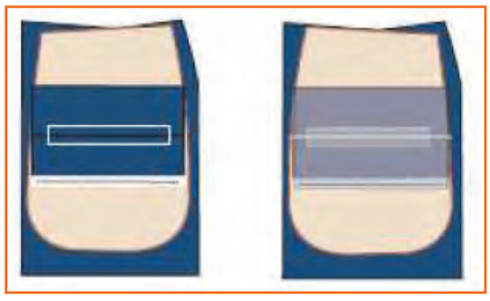
Step 16: Attach bone piece with the pocket bag using lockstitch.

Step 17: Put overlock stitch on the back pocket facing.

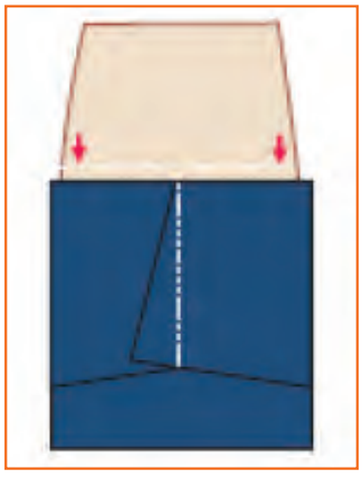
Step 18: Take the other piece of the pocket bag. Place the back pocket facing on top of the pocket bag at a distance of 2½ inches from top of the pocket bag.



Step 19: Put a lockstitch over the overlock portion.



Step 20: Take the fi rst pocket bag, which is already sewn to the back piece. Place the other pocket bag over it. Both the bags should match perfectly.



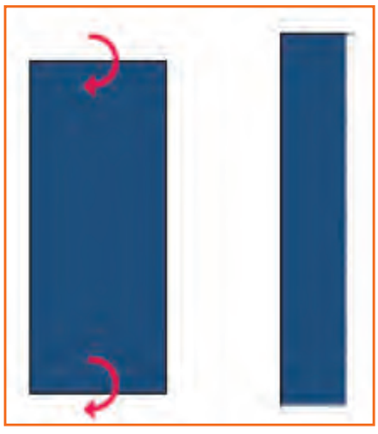
Step 21: Now put a stitch at the inner side to join the two pocket bags together.

Step 22: Put 5-thread overlock stitches starting from right (back rise side) to the left side.

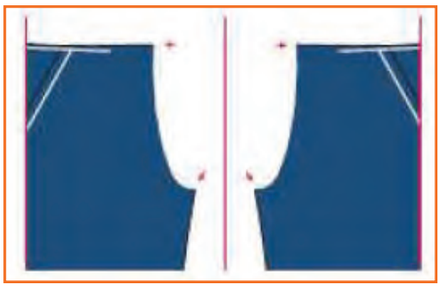
Step 23: Put 3 mm lockstitch at the waistline, starting from the left towards the right, to stitch the loose top end of the pocket bag with the fabric.

2.3.3.4 Fly Making and Attaching

Step 1: Take the fused J-fly piece and put overlock stitch on the face side of the fabric starting from bottom of the curved side till the top.



Step 2: Take the fl y supportive part. Fold it into two equal parts and put over lock stitch on the long open side and one on the short open sides.



Step 3: Take the fused J-fly piece and put overlock stitch on the face side of the fabric starting from bottom of the curved side till the top.

Step 4: Take the left front piece and place the J-fl y piece over the left front piece. Align the straight end of the J-fl y with the front rise along with the backside of the J-fl y facing up.

Step 5: Put a 6 mm lockstitch starting from the bottom to the top (waist line).

Step 6: Turn the J-fl y piece and put an edge stitch on top of the fl y from bottom to top. Make sure that the raw edges are facing towards the fly.

2.3.3.5 Zipper Attaching

Step 1: Take the zipper, open it and bring the slider down.

Step 2: Place the zipper with slider facing down over the fly piece at 8 mm from the straight edge at the top and 6 mm at the bottom. Align the bottom edge of the zipper with the curved portion of the fly piece.

Step 3: Put an edge stitch on the left side of the zipper from top to bottom.

Step 4: Close the zipper and turn the piece 180o clockwise.

Step 5: Now put a 4 mm stitch starting from bottom to top.

Step 6: Take the fl y supportive part. Place the zipper with slider facing up on the fly supportive part. Properly align the zipper end and the overlock side of the fly supportive part.

Step 7: Turn the fabric and put edge stitch on the zipper starting from bottom to top.

Step 8: Take the right front piece and place the front rise side over the zipper. Make sure that the waistlines of both the left and right front pieces match.

Step 9: Put 6 mm stitch starting from bottom to the top.

Step 10: Turn the stitched panels and bring the face side up.

Step 11: Leave a gap of 1 mm between the zipper teeth and the edge of the fabric and put top-stitch.

Step 12: Open the zipper.

Step 13: Turn the left side front piece from the zipper side at the point of stitch.

Step 14: Place the ready pattern of J-fly over the left front piece on the front rise side.

Step 15: Put lockstitch along the ready pattern starting from top to the bottom.

Step 16: Close the zipper and complete the J-stitch along the J-pattern.

Step 17: Put a top-stitch on the edge of the fi nished J-piece starting from bottom to top.

Step 18: Reverse the fabric and put 6 mm stitch on the curved portion of the front rise.

Step 19: Turn the piece so that the front side of the fabric is facing up. Put an edge stitch on front rise starting from bottom till the end of J-stitch.

2.3.3.6 Back Rise Attaching

Step 1: Take both the left and right back pieces. Match them face-to-face.

Step 2: Put 1 cm stitch at the back rise starting from top to bottom with back tack at both the top and bottom.

Step 3: Now put overlock stitches at the back rise starting from top to bottom.

Step 4: Turn the raw edges towards the left side and put top-stitch at the edge of the back rise.

2.3.3.7 Front and Back Piece Attaching

Step 1: Place front and back pieces in such a way that the face sides of both pieces face each other.

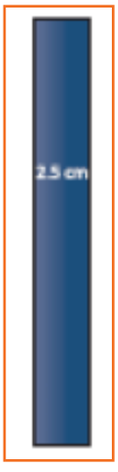
Step 2: Put 1 cm stitch throughout the right side starting from top to bottom.

Step 3: Turn the raw edges towards the back. Put topstitches at the edge starting from top to bottom for the right side and bottom to top for the left side.

Step 4: Align the back and front rise seams and the open sides of the front and back.

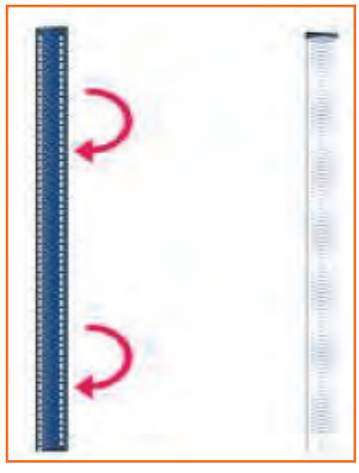
Step 5: Put 5-thread overlock stitches starting from bottom to finish at other bottom side.

2.3.3.8 Belt Loop Making

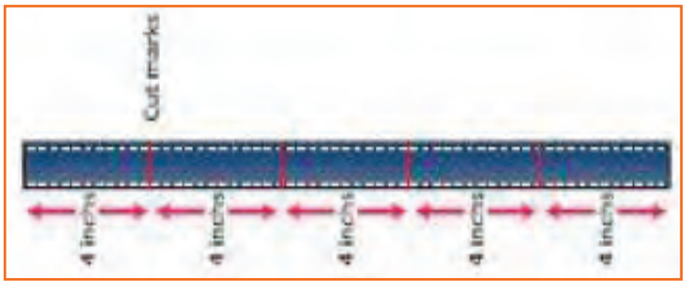


Step 1: Take a long strap, 2.5 mm wide, of the fabric used in body.

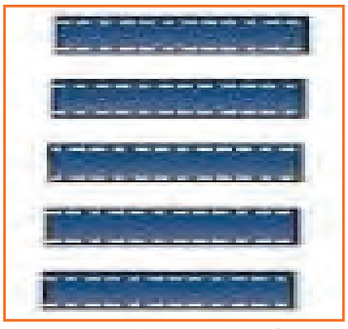
Step 2: Turn the raw edges towards the left side and put top-stitch at the edge of the back rise.



Step 3: Start sewing and feeding the fabric properly.

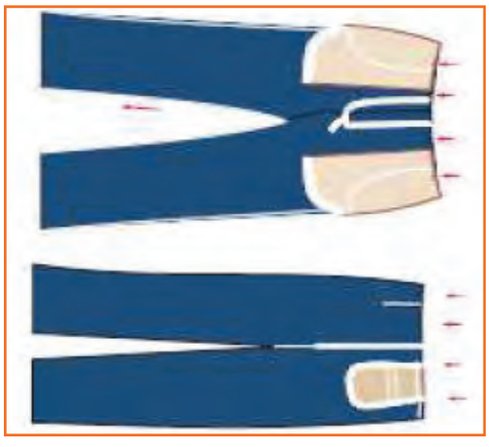


Step 4: Put the marking on the strap for the required length.



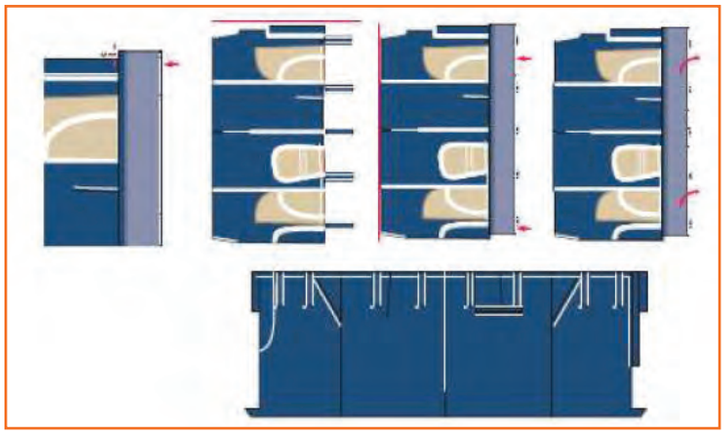
Step 5: Cut the strap of desired leangth.

2.3.3.9 Belt Loop Attaching



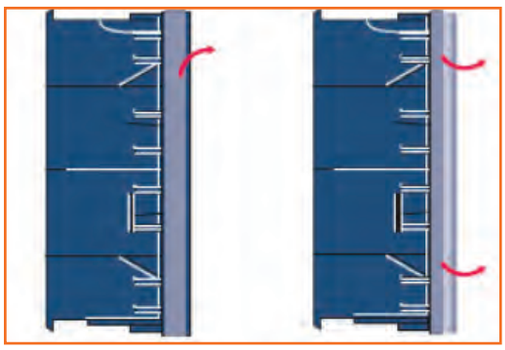
Step 1: Mark the positions on the waistline where the loops are to be attached.

Step 2: Place the belt piece, with the folded side up on the backside of the right front. Belt band should be extended by ½ inch.

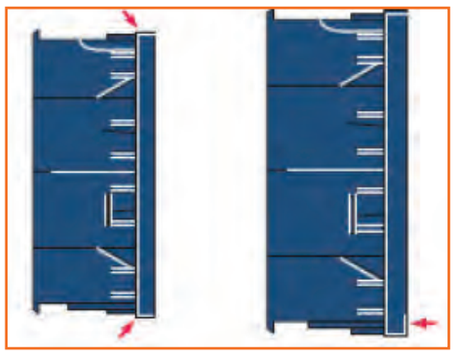


Step 3:

- Put a lockstitch adjacent to the folded part of the belt piece.
- Place the loop with the side facing the fabric and continue to stitch till the end by placing other loops at required positions.

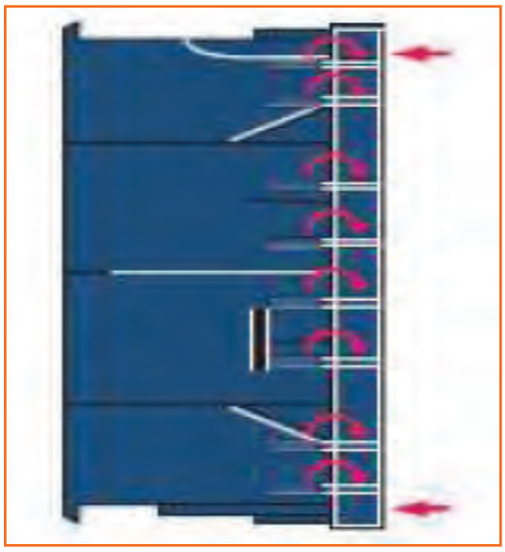


Step 4: Turn the belt piece in such a way that the fused side is up.

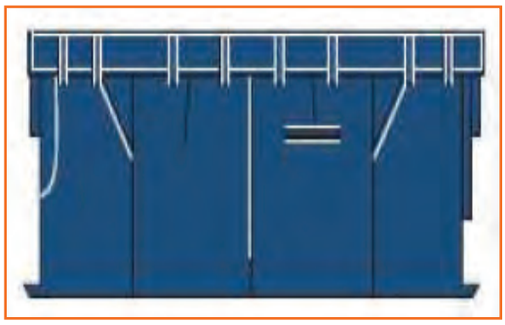


Step 5:

- Stitch the open vertical end on both sides starting with back tack.
- Now again turn the belt piece so that the face side is facing up.

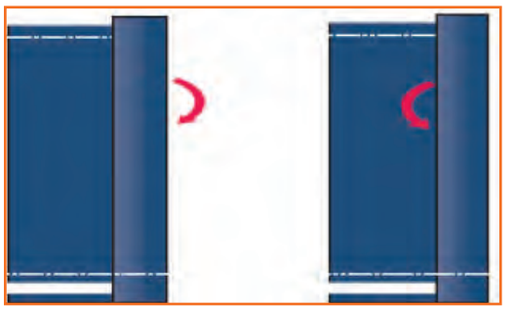


Step 6: Now put edge stitches throughout the length of the belt on the bottom side.

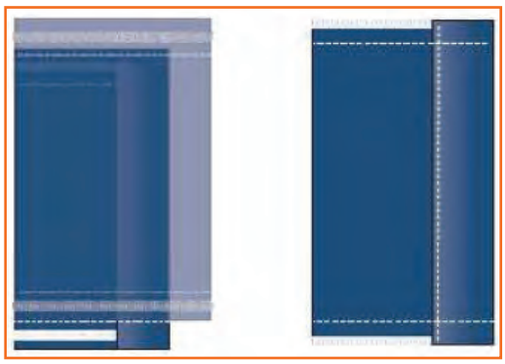


Step 7: Finally put edge stitches throughout the top side of the belt and stitch the loops at appropriate positions.

2.3.3.10 Bottom Hemming



Step 1: Fold the fabric as per the design requirement.



Step 2: Start putting the edge stitch from the inseam and fi nish at inseam. Repeat steps 1 and 2 for the other leg.

2.3.3.11 Bottom Hemming Using Folder

Step 1: Fold the bottom of right trouser leg 1 cm inside. Again fold the fabric to the required width and put 2 or 3 stitches.

Step 2: Place the attachment in such a way that the folded portion is fitted into the groove of the folder and then start stitching. Feed the fabric properly.

Step 3: Repeat steps 1 and 2 for the other leg.

2.3.3.12 Button Holing

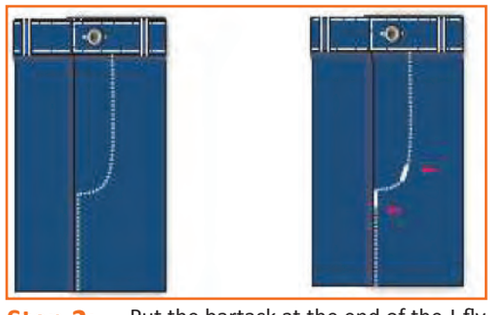
Step 1: Make the buttonhole on the left hand side belt as per design requirement. Make another buttonhole on the back pocket.

2.3.3.13 Button Attaching

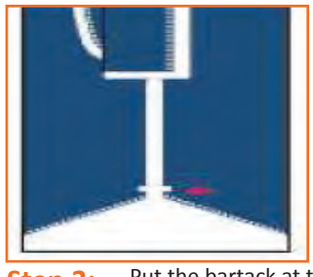
Step 1: Sew the button on the right hand side belt as per the design requirement and sew one button at the back pocket.

2.3.3.14 Bartacking

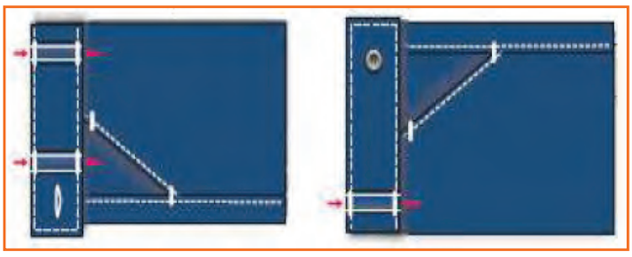
Step 1: Put bartack as per design requirement. Normally bartacks are put at both ends of left and right front pocket mouth and at the end of the front and back pocket joints.



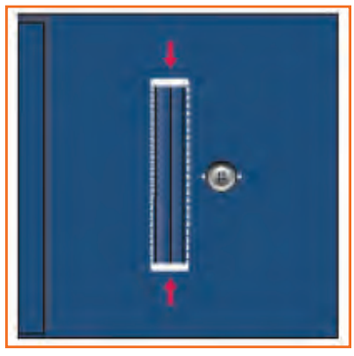
Step 2: Put the bartack at the end of the J-fly and at the curve of the J-fly.



Step 3: Put the bartack at the joining of front and back rise.



Step 4: Put the bartack at the top and bottom of each belt loop.



Step 5: Put the bartack at both ends of the back pocket.

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:

- Recognize the different parts of a trouser.
- Analyze how an SMO makes and attaches the pocket bag, fly, zip, back rise and front and back pieces to pant.
- Also see how he makes and attaches the belt loop, bottom hemming and button and button holes.
- Ask questions to SMOs/supervisors if you have any query.

Exercise

1. 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

2. What are the steps of stitching a trouser?

   .....

   .....

   .....

3. What are the steps of Bartracking?

   .....

   .....

   .....

UNIT 2.4: Stitching a Shirt

Unit Objectives

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

1. Recognize the different parts of a shirt.
2. Stitch a shirt.

2.4.1 A Traditional Shirt

Parts of a Shirt

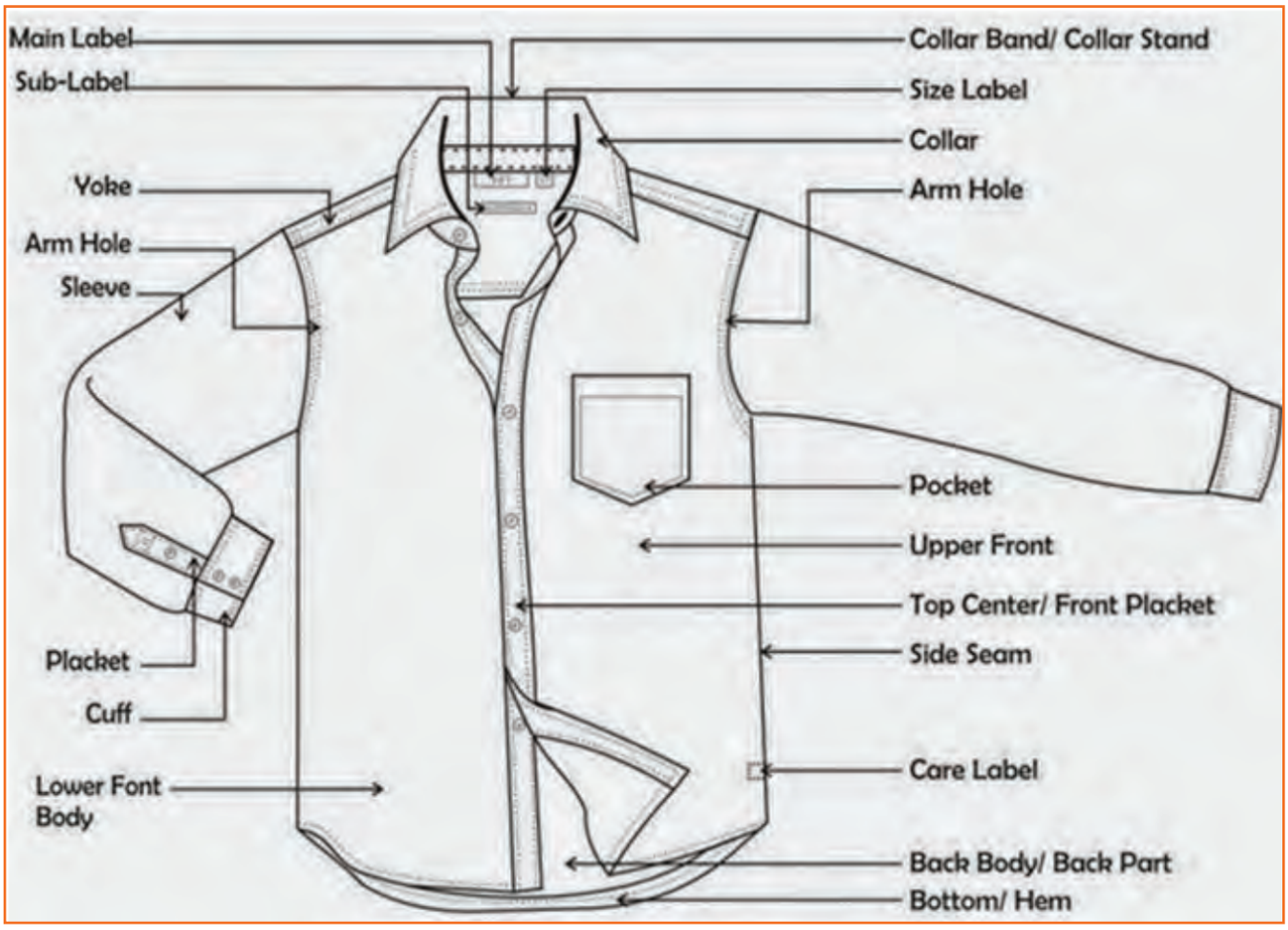
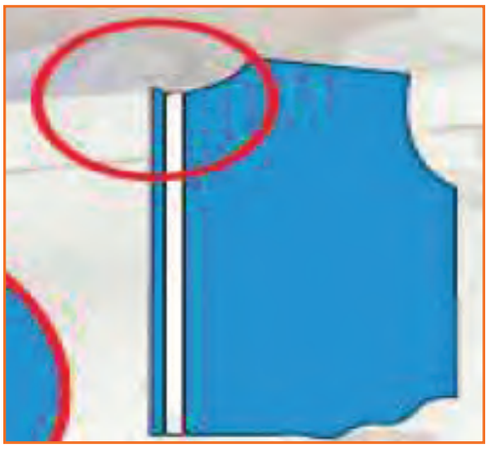
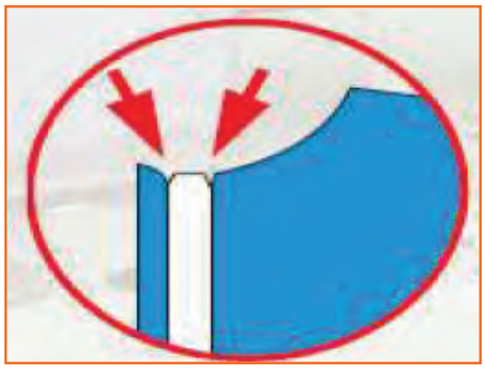


Fig.2.4.1: Parts of a Traditional Shirt

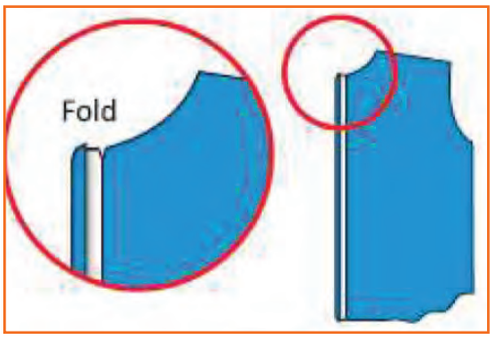
2.4.2 Left Hand Side Placket



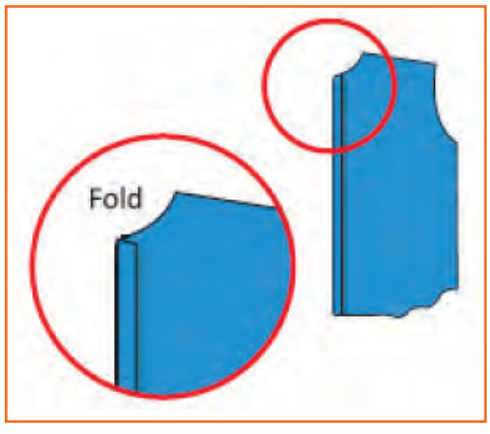
Step 1: Take the fused left hand side placket.



Step 2: Locate the two notch marks. There is one at 1.5 cm and the other at 5.5 cm from the edge.

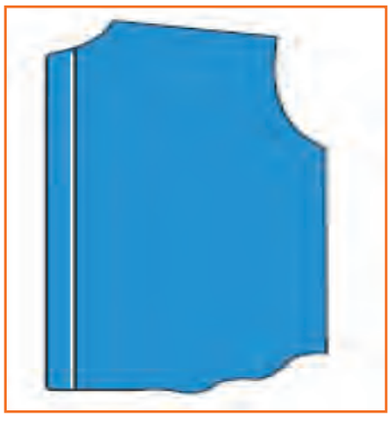


Step 3: Now, fold the fabric 1.5 cm till the first notch mark and press the folded part with an iron.

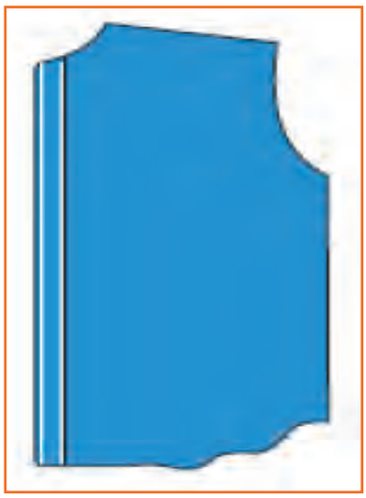


Step 4: Now, fold the fabric 4 cm to the second notch mark. Th e placket should be 4 cm wide.

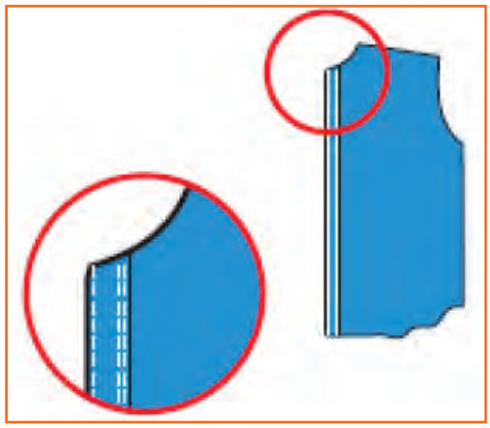
Step 5: Now, crease the folded part again with an iron.



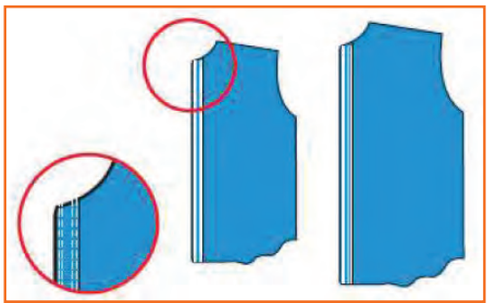
Step 6: Start from the bottom and stitch the inner side of the placket using edge stitch.



Step 7: Again from the bottom, stitch the outer side of the placket using edge stitch.

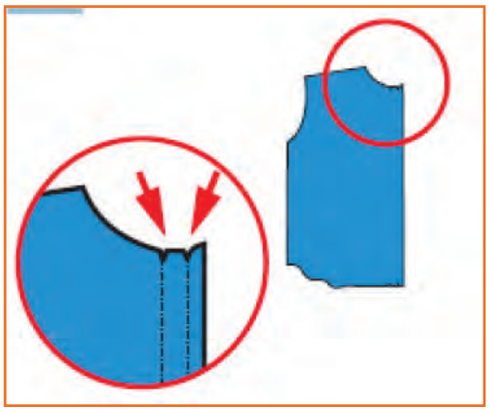


Step 8: Identify the reference mark on the throat plate and put a 4 mm stitch on the outer side of the placket from the bottom.



Step 9: Put a 4 mm stitch on the inner side of the placket from the top.

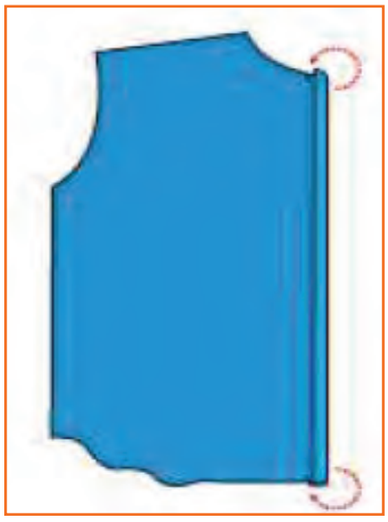
2.4.3 Right Hand Side Placket



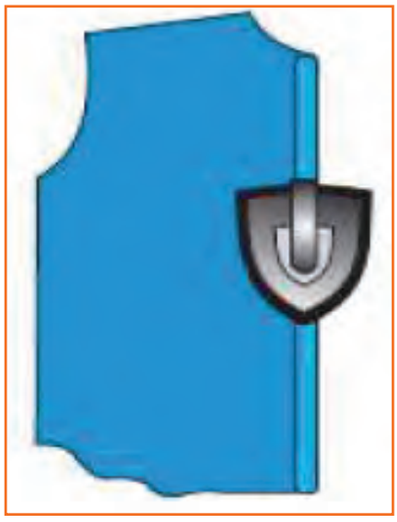
Step 1: Identify the notch marks on the back side of the fabric.

Step 2: Fold the fabric 1cm towards the notch mark or the neck, on the back of the fabric.

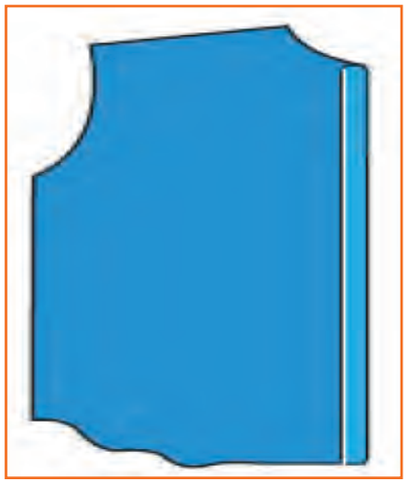
Step 3: Crease folded part.



Step 4: Now, fold the fabric 2.5 cm till the second notch mark.



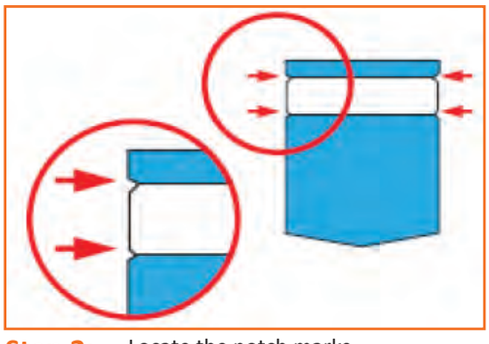
Step 5: Crease the fold with an iron again like in Step 3.



Step 6: Start from the top and stitch the inner side of the placket using an edge stitch.

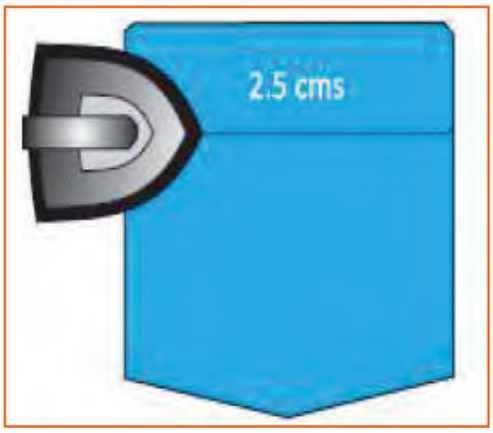
2.4.4 Pocket Making and Stitching

Step 1: Take the fused pocket piece.



Step 2: Locate the notch marks.

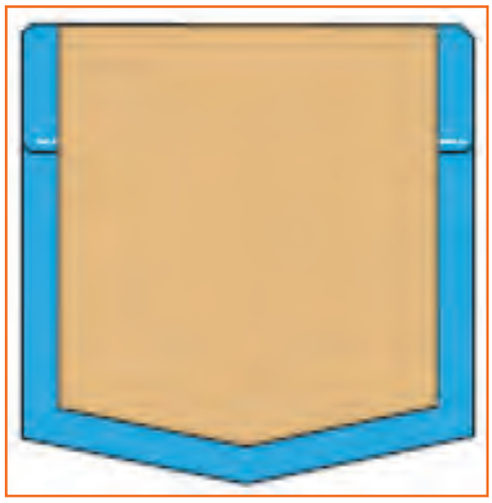
Step 3: Now, fold the top part of the fabric 1cm till the first notch mark and press the folded part with an iron.



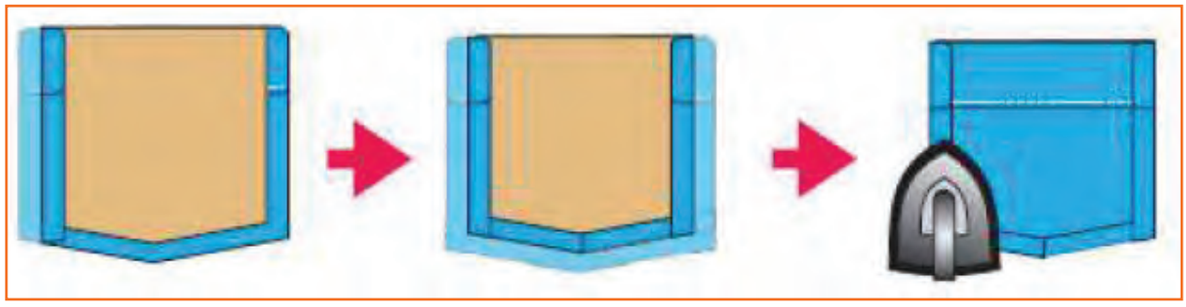
Step 4:

- Now, fold the fabric 2.5 cm to the second notch mark.
- Now, crease the folded part again with an iron.

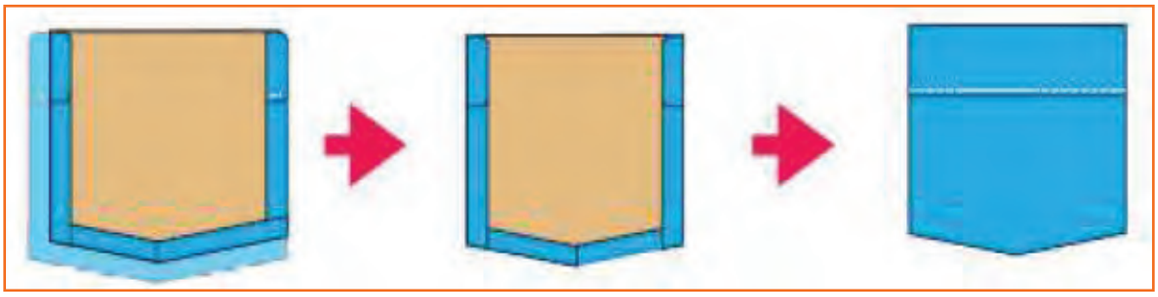
Step 5: Stitch the inner side of the pocket mouth using edge stitch.



Step 6: Take the ready pattern given and place it over thepocket.

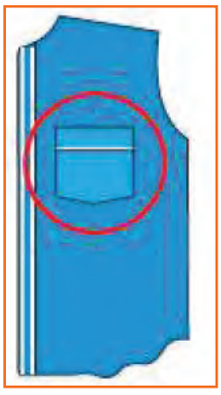


Step 7: Now, fold the three sides 1 cm each and crease them as you fold.

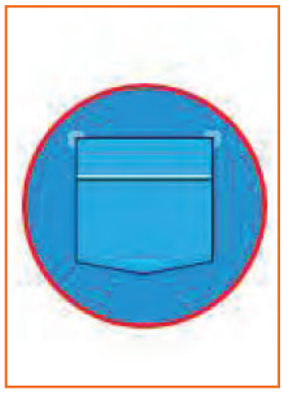


Step 8: The pocket is now ready to be attached.

2.4.5 Attaching the Pocket



Step 1: Place the pocket piece on the left half of the shirt front.



Step 2: Match the right side of the pocket with the markings on the front of the fabric.

Step 3: Sew the pocket from the placket side. Put 4 stitchesfollowed by a back tack.

Step 4: Now, sew till the top using 4 mm stitch.

Step 5:

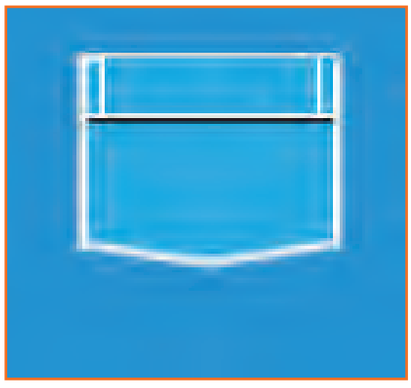
- Turn the fabric in a clockwise direction. Keep the needle in the fabric.
- Stitch at the edge of the pocket till the end.

Step 6:

- Again, turn the fabric clockwise.
- Put the stitch at the edge till the end.

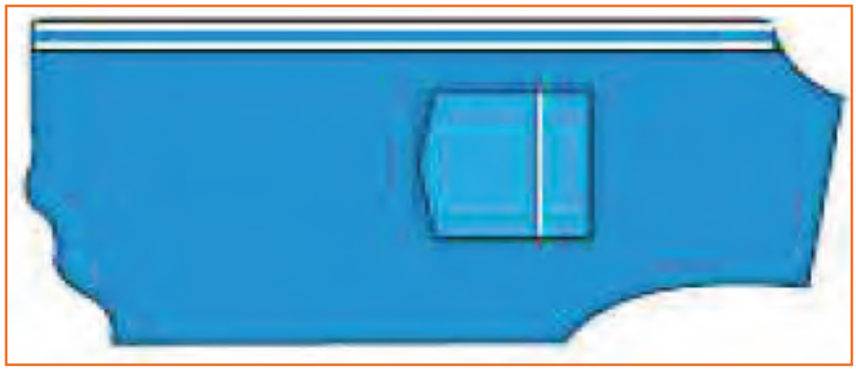
Step 7:

- Again, turn the fabric clockwise. Stitch the edge ofthe bottom part of the pocket.
- Step 10: Turn the fabric clockwise and stitch the edge of the other side of the pocket.



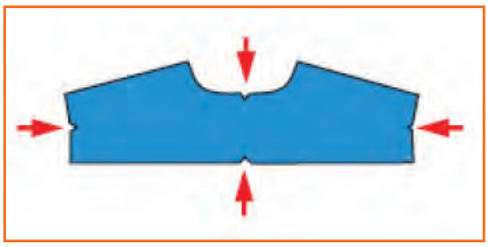
Step 8:

- Again, turn the fabric clockwise and stitch up to 4 mm.
- Turn the fabric. Stitch up to the pocket mouth and put a back tack.



Step 9: Now, the pocket is fully attached.

2.4.6 Attaching Yoke



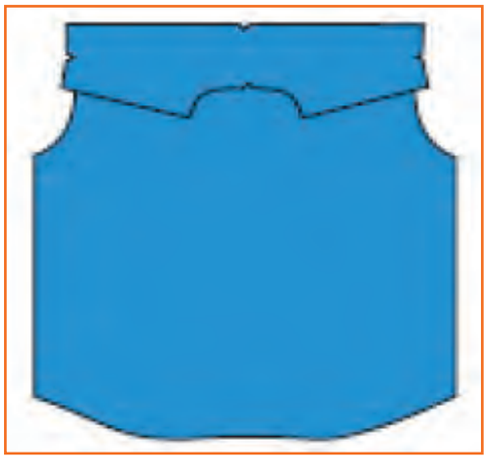
Step 1: First, check for the following notches:

- One notch at the centre of the back piece of the shirt.
- 4 notches in the yoke piece:
  - » One at the centre of the reverse side of the yoke piece.
  - » One at the centre of the neckline.
  - » One at the centre of the left armhole.
  - » One at the centre of the right armhole.

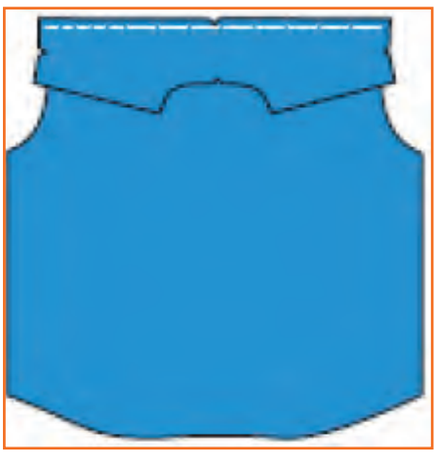
Step 2: Keep one piece of the yoke on the sewing Fig.

Step 3: Place the back piece of the shirt on top of the yoke in alignment with the two notches.

Step 4: The right side of the inner yoke piece should face the reverse side of the back piece of the shirt. Take the other yoke piece and place it on top of the back piece of the shirt and align with the notch.

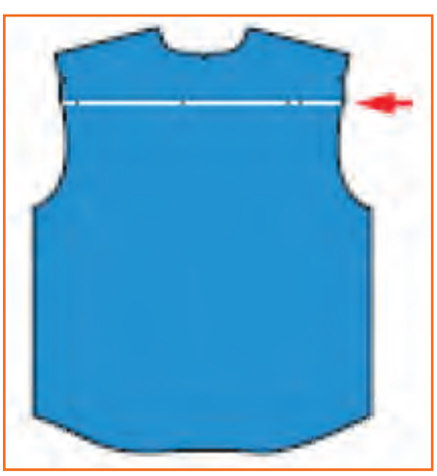


Step 5: The alignment should be such that the right side of the outer yoke piece faces the right side of the back piece of the shirt.



Step 6: Put a stitch of 1cm on the edge of the 3 pieces—2 yoke pieces and the back piece of the shirt.

Step 7: Turn the yoke and crease it with your fi ngers.



Step 8: Now, put a top-stitch at the edge first.

Step 9: Finally, put a 4 mm stitch from the edge.

2.4.7 Attaching Yoke to the Front

Step 1: Keep the front side of the back piece of the shirt on the top.

Step 2: The alignment should be such that the right side of the outer yoke piece faces the right side of the back piece of the shirt.

Step 3: The pieces are stitched at a distance of 1 cm from the edge leaving the bottom-most ply of the yoke.

Step 5: Hold the edge of the yoke from the armhole side in one hand and the unstitched yoke piece in the other hand.

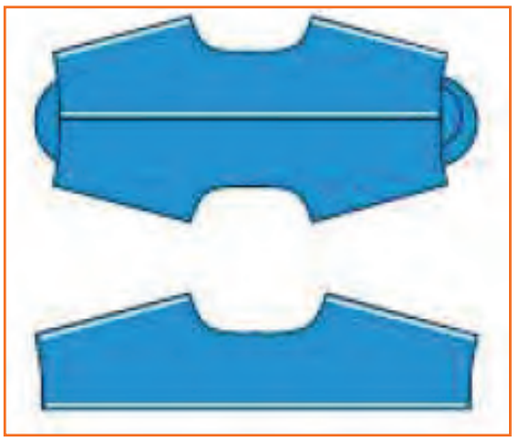
Step 7: Roll the body fabrics and insert it between the two yoke pieces.

Step 4:

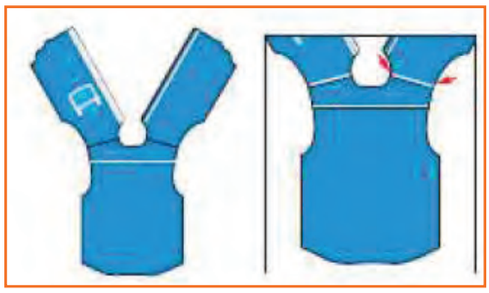
- The right side of the front and the right side of the back piece of the shirt are placed together by matching the yoke. The placket should be towards the centre.
- Repeat Step 3 for right side.

Step 6: Turn and match the unstitched yoke piece to the stitched yoke piece.

Step 8: Put a 1 cm stitch throughout.



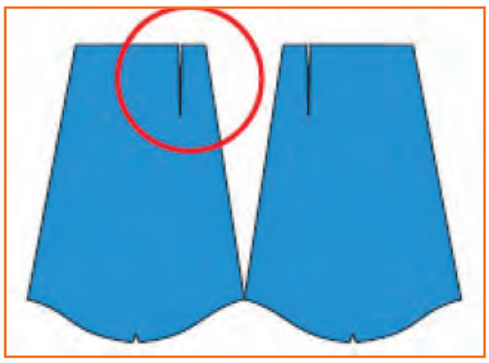
Step 9: Hold the front and the back pieces and stretch them.



Step 10: Put a top-stitch at the edge on both sides.

Step 11: Finally, put a 4 mm stitch on both sides.

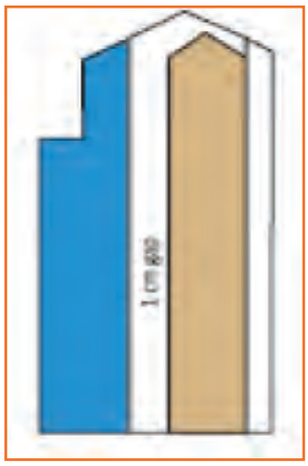
2.4.8 Upper Sleeve Placket Preparation



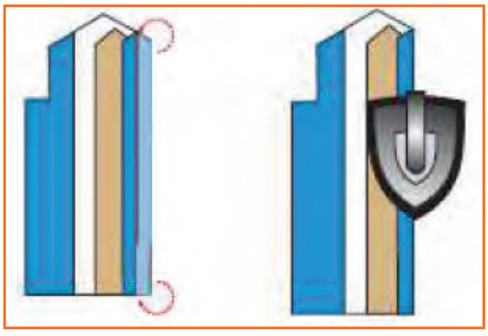
Step 1: Take the two sleeve pieces and identify the notch marks on the armhole side in each one of them.

Step 2: Look at the reverse side of the sleeve and ensure that there is a cut of 13 cms or 5 inches at the bottom.

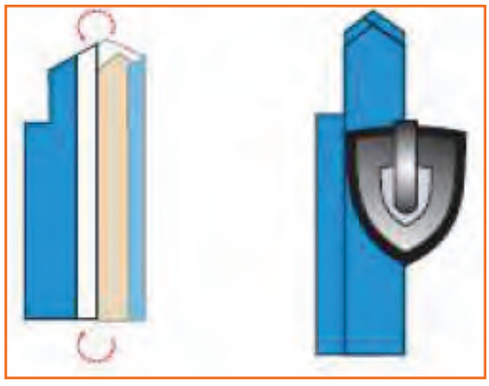
Step 3: Keep the two sleeve plackets with their straight sides facing each other.



Step 4: Take the ready pattern. Leave a gap of 1 cm and place it over the longer side of the placket.



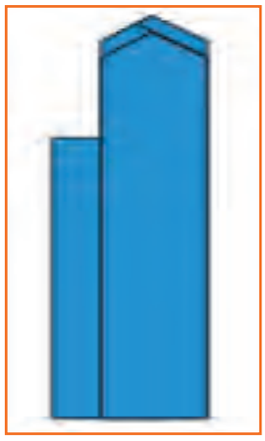
Step 5: Use the pattern and fold the longer side of theplacket 1 cm and iron it.



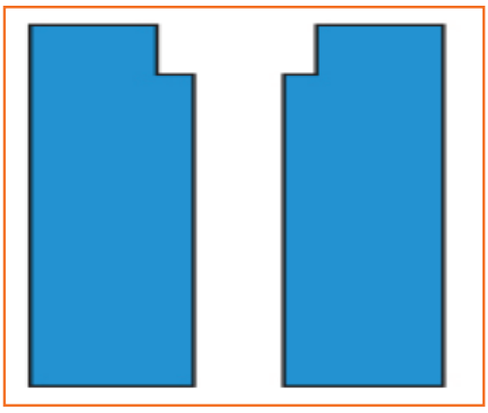
Step 6: Again, using the pattern, fold the longer side 3.5 cm and iron it.

Step 7: Use the pattern and fold the upper portion of the placket in a V-shape. Iron it well to form crease.

Step 8: Use the pattern and fold the upper portion of the placket in a V-shape. Iron it well to form crease.

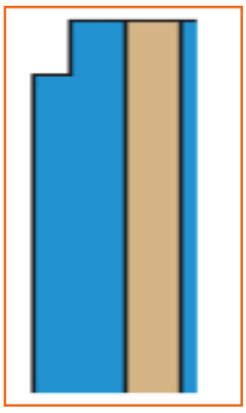


2.4.9 Lower Sleeve Placket Preparation



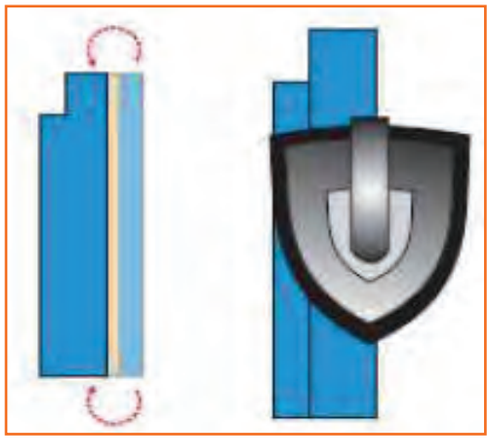
Step 1: Keep both the lower sleeve plackets on the Fig.

They are unfused and shorten in length than upper sleeve plackets.

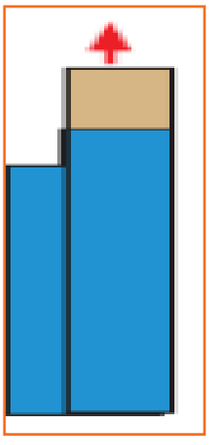


Step 2: Place the ready pattern on the placket.

Step 3: USe the pattern and fold 1 cm. Use the iron to crease it.



Step 4: Again, use the pattern and fold 2 cm. Use the ironto crease it.

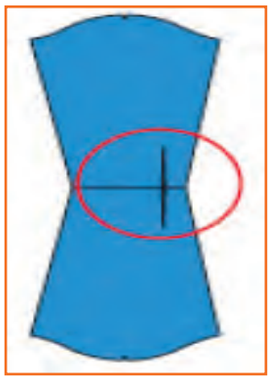


Step 5: Remove the ready pattern.

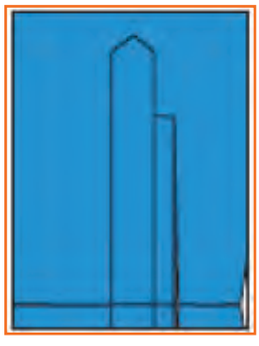
Step 6: Repeat Steps 2 to 5 for the other placket.

2.4.10 Attaching Plackets to the Sleeve

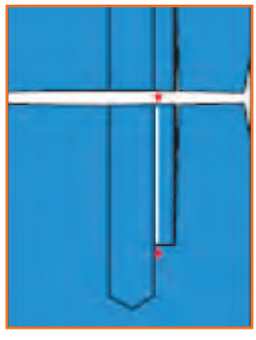
Step 1: Place the two sleeves on top of each other and align the cut sides.



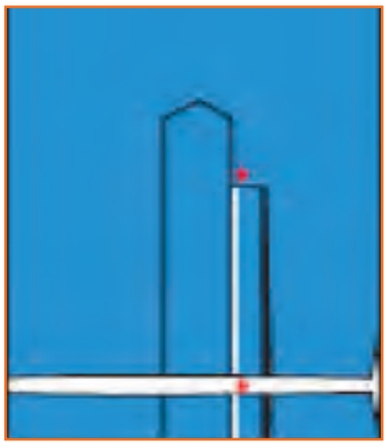
Step 2: Take the two upper sleeve plackets and place them on the longer cut side of the sleeves. Ensure that the folded side is on top.



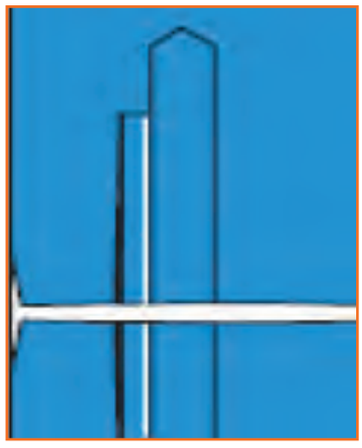
Step 3: Take a set of sleeve placket and sleeve. Align the edges of the sleeve placket with the longer cut part of the sleeve.



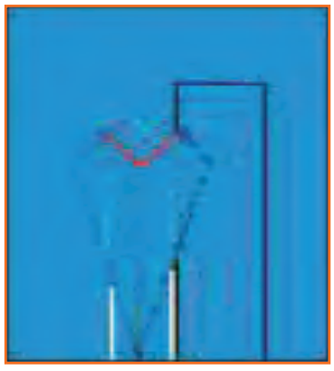
Step 4: Stitch the placket edge. Take the other set of sleeve and sleeve placket. Stitch the placket edge.



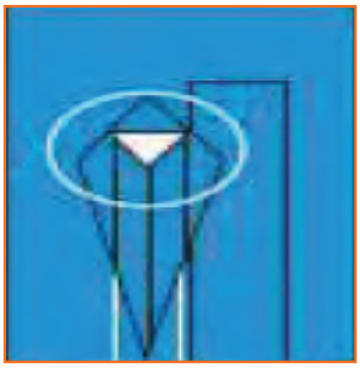
Step 5: Turn the fabric such that the cut part of it faces you.



Step 6: Now, place the lower placket on the shorter cut part of the fabric and stitch the edge along the length. Repeat Step 3 and Step 6 for the other set of sleeve plackets and sleeves.

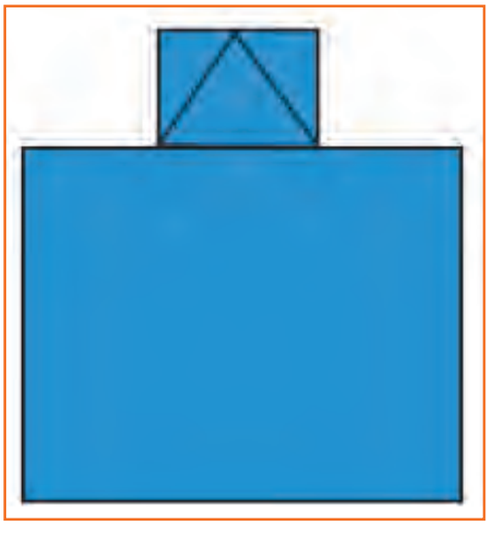


Step 7: Make two v-shape cuts on the top part of the placket-stitch.

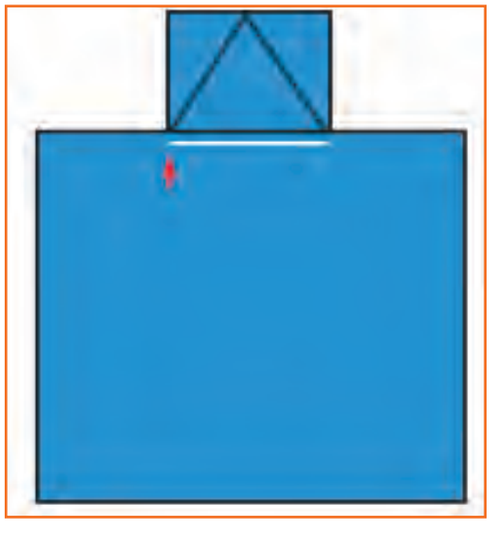


Step 8:

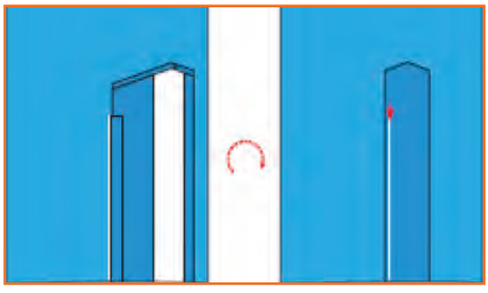
- Smoothen the lower placket and turn it to the reverse side.
- Stitch the edged side of the lower placket till the end.
- Turn the v-shaped cut to the upper side.



Step 9: Place the placket on top of the v-shaped cut.

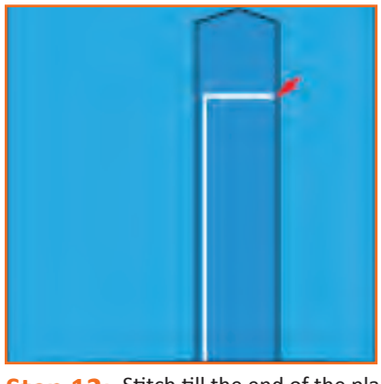


Step 10: Hold the placket and the cut, together and put a stitch at the bottom of the cut.

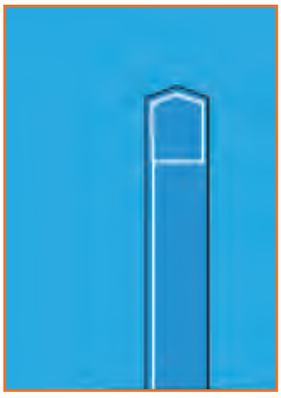


Step 11:

- Turn the upper placket over and put an edged stitch till the end.
- Turn the fabric clockwise. Align the upper and lower plackets.



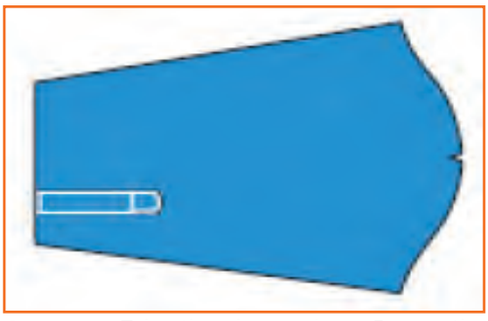
Step 12: Stitch till the end of the plackets.



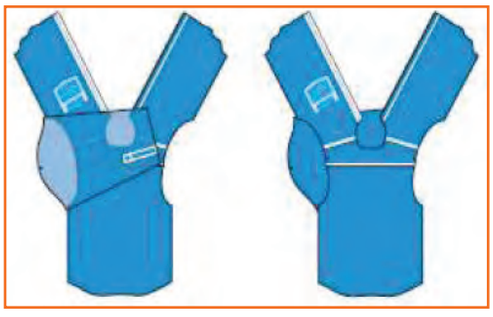
Step 13:

- Turn the fabric counter-clockwise. Put an edgestitch on all the edges of the box of the placket.
- Repeat Step 9 to Steps 7-13 for the other sleeve plackets.

2.4.11 Attaching the Sleeve



Step 1: Take the sleeve piece. Ensure the armhole faces you. Also, the longer cut edge should be on the right hand side. The sleeve should be attached to the left hand side armhole.



Step 2: Match the left front piece with the armhole. Placethe shirt front above and the sleeve piece below.

Step 3: Attach the left front with the left sleeve with a 1 cm stitch.

Step 4: Take the right sleeve and place it on the machine. Ensure that the longer cut portion is to the left and facing away from you.

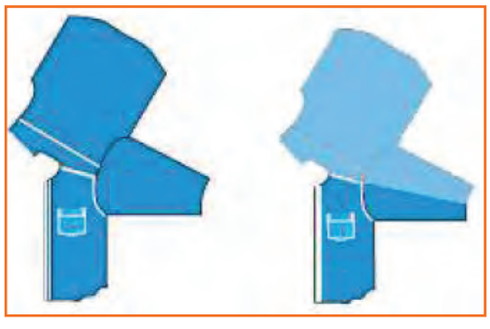
Step 5: Match the notch marks and attach the sleeve armhole with the body armhole by putting a 1 cm stitch.

Step 6: Put an over-lock stitch at both the armholes. If top-stitch is required on the armhole, the sleeve should be kept up and the body part of the shirt should be kept down while putting the over-lock stitch. In case top-stitch is not required, the body part of the shirt should be kept up and the sleeve down.

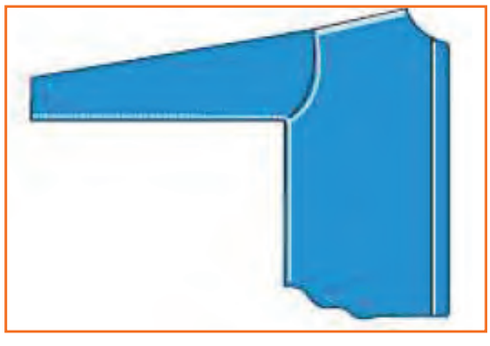
Step 7:

- While putting top-stitch, keep the margin towards the body. Put an edge stitch followed by a 4 mm top-stitch.
- Repeat the above steps for the other sleeve piece.

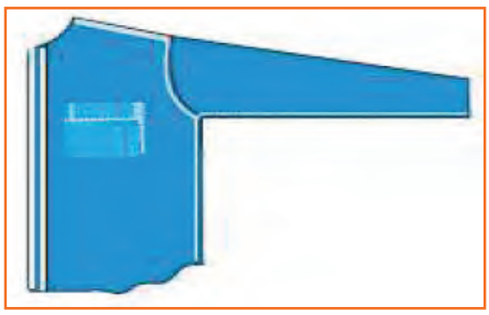
2.4.12 Side Seam



Step 1: Match the armhole and align the loose ends.

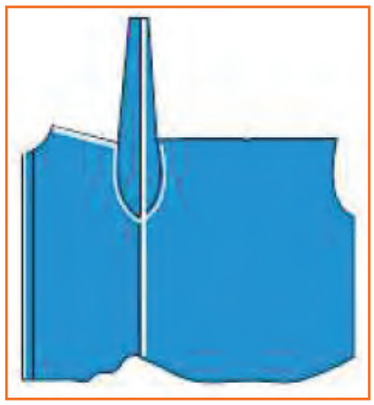


Step 2: Take the right hand sleeve. Stitch 1 cm from thesleeve bottom and continue till side bottom.



Step 3: Take the left hand sleeve. Stitch 1 cm from the sidebottom up to the sleeve bottom.

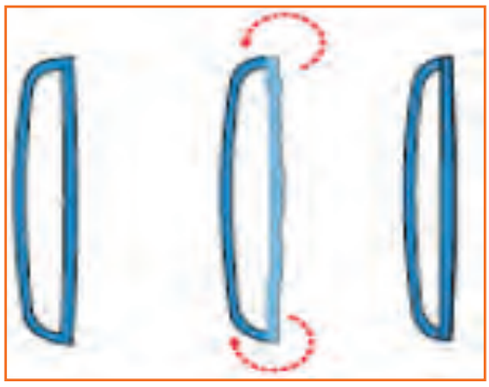
- Turn the fabric margin towards back side and sew the top-stitch by first sewing edge stitch and then 4 mm stitches on both the sides.



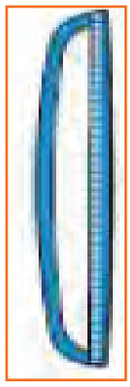
Step 4:

- Put the overlock stitch on both sides, keeping the front part on the top.

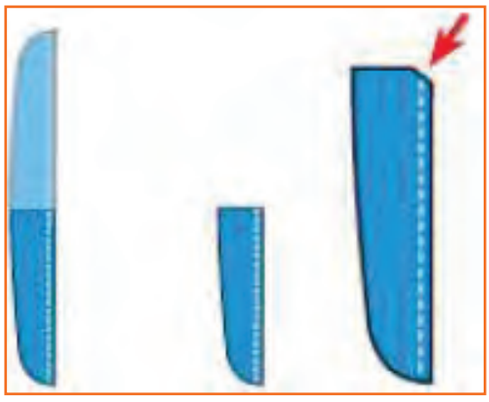
2.4.13 Collar and Neckband Preparation



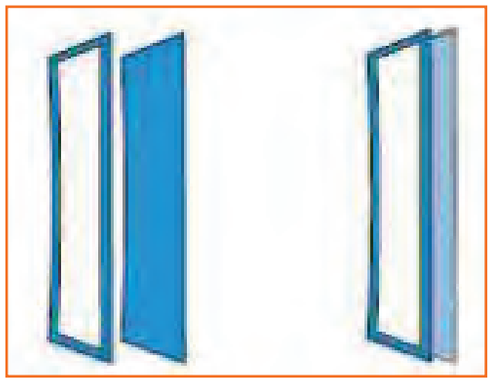
Step 1: Take the fused neckband piece. Turn the bottomend of the piece with your hand.



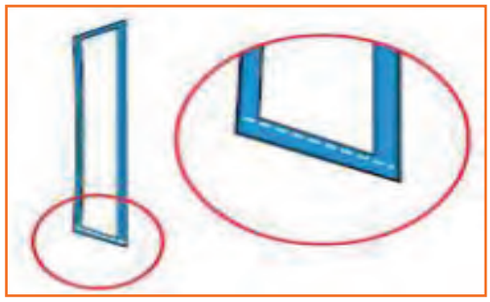
Step 2: Turn the fusing side down. Put a 4 mm stitch at the top.



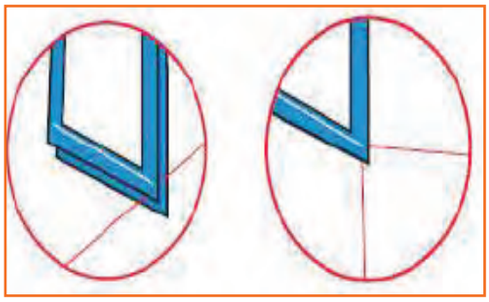
Step 3: Fold the neckband and cut a notch at the centre of the upper side.



Step 4: Take the fused collar piece and place it on the collar piece that is not fused. The right side of the fused collar should face the right side of the unfused collar.



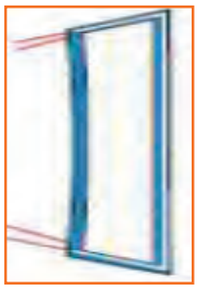
Step 5: Start stitching at a gap of 1 mm from the fusing material from the collar base side.



Step 6: Stop the sewing machine one stitch before the collar point with the needle down. Insert an extra thread between the two fabric layers touching the needle.

Step 7:

- Put one stitch and stop the sewing machine with the needle down. The thread will be at the back of the needle side.
- Hold both ends of the thread and bring it towards the other side of the collar.
- Put stitches at a distance of 1mm from the fused material on the remaining collar.
- Repeat steps 6, 7, 8, and 9.

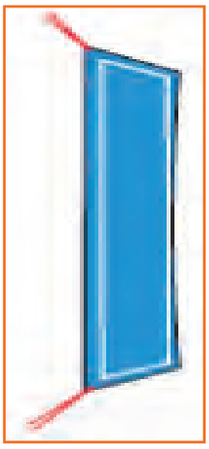


Step 8: Now, put stitches at a distance of 1 mm from the fused material.

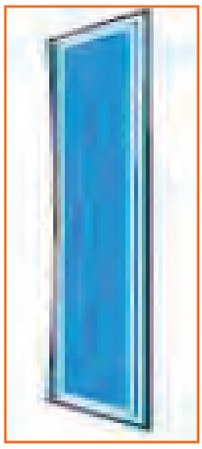
Step 9:

- Put back tack stitch at both the ends.
- Cut both the collar points and turn the collar.
- Stretch the threads to give proper shape to the collar.

Step 10: Put a 4 mm stitch on all three sides of the collar. Keep the lower fabric stretched to avoid wrinkles.



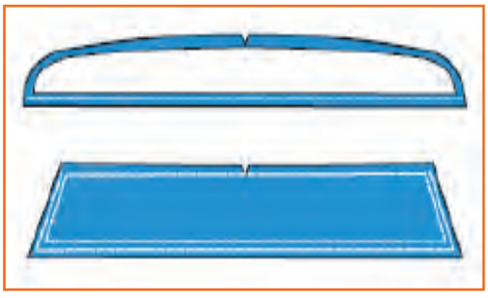
Step 11: Put a 2 mm stitch on the open side of the collar.



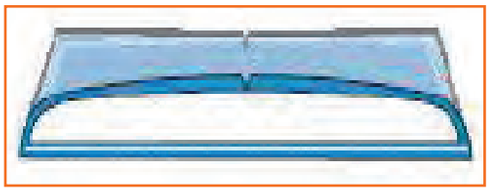
Step 12: Put edge stitch on the three sides of the collar.

Step 13: Fold the collar and put a notch mark at the centre.

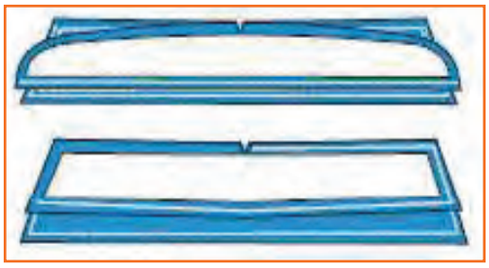
2.4.14 Collar and Neckband Attachment



Step 1: Place the neckband and collar face to face.

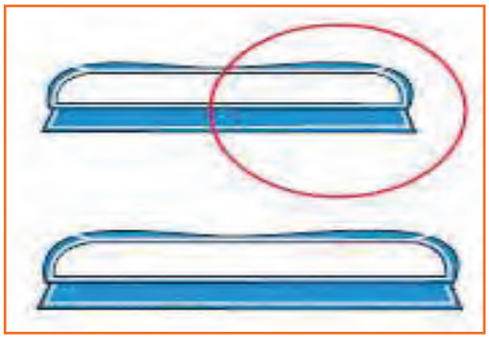


Step 2: Align the notch and the band of the collar.

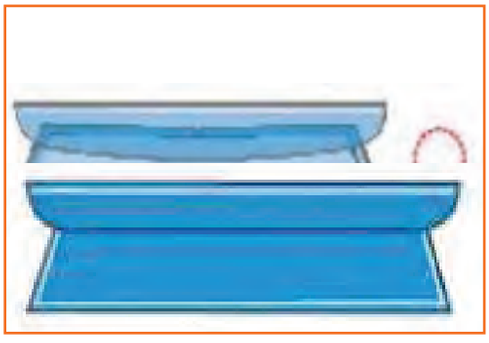


Step 3: Start stitching from the notch point leaving a gap of 1 mm. Repeat this stitch from the notch point to both ends.

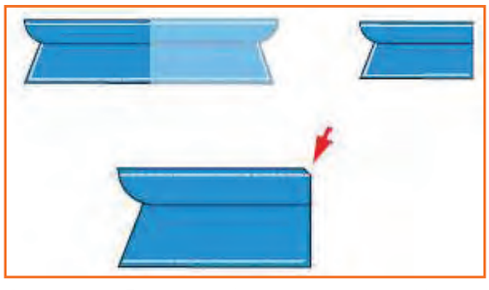
Step 4: Take the other neckband piece without fusing. Place it below the ready neckband collar piece.



Step 5: Now, start stitching from the neckband bottom portion, till the other end.

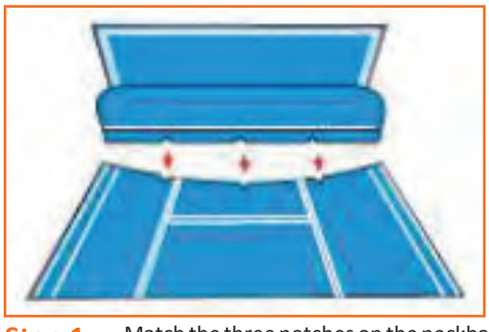


Step 6: Turn the neckband piece.

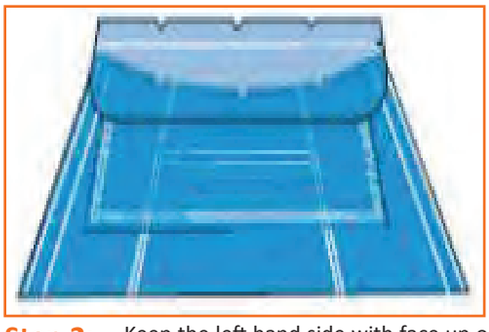


Step 7: Fold the piece and put a notch at the centre. The folded part is now refolded and another notch is put.

2.4.15 Collar Attachment to Body



Step 1: Match the three notches on the neckband with the two shoulder seams of the body and the centre notch.



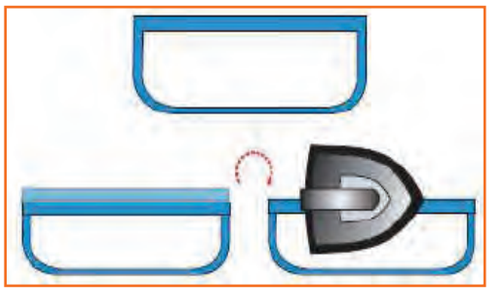
Step 2: Keep the left hand side with face up on the Fig. Match the edge of the front placket with the edge of the collar band.

Step 3: Put the stitch just below the fused portion of the band till the end.

Step 4: Starting from the neckband's centre, put edge stitch towards the right side.

Step 5: Turn and continue to put edge stitch till the other end.

2.4.16 Cuff Preparation



Step 1: Fold the fabric edges on the straight side of the cuff and iron it.

Step 2: Put a 4 mm top-stitch.

Step 3: Take the unfused piece of the cuff and place it below the fused cuff .

Step 4: Stitch the two curved and one straight side by leaving a 1 mm gap.

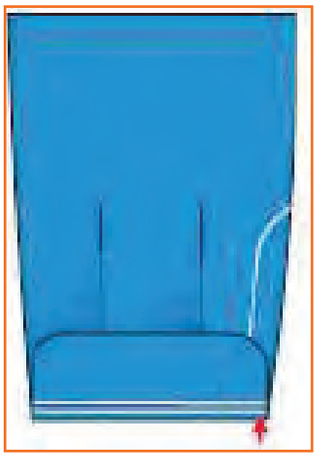
Step 5: Turn the cuff .

Step 6: The unfused cuff fabric should be 1 mm extra.

2.4.17 Cuff Attachment to Sleeve

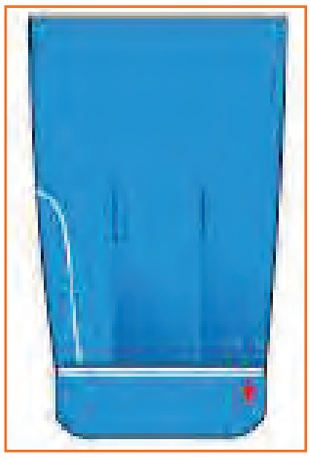
Step 1: First, check that there are 4 notches for sleeve pleatsand one notch at the centre of sleeve bottom.

Step 2: Make sleeve pleats by overlapping the notches and stitching it in such a way that the pleats remain open from the edges.



Step 3:

- Place the cuff with fused side up on the inner side of the sleeve.
- Stitch just below the edge of the cuff .



Step 4: Straighten the cuff . Put the excess fabric inside thecuff and put stitches at the edge.

Step 5: Now put the edge stitch throughout the cuff.

Step 6: Now put 4 mm stitch throughout the cuff. Repeat Steps 1 to 7 for the second cuff.

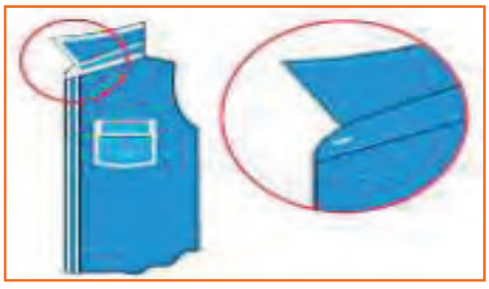
2.4.18 Bottom Hemming

Step 1: Match the collar band tip to bottom.

Step 2:

- Fold the bottom (as per requirement) and put edge stitch from the left front side to the right side.
- Close the two ends.

2.4.19 Button-holing



Step 1:

- Take the left hand side placket.
- Make one button hole on collar band parallel to theband at the centre and about 1 cm from the edge.

Step 2:

- Along the centre of the placket width, mark the button holes at a distance of 9 cm from each other from the collar band button hole.
- In case of cuff , mark button hole at the centre of the cuff on upper placket side.
- Make button holes using buttonhole machine. Themarking should come in the middle of the buttonhole.

2.4.20 Button Attaching

Step 1: Keep the left hand and right hand plackets on top of each other. Th ey should be properly aligned.

Step 2: Put a mark at the centre of the button-hole using a chalk.

Step 3: Attach buttons at the marked positions using the button sew machine.

Step 4: Repeat the same procedure for the cuff.

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:

- Recognize the different parts of a shirt.
- Analyze how an SMO makes and attaches the left and right hand side placket, pocket, yoke, placket to sleeve, sleeve, side seam, collar and neckband, cuff and bottom hemming etc.
- Also see how he makes button holes and attaches the buttons to shirt.
- Ask questions to SMOs/supervisors if you have any query.

Exercise

1. 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
2. What are the parts of a shirt?

   .....

   .....

   .....
3. What are the steps of cuff preparation?

   .....

   .....

   .....

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3. Contribute to Achieve Product Quality In Stitching Operations

Unit 3.1 - Contribute to Achieve Product Quality in Stitching Operations

AMH/N0302

Key Learning Outcomes 

At the end of the module, you 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 workflow and meet production target.
10. Familiarize with the quality department and its role in production.
11. Understand the inspection and possible defects.

UNIT 3.1: Contribute to Achieve Product Quality in Stitching Operations

Unit Objectives

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8. Sew and apply trims by hand and machine.
9. Maintain workflow and meet production target.
10. Familiarize with the quality department and its role in production.
11. Understand the inspection and possible defects.

3.1.1 Product Quality

What is quality? If a product fulfills the customer's expectations, the client are happy and consider that the merchandise is acceptable or even prime quality. If his or her expectations are not fulfilled, the client will consider that the merchandise is of low quality. This means that the quality of a product may be outlined as "its ability to fulfill the customer's desires and expectations".

Fig.3.1.1: Product quality process

Quality has to be outlined first off in terms of parameters or characteristics , that vary from product to product. for example, fora mechanical or electronic product these are performance, reliability, safety and appearance. For pharmaceutical merchandise, parameters such as physical and chemical characteristics, medicinal impact, toxicity, taste and period of time may be vital. For a food product they will embrace taste, nutritional properties, texture ,shelf life and so on.

Fixing product specifications

A specification is the minimum demand according to that a producer or service supplier makes and delivers the product and service to the client. In setting specification limits, the following ought to be considered:

- The user's and/or customer's needs.
- Requirements relating to product safety and health hazards provided for in the statutory andregulatory requirements. Requirements provided for in national and/or international standards.
- The competitor's product specifications, in order to achieve selling advantages.

- In planning the merchandise, the capability of processes and machines ought to be kept in mind.
- it is additionally necessary to keep up a balance between cost and value realization. The clearer the specification , the higher the possibility of making and delivering quality merchandise. preparing productdesign.
- The specifications and drawings created by the designer should show customary} standard demanded by the client or marketplace in clear and precise terms.
- every dimension ought to have realistic tolerances and alternative performance necessities.
- Product quality ought to have precise limits of acceptability so the production team will manufacture the product strictly per specification and drawings.

To achieve the above, those accountable for design, production and quality ought to be consulted from the sales negotiation stage onwards. the general design of any product is created from several individual characteristics. For example these could be:

- Dimensions, like length, diameter, thickness or space.
- Physical properties, like weight, volume or strength.
- Electrical properties, like resistance, voltage or current.
- Look, like end, color or texture; practical qualities, like output or metric linear unit per liter.
- Effects on service, like style, feel or noise level.

Manufacturing drawings and specifications are prepared by the designers and these ought to illustrate to the production team exactly what quality is needed and what raw materials ought to be used. Preparation for manufacture once the design, together with the producing drawings, has been reviewed and finalized, it is timeto plan for manufacture.

This will include the following steps: 

1. **Preferring the strategy of manufacture:** ways should be devised that let the operators and processes to make the merchandise within the fastest, best and most foolproof approach, as well as preparation of producing instructions, putting in procedures, listing numerous operations then on.
2. **Providing the mandatory machines, plant, tooling and alternative equipment:** Everything that's needed for manufacture should be elect, taking care that each one the weather are capable of achieving the quality of quality demanded.
3. **Getting satisfactory raw materials:** nobody will build a decent product from unsatisfactory raw materials,so each material should have a particular written shopping for specification in order that the business department will buy precisely what's needed. typically purchasers ar expected to shop for from suppliers United Nations agency are assessed and approved by them and once provides arrive the products ought to be checked before acceptance into stores. Quality necessities and producing processes ought to be mentioned with the suppliers, also because the inspection activities to be dole out by the client on the products on arrival.
4. **Getting and coaching operators:** Operators United Nations agency ar willing and ready to do the add a satisfactory manner must be chosen and given no matter coaching they have.
5. **Designing review and work quality control:** Plans for review activities ought to be ready, proper work places provided for review employees, written review.

3.1.1.1 Guidelines

A guide for small and medium-sized enterprises procedures ready, inspection instrumentality provided, checking and calibration of examination instrumentality planned for, inspection personnel selected and trained and prepilot and pilot runs carried out. One ought to never conceive to solve a high quality drawback by closing additional inspections.

The producing will begin only if coming up with|the look} and planning are completed. If the look is carried out systematically, things ought to run smoothly. during manufacture the subsequent are the foremost common factors that can affect quality:

- **Set-up:** Some processes, like punching, cutting, printing and labelling, are thus consistent that, if the initial set-up is correct, the entire ton can change to the specifications. However, the initial set-up should be checked by carrying out first-piece inspection.
- **Machines and tools:** From time to time changes will occur in machine or tool settings, which may then causedefects. Processes of this kind include machining, resistance welding and filling. Here it is necessary to carry out periodic checks by patrol inspection.
- **Operator:** There are some processes wherever the result depends on the ability and a focus of the operator, suchas welding, hand fastening and painting processes. For such processes it is necessary at the manufacture planning stage for the operator's operating strategies to be determined upon.
- **Materials and components:** it is vital to ensure the standard of raw materials and components by undertaking regular checks on the suppliers' processes and additionally wherever necessary by carrying out incoming inspection.

The following are obvious possibilities:

- The shop-floor operators had no clear plan what standard of quality was needed.
- the method was such that it was terribly difficult to induce the work right, but very simple to induce it wrong.
- The machine and instrumentality were incapable of achieving the tolerances needed.
- The incoming materials and components were unacceptable.
- The operators were untrained and not up to the job; Shop-floor internal control was either not properlyplanned or not properly executed, or both.

3.1.1.2 Coordination

It is obvious from the on top of steps that everyone in the company, that is, the salesmen, designers, purchasing,stores and strategies employees, plant engineers, jigs and tool personnel, production planning and production employees,operators, inspection and testing employees, packaging, dispatch and so on, square measure answerable for product quality.Indeed, quality is everybody's business. unfortunately, if care is not taken, it winds up being nobody's business.It is so necessary to ensure that everybody is quality-conscious which all of them work along on matters related to quality.

3.1.2 Sewing Department

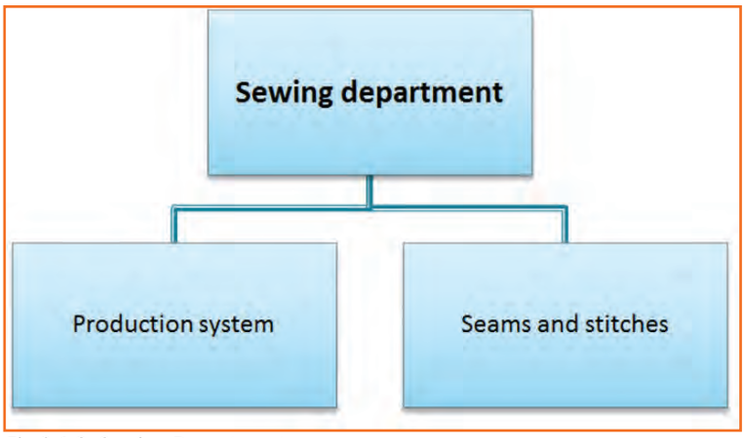

Fig.3.1.2: Sewing Department

3.1.2.1 Sewing Process Flow

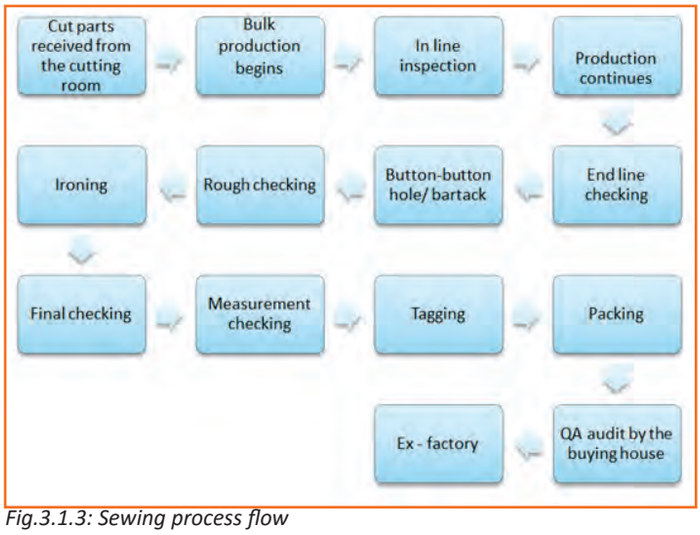

Fig.3.1.3: Sewing process flow

3.1.3 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's essential that the trims' color ought to match with base fabric instead of color code orpantone card. Also, the trims those are with Dye to Match demand is checked when attaching trims onthe fabric swatch. Check shade of the trims whether or not shade is matched or not. This check is usually needed forshade matching of stitching threads, embroidery threads, etc.
- **Shrinkage:** If the shrinkage percentage of the trims differs from the fabric's (base material) shrinkagepercentage, then it is definitely going to cause a defective garment. Trims such as tapes, laces should be testedfor its shrinkage percentage.
- **Color bleeding:** bleached trims like Buttons, stitching threads, bleached tapes and laces are checked for color hemorrhage.In this test, trim samples (one by one) are washed with white cloth for variety of cycles as mentionedin testing methods. If the white cloth is got tainted with trims color then these trims should not be used iproduction. prior to use, trims should be processed for color fixing to stabilize the colour.
- **Width & Thickness:** live width of the trims such as tapes, elastics, laces etc. it might be good if you're takingmeasure when 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.

3.1.4 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.

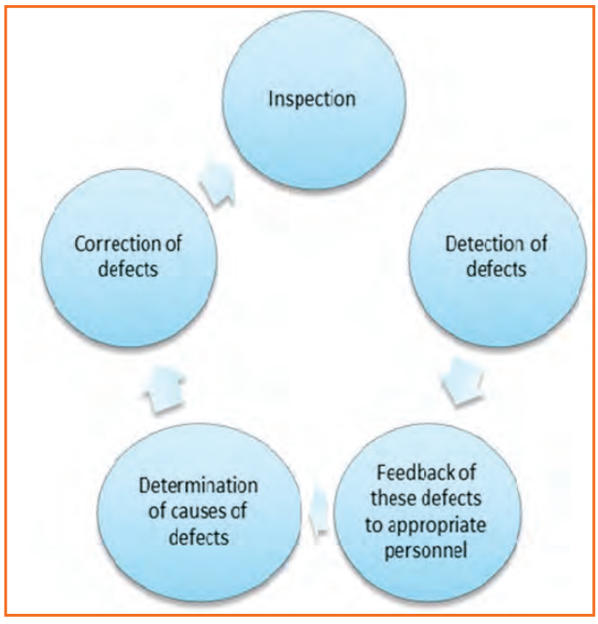

Fig.3.1.4: Inspection Process

How much to examine ?

- No inspection
- 100% inspection
- Spot checking- inspecting random shipments
- capricious sampling-10% sampling
- statistical sampling or acceptance sampling-flexibility with reference to the number of inspection to be performed

Inspection terms

- **Sample:** A sample consists of one or more units of a product drawn from plenty or batch, the units of the sample being chosen at random without regards to their quality. the quantity of units of a product within the sample is the sample size.
- **Lot or batch:** suggests that 'Inspection lot' or 'Inspection Batch', that is a collection of units of a product from that 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:

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

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.

3.1.5 Identify Mark and Place Rejects in the Designated Locations

1. 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.
2. Keep the work area clean and tidy all the time, once this is accomplished look for any unwanted or faulty item.

3. While looking for a faulty item make sure to identify it properly, mark it clearly and label it promptly as rejected.
4. 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.
5. Place the fabric or other rejected items which are torn, damaged broken, stained etc in the rejection box (designated area) of the work-place.
6. Examine garments at different stages of production for correct positioning of parts appearance.
7. 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
8. Tag items as rejected items so that if possible, they can be reworked on.
9. Items tagged as rejects, should be disposed if they can't be re-worked on.
10. Place the rejected item in the assigned or designated locations only.
11. Always maintain inspection records to compute level of quality control achieved.

3.1.6 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	• Increase needle size • Use reinforced needle
Incorrect or blunt needle point	• Change needle
Incorrect needle-to-thread size relationship	• Change needle thread size to appropriate size

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	• Adjust top or bottom thread tension as necessary for balanced stitches
Incorrect threading	• Check for correct thread path
Variable thread tension	• Check for correct thread path • Make sure spring is properly set • Check thread lube consistency

3.1.7 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.

3.1.8 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.

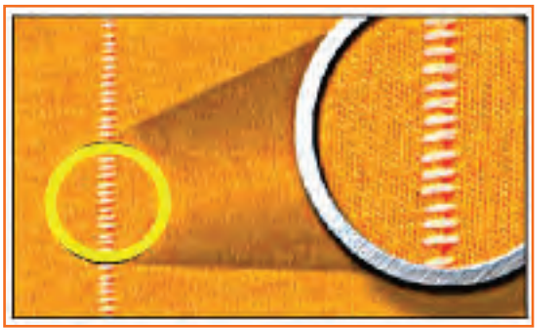

Fig.3.1.5: Seam Grin

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 could be a material connected issue that occurs infabrics that are with low noumber of warp and pick yarns. the fabric on either side of the seam distorts as the fabric yarns slide away leading to the permanent gap as shown in the image below.Once you increase seam allowance, use a better stitch density and prefera lapped fell seam.

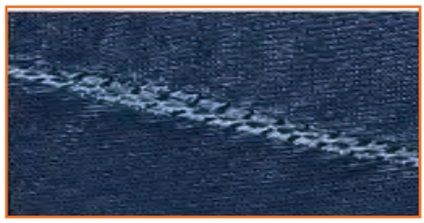

Fig.3.1.6: Seam Slippage

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Seam Pucker:

Bad tension, Bad feet, Fabric, Thread instability

- Uneven shrinkage throughout finishing
- Thread bloat from laundry Structural jamming/ inherit pucker
- Tight weaving doesn't have enough space between yarns for thread
- stitching caused yarns to be pushed out of place

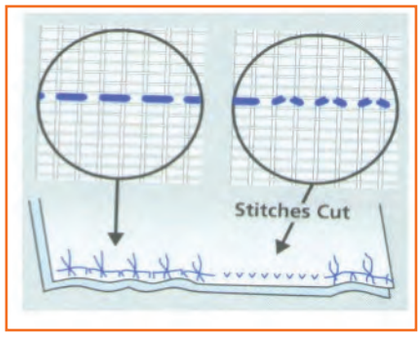


Fig.3.1.7: Seam Pucker

As shown within the pictures on top of, seam pucker usually happens when artificial threads are used. once stitching thethreads pass though the stretched state propulsion the material with it. this will be avoided if thread tensions ar unbroken.

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.

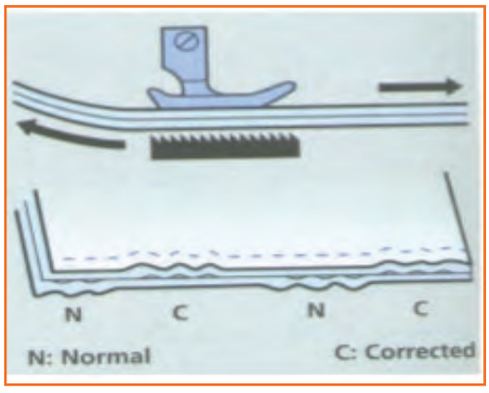


Fig.3.1.8: Feed Pucker

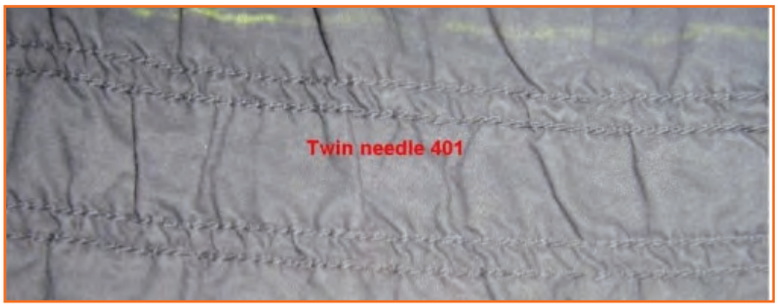


Fig.3.1.9: : Shrinkage pucker occurs during the

3.1.9 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.

Fig.3.1.10: Seam Pucker

- 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.

3.1.10 Maintain Workflow and Meet Production Target

Here are some of the tips with which work should be carried out so that the workflow 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 workflow should not affect the workflow 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 workflow of other production.

Fig.3.1.11: Work flow at work place

3.1.11 Fabric Defects

Classification of defects

Certain defects are acceptable to some whereas unacceptable to others. fabric for curtain inner lining might notgenerally be judged with stringent dealings. Whereas that for top grade dress wear could also be rejected on the ideaof a minuscule imperfection.

- Classification is that the categorization of defects into major and minor. Defects are classified relyingon many factors. In some cases defects might not be defects within the first place. For instance: Barre in knitting appears within the sort of sequential horizontal lines on the fabric. this might simply be used as a sway and usefully incorporated in product. Laddering will be achieved as a sway by deliberately deactivating a needle within the bed.
- Generally the classification defends on the frequency of the defect. alittle hole within the fabric might not cause problems however repeated little holes can clearly be problematic and so a significant defect.

The classification of defects depends on degree of visibility. for example registration problems will be neglected if there is only minor misalignment. Variation in matching of coloured shade is acceptable within bound limits.

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

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 is 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.3.1.12: 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.3.1.13: Misprinting

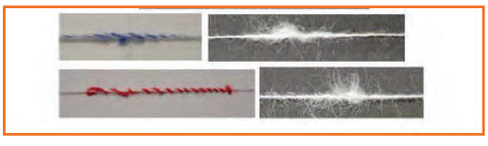


Fig.3.1.14: Double Pick

- **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 un-attended. 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.3.1.15: Oil Stains

Fig.3.1.16: 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.

Marker Making Defects

Fig.3.1.17: 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.3.1.18: 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)
- UnaccepFig.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

Fig.3.1.19: Cutting Defects

- Mixed plies resulting in Shaded Garment parts when assembled
- Mixed Size parts resulting in uneven appearance
- Inconsistent Grain and Surface of the Skin

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.3.1.20(a): Unmatched Trimmings

Fig.3.1.20(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.3.1.21(a): Normal Fabric

Fig.3.1.21(b): Discoloration after fusing

Strike through

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

Fig.3.1.22(a): Ideal fusing in fabric

Fig.3.1.22(b): Strike through in a fabric

Fig.3.1.22(c): Interlining shrinking

Strike Back

Fig.3.1.23(a): Ideal fusing

Fig.3.1.23(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.

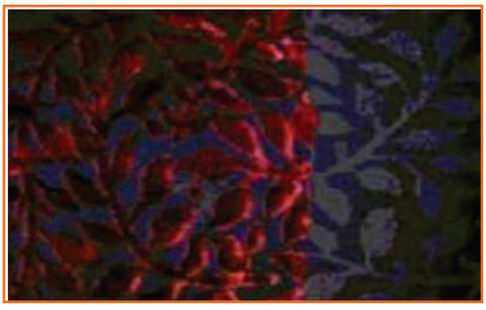


Fig.3.1.24: Glazing and Discoloration

Fig.3.1.25: Fusing distortion

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.

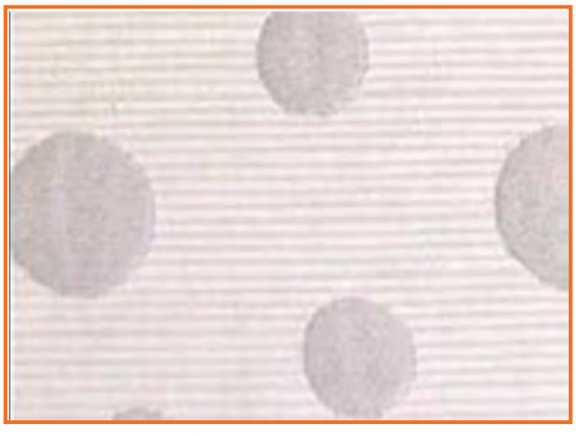


Fig.3.1.26(a): Ideal fusing

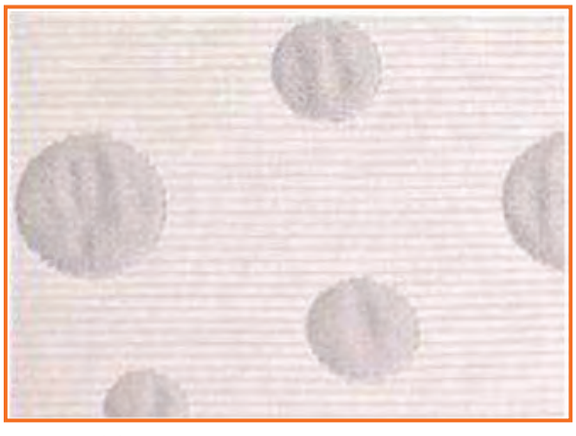
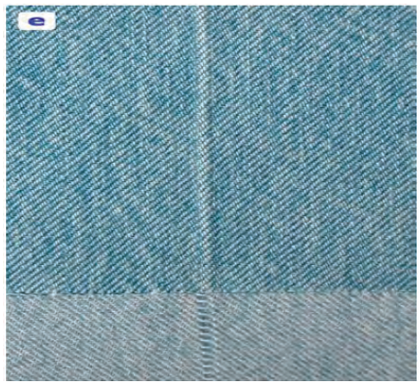
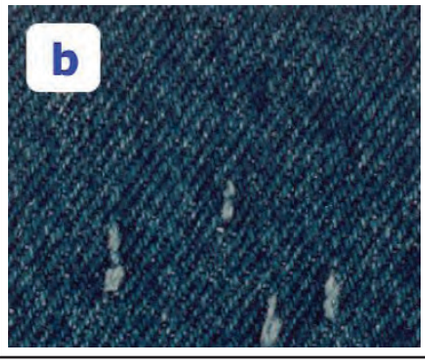
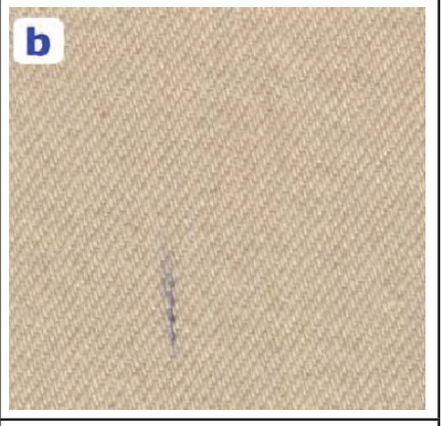
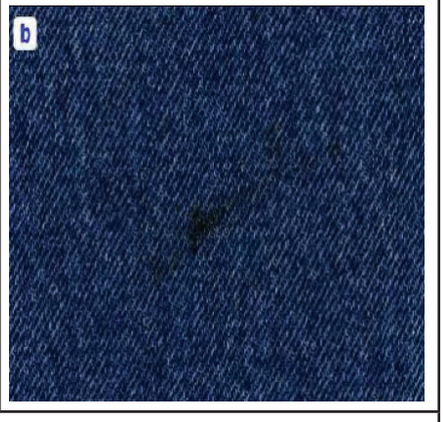
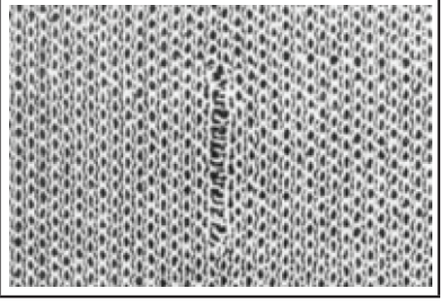
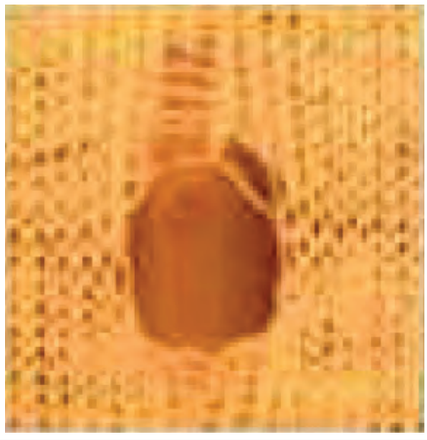
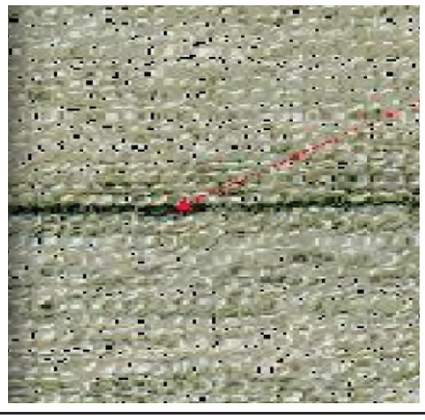
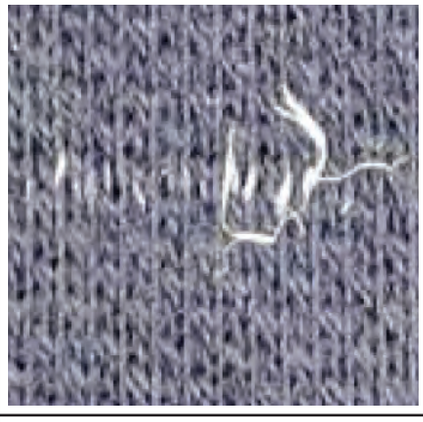
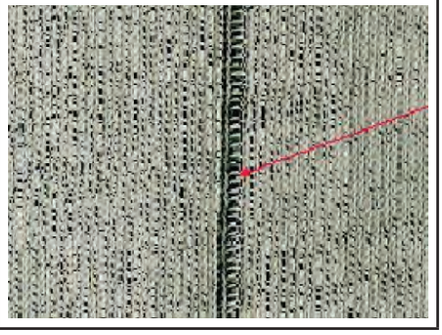


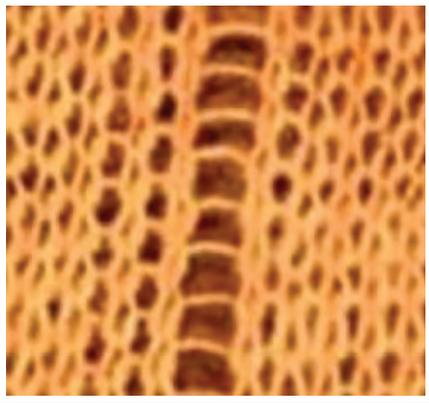
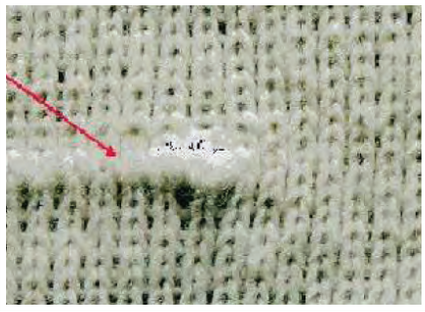
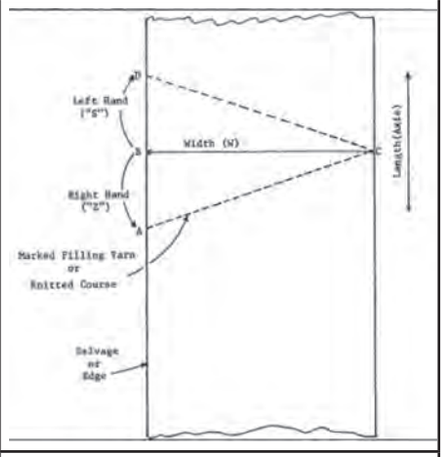
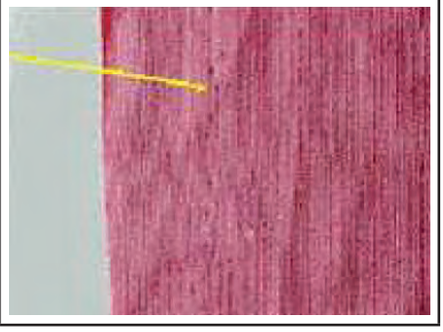
Fig.3.1.26(b): Fusing delamination

Common Woven and Knit Fabric Defects

Defect	Explanation	Severity	Photograph
Defects of Woven Fabric			
Dropped Pick	Caused by the filling insertion mechanism on a shuttle less loom not holding the filling yarn, causing the filling yarn to be woven without tension. The filling yarn appears as "kinky."	Major	
End Out	Caused by broken yarn and loom continuing to run with left end.	Major	
Slub	Usually caused by an additional piece of yarn that's woven into fabric. It can even be caused by thick places in the yarn. Often is caused by fly waste being spun in yarn in the spinning process.	Major or Minor	
Knots	Caused by tying spools of yarn together	Usually Minor	

Mixed End (Yarn)	Yarn of a different fiber blend used on the wrap frame, resulting in a streak in the fabric.	Usually Major	
Mixed Filling	Caused by bobbin of lightweight yarn or different fiber blend used in filling. Will appear as a distinct shade change	Major	
Soiled Filling or End	Dirty, oil looking spots on the wrap or filling yarns, or on package-dyed yarn	Major	
Defects of Knitted Fabric			
Drop Stitches	Results from malfunctioning needle or jack. can 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 is running continuously.	Major	
Mixed Yarn	Occurs in wrap knit. Results from wrong fiber yarn (or wrong size yarn) placed on wrap. cloth might 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 verticals line.	Major or Minor	

Runner	Caused by broken needle. Can appear as vertical line. (Most machines have a stopping device to prevent machine once 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	
Askewed or Bias	Condition wherever filling yarns are not square with wrap yarns on woven fabrics or wherever courses don't seem to be 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 extents into body of fabric	

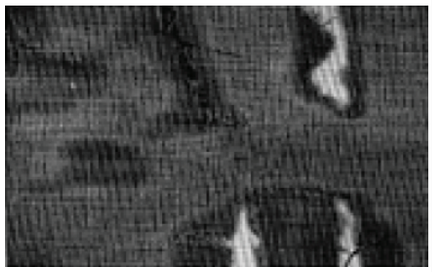
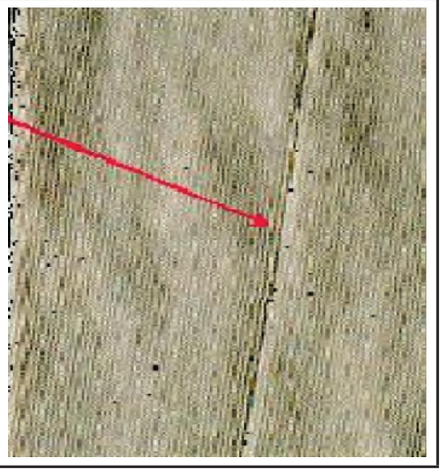
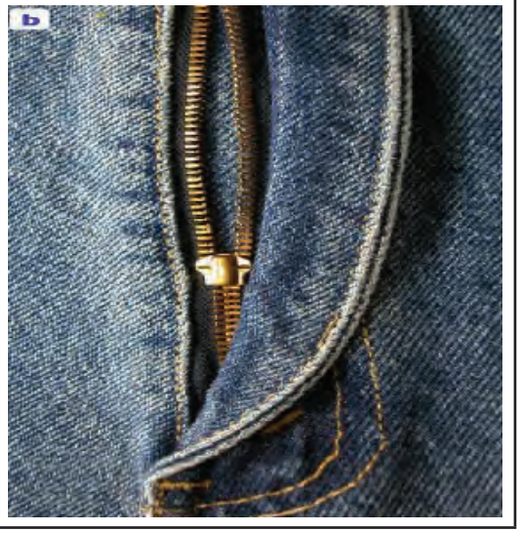
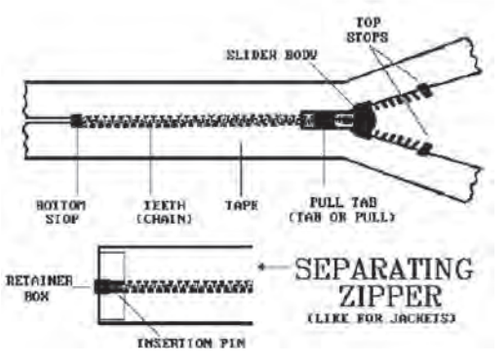
Straying End	Caused when an end of yarn breaks and loose end strays and is knit irregularly into another area.	Major	
Bowing	Usually caused by finishing in knits ,the course lines lie in an arc across width of goods.	Major on stripes or patterns Minor on Solid color	

Fig.3.1.27: Common Defects

Accessories Defect

Zippers		
Slider defect	**Won't Lock:** Not apparent without testing by placing Zipper slider in locked position and applying tension. **Faulty Dimension:** 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. **Crushed Slider:** May be due to improper garment pressing or due to padding or compensating springs in the presses not being in best condition. **Tarnished:** 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. **Weak Slider Bodies:** Can best be determined with correct testing equipment. However, manifests itself by slider becoming compressed or crushed below minimum pressure or becoming distorted enough to form hard operation.	 
Chain or Teeth Defect	**Improper Dimensions:** 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. **Miss meshed and Unmeshed Teeth:** Readily visible, particularly in large. Usually results in inoperable zipper. Missing Teeth: Readily visible, will result in early failure of the zipper.	

	Misplaced Teeth: 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. **Off color:** This defect is quite apparent. Zipper makers usually carry an entire range of tape colours. because of similarity of different colours, one may be mistaken for another. it's also possible, because of color similarities or distinction in dye lots that the {two|the 2} halves of the zipper can have two different shades of tape. **Humpy Chain:** readily noticeable by its waviness. Causes issue at sewing operation and distorts finished garment's look. **Cord not attached to Tape:** because of skipped stitches during operation of sewing cord to tape. Not readily apparent however under strain, cord and teeth can rip away from tape and render zipper and garment unusable. Length: Improper zipper length for given opening.	
Top or Bottom Stop Defects	**Missing Top or Bottom Stop:** Readily apparent and will end in zipper failure. If facilities for attaching a top or bottom stop don't seem to be available, then the complete zipper ought to get replaced. In some instances, bottom stops ar hooked up at garment plant. an improperly or poorly attached bottom stop is also result of carelessness on a part of the operator or of improper functioning of the bottom stop machine.	
	Snap Fasteners	
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.	

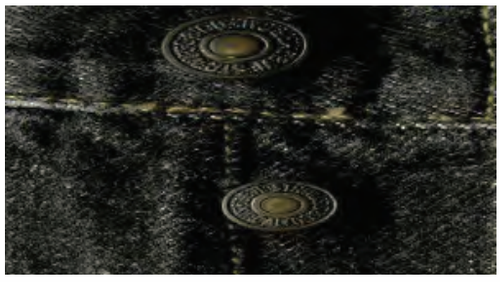
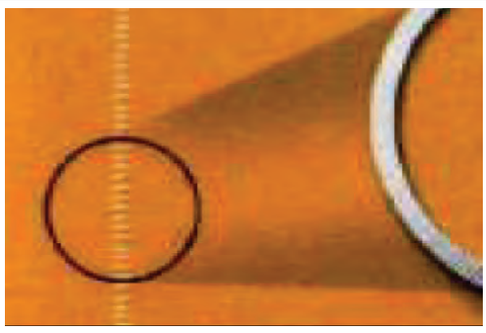
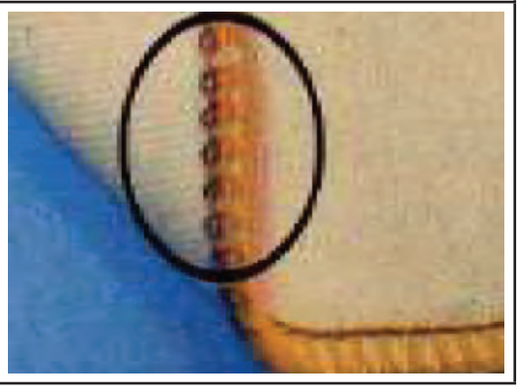
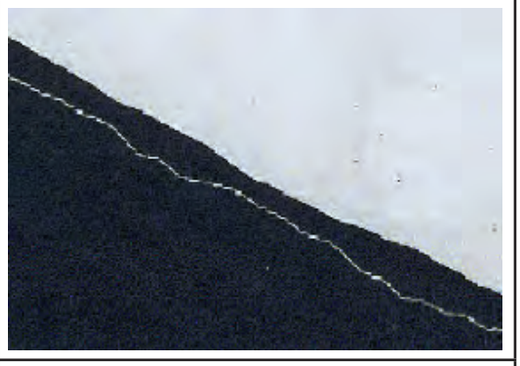
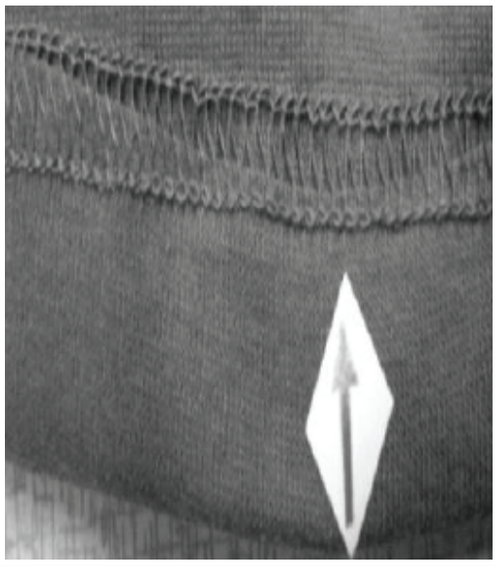
		
Light Action	Snap fastener does not stay closed because of lack of proper tensions. Same comment applies as for tight closure.	
Hooks & Eyes	**Improperly Applied:** This is usually caused by a careless operator or improperly adjusted attaching equipment, and corrections are usually simple when apparent. **Improper Alignment:** Gauges are available for attaching equipment to assure proper alignment in positioning. this can be a necessary if garment is to own a properly tailored look. If the top of the zipper is extended into the waistband of the garment, than the hook and eye ought to be offset to prevent it from hit the zipper material. **Poor Finish:** 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. **Tight/Loose Closure:** Attaching equipment bad fitt with an adjustable feature permitting secure application of hook and eye to either light-weight or heavyweight goods. If closures seem too tight, then one should instantly check the attach.ing equipment for correct adjustment.	
	Buttons	
Rough or **Dull Surfaces**	This fault is not so serious 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.	

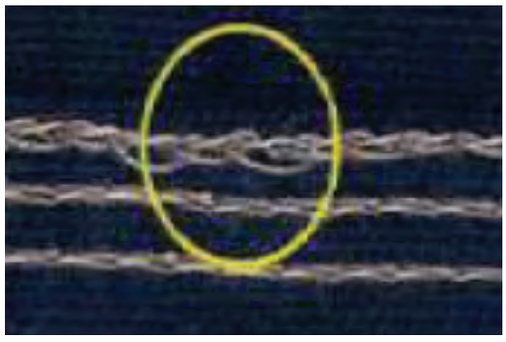
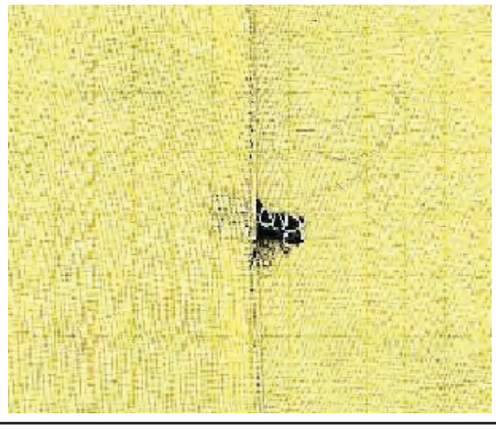
Fig.3.1.28: Accessories Defects

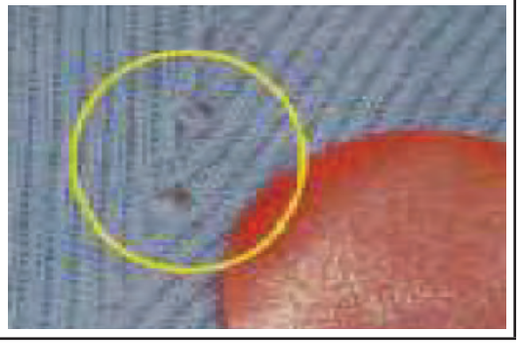
Stitch and Seam Defects

Type of Defects	Description	Photograph
Broken stitches	Caused due to: • Too thick/ too thin a thread for the needle • Needle heat • Operator working non-rhythmically • Too tight tension	
Skipped stitches	Caused due to: • Hook irregularly failing to pick up the loop of thread from a needle's eye	
Seam Grinning	Caused due to: • The Seam itself may open and produce a Gap between two pieces of fabric • Arising from too loose a tension or too large stitch length or use of a wrong stitch type.	
Unbalanced stitch	Caused due to: • Arising from unbalanced tension of needle thread and bobbin/looper thread.	

Improperly formed Stitches	Caused due to: • Bad thread tension • Ill fitting machine components	
Irregular or incorrect shape of sewing line	Caused due to: • Badly set guide, • Handling error	
Twisted seams	Caused due to: • Improper alignment of fabric parts, • Mismatched notches, components off grain	
Mismatched stripes or checks	Caused due to: • Mishandling by operator • Incorrect cutting	

Insecure back stitching	Caused due to: • Rows do not cover the first row of stitching-Manual error	
Uneven width of inlay	Caused due to: • Bad handling by operator • Incorrectly set guide, incorrectly set folder	
Linings too full, too tight.	Caused due to: • Operator twisted or stretched extensively during Sewing	
Uneven Stitch Density	Caused due to: • Operator causing the machine to snatch and does not allow the machine to control fabric feeding.	
Wrong Stitch density	Caused due to: • Too high SPI give rise to jamming and rupture of fabric • Too low SPI give rise to weak seams and seam grinning	

Mismatched seams	Caused due to: • Edges of the upper and lower fabric parts not matched during sewing, causing the seams to shift	
Loose Stitch	Caused due to: • Unbalanced seam sewing thread tension not set properly	
Extraneous part caught in the seam	Caused due to: • Handling error	
Garment parts Cockling, Pleated, Twisted, Showing Bubbles	Caused due to: • Handling error • Usage of wrong interlining/fusing under improper conditions	

Components of features wrongly positioned or misaligned	Caused due to: • Incorrect marking • Incorrect sewing not following the marker	
Seam Slippage	Caused due to: • Insufficient thread tension • Low count, unbalanced weave and filament yarns.	
Thread Breakage	Caused due to: • Improper m/c settings • Incorrect threading • Excessive needle heat • Incompatible needle, thread and fabric, damaged machine parts	
Yarn Severance	Caused due to: • Incorrect needle point • Damaged needle • High machine speed	

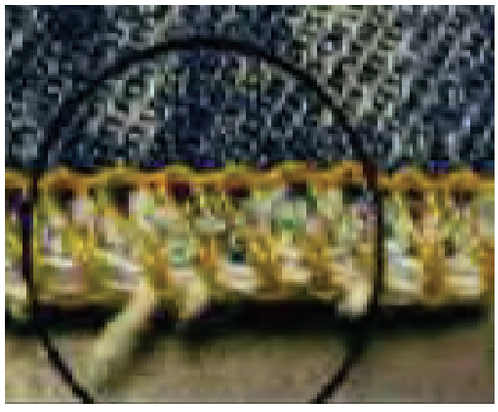
Puckering	Caused due to: • Tension pucker • Feed pucker • Puckering due to differential shrinkage • Puckering due to structural jamming	
Ragged Edges	Caused due to: • Knives on automatic sewing machine not dipping smoothly.	
Uncut thread	Caused due to: • Operators' negligence • Malfunctioning thread trimmer in automatic machines	
Oil stains	Caused due to: • Malfunctioning machines	

Fig.3.1.29: Seam defects

Processes to Rectify Few Defects

Defects	Rectification
Restitched Seams / Broken Stitches	• Using better quality sewing threads • Ensure proper machine maintenance
Open Seam- Seam Failure- Stitch	• Better quality threads • Proper size thread for application • Proper tension

Seam Slippage	• Change seam type if possible • Increase seam width • Optimize the stitches per inch.
Excessive seam Puckering	• Correct thread type and size. • Sew with minimum sewing tension to get a balanced stitch • Machine needle, bobbin and threads are set properly according to the fabric to be sewn.
Knits & Strech woven puckering	• Set the machine properly according to the fabric • Minimum pressure foot pressure
Improper Stitch balance	• Use quality thread • Properly balance the stitch so that the needle and bobbin threads meet the middle ofthe 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.
Raggeded/Inconsistent Edge	• Make sure the sewing machine knife are sharpened and changed often. • The knife should be adjusted in correct form in relationship to the "stitch tongue" on the needle plate to get the proper seam width.
Improper Stitch balance – 504 Overedge Stitch	• Use Quality thread • Balance the stitch properly so that if the looper thread is unravaled, the needle loop lays over half way to the next needle loop on the under side of the seam
Raggeded/Inconsistent Edge	• Make sure the sewing machine knife are sharpened and changed often • The knife should be adjusted properly in relationship to the “stitch tongue” on the needle plate to obtain the proper seam width.

Fig.3.1.30: Rectification of 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.

Exercise

1. _____ Stitches are usually caused due to needle defects
   a) Staggered
   b) Skipped
   c) Both a and b
   d) None of the above
2. Seam slippage is a fabric related issue which occurs in fabrics which are with low noumber of warp and weft yarns.
   a) True
   b) False
3. What are the common cutting defects?

   .....

   .....

   .....
4. What are the terms of inspection?

   .....

   .....

   .....

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4. Maintain Work-Area, Tools and Machines

Unit 4.1 - Maintain Work Area, Tools and Machines

AMH/N0102

Key Learning Outcomes

At the end of this unit, you 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, you 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.

Fig.4.1.1: A well maintained machine shop

4.1.1 Introduction

Machines are essential to modern production. However, along with accrued productivity, they have brought hazards into the workplace. proper management of machine hazards has traditionally been seen as expensive and a constraint on productivity. In general, the garment manufacturing trade is considered to be less dangerous than alternative industrial sectors and, therefore, safety policy is a low priority in several enterprises. for example, it has been ascertained that some workers remove guards protective belts from sewing machines, and manual cutting machines are operated with naked hands.

Machine breakdown is a common reason behind production delay affecting delivery schedules. Considering the importance of meeting delivery dates, a competitive enterprise cannot afford penalties for delay due to machine breakdown therefore, proper maintenance of machines to prolong their economic life, reduce breakdowns, prevent defective outputs and guarantee safe operation ought to be additional importance. protective staff against pollution from the frequent use of solvents for cleaning and the existence of cotton or other fibers within the surroundings ought to also be taken into consideration. Maintenance and safety measures to eliminate these hazards and increase machine productivity, beside affordable techniques for environmental control, are mentioned below.

4.1.2 Maintain Machines Properly

A poorly maintained machine is inefficient, if not dangerous. it will also have frequent breakdowns and quality issues. proper maintenance isn't lost production time; it's an investment for higher productivity and lower repair prices. nonetheless in several corporations, machines are maintained only if they break down. this can be as a result of a number of reasons:

- Machines are owned by the contractors or they're leased.
- No maintenance personnel are available.
- No time to maintain machines is allotted under production time.
- There is a powerful belief that maintenance means cost.
- Some machines are not simple to maintain.

Machine down-time affects production and causes delays. Defects are also made inflicting quality and productivity issues. Machine maintenance ought to, therefore, be planned and coordinated with supervisors and employees. employees ought to be involved in machine maintenance and should be equipped a basic tool kit to include tweezers, small screwdriver, machine brush, oil can and material wipes. one of the basic training skills is to train employees 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.4.1.2: 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're not operating properly, damage to the machine or fabric can occur. Feed dog assembly maintenance is essential to smart 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, however older models could have rubber ones, which regularly need replacement. 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 fabric. Use a small soft brush to wash the feed dogs. ensure to get rid of 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 must be in the raised position for better viewing during the cleanup method.
- **Step 3:** Clean the area around the feed dogs with a soft brush. compressed gas could be a sensible choice to use in the small tight areas.
- **Step 4:** Wipe down all areas with a clean, lint free fabric before replacing the throat plate.
- **Step 5:** Prepare to clean the feed dogs and all other areas that lint could accumulate on, after each 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 make sure that your sewing machine enjoys the long life it was engineered for, it is important to repairs it regularly using proper maintenance techniques. one of the best things you can do to keep your sewing machine running smoothly is to lubricate it using sewing machine oil. sewing machine oil isn't something you borrow from the garage. it is clear white oil. make sure to use the right oil. refer to your owner's manual for the right spots to oil. some of the older machines have these areas marked.

After oiling your machine run stitches on some scrap cloth before you tackle your project. this enables oil to escape on to the scraps, if it's going to, rather than the project you're working on. Oiling the machine not only lubricates your moving elements, to prevent wear, it reduces the chance of rust. Rust forms rapidly with any moistness, even just the humidness in the air. Surface rust will act just like loose sand grain in your machine, and make excess wear.

- **Step 1:** Purchase a high-quality brand of sewing machine oil from a sewing store or other specialty merchandiser. Higher quality typically comes with a higher price tag, however the value of good sewing machine oil is favorable to the prices involved repairing or replacement an entire sewing machine.
- **Step 2:** unplug your sewing machine. check that its power switch is set to 'off.' as a result of 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 bought quality sewing machine oil, more than one drop can usually not be necessary.
- **Step 4:** Repeat Step three, applying one drop of oil to each part of your sewing machine that moves. Consult your sewing machine owner's manual if you would like instruction on the way to access any moving parts which will 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 counsel that fifteen to half-hour could be a sensible window of time to let your machine stand while the stitching machine oil works its magic.
- **Step 6:** Plug your sewing machine back in. once you have safely done so, turn the power switch to 'on.'
- **Step 7:** Feed some scrap fabric through the sewing machine, running its moving elements at a slow but constant rate. this may allow the oil to spread equally throughout the parts that need lubrication to maintain best performance.

Tips & Warnings

- Never lubricate any electrical part of your sewing machine. This may damage to your sewing machine, and could result in an electric shock.

4.1.4 Machine Guards

There are different safety guards given in the sewing machine that are vital to use and it's also essential to check that the right safety guard is in place as per the need. Below are given the machine guards of a sewing machine.

- **Finger guard:** while guiding the fabric under the presser foot the fingers may accidently 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.4.1.3: 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.

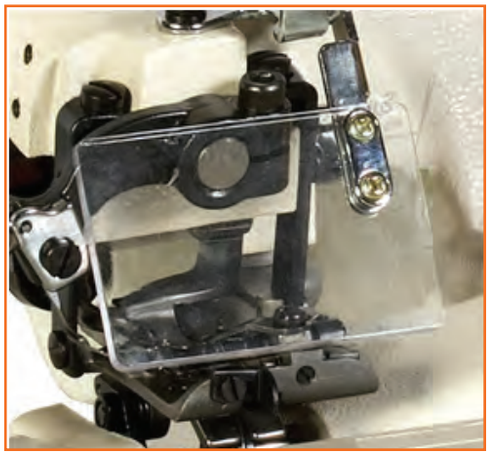

Fig.4.1.4: Eye Guard

- **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.
- **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 several cases machine issues are due to the employee not having received correct training in basic machine maintenance. This causes issues that need to be corrected by a certified mechanic/technician. All garment enterprises suffer from such issues to varying degrees. Some common causes are:

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

On-the-job training sessions could also be organized for beginners as part of their training period. Enlist the assistance of senior operators with teaching skills. group work will provide good opportunities for these training sessions. Sessions ought to embrace acquiring the essential sewing skills and troubleshooting sewing issues.

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, therefore safety is a concern. Some sewing machine safety tips are as follows:

Fig.4.1.5: Advanced Sewing Machine

- Keep your fingers off from the needle. experienced sewists may even be more apt to do this than beginners. about 60 minutes of the sewing machine related injuries treated in a hospital each year are puncture wounds from needles.
- Minimize distractions, and do not operate your sewing machine once you are tired or under the influence of alcohol. sewing could be a lot easier once you're feeling refreshed and relaxed, and it's also safer.
- Turn off and unplug your sewing machine once you are away from it for more than a few minutes. sewing machines will generate considerable heat once left on, and a lightning strike once a sewing machine is plugged in can cause irreversible harm. consider obtaining a surge protector to plug your machine into, just in case.
- Be aware of cords. attempt to keep cords towards the back of the machine and not draped across the floor wherever you (or somebody else!) is probably going to trip over them. If they do need to run across the ground, consider tape them down-- or simply notice somewhere else to work.

- Have your machine serviceable often. Not only will this keep your machine in top operating order, potentially dangerous repairs are more likely to be detected before they cause a problem.
- Always disconnect the machine and use caution once replacing parts like lightbulbs.
- Don't sew over straight pins. At the very least this can bend the straight pins and compromise your sew quality, however the straight pins also are susceptible to breaking, and very likely might end up in your finger (or worse).
- Don't force your machine to stitch through thick or tough material. you may damage your machine or cause injury to yourself. Your project may need an industrial strength sewing machine.
- Consider the ergonomics of your sewing Fig.and chair. If your sewing machine is too high it'll cause strain on your back. Your feet ought to be flat on the floor and your elbows bent at a 90 degree angle whereas you are stitching.
- Wear shoes while operating your machine. This one may appear a bit silly, however your foot pedal might break, and if you're wearing shoes, your feet will be protected. Stepping on stray needles, or dropping needles, scissors or a rotary cutter on your foot while stitching is additionally a prospect while stitching.
- Use care when eliminating used sewing machine needles. Prescription bottles or a mint tin are excellent for this. just take care you mark it clearly therefore you do not mistake it for your sensible needles.
- Your sewing area ought to be well lit. this can reduce strain on your eyes and assist you avoid leaning in unnecessarily near your machine.

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 equipments 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.

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5. Maintaining Health, Safety and Security at Workplace

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Unit 5.1 - Maintaining Health, Safety and Security at Workplace

AMH/N0103

Key Learning Outcomes

At the end of this unit, you 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 otherauthorized 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.

UNIT 5.1: Maintaining Health, Safety and Security at Workplace

Unit Objectives

At the end of this unit, you 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.
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Fig.5.1.1: Maintaining Health, Safety and Security at Workplace

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.

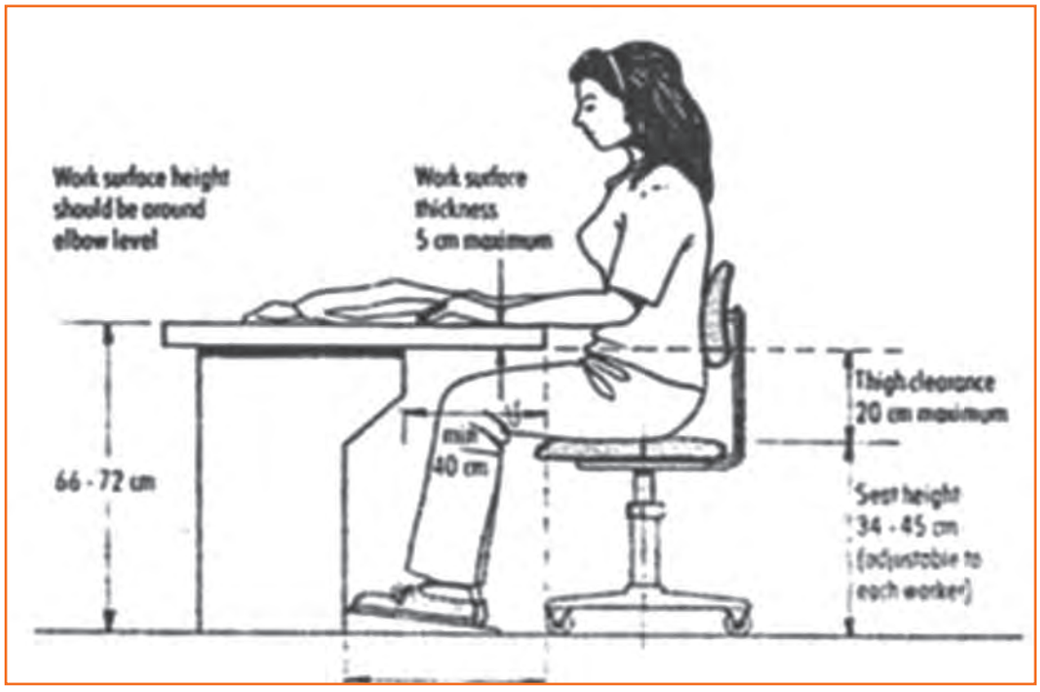

Fig.5.1.2: Body Posture

Sewing Machine Operator 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. Sewing Machine Operator experience a number of cases of strain injuries. 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 Sewing Machine Operator have been linked to conditions such as improper work area design, including sitting arrangements.

Factors like repeated motions, force, body-posture are associated with higher risks and rate of injury. There are other factors

Fig.5.1.3: Body Posture

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 comfortally enough 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.

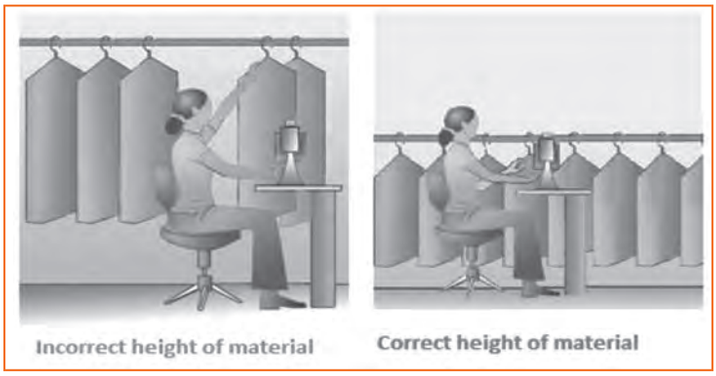

Fig.5.1.4: Situating the material

Injuries and illnesses among textile and apparel workers

- 81% complained CTDs to the wrist.
- 70% of Sewing Machine Operator complains of back pain.
- 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.

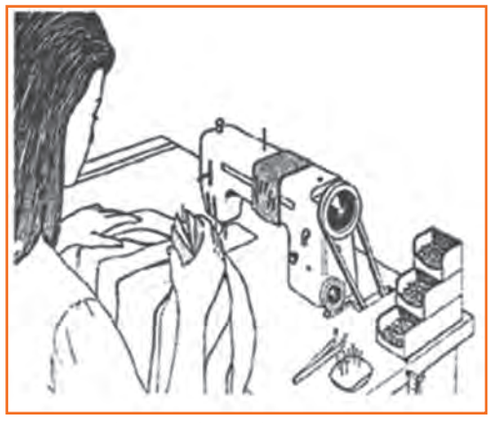

Fig.5.1.5: Cleaning the Tools

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 rejuverate the body and mind so that they don't get injuried. 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 ust go for a walk whenever his work permits.

  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.5.1.6(a): Don'ts

Fig.5.1.6(b): Don'ts

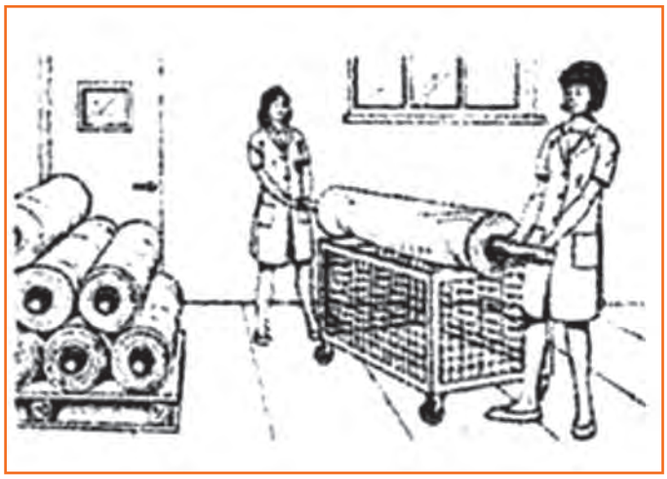

Fig.5.1.7(a): Do's

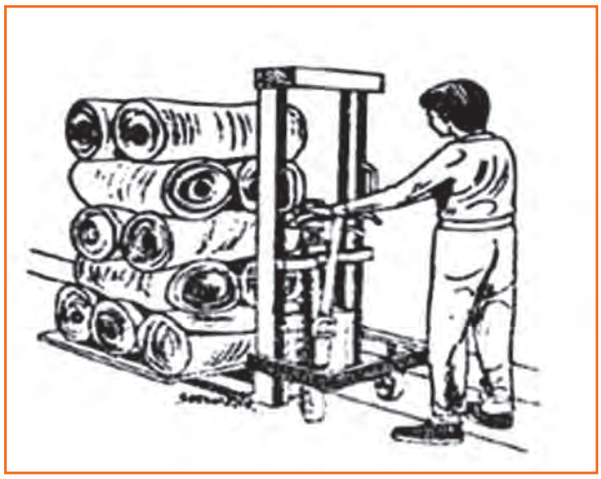

Fig.5.1.7(b): Do's

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.5.1.8: 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.5.1.9: 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 Make Full 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.5.1.10: Sunlight int he Shop Floor

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 ad 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.5.1.11: 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.

Fig.5.1.12: Fire Safety

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 out-dated 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.

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 Make Sure Essential Facilities Serve Their Purpose

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 different 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.

5.1.8.2 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.5.1.13: 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:

Fig.5.1.14: First Aid

- 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

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.5.1.15: Prohibition sign

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

Fig.5.1.16: Warning sign

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

Fig.5.1.17: 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'.

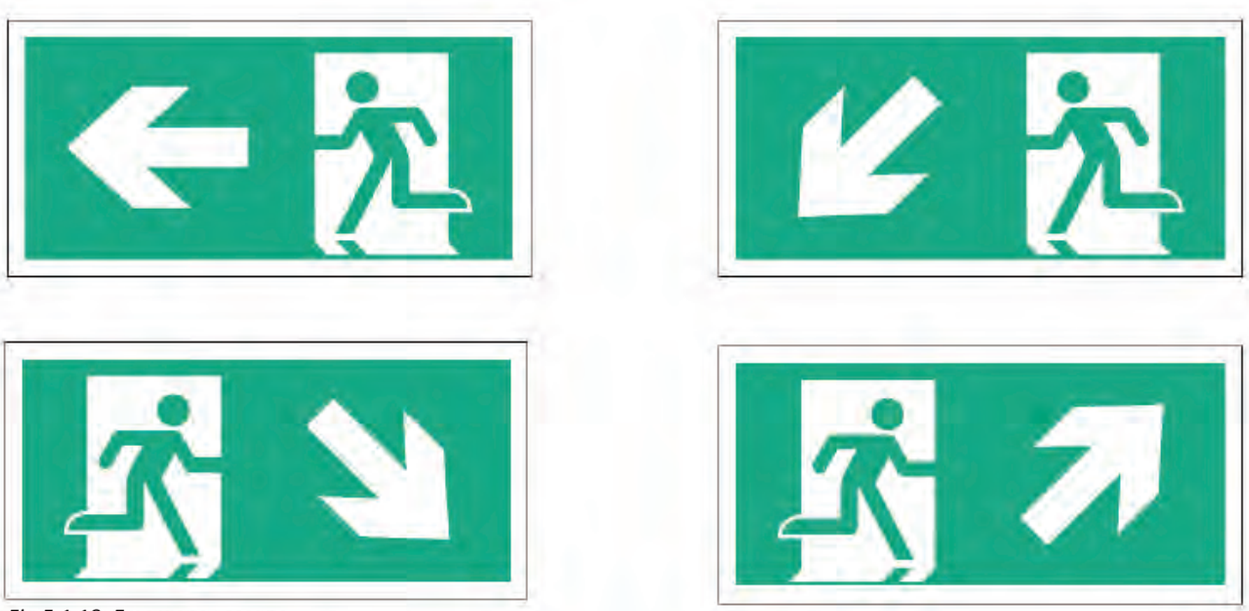

Fig.5.1.18: Emergency escape

Signs for emergency exits

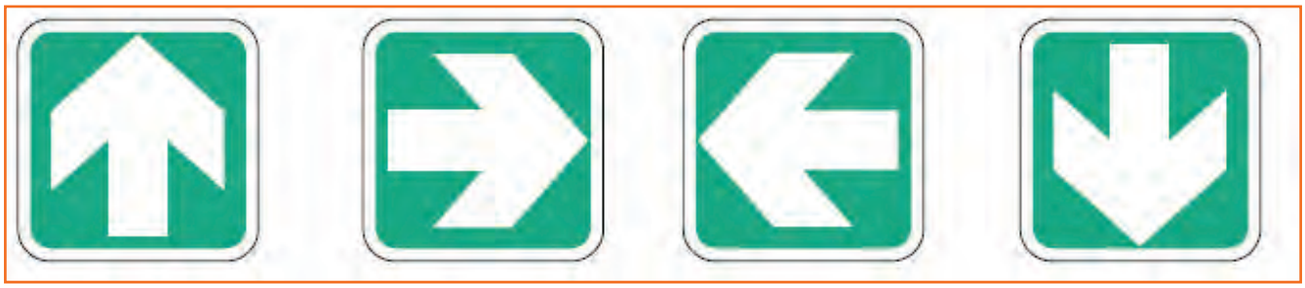

Fig.5.1.19: Signs for emergency exits

Signs for Fire and First Aid

Fig.5.1.20: Signs for Fire

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:
  - » 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.
  - » Undertake first aid, fire-fighting and emergency response training, if asked to do so.
  - » Take action based on instructions in the event of fire.
- Ask questions to SMOs/supervisors if you have any query.

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National
Skill Development
Corporation
Transforming the skill landscape

6. Comply with Industry, Regulatory and Organizational Requirements

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

Unit 6.1 - Comply with Industry, Regulatory and Organizational Requirements

AMH/N0104

Key Learning Outcomes 

At the end of this unit, you 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.

UNIT 6.1: Comply with Industry, Regulatory and Organizational Requirements

Unit Objectives

At the end of this unit, you 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.

6.1.1 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).

6.1.3.2 AEPC-Disha

Apparel Export Promotion Council (AEPC), the peak body of Indian apparel exporters, has launched an agenda, named it "DISHA" (Driving Industry towards Sustainable Human Capital Advancement) with a primary objective to aid garment exporters comply with global standards referring to child labour.

This program is directed to encourage members to follow better social practices. These practices will give them a competitive edge in the global market. That market, where industrial compliance code is progressively becoming an important factor in buying decision.

Responsibilities of Disha member factory

DISHA member factory is dedicated to stick to the DISHA common code of conduct (CCC) Principle on child labour and takes the responsibility to:

- Comprehend and classify applicable laws and acts.
- Understand general industry practices and perception.
- Establish management systems for nourishment and continual improvement.

Disha-CCC for child labour

The CCC- Common Code Of Conduct is based on various central and state laws. Some of the laws that stipulate situations on the subject of employment of children and young persons are as follows:

- No child who has not completed fourteenth year of age shall be required or allowed to work in any occupation in the factory.
- Persons who have completed fourteenth, but not eighteenth, year of age are not employed in hazardous or dangerous operations.
- No female young person shall be required or allowed to work in any factory except between 8.00 A.M. and 7.00 P.M.
- Young people are required to work only after obtaining a 'certificate of fitness' from a government medical officer not below the rank of an Assistant Surgeon. The fee for obtaining this certificate would be borne by the factory.

It will be possible for the DISHA member's factory to follow the Indian Law, re-frame policies and better practise aimed to improved environmental and social impact on factories culture, by applying DISHA CCC.

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 tracing 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.

AEPC- Disha Initiative

AEPC in its unceasing efforts to make India a preferred sourcing end point plans to undertake a series of activities to reinforce the compliance code volume in the Indian export garment industry. The project DISHA has been originated with the aim to merge the Indian apparel manufacturers for mutual co-operation, global configuration and resource optimisation. It also focuses to create and adopt management systems to address human and ecological encounters.

Purpose of Disha programme

- To increase mindfulness among apparel companies on social and environmental standards based on applicable Indian laws.
- To progress effectiveness of apparel manufacturer.
- To promote a management system oriented thinking and approach for engaging with social and environmental issues.
- To promote a progression-based certification system that supports quantity of progress towards adoption and upkeep of yardstick practices in the Disha Common Code of Conduct (Disha-CCC).

Fig.6.1.3: AEPC Initiative

Main components of Disha

Ecological, societal and security linked compliance issues are increasing importance in fabrics and apparel sector. The competiveness in the sector moves to new embryonic markets. Improved social sustainability of the industry and creating an atmosphere for improved compliance principles can give India the mandatory edge over its competitors in the global market. Some of the major mechanisms of the program Disha are:

- **Disha Certification:** A Disha certificate shall be awarded to the factory by AEPC upon successful and agreeable application of the social and biological management system.
- **Common Code of Conduct (CCC):** AEPC-Disha's common code of conduct is intended to lead the Indian apparel manufacturers on legal, social and environmental issues. The program creates the values for business responsibility, based on applicable Indian laws and International labour organisation (ILO) resolutions approved by the Government of India.
- **Factory Capacity Building & Training:** The common code of conduct includes orientation for the owners of apparel factories and capacity building for factory-nominated personnel on Disha-CCC and towards applying the management systems for Disha-CCC.
- **Baseline & Impact Assessment:** Initially, a factory shall undergo a pre interference baseline evaluation for gap analysis against the Disha-Common Code of Conduct (CCC) ideologies and benchmarks. Post intervention assessments on operationalization of the management systems in the factory shall be undertaken.

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 tiresome 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 takes 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

The Indian garment industry is aiming to reach 7.5 billion by the end of 2012, a Fig.that is practically double the size of the last profit intended by the Indian Chamber of Commerce (ICC).

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 aduls (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.

6.1.7.3 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.

6.1.8 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.

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.

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.

Notes

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

7. Professional Skills

Unit 7.1 Professional Skills

Key Learning Outcomes 

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

1. Work effectively within a team.
2. Manage job related stress effectively.
3. Understand the importance of punctuality.
4. Recognize the causes of AIDS.
5. Get familiar with prevention methods for AIDS.
6. Importance of health and hygiene.
7. Effects of alcohol and tobacco.

UNIT 7.1: Professional Skills

Unit Objectives

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

1. Work effectively within a team.
2. Manage job related stress effectively.
3. Understand the importance of punctuality.
4. Understand the causes of AIDS.
5. Know prevention methods for AIDS.
6. Importance of health and hygiene.
7. Effects of alcohol and tobacco.

7.1.1 Team Work

Teamwork Is a skill in which a group of people work together to achieve a set goal and target objective given to them. It is an integral part of professional life of everyone who works in a professional environment. At the heart of effective teamwork in the workplace is the sense of comradeship and valuing of each other, which means when people come together they deliver more than they would separately, and they are empowered to do it! Effective teamwork in the workplace happens when three things are in place:

Fig.7.1.1: Team Work

1. Individuals flourish as they use their Strengths.
2. People come together building relationships that often become friendships resulting in effective Teamwork.
3. Together everyone accomplishes more as enactment flows and Results are achieved.
4. Teamwork in the workplace encompasses cooperation among workers. This cooperation is for the sake of a common goal that the entire team is working toward -- such as a sales quota or some other measurable result. But in some situations, the common goal may be something more imprecise, such as the wellbeing of the company. Teamwork requires that all workers add their fair share to the workload so that the company can achieve its goals in a timely and acceptable manner.

7.1.1.1 Elements of Team Work

Collaboration

Collaboration is a significant component to any team. As per Penn State University, teamwork allows projects to get done that one person alone is not able to complete. Members of the team bring in their own capabilities and level of proficiency to a venture to help create an effective finished product. To collaborate effectively the team must be able to communicate and share ideas, and there also needs to be a feeling of respect in place for each team member's impact.

Conflict Resolution

When a team works together there can be conflict in opinion, strategies and decision making. There are some team members who are not very articulate. They feel their concepts are not being heard. Whereas there are others who are over-articulated and they impose their ideas. They feel they should always be part of the team's solution. There could also be a struggle for leadership of the group that can threaten to diminish the group's effectiveness. The element of conflict resolution within a team means leaving room for everyone's helps, developing the ability to listen to all ideas and creating a method of agreement that is used to develop a solution the team can agree on.

Related Reading: *How to Make the Workplace Environment Become Less Stressful & Increase Feelings of Teamwork*.

7.1.1.2 Roles and Responsibilities of Team

A team work has a dynamic personality because there are many different people playing different and unique role in a group work. But the team is only effective and can contribute positively when the members understand their roles and responsibilities within the group, and effort to execute them efficiently. According to the Missouri Small Business and Technology Development Centres, an assignment given to a group is completed more effectively when the responsibilities are distributed fairly among the group members. Each member is assigned a part of the task based on his role within the group and his level of expertise.

Fig.7.1.2: Team Role

7.1.1.3 Differing Points of View

The best assets about doing a project in a team within an organization is the capability to bring together divergent points of view and opinions in order to settle down with a solution. According to Penn State University, an effective team creates solutions that are manufactured from the many different perspectives of the individual group members. This helps to see a circumstance from several different angles, and can create a solution that no one individual could create on his own.

Fundamental Techniques in Handling people

1. Do not criticize, condemn or complain.
2. Give honest and sincere appreciation.

Six ways to make people like you

1. Be genuinely interested in other people.
2. Smile
3. Remember to address by the person’s name.
4. Be a good listener.
5. Talk in the terms of other person’s interest.

6. Make the other person feel important.

Win people to your way of thinking

1. Avoid arguments.
2. Show respect for other people's opinion.
3. Admit your mistake.
4. Be friendly.
5. Let other people express their ideas.
6. Dramatize your ideas.
7. Throw down a challenge.

Be a leader: A leader's job often includes changing people's attitude and behaviour.

1. Call attention to mistakes indirectly.
2. Ask questions instead of giving direct orders.
3. Praise improvement.
4. Give a person a fine reputation to live up to.
5. Encourage hard work.
6. Make the person happy about accomplishing work.

7.1.2 Stress Management

In today's world, each and every human being is stressed in some way or the other. Stress had a very detrimental effect on us. Therefore it is imperative to resolve any element that causes stress. Here comes the role of Stress Management. Stress management refers to the wide spectrum of methods and psychotherapies aimed at controlling a person's levels of stress, especially chronic stress, usually for the purpose of refining everyday functioning. It is a prearranged strategy for coping with psychological or emotional turmoil. As part of a health benefits package, a company may offer stress management therapy to improve job performance.

Negative effects of stress

- Physiological impact
- Skin problem and hair loss
- Heart palpitations and fluctuation of blood pressure
- Anxiety and Depression

Fig.7.1.3: Stressed mangement

7.1.2.1 Basic Techniques to Analyse Stress

- Get the facts.
- After analysing the facts return to a choice.
- Once a choice is reached, act on it.

Tips to prevent stress

- Changing in the point of view and expectation level from the people around.
- Task break-down into manageable elements.
- Set S-M-A-R-T goals:
  - » Specific – mark a definite area for progress.
  - » Measurable – calculate or indicate the progress.
  - » chievable – the goal set should be attainable.
  - » Realistic – The result of the set goal should be realistic and not illusory.
  - » Time-bound – the goal should be time bound and time definite.
- Avoid postponement for tasks.
- Set restrictions on procrastination.
- Plan some 'ME' time for your rejuvenation.

How to fight stress?

- Be busy to keep stress out of your mind.
- Do not fuss about trifles.
- Co-operate with the ineffective.
- Do not consider the past and think about the present.

Cultivating a attitude to stay happy

- Fill your mind with thoughts of peace,courage and health.
- Never try to get even along with your enemies.
- Do not worry about feeling.
- Believe in the thrill of giving.
- Count your blessings and not your troubles.
- Be yourself
- Try to create the best of everything you get.

How to keep from worrying about criticism

- Criticism of any kind is compliment in disguise.
- Do not focus on the negative aspect of criticism.
- Correct and criticise yourself before anyone would do and don't repeat mistakes.

Ways to prevent fatigue

- Rest before you get tired.
- Relax at work.
- Keep your table clear.
- Do things in the order of importance.
- Be organized and reduce rework.
- Have enough amount of sleep daily.

7.1.2.2 Benefits of Stress Management

Physical health gets better

- Focus on physical fitness

Emotions stabilized

- Positive Metal Attitude
- Optimistic Approach

Ability to focus improved

- Productivity increases when one is stress-free.
- Present moment awareness.
- Conflict resolution skills get enhanced
- Work-Life balance is easy

7.1.3 Punctuality

Importance of punctuality

Fig.7.1.4: Punctuality

- **Respect:** Timekeeping speaks of a person's respect of others.
- **Credibility:** An employee who is punctual is deliberated as trustworthy in the eyes of his/her employer.
- **Organised:** A punctual person usually bring together his/her work well, thinks ahead of time, arranging the given tasks and is overall successful.
- **Networking:** Much of the interacting in a company happens just before a meeting when the board members are waiting for everybody to gather. Being early can give you a chance to talk to the company leaders and senior managers, and create a network of associations for you.
- **Ready:** Being a couple of minutes early to a meeting or work, gives you time to relax, collect your opinions and arrange your day's To-Do activities. This will help you sail through the day with no major glitches.
- **Productivity:** An employee who isn't stressed about reaching late or has come in early enough to give him minutes to settle in before the day's work begins, has got better chances to get more accomplished than a late comer who feels more pressurized.
- **Promotion:** All of the above points help an employee become a strong contender for a promotion (of course, given the fact that he/she is good at the job).

7.1.4 AIDS Awareness

Causes

The virus can be found in the blood, semen, vaginal fluid, and breast milk of infected people. HIV is also found in saliva, sweat, and tears, though not in high enough amounts to transmit the virus to another person. There are no known cases of anyone catching HIV through sneezing, shaking hands, or from toilet seats or mosquito bites. The two most common ways to be infected with HIV are through sharing needles and unprotected sex.

Fig.7.1.5: AIDS Logo

HIV may be transmitted through unprotected heterosexual or homosexual, vaginal, anal, or oral sex. Although the risk of infection is lower with oral sex, it is still important to use protection during oral sex. HIV can also be passed on through perinatal infection, where mothers who have HIV are at risk of giving the disease to the baby during birth. The risk of perinatal infection is declining with new treatments. Breast-feeding by an infected mother can also transmit HIV. Once HIV enters the bloodstream, it proceeds over cells vital to the immune response, known as CD4+ lymphocytes. The virus then inserts its own genes into the cell, turning it into a miniature factory that produces more copies of the virus. Slowly, the amount of virus in the blood goes up and the number of healthy CD4+ cells goes down. The obliteration of CD4+ cells interferes with the body's ability to fight off infections and other diseases

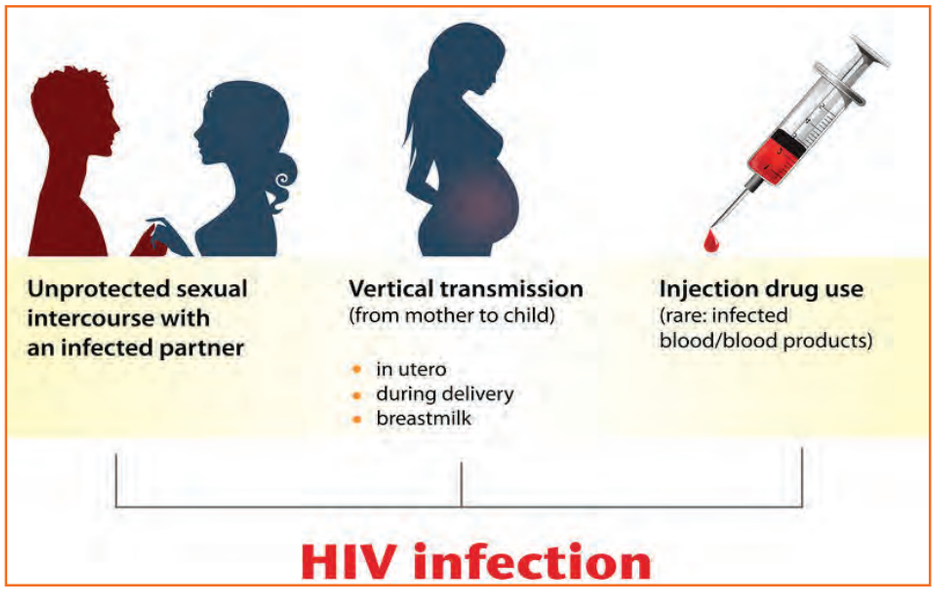

Fig.7.1.6: How AIDS spreads

Prevention

- Do not share razors.
- Dispose needles after use.
- Have protected sex.

7.1.5 Health and Hygiene

Hygiene

Poor hygiene can lead to poor health. If you have cut yourself, the wound should be cleaned and dressed suitably, this can help reduced the risk of infection and pain. Conditions such as head lice, athlete's foot etc. should be treated immediately to prevent further infections and spread to others.

Hand washing cannot be emphasised enough as this simple action can prevent a plethora of illnesses and disorders developing. Many people 'forget' to wash their hands after using the toilet or before handling foods; this can cause a great deal of illness and even death.

Fig.7.1.7: Health and Hygiene

Hair: Dirty head hair does not actually cause many health problems

- **Greasy hair:** There is extremely just one solution to greasy hair which is to clean it.
- **Dandruff:** If you suffer from dandruff, try the various shampoos available. If it's serious there ar some medical treatments available that are not harmful to the skin.
- **Head lice:** Head lice are extremely contagious. If left unattended, the lice grow large enough that you can really see them moving and therefore the white eggs are also sometimes visible. Read more about head and hair hygiene here.

Teeth and Mouth:

- **Teeth:** A beautiful smile can create a person's day - however if teeth are grubby or breath is smelly, it has an entirely different result. Brush your teeth twice daily with a decent.
- **Smelly breath:** Generally, despite good brushing a tooth will succumb to decay, if left untreated this can spread and infect your gums. bad breath can be the sign of a gum infection. make sure you visit your dentist regularly to keep a check on it.
- **Areas prone to Odour and fungal Infection:** Unpleasant smells and fungal infections are most commonly experienced in areas of the body that are warm and not often exposed to fresh air: the feet; the genitals and some of our sweat glands.
- **Smelly Feet:** The feet contain lots of sweat glands. If feet are confined in socks and shoes the sweat has nowhere to 'evaporate' and the skin microorganism can in effect attack to, inflicting that pungent'cheesy' aroma. Here are some measures you can take to minimise smelly feet:

» Wash regularly and dry thoroughly with a soft towel and an anti-bacterial foot powder or a baby talc.

» Allow feet to air when feasible and wear open shoes as much as possible.

» Change socks more than once a day if needed and make sure they are cotton or other breathable fabric.

7.1.5.1 Effects of Alcohol and Tobacco

Effects of tobacco

Fig.7.1.8: Tobacco and Cigrate

Tobacco is one of the major reasons of unnecessary deaths globally. Tobacco use leads most usually to ailments distressing the heart, liver and lungs. Smoking is a major jeopardy factor for heart attacks, strokes, chronic obstructive pulmonary disease (COPD) including emphysema and chronic bronchitis and cancer (particularly lung cancer, cancers of the larynx and mouth, and pancreatic cancer). It also causes peripheral vascular disease and high blood pressure.

The effects depend on the number of years that a person smokes and on how much the person smokes. Smoking earlier in life and smoking cigarettes higher in tar increases the risk of these diseases. Also, environmental tobacco smoke, or passive smoke, has been shown to cause adverse health effects in people of all ages.

Fig.7.1.9: Effects of tobacco

Effects of alcohol

Brain: Alcohol inhibits with the brain's communication pathways, and can distress the way the brain looks and works. These disruptions can change mood and performance, and make it harder to think visibly and move with synchronization.

Heart: Drinking a lot over a long time or too much on a single occasion will damage the heart, causing problems including:

- Cardiomyopathy – Stretching and drooping of heart muscle
- Arrhythmias – Irregular heart beat
- Stroke
- High blood pressure

Fig.7.1.10: Say no to Alcohol

Liver: Heavy drinking takes a toll on the liver, and can lead to a variety of problems and liver inflammations including:

- Steatosis, or fatty liver
- Alcoholic hepatitis
- Fibrosis
- Cirrhosis

Pancreas: Alcohol causes the pancreas to produce noxious substances that may eventually cause pancreatitis, a dangerous inflammation and swelling of the blood vessels in the pancreas that prevents proper digestion.

Immune System: Drinking too much can weaken your immune system, making your body a much easier target for disease. Chronic drinkers are more liable to contract diseases like pneumonia and tuberculosis than people who do not drink too much. Drinking a lot on a single occasion slows your body's ability to ward off infections – even up to 24 hours after getting drunk.

Notes

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सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
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N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

8. IT Skills

Key Learning Outcomes

At the end of the module, you will be able to:

1. Familiarise with computers
2. Identify and use basic uses of a computer
3. Familiarise with a computer motherboard
4. Familiarise with a computer operating system
5. Use Microsoft Word, Excel and Powerpoint
6. Familiarise with Internet and use e-mails

UNIT 8.1: Introduction to Computer

Unit Objectives

At the end of the unit, you will be able to:

1. Define the computer.
2. Recognise its various parts.
3. Differentiate the advantages and disadvantages of computer.

8.1.1 What are Computers?

Computer is the greatest technology of all times. An innovative electronic device that takes raw data as input from the user and processes these data under the control of set of instructions which is called program, to give the result the output. The first fully electronic computers, announced in the 1940s, were huge machines. The computer of today's time is thousands of times faster and in any size you want. They can fit on your desk, on your lap, or even in your pocket. Computers work through an interface of hardware and software.

Computers work through an interaction of hardware and software.

- **Hardware = Internal Devices + Peripheral Devices:** All concrete parts of the computer (or everything that we can touch) are known as hardware. The most significant piece of hardware is a tiny quadrangular chip inside the computer called the central processing unit (CPU), or microprocessor. It's the "brain" of the computer—the part that interprets instructions and performs calculations. Hardware items such as your monitor, keyboard, printer, mouse and other components are often called hardware devices.
- **Software = Programs:** Software provides "intelligence" to the computer. Software refers to the instructions, or programs, that tell the hardware what to do. A word-processing program that you can use to write letters on your computer is a type of software. The operating system (OS) is software that manages your computer and the devices linked to it. Windows is a well-known operating system.

8.1.2 Advantages of Computers

Compared to conventional systems, computers offer many notable benefits. The main benefits offered by computers are as follows:

- High Accuracy
- Superior Speed of Operation
- Large Storage Capacity
- User-friendly Features
- Portability
- Platform independence
- Economical in the long term

Exercise

1. When was the first fully electronic computer introduced?
   a) 1930s
   b) 1940s
   c) 1950s
   d) None of these
2. Give 3 examples of the hardware components of computers?

   .....

   .....
3. What is an Operating System (OS)?

   .....

   .....
4. Mention 3 advantages of computers

   .....

   .....

Notes

UNIT 8.2: Basic Computer Knowledge

Unit Objectives

At the end of the unit, you will be able to:

- Use computer.
- Explain the web, email services.

What can you do with computers?

In the workstation, many people use computers to keep chronicles, records, analyze data, do research, and manage projects. At home, you can use computers to find information, track finances, store pictures and music, play games, and connect with others—and those are just a few of the opportunities. You can also use your computer to link to the Internet, a network that associates computers around the world. With Internet access, you can interconnect with people all over the world, communicate with them and find a vast amount of information. Some of the most prevalent things we can do with computers are cited in this chapter.

8.2.1 The Web

The World Wide Web is an enormous warehouse of information. The web is the most prevalent part of the Internet, partly because it exhibits most information in a visually pleasing format. Headlines, text, and images can be combined on a single webpage—along with sounds and animation. A website is a collection of interconnected webpages. The web contains millions of websites and billions of webpages.

Surfing the web means reconnoitring or exploring it. You can find information on the web about almost any topic possible. For example, you can read news stories and movie reviews, check airline schedules, book a hotel, find places to dine, see street maps, search the route to reach a place, get the weather forecast for your city, or research a health condition.

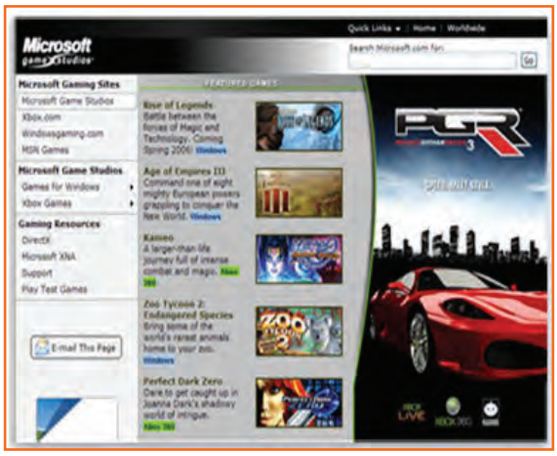


Fig.8.2.1: A Microsoft Web Plateform

8.2.2 E-mail

Who writes letters these days? Email which is a short form for electronic mail, is the most appropriate way to communicate with others to date. When you send an e mail message, it arrives almost instantly in the receiver's email inbox. You can send email to many people at the same time and you can save, print, and forward email to others. You can send almost any type of file in an email message, including documents, pictures, and music files.

Fig.8.2.2: Email Link (Exampple)

8.2.3 Instant Messaging

Instant messaging is like having a real-time conversation with another person or a group of people. When you type and send an instant message, the message is instantly visible to all participants. Unlike an email, all participants have to be online (connected to the Internet) and in front of their computers at the same time. Interaction by means of instant messaging is called chatting.

Fig.8.2.3: Instant Messaging

8.2.4 Pictures, Music and Movies

If you have a digital camera, you can move your images from the camera to your computer. Then you can print them, create slide shows, or share them with others by e mail or by posting them on a website. You can also listen to music and watch movies on your computer. Computer has become a prominent source of entertainment.

Fig.8.2.4: Media Resources Icons

Exercise

1. Give 3 examples of how you can use computers?

   .....

   .....

2. All participants have to be online and in front of the computers for instant messaging to work?

   a) True

   b) False

Notes

UNIT 8.3: Components of Computer

Unit Objectives

At the end of the unit, you will be able to:

- Know the different parts and components of computer.

8.3.1 Motherboard

The motherboard is the main element inside the case. It is a large rectangular board with combined circuitry this connects the several parts of the computer as the CPU, RAM, Disk drives (CD, DVD, Hard disk or any others) as well as any other peripherals linked via the ports or the expansion slots. Components directly attached to the motherboard include the following.

The central processing unit (CPU)

The central processing unit (CPU) performs most of the calculations that allow a computer to function and is sometimes referred to as the "brain" of the computer. It is usually cooled by a heat sink and fan.

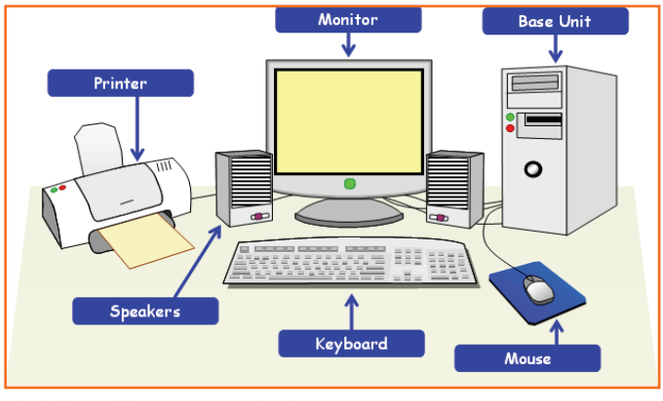


Fig.8.3.1: Different parts of a Computer

The chip set

The chip set aids communication between the CPU and the other components of the system, including main memory.

RAM (Random Access Memory)

RAM (Random Access Memory) stores all running processes (applications) and the current running OS.

The BIOS

The BIOS includes boot firmware and power management. The Basic Input Output System tasks are handled by operating system drivers.

Internal Buses

Internal Buses connect the CPU to various internal components and to expansion cards for graphics and sound.

Exercise

1. What is the full form of CPU?

   .....

   .....

2. What does the Chip Set do?

   .....

   .....

3. What is the full form of BIOS?

   .....

   .....

Notes

UNIT 8.4: Concept of Operating System

Unit Objectives

At the end of the unit, you will be able to:

- Familiarise with the concept of operating system.
- Work on Windows 8 and 8.1.
- Add or Remove desktop icons, make or delete a folder etc.

8.4.1 Windows XP

Windows XP is a personal computer operating system created by Microsoft as part of the Windows NT family of operating systems. Basically it lets you use different types of applications or software on the operating system For example, it allows you to use a word processing application to write a letter and a spread-sheet application to track your financial information. Windows XP is a graphical user interface (GUI).

Learn more about Windows XP by exploring it

There are various versions of Windows, when you install any version of Windows on your operating system it is called 'upgrade´ your system. Below are the images of different versions of windows for your more clarity.

Desktop: The desktop is your work surface in place of a physical workspace at home or work. It is the screen you see once your computer has finished booting up and you are ready to get started.

Wallpaper (Desktop Background): The image on your desktop is called Wallpaper or Desktop Background

Fig.8.4.1(a): Different versions of windows

8.4.2 Tools and Parts of an Operating System

Icons: The small pictures are shortcuts to programs called icons. Double-click icons to start a program. Clicking the Start button also shows a list of programs and other options on the computer.

Taskbar: The blue bar across the bottom of the screen is called the Task Bar.

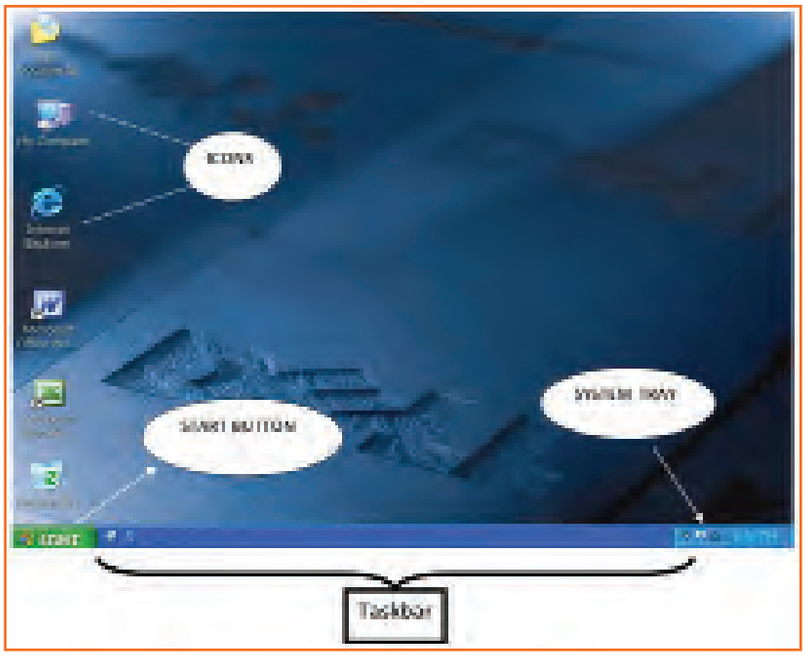


Fig.8.4.1(b): Windows XP Desktop

System Tray: It is an area where you can access programs that are running in the background. The more programs you have in this area, the longer it takes for the computer to boot up. The system tray of a desktop area has icons as shown in the image to indicate which programs are currently running in the background. Once you single click on the left-facing arrow button you would be able to open and see what else is there.

Volume Controls: The speaker icon will open the volume controls. Once you do the single click on an icon you can make a quick volume change. Click and drag on the bar to raise or lower the overall volume, or click in the check box to mute all sound as shown in the picture.

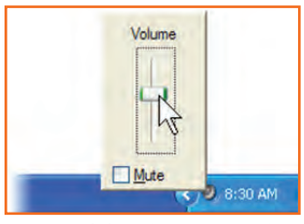


Fig.8.4.2(a): Volume Controler

To view sound settings, right click on the sound icon in task bar and left click on open volume control or double click on the sound icon. To change the volume settings, click and move the volume bars up and down in specific categories. To set volume balance, click and move balance bars right and left. To mute, click the check box below the volume categories.

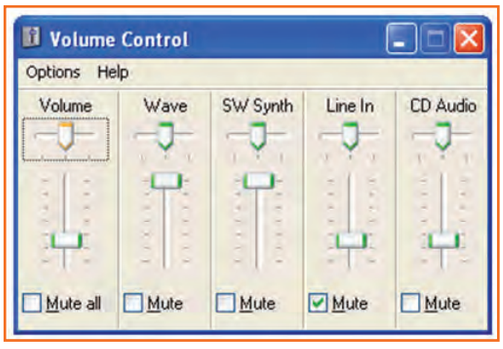


Fig.8.4.2(b): Volume Controler

External Hardware: You might run across this icon on your operating system frequently. This appears every time any piece of external hardware is plugged in. for e.g. USBs like pen drives, digital cameras, external hard drives, etc.

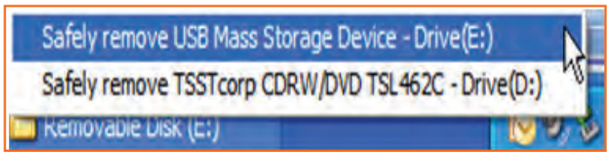


Fig.8.4.3: Removing External Drives

Fig.8.4.4: Message shown AfterRemoving External Drives

Windows Updates: A yellow shield with an exclamation mark on it will appear, if the computer has any updates from Microsoft to be downloaded. Make a single click on the icon to identify what needs to be done as shown in the picture, once you single click, your computer will walk you through the steps.

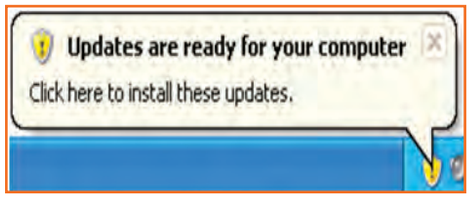


Fig.8.4.5: Message Windows Update

Power: There are 2 symbols for power one is a battery and the alternative is a power cord with a blue lightning bolt. The latter symbol means the laptop is plugged into the wall outlet and is charging. The battery symbol means the laptop is running purely off of batter Power.

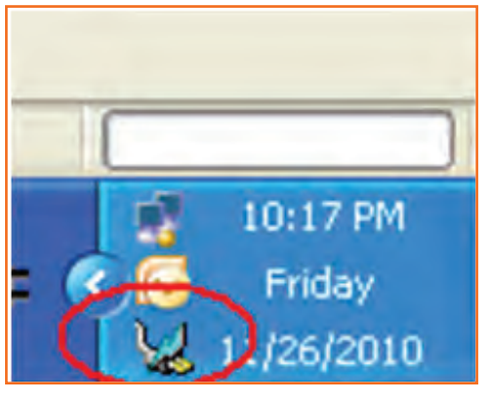


Fig.8.4.6: Icon Showing Charging on Laptop

Wireless: Laptop computers are capable of connecting to a wireless network to achieve access to the web. to connect to a network, right click on the wireless icon and select.

Fig.8.4.7: Wireless Network Icon

Fig.8.4.8: Network Selection Dialog

View Available Wireless Networks: In the Window that appears, select the network from the list that you just need to connect to and click on on the Connectbutton that may appear within the lower right corner.

8.4.3 Add or Remove Desktop Icons

You can add or delete Icons or Desktop Shortcuts from the Desktop area.

To add an Icon:

- **Step 1:** Click on the *Start* button.
- **Step 2:** Put your mouse over *All Programs*. A menu will appeat with all of your programs.
- **Step 3:** Go to the program that you want to create a shortcut for and *Right-click* on it. A menu will appear.
- **Step 4:** Point to *Send To.*
- **Step 5:** Left click on *Desktop (create shortcut*).

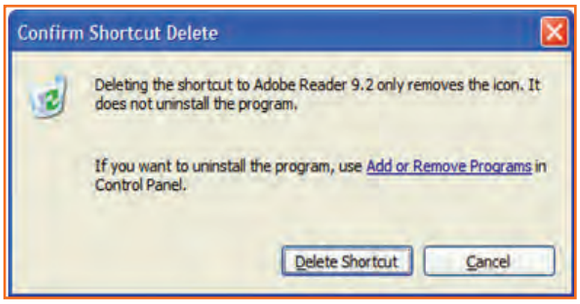


Fig.8.4.9: Delete Shortcut

To remove an icon:

- Left click on the icon.
- Hit the *Delete* button on your keyboard.
- When your computer asks if you are sure you would like to delete this program, click on the *Delete Shortcut* button. The window that popped up is called a Dialog Box.

Dialogue box: A dialog box is window that appears once your pc encompasses a question for you. Generally a dialog box appears just to tell you something. You must click on the OK button to acknowledge that you simply have scan the message before you'll be able to continue. For example:

- **Step 1:** Double click on the *My Documents* folder on the desktop.
- **Step 2:** Locate the folder titled *Travel Class*, and right click on it.
- **Step 3:** Left click on *Rename*.
- **Step 4:** Type *eBay* and press the enter key on the keyboard.
- **Step 5:** A dialog box will appear to inform you that you cannot rename the folder to "eBay" because an item by that name already exists.

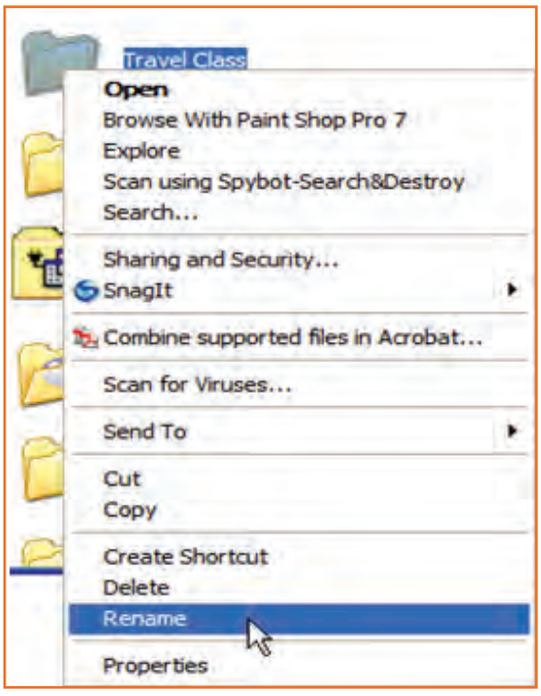


Fig.8.4.10: Rename File or Folder

8.4.4 Create a Folder

Some individuals wish to keep folders on their desktop to keeping vital files in. (You might also use the My Documents folder for this purpose.)

- **Step 1:** Find an empty area on your desktop with no icons or windows in the way.
- **Step 2:** Right click on the empty space.
- **Step 3:** Point to *New*. (You do not need to click.)
- **Step 4:** In the menu that pops out, left click on *Folder.*
- **Step 5:** Your new folder has been created and is waiting for a name. *Don't click!* Just start typing to give the folder a name.
- **Step 6:** When finished, hit the enter key on the keyboard or click beside the folder. Your new folder is ready to receive files.

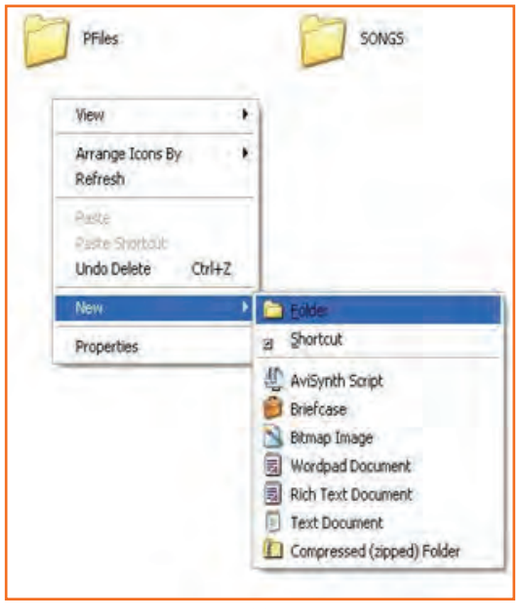


Fig.8.4.11: Create New Folder

8.4.5 Place Your Favorite Webpage as a Desktop Icon

You can create a shortcut of your favorite web page directly on your Desktop:

- **Step 1:** To create the shortcut, you must first open your Internet browser. (Double click on the Internet Explorer icon.).
- **Step 2:** Type in the web address of the page you want to view and hit the enter key on your keyboard.

Fig.8.4.12: I E Icon

- **Step 3:** Once the website is open, restore down the windows to that you can view the Desktop space partially behind the opened webpage.
- **Step 4:** Either, point your mouse at the icon to the left of the web address in the address bar as shown below. Hold down your left mouse button and drag the small icon onto empty space of your Desktop. Let go and a shortcut of your webpage will be created on your Desktop.

8.4.6 Managing Multiple Windows

Your taskbar area shows that windows are open, if you open a lot of windows from the same program, they're going to begin to stack up. Let's open a lot of windows and see what happens.

- **Step 1:** In Internet Explorer, click on the *File* menu and then on *New Window*.
- **Step 2:** In the *address bar* type Yahoo.com and hit the *enter key* on the keyboard.

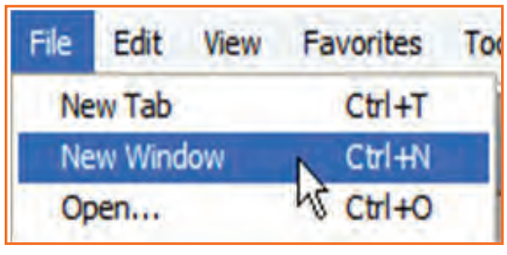


Fig.8.4.13: Create New Folder

- **Step 3:** Repeat the first two steps at least 5 times and go to different websites such as *Google.com, abc.com, nbc.com, msnbc.com, pbs.org, fox8.com, andwews.com*. Your taskbar will start to get full. Once you have seven windows open, they will all group together under one item.

Normally, if your things aren't grouped along, you would be able to select one item from the taskbar to navigate to that window. After they are all stacked, you have to click on the group and go from there.

- Left click on the group of stacked Internet Explorer windows in the taskbar to open the list.

Fig.8.5.14: Application Icons on Taskbar

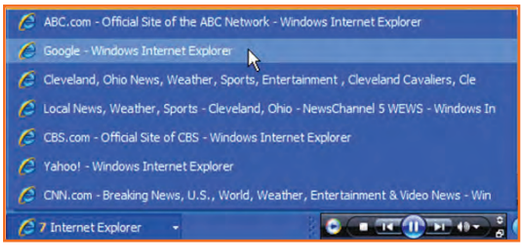


Fig.8.4.15: Multiple Windows of Application

8.4.7 The Keyboard

A computer keyboard is same as a typewriter keyboard with some extra keys.

Fig.8.4.16: A Simple Keyboard

The ESC key in the upper left corner will close any menus or dialogs you have opened but do not want to select an item from. (Try to open the Start menu and then click on the Esc key.)

The Function keys along the top of the keyboard each key has its special utilisation, often in conjunction with the ALT, CTRL or a combination of both keys, depending on the application you are using. F1 generally opens the program's Help options. It is different for every application.

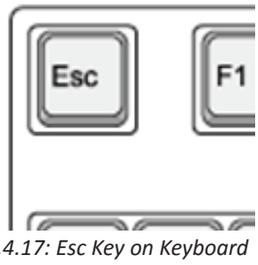


Fig.8.4.17: Esc Key on Keyboard

Fig.8.4.18: Function Keys on Keyboard

In the bottom left corner are three keys unique to the keyboard – CTRL, Windows, and ALT:

- **The CTRL key** is used in conjunction with other keys to perform various functions. (i.e. CTRL+P will open the print window when in Microsoft Word.)

- **The Windows key** works like pressing the Start button on the screen.
- **The ALT key** is another helper key used in conjunction with other keys.
- **The Caps Lock key** is used in typing. Pressing this key once will make all letters you type CAPITALIZED. Press the Caps Lock key again to turn typing into small letters.
- **The Shift key** is used in typing to make one capital letter. To capitalize a letter, press the Shift key and hold it down, then press the letter you want capitalized. Release the Shift key and continue to type.
- **Page Up** and **Page Down** move the cursor through a document page by page, either up or down.
- **The Arrow keys** help you move the cursor around the screen (when using a program like Microsoft Word) or across a line of text when typing in a text box.
- **The Insert key** is used when typing to replace words you have already typed.
- **The Delete key** removes text you have typed that is to the right of the cursor or to send selected items to the Recycle Bin.
- Pressing the **Home key** sends your cursor to the beginning of a line of text. Pressing the End key sends the cursor to the end of a line.
- To the right of the spacebar you see another **Alt key, Windows key, and Ctrl key**. Notice the new Application key. Pressing this key is the same as pressing the right mouse button (right clicking).
- **The Backspace** key removes text you have typed that is to the left of the cursor.
- **The Enter key** gives a new line (like a carriage return) when you are typing. At other times the Enter key works like a left mouse click.

8.4.8 Common Windows Commands

One feature of Windows is that there are usually some ways to perform an action. This table shows the Windows Command, with the Menu, Keyboard and Toolbar ways to inform the computer to perform that action.

Table: Common Window Commands

Key	Description
Alt + F	File menu options in current program
Alt + E	Edit options in current program
Alt + Tab	Switch between open programs
F1	Universal Help in almost every Windows program
F2	Rename a selected file
F5	Refresh the current program window
Ctrl + N	Create a new, blank document in some software programs
Ctrl + O	Open a file in current software program
Ctrl + A	Select all text
Ctrl + B	Change selected text to be Bold
Ctrl + I	Change selected text to be in Italics
Ctrl + U	Change selected text to be Underlined
Ctrl + F	Open find window for current document or window

Ctrl + S	Save current document file
Ctrl + X	Cut selected item
Shift + Del	Cut selected item
Ctrl + C	Copy selected item
Ctrl + Ins	Copy selected item
Ctrl + V	Paste
Shift + Ins	Paste
Ctrl + K	Insert hyperlink for selected text
Ctrl + P	Print the current page or document
Home	Goes to beginning of current line
Ctrl + Home	Goes to beginning of document
End	Goes to end of current line
Ctrl + End	Goes to end of document
Shift + Home	Highlights from current position to beginning of line
Shift + End	Highlights from current position to end of line
Ctrl + Left arrow	Moves one word to the left at a time
Ctrl + Right arrow	Moves one word to the right at a time
Ctrl + Esc	Opens the START menu
Ctrl + Shift + Esc	Opens Windows Task Manager
Alt + F4	Close the currently active program
Alt + Enter	Open the Properties for the selected item (file, folder, shortcut, etc.)

Fig.8.4.19: Some Important Keys and Their Uses

Exercise

1. Where is the taskbar located on your screen?

   .....

   .....

2. System Tray is an area where you can access programs that are running in the background?

   a) True

   b) False

3. To view sound settings, right click on the sound icon in task bar and left click on open volume control or double click on the sound icon.

   a) True

   b) False

4. When does the image appear on your screen?

   a) When any external hardware is inserted into the computer

b) When any external hardware is removed from the computer

5. Laptop computers are capable of connecting to a wireless network to gain access to the Internet.
   a) True
   b) False
6. You can add or delete Icons or Desktop Shortcuts from the Desktop area.
   a) True
   b) False
7. What is a dialogue box?

   .....

   .....
8. The ESC key in the upper right corner of your keyboard will
   a) Close any menu you don't need
   b) Open the start menu
   c) Shut down your laptop
9. The CTRL key is used in conjunction with other keys to perform various functions.
   a) True
   b) False
10. What happens if you press the Caps Lock key?
    a) All letters get capitalised
    b) All letter become small
    c) The first letter is capitalised
11. The Delete key is used to remove text you have typed that is to the right of the cursor or to send selected items to the Recycle Bin.
    a) True
    b) False
12. Which is the command to select 'all the text'
    a) Ctrl + C
    b) Ctrl + D
    c) Ctrl + A
    d) Ctrl + X

UNIT 8.5: MS Word

Unit Objectives

At the end of the unit, you will be able to:

- Learn the concept of and practice MS-Word.
- Format a document.
- Print a document etc.

Concepts of word processing - MS Word

Most people who use a computer daily use word processing skills. word processing skills enable us to prepare text documents like letters, memos, and different correspondence. most up-to-date word processing software package permits us to create text documents that embody photos and drawings.

Fig.8.5.1: MS Word Icon

8.5.1 Creating a Word Document

Once the document that has opened, type a short paragraph of why you are taking this mini- session. for example, are you new to Microsoft Word 2007 or are you up your software your skills? keep in mind to purposely misspell some words. Later in the session you'll use this paragraph to learn the way to spell check and use basic Word 2007 functions.

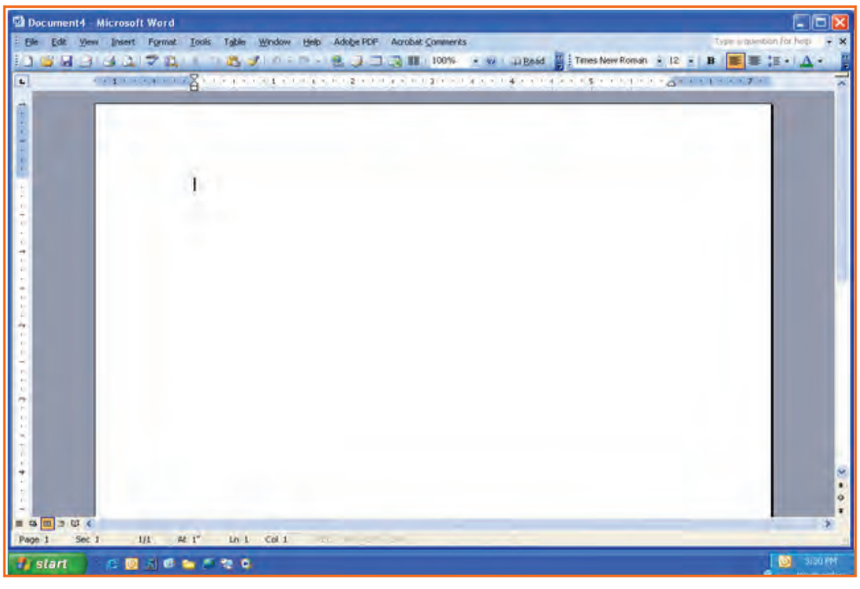


Fig.8.5.2: MS Word Window

The above image shows components of the Word window, that also contains a document in the window. This view displays rulers at the top and along the left aspect that indicate the size of the page.

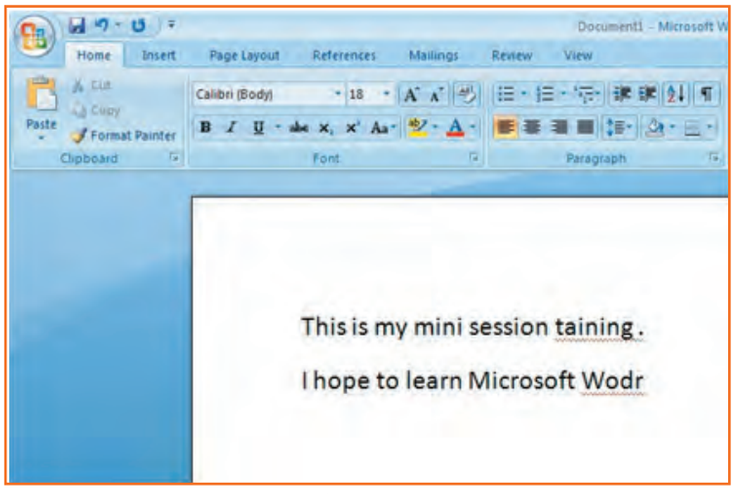


Fig.8.5.3: Writing Text in MS Word

8.5.2 Saving a Document

A Command is used for a first-time save or if you have created revisions to a document and want to replace the previous version with the new revised document. Use the 'Save as' command to save a revised document to a new name, so keeping the original as it was before revisions or to save a copy of a document in a different folder.

- **Step 1:** Save your document in the "My Documents" folder.
- **Step 2:** In the '*File Name*' box enter the document name.
- **Step 3:** Check to make sure in the '*Save As Type*' box the word document is (*.docx.)*.

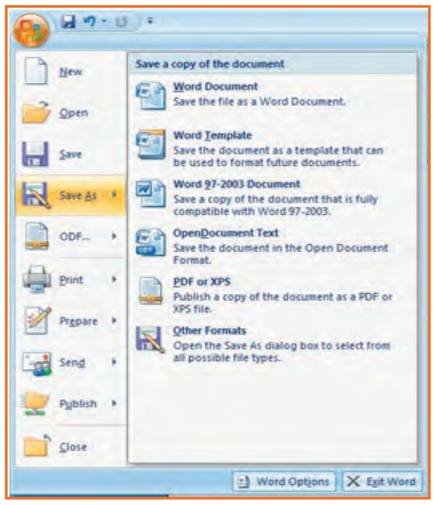


Fig.8.5.4: Saving a Document

8.5.3 Change Font Type and Size

As shown within the image below, the document that you have just created, you are currently going to format the font size and type different fonts and sizes can offer character to words in your document i.e. once you are creating your resume, you use bold as an 'eye-catcher' also, font size affects word characteristics.

1. **Step 1:** Highlight the text you wish to change the font and size for; in this practice highlight your name.
2. **Step 2:** Click on the font menu, select Theme font for e.g. Arial Black and then select the size of the font (let's say 16) as shown in the image below.

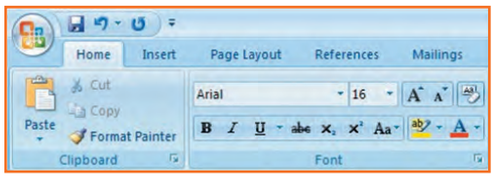


Fig.8.5.5: Change Font Type and Size

3. **Step 3:** Now click on SAVE in the Quick Access Toolbar to save your document (Refer to the second picture below, for saving your document).

8.5.4 Create Headers and Footers by Inserting Texts

Headers and Footers in the word document are needed to insert information like text, page numbers and date. Information on either header or footer can appear in all current document pages by default, you don't have to re-type in the header or the footer column once you add a new page to your current document. The header information appears at the top of the page whereas the footer information appears at the bottom of the page.

Follow to the simple steps and refer to the image below to make it work:

- **Step 1:** Click on the option 'insert' right next to 'Home' from the bar above the word page and select 'Header'.
- **Step 2:** Choose a style you like, (for now use blank).
- **Step 3:** Let's use your last name to fill it; now hit enter.
- **Step 4:** Add today's date and then highlight your last name and date.
- **Step 5:** Click on the Home tab from the menu.
- **Step 6:** Now select 'Home' from the bar and then click on 'left justification button'.
- **Step 7:** finally click 'close Header and Footer'.

NOTE: *the Header Menu will close and return you to your document to continue typing.*

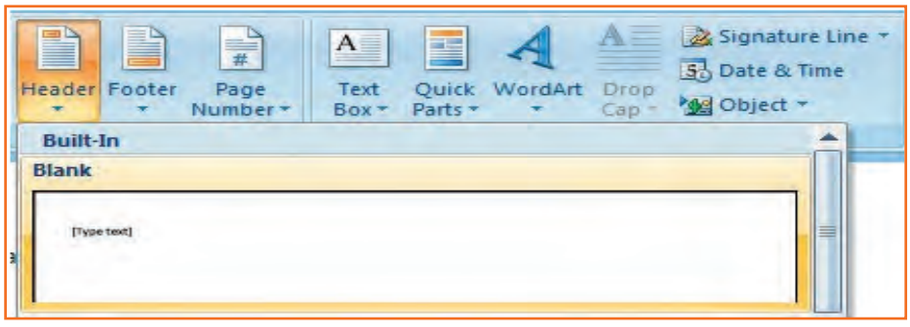


Fig.8.5.6: Headers and footers

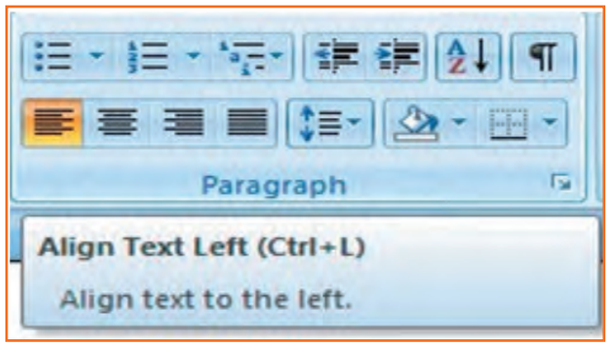


Fig.8.5.7: Formatting

8.5.5 Indents and Spacing

Spacing your word document in a right way!

To prepare project reports which needs paragraphs in double line spacing so it is very important to understand how you would be able to change the space between lines and paragraphs by doing the following:

1. **Step 1:** Select the paragraph or paragraphs you wish to change.
2. **Step 2:** Click on the Home Tab then click 'Paragraph' Dialog Box.
3. **Step 3:** Click the 'indents and spacing' Tab.
4. **Step 4:** In the 'Line Spacing' section, adjust your spacing accordingly.
5. **Step 5:** The image below shows visual version of how your page would like.

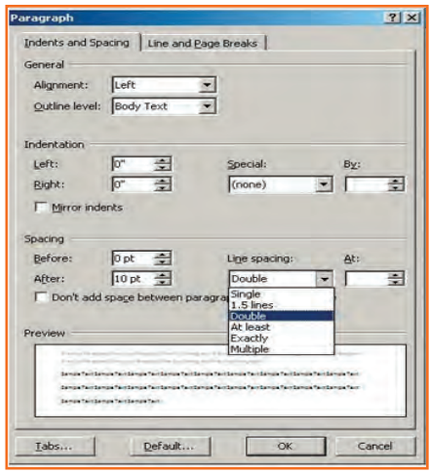


Fig.8.5.8: Indents and Spacing

8.5.6 Modifying Margins

MS-Word 2007 allows you to preview how your paper will look if the margins are modified. The page margins can be modified through the following steps:

- **Step 1:** Click the 'page layout' tab from the bar.
- **Step 2:** Now select 'Margins' from there.
- **Step 3:** Click a default margin Or,
- **Step 4:** Click custom margins and complete the dialog box.

NOTE: *As you roll over each Margin preset, it will show you how the document will look when it is modified.*

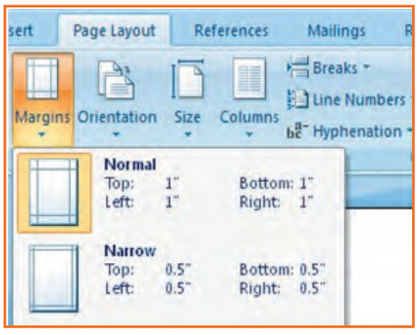


Fig.8.5.9: Modifying Margins

8.5.7 Lists

Lists enable you to format and organize text with numbers, bullets, or in an outline. instead of using numbers for steps, an outline list is used to show an example of a type of number lists.

8.5.7.1 Bulleted and Numbered Lists

Bulleted lists have bullet points, numbered lists have numbers, and outline lists combine numbers and letters depending on the organization of the list.

How to add list to the existing text?

1. **Step 1:** Select the text you wish to make a list.
2. **Step 2:** Click a bulleted or numbered lists button from the paragraph tab on the home tab.

Now, to create a new list in your document, place your cursor where you want the list to begin. Click a bulleted or numbered lists button and start typing.

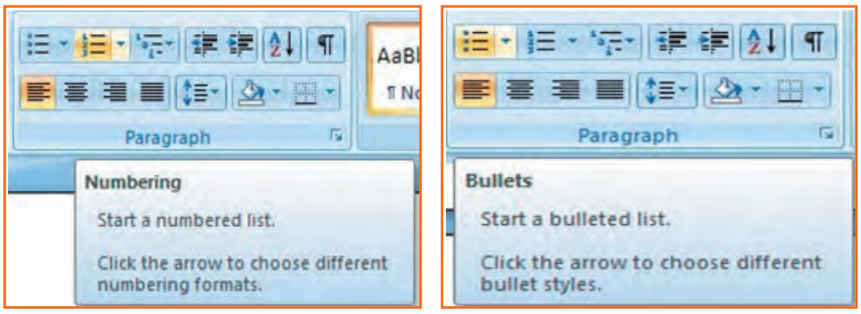


Fig.8.5.10: Bulleted and Numbered Lists

8.5.7.2 Formatting Lists

- **Step 1:** The bullet image and numbering format can be changed by using the bullets or numbering dialog box.
- **Step 2:** Select the entire list to change all the bullets or numbers, or place the cursor on one line within the list to change a single bullet.
- **Step 3:** Right click once.
- **Step 4:** Click the arrow next to the bulleted or numbered list.
- **Step 5:** Now, select a bullet or numbering style.

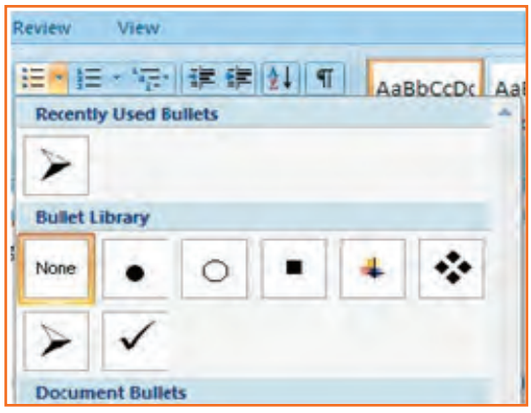


Fig.8.5.11: Formatting Lists

8.5.8 Spelling and Grammar

There are many features in Ms-Word 2007 to help you proof-read your document these features include:

- Spelling and Grammar
- Thesaurus
- AutoCorrect
- Default Dictionary
- Word Count

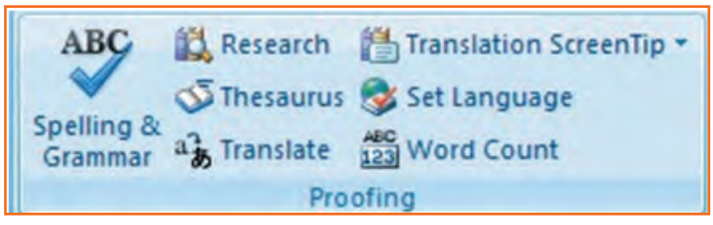


Fig.8.5.12(a): Spelling and Grammar

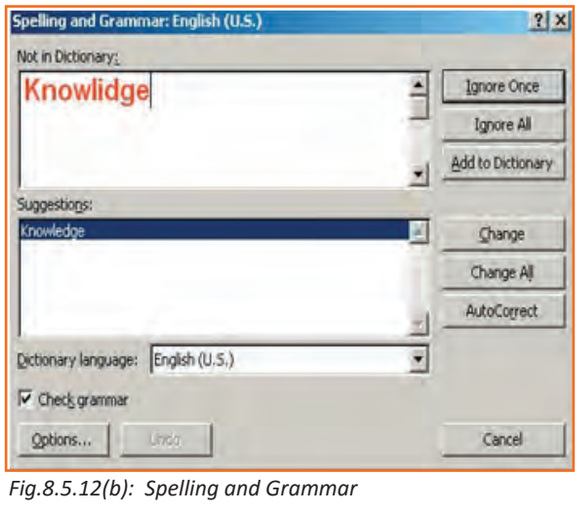


Fig.8.5.12(b): Spelling and Grammar

The most common feature used is the spelling and grammar checker tool. To check the spelling and grammar of your document:

1. **Step 1:** Place the cursor at the beginning of the document or the beginning of the section that you want to check.
2. **Step 2:** Click the 'Review' Tab on the Ribbon.
3. **Step 3:** Click 'Spelling & Grammar' on the Proofing Group.

Note: *Any errors will display a dialog box that permits you to choose a additional appropriate spelling or phrasing. Go through the spelling and grammar checker to correct any spelling errors you may have created in your document. Once the spelling and grammar checker has completed, you will see a dialog box that notifies you 'The spelling and grammar check is completed'.*

8.5.8.1 Word Count

To count words in one selection, you can select the words you want to count. The status bar displays the number of words in the section for e.g. 50/1,200 means that the section accounts for 50 words out of the total number of 1200 in the document.

Note: To select the sections of text that are not next to each other, select the first section and press hold down CRTL (from the keyboard) and select the additional section.

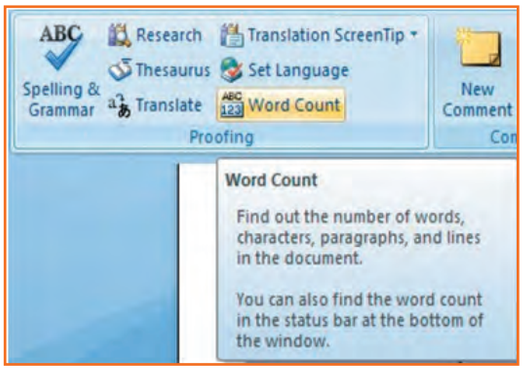


Fig.8.5.13(a): Word Count

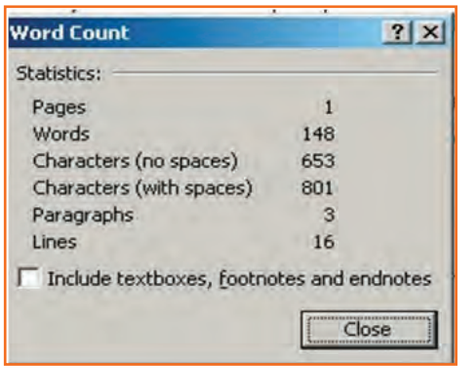


Fig.8.5.13(b): Word Count

8.5.9 Different Editing Modes in Word

Insert mode and an overtype mode. when insert mode (default) is active, the data you can type is inserted at the insertion point where as when over-type mode is active the information is active it isn't inserted however; t replaces text as you sort. to modify between the two modes double click o the OVR letters on the standing bar.

Another interesting fact about the word document is that it's not just a document to write things however you can add expression to your document by inserting pictures with the document, currently let's see however this will be done. invariably bear in mind to not use any copyright image if you are using any pictures from the internet.

The insert picture method supports graphics that may be are too large to fit on the clipboard. The default setting for inserting or pasting pictures is "In Line With Text." The Advanced Word options, located in the office Button Commands Gallery, allow you to change the default settings to any of the available text wrapping styles.

Fig.8.5.14: Sample Image

8.5.10 Inserting an Image and Table

1. **Step 1:** Place the insertion point at the location where the image has to be placed In the document.
2. **Step 2:** Select Insert tab>> illustrations gallery.
3. **Step 3:** Now select *Insert picture.*
4. **Step 4:** Navigate to the appropriate location where the image is stored.
5. **Step 5:** Now select the appropriate image which you want to insert in the document by doing a double click on the image.

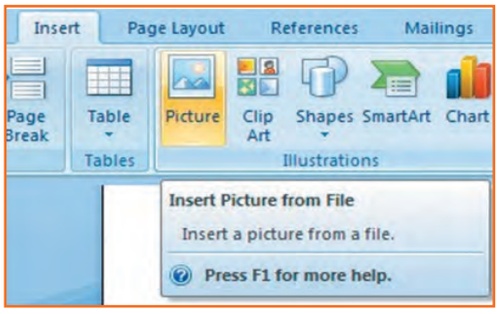


Fig.8.5.15 Inserting an Image

Similarly, now let's see how to insert a table in a word document

The table feature can be used to organize data into rows and columns without having to set tabs. Tables can even be used to produce forms and side by side paragraphs. A table consists of vertical columns and horizontal rows, the inter-section of these rows and columns produce cells. A cell is every individual square in which you'll be able to enter text. The tab key advances the pointer to next cell (Shift + tab) it moves the pointer backward within a table.

Fig.8.5.16(a): Inserting an Table

Steps below would make it much easier for you to understand how to create a table:

1. **Step 1:** Place the insertion point at the desired location on your word document.
2. **Step 2:** From the bar select Insert tab>>tables gallery.
3. **Step 3:** Now select insert table.
4. **Step 4:** Enter desired no. of columns and rows at insert table dialog box.
5. **Step 5:** Now select AutoFit behavior.
6. **Step 6:** Click OK.

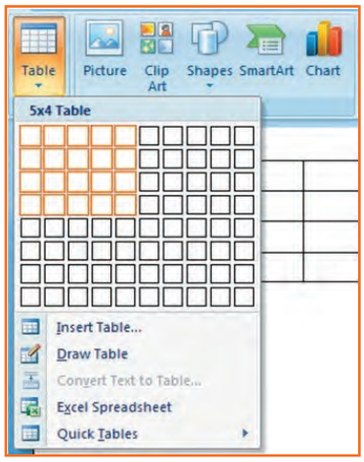


Fig.8.5.16(b): Inserting an Table

8.5.11 Inserting a Blank Page

The blank page command permits you to manually insert a blank page at the required location. When you fill a page with text or graphics, Microsoft office Word inserts an automatic page break and starts a new page. However, you'll manually add pages or delete pages by adding page breaks or deleting page breaks. refer to the image below.

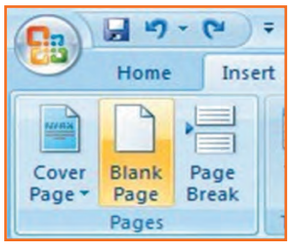


Fig.8.5.17: Inserting New Page

8.5.12 Inserting a Page Break

You can insert a page break anywhere in the document, or you can specify wherever Microsoft Word positions automatic page breaks. If you insert manual page breaks in documents that are quite many pages in length, you might have to frequently re-break pages as you edit the document. To avoid the difficult of manually re-breaking pages, you can set choices to control where word positions automatic page breaks. Refer to the image below.

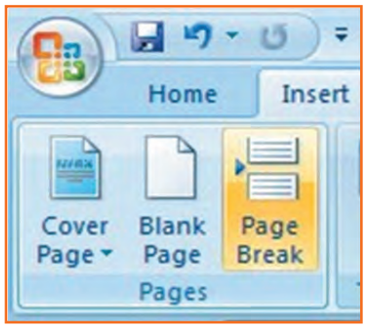


Fig.8.5.18: Inserting Page Break

8.5.13 Inserting a Cover Page

- **Step 1:** From the insert Tab, select Cover Page, the cover page drop down menu will be displayed.
- **Step 2:** Select from the pre-formatted options under Cover Page.
- **Step 3:** To insert a blank page or a page break, position your insertion point at a desired location.
- **Step 4:** Now, from the insert tab, select blank page or page break as shown in the image below.

Now, once the document is ready let's focusing on learning how to get the document in a hardcopy.

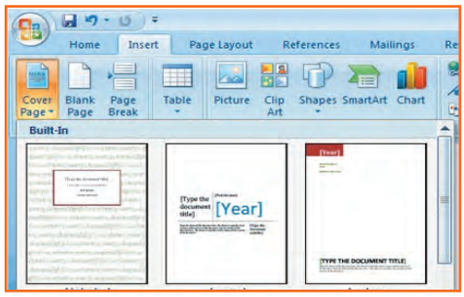


Fig.8.5.19: Inserting Cover Page

8.5.14 Printing the Word Document

1. **Step 1:** Click the 'Home' key, select 'Print', and then 'Print' again.
2. **Step 2:** Choose the printer you will be printing from (Black & White, or Color printer).
3. **Step 3:** Once you have selected the printer of your choice, reassure to check if you have selected the right and the complete document for printing.
4. **Step 4:** Once all above steps are performed, select 'OK' to print your work.
5. **Step 5:** Now that your document is ready and has been printed as well, let's see how can we close and exit this word document completely.

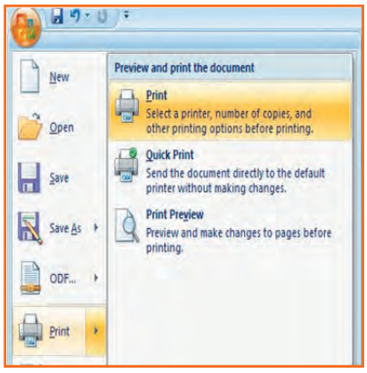


Fig.8.5.20: Printing the Word Document

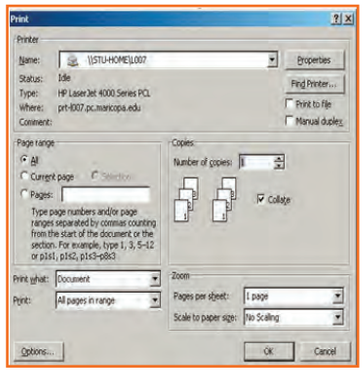


Fig.8.5.21: Print Dialog Box

8.5.15 Closing and Exiting Microsoft Word

It's always good to reassure that your word file has been saved before closing or exiting the word.

Note: *Closing word would only close the current document however the word would remain open.*

Exiting word would exit the program completely. (You may not have to follow this, it basically depends on what MS word you are having in the system).

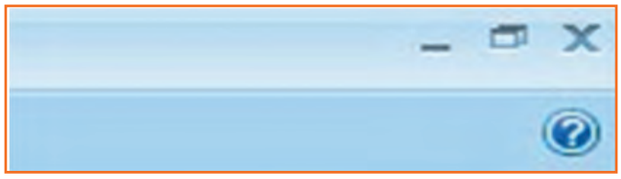


Fig.8.5.22(a): Closing and Exiting Microsoft Word

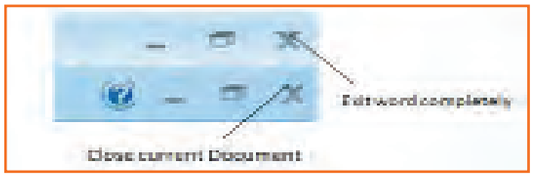


Fig.8.5.22(b): Closing and Exiting Microsoft Word

Exercise

1. What are things that MS word helps us with?

   .....

   .....

2. Give any two features to proof read a document?

   .....

   .....

3. You can insert a page break anywhere in the document, or you can specify where Microsoft Word positions automatic page breaks.

   a) True

   b) False

Notes

UNIT 8.6: MS PowerPoint

Unit Objectives

At the end of the unit, you will be able to:

- Practice MS-Powerpoint.
- Make a new presentation.
- Format a slide as well

PowerPoint is the presentation graphics software in the Microsoft Office suite. PowerPoint has predefined layouts, themes, and templates to create dynamic and professional presentations.

8.6.1 Opening PowerPoint

To open PowerPoint in Windows, click on the:

Step 1: Start button --> Programs --> Microsoft PowerPoint. *OR*

Step 2: Double-click on the PowerPoint icon on the desktop.

When PowerPoint is opened, by default a blank Title slide appears as the first slide in your new presentation. However, to change the layout of an open slide, click on the Layout button in the Home tab.

Fig.8.6.1: PowerPoint Icon

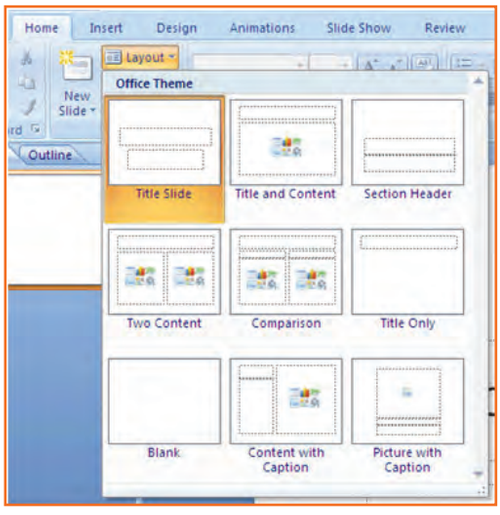


Fig.8.6.2: Layouts in PowerPoint

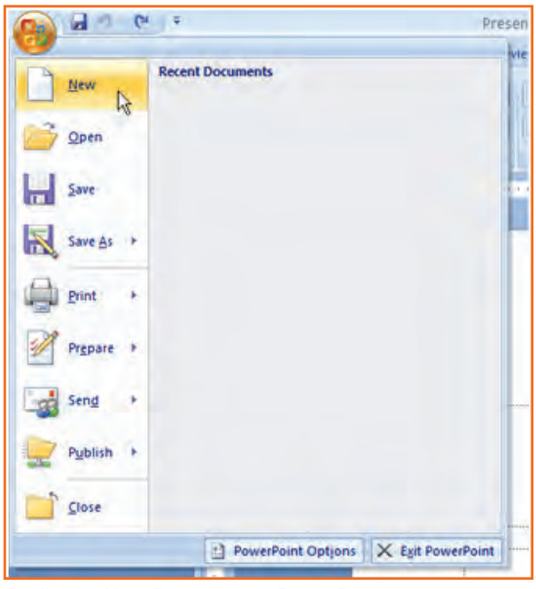


Fig.8.6.3: New Document in PowerPoint

If the PowerPoint is already open, to begin a new presentation, click on the office button on the top left corner of the screen and choose New.

The New Presentation window can appear. Blank presentation is chosen by default. you wish to click create and a new presentation can open in the PowerPoint window.

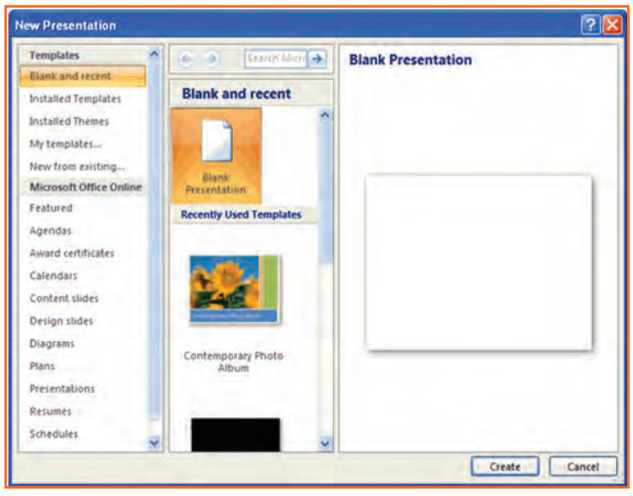


Fig.8.6.4: Create new PowerPoint

8.6.2 PowerPoint – Understanding the screen

- **Office Button:** It contains the main File Functions: New, Open, Save, Save as, Print, Print Preview, etc.
- **Ribbon Tabs:** Each Ribbon Tab displays a Ribbon that provides a set of Tool Groups. Click on the arrow to open a dialogue box with more options.
- **Command Tabs:** Office 2007 applications automatically open to the Home command tab, which contains formatting options needed to create a basic document. Specialized features can be accessed from other command tabs.
- **Slide and Outline Tabs:** The Slides tab shows thumbnail images of your slides, allowing you to rearrange, add, delete, hide slides and view set transitions as you work. The Outline tab shows the content of your slides, making it easy to rearrange your text.
- **Slide:** In this area you enter the content of your slides. Slides contain placeholders (enclosed by dotted borders) containing text, pictures, and charts.
- Notes Panel: This is where you can enter notes. If you wish to enter longer notes, you can go to the View tab and select Notes Page.
- **View Buttons:** These three buttons include:
  - » Normal View - shown here.
  - » Slide Sorter - This allows you to shuffle your slides.
  - » Slide Show - This shows the slides as viewed during presentation.
- **Zoom Slider:** This allows you to zoom in and out on the Slide Panel.

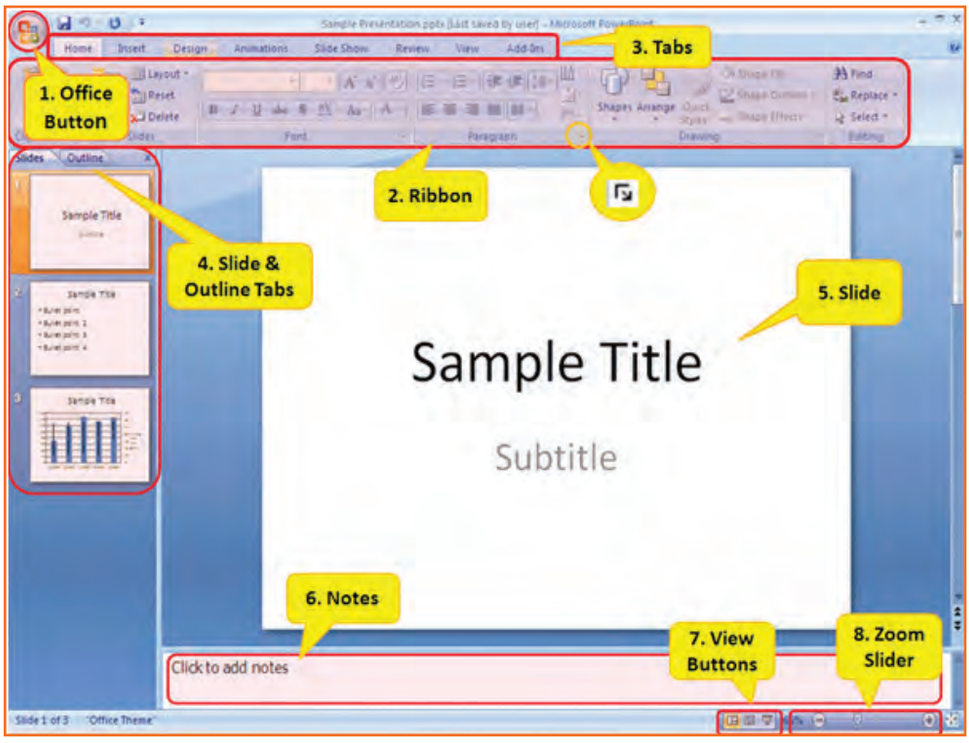


Fig.8.6.5: PowerPoint screen

8.6.3 Saving a PowerPoint

- Click the *Save* button on the *Quick Access toolbar*.

OR

- Click the *Microsoft Office Button* , and then click *Save As*.

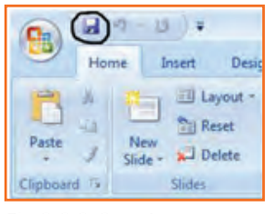


Fig.8.6.6: Save Icon

In the File name box, enter a new name for the presentation, or do nothing to accept the suggested file name.

In the Save as type list, select the file format that you want, and then click Save.

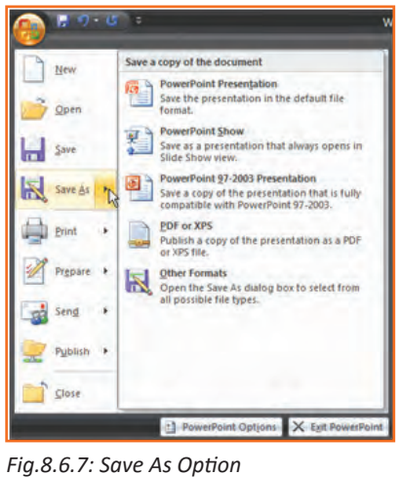


Fig.8.6.7: Save As Option

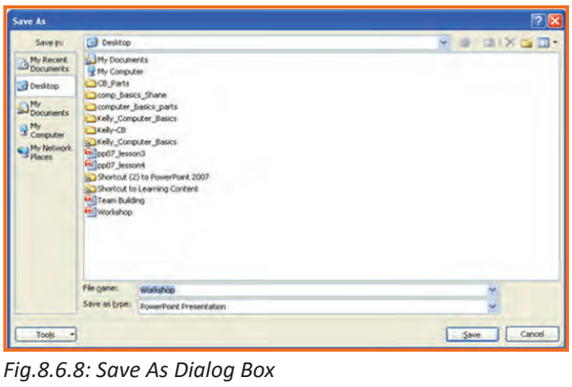


Fig.8.6.8: Save As Dialog Box

8.6.4 Working with Slides

Insert a New Slide

- **Step 1:** Click the New Slide command in the Slides group on the Home tab. A blank slide will be inserted after your active slide.
- **Step 2:** If you wish to choose the layout while creating your new slide, click the on the New Slide button and choose a theme.

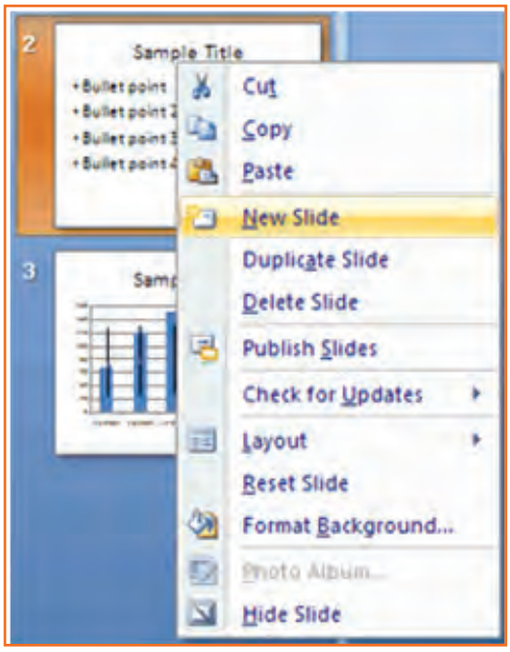


Fig.8.6.10: Insert new slide in PowerPoint

Fig.8.6.9: Insert new slide in PowerPoint

To insert a new slide using the Quick Menu, in the Slides panel right click the slide after which you want a new slide inserted and select New Slide.

Copy and paste a slide

- **Step 1:** Select the slide you want to copy.
- **Step 2:** Click the Copy command on the Home tab.
- **Step 3:** Click inside the Slides tab on the left task pane. A horizontal insertion point will appear.
- **Step 4:** Move the insertion point to the location where you want the copy of the slide to appear.
- **Step 5:** Click the Paste command on the Home tab. The copied slide will appear.
- **Step 6:** You can use the keyboard shortcut Ctrl+C to copy the slide and Ctrl+V to paste it.

Fig.8.6.11: Copy paste of slide

Delete a slide

- **Step 1:** Select the slide you want to delete and click the Delete command in the Slides group on the Home tab.

Move a slide

- **Step 1:** On the Slides tab in the left task pane, select the slide you want to move.
- **Step 2:** Click and drag the slide to a new location. The insertion point will appear.
- **Step 3:** Release the mouse button.
- **Step 4:** The slide will appear in the new location.

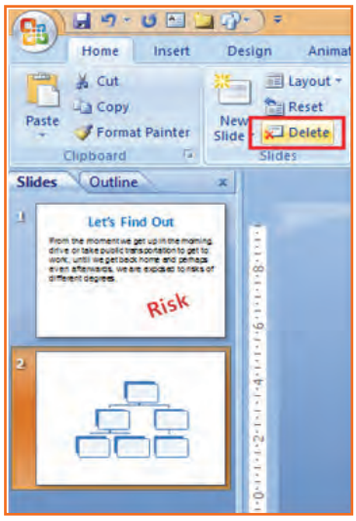


Fig.8.6.12: Delete a slide

8.6.5 View Tabs

Different views allow you to manage different aspects of your presentation.

- **Step 1:** Normal View is the default view. It splits the window into Slide Frame, Notes, and the left frame where you can choose either Slides Thumbnails or Outline.
- **Step 2:** Slide Sorter is thumbnails view of all the slides in the presentation. The slides are displayed horizontally and lets you see the big picture.
- **Step 3:** Slide Show plays the presentation from the beginning with animation.

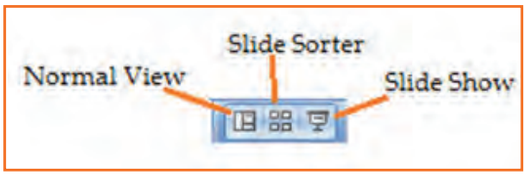


Fig.8.6.13: View Tabs

8.6.6 Animating Text and Images

In PowerPoint, you can add animation to text and objects to draw the audience's attention an add flair to your presentation.

- **Step 1:** Select the object or text box you wish to animate.
- **Step 2:** In the Animations tab under the Animations group, select an option from the Animate drop-down menu. As you hover your mouse over each choice PowerPoint will preview the effect on your slide.

NOTE: *Remember that animations are applied only to the article or the text box selected . For adding animation across many slides you may need to add them to every.*

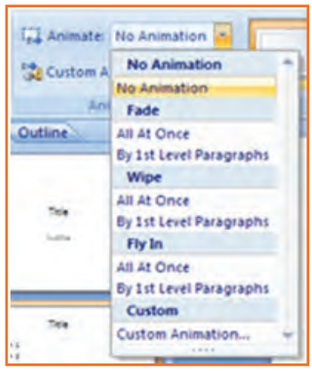


Fig.8.6.14: Animating Text and Images

To apply a custom animation effect:

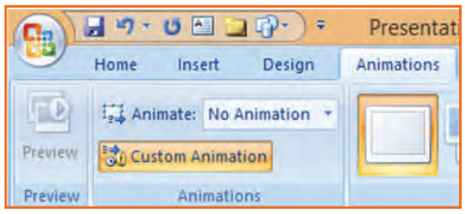


Fig.8.6.15: Adding Animation in PowerPoint

- **Step 1:** After you select the text or object on the slide you want to animate, select the Animations tab.
- **Step 2:** Click Custom Animation in the Animations group. The Custom Animation task pane will appear on the right.
- **Step 3:** Click Add Effect in the task pane to add an animation effect to the selected text or object.

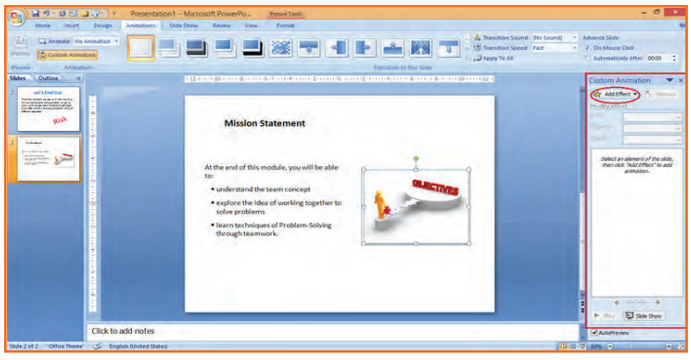


Fig.8.6.16: Animation in PowerPoint

- **Step 4:** Select Entrance, Emphasis, Exit, or Motion Path to display a submenu of animation effects for the category.
- **Step 5:** To customize the speed, properties and timing of your animation, on the Custom Animation Pane click on the effect you wish to modify.
- **Step 6:** To modify an animation, use the options in the Modify: [Effect] section of the Custom Animation Pane. These options will change depending on the effect selected.

Hint: *If the button on the Custom Animation Pane says "Change" instead of "Add Effect" click outside the object to deselect it and then click on it again.*

8.6.7 Removing Animations

There are two methods:

1. Animations group (remove all at once):
   - » Select the slide and then the object with the animation you would like to remove.
   - » In the Animations tab under the Animations group click on the Animate pull-down menu and select No Animation.
2. Custom Animation Pane (remove one by one):
   - » Select the slide with the animation you would like to remove.
   - » If the Custom Animations pane is not visible, click on the Custom Animation button in the Animations group on the Animations tab.
   - » In the Modify: [Effect] list select the animation to be removed.
   - » Click Remove.

8.6.8 Working with Charts

A chart is a tool you can use to communicate your data graphically.

Chart elements

Let's familiarize with different chart element:

- **Titles:** There are two types of titles:
  - » Chart Title placed above the chart (default).
  - » Axes Titles placed besides the axes (The vertical axis is referred to as the Y axis, while the horizontal axis is referred to as the X axis.)
- **Legend:** The chart key, which displays captions (and/or color coding) to the series on the chart.
- **Data:** This is the range of cells (displayed in excel) that make up a chart. The chart is updated automatically whenever the information in these cells changes.

Inserting Charts

- **Step 1:** Select the Insert tab.
- **Step 2:** Click the Insert Chart command to open the Insert Chart dialog box.
- **Step 3:** Click a chart to select it.
- **Step 4:** The chart will appear on your slide, and Excel will open as a split screen with dummy data already filled in.
- **Step 5:** You add your data and labels to the Excel spreadsheet and the chart will be automatically updated on your slide.

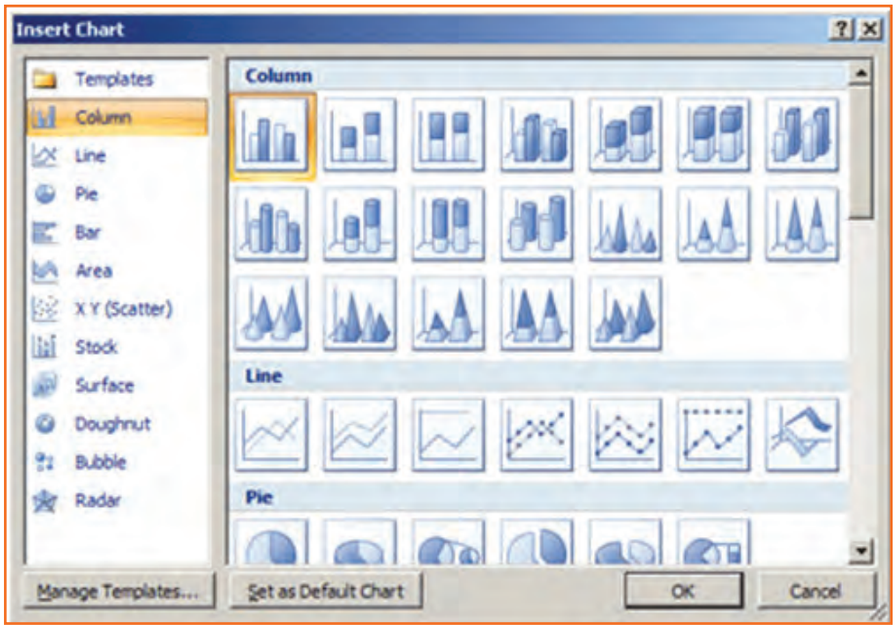


Fig.8.6.17: Inserting Charts

- **Step 6:** When finished, click the Close Window in the upper right hand corner of Excel to close the worksheet.

Changing To a Different Chart

- **Step 1:** You can change your present chart to a different format by right-click on the chart and select Change Series Chart Type. This opens the Change Chart Type dialog.
- **Step 2:** Make a selection and press OK.

Edit source data

Fig.8.6.18: Edit source data

- **Step 1:** Select the chart.
- **Step 2:** Select the Design tab.
- **Step 3:** Click the Edit Data command. An Excel spreadsheet with the current source data will appear.
- **Step 4:** After you edit the data in the spreadsheet, the changes will appear on the slide.
- **Step 5:** Close Excel without saving the spreadsheet.

Fig.8.6.19: Change Chart Type

Modifying the chart layout

- **Step 1:** Select the chart.
- **Step 2:** Click on the Design tab.
- **Step 3:** Scroll through the options in the Chart Layout group, or click the More drop-down arrow to see all available chart layout options.
- **Step 4:** Select a chart layout by clicking on it. The chart layout will change on the slide.

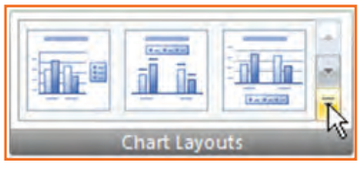


Fig.8.6.20: Chart Layouts

Modify specific areas of the chart layout

- **Step 1:** Select the chart.
- **Step 2:** Select the Layout tab.
- **Step 3:** Locate the Labels group.
  - » Chart Title: Add, remove, or re-position the chart title.
  - » Axis Titles: Add, remove, or re-position the text used to label each axis.
  - » Legend: Add, remove, or re-position the chart legend.
  - » Data Labels: Click this command to display or hide data values next to each chart element.
  - » Data Table: Adds a table summarizing your data to the chart.

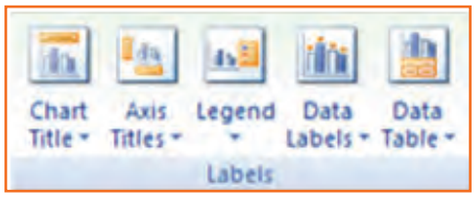


Fig.8.6.21: Modify Chart

Exercise

1. What does the office button in Power Point contain?

   .....

   .....

2. What is the Notes Panel?

   a) It's a new slide

   b) It's where you can enter notes on the slide

3. What are the three kind of 'view buttons'?

   .....

   .....

4. You can change your present chart to a different format by right-click on the chart and select Change Series Chart Type.

   a) True

   b) False

Notes

UNIT 8.7: MS Excel

Unit Objectives

At the end of the unit, you will be able to:

- Work on MS-Excel
- Format cells and cell content
- Use formulas
- Make Charts and Pivot Table.

MS surpass stands for - Microsoft excel is one of the foremost common electronic spreadsheet applications supported by both mack and computer platforms. as with a paper spreadsheet, you'll be able to use excel to prepare your data into rows and columns and to perform mathematical calculations.

MS Excel helps in:

- Managing data online
- Creating visually persuasive charts, and thought-provoking graphs.
- Creating and expense reports.
- Building formulas and editing them.
- Balancing a checkbook.

Fig.8.7.1: MS Excel Icon

Thia tutorial teaches you how to create an Excel spreadsheet.

Before you start making spreadsheets in excel, you will need to line up your excel setting and become familiar with many key tasks and options like a way to minimize and maximize the Ribbon, configure the quick Access toolbar, switch page views, and access your excel choices.

8.7.1 Exploring the Excel Environment

The tabbed Ribbon menu system is however you navigate through excel and access the assorted excel commands. If you have used previous versions of excel, the Ribbon system replaces the traditional menus. on top of the Ribbon in the upper-left corner is the Microsoft office Button. From here, you'll access important options like New, Save, Save As, and Print. By default, the short Access Toolbar is pinned next to the Microsoft office Button and includes commands like Undo and Redo.

At the bottom-left space of the spreadsheet, you will notice worksheet tabs. By default, 3 worksheet tabs appear each time you create a new book. On the bottom-right space of the spreadsheet you will find page view commands, the zoom tool and the horizontal scrolling bar.

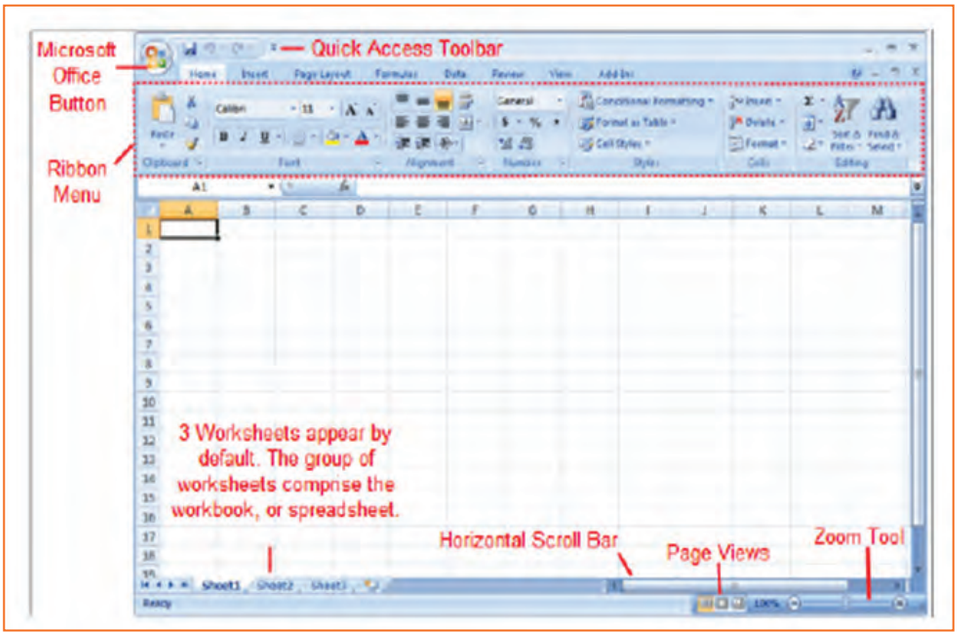


Fig.8.7.2: Excel screen

8.7.2 Zoom In and Out

- **Step 1:** Locate the zoom bar in the bottom-right corner.
- **Step 2:** Left-click the slider and drag it to the left to zoom out and right to zoom in.

To Scroll Horizontally in a Worksheet:

- **Step 1:** Locate the horizontal scroll bar in the bottom-right corner.
- **Step 2:** Left-click the bar and move it from left to right.

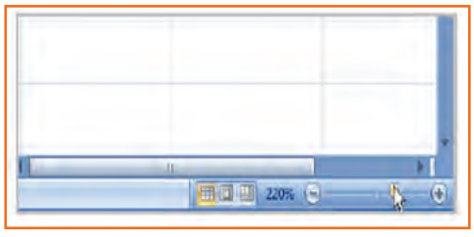


Fig.8.7.3: Zoom In and Out

8.7.3 Page Views

- **Step 1:** Locate the Page View options in the bottom-right corner. The Page View options are Normal, Page Layout, and Page Break.
- **Step 2:** Left-click an option to select it.

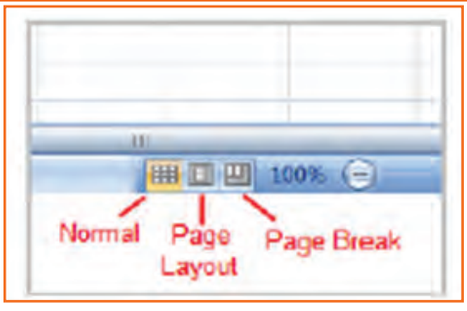


Fig.8.7.4: Page Views

8.7.4 Add Commands to the Quick Access Toolbar

- **Step 1:** Click the arrow to the right of the Quick Access toolbar.
- **Step 2:** Select the command you wish to add from the drop-down list. It will appear in the Quick Access toolbar.

The Save, Undo, and Redo commands appear by default in the Quick Access toolbar.

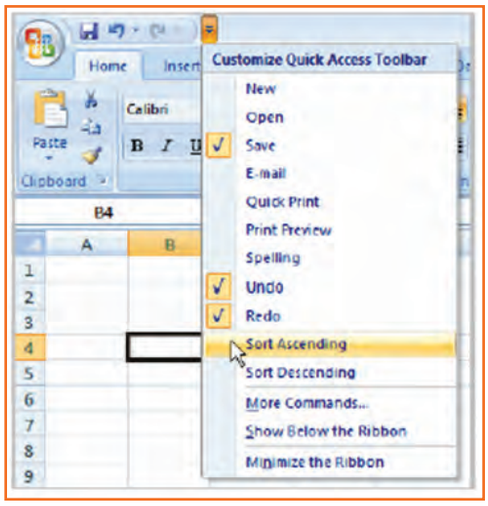


Fig.8.7.5: Quick Access Toolbar

Fig.8.7.6: The Microsoft Office Button

The Microsoft Office Button

The Microsoft office Button appears at the top of the stand out window. once you left-click the button, a menu appears. From this menu, you'll be able to produce a new spreadsheet, open existing files, save files in a type of ways and print. you'll be able to also add security features, send, publish and close files.

8.7.5 Change the Default Excel Options

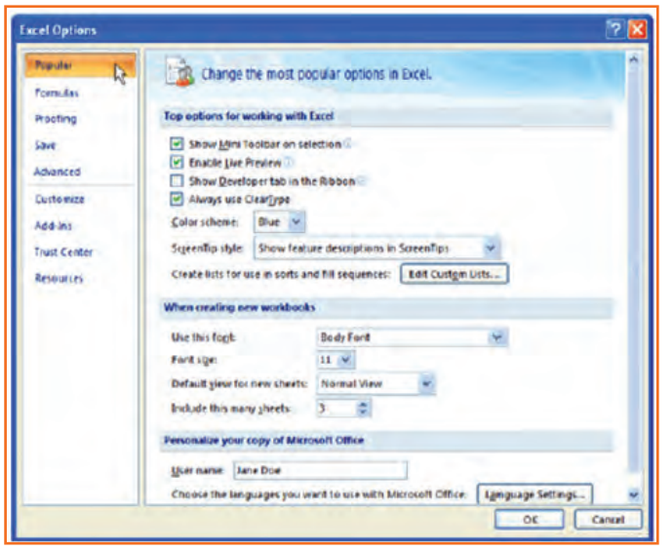


Fig.8.7.7: Default Excel Options

- **Step 1:** Click the Excel Options button. A dialog box will appear.
- **Step 2:** Select a category on the left to access different Excel options.
- **Step 3:** Modify any of the default settings.
- **Step 4:** Click OK.

You will have to be compelled to skills to insert text and numbers into excel workbooks to be ready to use it to calculate, analyze, and organize data. during this lesson, you will learn how to create a new workbook, insert and delete text, navigate a worksheet and save an excel workbook.

8.7.6 Create a New Blank Workbook

- **Step 1:** Left-click the *Microsoft Office Button*.
- **Step 2:** Select *New*. The New Workbook dialog box opens, and Blank Workbook is highlighted by default.
- **Step 3:** Click *Create*. A new, blank workbook appears in the window.

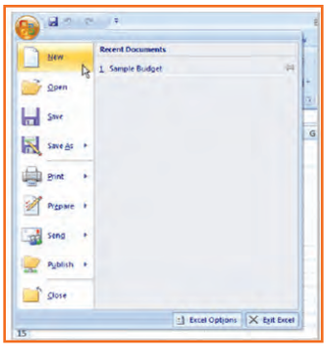


Fig.8.7.8: New Blank Workbook

8.7.7 Insert Text

- **Step 1:** Left-click a cell to select it. Each rectangle in the worksheet is called a cell. As you select a cell, the cell address appears in the Name Box.
- **Step 2:** Enter text into the cell using your keyboard. The text appears in the cell and in the formula bar.

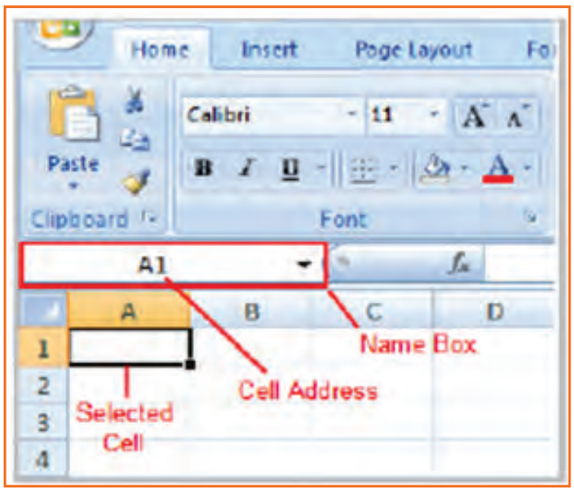


Fig.8.7.9(a): Different Areas on Worksheet

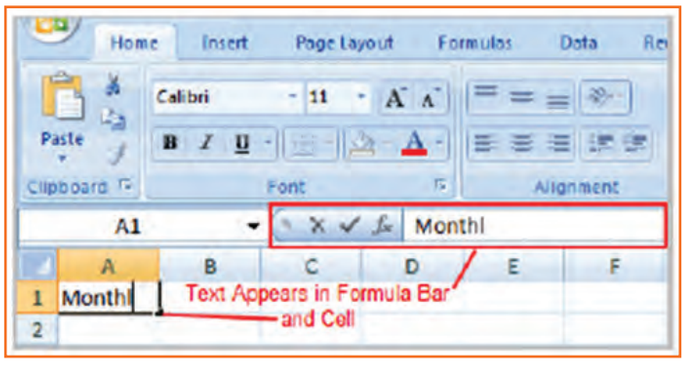


Fig.8.7.9(b): Different Areas on Worksheet

8.7.8 Cell Addresses

Each cell contains a name, or a cell address, based on the column and row it is in. for example, this cell is C3 since it is wherever column C and row 3 intersect.

You can also select multiple cells at the same time. a group of cells is known as a cell range. instead of a single cell address, you will refer to a cell range using the cell addresses of the first and last cells in the cell range, separated by a colon. as an example, a cell range that included cells A1, A2, A3, A4, and A5 would be written as A1:A5.

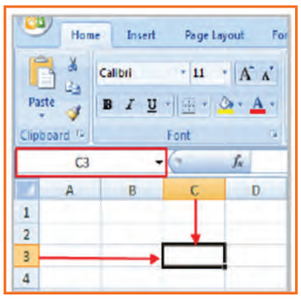


Fig.8.7.10: Cell Address

Edit or Delete Text

- **Step 1:** Select the cell.
- **Step 2:** Press the Backspace key on your keyboard to delete text and make a correction.
- **Step 3:** Press the Delete key to delete the entire contents of a cell.

You can also make changes to and delete text from the formula bar. Just select the cell and place your insertion point in the formula bar.

8.7.9 Move across a Worksheet Using the Keyboard

- **Step 1:** Press the Tab key to move to the right of the selected cell.
- **Step 2:** Press the Shift key and then the Tab key to move to the left of the selected cell.
- **Step 3:** Use the Page Up and Page Down keys to navigate the worksheet.
- **Step 4:** Use the arrow keys.

To Save the Workbook:

- **Step 1:** Left-click the Microsoft Office Button.
- **Step 2:** Select Save or Save As.
- **Step 3:** Save As allows you to name the file and choose a location to save the spreadsheet. Choose Save As if you'd like to save the file for the first time or if you'd like to save the file as a different name.
- Select Save if the file has already been named.

You can save a workbook in many ways, but the two commonest are as an excel workbook, that saves it with a 2007 file extension, and as an excel 97-2003 workbook, that saves the file in a compatible format therefore those who have earlier versions of excel can open the file.

When you open a new, blank workbook, the cells, columns, and rows are set to a default size. you do have the ability to alter the size of each, further as to insert new columns, rows, and cells as needed.

To Modify Column Width:

- **Step 1:** Position the cursor over the column line in the column heading and a double arrow will appear.
- **Step 2:** Left-click the mouse and drag the cursor to the right to increase the column width or to the left to decrease the column width.
- **Step 3:** Release the mouse button.

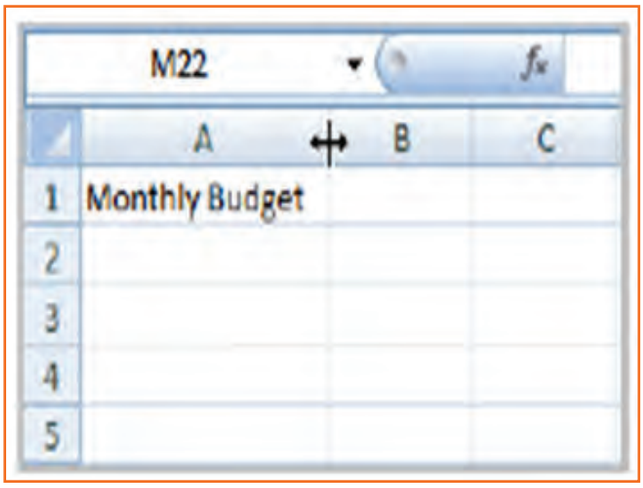


Fig.8.7.11: Modify Column Width

To Modify the Row Height:

- **Step 1:** Position the cursor over the row line you want to modify, and a double arrow will appear.
- **Step 2:** Left-click the mouse and drag the cursor upward to decrease the row height or downward to increase the row height.
- **Step 3:** Release the mouse button.

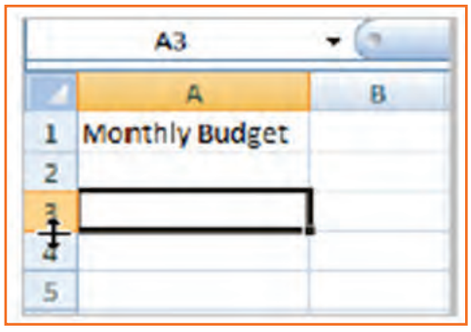


Fig.8.7.12: Modify the Row Height

To Insert Rows:

- **Step 1:** Select the row below where you want the new row to appear.
- **Step 2:** Click the Insert command in the Cells group on the Home tab. The row will appear.
- **Step 3:** The new row always appears above the selected row.

Make sure that you} choose the complete row below where you wish the new row to appear and not just the cell. If you select simply the cell and then click Insert, only a new cell can appear.

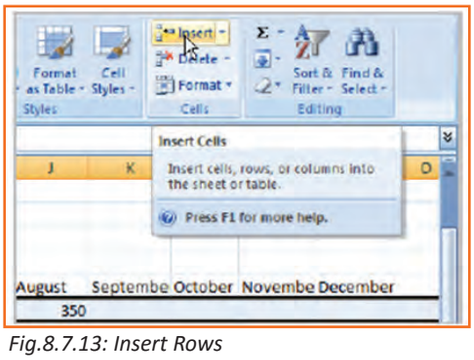


Fig.8.7.13: Insert Rows

To Insert Columns:

- **Step 1:** Select the column to the right of where you want the column to appear.
- **Step 2:** Click the Insert command in the Cells group on the Home tab. The column will appear.

The new column continually appears to the left of the selected column. for example, if you wish to insert a column between september and october, choose the october column and click on the Insert command.

Make sure that you select the complete column to the right of where you want the new column to appear and not just the cell. If you choose simply the cell and then click Insert, only a new cell can appear.

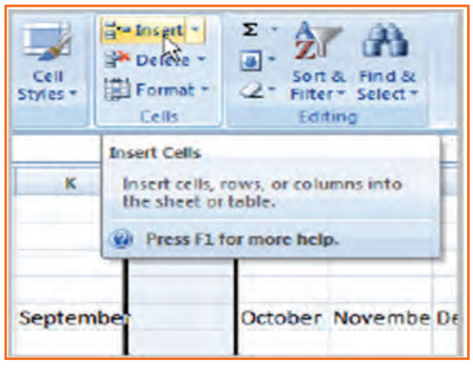


Fig.8.7.14: Insert Columns

To Delete Rows and Columns:

- **Step 1:** Select the row or column you'd like to delete.
- **Step 2:** Click the Delete command in the Cells group on the Home tab.

8.7.10 Formatting

Once you have entered information into a spreadsheet, you will need to be able to format it.

To Format Text in Bold or Italics:

- **Step 1:** Left-click a cell to select it or drag your cursor over the text in the formula bar to select it.
- **Step 2:** Click the Bold or Italics command.

You can select entire columns and rows, or specific cells. to select the entire column, simply left-click the column heading, and the entire column can appear as selected. to select specific cells, simply left-click a cell and drag your mouse to select the opposite cells. Then, release the mouse button.

Fig.8.7.15: Format Text in Bold or Italics

To Format Text as Underlined:

- **Step 1:** Select the cell or cells you want to format.
- **Step 2:** Click the drop-down arrow next to the Underline command.
- **Step 3:** Select the Single Underline or Double Underline option.

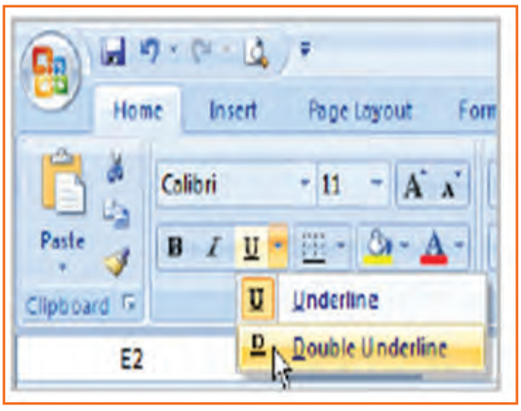


Fig.8.7.16: Format Text as Underlined

To Change the Font Style:

- **Step 1:** Select the cell or cells you want to format.
- **Step 2:** Left-click the drop-down arrow next to the Font Style box on the Home tab.
- **Step 3:** Select a font style from the list.

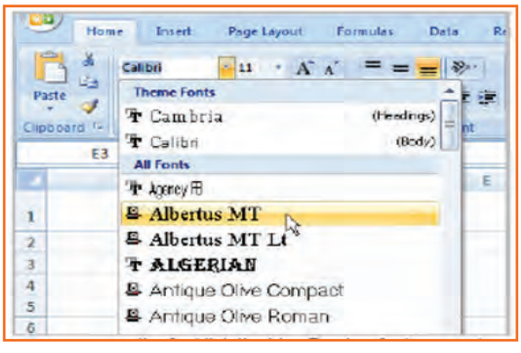


Fig.8.7.17: Change the Font Style

To Change the Font Size:

- **Step 1:** Select the cell or cells you want to format.
- **Step 2:** Left-click the drop-down arrow next to the Font Size box on the Home tab.
- **Step 3:** Select a font size from the list.

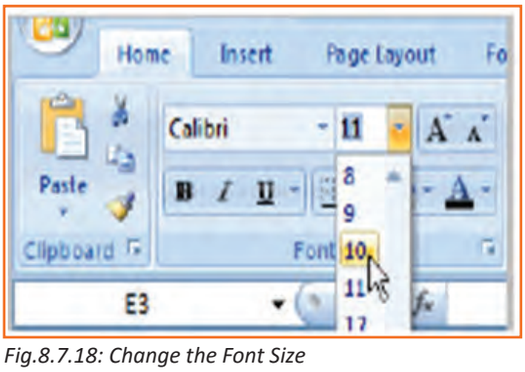


Fig.8.7.18: Change the Font Size

To Change the Text Color:

- **Step 1:** Select the cell or cells you want to format.
- **Step 2:** Left-click the drop-down arrow next to the Text Color command. A color palette will appear.
- **Step 3:** Select a color from the palette.

OR

- **Step 1:** Select More Colors. A dialog box will appear.
- **Step 2:** Select a color.
- **Step 3:** Click OK.

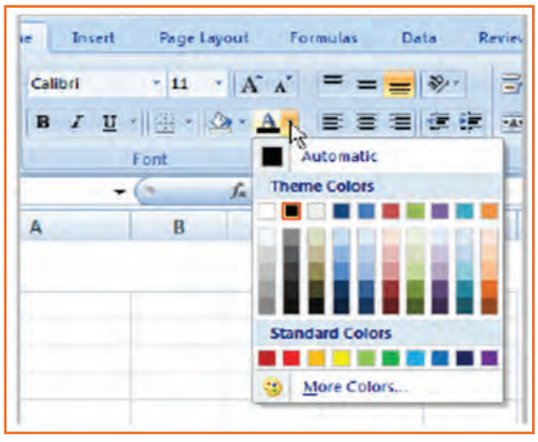


Fig.8.7.19: Change the Text Color

To Add a Border:

- **Step 1:** Select the cell or cells you want to format.
- **Step 2:** Click the drop-down arrow next to the Borders command on the Home tab. A menu will appear with border options.
- **Step 3:** Left-click an option from the list to select it.

You can change the line style and color of the border.

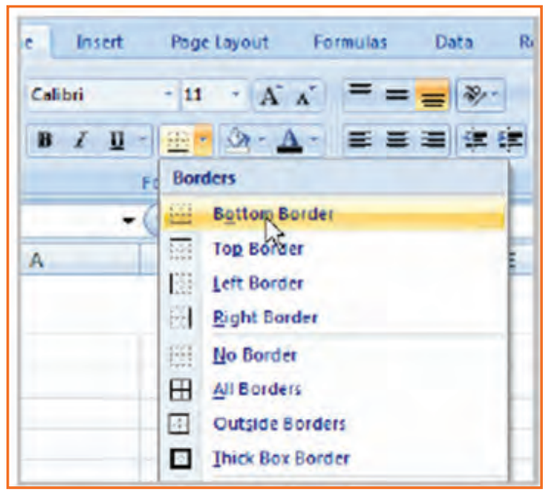


Fig.8.7.20: Add a Border

To Add a Fill Color:

- **Step 1:** Select the cell or cells you want to format.
- **Step 2:** Click the Fill command. A color palette will appear.
- **Step 3:** Select a color.

OR

- **Step 1:** Select More Colors. A dialog box will appear.
- **Step 2:** Select a color.
- **Step 3:** Click OK.

You can use the fill color feature to format columns and rows, and format a worksheet so that it is easier to read.

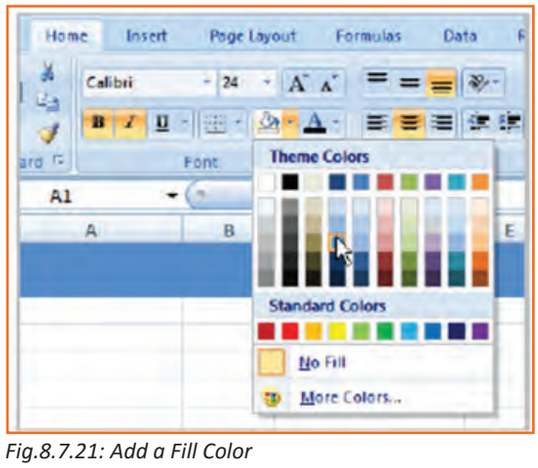


Fig.8.7.21: Add a Fill Color

To Format Numbers and Dates:

- **Step 1:** Select the cell or cells you want to format.
- **Step 2:** Left-click the drop-down arrow next to the Number Format box.
- **Step 3:** Select one of the options for formatting numbers.

By default, the numbers appear in the General category, which means there is no special formatting.

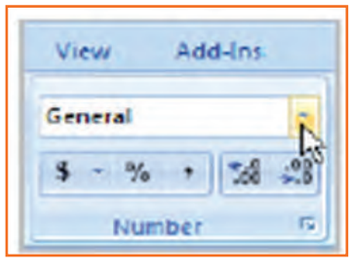


Fig.8.7.22: Format Numbers and Dates

8.7.11 Calculations and Analysis

Excel could be used to calculate and analyze numerical data; however, you need to know how to write formulas to maximize Excel's streangth. A formula is an equation perform a calculation using cell values in the worksheet.

To Create a Simple Formula that Adds Two Numbers:

- **Step 1:** Click the cell where the formula will be defined (C5, for example).
- **Step 2:** Type the equals sign (=) to let Excel know a formula is being defined.
- **Step 3:** Type the first number to be added (e.g., 1500).
- **Step 4:** Type the addition sign (+) to let Excel know that an add operation is to be performed.
- **Step 5:** Type the second number to be added (e.g., 200).
- **Step 6:** Press Enter or click the Enter button on the Formula bar to complete the formula.

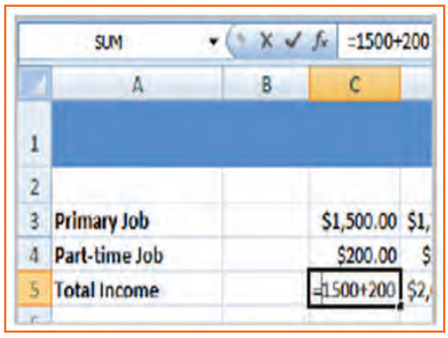


Fig.8.7.23(a): Creating Formulas

To Create a Simple Formula that Adds the Contents of Two Cells:

- **Step 1:** Click the cell where the answer will appear (C5, for example).
- **Step 2:** Type the equals sign (=) to let Excel know a formula is being defined.
- **Step 3:** Type the cell number that contains the first number to be added (C3, for example).
- **Step 4:** Type the addition sign (+) to let Excel know that an add operation is to be performed.
- **Step 5:** Type the cell address that contains the second number to be added (C4, for example).
- **Step 6:** Press Enter or click the Enter button on the Formula bar to complete the formula.

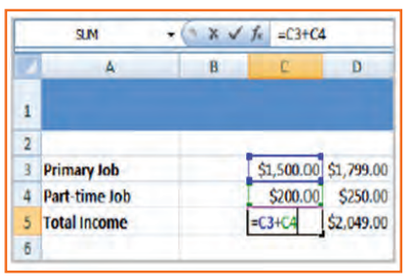


Fig.8.7.23(b): Creating Formulas

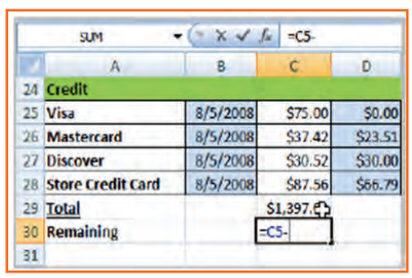


Fig.8.7.23(c): Creating Formulas

To Copy and Paste Cell Contents:

- **Step 1:** Select the cell or cells you wish to copy.
- **Step 2:** Click the Copy command in the Clipboard group on the Home tab. The border of the selected cells will change appearance.
- **Step 3:** Select the cell or cells where you want to paste the information.
- **Step 4:** Click the Paste command. The copied information will now appear in the new cells.

To select more than one adjoining cell, left-click one of the cells, drag the cursor until all the cells are selected, and release the mouse button.

The copied cell will stay selected until you perform your next task, or you can double-click the cell to deselect it.

To Cut and Paste Cell Contents:

- **Step 1:** Select the cell or cells you wish to cut.
- **Step 2:** Click the Cut command in the Clipboard group on the Home tab. The border of the selected cells will change appearance.
- **Step 3:** Select the cell or cells where you want to paste the information.
- **Step 4:** Click the Paste command. The cut information will be removed from the original cells and now appear in the new cells.

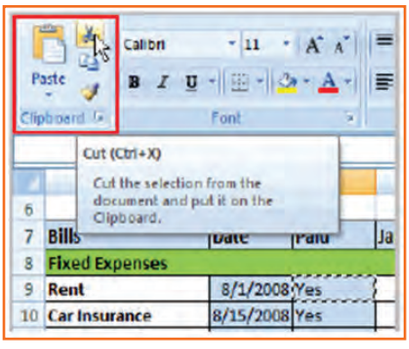


Fig.8.7.24(a): Cut and Paste Cell Contents

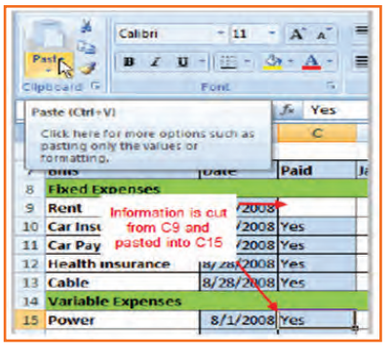


Fig.8.7.24(b): Cut and Paste Cell Contents

To View the Spreadsheet in Print Preview:

- **Step 1:** Left-click the Microsoft Office Button.
- **Step 2:** Select Print.
- **Step 3:** Select Print Preview. The spreadsheet will appear in Print Preview view.

Click the Close Print Preview button to return to the Normal View.

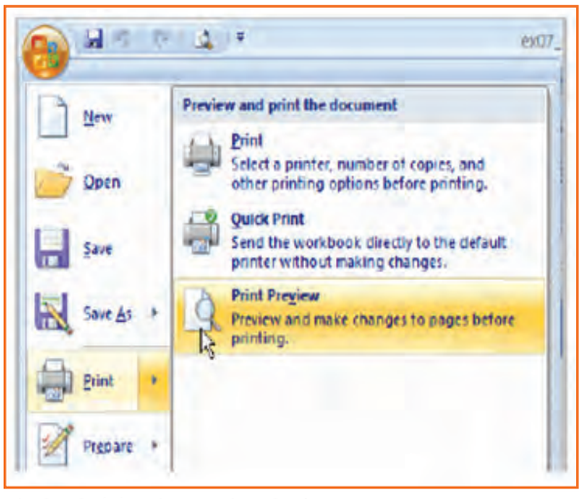


Fig.8.7.25(a): Print Preview Option

Exploring Print Preview:

If you are in Print Preview, you can use many of the same features that you can from the Ribbon; however, in Print Preview you can see how the spreadsheet will appear in hard form.

To Modify Margins, Column Width, or Row Height While in Print Preview:

- **Step 1:** Click the Print Preview command on the Quick Access toolbar, or select Print Preview from the Microsoft Office Button menu. The spreadsheet opens in print preview mode.
- **Step 2:** However your cursor over one of the black margin markers until a double arrow appears.
- **Step 3:** Left-click and drag the marker to the desired location. The change will be reflected in the spreadsheet.

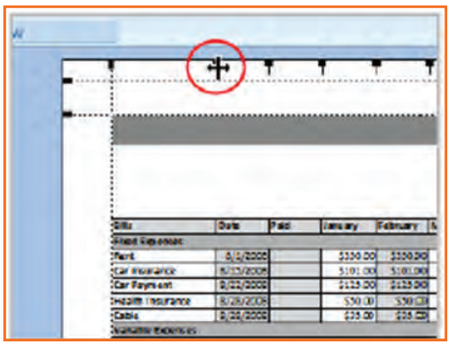


Fig.8.7.25(b): Print Preview Option

To Modify Margins:

- **Step 1:** Select the Page Layout tab.
- **Step 2:** Left-click the Margins command.
- **Step 3:** Choose one of the predefined settings or enter custom margins.

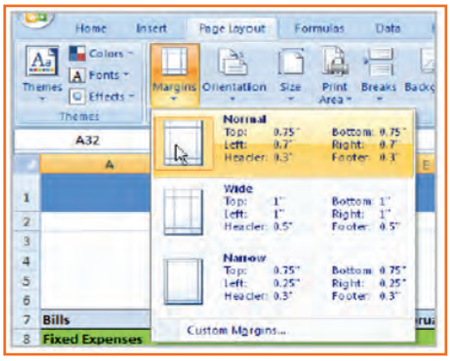


Fig.8.7.26: Modify Margins

8.7.12 Change Page Orientation

- **Step 1:** Select the Page Layout tab.
- **Step 2:** Left-click the Orientation command.
- **Step 3:** Select either Portrait or Landscape.

Portrait gets the page oriented vertically, while Landscape orients the page horizontally.

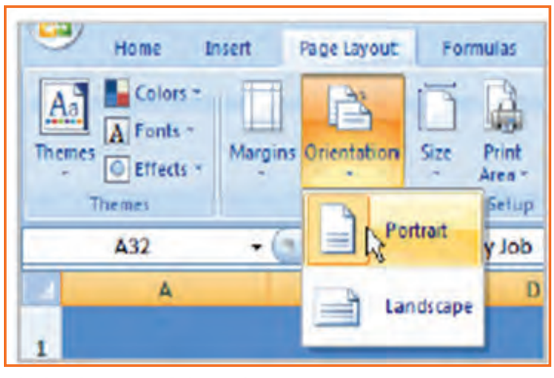


Fig.8.7.27: Page Orientation

To Change the Paper Size:

- **Step 1:** Select the Page Layout tab.
- **Step 2:** Click the Size command.
- **Step 3:** Select a size option from the list.

To Print from the Microsoft Office Button:

- Left-click the Microsoft Office Button.
- Select Print. The Print dialog box appears.
- Select a printer if you wish to use a printer other than the default setting.
- Click Properties to change any necessary settings.
- Choose if you want to print specific pages, the whole worksheet, a selection, the active sheet or the complete workbook.
- Select the number of copies you'd like to print.
- Click OK.

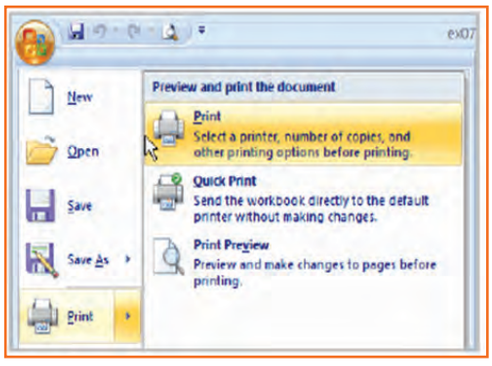


Fig.8.7.28: Print from the Microsoft Office Button

8.7.13 Excel's Different Functions

There are many different functions in Excel 2007. Some of the more common functions include:

Statistical Functions:

- SUM - Used to add a range of cells together.
- AVERAGE - This formula can calculate the average of a range of cells.
- COUNT - Used to count the number of chosen data in a range of cells.
- MAX - We can identify the largest number in a range of cells with it.
- MIN - Used to identify the smallest number in a range of cells.

Financial Functions:

- Interest Rates
- Loan Payments
- Depreciation Amounts

Date and Time functions:

- DATE - Converts a serial number to a day of the month.
- Day of Week.
- DAYS360.
- TIME - Returns the particular time.
- HOUR - Converts value to an hour.
- MINUTE - Converts value to a minute.
- TODAY - Returns value to today's date.
- MONTH - Converts value to a month.
- YEAR - Converts value to a year.

You don't have to memorize the functions but should have an idea of what each can do for you.

To Calculate the Sum of a Range of Data Using AutoSum:

- **Step 1:** Select the Formulas tab.
- **Step 2:** Locate the Function Library group. From here, you can access all the available functions.
- **Step 3:** Select the cell where you want the function to appear. In this example, select G42.
- **Step 4:** Select the drop-down arrow next to the AutoSum command.
- **Step 5:** Select Sum. A formula will appear in the selected cell, G42.
- **Step 6:** This formula, =SUM(G2:G41), is called a function. AutoSum command automatically selects the range of cells from G2 to G41, based on where you inserted the function. You can alter the cell range, if necessary.
- **Step 7:** Press the Enter key or Enter button on the formula bar. The total will appear.

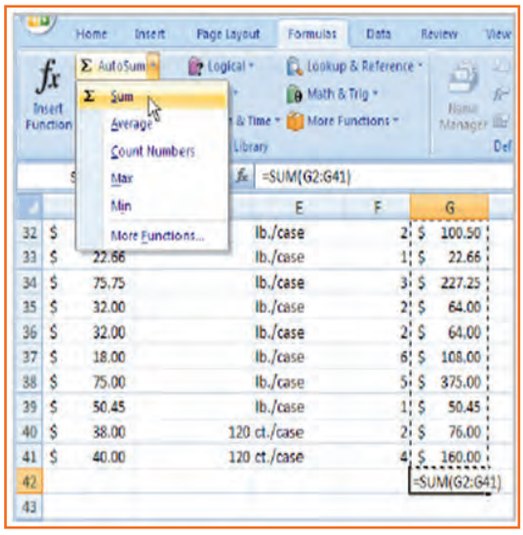


Fig.8.7.29: Using AutoSum

To Edit a Function:

- **Step 1:** Select the cell where the function is defined.
- **Step 2:** Insert the cursor in the formula bar.
- **Step 3:** Edit the range by deleting and changing necessary cell numbers.
- **Step 4:** Click the Enter icon.

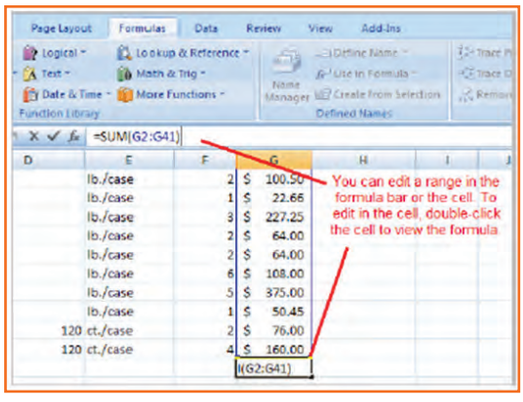


Fig.8.7.30: Edit a Function

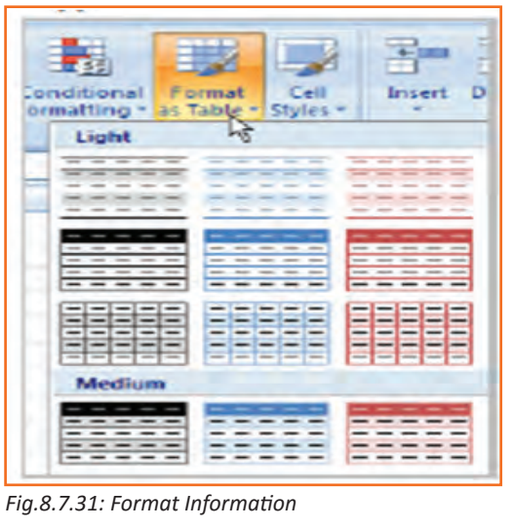


Fig.8.7.31: Format Information

To Format Information as a Table:

- **Step 1:** Select any cell that contains information.
- **Step 2:** Click the Format as Table command in the Styles group on the Home tab. A list of predefined tables will appear.
- **Step 3:** Left-click a table style to select it.
- **Step 4:** A dialog box will appear. Excel has automatically selected the cells for your table. The cells will appear selected in the spreadsheet, and the range will appear in the dialog box.

- **Step 5:** Change the range listed in the field, if necessary.
- **Step 6:** Verify the box is selected to indicate your table has headings, if it does. De-select this box if your table does not have column headings.
- **Step 7:** Click OK. The table will appear formatted in the style you chose.

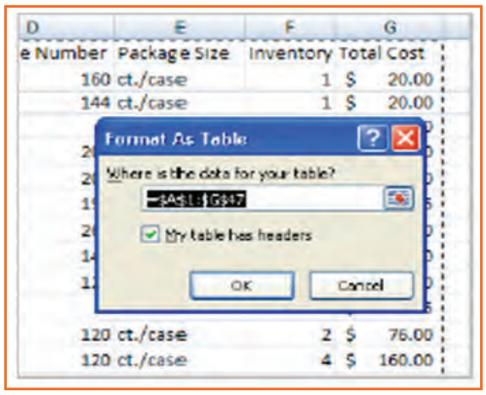


Fig.8.7.32: Format as Table

8.7.14 Aligning Text

Excel 2007 left-aligns text (labels) and right-aligns numbers (values). This makes data easier to read, but you do not have to use these defaults. Text and numbers can be defined as left-aligned, right-aligned, or centered in Excel.

To Align Text or Numbers in a Cell:

Fig.8.7.33: Align Text or Numbers

- **Step 1:** Select a cell or range of cells.
- **Step 2:** Click on either the Align Left, Center, or Align Right commands on the Home tab.
- **Step 3:** The text or numbers in the cell(s) take on the selected alignment treatment.

Left-click a column label to select the entire column or a row label to select an entire row.

Changing Vertical Cell Alignment:

You can also define vertical alignment of a cell. In Vertical alignment, information in a cell can be located at the top of the cell, middle of the cell, or bottom of the cell. The default is bottom.

To Change Vertical Alignment from the Alignment Group:

- **Step 1:** Select a cell or range of cells.
- **Step 2:** Click the Top Align, Center, or Bottom Align command.

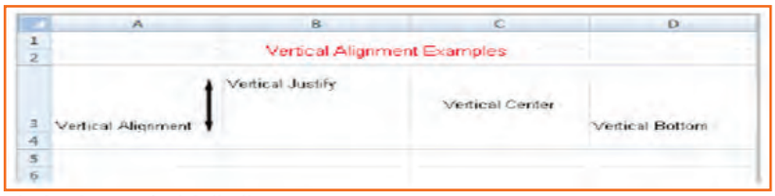


Fig.8.7.34: Vertical Cell Alignment

Changing Text Control:

- **Step 1:** Text Control allows you to control the way Excel 2007 presents information in a cell.
- **Step 2:** There are two common types of Text control: Wrapped Text and Merge Cells.

Fig.8.7.35: Text Control

- **Step 3:** The Wrapped Text wraps the contents of a cell across several lines if it's too large than the column width. It increases the height of the cell as well.
- **Step 4:** Merge Cells can also be applied by using the Merge and Center button on the Home tab.

To Change Text Control:

- **Step 1:** Select a cell or range of cells.
- **Step 2:** Select the Home tab.
- **Step 3:** Click the Wrap Text command or the Merge and Center command.

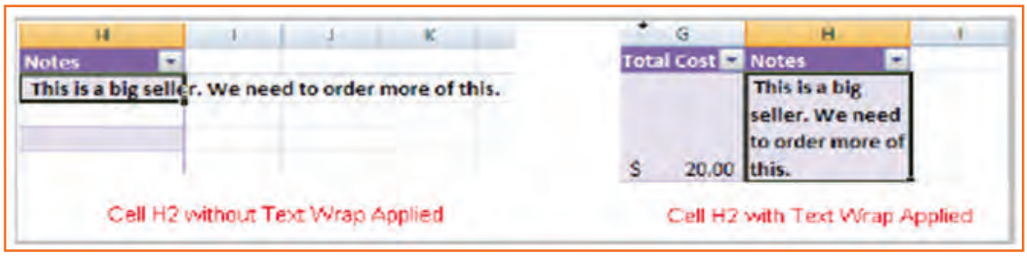


Fig.8.7.36: Text Control

To Name a Worksheet:

Right-click the sheet tab to select it.

- **Step 1:** Choose Rename from the menu that appears. The text is highlighted by a black box.
- **Step 2:** Type a new name for the worksheet.
- **Step 3:** Click off the tab. The worksheet now assumes the descriptive name defined.

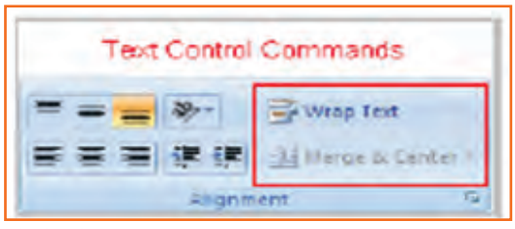


Fig.8.7.37: Wrap Text

To Insert a New Worksheet:

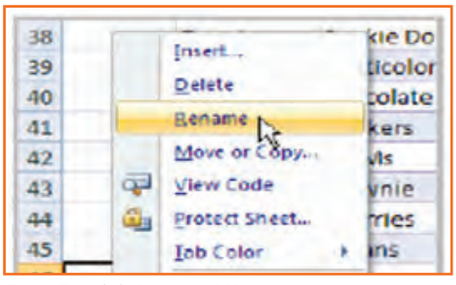


Fig.8.7.38(a): Name a Worksheet

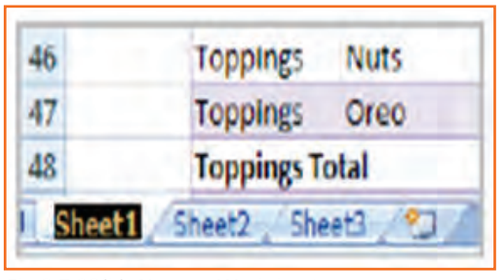


Fig.8.7.38(b): Name a Worksheet

- **Step 1:** Left-click on the Insert Worksheet icon. A new worksheet appears. It will be named Sheet 4, Sheet 5, or whatever the next sequential sheet number may be in the workbook.

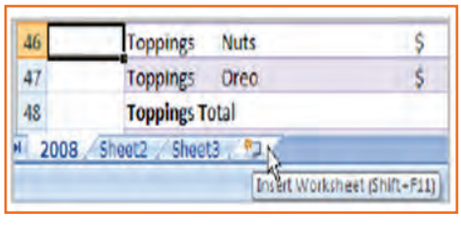


Fig.8.7.39: Insert a New Worksheet

To Delete One or More Worksheets:

- **Step 1:** Click on the sheet(s) you want to delete.
- **Step 2:** Right-click the sheet(s) and a menu appears.
- **Step 3:** Select Delete.

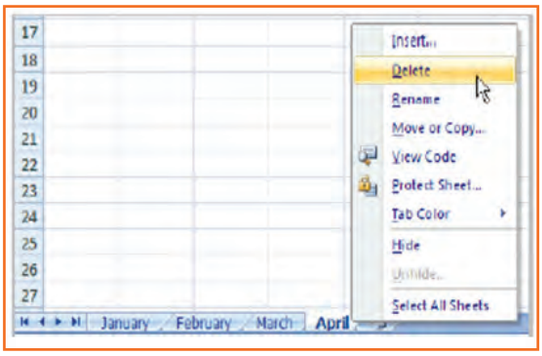


Fig.8.7.40: Delete One or More Worksheets

Exercise

1. What are the things that MS Excel helps in?

   .....

   .....

2. How does one Zoom out in MS Excel?

   .....

   .....

3. The Save, Undo, and Redo commands appear by default in the Quick Access toolbar.
   a) True
   b) False
4. What can the Microsoft Button help with?

   .....

   .....

5. Calculate the average range of cells is a statistical function in MS Excel?
   a) True
   b) False
6. What is a financial function in MS Excel?
   a) Adding the SUM of all cells
   b) Convert a serial number to a minute
   c) Calculate interest rates

UNIT 8.8: Internet Concepts

Unit Objectives

At the end of the unit, you will be able to:

- Understand internet concepts.
- Recognise the different types of URLs.
- Use MS-Outlook.

8.8.1 URL Concepts

The full form of url is Uniform Resource Locator. It is the worldwide address of documents and other resources on the world wide web. The URL is divided into two different elements. the primary part of the url is called a protocol identifier as it helps us distinguishing what protocol to use. The second part of the url is called a resource name and it indicates the ip address or the domain name where the resource is located. The protocol identifier and the resource name are separated by a colon and two forward slashes it is more clearly understood by looking in to the following example: the two URLs below purpose two different files at the domain pcwebopedia.com. Here the primary one specifies an executable file that should be fetched using the FTP protocol; the second specifies a web page that should be fetched using the HTTP protocol:

1. ftp://www.pcwebopedia.com/stuff.exe
2. http://www.pcwebopedia.com/index.html

8.8.1.1 Different Kinds of URLs

There is a wide range of URLs, as well as different terms to describe what a URL looks like. Let's have a better understanding of various URLs and their types with an example:

- **Messy:** Such URL has many distorted and jumbled numbers, letters on it that makes slight organizational sense i.e.

  http://www.example.com/woeiruwoei909305820580.

- **Dynamic:** Dynamic URLs are the end result of database queries that provide content output based on the result of that query. The URL ends up looking quite mangled, alias "messy", which usually consist of the characters like: ?, &, %, +, =, $. Dynamic URLs are often found as part of consumer-driven websites: shopping, travel, or anything that requires changing answers for many different user queries.
- **Static:** A static URL is the opposite of a dynamic URL. The URL is "hard-wired" into the Web page's HTML coding. Static URL does not alter or adjust; it cannot be compromised; depending on what the user requests.
- **Obfuscated:** Obfuscated, or hidden, URLs are mostly used in phishing scams. Basically, a familiar URL is distorted in some way to make it seem legitimate. As soon as the user clicks on the obfuscated URL redirected to a malicious website.

There are a lot of clues and information that you can garnered from a simple URL, including:

- What kind of server the Web page is hosted on.
- What kind of organization the Web page belongs to.
- Where the Web page is located in the world.
- The names of the directories on the website.

By carefully looking at the different parts of any Web address, you can quickly determine quite a bit of useful information. In addition, by simply deleting parts of the URL, you can learn more about the website than what might be actually publicly accessible. For example:

- **http://www.widget.com/blog/music/:** This points to a resource online, and the URL tells you that yes, indeed, it does point to an online resource. Let's go further back.
- **http://www.widget.com/blog/:** By moving backwards in the URL from right to left, we can see that we're now at the blog section of this publication.
- **http://www.widget.com:** The home page of the website.

Of course, this is a very simple example. However, by dissecting complex URLs one step at a time, quite a bit of information can be uncovered.

8.8.2 How to create Your E-mail account (Outlook)

You can create a new or additional Outlook account by following the same account creation wizard. You can follow the steps listed below to configure your Microsoft Outlook Express email client to work with your email account:

- **Step 1:** Open Outlook Express and select Tools E-mail Accounts from the main menu. The E-mail Accounts wizard will appear.
- **Step 2:** Click Add a new e-mail account. Click Next.
- **Step 3:** Select the server type. Most ISPs and webmail services use POP3 servers. Click Next.
- **Step 4:** Enter your Name.
- **Step 5:** Enter your E-mail Address.
- **Step 6:** Enter the incoming mail server and outgoing mail server information you obtained from your ISP or webmail service.
- **Step 7:** Enter your user name if it is different from the user name that automatically appears in the wizard form.
- **Step 8:** Enter your password.
- **Step 9:** Click Test Account Settings to test the information you entered in the wizard and confirm that it is valid.
- **Step 10:** Click Next.
- **Step 11:** Click Finish.

Note: *If you do not have an Outlook email account, you can select Microsoft Office Outlook from your computer's Start menu. The wizard will open, and you can follow the steps above to create an Outlook account.*

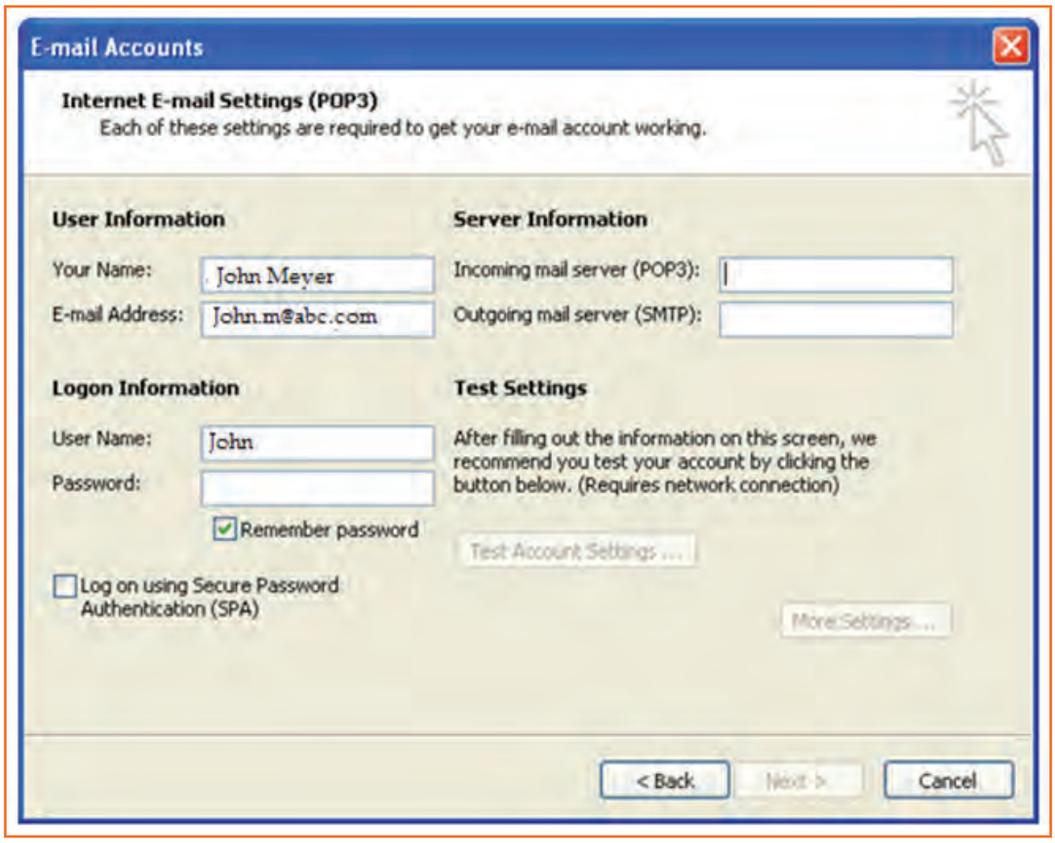
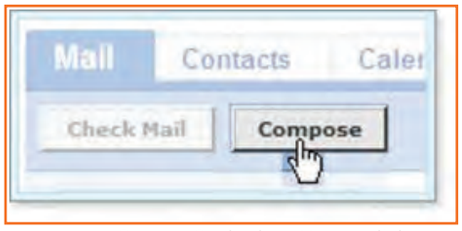


Fig.8.8.1: Creating E-mail Account in Outlook

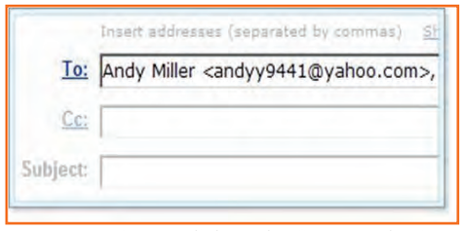
Congratulations you have successfully configured your e-mail account!!

8.8.3 Sending an Email

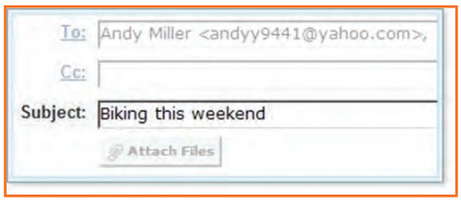
The following page will make it easy for you to understand how easily and swiftly you can send an E-mail, just follow these simple steps and refer to the each image given below.



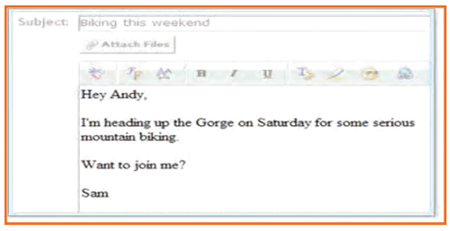
STEP 1: Open Outlook. Now click on Compose button.



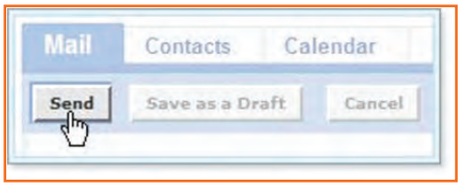
STEP 2: As you click on the Compose button, a new page would open.



STEP 3: In the To box, (refer to the image below) type the email address of the person you want to send an e-mail to.



STEP 4: Now, In the Subject box as shown in the image; type the subject of the message, a few words to give the receiver an idea of what the email is all about.



STEP 5: In the large box under the tools, compose the body of an email as shown in the image. Once the writing and addressing your email is done, click the Send button.

Mail has successfully sent your email to your wishing recipient.

8.8.4 Reading Emails

Outlook takes care of all email under mail folders. Initially, all of your incoming emails messages arrive in your Inbox folder (except suspected spam which goes directly into your Spam folder). To read an email message, open a mail folder and then click on email's subject.

- **Step 1:** Select the Inbox in the navigation pane.
- **Step 2:** If you see Inbox is in bold, it indicates that you have unread messages.
- **Step 3:** The number of unread messages is indicated by the number to the right of the word Inbox in parentheses.
- **Step 4:** Click a message in the inbox once, and Outlook will display it in the reading pane (if that feature is turned on).
- **Step 5:** You need to double-click a message, to open the message in a new window.

NOTE: *Unread messages are display in bold textin order to make it easy for a reader to identify how many mails are new or still unread.*

Now, to open and read an email, click on email's subject (bold or not) in the Subject column and you will be able to read your email.

8.8.5 Replying E-mails

Often, it is seen that once the mail is read, viewer looks for the option of reverting to that email to the sender or to add more recipient. Well! This can be done in two separate ways with Outlook i.e. there are two options as given below:

- **Reply:** It allows you to respond to the sender only.
- **Reply all:** Reply all, allows responding to the sender and everyone else who received themessage. This includes all email addresses listed in the To box and the Cc box, except your own email address.
- Now, Open the your email and click the drop down arrow given at the Reply button, then opt for Reply to reply to the sender only or Reply All to reply to all recipients of the email message.

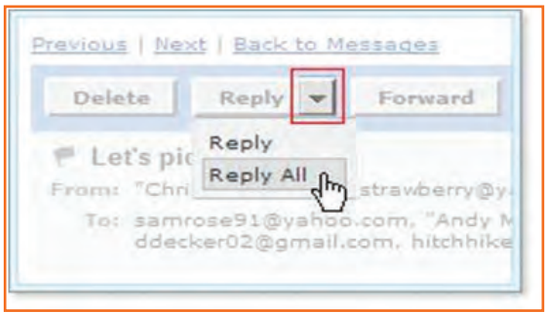


Fig.8.8.2: Replying E-mail

NOTE: *To reply to the sender only, you can also click the Reply button and not the arrow.*

- **Step 1:** Click Reply on the Standard toolbar while viewing the message you want to reply to. Outlook will create a pre-addressed reply form to the email address the original email came from.

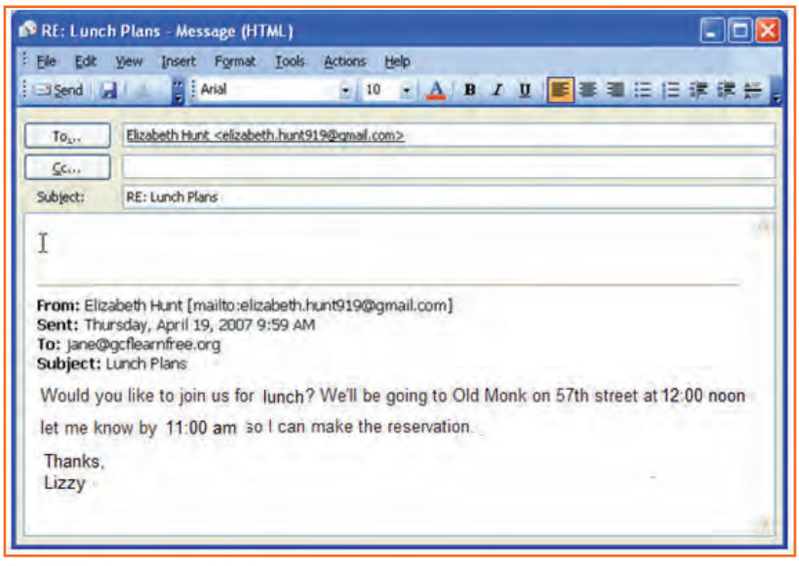


Fig.8.8.3: Composing Mail

- **Step 2:** Enter text into the body of the form.
- **Step 3:** Click the Send button when you're ready to send your email message.

Tip: *Original email which you received from the sender will always be included when you are replying to the sender however, this original text, is editable, you can type your reply anywhere in the text box. In fact, some of the information or whole mail can be deleted in the original message. Different colors can be used (if required) to differentiate between your reply followed by the original text in the same image.*

8.8.6 Receiving Email Attachments

You know you have received an email with an attachment when you see a paper clip ( ) next to the email's subject in the mail folder. Open the message to see what type of file is attached.

In a mail folder, click the subject of an email message that includes an attachment (the paper clip icon appears to the left of the subject).

When the message opens, a link to download the attachment appears in the message header, and if the attachment includes images, thumbnails appear at the bottom of the messages.

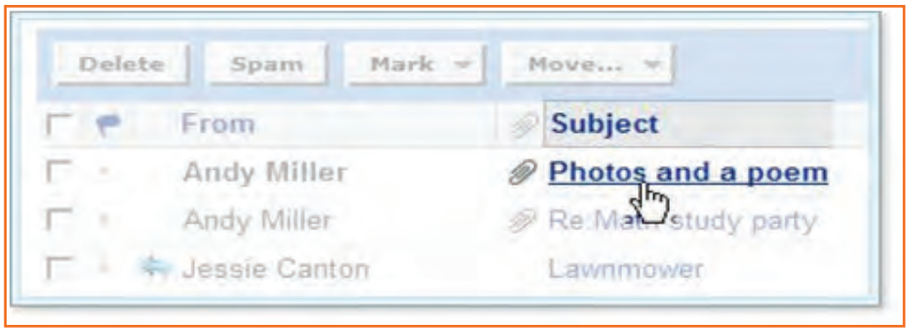


Fig.8.8.4: Receiving Email Attachments

8.8.7 Opening and Saving Attachments

When you click the link to an attachment, Outlook automatically uses AntiVirus™ installed on your system scan the file for viruses. Virus scanning can often "clean" a file that may have viruses, so that you can safely open and download the file onto your computer.

1. Open the email message with the attachment.
2. Click the file name or thumbnail to allow Outlook to scan the file.

Antivirus scans the attachment and displays the results above the message header.

- If Norton Antivirus detects a virus, you can't download the file.

Fig.8.8.5: Click the file for Virus Scan

- If Antivirus doesn't detect a virus, you can download the file.

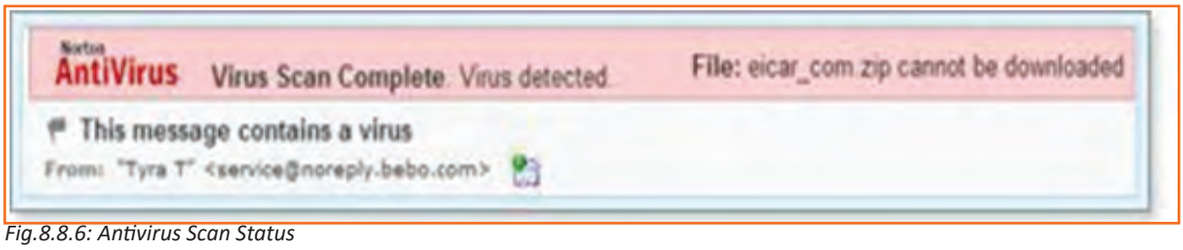


Fig.8.8.6: Antivirus Scan Status

- To download a virus-free attachment, click the Download File button.

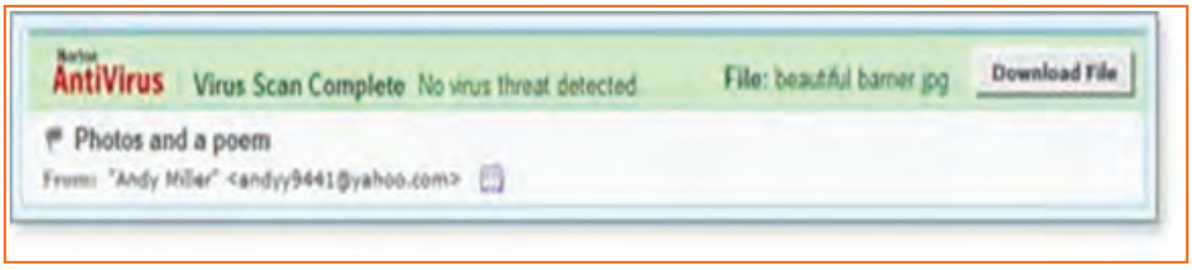


Fig.8.8.7: Click the Download File button

The File Download window prompts you to open or save the file. (The appearance of this window varies, depending on your operating system and other factors.)

Fig.8.8.8: Click the Download File button

3. You can click the Open button to view the attached file in its original application (such as Microsoft Word or Acrobat Reader), or you can click the Save button to download the file and save it on your computer.

Tip: *When you open a file without saving it, your browser automatically downloads it to a temporary location on your computer. When you close the file, your browser deletes the temporary file.*

8.8.8 Sending Attachments with Outgoing Email Messages

You can send all types of files as attachments, including word processor or spreadsheet documents, audio files, image files (such as .bmp, .jpg, .gif), and more but not .exe (executable files).

Notes: *With Outlook, effective email virus protection is automatic. Anti-virus software in Mail automatically detects and cleans viruses in incoming and outgoing email and attachments.*

1. While composing a message, click the Attach Files button (You can attach files at any time before sending the message.). The Attach Files page opens.
2. Click the first Browse button.

   The Choose File or Open File window opens (depending on your operating system).
3. Locate the file you want to attach, select it, and click the Open or OK button.

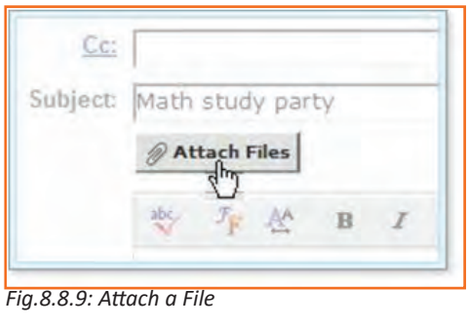


Fig.8.8.9: Attach a File

The selected file and its location appear in the first attachment box.

4. To attach more files, click the next Browse button, and repeat step 4.

Fig.8.8.10: Browse a File

Tips:

- You cannot attach the same file multiple times to the same email message.
- If you need more attachment boxes, click the Attach More Files link. Outlook adds another box.

5. You can attach one or more files up to a total combined size of 10 MB.
6. When all the files you want to send are listed, click the Attach Files button.

Tip: *Antivirus™ automatically scans all outgoing email attachments andwill not let you attach an infected file.*

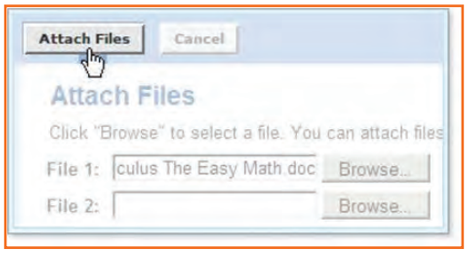


Fig.8.8.11: Attach a File

Progress bars display the process of scanning and attaching each file. When the process is complete, the Compose page opens with the attached file.

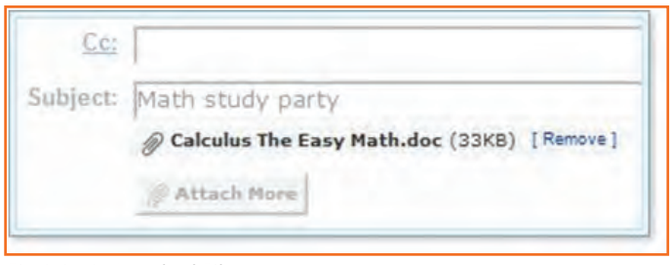


Fig.8.8.12: Attached File

Note: *Though Outlook often displays attached photos within the messagesyou receive, it doesn't display the photos you attach while composing your message. Instead, it lists the photos in the attachments area. The photos may appear within the text of the message when your recipients receive it if their email applications support embedded photos.*

Exercise

1. What is the full form of URL?

.....

.....

2. The second part of the URL is called a resource name and it indicates the IP address or the domain name where the resource is located.
   a) True
   b) False
3. Choose a URL example from the below list
   a) Messy
   b) Straight
   c) Constant
4. Initially all mails arrive in the inbox in outlook?
   a) True
   b) False
5. 'Reply' allows you to reply ONLY to the sender?
   a) True
   b) False

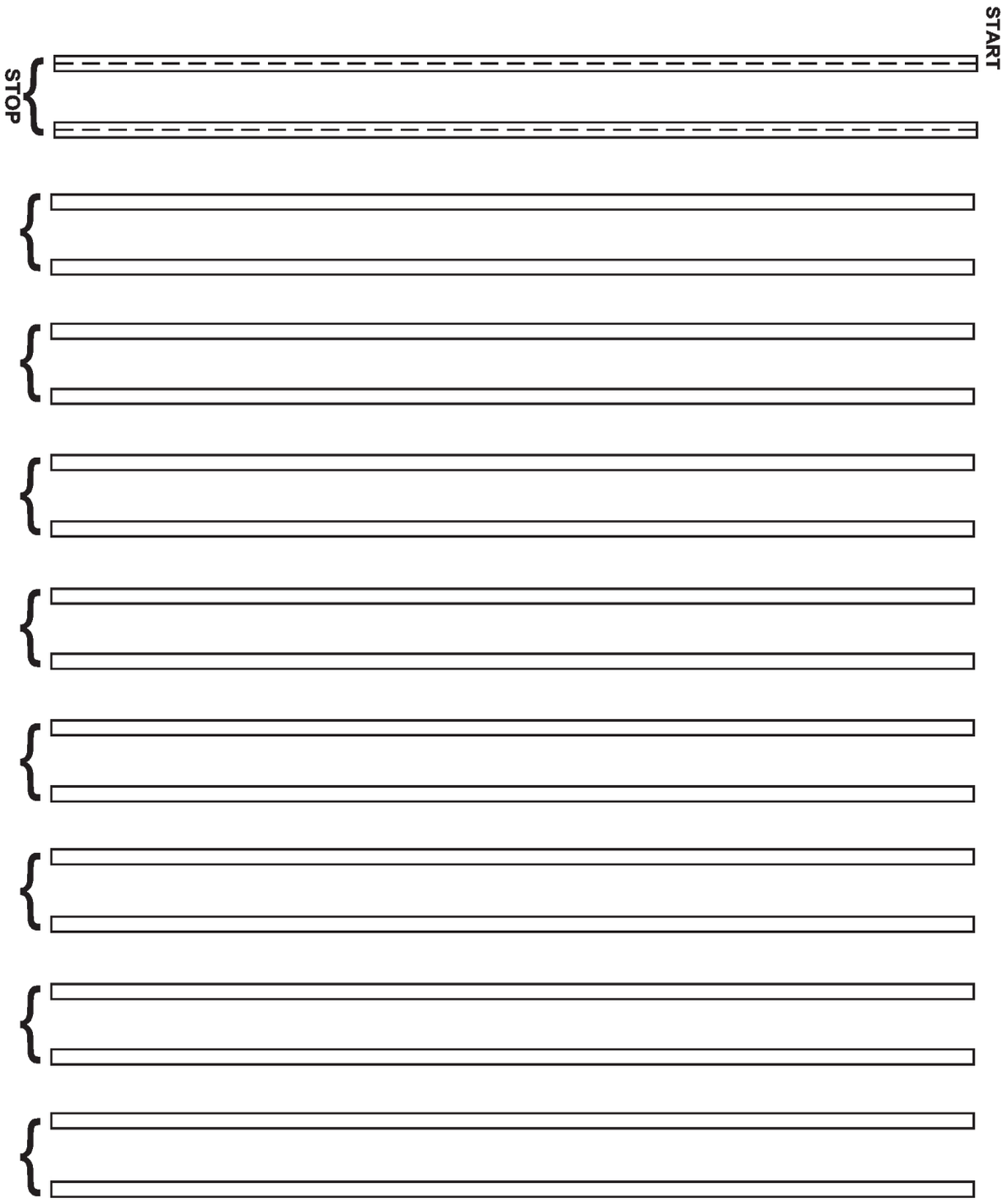
Notes

Annexure - Excercises

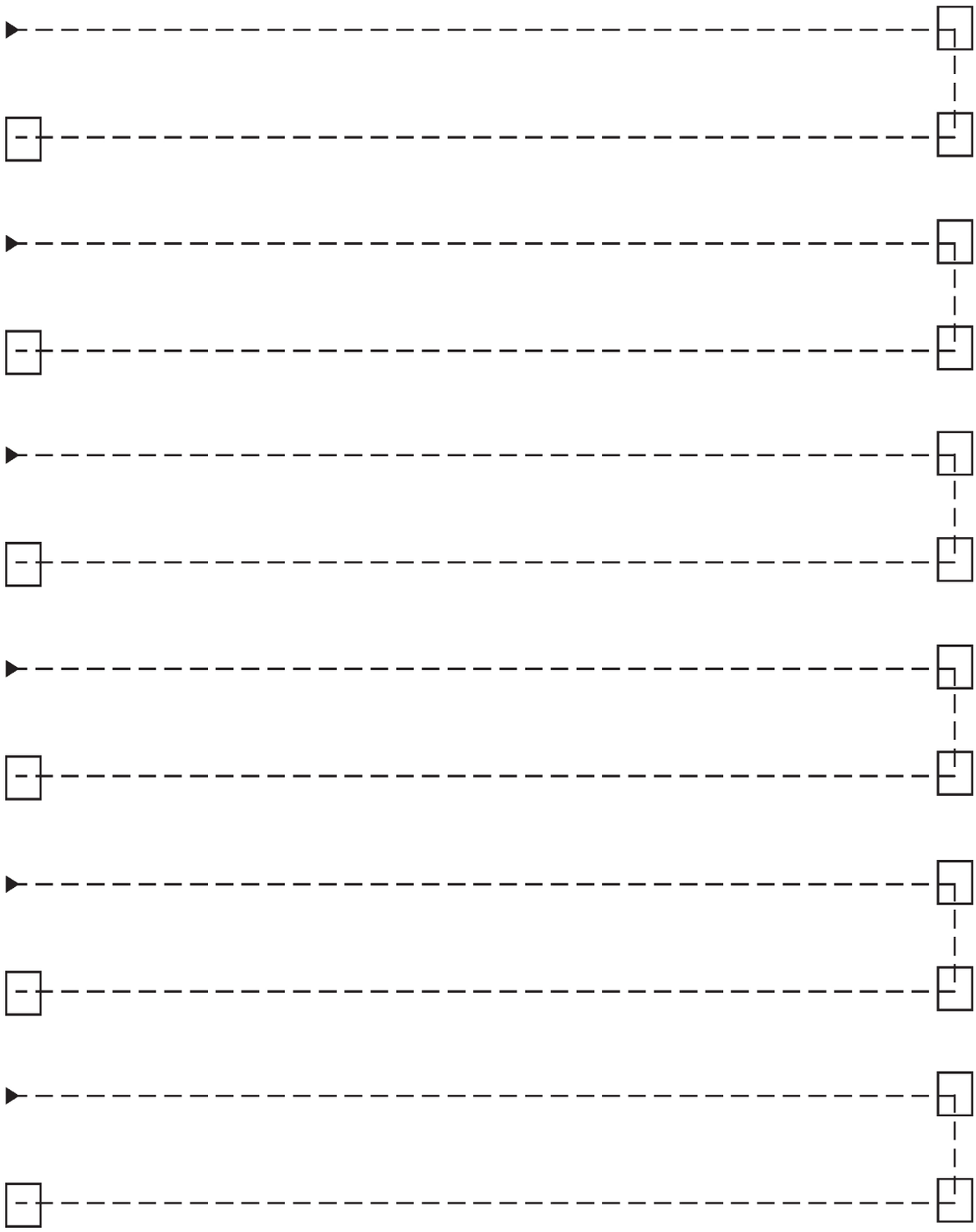
FULLSPEEDTREADLECONTROL,PS1

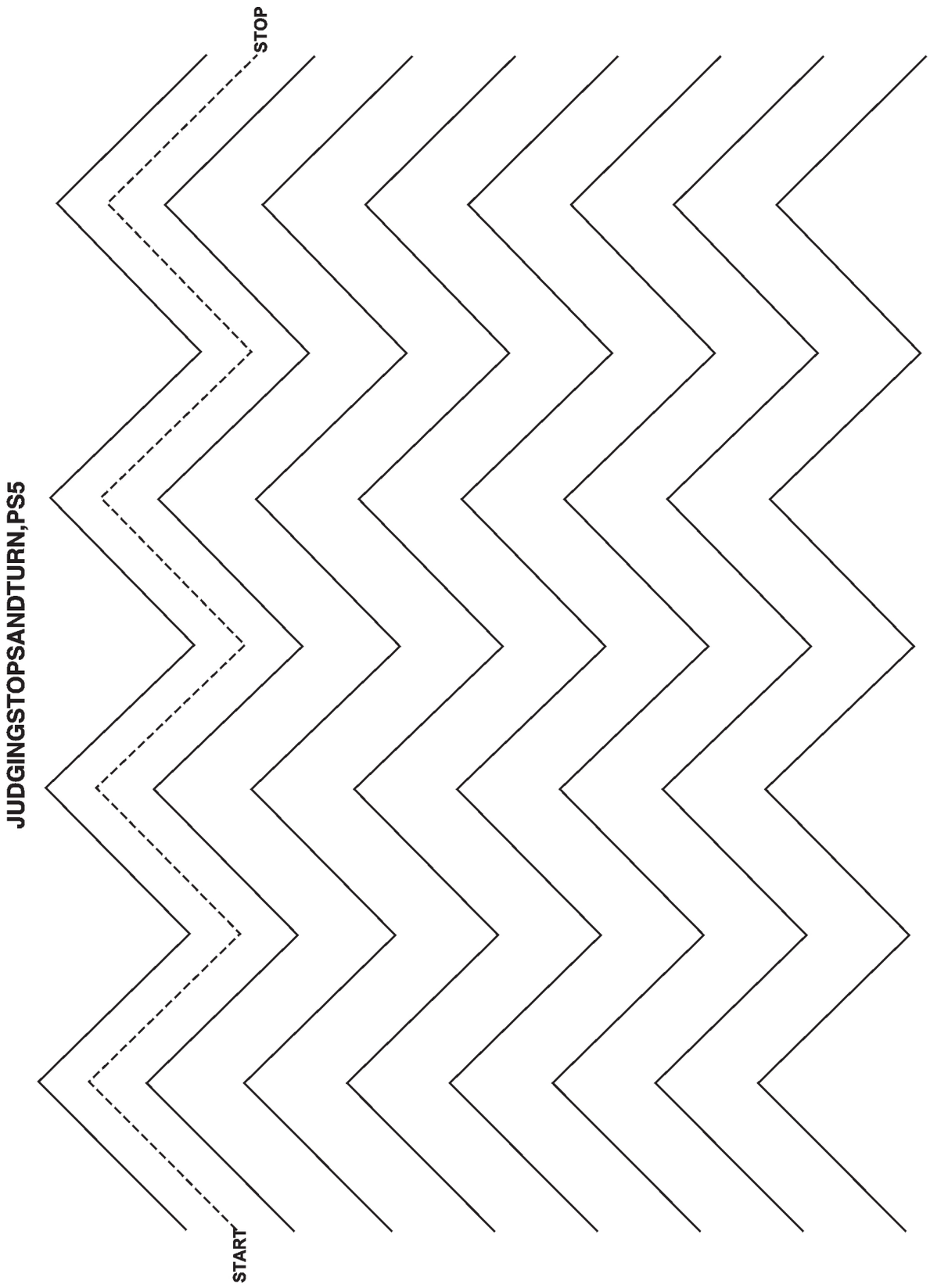
		FULL SPEED TREADLE CONTROL ANDSTOPPING ACCURACY PS2
		START STOP

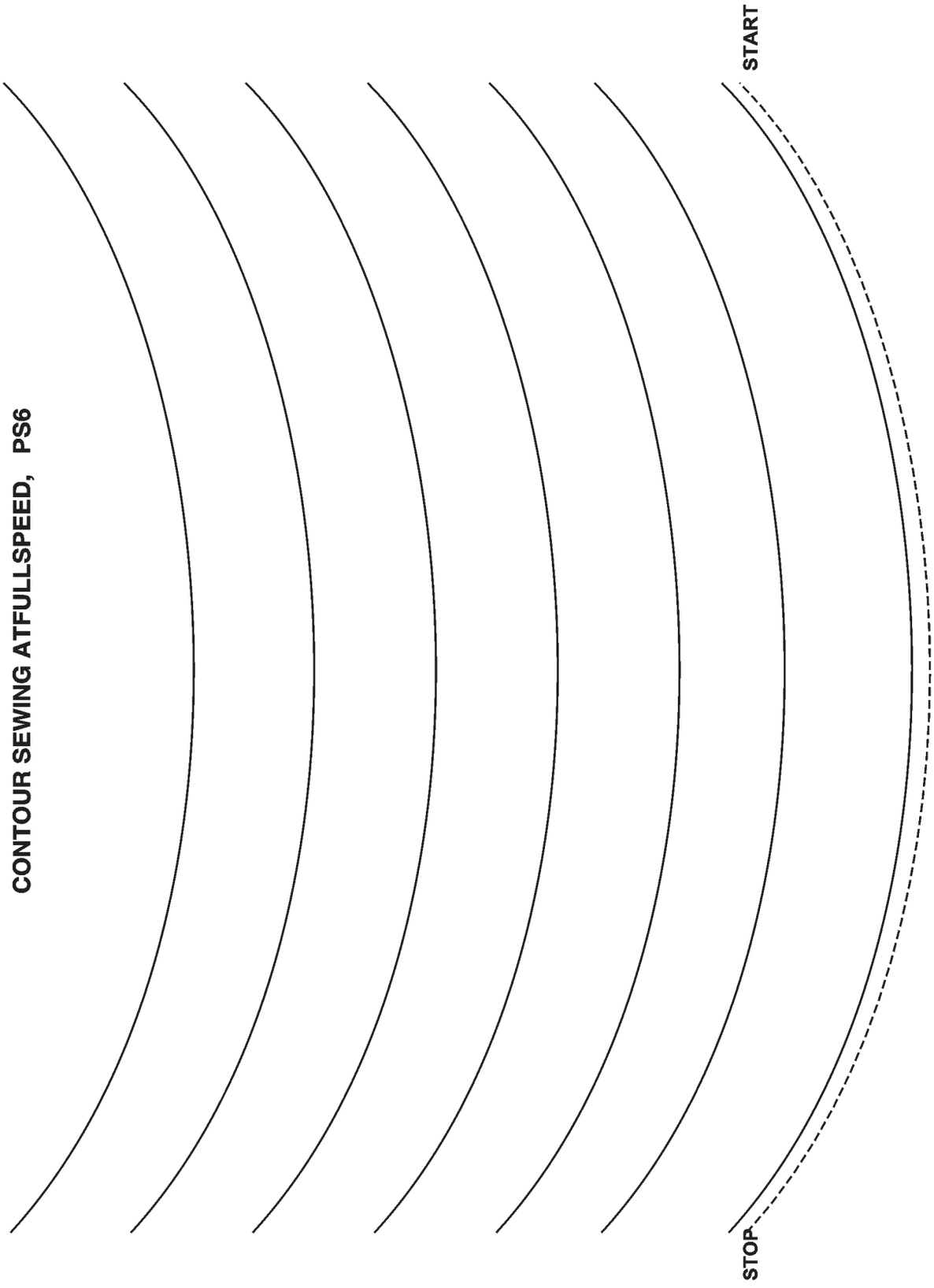
SPEEDANDSTARIGHT LINEACCURACY, Ps3



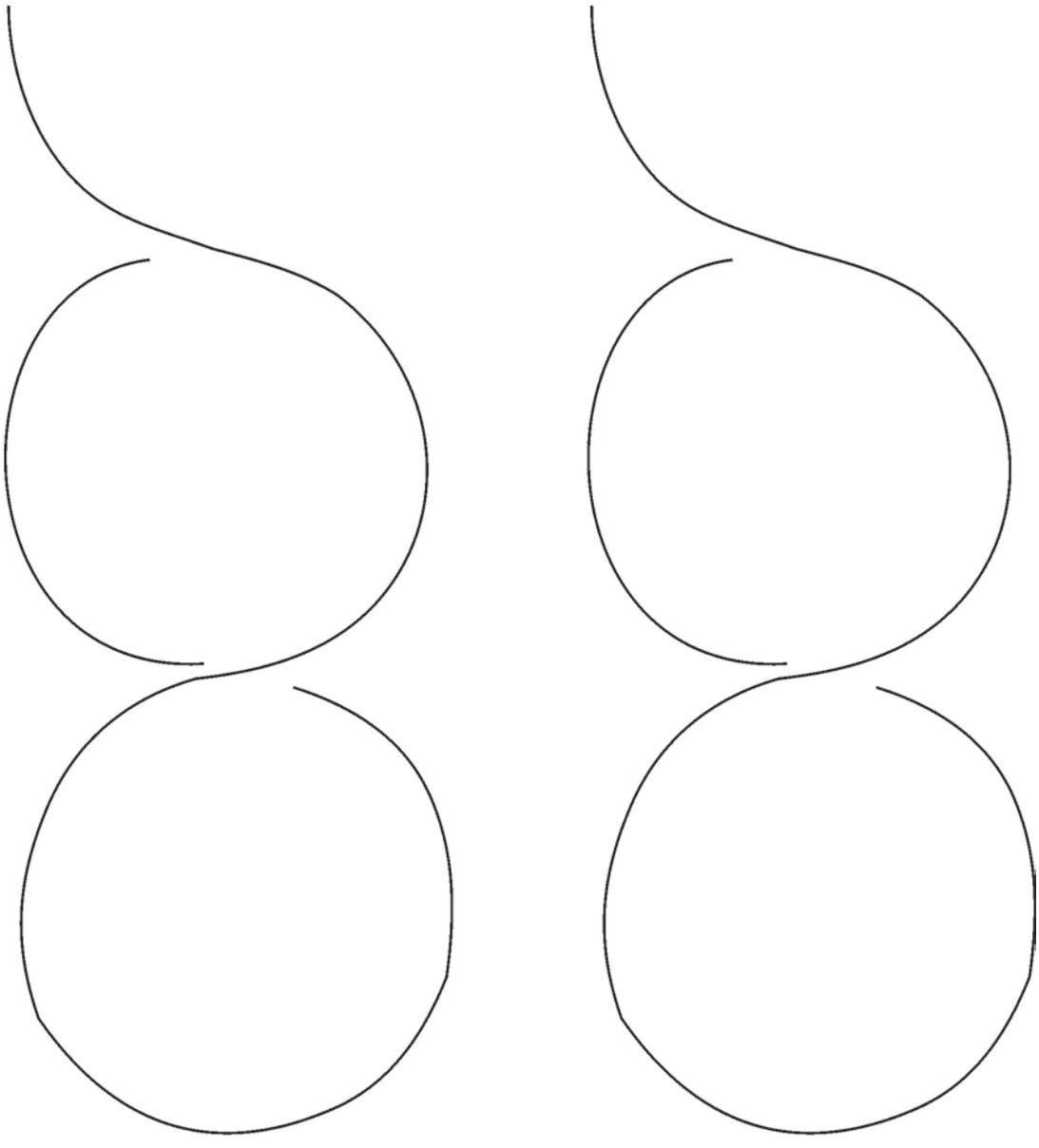
NEEDLE DOWN TURN-A PS4




JUDGINGSTOPSANDTURN,PS5
STOP
START

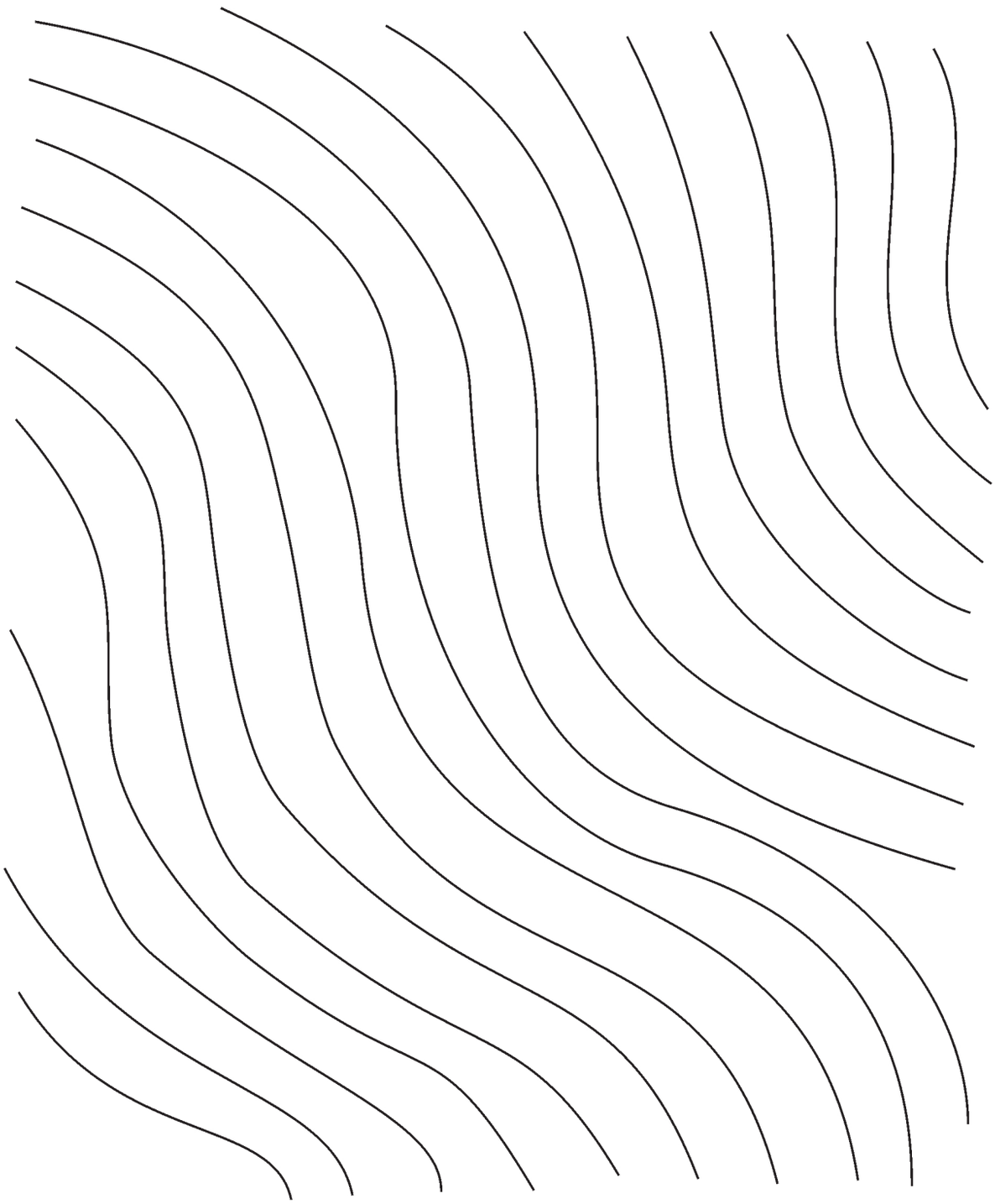

CONTOUR SEWING ATFULLSPEED, PS6
START
STOP

PS-7



Forma AAMT-7

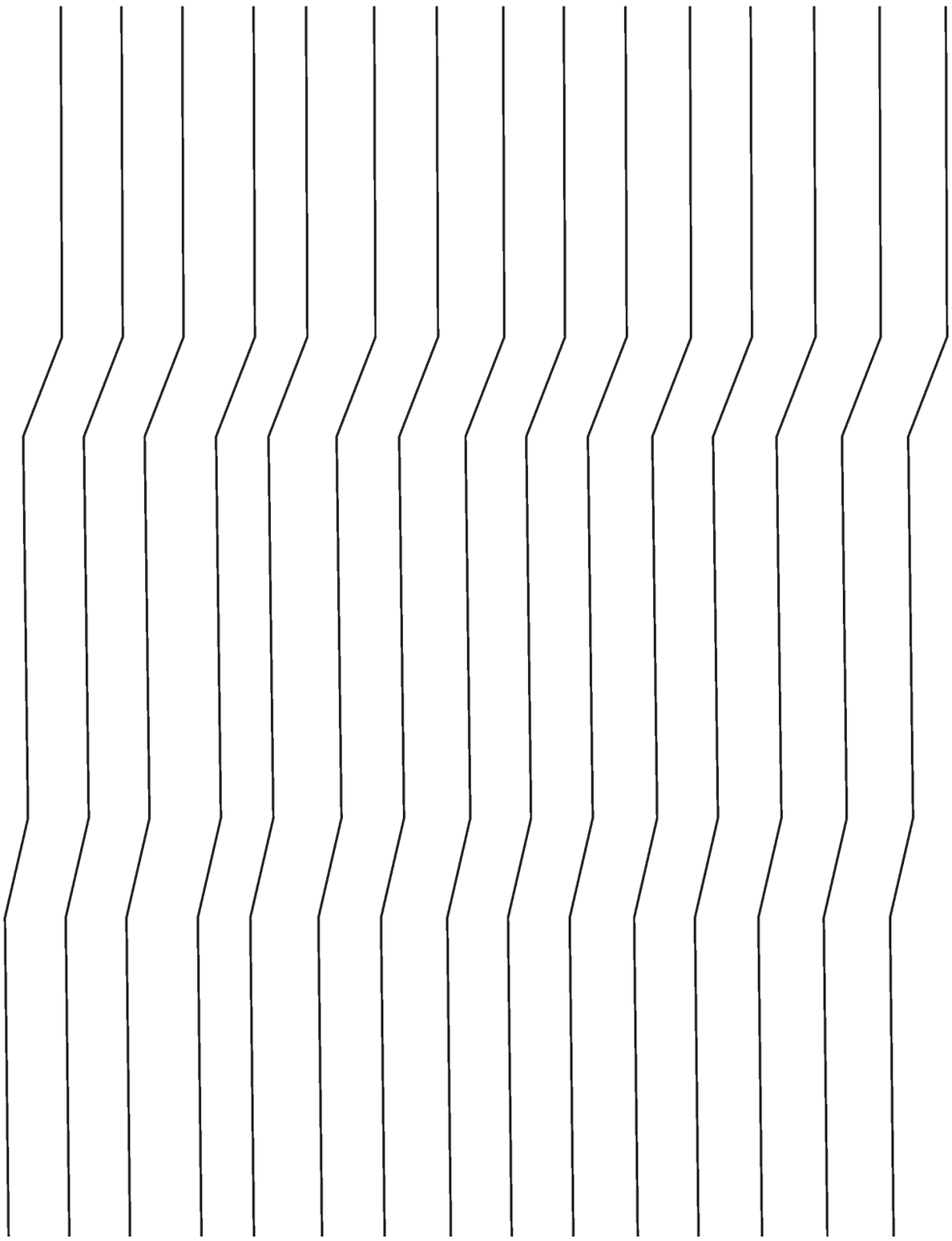
PS -8



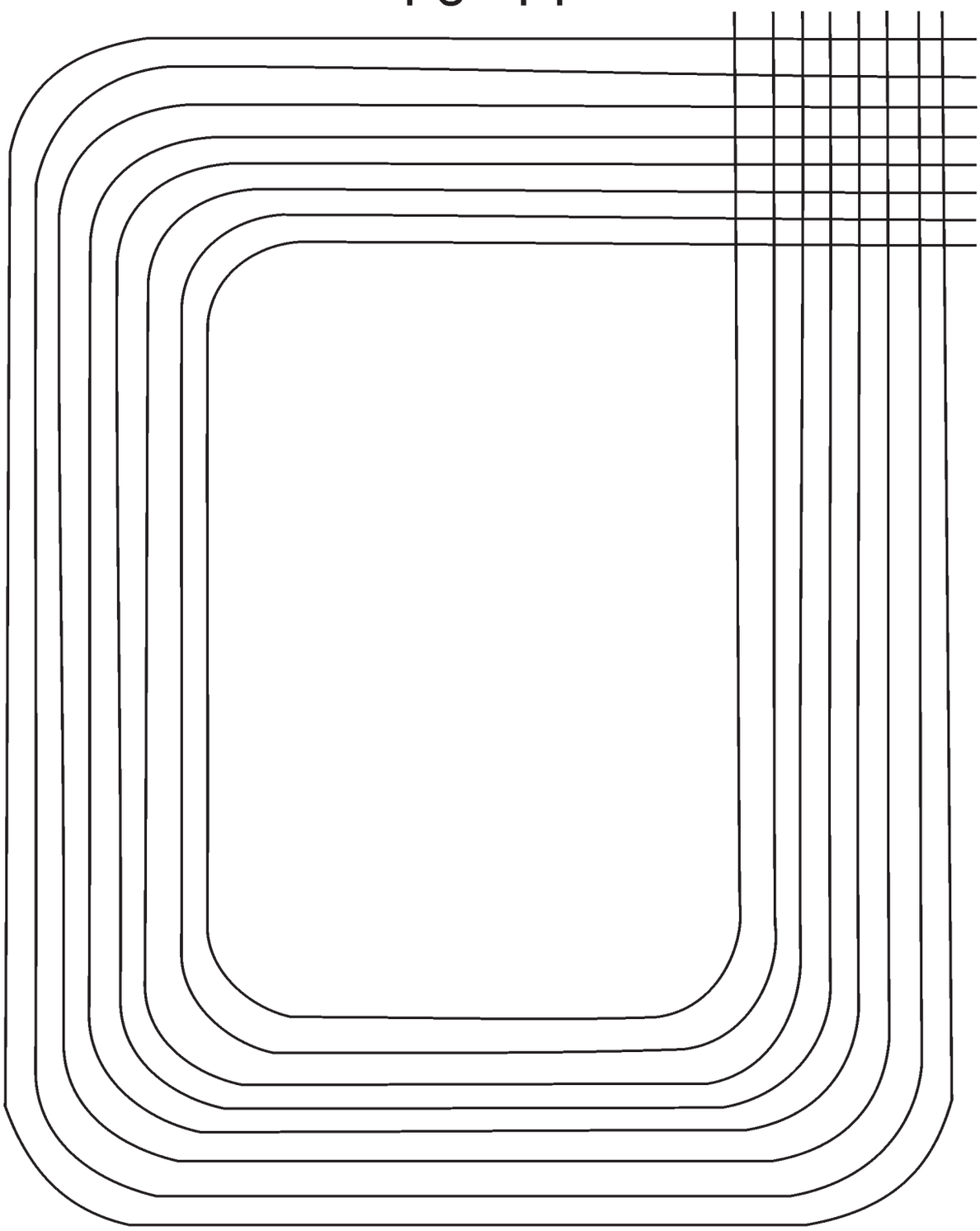
Forma AAMT -8

PS -9

PS -10



PS -11



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