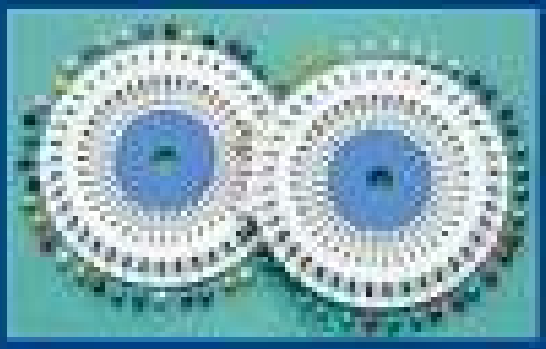

# Sewing Machine Operator

(Job Role)

Qualification Pack: Ref. Id. AMH/Q0301
Sector: Apparel, Made-ups and Home Furnishing

Textbook for Class IX

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एन सी ई आर टी
NCERT
राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

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# Foreword

The National Curriculum Framework (NCF)–2005 recommends bringing work and education into the domain of the curricular, infusing it in all areas of learning while giving it an identity of its own at relevant stages. It explains that work transforms knowledge into experience and generates important personal and social values, such as self-reliance, creativity and cooperation. Through work, one learns to find one's place in the society. It is an educational activity with an inherent potential for inclusion. Therefore, an experience of involvement in productive work in an educational setting will make one appreciate the worth of social life and what is valued and appreciated in society. Work involves interaction with material or other people (mostly both), thus, creating a deeper comprehension and increased practical knowledge of natural substances and social relationships.

Through work and education, school knowledge can be easily linked to learners' life outside the school. This also makes a departure from the legacy of bookish learning and bridges the gap between the school, home, community and the workplace. The NCF–2005 also emphasises on Vocational Education and Training (VET) for all those children who wish to acquire additional skills and/or seek livelihood through vocational education after either discontinuing or completing their school education. VET is expected to provide a 'preferred and dignified' choice rather than a terminal or 'last resort' option.

As a follow-up of this, the NCERT has attempted to infuse work across the subject areas and also contributed in the development of the National Skill Qualification Framework (NSQF) for the country, which was notified on 27 December 2013. It is a quality assurance framework that organises all qualifications according to the levels of knowledge, skills and attitude. These levels, graded from one to ten, are defined in terms of learning outcomes, which the learner must possess regardless of whether they are obtained through formal, non-formal or informal learning. The NSQF sets common principles and

guidelines for a nationally recognised qualification system covering Schools, Vocational Education and Training Institutions, Technical Education Institutions, Colleges and Universities.

It is under this backdrop that Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE), Bhopal, a constituent of NCERT, has developed learning outcomes based modular curricula for the vocational subjects from Classes IX to XII. This has been developed under the Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education of the Ministry of Human Resource Development.

This textbook has been developed as per the learning outcomes based curriculum, keeping in view the National Occupational Standards (NOSs) for the job role and to promote experiential learning related to the vocation. This will enable the students to acquire necessary skills, knowledge and attitude.

I acknowledge the contribution of the development team, reviewers and all institutions and organisations, which have supported in the development of this textbook.

NCERT would welcome suggestions from students, teachers and parents, which would help us to further improve the quality of the material in subsequent editions.



HRUSHIKESH SENAPATY
*Director*
National Council of Educational
Research and Training

New Delhi
*June 2018*

# About the Textbook

Apparel, Made-ups and Home Furnishing sector is amongst the fastest growing sectors in our country. It covers a great number of activities from the transformation of raw material into fibres, yarns, fabrics and produced end products. This sector includes activities related to designing, drafting, cutting, stitching, finishing and decoration of apparel, made-ups and home furnishing products. It also includes their quality, merchandising and export aspects. One of the very important areas of this sector is Sewing Machine Operation. Sewing machine operations broadly involve stitching of fabrics and other pliable materials using a sewing machine. A worker who operates the sewing machine is called a Sewing Machine Operator. They are also called a stitcher or machinist. The major responsibility of a Sewing Machine Operator is to stitch various parts of a garment or any other article. Generally, Sewing Machine Operators are specialised in a specific type of sewing machine. These Operators usually begin by performing simple tasks, and with experience, they can perform more difficult tasks. Sewing machine operation is one of the very important steps in the process of construction, and the quality of apparel, made-ups and home furnishing. Hence, the area has wide scope of manpower requirement, and there is a huge demand of trained personnel.

The Student Textbook for the job role of Sewing Machine Operator has been developed to impart knowledge and skills through hands-on-learning experience, which forms a part of the experiential learning. Experiential learning focusses on the learning process for the individual. Therefore, the learning activities are student-centred rather than teacher-centred.

The Student Textbook has been developed with the contribution of the expertise from the subject and industry experts and academicians for making it a useful and inspiring teaching-learning resource material for the students of vocational education. Adequate care has been taken to align the content of the textbook with the National Occupational Standards (NOSs) for the job role so that the students acquire necessary knowledge and skills as per the performance

criteria mentioned in the respective National Occupational Standards (NOSs) of the Qualification Pack (QP). The textbook has been reviewed by experts so as to make sure that the content is not only aligned with the NOSs, but is also of good quality. The NOSs for the job role of Sewing Machine Operator covered through this textbook are as follows:

1. AMH/N0301 Carry out stitching activities using machine or by hand
2. AMH/N0302 Contribute to achieve product quality in stitching operations
3. AMH/N0102 Maintain work area, tools and machines
4. AMH/N0103 Maintain health, safety and security at workplace
5. AMH/N0104 Comply with industry, regulatory and organisational requirements

This textbook covers sewing machine, its parts and attachments which are very important for the stitching process. The common terminology important for sewing machine operators is also given as it is necessary that a Sewing Machine Operator should understand the terms related to sewing and garments. The major activities of the construction process are measuring, marking, cutting and stitching. The required tools and equipment for these activities, their utility and importance is included in this textbook. The textbook describes the preparation and operationalisation of the sewing machine. In construction, various types of stitches, seams and edge finishes are used which have been covered here. The commonly occurring hazards and their safety measures for the workers are also explained in the textbook.

I extend my gratitude to all the contributors for sharing their precious knowledge, expertise, and time and also positively responding to our request for development of the present textbook. I hope this textbook will be useful for students and teachers who will opt for this job role. I shall be grateful to receive suggestions and observations from readers which would help in bringing out a revised and improved version of this textbook.

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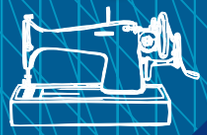
# Contents

Cherish cultural diversities
end gender disparities

Unit 1



# Introduction to Sewing Machine

## Introduction

A sewing machine is used to stitch the fabric and other pliable materials together with threads. Sewing machines were invented during the first Industrial Revolution to decrease the quantum of manual sewing done in garment industries. Since its invention, it has greatly improved the efficiency and productivity of the fabric, garment and needle industries.

The different parts of a sewing machine and its functions help the Operator to know the functioning of a sewing machine. There are different types of sewing machine used in the manufacturing of garments and other articles, but here in this Unit, we will study only single needle lock stitch machine.

A sewing machine controls the fabric with feeding devices and forms a perfect stitch to join the fabrics. It has various parts and attachments, each of which have their own importance and use. There are mainly two categories of sewing machines that is, domestic sewing machine and industrial sewing machine.

A Sewing Machine Operator should have the knowledge and skills to operate the different types of sewing machine. The Operator should know about the various operations of the sewing machine, its parts,

their functions, its attachments and the terms related to stitching. Some of the common and important terms are explained in this Unit.

## SESSION 1: SEWING MACHINE AND ITS TYPES

### Introduction to sewing machine

Before the invention of a useable machine for sewing, everything was sewn by hand. Many early efforts tried to replicate this hand sewing method but were mostly a failure. It looked to embroidery, where a needle was used to produce decorative stitches but not for joining the fabrics.

The final look of any garment or article depends on how the different components are attached together by sewing. Any variation in sewing leads to a defective material. Thus, sewing must be done with caution.

Sewing can be broadly classified in two categories—hand sewing and machine sewing. Hand sewing may be used for temporary purposes or sometimes, it may be used for some special purposes like hemming, buttonhole making, blanket stitch, etc. Here in this session, our main focus is on the sewing machine. The basic thought behind sewing machines is to mechanically stitch two or more pieces of material—mainly fabric, together using thread and a needle. Sewing machines reduce the amount of manual sewing in preparing a garment or any other article. Sewing machines help the operator in getting the work done quicker, with greater accuracy and much more consistently.

### Evolution of the sewing machine

The sewing machine device was invented in 1790 by English inventor, Thomas Saint, but he could not advertise his invention. He designed a wooden awl to make holes in leather and canvas, thus allowing a needle and single piece of thread through to hook underneath, and forming locked chain stitches. Josef Madersperger began developing the sewing machine in 1807 and he presented the working machine in 1814.

John Greenough patented the first sewing machine in the United States in 1842. Elias Howe created a sewing machine in 1845.

The sewing machine's recognition quickly spread like wildfire, initially selling to clothing manufacturers so that they could construct standardised clothing sizes on a larger scale. In 1860s, there was a quick popularity of these machines in the middle class section. Later in 1889, the machines run by electricity were designed with motors fixed in them. At first, these were standard machines with a motor strapped on the side. As with the expansion of the power in houses, these became more popular and the motor was gradually introduced into the casing. Later innovations include the ability to make more sophisticated stitching patterns. In the twenty-first century, sewing machine companies have manufactured several type of machines used for different sewing techniques and there are also computerised machines, embroidery machines and special purpose machines manufactured. The latest machines have LCD screens, microprocessors, and pre-programmed fonts.

## Categories of sewing machine

The following are the main categories of sewing machine.

### Domestic sewing machines

These are designed mainly for one person to sew individual dresses while using a single stitch type. Modern sewing machines are designed in such a way that the fabric easily glides in and out of the sewing machine, speeding the stitching process and saving time and energy. Some key points for domestic sewing machines are as follows.

1. Domestic sewing machines are usually used in homes by people simply interested in sewing.
2. These are commonly used by people in a variety of projects for dressmaking, and for stitching simple home furnishing items.
3. With little changes, these machines can perform a variety of stitch types.

4. Domestic sewing machines usually work on lightweight fabrics or work pieces.
5. These machines run on significantly smaller motors compared to that of the industrial sewing machines.

## Industrial sewing machines

1. Industrial sewing machines are a heavy-duty version of a standard basic sewing machine, and it is used in garment and other related industries.
2. Industrial sewing machines are used for mass production.

*Fig.1.1: Operators working on industrial machines*

3. These are heavy-duty machines that work thousands of stitches per minute.
4. An industrial machine is well equipped with a clutch and large servo motor.
5. Industrial machines are mainly designed to perform one single specific function in assembly-line based factories.
6. Some industrial machines are designed to operate heavier than normal material.
7. Mainly, mass production requires an industrial sewing machine, which is designed to sew heavy material speedily, such as leather, canvas, and vinyl, at one time.



8. The industrial machines are named based on the function that they serve. Typical names for industrial machine class include pocket setter, buttonhole, and programmable pattern sewers, etc. For instance, a pocket industrial machine can sew 2,000 pockets in an eight-hour production cycle.
9. Programmable machines can store 10–30 or more patterns in the memory.
10. Special purpose industrial machines can give better output in production, for example, buttonhole machines, pocket setter, pattern sewer.

Industrial sewing machines are larger, faster, more complex, and more varied in their size, price and task.

The following are the comparison between domestic and industrial sewing machines:

1. The industrial machine is faster, stitching from 3000–6000 stitches per minute, while the fastest domestic sewing machine stitches not more than 1500 stitches per minute.
2. The presser foot (See Session 3) on a power machine is raised and lowered with a knee lift to a special foot pedal. On domestic machines, it is generally operated manually using a lever at the back of the needle bar.
3. Lubrication is done automatically in industrial sewing machines whereas it is done manually in domestic sewing machines.

## Types of sewing machine

Though there are different types of sewing machine but mainly, three types are considered for sewing, as given below.

1. Mechanical sewing machines
2. Electronic sewing machines
3. Computerised sewing machines

### 1. Mechanical sewing machines

These machines are less expensive and are the simplest type of sewing machines in terms of build. They are the hand-operated sewing machine and treadle sewing machine.

*Fig.1.2: A hand-operated sewing machine*

*Fig.1.3: Treadle sewing machine*

**Hand-operated sewing machine**

(i) This is the simplest form of domestic sewing machine which is operated by hand.

(ii) A handle is attached to the flywheel (See Session 3) which is detachable and is used to operate the machine.

(iii) A hand-operated sewing machine is generally used for domestic purpose for simple projects as it does not work very speedily.

(iv) This machine is suitable where there is no electricity supply.

**Treadle sewing machine**

(i) This machine is the same as a hand-operated sewing machine but it is operated by feet, with an additional stand attached to the machine.

(ii) A belt is attached to the lower stand passing through the balance wheel and driven by feet.

(iii) These machines run faster than the hand-operated sewing machine.

(iv) This machine is also suitable for the places where there is no electric supply.

(v) When handling the treadle sewing machine, both the hands of the Operator are free to handle the fabric. Hence, this speeds up the work of sewing.

## 2. Electronic sewing machine

These machines became popular during the 1970s. There are many more features in an electronic sewing machine than in a mechanical sewing machine.

(i) These sewing machines run faster than manually operated machines.
(ii) In the electronic machines, balance wheel comes to motion by a belt, which is attached to an electric motor.
(iii) A single motor is attached to the electronic sewing machines and this motor supplies power to the needle.
(iv) It is essential to control the speed of this machine by putting pressure on an electronic foot pedal.
(v) Practice is essential to handle an electric sewing machine.

## 3. Computerised sewing machines

(i) These sewing machines are very fast and specific to use.
(ii) These machines are similar to the electronic sewing machines. However, a computerised sewing machine works with the help of various softwares.
(iii) Computerised sewing machines allow the Operator to tailor the functions according to the sewing needs. A computerised sewing machine functions very appropriately in designing and stitching various components of the garment like sleeves, yokes, pockets, etc. These advanced computerised machines have an LED display or LCD display or touch screen. They are multi function machines and are expensive.

The following are some other types of sewing machines according to their specific applications.

(i) Lock stitch machine
(ii) Chain stitch machine
(iii) Double chain stitch machine
(iv) Buttonhole machine
(v) Button stitch machine
(vi) Bar-tack machine
(vii) Feed off arm machine
(viii) Over-lock machine
(ix) Blind stitch machine
(x) Over-edge machine

*Fig. 1.4: Lock stitch machine*

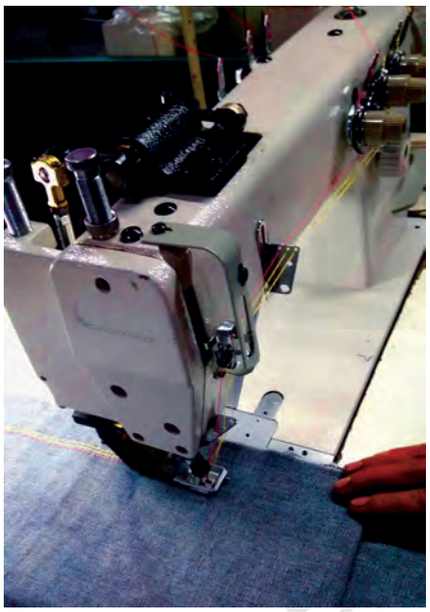


*Fig. 1.5: Chain stitch machine*

*Fig. 1.6: Double chain stitch machine*

*Fig. 1.7: Buttonhole machine*

*Fig. 1.8: Button stitch machine*

*Fig.1.9: Bar-tack machine*

*Fig. 1.10: Feed off arm machine*

*Fig. 1.11: Over-lock machine*

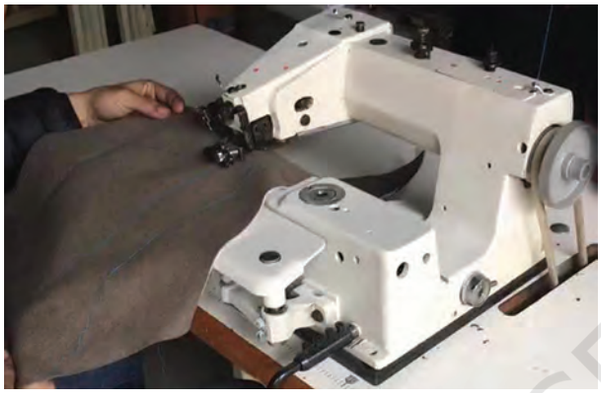


*Fig. 1.12: Blind stitch machine*

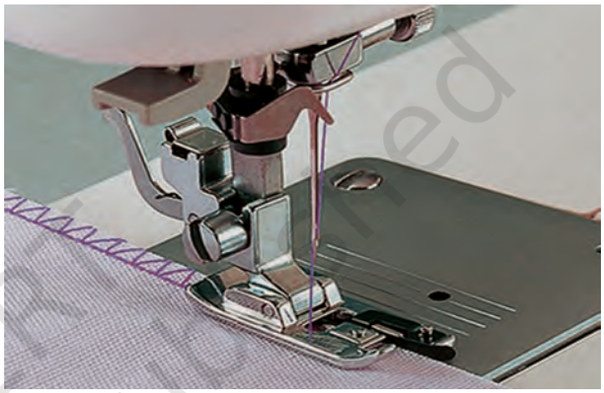


*Fig. 1.13: Over-edge machine*

## Practical Exercises

**Activity 1**

Prepare a chart of the different type of sewing machines.

**Material Required**

1. Chart sheet
2. Pictures of sewing machines
3. Adhesive/glue
4. Scissors
5. Coloured pens/pencils

**Procedure**

1. Search and collect the pictures of different type of sewing machines.
2. Cut the pictures very neatly with scissors.
3. Paste them on a chart sheet.
4. Label them.
5. Place the chart in the classroom/practical lab.

**Activity 2**

Visit the garment manufacturing industry/local distributors of sewing machines/boutiques/workshops/units of garment making and designing.

**Materials Required**

1. Notebook
2. Pen
3. Camera (if available/mobile phone with camera)
4. Vehicle (bus) for field visit

**Procedure**

1. Visit a garment manufacturing industry/local distributors of sewing machines/boutiques/workshops/units of garment making and designing with your teacher.
2. Observe the different parts and attachments of a sewing machine and its functions.
3. List the type of sewing machines used and write about their functions.
4. Prepare a report of the field visit.

## Check Your Progress

**A. Fill in the blanks**

1. _____ sewing machines are those usually used in homes by people simply interested in sewing.
2. A _____ sewing machine works with the help of various softwares.
3. _____ sewing machines use a single motor that supplies power to the needle.

**B. Short answer questions**

1. Enlist the different type of sewing machines.
2. Write short notes on:
   (a) Electronic sewing machines
   (b) Computerised sewing machines
3. Write the difference between a domestic and industrial sewing machine.

**C. Long answer questions**

1. Write down the different categories of sewing machine.
2. Explain mechanical sewing machines in detail.



## Session 2: Terminology Related to Sewing and Garments

Notes

There are some special terms related to sewing and garments which a Sewing Machine Operator should know to facilitate the task.

### A

#### Anchoring stitches

Machine stitches sewn with zero stitch length to keep from pulling out the stitch/thread, or the end of seam where one stitch backwards for some stitches to anchor the stitch

#### Apex

The highest point on the bust for ladies' garment

#### Armhole

It is a hole for the arm where bodice joins the sleeve. It is important to have the depth and width of the armhole to be perfect for an individual, especially when clothes are closely fitting.

#### Armhole scye

It is used to describe the scooped out curve of the armhole on a block or pattern.

### B

#### Balance

It refers to the hang and proportion of the garment. Fashion does determine balance to a certain extent, for example it is appropriate to wear long tops over short skirts. Where the flat pattern cutting is concerned, it is often difficult to judge correct balance until the garment is test-fitted.

#### Balance point

It is a mark made on the various pieces of the garment to maintain a balance while stitching.

#### Baste

To stitch the pieces of a fabric together temporarily (long running stitches) created by hand or by machine.

## Basting

Long, loose stitches employed to hold two pieces of fabric together until they can be sewn firmly by hand or by machine.

## Bell sleeve

A style of sleeve that is full and flared at the elbow or wrist level.

## Bias

It is a diagonal line across the grain of the fabric. When used to substitute crosswise or lengthwise grain in pattern placement, a bias cut will cling to the figure following body curves closely.

## Bias cut

Any diagonal cut that is not on the lengthwise or crosswise grain is a bias cut.

## Binding

It is a strip of fabric used to cover a seam edge or enclose raw edges. It can be straight or bias.

## Blind hemming (stitch)

It is a hemming (stitch) that is not visible on the face of a fabric or garment.

## Bobbin winder tension angle

It is a device situated near the bobbin winder which helps to wind the bobbin evenly.

## Bodkin

Long, flat, needle-like tool used to thread elastic through a loop

## Brocade

In textiles, woven fabric having a raised floral or figured design that is introduced during the weaving process. The design, appearing only on the fabric face, is usually made in a satin or twill weave. The rich, fairly heavy fabric is frequently used for evening dresses, draperies, and upholstery.



### Button

It is usually round in shape and is used to close an opening in the garments or any other article. It is used for decoration purpose also. Buttons are available in the market in different size, shape, material and colours.

## C

### Cambric

It is a soft, plain weave cotton or linen fabric closely woven, usually given a slight stiffening.

### Canvas

It is a general classification of strong, firm, closely woven fabrics usually made with cotton, originally made of hemp. Produced in many grades and qualities, it may be softly finished or highly sized.

### Carding

It is a mechanical process that disentangles, cleans and intermixes fibres to produce a continuous web or sliver suitable for subsequent processing.

### Centre point

The point that is equally distant from every point on the circumference of a circle or sphere or place in the middle.

### Chain stitch

It is a stitch formed by making connected loops that form a chain.

### Cheesecloth

It is a plain weave, thin cotton fabric, loosely woven. It has a slight crepe texture

### Chiffon

It is a very lightweight, sheer silk or manufactured filament fabric made in a plain weave with fine, hard spun yarn of approximately the same size in warp and filling and the same number of ends and picks per inch. The finish is dull and soft, or sometimes stiff. The fabric is delicate but relatively strong.

## Clip

It is a small snip or cut made in the edge of fabric. All curved edges must be clipped so that the fabric lies flat when final pressing is done.

## Combing

It is a technique whereby fibres are passed through a series of straight, metal teeth in order to lay the fibres parallel to one another.

## Cords

It is thin, flexible string or rope made from several twisted strands.

## Corduroy

It is a strong durable fabric with a rounded cord, rib, or wale surface formed by cut pile yarn. The back of the goods has a plain or a twill weave.

## Couching

A method of embroidering in which a design is made by various threads or cords laid upon the surface of a material and secured by fine stitches drawn through the material and across the cord. Couching is either raised or flat.

## Crêpe

It is a general classification of fabrics that may be made of silk, rayon, acetate, cotton, wool, manufactured fibres, or blends, characterised by a broad range of crinkled or grained surface effects.

## Cross grain

It refers to the yarn direction that is perpendicular to selvedge.

## Crotch point

This is where the inside leg seams meet the crotch seams in a trouser. The exact position depends on the figure but the crotch point should be towards the front of the body.

## Cutting board

It is a specially constructed, folded, corrugated board which opens out to cover a table or bed to provide a surface on which the pattern is cut out or made.

## D

### Dart

It is a wedge or diamond-shaped section removed from the surface area of a garment part by stitching.

### Dart intake

The intake is the extra quantity of fabric taken while making the dart.

### Denim

A well-known basic cotton or blended fabric usually woven in a 2/1 or 3/1 warp- faced right hand twill. Generally, the warp is dyed blue or sometimes brown with a white filling

### Dobby weave

It is a style of patterned weave consisting of small frequently repeated geometric designs.

### Double-fold hem

It is a hem that is folded once for the hem allowance and a second time to enclose the raw edge.

### Double needle

Two machine needles attached to a single shaft that sews two parallel rows of stitches at once with two spools of thread and one bobbin. Sometimes it is known as twin needle.

### Drafting

It is a step/system for pattern making that depends on the measurements taken from a dress form or model, or the actual measurements, to create basic/foundation or design patterns of the garment or article.

## E

### Ease

It is the amount of space added to the measurements in order to ensure that there is space to move while wearing the garment. The amount varies according to the current fashion.

## Easing

This is needed when joining two edges that are of different lengths and shape. The longer edge makes a slight bubble of fabric as it is seamed, which provides a slight ease for movement. Examples of easing include sleeve heads into armhole, back shoulder on to front shoulder, back edge of sleeve seam on to front edge at elbow level.

## Edge stitch

It is a kind of straight stitching very close to the edge of a seam, trim, or outer edge. It secures seam allowances, prevents the edge from stretching, and supports the fabric.

## Eye

It is the part on the needle that carries the thread to keep forming stitches.

## Eyelets

It is a small hole, usually round and finished along the edge, as in cloth or leather for the passage of a lace or cord.

# F

## Fabric weight

The weight of a fabric depends on the thickness of the threads it is made of, of the density of the weave or knit, as well as its composition. The dyeing or printing process can also affect the weight. The weight will be measured in grams per square metre ($g/m^2$ or gsm) or in ounce per square yard ($oz/y^2$, often abbreviated to oz.)

*Very light:* upto 4 oz. (135 $g/m^2$)
*Light:* 4 to 6 oz. (135 $g/m^2$ to 200 $g/m^2$)
*Medium:* 6 to 8 oz. (200 $g/m^2$ to 270 $g/m^2$)
*Medium-heavy:* 8 to 10 oz. (270 $g/m^2$ to 340 $g/m^2$)
*Heavy:* 10 to 12 oz. (340 $g/m^2$ to 400 $g/m^2$)
*Very heavy:* above 12 oz. (400 $g/m^2$)

## Fabric width

It is the fabric cut from one selvedge edge to the other selvedge.

## Feeding devices

These are the parts of a sewing machine which are used to advance and raise the fabric while stitching.

## Felt

It is a non-woven sheet of matted material made from wool, hair, fur, or certain manufactured fibres. It is an entanglement of a mass of fibres that takes place by a combination of heat, moisture, and pressure; no bonding adhesive (sticking material) is used.

## Filament

It is a fibre of indefinite or extreme length. This length permits the use of filament in yarn without twist or with very low twist.

## Flare

It is a shaped fullness added to the different parts of a garment. While cutting a pattern, flare is added by cutting from the top to the bottom of the basic shape of the garment and spreading the pieces at one edge only.

## Floss

It is a soft thread of silk or mercerised cotton for use to clean between tension discs, feed dog, etc. It may be used to clean the area between two narrow parts.

## Flounce

It is a full circular edging for the neckline, sleeves and hems.

## Forearm seam

It is the seam nearest to the front of a two piece sleeve.

## Frill

It is a strip of fabric of any width gathered and attached to a garment as an edging.

## Fringe

It is a decorative edge made of hanging strings of thread or fabric. It is an edging or border of loose threads, tassels, or loops. These may be produced by the constituent threads or by threads added to a fabric after weaving or knitting. The threads forming the fringe are

sometimes bunched or knotted together to increase the decorative effect.

### Fullness

It is an extension on one of two sections of a garment joined by a seam, used to create volume or shape in the garment.

### Fusible

It is a type of fabric or material that has heat-sensitive adhesive on one side that enables it to bind to another fabric.

### Fusible interfacing tape

It is available in a variety of narrow widths. On heating, this tape fuses to fabric to stabilise a seam or edge.

### Fuzz

It refers to the fibre ends that protrude from a yarn or fabric.

## G

### Gather

It means becoming contracted into wrinkles/small folds, creases, etc., as cloth/fabric. Gathers are made by sewing parallel rows of running stitch near the garment edge and then pulling or drawing the stitching thread so that small folds are formed.

### Gathering

It allows for making a long piece of fabric to fit with a shorter piece of fabric and also is a method of easing a seam to allow insertion of sleeves and another rounded pattern pieces.

### Gingham

It is a medium weight cotton fabric, plain weave and yarn died; made with carded or combed yarns. Gingham varies in quality, depending upon the type of yarn, fastness of colour, construction and weight.

### Godet

It is a flared or triangular insert in the hemline of any garment.



## Grain

It is the direction of yarns in a woven fabric along the length to across the width. It is important for a good fit and the garment should be cut on the right grain or in other words on grain. An on grain garment hangs evenly and appears symmetrical. If the garment is off-grain, it will not hang straight.

## Grain line

It is a line drawn from end to end on the pattern piece to show how the pattern should align with the lengthwise grain of the fabric. The pattern pieces will always be placed parallel to the selvedge on the fabric in the direction in which the grain line is drawn on each pattern.

## Gusset

It is a small piece of fabric inserted in the seam to allow room for movement. Gussets are mostly required in *kalidar* kurta sleeves to allow arm movement.

# H

## Halter

It is a style of neckline that has a strap or an extension of fabric running from the front armhole to around the back of the neck edge.

## Ham

A tailor's ham or dressmaker's ham is a tightly stuffed small pillow used as a curved mould when pressing curved areas of clothing, such as sleeves, darts, waistlines collars, or cuffs.

## Hand overcast

A hand stitch that wraps around an edge like a spiral

## Handle

It is attached to the handle attachment of the machine and helps to drive it with hand.

## Hem

It is an edge finish used to finish the bottom edge of a garment or any other article.

### Hem allowance

It is the distance between the cutting line and the hemline

### Hemline

It is the lowest edge of the garment once the hem is sewn.

### Hemp

It is a fine, light-coloured, lustrous, and strong bast fibre, obtained from the hemp plant. The term hemp is often incorrectly used in a generic sense for fibres from different plants.

### Hook

A piece of metal or other hard material curved or bent back at an angle, for catching hold of or hanging.

## I

### Interfacing

It refers to a sew-in or fusible fabric used to stabilise the fashion fabrics. It can also add body, reinforce, or shape.

### Interlacing

During stitching, when one thread passes over or around another thread or loop of another thread, it is called interlacing.

### Interlooping

It is the passing of a loop of thread through another loop formed by a different thread.

### Intralooping

When a loop of one thread passes through the loop of the same thread during sewing

## J

### Jacquard weave

It is a decorative weave which is manufactured on a jacquard loom. In this weave, detailed and intricate designs are made. Manufacturing of the jacquard designs involves at least two basic weaves in various



arrangements to form the pattern. Brocade is a common example of the jacquard weave.

**L**

### Lawn

A fine, plain weave, relatively sheer cotton fabric made in close constructions

### Linen

This fibre is obtained from the stem of the flax plant. Linen is a strong and durable fabric.

### Lining

A fabric (usually lightweight) which helps to cover the stitching details on the inside of the garment

### Loop stitches

These are stitches formed by the loop section of a serge or over locker.

**M**

### Marking chalk

These are made of coloured powder that is used to transfer markings on to the fabric.

### Mending

It is a finishing process in fabric manufacture in which irregularities such as weaving imperfections, tears, and broken yarns are repaired after the cloth is taken from the loom. It is primarily done on woollen and worsted woven fabrics to prepare them for further finishing.

### Mercerised thread

It is a boil-fast (that is, damage resistant at the boiling temperature), plied, corded cotton thread which has been treated with caustic soda, to give it more strength, lustre and affinity for dyes.

### Mercerising

It is a treatment of cotton yarn or fabric by swelling in strong alkali. The process causes a permanent swelling of the fibre, increasing its lustre, strength, and affinity for dyes.

## Muslin

It is basically an unbleached plain woven cotton fabric used for making test fits. It is available in light, medium and heavy weight. Medium quality is used for test fitting and draping. It is used by the designers to check the fit and look of the design before the construction of a garment.

**N**

## Nap

It is a layer of fibre ends raised from the ground weave of the fabric by a mechanical brushing action. In napped fabrics, a fuzzy, fur-like feel is created when the fibre ends extend from the basic fabric structure to the fabric surface. The fabric can be napped on either one or both sides. In napped fabrics, the texture runs in a particular direction and requires all pattern pieces to be cut facing the same direction.

## Needle clamp

It is a screw that is tightened to hold the needle in position.

## Notch

It is a small cut that is shaped like a V and that is made on an edge or a surface.

**O**

## Organza

It is a lightweight, transparent fabric in plain weave with a crisp hand that usually is made of very fine filament yarns. The most commonly used fibres are silk, nylon, polyester, or rayon.

## Overcast stitch

It is a slanting stitch used around cut edges or open parts to prevent raveling.

**P**

## Pattern

It is the paper or cardboard template from which the parts of a garment are traced onto the fabric before cutting out and assembling.



## Pile

A surface effect on a fabric formed by upright yarns, cut or loops of yarn raised from the surface of the fabric

## Pinning

Attaching pins for keeping the fabric and pattern in place

## Plain weave

A weave in which each weft yarn passes alternately over and under each warp yarn in a square pattern that is, the interlacing is one up and one down for the whole length of the fabric

## Pleat

It is a type of fold formed by doubling the fabric back upon itself and securing it in place. It is commonly used in garments and upholstery to gather a wide piece of fabric to a narrower circumference.

## Ply

It is one of the strands in a yarn. The thickness of yarn is also determined by how many plies or strands it has twisted together.

## Point presser

A small tool used to insert into a tight corner or small space for ease of pressing

## Point turner

A tool used to turn a sewn corner to the right side with a sharp, crisp point

## Polyester fabric

It is a generalised term for any fabric, which is made using polyester yarns or fibres. This name is used for a synthetic, man-made polymer, which, as a specific material, is most commonly referred to as a type called polyethylene terephthalate (PET).

## Pre-shrink

Washing the fabric before cutting to allow it to shrink depending upon the type of fabric

### Princess seam

It is a lengthwise seam passing through the apex and giving shape to the garment. The seam may originate from the armhole, shoulder and neckline. The seams are named accordingly. For example, a princess seam originating from the shoulder is called a shoulder princess.

### Pucker

It is tightly gathered or contracted into wrinkles or small folds, caused due to incorrect density of stitches, blunt point needle, insufficient backing, and incorrect thread tensions.

## R

### Raw edge

Fabric ends with an unfinished look

### Rib weave

It is a variation of plain weave with cords in the warp or weft direction.

### Ripping

To cut or tear apart in a rough or vigorous manner to rip open a seam

### Rubber ring

This is a ring on the bobbin winder which comes in contact with the nut of the balance wheel. This should never be allowed to become oily which will make it slippery and will not be able to make proper contact with the balance wheel.

### Ruffles

It is a pleated piece of fabric often used as trim on clothes. A ruffle on the bottom of a dress is like a fancy wrinkle. It can be used as linear trims to finish any edge of the garment.

## S

### Seam

A line along which two or more fabrics are joined by fusion, glueing, sewing, stapling. Usually near edges of the fabric pieces.



## Seam allowance

It is the area between the edge and the stitching line on two (or more) pieces of material being stitched together. It can range from 1/4 inch wide to as many inches as required (mostly not more than three inches).

## Seam finish

Any technique that finishes the raw edges of a seam

## Seam roll

It is a cylindrical-shaped long tool used to press open long seams or to slide inside a sleeve for creaseless pressing.

## Selvedge

It runs parallel to the lengthwise grain of the fabric which is a tightly woven finished edge of fabric.

## Sewing needle

It is a fine cylindrical piece of metal with a sharp point at the lower end, a hole or eye in it, used in sewing.

## Sewing threads

It refers to special types of yarns that are designed to pass through a sewing machine. The basic function of a thread is to deliver aesthetics and help in the performance in stitches and seams.

## Shank

The back of a button through which the thread passes, to attach the button to the garment

## Shears

It is a cutting instrument in which two blades move past each other, like scissors, but these are typically larger. These are also known as large scissors.

## Sheer

Any such transparent or very light-weight fabric as sheer chiffon, crepe, georgette or voile of various constructions and yarns, especially silk and manufactured fibre yarns. Sheers are made in both spun and filament yarn constructions.

NOTES

## Shirring

It is a process to gather (an area of fabric or part of a garment) by means of drawn or elasticised threads in parallel rows.

## Shuttle

It holds the bobbin case and moves to form the loop as the machine is operated. It is fitted below the feed dog.

## Skipped stitches

In skipped stitches, there is no needle thread or looper thread movement during certain respective portions of the stitch cycle. It is one of the most common sewing machine problems. It can be one skipped stitch or multiple skipped stitches between normally sewn stitches.

## Snagging

In fabrics, a yarn or part of a yarn pulled or plucked from the surface

## Snap tape

It is perfect for keeping bodysuits closed and taut that is, not loose. Snap tape is made up of snap fasteners, sometimes called press studs, which have been applied to pieces of fabric. The snaps are made of mainly metal or plastic.

## Stabiliser

In the context of a garment, it is a fabric under the layer used to hold the shape of the fabric/garment or support its strength.

## Staple yarn

It is produced from short-length fibres called staple. With the exception of silk, mostly the fibres that come from natural sources are staple fibres.

## Stay stitch

Stitching placed on or just outside the seam line, used to stabilise the fabric



## Stitch

Loop or loops of one or more threads when bound with each other, either by interlooping, interlacing, intralooping or combination of these three while sewing fabric, each unit of such configuration is called stitch.

## Stitches per inch (SPI)

A stitch per inch (SPI) is measured by counting the number of stitches found within one inch. The number of stitches per inch has a direct influence on the seam strength, the stitch appearance and the seam elasticity on stretch fabrics. Using the correct number of stitches per inch can greatly enhance the strength, appearance and performance of the seam for a given fabric type and application.

## Stitch length

Length of a stitch determined by the movement of the feed dog.

## Stitch line

It refers to a line in the paper pattern where one complete movement of a threaded needle passes through a fabric or material over the line.

## Strand

A general term for one component of a rope, thread, or ply yarn, or any of the fibers that are twisted or plaited together to form the aforementioned. Sometimes the term also is applied to the entire rope, cable, thread, or ply yarn.

## Stretch fabric

The fabric in which the properties of substantial elongation (stretching) and recovery that is, coming back to its original position, have been produced

## Stripe

A design consisting of bends or straight lines against a plain background







## T

### Tacking

Fastening pieces of fabric together, mostly temporarily, with stitches

### Tassels

A bunch of loosely hanging threads or cords knotted at one end and attach for decoration of garments such as dupattas, scarf, kurtis and home furnishing items

### Terry

It is a woven fabric, usually cotton, or a blend with manufactured fibre, with loops pile on one or both sides. Loops may cover the entire surface or may form stripes, cables, checks or other pattern. The fabric is noted for its ability to absorb moisture.

### Thread tail

The left-out thread, unfinished or untrimmed threads on the edges

### Thread tension

The degree of tightness of stitches in machine sewing or the state of the thread being stretched tight

### Top stitch

It is a row of continuous stitches on the top or right side of a garment or any other article. It is a sewing technique where the line of stitching is designed to be seen from the outside of the garment, either decorative or functional. Top stitching is used most often on garment edges such as necklines and hems, where it helps facings to stay in place and gives a crisp edge.

### Trim

It is any decorative item, ribbon, lace, etc., that is put on a garment or other item that is being sewn. The word trim is also used to define the act of trimming excess seam allowances or fabric with scissors.



## Trimming materials

Additional material used for decorative or functional purposes on a garment and on other items are trimming materials.

## True bias

Also called true across, it refers to a bias of 45 degrees to the selvedge.

## Tucks

A flattened, stitched fold in a garment or material, typically one or several parallel folds put in a garment for shortening, tightening, or decoration

## Twill weave

It is a type of textile weave with a pattern of diagonal parallel ribs. This is done by passing the weft thread over one or more warp threads then under two or more warp threads.

# U

## Upholstery fabric

Any fabric used as upholstery, for example, to cover furniture. It is made in a wide variety of fibres including cotton, linen, silk, wool, manufactured fibres, and blends. Weaves include plain, twill, satin, jacquard and dobby. Some knits are also used.

# V

## Velvet

It is a warp ply fabric with shorts closely woven cut pile that gives the fabric a rich, soft texture. Originally the pile was made of silk but now, it is also made of cotton, manufactured fibres, and various blends.

## Voile

It is a lightweight, sheer fabric, made of hard twisted yarns in a low count plain weave. It is made of cotton, worsted, silk, rayon or acetate.

## W

### Warp

It is the lengthwise yarns used in the weaving operation. This forms the basic structure of the fabric. Warp yarns generally have more twist than weft yarns because they are subjected to more strain in the weaving process, and therefore, require more strength.

### Weft

The crosswise yarn that interlaces with warp in weaving is known as weft or filling yarn. Weft yarns are carried over and under the warp. Filling yarns, generally have less twist than warp yarns because they are subjected to less strain in the weaving process and therefore, required less strength.

### Worsted

The yarns spun wholly from combed wool to ensure that all the fibres are reasonably parallel. The fabrics made from such yarns are called worsted fabrics.

## Y

### Yarn

It is a continuous strand of textile fibres that may be composed of endless filaments or shorter fibres twisted or otherwise held together. Yarns may be single or ply, and form the basic elements for fabric/threads.

### Yoke

It is a shaped pattern piece which forms part of a garment, usually fitting around the neck and shoulders, or around the hips to provide support for looser parts of the garment, such as a gathered skirt or the body of a shirt.

## Z

### Zigzag stitch

The Z-shaped stitches used to finish raw edges. It may be used for decoration purpose also.



## Practical Exercises

**Activity 1**

Collect any ten pictures showing different stitches/parts of a sewing machine/fabric, etc., from the terminology listed above and prepare a scrapbook of the same.

**Material Required**

1. Scrapbook
2. Ten pictures of your choice from the terminology listed above
3. Adhesive/glue
4. Scissors
5. Coloured pens/pencils

**Procedure**

1. Search and collect any ten pictures showing different stitches/parts of a sewing machine/fabric, etc., from the terminology listed above.
2. Cut the pictures very neatly with scissors.
3. Paste them in a scrapbook.
4. Label them.

## Check Your Progress

**A. Fill in the blanks with the most appropriate answer from the choices given below**

1. True bias refers to a bias of _____ to the selvedge.
   (a) 90 degrees
   (b) 45 degrees
   (c) 50 degrees
2. Selvedge is a tightly woven factory edge of fabric that runs parallel to the _____ grain.
   (a) width wise
   (b) crosswise
   (c) length-wise
3. _____ is the finished bottom edge of a garment.
   (a) Warp
   (b) Selvedge
   (c) Hem
4. _____ is the distance between the cutting line and the hemline.
   (a) Hem allowance
   (b) Hem
   (c) Hemline

5. _____ is a strip of fabric of any width gathered and attached to a garment as an edging.
   (a) Gathers
   (b) Frill
   (c) Dart
6. _____ is basically an unbleached, plain woven cotton fabric used for making test fits.
   (a) Voile
   (b) Mulmul
   (c) Muslin

**B. Arrange the jumbled words**

| | | | |
|---|---|---|---|
| (a) seae | (d) pwar | (g) radngfit | (i) ctshit |
| (b) iabs | (e) denele | (h) fewt | (j) tpatner |
| (c) anigr | (f) hteard | | |

**C. Questions**

1. Enlist any ten sewing terminologies and explain the same.
2. Explain the given terminologies:
   (a) Grain
   (b) Hem
   (c) Seam allowance
   (d) Selvedge

## SESSION 3: VARIOUS PARTS OF A SEWING MACHINE AND ITS ATTACHMENTS

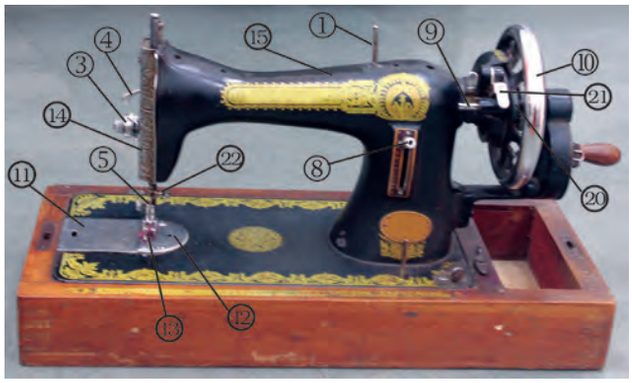
The basic structure of the mechanical sewing machines is the same—whether it is a hand-operated sewing machine, treadle sewing machine or motorised sewing machine.

### Sewing machine: parts and their functions

The basic parts of a sewing machine are:

1. *Spool pin* is a metal rod placed on the top of the machine for correct positioning of the reel of thread.
2. *Thread guide* takes the thread from the spool pin to the needle through a small hole. It holds the thread in position from the spool to the needle. It smoothens the thread and protects it from abrasion.

3. *Tension disc* is a combination of two concave discs placed together with the convex sides facing. From spool pin, the thread passes through the thread guide, then between the tension discs to the needle. Tension discs control the delivery of the upper thread from the spool to the needle. The tension of the thread is adjusted by a spring and nut which decreases or increases the pressure.
4. *Thread take-up lever* is a lever fitted to the body of the arm located above the tension disc. It receives its up and down motion from the front axle. At the outside end of the lever, there is a small hole through which the thread passes. The take-up lever first loosens the top thread during the stitch formation, and then removes any slack to set or lock the stitch.




(a)

(b)

(c)

(d)

(e)

*Fig.1.14 (a–e): Parts of a sewing machine*





5. *Needle bar* is a metal rod to hold the needle at one end with the help of a clamp. Its main function is to give motion to the needle.
6. *Presser foot* is a detachable device for holding the material in place on the feed dog while stitching. This device is not used when attachments for tucks, ruffles or embroidery are used.
7. *Presser foot lifter* is the lever attached to the presser bar (located inside the face plate) to control the up and down movement of the presser foot. It must always be lifted up to take out the material from the machine.
8. *Stitch regulator* controls the length of the stitch.
9. *Bobbin winder* is a device which helps in winding the bobbin (located inside the slide plate) properly. The thread passes through it tightly or loosely, as desired.
10. *Fly wheel (or balance wheel)* is a round wheel located at the upper right of the sewing machine. This is made to revolve the machine. It controls the motion of the machine manually or electrically.
11. *Slide plate* is a rectangular plate, which facilitates the removal of the bobbin case without lifting the machine top.
12. *Needle plate or throat plate* is a semi-circular disc with a hole to allow the needle to pass through it. The fundamental purpose of this plate is to provide a levelled surface for the material and to prevent the dust from entering the inner parts of the sewing machine.
13. *Feed dog* consists of a set of teeth fitted below the needle plate. When the machine is in motion, the feed moves upwards, thus advancing the material as each stitch is made. It helps to move the material forward while sewing.
14. *Face plate* is a cover, which when removed, gives access to the oiling points on the needle bar, presser bar and take-up lever.
15. *Arm* is a horizontal part of the head that houses the drive shafts.



16. *Check spring* is a small wire spring behind or at the top of the tension discs. It provides a little amount of tension on the thread of the needle and acts a shock absorber.
17. *Slack thread regulator* is a metal hook near the tension discs.
18. *Bobbin case* is fixed in the shuttle case placed in the bottom chamber (the hollow space under the slide plate) of the sewing machine and moves into position to catch the top thread and form the stitch as the needle is lowered into the bobbin case. The lower tension of the thread can be adjusted (by loosening or by tightening) by a small screw fixed on the bobbin case.
19. *Clutch or thumb screw* is in the centre of the fly wheel and it engages and disengages the stitching mechanism.
20. *Rubber ring* is a ring on the bobbin winder which comes in contact with the nut of the balance wheel. This should never be allowed to become oily, as it will make it slippery and will not be able to make proper contact with the balance wheel.
21. *Bobbin winder tension angle* is a device situated near the bobbin winder which helps to wind the bobbin evenly.
22. *Needle clamp* is a screw that is tightened to hold the needle in position.
23. *Handle driver* is attached to the handle attachment of the machine and helps to drive it with hand.
24. *Shuttle* holds the bobbin case and moves to form the loop as the machine is operated. It is fitted below the feed dog or to its left side.
25. *Treadle drive* is a large wheel located under the board in the treadle machine. It is connected to

*Fig 1.15: Shuttle and shuttle case*

the balance wheel with a leather belt. As it rotates, the power is transmitted to the balance wheel by the leather belt.

26. *Treadle* is the foot rest at the base of the treadle machine which is pressed with the feet to operate the treadle machine.
27. *Pressure regulating screw* is the screw above the presser bar, which can be tightened to increase the pressure on the fabric when stitching with fine/ lightweight fabric and loosened to accommodate thick fabric.

*Fig.1.16: Blind hem foot*

*Fig.1.17: Braiding foot*

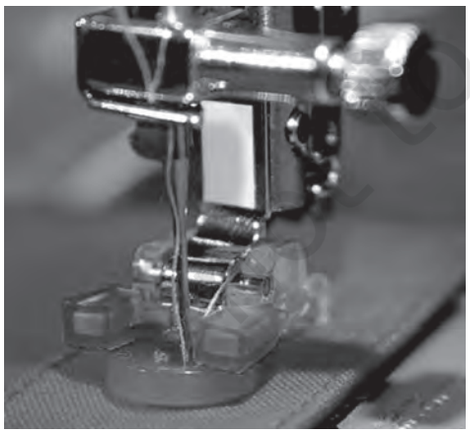


*Fig.1.18: Button fixing foot*

## Sewing machine: attachments and their functions

Different machines have separate attachments for different sewing processes such as hemming, gathering, etc., but they operate differently on various makes of machines. The details of attachments are mostly given in the manual provided with the machine. Students may discuss with the teacher and according to the availability of the sewing machine and attachments, they can practise on it. Some common sewing attachments are given here.

### Blind hem foot

It is an additional attachment basically used for edge finishing of various apparels like trousers and skirts, and home furnishing items like curtains, etc. (Fig.1.16).

### Braiding foot

It allows lot of flexibility while attaching elastic cord, braid or cord (Fig.1.17).

### Button fixing foot

It can attach two-holed buttons and four-holed buttons to the material or garment. In this machine, the foot holds the button in place and then attaches the button to the fabric using zigzag stitch (Fig.1.18).





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## Buttonhole foot

It is used for preparing precise buttonholes or binding the raw edges. These attachments are complicated to use on straight stitch machines. In such cases, it is advisable to handsew the buttonholes. On a sewing machine, the buttonhole attachment produces a simple buttonhole stitch by swinging the needle from side to side. Insert the attachment by removing the presser foot and putting the buttonhole attachment in its place (Fig.1.19).

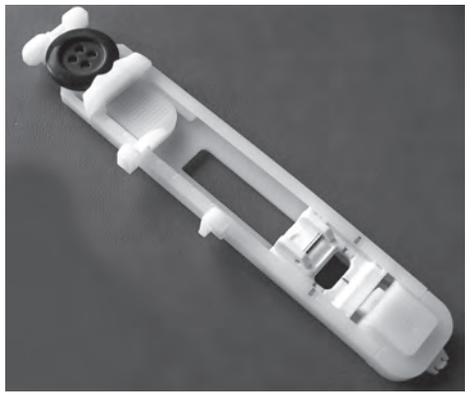


*Fig.1.19: Buttonhole foot*

## Circular sewing attachment

It allows the operator to stitch in a circular pattern using straight stitch, zigzag stitch and any decorative stitches. Circles mostly up to 26 cm in diameter are stitched perfectly using this popular attachment, which is very essential for craft and decorative work. This is suitable for most top loading machines (Fig.1.20).

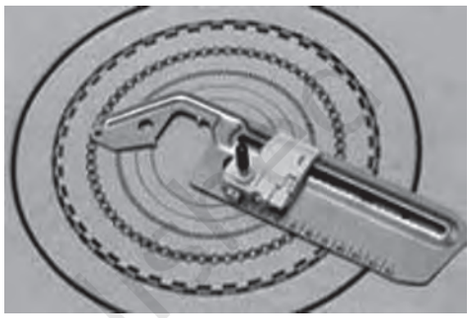


*Fig.1.20: Circular sewing attachment*

## Cording foot

To attach decorative cords and threads, a cording foot is attached to the machine. This foot is designed for stitching closed to a raised edge. It is used for applying cord to the seam (Fig.1.21)

*Fig.1.21: Cording foot*

## Decorative tape foot

This attachment is used to fix trimmings and ribbons on the fabric (Fig.1.22).

*Fig.1.22: Decorative tape foot*

## Gathering foot

It is attached to create gathers on a fabric with high speed and precision to create perfect ruffles. This attachment gathers the fabric as it is stitched with fullness locked in every stitch (Fig.1.23)

*Fig.1.23: Gathering foot*

## Zigzag foot

It is attached to create designs in fabric using zigzag stitches of different widths (Fig.1.24).

*Fig.1.24: Zigzag foot*

*Fig.1.25: Hemmer foot*

*Fig.1.26: Overcasting foot*

*Fig.1.27: Ruffling foot*

## Hemmer foot

It works on the sleek and small edges of fabrics as it automatically curls using either a straight stitch or decorative stitch at the hemlines. It works for hems which are too small to do by hand. It is best suitable for light weight fabrics. Hemmers make hems from three-sixteenths of an inch to seven-eighths of an inch wide, right on the machine. This attachment means hours saved from hand turning and basting. The hem is turned by the hemmer, and at the same time the line of stitching is guided close to the edge of the hem (Fig.1.25).

## Overcasting foot

It delivers an accurate and consistent overcasting stitch where the thread is locked around the edge of the fabric and aligned with it to prevent the fabric from ravelling (Fig.1.26).

## Ruffling foot

It easily makes and attaches ruffles on different types of fabric and finish the fabric edges. This attachment is capable of taking gathered or pleated frills, and will take and apply frills to another section at the same time. It is useful in making children's clothes and curtains. It is one of the most important attachments of sewing machine, and reflects a great deal of credit upon the inventors of these remarkable time-and-money-saving bits of steel. The method of using this attachment varies with different machines (Fig.1.27).

## Zipper foot

It is the footer used for attaching mainly zips and snap tape. Zipper foot has a

narrow toe foot which gives more precision and visibility. The foot needs to be adjusted to right or left to stitch both sides of the zip. This foot also attaches decorative cording and piping. There are two kinds of zip foot attachment: one with an adjustable foot, the other with a non-adjustable foot (Fig.1.28).

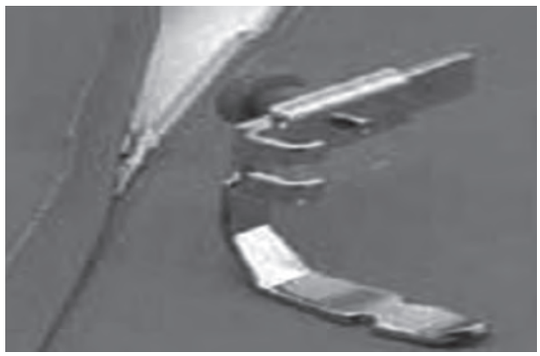


*Fig.1.28: Zipper foot*

## Elastic foot

It helps in attaching elastic to the fabric and provides even tension every time to avoid pulling and tugging on the needle (Fig.1.29).

*Fig.1.29: Elastic foot*

## Embroidery foot

It is suitable for shirring fabric. Its design allows the elastic thread to pass easily under the presser foot. On sewing machines, the elastic is couched onto the fabric. The thread is fed through the presser foot hole and pulled gently. The more it is pulled, the more the fabric gathers. On a straight stitch machine, the elastic is wound around the bobbin (Fig.1.30).

*Fig.1.30: Embroidery foot*

## Overlock foot

It is useful for producing a durable finish on seams which fray easily or are bulky. It is suitable for use on a sewing machine and is most effective when the fabric is positioned under the presser foot so that the stitches form slightly over the fabric edge. A metal bar holds the edge in place to make sure that the stitches are set correctly. Test that you have the correct positioning and stitch width before you start to sew. Fig. 1.31 shows the attachment of overlock foot. It can be attached to the sewing machine.

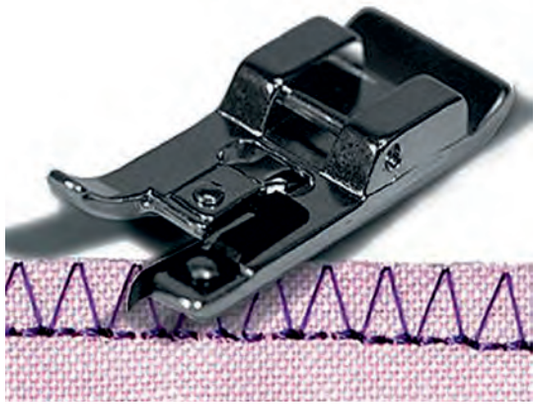


*Fig.1.31: Overlock foot*





## Practical Exercises

### Activity 1

Draw the sewing machine and label its different parts.

**Material Required**

1. Pencil
2. Sharpener
3. Eraser
4. Practical file
5. Ruler

**Procedure**

1. Draw a diagram of the sewing machine in the practical file.
2. Label the different parts of the sewing machine.

### Activity 2

Make a chart of the different attachments of a sewing machine.

**Material Required**

1. Chart sheet
2. Pictures of different attachments of sewing machine
3. Adhesive/glue
4. Scissors

**Procedure**

1. Search and collect pictures of different attachments of the sewing machine.
2. Cut the pictures very neatly with scissors.
3. Paste them on a chart sheet.
4. Label them.
5. Place the chart in the classroom/practical lab.

### Activity 3

Identify the different parts and attachments of the sewing machine under the guidance of instructor/teacher.

**Material Required**

1. Sewing machine
2. Different attachments (as per availability)

**Procedure**

1. Identify the parts of the sewing machine one by one.
2. Identify the different attachments of the sewing machine one by one.



**Activity 4**

Visit a sewing machine shop/boutique/workshop/garment manufacturing unit. Study the machines and their attachments used. Prepare a report on the parts, attachments and their functions.

**Material Required**

1. Notebook
2. Pen
3. Camera (if available/mobile phones with camera)
4. Vehicle (bus) for field visit

**Procedure**

1. Visit the local sewing machine shop/boutique/workshop/ garment manufacturing unit with the teacher and study different types of machine and its latest developments.
2. Identify the different parts of the sewing machine and explain its functions.
3. Identify the sewing machine attachments.
4. Write down the types of sewing machine used in shop/ boutique/workshop/garment manufacturing units and write about its parts, functions and operations.
5. Prepare a report of the field visit using photos and materials collected from the site.

## Check Your Progress

**A. Fill in the blanks with the most appropriate answer from the choices given below**

1. _____ is a metal rod to hold the needle at one end with the help of a clamp.
   (a) Thumb screw
   (b) Bobbin winder
   (c) Face plate
   (d) Needle bar
2. _____ consists of a set of teeth fitted below the needle plate.
   (a) Face plate
   (b) Elastic foot
   (c) Feed dog
   (d) Fly wheel
3. _____ sewing foot delivers a consistent and accurate overcasting stitch around the edge of the fabric
   (a) Ruffling
   (b) Overcasting
   (c) Cording
   (d) Zipper

4. The function of the clutch is to _____ .
   (a) engage stitch mechanism
   (b) raise presser foot
   (c) control the speed of the machine
   (d) feed the thread to the needle

**B. Short answer questions**

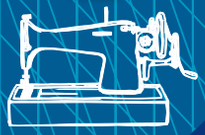
1. Write down the functions of the slide plate and feed dog.
2. Differentiate between a bobbin winder and bobbin case.
3. Explain the function of hemmer foot and zipper foot.
4. Write short notes on:
   (a) Button fixing foot
   (b) Overcasting foot
5. Enlist any five sewing machine attachments.

**C. Long answer questions**

1. Write down the different parts of a sewing machine and their functions in detail.
2. Write down the functions of any five sewing machine attachments.



Unit 2



# Sewing Tools and Sewing Machine Operations

## Introduction

The process of garment making mainly includes the knowledge and skills of measuring, marking, cutting and stitching, which is done using appropriate tools. Different tools and equipment of measuring, marking and cutting have their own utility and importance.

The selection of needles, threads and fabric based on suitability is important for good quality production. If ignored, it may lead to many defects. In this Unit, the appropriate threads and needles to be used have also been discussed.

A Sewing Machine Operator should know how to make preparations before stitching. For example, one must be aware about fixing the sewing needle, threading, adjusting thread tension, checking of stitch formation, etc. The operationalisation of sewing machine is also described in this Unit.

## Session 1: Measuring and Marking Tools and their Usage

A Sewing Machine Operator must have sound knowledge of the various measuring and marking tools so as to enable one to stitch a garment that fits well.

## Measuring tools

It is important to take accurate measurements to stitch a well-fitted garment or any article. Proper selection of measuring tools is essential for taking the accurate measurements of the body. Accurate measurements are needed for making correct pattern to ensure proper fitting of the garment. Different type of measuring tools which help to do the job properly are as follows.

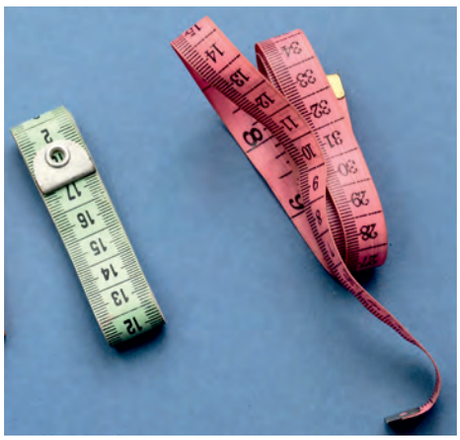


*Fig. 2.1: Measuring tape*

### Measuring tape

It is a metal tipped cotton or plastic tape to take measurements. Generally, the size of a measuring tape is ½ inch to ¼ inch wide, 60 inches long and has ⅛ divisions (Fig. 2.1). At one end, it has a small metal cover and at the other end of the tape, there is a metal strip of about 3 inches long attached to take measurements from points like round chest, round waist and length of the garment, etc.

*Fig. 2.2: Ruler*

### Ruler

It is made up of plastic, metal or wood. It is better to have two rulers—one being 1 inch wide and 6 inches long, and the other one being 2 inches wide and 18 inches long. The 18-inch ruler is with ⅛ inch grid. A ruler is convenient for measuring small measurements. A transparent ruler is used to draw straight lines or bias lines.

*Fig. 2.3: Yardstick*

### Yardstick

It is a straight edge tool used to physically measure the lengths up to a yard. It is a flat wooden tool with markings at regular intervals (Fig. 2.3). Yardsticks are very useful to draw long seam lines on paper or fabric.

### L-square

It is an L-shaped wooden or metal ruler, the long arm of which measures 24 inches and the short arm measures 14 inches. The L-square has a perfect right-angled corner and it is used to draw the lines at right angles

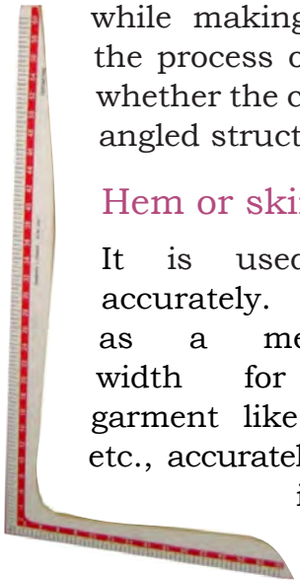


Fig. 2.4: L-square

while making drafts. It is very useful during the process of straightening the fabric to check whether the corners of the fabric have got a right-angled structure.

## Hem or skirt marker

It is used to mark the hem length accurately. It is adjustable and is used as a measuring guide for marking width for various sections of the garment like pleats, hems, seam allowances, etc., accurately using notches provided at regular intervals along the gauge (Fig. 2.5).

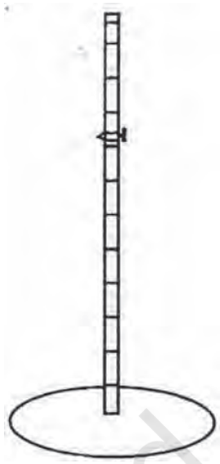


Fig. 2.5: Hem or skirt marker

## French curves

It is a template made of plastic, wood or metal composed of different curves. It is used in making drafts to draw smooth curves of varying radii. The French curve is placed on the material and a pencil is traced around its curves to produce the required curves. In garment making, French curves are mainly used for pattern drafting, pattern alteration and for shaping the armhole and neckline (Fig. 2.6). The transparent, light and unbreakable plastic material is most commonly used in French curves.

Fig. 2.6: French curves

## Vary form curve

It is the most accepted contour ruler. It is basically an elongated French curve. This tool is used by pattern makers, graphic artists, illustrators, etc., to sketch smooth curved lines. The vary form curve draws a wide variety of curves by turning smoothly. They are especially helpful to the pattern makers for drawing more defined curves of the neckline, collar design, sleeve caps, pocket contour, armhole, elbow, skirt, trousers, or when a specific contour is required (Fig. 2.7).

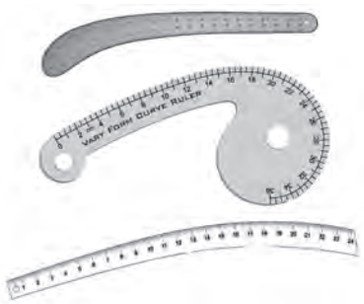



Fig. 2.7: Vary form curve

## Seam or sewing gauge

It is a small 6-inch metal ruler that has a sliding distance indicator. It has inch markings on one edge and centimetres on the other edge. It can take exact


*Fig. 2.8: Sewing gauge*

measurements of small portions such as hems, pleats, and buttons, or for other alterations (Fig. 2.8). This is a useful tool for detail designing and for small repetitive designs.

## Marking tools

The printed symbols and markings on the patterns must be transferred to the fabric to accurately match the seams and position of pockets, folds, buttonholes, darts, tucks and pleats. The object is to create precise marks that do not remain permanently or stain the fabric, but are visible during construction.

### Tracing wheel

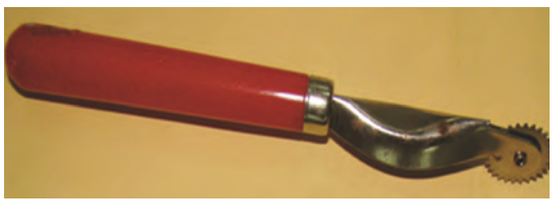


*Fig. 2.9: Tracing wheel*

It helps in marking the measurements and pattern on the wrong side of the fabric using tracing paper. Tracing wheels are available in two styles, one with small serrated edge which is appropriate for most fabrics, and another, with a smooth edge used on fine or knit fabrics to avoid snagging of the yarns. The tracing method is to keep the first layer of the right side of the fabric facing the ground, the second layer is that of the tracing paper, and the third layer is a paper pattern on which the tracing wheel is moved to transfer the markings.

### Tracing papers and sheets


*Fig. 2.10: Tracing paper*

A tracing paper is used with the tracing wheel/pen/pencil to transfer pattern markings to the wrong side of the fabric (Fig. 2.10). Care must be taken when choosing from the wide range of available colours, since most varieties produce a mark that remains in the fabric until it has been laundered.

## Tailor's chalk

It is made of coloured powder that is used to transfer markings on to the fabric. The tailor's chalk is available in assorted colours and in different shapes, mainly rectangular and triangle. It is also available in the form of a pencil (Fig. 2.11).

*Fig. 2.11: Tailor's chalk*

## Tailor's wax

It has a consistency like that of a crayon. It is especially suitable for use on wool or worsted materials. It is available in a wide range of colours that is, white, yellow, red, blue, black and fluorescent green, etc. The marks it produces can only be removed from the fabric with heat or laundering. Thus, it is advisable to test the tailor's wax on a small scrap of fabric before using it on the right side of the material (Fig. 2.12).

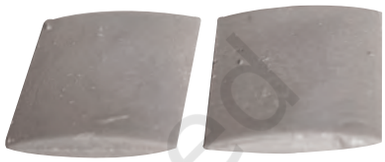


*Fig. 2.12: Tailor's wax*

## Fabric-marking pens

Such pens are air erasable or water soluble. These are specifically used for marking designs. After tracing the design, the colour can last for a long time but disappears completely at once when damped with water (Fig. 2.13).

Air-erasable pens are especially used for dressmaking, shoe making, handicraft, embroidery, etc., for temporary marking (Fig. 2.13). After drawing, the colour evaporates after 2 to 10 days. Sew the garments shortly after marking, or seal the marked fabric in a plastic bag with the air squeezed out. To remove the marks, you can dab the marks with a cotton swab soaked in alcohol.


*Fig. 2.13: Fabric-marking pens (air erasable, water soluble)*

## Pins

Dressmaking pins are mainly made of stainless steel or brass and are sized from 10 to 32. Size 17 is the general purpose dressmaker's pin, but there are several special varieties that can be useful (Fig. 2.14). Its main function is to hold the paper or fabric in position during marking, cutting and stitching. The correct selection of pins for the specific fabric (based on the size and material of the pin) is important as a wrong pin used may create a defect in the fabric.

*Fig. 2.14: Pins*

## Practical Exercises

### Activity 1

Draw the marking tools in the practical file (any four).

**Material Required**

1. Pen/pencil
2. Practical file
3. Sharpener
4. Eraser
5. Ruler

**Procedure**

1. Draw neatly and correctly, any four marking tools with the help of a pencil and ruler.
2. Label them.

### Activity 2

Prepare a chart of the measuring tools.

**Material Required**

1. Chart paper
2. Pictures of measuring tools
3. Scissors
4. Adhesive/glue

**Procedure**

1. Search and collect pictures of the measuring tools from the Internet, books, etc.
2. Cut the pictures neatly.
3. Paste the pictures on a chart paper and label them.
4. Place the chart paper in the classroom/practical lab.

### Activity 3

Identify and practise the use of different types of measuring and marking tools under the guidance of the teacher/instructor.

**Material Required**

1. Different types of measuring and marking tools

**Procedure**

1. Visit the practical/sewing lab under the guidance of the teacher.
2. Identify the different types of measuring and marking tools.
3. Practise the use of each of these tools.



## Check Your Progress

**A. Fill in the blanks**

1. Tailor's chalk is made of _____, used to transfer markings on to the fabric.
2. The available varieties of fabric-marking pens are _____ and _____.
3. The short arm of the L-square measures 14 inches and the long arm measures _____.
4. A _____ curve is a template made out of metal, wood or plastic composed of many different curves.
5. The correct selection of pins for the specific fabric is important as a wrong pin used may create a _____ in the fabric.
6. _____ helps in marking the measurements and pattern on the wrong side of the fabric using the tracing paper.

**B. Questions**

1. Explain the various measuring tools and its uses.
2. Explain the various marking tools and its uses.

# Session 2: Cutting Tools and Usage

The selection of cutting tools according to the fabric is important before starting the cutting process. While selecting the cutting tools, the quality of tools is very important that is, the quality of metal used, strength/ hardness of blades, its weight and its plating, etc.

## Cutting tools

Some of the important cutting tools that a Sewing Machine Operator must be aware about are listed below.

### Bent-handled shears

These shears are available commonly with 7- or 8-inch blades (Fig. 2.15). The bent handle allows the fabric to lie smooth and straight when it is being cut, thus yielding better control over the cutting edge. These scissors are available in right-handed or left-handed styles. These scissors are used to cut fabrics only.

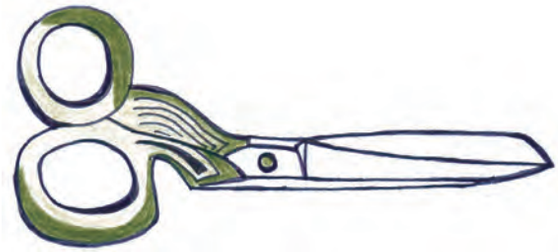


*Fig. 2.15: Bent-handled shears*

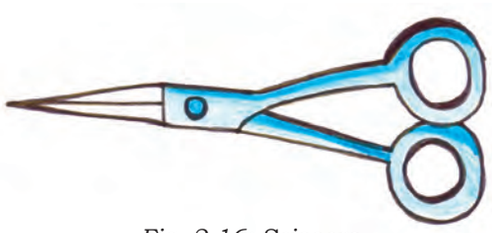


*Fig. 2.16: Scissors*

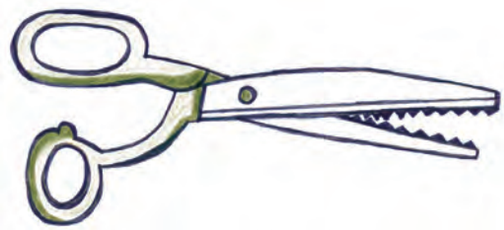


*Fig. 2.17: Pinking shears*

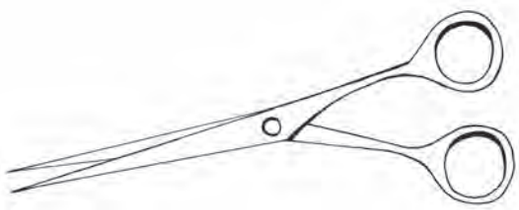


*Fig. 2.18: Embroidery scissors*

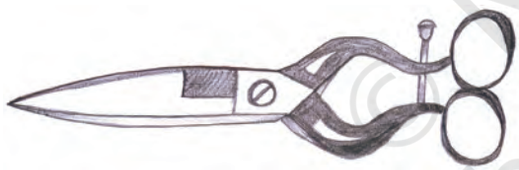


*Fig. 2.19: Buttonhole scissors*

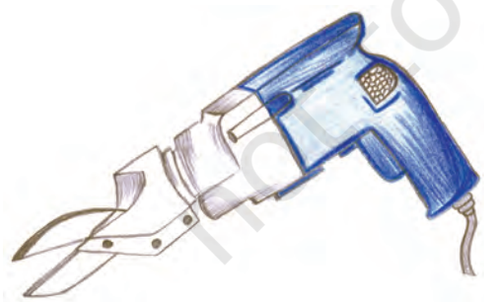


*Fig. 2.20: Electronic scissors*

## Scissors

These are the main tool for cutting fabric. Scissors have sharp, pointed and slender blades, used for cutting of different materials. These scissors are mostly 3 to 10 inches long in size. These have round handles for both the blades. Specific fabric-cutting scissors should not be used for cutting of heavy material as it may reduce the sharpness of the blades.

## Pinking shears

These shears are generally 9 to 10 inches long (Fig. 2.17). It is useful in finishing raw edges of fabric or to produce a decorative edge. It is one of the best shears for edge finishing of various type of fabrics, which do not ravel too badly. It creates a clean zigzag cut line of any fabric/material or garments. Pinking shears produce a notched cutting line (zigzag) to give a neat look to the inside of the garment and also prevent ravelling.

## Embroidery scissors

These scissors are small, usually 4–5 inches in length with very sharp blades, used for all-purpose needlework, ripping and for making buttonholes (Fig. 2.18).

## Buttonhole scissors

These scissors have notched blades (Fig. 2.19). They are useful if one needs to make many buttonholes. These scissors have a bolt and lock nut which is adjusted to cut a buttonhole of any length upto 1.5 inches.

## Electronic scissors

These scissors are used mostly in the industry. It can cut thin and heavy fabric (Fig. 2.20). It is appropriate for cutting silk, nylon, soft and hard-to-cut fabric. The backside of scissors is like a battery in which the cells are fitted. The scissors move when the button is pressed.

## Straight knife

It is a cutting machine basically used for cutting fabrics with perfect edges. This machine has a base plate and an upright stand to hold the vertical blade. A straight knife consists of a motor to transfer the complete assembly to another position. The straight knife operator's efforts are affected by the weight, motor and the base plate movement of the machine. Straight knives are available with large variety of sizes and blade speeds in the market. It is widely used in the garment industry.

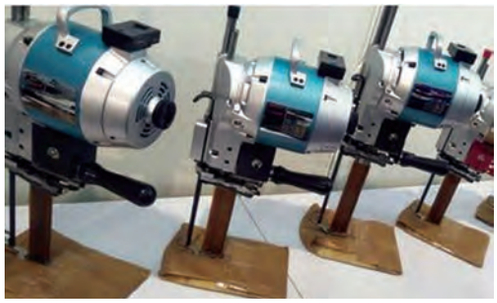


*Fig. 2.21: Straight knife*

## Round knife

It has a base plate with an electric motor placed above it, with a handle to direct the blade for cutting as per the requirement. It is used for fabric cutting in garment factories. Though it is not used as commonly as the straight knife cutting machine, but it is used for some specific purpose like cutting single ply as well as multi layer. It is very suitable for gentle curve line cutting. This is used to cut the larger part of the garment.

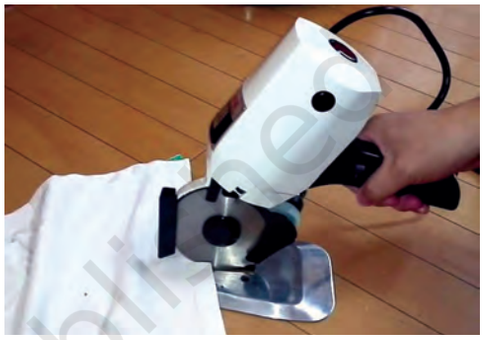


*Fig. 2.22: Round knife*

## Seam ripper

It is a simple pen-like device that allows the removal of machine or hand stitched seams by cutting the stitches in an accurate and safe manner. A seam ripper is the best equipment to rip or open seams (Fig. 2.23). While removing the stitches, the fabric should not be pulled as it can stretch and easily tear the fabric.

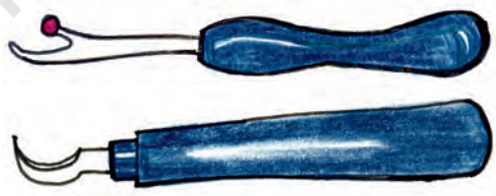


*Fig. 2.23: Seam ripper*

## Thread cutter

It is a small handy spring loaded tool, specifically used for cutting extra threads on the garments and ripping seams (Fig. 2.24). Threads are simply cut by pushing the upper blade down with the thumb.

*Fig. 2.24: Thread cutter*



*Fig. 2.25: Cutting table*

## Cutting table

It is a large, flat table used to spread the fabric and patterns while marking, pinning, and cutting (Fig. 2.25). They are often covered with thick felt, which allows the pins to be placed into the surface.

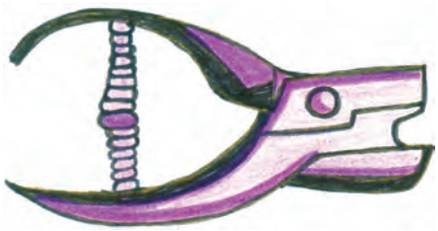


*Fig. 2.26: Notcher*

## Notcher

It is a tool commonly used in pattern making and sewing. It creates notches in the paper pattern or material. By notching, one marks the balance points of the pattern and also seam allowance, centre lines, ease, dart intake, etc. (Fig. 2.26). Notches are used to align the pattern pieces.

## Practical Exercises

**Activity 1**

Draw any five cutting tools in the practical file.

**Material Required**

1. Practical file
2. Pencil
3. Eraser
4. Sharpener
5. Ruler

**Procedure**

1. Draw any five cutting tools in your practical file with the help of a pencil and ruler.
2. Label them.

**Activity 2**

Prepare a chart of the cutting tools.

**Material Required**

1. Chart paper
2. Pencil
3. Scissors
4. Ruler
5. Books/magazines



6. Pictures of cutting tools
7. Adhesive/glue

**Procedure**

1. Search and collect pictures of cutting tools from books, magazines or the Internet.
2. Cut the pictures neatly with scissors and paste on the chart paper.
3. Label them.
4. Place the chart in the classroom/practical lab.

**Activity 3**

Identify and practise the use of the different types of cutting tools.

**Material Required**

Different types of cutting tools

**Procedure**

1. Visit the practical/sewing lab under the guidance of the teacher.
2. Identify the different types of cutting tools.
3. Practise the use of these cutting tools.

## Check Your Progress

**A. Fill in the blanks**

1. _____ are used to align pattern pieces.
2. A _____ is used to rip or open seams.
3. _____ shears are useful in finishing raw edges of fabric or to produce a decorative edge.
4. _____ is a small tool specifically used for cutting extra threads.
5. The cutting table is mostly covered with _____, which allows the pins to be placed into the surface.
6. _____ is the main tool for cutting fabric.

**B. Questions**

1. Make a list of cutting tools and give their uses.
2. Write short notes on the following:
   (a) Pinking shears
   (b) Seam ripper
   (c) Cutting table

## Session 3: Needles and Threads

There are various type of needles and threads available in the market. It is important to select a suitable needle, thread and miscellaneous tools for sewing.

### Hand sewing needles

*(a) Milliner needle*

*(b) Sharp needle*

*(c) Between needle*

*Fig. 2.27(a, b, c): Hand sewing needles*

These needles are used for hand sewing work or embroidery. The needle design varies according to the purpose. Sharps of medium length can be used on most fabric weights; betweens are smaller, allowing them to make fine stitches. Use long Milliner's needles for tacking. Needles are mostly available in different sizes—from the very small size 9 to the heavy size 18 as shown in Fig. 2.27 (a, b, c). The selection of hand sewing needle depends on the work to be done and the type of fabric. For hand sewing, medium length needles with a short oval eye are selected whereas, for embroidery work, crewel needles with a long oval eye are selected.

The hand sewing needle has three parts—the eye, stem and point.


*Fig. 2.28: Parts of a hand sewing needle*

### Sewing machine needles

In the garment industry, there are several types of sewing machine, each requiring different type of needles. Each manufacturer of the needle identifies its needles in a different way; and needles for the same type of system may have several different names or numbers, depending on the manufacturer.

Though the sewing machine needles are of various types, they may be selected according to its application. The size of the needles mainly depends on the structure and type of fabric, and sewing threads. Machine sewing needles (Fig. 2.29) are mostly available from sizes 9 to 18. The different type of needles are made to fix on specific sewing machines and specific models. The



needle sizes should match with the weight, thickness, and kind of the fabric .

If the needle is very fine, it will abrade the thread; bend, break, affect the loop formation and cause skipped stitches. If it is too coarse, it will damage the fabric, producing an unattractive seam, and causing the seam to pucker. The different parts of a sewing machine needle are as follows.

## Butt

It is a small pyramid at the upper end of the shank. It is designed to make a single point contact with the hole in the needle bar [see 2.29 (a, b)].

## Shank

The upper end of the needle that is held in the needle bar by the needle screw is the shank. The shank is usually round, but it can have one or two flat sides. Designed to support and stabilise the needle blade, the diameter of the shank is mostly larger than the diameter of the blade.

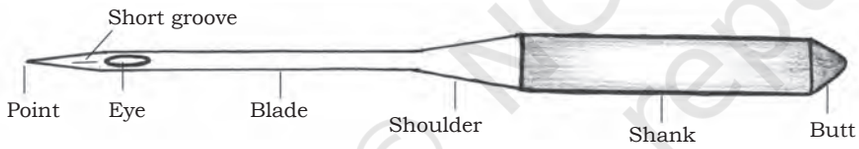



*Fig.2.29 (a) A sewing machine needle*


*Fig.2.29 (b) A sewing machine needle*

## Shoulder

It is the beginning of the shank just above the needle blade.

## Blade

It is the thin section of the sewing needle that extends from the shank to the eye. It can be easily bent and hence, should be examined regularly for its straightening.

## Scarf

It is a small indentation above the eye that permits the hook to pick up the thread loop. On some needles, the scarf is elongated and/or deeper to ensure that the needle thread loop will be large enough to prevent the skipped stitches.

## Short groove

It is placed in the side of the needle where the hook or looper is placed. It is a small groove between the tip and the needle eye. Short groove helps the sewing thread to create a loop.

## Eye

It is an opening in the needle blade at the lower end of the long groove. It carries the thread into the fabric to the hook or looper to make a stitch. The size of an eye is proportional to the diameter of the blade.

## Point

It is the tapered end of the needle and is often considered the most critical part of the needle. Mostly, the needles have a round point, ball point, or a cutting point. Generally, round points and ball points are used for woven and knit fabrics because they can penetrate the fabric by spreading the fibres or deflecting the yarns without damaging them, while needles with cutting points are used mainly for leather.

The different points of a needle are as follows.

***Sharp needle***

It is pointed and ideal for almost all woven fabrics.

***Ball point needle***

It has a slightly rounded tip, which is recommended for all knit and elastic fabrics.

***Wedge point needle***

A specially designed needle with a wedge like, triangular point, which enables it to make large, clean holes through



thick material like leather, vinyl or suede (pronounced as swayed). They are ideal for shoe repair, belts and other leather garments and accessories.

Sewing machine needles can affect the output of a sewing machine. When an inappropriate needle or bent needle is used, it can cause skipped stitches, poor stitch formation, and even damage to the machine.

## Selection of needle, thread and stitch for various fabrics

There is no rigid rule for the selection of needle and thread but it should be chosen mainly as per the type of fabric. The recommended needle and thread selection is given in the table below.

**Table 2.1: Recommended needle and thread selection**

| S. No. | Type of Fabric | Type of Thread | Needle Number | Number of Stitches per inch* |
|---|---|---|---|---|
| 1. | Lightweight: lawn, voile, chiffon, organza, fine lace | Mercerised cotton, silk, nylon, extra fine (any fibre), size: 60–100 | 9 or 11 | 10–15 |
| 2. | Medium weight: crêpe, velvet, gingham, stretch fabric, terry, brocade, linen, corduroy, some types of denim | Polyester, cotton-wrapped polyester, mercerised cotton, size: 50–60 | 11 or 14 | 10–12 |
| 3. | Heavy: wide rib corduroy, terry cloth | Polyester, cotton-wrapped polyester, heavy duty (any fibre) size: 30-40 | 16 or 18 | 8–12 |
| 4. | Very heavy: canvas, upholstery fabric | Polyester, cotton-wrapped polyester, heavy duty (any fibre) size: 20 | 16 or 18 | 8–12 |

**see terminology*

## Sewing thread

Wide varieties of sewing thread are available in the market (Fig. 2.30). It is very important to select the correct sewing thread for the fabric. They should share the same characteristic as they will be laundered, ironed in the garment and thus, will stretch and shrink together. A long staple thread is smoother and creates less lint in the sewing machine. Made of short staples, the thread is uneven in texture and the result is less than perfect stitching. A strong thread is good for construction, especially on fabrics of natural fibre. Mercerised cotton has been treated to be smoother and straighter with less fuzz than other cotton threads. Polyester thread has a high sheen and is abrasion-resistant. Silk thread is strong and lustrous. This thread is used for construction and stitched details such as buttonholes and top stitching. Always select a thread according to the type of fabric being used. Use synthetic threads with man-made fibres and mercerised cotton or silk thread with cotton or linen. Woollen fabrics should be sewn with silk or synthetic threads as they have stretching capacity with the fabric. Select a thread which is one shade darker than your fabric because when worked on a garment, a thread appears lighter.

*Fig. 2.30: Sewing thread*

The higher the number on the label of a thread, the finer it is. When stitched, the thread should be well set into the fabric to give a firm long-lasting seam. If the thread is too heavy for the fabric, it will remain on the surface and tear out quickly, reducing the durability of your garment.

## Thimble

It is used to protect the fingers or thumb in the process of hand sewing. A thimble helps push the needle to the fabric painlessly, without harming the finger. Metal, rubber and plastic thimbles are available in the market. Always use a thimble while hand sewing. Thimbles can be worn in any of the fingers or the thumb of the hand. Mostly, it is worn in the index or middle finger which holds the needle. It must be comfortable and should be light in weight (Fig. 2.31).

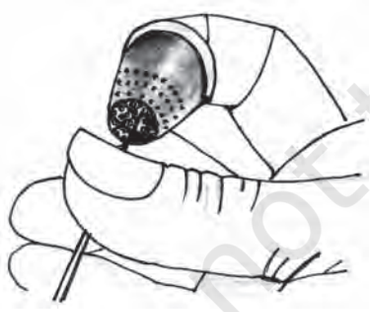


*Fig. 2.31: Thimble*

## Stiletto

It is a sharp pointed tool used for punching holes in a fabric/material (Fig. 2.32). It is used for forming eyelets in belts, and for making intricate holes in garments.

*Fig. 2.32: Stiletto*

## Bodkin

It is a flat needle with a blunt end and a large eye for threading elastic and tape through a loop or hem (Fig. 2.33).

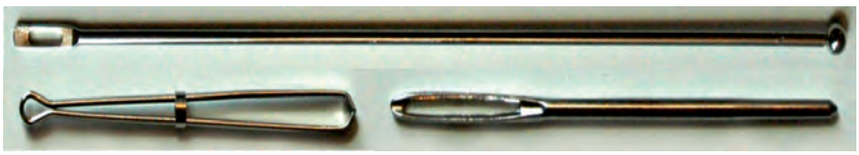


*Fig. 2.33: Bodkin*

## Iron

Pressing is an essential part of sewing. Every seam should be pressed as soon as it has been sewn, to give a clear, crisp line to the seam. Your pressing iron should be capable of both dry and steam ironing. A spray attachment is useful for dry ironing. An ordinary domestic iron is essential for general pressing; a steam iron is useful for lightweight fabrics. Pressing cloths are most important. Use cheesecloth for lightweight fabrics and cotton or linen for heavier fabrics.

*Fig. 2.34: Iron*



## Practical Exercises

**Activity 1**

Visit a sewing machine shop/boutique/workshop/garment manufacturing unit and make a report on the different type of needles and threads used for different type of fabrics.

**Requirements**

1. Notebook
2. Pen
3. Camera (if available, or mobile phones with camera)
4. Vehicle (bus) for field visit

**Procedure**

1. Visit the local sewing machinery shops/boutiques/ workshops/garment manufacturing units with your teacher to study and observe the different type of needles and threads used for different fabrics.
2. Write down the different type of needles and threads used in shops/boutiques/workshops/garment manufacturing units.
3. Prepare a report of the study field visit using photos and materials (if any) collected from the site.

**Activity 2**

Draw the different type of needles and label their different parts in your practical file.

**Material Required**

1. Practical file
2. Pencil
3. Eraser
4. Sharpener
5. Ruler

**Procedure**

Draw a hand and sewing machine needle in your practical file with the help of a pencil and ruler. Label its parts.

**Activity 3**

Identify the following tools—thimble, stiletto, bodkin

**Material Required**

1. Tools for identification
2. Notebook
3. Pen/pencil

**Procedure**

1. Visit the practical/sewing lab with your teacher.
2. Identify the given tools.
3. Write in the notebook.

## Check Your Progress

**A. Match the columns**

| Tools | Functions |
|---|---|
| (a) Thimble | 1. punching holes in material |
| (b) Needles | 2. threading elastic through loop |
| (c) Bodkin | 3. passing the thread through the fabric |
| (d) Stiletto | 4. safety of the finger |



**B. Fill in the blanks**

1. Machine sewing needles are available from sizes ____ to _____.
2. _____ is used for threading elastic or tape through the loop.
3. _____ is a protective tool used to fix on the thumb and fingers for safety from injury.

**C. Short answer questions**

1. Explain hand sewing needles in brief.
2. Describe the different points of sewing machine needles.
3. Write short notes on:
   (a) Thimble
   (b) Iron
   (c) Threads

**D. Long answer questions**

1. Explain the different parts of a sewing machine needle in detail.

## SESSION 4: PREPARATION AND OPERATION OF SEWING MACHINE

There are some key steps that need to be kept in mind for the preparation and operation of the sewing machine.

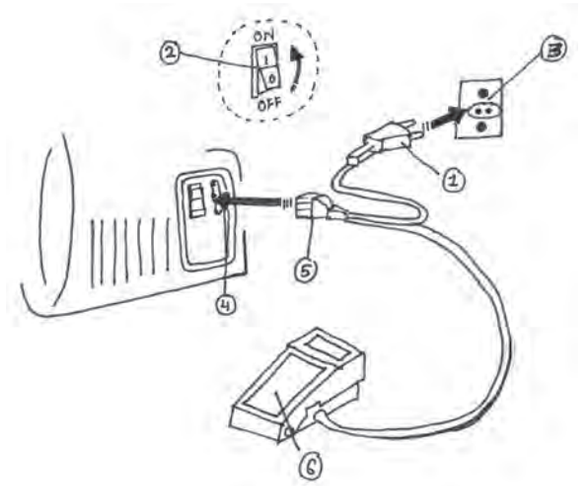
### Preparation of a single needle sewing machine

Before starting the operation process in a single needle sewing machine, an Operator should be aware of every aspect relating to the sewing machine. This includes the problems one may be faced with while working too, so that they may be rectified by the Operator or can be reported to one's supervisor.

The steps for preparing a sewing machine for stitching are listed below.

(a) Connect the machine to the power supply
(b) Placement of foot control
(c) Adjust the presser foot
(d) Wind the bobbin
(e) Select the correct needle and thread for sewing
(f) Fix the needle into needle bar
(g) Set the bobbin and bobbin case in the machine
(h) Thread the machine

(i) Adjust the thread tension
(j) Adjust the stitch length
(k) Check the stitch formation
(l) Check the reverse stitching lever




*(1) Power plug (2) Power switch (3) Power socket (4) Machine socket (5) Foot control plug (6) Foot control*
*Fig. 2.35: Connection of power supply to the sewing machine*

## (a) Connect the machine to the power supply

Before connecting the power cord, ensure that the voltage and the frequency shown on the sewing machine conform to the electrical power.

1. Connect the plug to connect the foot control.
2. Now, connect the foot control to the machine socket.
3. Connect the power plug to the power socket.
4. Switch ON the power and sewing light.
   *Note*: This step is applicable for a motorised sewing machine.

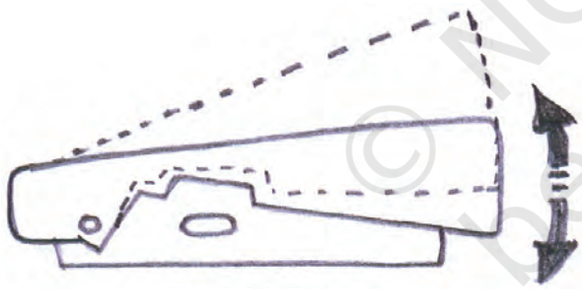


*Fig. 2.36: Foot control*

## (b) Placement of foot control

1. The speed of the sewing machine can be controlled by the foot control. The stronger it is pressed on the control, the faster the machine runs.
2. The foot control should be placed at the correct position for the Operator to operate it comfortably.
   *Note*: This step is applicable for a motorised sewing machine.

## (c) Adjust the pressure of the presser foot

It is important for a Sewing Machine Operator to have complete knowledge of the required pressure on the material, and method of adjusting the pressure when needed. The pressure of the presser foot is required to be adjusted as per the thickness or heaviness of the fabric/material to be sewn. Heavy fabrics require more pressure than the lightweight fabrics. The pressure should be heavy enough to prevent the fabric from

rising with the needle, and to enable the feed to move the fabric along evenly without side creeping.

The pressure of the presser foot can be adjusted by using the thumbscrew. To increase the pressure, turn the thumbscrew clockwise or downward. To lighten the pressure, turn the thumbscrew anticlockwise.

When the pressure is appropriately applied correct stitches will be formed (Fig. 2.37).

*Fig. 2.37: Correct stitches*

## (d) Wind the bobbin

A sewing machine has two thread sources for stitching—a top thread and a lower thread stored on a bobbin. The following steps are to be followed to fill the bobbin.

1. To wind the bobbin with the thread, place the bobbin spool on the bobbin winder fitted on the top.
2. Wrap the thread from the reel placed in the thread spool around the bobbin.
3. Press the treadle/foot control or turn the hand wheel to start winding.
4. The winding in the bobbin should be uniform.
5. Once the bobbin is sufficiently filled with thread, stop winding and remove the bobbin.

## (e) Selection of needle and thread for sewing

For the selection of the appropriate needle and thread, kindly refer to session 3 of this Unit.

## (f) Fix needle into the needle bar

Sewing machine needles have one side flat, so they can only be placed from one side—usually the flat side towards the back. The following steps should be followed to fix the needle into the needle bar.

1. Pull the needle bar to the highest level to insert the needle (Fig. 2.38 Label: 1).
2. Loosen the screw or needle clamp to fix the needle (Fig. 2.38 Label: 2).

3. Keep in mind that there is a groove. Insert the needle (Fig. 2.38 Label: 3) in a straight line in the groove and tighten the needle clamp securely and tightly to fix the needle properly.
4. If you are still having trouble, refer to your machine's manual.

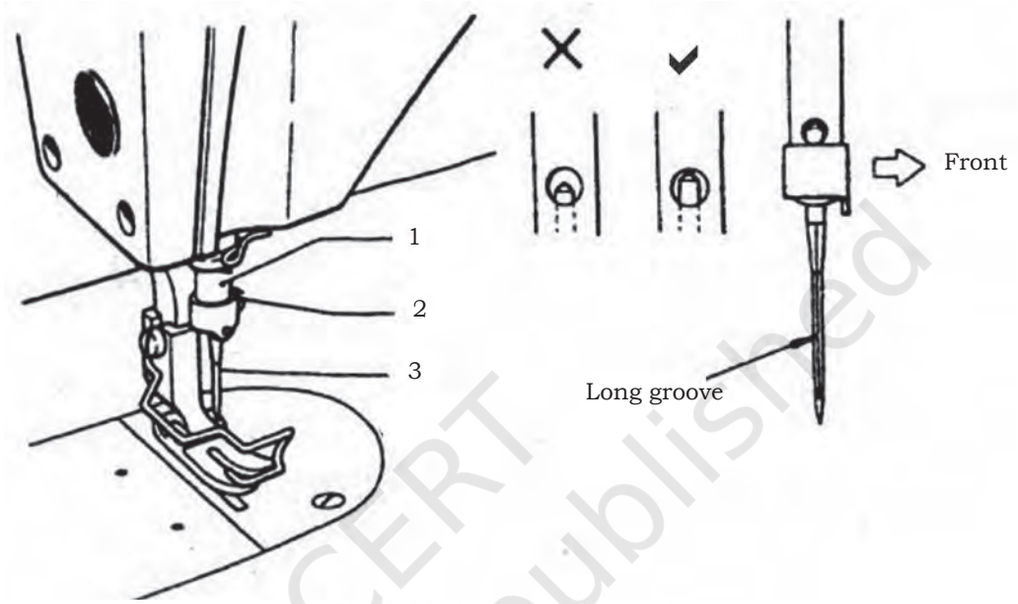



*Fig. 2.38: Attaching the needle*

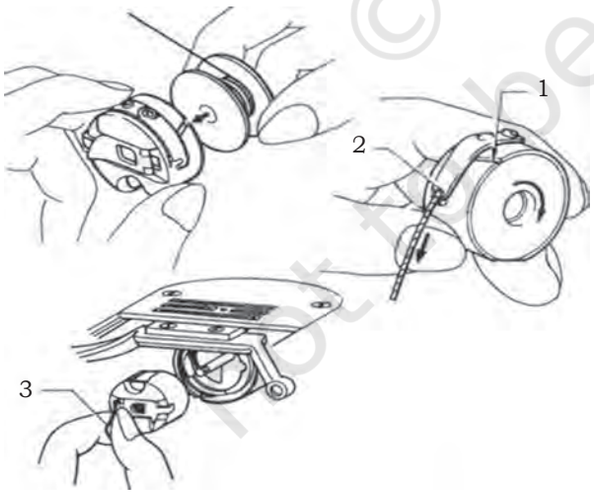



*Fig. 2.39: Threading the lower thread*

## (g) Set the bobbin and bobbin case in the machine

1. Hold the wound bobbin and bobbin case with both hands.
2. Place the bobbin in the bobbin case correctly.
3. Pass the thread through a small notch at the front of the bobbin case and then pull the thread out, as shown Fig. 2.39 Label: 1 and 2
4. It should be checked that the bobbin should move clockwise when the thread is pulled out.
5. Leave the end of the thread outside the bobbin case. It should

be brought up through the hole in the needle plate after the top thread is threaded.

6. Hold the latch of the bobbin case and fix it into the rotary hook (Fig. 2.39 Label: 3).
7. Lock the bobbin case in the machine.

## (h) Thread the machine

1. The take-up lever should be raised to keep the needle at its highest point which will help in threading the upper thread.
2. This will make threading easier and it will prevent the thread from coming out while sewing.
3. Take the thread end with the hand and pull it through the thread guide at the top, and then down.
4. Then thread it around the take up lever.
5. Follow the instruction to thread as per the guidelines printed in your machine's manual.
6. Usually, the thread follows this general pattern: left, down, into a hook, through the needle.

## (i) Adjust thread tension

For good quality stitching, a balanced tension or balanced stitches are desirable. When the tension of the upper and lower thread is balanced, the threads interlock in the middle of the fabric to make perfect or balanced stitches. Adjust the tensions only as needed until the stitch is balanced. The tension of the stitch is regulated by two controls.

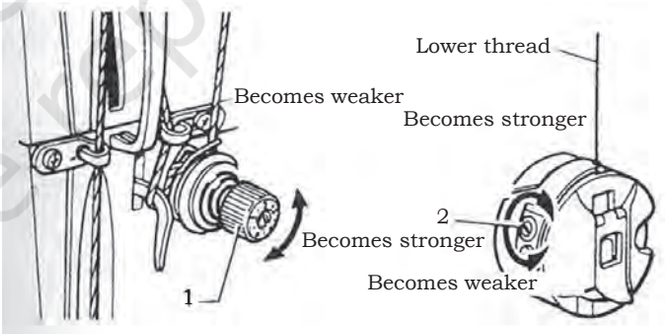



*Fig. 2.40: Adjusting thread tension*

### *1. Upper thread tension*

After lowering the presser foot, turn the nut to adjust the upper thread tension. For this, turn the nut to the left to loosen it. Turn it to the right to tighten, as shown Fig. 2.40 Label 1.

### *2. Lower thread tension*

It is adjusted by tightening/loosening the screw of the bobbin case, as shown Fig. 2.40 Label 2. The bobbin

case screw is very short and will fall out if turned too far. The bobbin case tension screw, which is located on the bobbin case, controls the tightness of the bobbin case spring. These controls increase or decrease the amount of pressure on the threads as they feed through the machine.

Appropriate thread tension is needed for perfect stitching. The tension on the needle and the bobbin threads must be heavy enough to pull the threads to the centre of the thickness of the fabric and make a firm stitch.

Correct seam with balanced thread tension is shown in Fig. 2.41.

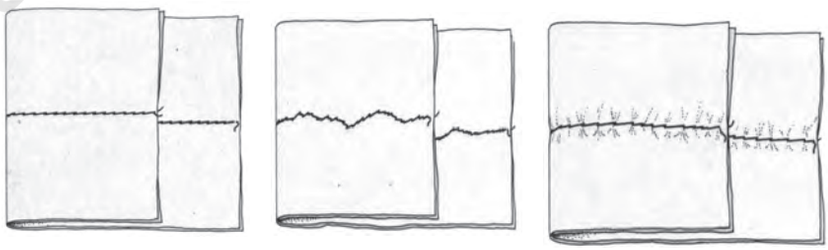

*Fig. 2.41: Correct seam*

The appearance of seams when the upper tension is too loose is shown in Fig. 2.42.

*Fig. 2.42: Seams when the upper tension is too loose*

The appearance of seams when the upper thread tension is too tight is shown in Fig. 2.43.

*Fig. 2.43: Seams when the upper tension is too tight*



*(a) Correct stitch* *(b) Too loose* *(c) Too tight*

*Fig. 2.44 (a,b,c): Tension problems*

The structure, texture, thickness, density, and resilience of the fabric, and the size and type of the thread, affect the tension. The tension setting will vary with the material and the thread size and type. Test the tension before you begin stitching or sewing with a different fabric, thread, or machine.

## (j) Adjust the stitch length

A stitch length regulator/dial is used to adjust the stitch length and get the desired length.

The stitch length regulator/dial controls the distance that the feed dogs move the fabric to the back of the machine to make a single stitch. The bigger number on the stitch length dial produces a long stitch, and the smaller number produces a smaller stitch. To change the stitch length, dial from a larger setting to a smaller setting, it is simpler to turn the dial.

## (k) Checking the stitch formation

Before starting sewing on the final material, it is a good practice to check the formation of stitch on a rough fabric. Change the pressure and thread tension as required for correct stitch on the final material (Fig. 2.37).

The method of stitch formation in a sewing machine (Fig. 2.45) is as follows.

1. The needle descend (that is, the downward action of the needle) passes through the fabric.
2. Then it reaches its lowest point and begins to rise slowly.
3. It creates a loop. The shuttle enters the slack-loop, enlarging it and taking with it the under thread, and when the needle reaches back to its highest level, a complete interlock stitch is formed.

*Fig. 2.45: Steps of stitch formation*

### (l) Checking of reverse stitching lever

1. When the reverse stitching lever is pushed, the cloth feed direction for sewing will be reversed.
2. When it is returned to its original position, the feed direction for sewing will change back to normal.

## Operating the sewing machine

Single needle sewing machines are mostly used in domestic tailoring and also in industrial or commercial production. They are most commonly used as they serve the purpose of basic seam formation. As the name suggests, the machine uses a single needle to make a single seam line. The stitch is formed by interlocking two threads—the upper and the lower bobbin thread.

The following are the steps for operating a single needle sewing machine.

### (a) Sew on the fabric

1. Raise the presser foot and then turn the flywheel so that the take-up lever is at its highest level.
2. Pull the upper and lower threads straight back side under the presser foot to avoid them from knotting at the beginning of the stitching line.
3. Place the fabric to be stitched under the presser foot, allowing the seam allowance to the right side of the needle and the rest of the fabric to the left.
4. Turn the flywheel until the needle point enters the fabric at the exact beginning point.
5. Lower the presser foot and then start the machine slowly, simultaneously guiding the fabric gently with the hand.
6. To check stitch length and proper tension, first stitch on a scrap, that is rough cloth. Finalise it and then stitch on the final material.
7. Gradually, increase the speed of the sewing machine for stitching.
8. The fabric will move forward and the stitch will be formed continuously.
9. Before the end of the stitching line, stitch slowly with the right hand on the flywheel and left hand



on the fabric that is being worked on (while using hand machine). Stop the machine in time to not sew beyond the fabric.

10. Take up the presser foot, then pull the material straight back with threads under the presser foot to avoid bending of the needle.
11. Cut the threads using the thread cutter or scissors.

***Precaution***

1. Do not pull the material/fabric forward or backward, but hold the two layers slightly tight and firm at the back and front of the presser foot.
2. Keep the take-up lever at its highest point to avoid unthreading the needle when beginning to stitch again.
3. Leave about two to four inches of thread, extending from the machine to prevent unthreading.

## (b) Fastening the thread ends

It is essential to fasten the threads at the ends of the stitching lines which are not to be crossed later (for example, points of darts). This can be done in three ways.

***Reverse stitching***

Stitch till the termination point with the needle in the fabric. Now carry out reverse stitching, and then cut the threads.

***Pivoting***

Stitch till the termination point with the needle in the fabric, lift the presser foot and stitch back a small distance along the seam. Cut the threads.

***Tying***

After you have reached the end of the stitching line, pull the fabric back and cut the threads, leaving a length of about two to four inches extending from the fabric. Pick the last stitch with a pin or needle point so that both the thread ends come to the wrong side of the fabric, and then tie a double knot.

## Practical Exercises

### Activity 1

Practise the following on a sewing machine in the practical lab.

1. Connecting the machine to the power supply
2. Understanding the placement of foot control
3. Adjusting the presser foot
4. Winding the bobbin
5. Selecting the appropriate needle and thread for sewing
6. Fixing the needle into the needle bar
7. Setting the bobbin and bobbin case in the sewing machine
8. Threading the machine
9. Adjusting the thread tension
10. Adjusting the stitch length
11. Checking the stitch formation
12. Checking the reverse stitching lever

**Material Required**

1. Single needle lock stitch machine (manual operated or motorised)
2. Power socket and outlet
3. Sewing machine needle
4. Screwdriver
5. Thread
6. Bobbin and bobbin case
7. Fabric scraps

**Procedure**

Follow the instructions given in this session.

### Activity 2

Practise operating the sewing machine in the practical lab and prepare a sample of the different stitch formations.

**Material Required**

1. Single needle lock stitch machine (manually operated or motorised)
2. Power socket and outlet
3. Sewing machine needle
4. Thread
5. Bobbin and bobbin case
6. Fabric scraps (10"X10") 4 samples
7. Practical file



8. Scissors
9. Adhesive/glue

**Procedure**

1. Prepare the sewing machine as per instructions given in this session for stitch.
2. Prepare the samples of correct stitch, or a stitch when the upper tension is too tight and too loose. Finish the prepared samples.
3. Attach samples in your practical file.

## Check Your Progress

**A. Fill in the blanks**

1. Speed of sewing machine can be controlled by the _____.
2. Check that the bobbin turns _____ when the thread is pulled.
3. When the reverse stitching lever is pushed, the cloth feed direction for sewing will be _____.

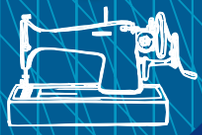
**B. Short answer questions**

1. Write steps of threading the sewing machine.
2. Write short notes on:
   (a) The steps for operating the sewing machine
   (b) Placement of foot control
   (c) Adjusting the stitch length
3. Write about adjusting the pressure of the presser foot.

**C. Long answer questions**

1. Explain the thread tension as per the stitch formation with a diagram.
2. Explain the winding of bobbin and its setting in the machine
3. Describe the operating procedure of a sewing machine and the precautions while sewing.

Unit 3



# Basics of Garment Construction

## Introduction

Sewing is a creative and interesting art and skill. To prepare a well-finished garment, its stitching is done by combining the different garment components. Garment construction is a technical accomplishment that requires the knowledge and skills of basic sewing techniques—application of stitches, seams, darts, gathers, pleats and edge finishing, etc. Its appropriate application in garment construction is necessary for a good quality product. A garment that is made, will be attractive if it fits well, and proper attention is paid to its finer details.

A Sewing Machine Operator must be aware about the two sides of the fabric—the right side and wrong side. These can be mainly identified by the selvedge of the fabric. Generally the selvedges appear less finished on the wrong side and are smoother on the right side.

It is essential to know and practise the various types of stitch, especially constructive stitches which include temporary and permanent stitches. To construct the garment, various types of seam are also used such as flat seam, lapped seam, French seam, slot seam, etc. The edges of garments are finished using different type of edge finishes like pinked finish, edge stitched finish, double stitch finish, etc. This Unit will help you learn about the various type of stitches, seams, edge finishes, etc., all of which have a key role in garment construction.

## Session 1: Various Types of Stitch

Notes

This session will help provide the student with a through understanding of the various kinds of stitch.

### Stitches

Almost every garment or other stitched articles we sew, needs some hand stitches. Thus, we should be able to handle the needle and thread to carry out hand stitches competently. Before learning stitching on the sewing machine, one should learn the basic hand stitches which are very commonly used in the manufacturing of garments and other articles. A stitch may be defined as one unit of conformation resulting from one or more strands or loops of thread intralooping, interlooping or passing into or through the material. Intralooping is the passing of a loop of thread through another loop formed by the same thread, while interlooping is the passing of a loop of thread through another loop formed by a different thread.

The basic hand stitches are divided into two types depending on their use.

#### Constructive stitches

It is a line made by a portion of sewing thread passed over and under an equal or unequal number of threads for construction purpose. Such stitches can be classified as temporary and permanent stitches.

***1. Temporary stitches***

Such stitches are used to hold the garment or fabric pieces together before permanent stitches are made. These stitches are also known as tacking or basting stitches. Usually this stitch is horizontal and it is worked from the right to the left side with a knot.

Various kind of tacking/basting stitches are as follows.

*(i) Even basting*

It is used to hold the fabric together temporarily, but more securely than in uneven basting. Make even stitches of about ¼ inch to ⅜ inch long. When easing

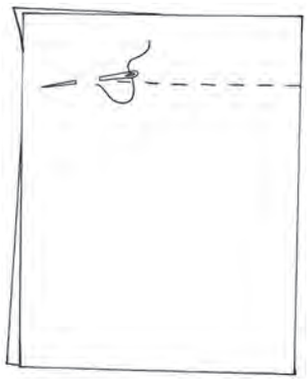


*Fig. 3.1: Even basting*

one layer of the fabric to another layer, hold the layer to be eased on top and gather this top layer to stitch (Fig. 3.1).

*(ii) Uneven basting*

This is used to mark or to hold fabrics together, only where there is no strain on the stitches. Use this type of basting, as the guideline on the upper side of the fabric is at least twice than that on the underside of the fabric. Make a long stitch, about ½ inch on one side of the fabric and then a short stitch ¼ inch on the other side of the fabric (Fig. 3.2).

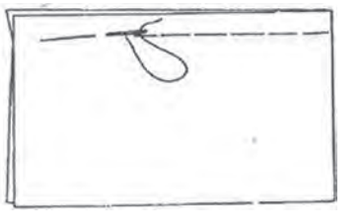


*Fig. 3.2: Uneven basting*

*(iii) Diagonal basting*

This is used to hold two pieces of fabric together when more than one row of tacking is required. For example, when you are attaching interfacing to a collar or mounting a fabric on to an underlining, etc. It may be done vertically or horizontally (Fig. 3.3).

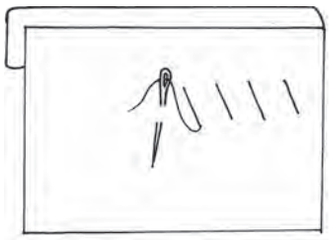


*Fig. 3.3: Diagonal basting*

*(iv) Slip basting*

Also called invisible hand basting, it is used when working from the right side of the fabric, and to mark fitting alterations, or on occasions where patterns have to be joined accurately. For example, strips, checks, etc. Turn under one edge of the material on the seam line. Pin the folded edge carefully to the seam line on the other edge with pins at right angles to the seam. Take even tacking stitches alternately through the fold and through the single edge on the seam line (Fig. 3.4).

*Fig. 3.4: Slip basting*

### *2. Permanent stitches*

The stitches that form a part of the stitched garment are called permanent stitches.

*(i) Running stitch*

This is the simplest form of hand stitch which is used mainly for gathering and shirring fabrics. When it is used for both gathering and shirring, make sure that enough thread should be left to make an unbroken line of stitches. It is similar to the even basting, but the stitches are much smaller. The stitches should be straight, fine and evenly spaced and mostly about

1/16 inch to ⅛ inch in length. To carry out the running stitch, take several very small stitches on to the point of the needle before drawing the thread through the fabric. The stitches should be as small as the thickness of the fabric to allow less than 2mm on fine fabrics (Fig. 3.5).

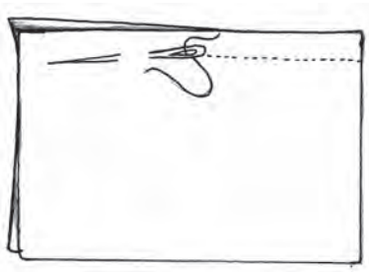


*Fig. 3.5: Running stitch*

*(ii) Back stitch*

It is considered to be very strong and is many a times used as a substitute for machine stitching. It is mainly applied when extra strength is needed. Back stitch is very useful for making strong seams and for finishing off a line of stitching. The stitches on the front of the work are small and appear continuous. To work the back stitch, make a small stitch back from left to right. Then make a double length stitch forward on the wrong side of the fabric. So the needle emerges a stitch's length in front of the first one. Repeat this way, keeping the stitches uniform in size and fairly firm (Fig. 3.6).

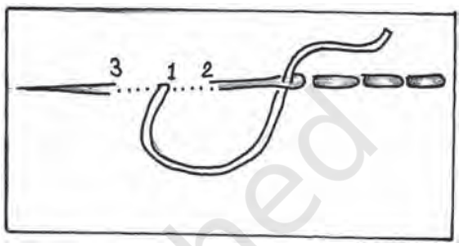



*Fig. 3.6: Back stitch*

*(iii) Run and back or combination stitch*

In this combination, a back stitch and three or four running stitches are combined and can be used for working plain seams done by hand. This stitch is worked faster than the back stitch and stronger than the running stitch.

*(iv) Hem stitch*

It is used for hems on medium weight or lightweight fabrics. It is mainly used to fasten a raw edge which should be turned in or to flatten a seam. It appears as small slanting stitches on the wrong side of the fabric. The stitch size will depend on the fabric. The thread should not be pulled taut or the fabric will pucker (Fig. 3.7).

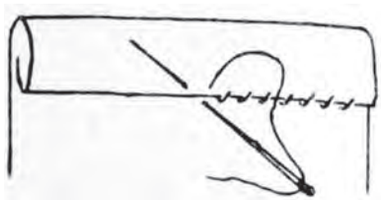


*Fig. 3.7: Hem stitch*

*(v) Half back stitch*

This stitch is quite similar to the back stitch, but with a longer stitch at the back side of the fabric. To carry out the stitch, make a small stitch back from left to right and then make a stitch forwards, two and a half times as long, on the wrong side of the work. Make another small stitch from left to right on the right side.

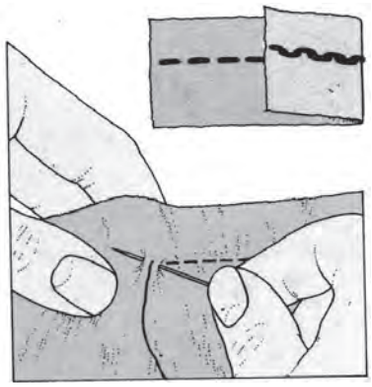


Fig. 3.8: Half back stitch

*(vi) Oversewing*

It is used to finish seam edges on fabrics which fray easily. To carry out the stitch, hold the fabric with the edge to be worked away from the worker. Insert the needle ⅛ to ¼ inch from the edge, and bring the thread over the edge of the fabric. Make the next stitch ¼ inch further on.

*(vii) Blind hemming stitch*

This stitch is worked on the inside fold of the hem so that the stitches are almost invisible; thus, the name 'blind'. The thread should not be pulled tightly. To carry out the stitch, hold the work with the fold of the hem towards you, take a very small stitch inside the hem fold edge, picking up a thread of the single fabric on the point of the needle before taking another stitch on the inside hem fold of the garment.

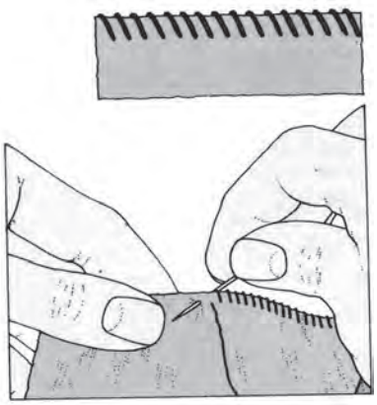


Fig. 3.9: Oversewing stitch

*(viii) Buttonhole stitch*

This stitch is worked with the needle pointing towards you, and the fabric edge away from you. To carry out the stitch, insert the needle in the right side of the edge of the buttonhole. Bring it out ⅛ inch below. Loop the thread hanging from the eye of the needle from right to left under the point of the needle and draw the needle upwards to knot the thread at the buttonhole edge.

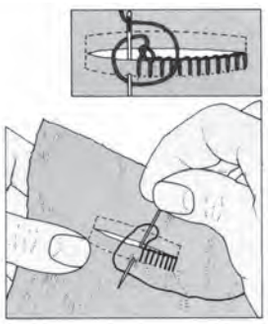


Fig. 3.11: Buttonhole stitch

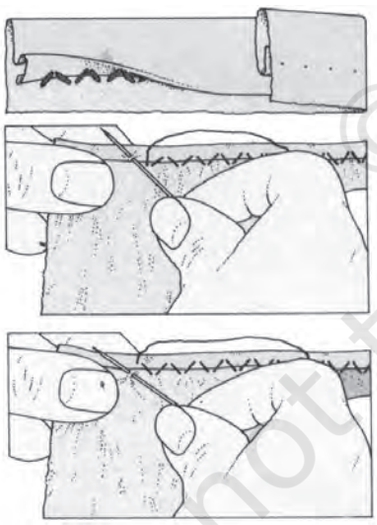
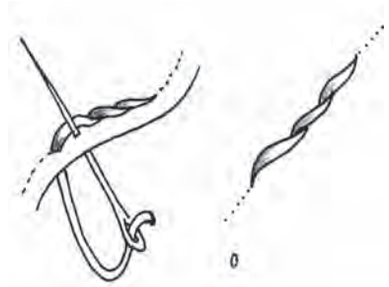


Fig. 3.10: Blind hemming stitch

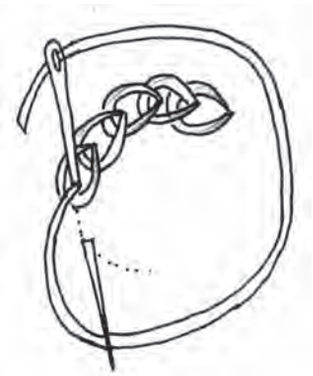
## Decorative stitches

These stitches are also known as embroidery stitches. This art is practised on all kinds of pliable material with different types of threads, precious and semi-precious stones, pearls, shells, beads, etc. There are different kind of hand embroidery stitches. Some of the common hand embroidery stitches are stem stitch, chain stitch, herringbone stitch, feather stitch, lazy-daisy, satin stitch, cross stitch, Bullion stitch, etc., which are used to decorate garments, home

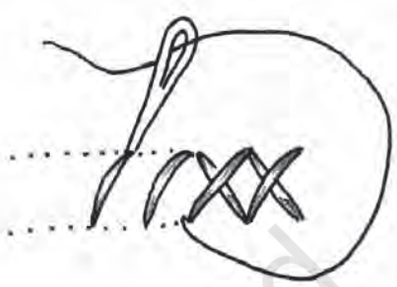
furnishing items and other articles. As these stitches are mainly used to decorate the garment or material, hence, not discussed in detail in this book as shown in Figs. 3.12(a–i).



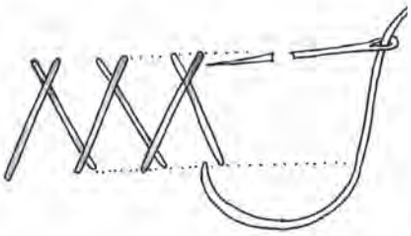
*(a) Stem stitch*



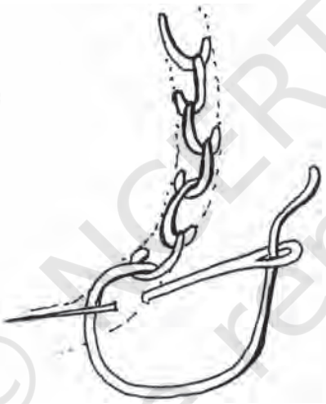
*(b) Chain stitch*



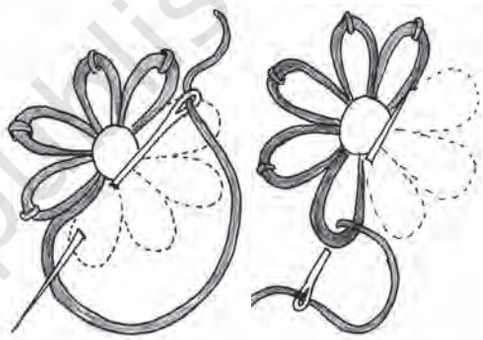
*(c) Cross stitch*



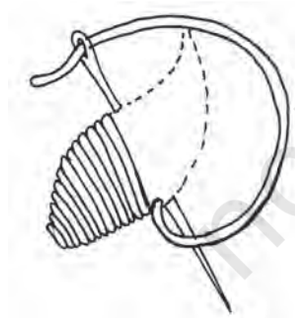
*(d) Herringbone stitch*



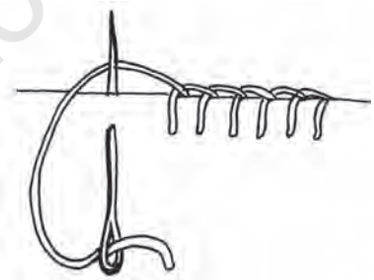
*(e) Feather stitch*



*(f) Lazy-daisy stitch*



*(g) Satin stitch*



*(h) Blanket stitch*

*(i) Bullion stitch*

*Fig. 3.12 (a–i) Decorative stitches*

## Practical Exercises

### Activity 1

Make a scrapbook of the constructive and decorative stitches and label them.

**Material Required**

1. Coloured pens/pencils
2. Scrapbook
3. Pictures of constructive and decorative stitches
4. Scissors
5. Adhesive/glue

**Procedure**

1. Search and collect the pictures of different types of constructive and decorative stitches.
2. Cut the pictures very neatly with scissors.
3. Paste them in a scrapbook.
4. Label them.

### Activity 2

Prepare samples of hand stitches as given in this session.

**Material Required**

1. Cotton fabric to prepare samples (12" x 12")
2. Needle
3. Thread
4. Frame
5. Pen
6. Pencil
7. Eraser
8. A3-sized chart sheet
9. Glue
10. Markers/coloured pens

**Procedure**

1. Use slip basting, running stitch, back stitch and hem stitch to finish four sides of the sample fabric.
2. Make different constructive (temporary and permanent) stitches on the sample.
3. Paste them on the chart sheet and write where they are used.
4. Label them.
5. Place the chart in the classroom/practical lab.



## Check Your Progress

**A. Fill in the blanks with the most appropriate answer from the choices given below**

1. _____ stitch forms part of a stitched garment.
   (a) Temporary
   (b) Permanent
   (c) Constructive
   (d) Hem
2. _____ stitch is of equal length about ¼ inch on both sides of the fabric.
   (a) Uneven basting
   (b) Slip basting
   (c) Diagonal basting
   (d) Even basting
3. _____ stitch is used for hems on medium or lightweight fabrics.
   (a) Hem
   (b) Back
   (c) Run and back
   (d) Decorative

**B. Short answer questions**

1. Write short notes on the following
   (a) Decorative stitches
   (b) Buttonhole stitch

**C. Long answer questions**

1. Describe how to make temporary stitches.
2. Describe how to make permanent stitches.

## Session 2: Different Type of Seams

Seams refer to the stitching line where two pieces of fabric are stitched together. It is the basic building unit of any garment or stitched article. It is an application of a series of stitches or stitch types to one or several thickness of material. Seams mainly construct the structure of the garment or stitched article. It is also used for decorative purpose. Decorative seams are mainly used for decorative purposes while functional seams are used mainly for the purpose of construction. An example of decorative seams is a tucked seam, and example of functional seam is flat seam, French seam,

NOTES

etc. Good appearance in a seam normally means smooth fabric joins with no missed or uneven stitches and no damage to the material being sewn. Alternatively, it means regular gathering to form a style feature, or a varying but controlled amount of ease to ensure a good fit of the garment to the body. With the wide variety of fibre types and fabric construction available, good seam appearance during manufacturing requires different techniques. Once it has been achieved, it should be maintained throughout the lifetime of the garment, despite the many problems that arise during wearing, washing and dry-cleaning. Performance of the seams means the achievement of strength, comfort, durability and elasticity. Seams should be as strong as the fabric.

Following are the points to be considered while making seams. Seams are commonly machine stitched but one can hand stitch a seam using back stitch. Before making a seam, ensure that the needle and thread used are appropriate for the fabric weight and texture. Because the seams of a garment must withstand wear and tear, the beginning and the end of the line of stitching should be secured with a few back stitches. To prevent fraying, enough quantity of fabric should always be left between the line of stitching and the fabric edge.

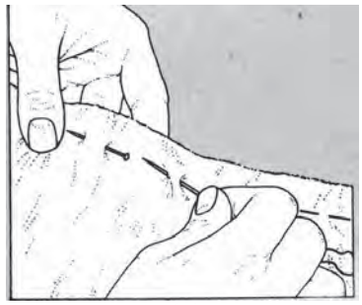
There are different type of seams, and the type of fabric and garment should determine the one you select. Some commonly used seams are given below.

## Flat seam

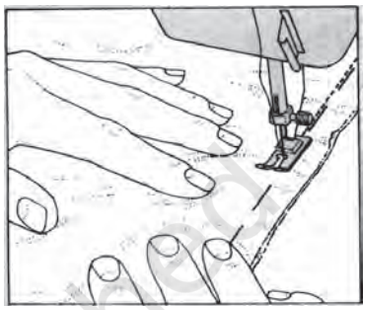
It is the basic seam (functional seam), joining the edges of two pieces of fabric. This seam is used on medium weight fabrics where there is no special strain on the seam. Mostly, plain straight stitch is used to stitch the seam. Flat seam can be used on most of the garments and the seam edges should always be finished as appropriate for the type of fabric. Although a flat seam is always made with the right side of the fabric facing, some other seams will require to be initiated with the wrong sides of the fabric facing. With the right sides of the fabric facing, pin the fabric together at both the ends of the seam line and at intervals along the seam



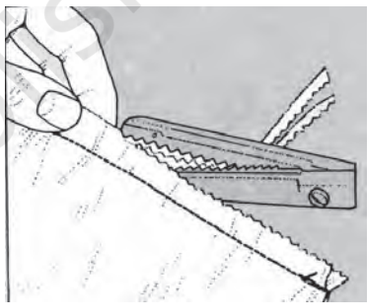
line leaving an allowance of about ¾ inches properly, close to the seam line. Then stitch along the seam line, back stitching a couple of stitches at each end to secure the seam, and remove the pins. After removing the pins, finish the seam edge by pinking it or as necessary for the fabric. Press the seam as stitched and then press it open, using a pressing cloth between the iron and the fabric.



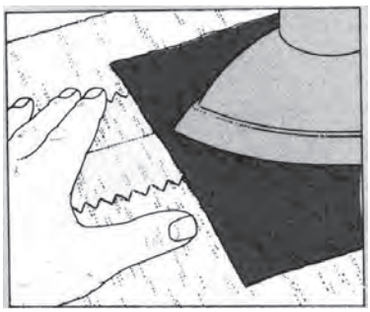
*(a)*



*(b)*



*(c)*

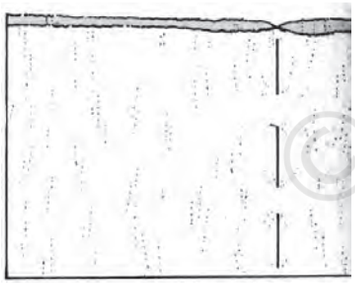


*(d)*

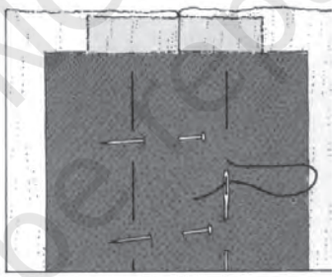
*Fig.3.13 (a, b, c, d) Flat seam*

## Channel seam

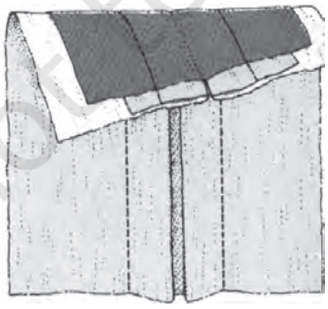
This is a decorative seam mostly used in trousers, pockets of jeans, jackets, etc. It has a strip of fabric behind it which is visible through the seam fold. It can be made of contrasting fabric, if desired. With the right sides of the fabric together, pin and tack along the seam line. Press the seam open and cut an underlay of the same or contrasting fabric 1 inch wider than the two seam edges. With the wrong side of the work facing you, centre the right side of the underlay on the seam and pin in the position. Pin and then stitch an equal distance, each side from the seam depression. Remove the pins and tacking, then press as stitched.



*(a) Tacked fabric together*



*(b) Underlay pinned to seam*



*(c) Completed seam*

*Fig. 3.14 (a, b, c) Channel seam*

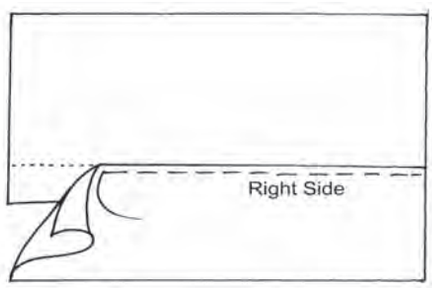
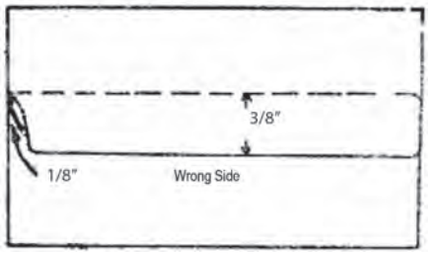
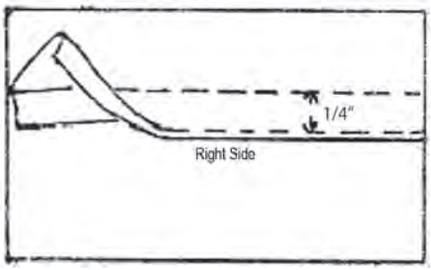



*Fig. 3.15: Lapped seam*

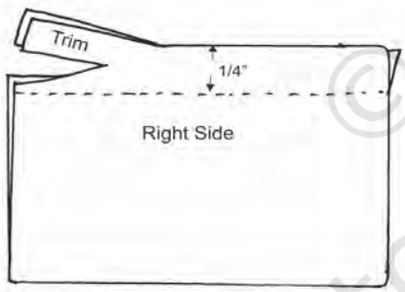



*(a)*

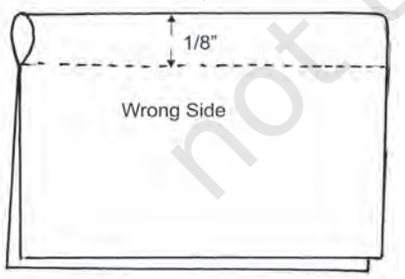



*(b)*

*Fig. 3.16 (a, b) Flat felled seam*




*(a)*




*(b)*

*Fig.3.17 (a, b) French seam*

## Lapped seam

This seam is used for joining sections of interfacing to avoid bulking, that is a mass of fabric getting thick. Lap one edge of the fabric over the other with the seam lines directly over each other. Tack and then stitch along the seam line with a wide zigzag stitch or a straight stitch. Trim the seam edges (Fig. 3.15).

## Flat felled seam

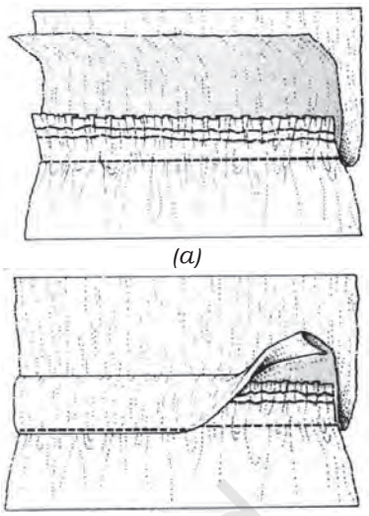
This is a flat, durable and strong seam used mainly on men's sports shirts, work clothes, children's clothes and pyjamas. It is time consuming and difficult to make on curved edges and on bulky fabrics. Place the fabric pieces to be joined at the wrong side facing, and then stitch on the seam line. Press both seam allowances together in the same direction and trim the under seam allowance to ⅛ inch and the upper one to ⅜ inch (Fig. 3.16 a). Turn under the raw edge of the wide seam allowance so as to make a smooth fold of ¼ inch wide. Stitch close to the folded edge on the right side of the garment. The right side of the seam shows two rows of stitching and wrong side shows only one row of stitching (Fig. 3.16 b).

## French seam

It is a narrow seam generally used for fine fabrics or for those fabrics which fray easily. It is a seam within a seam. When finished, it should be about ¼ inch or less in width. To make the French seam, place the wrong sides of the fabric together (Fig. 3.17 a). Pin and tack in position close to the seam line. Stitch ¼ inch to the right of the seam line to the end of the seam. Press as stitched. Pressing can be done using hands to form a crease or using a heat pressing iron. Then trim the seam allowance to ⅛ inch. Press the seam open. Then turn the right sides of the fabric together. Fold on the stitch line and press. Tack in position. Stitch along the seam line and press as stitched (Fig. 3.17 b).

## Mantua maker's seam

It is used to attach a frill to a straight piece of fabric. With the right sides of the fabric together, tack along the seam line and stitch. Trim the frill seam allowance to ¼ inch. Double fold the other seam allowance over the raw edge down to the seam line. Stitch very close to the seam line then remove tacking and press the seam upwards, keeping away from the frill.



(a) (b)

*Fig. 3.18 (a, b) Mantua maker's seam*

## Double stitch seam

It is used mainly for sheer fabrics. To make this seam, take the right sides of the fabric together, tack and stitch along the seam line and press as stitched. Make another line of stitching in the seam allowance ¼ inch from the first line, using a fine multi stitch zigzag or straight stitch. Then trim the raw edge using a scissors or a pinking shear to prevent the fabric from fraying.

## Lingerie seam

It is used mainly for making very fine seams. It is so named because of its use in lingerie. To make the seam, take the right sides of the fabric facing; pin, tack and then stitch along the seam line. Then press as stitched. Finish the seam edges with pinking scissors and press both seam allowances to one side. Stitch seam edges on the right side with small stitches of zigzag.

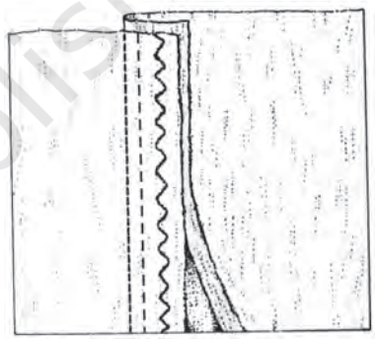


*Fig. 3.19: Double stitch seam*

## Tucked seam

It is a decorative seam and generally used as a design feature on a garment. If a tucked seam is used on a fabric which frays easily, the seam edges should be finished by oversewing. To make a tucked seam, take the right side of the fabric facing you, turn under the seam allowance on one piece of fabric, and then pin

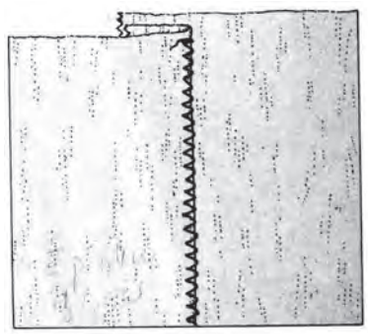
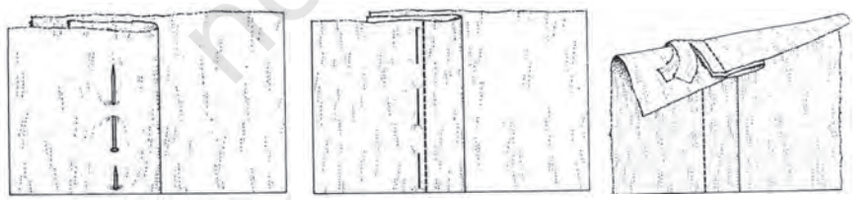


*Fig. 3.20: Lingerie seam*



(a) (b) (c)

*Fig. 3.21 (a, b, c) Tucked seam*

into place. Place the folded edge of the seam line on the right side of the second piece of fabric, putting the edges together. Tack and stitch the desired width from the folded edge. Remove tacking threads and trim off the seam edge underneath the seam. Press as stitched.

## Practical Exercises

### Activity 1

To identify the various seams used on a pair of denim jeans, pillow covers, shirt, skirt, frock, bloomer and blouse.

**Material Required**

1. A pair of denim jeans
2. Pillow covers
3. Shirt
4. Skirt
5. Frock
6. Bloomer
7. Blouse
8. Pen
9. Pencil
10. A3-sized chart sheet
11. Eraser

**Procedure**

1. Place each of the above items in front of you.
2. Begin by observing and identifying the seams used in each of these. Make a note of your observations.
3. Now take an A3-sized chart sheet and draw out a table.
4. While preparing the chart, remember to refer to the notes you made earlier.
5. List the names of the items you observed such as frock, shirt, blouse, etc., on the left side. Now write your observations on the kind of seams used in each of these on the right side of the table.

### Activity 2

Prepare samples of different seams as given in this session.

**Material Required**

1. Cotton fabric to prepare samples (12" x 12")
2. Needle, thread and scissors
3. Pen



4. Eraser
5. Pencil
6. Practical file
7. Adhesive/glue
8. Markers/coloured pens
9. Sewing machine
10. Bobbin/bobbin case

**Procedure**

1. Prepare samples of different seams.
2. Finish the edges of the samples.
3. Attach them in the practical file and write where they are used.
4. Label them.

## Check Your Progress

**A. Fill in the blanks with the most appropriate answer from the choices given below.**

1. Channel seam is a _____ seam.
   (a) decorative
   (b) functional
   (c) Both (a) and (b)
   (d) None of the above
2. _____ seam is used for joining section or parts of interfacing to avoid bulk.
   (a) Welt (b) Lapped
   (c) Channel (d) French
3. Tucked seam is a _____ seam.
   (a) functional
   (b) decorative
   (c) Both (a) and (b)
   (d) None of the above
4. _____ is a seam within a seam.
   (a) Flat (b) French
   (c) Lapped (d) Channel

**B. Short answer questions**

1. Write short notes on the following
   (a) Double stitch seam
   (b) Lapped seam
   (c) Lingerie seam

**C. Long answer question**

1. Describe the various type of seams in detail along with a diagram.

NOTES

## Session 3: Edge Finishes

Edge finishes are made to prevent fraying of the raw edges of the fabric or garment and thus, make the fabric edge more durable and attractive. They also provide a neat appearance to the inner side of the garment. Although edge finishes are not essential for completion of the garment, it can add durability to a garment's life. There are various types of edge finishes. They may be carried out by hand stitches or by sewing machine. Some of the common edge finishes are described in this session.

### Different type of edge finishes

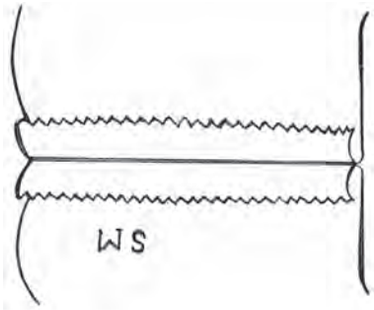



*Fig. 3.22: Pinked finish*

#### Pinked finish

This is a quick method of finishing done with pinking shears (a kind of fabric cutting scissors). After stitching, trim the edges, preferably at a distance of ⅛ inch by using pinking scissors (also called pinking shears). This technique is not used on fabrics that ravel badly (Fig. 3.22).

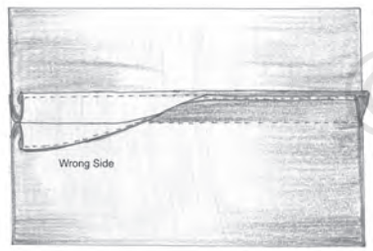



*Fig. 3.23: Edge stitched finish*

#### Edge stitched finish

This is a neat finish for light to medium-weight, non-bulky fabrics. In this finish, the seam is stitched and pressed open. Then turn under ¼ inch on each seam edge. Stitch close to the fold without catching the garment (Fig. 3.23). This is a bulky type of finish and is not suitable for deeply curved seams. This finish is mostly used on unlined coats and jackets where the seam allowance is wide.

*Fig. 3.24: Double stitch finish*

#### Double stitch finish

After making a plain seam, to carry out double stitch finish work, an extra line of stitching is made about ¼ inch from the raw edge of the fabric or garment (Fig. 3.24). This is done for a plain unfinished seam or pinked seam. It is not suitable for bulky fabrics. This type of finish is commonly used on sheer fabrics.



## Herringbone finish

This finish neatens the raw edges of heavy material like flannel, brocade, tweed, etc. It also holds down the turning, making the seam flat, avoiding the bulkiness. After pressing the seam open, herringbone stitches are worked on the two raw edges (Fig. 3.25).

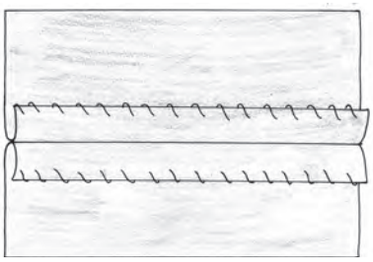


*Fig. 3.25: Herringbone finish*

## Bound seam edge finish

In this method, the seam is pressed open and a separate piece of binding (a double folded bias strip) is attached to both the seam edges (Fig. 3.26) and tacked. It is often used on lightweight fabrics like silk, chiffon, etc.

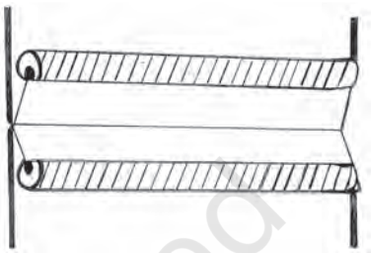


*Fig. 3.26: Bound seam edge finish*

## Practical Exercises

**Activity 1**

Draw pictures of various types of edge finishes and prepare a scrapbook.

**Material Required**

1. Pen
2. Pencil
3. Sharpener
4. Eraser
5. Scrapbook
6. Ruler
7. Markers/coloured pens

**Procedure**

1. Draw edge finishes on the scrapbook and write where they are used.
2. Label them.

**Activity 2**

Prepare samples of edge finishes as given in this session.

**Material Required**

1. Cotton fabric to prepare samples (12"X12")
2. Needle and thread
3. A3-sized chart sheet
4. Adhesive/glue
5. Pen

6. Pencil
7. Eraser
8. Markers
9. Coloured pens
10. Pinking scissors
11. Sewing machine
12. Bobbin/bobbin case

**Procedure**

1. Prepare samples of edge finishes.
2. Paste them on a chart sheet.
3. Label them.
4. Place the chart in the classroom or practical lab.

## Check Your Progress

**A. Fill in the blanks with the most appropriate answer from the choices given below.**

1. _____ seam edge is trimmed with pinking shears and gives a zigzag appearance.
   (a) Pinked finish
   (b) Herringbone
   (c) Double-stitch finish
   (d) None of the above
2. In _____, a separate piece of binding is attached to both seam edges.
   (a) pinked edge
   (b) bound seam edge finish
   (c) herringbone finish
   (d) double stitch
3. _____ finish is suitable for heavy fabrics.
   (a) Pinked edge
   (b) Edge stitch
   (c) Herringbone
   (d) None of the above
4. _____ finish is commonly used on sheer fabrics.
   (a) Herringbone
   (b) Double stitch
   (c) Bound seam edge
   (d) Edge stitch
5. Edge finishes are made to prevent _____ of the raw edges of the fabric/garment.
   (a) Basting
   (b) Hemming
   (c) Fraying
   (d) None of the above



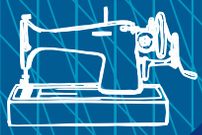
**B. Short answer questions**

1. Write short notes on the following
   (a) Bound seam edge finish
   (b) Herringbone finish
   (c) Pinked seam
   (d) Edge stitch finish
2. Explain the double stitch finish.

**C. Long answer question**

1. Describe various type of edge finishes and their use in detail along with diagrams.

Unit 4



# Care and Maintenance of Sewing Machine

## Introduction

The care and maintenance of a sewing machine helps to improve its working. This consists mainly of cleaning, oiling, and right handling, which contributes to good output, quality production and safety of the workers. Care and maintenance is also necessary in order to operate the machine smoothly and for its long term use. It is very important to identify the sewing defects such as upper thread break, bobbin (lower) thread break, bunching of threads, skipped stitches, irregular stitches and stitches that are not formed properly, etc., for proper working of sewing machine and good quality production. This Unit discusses the cause and different defects and the corrective action to be taken.

## Session 1: Cleaning, Oiling and Handling of Sewing Machine

A clean, well-oiled sewing machine is essential for good output and safety. The maintenance of sewing machine is also important in preventing stitching faults. When not in use, keep the machine covered with a suitable cover to prevent dust from settling on it. In some organisations, this is done by the operators but in others, it is done by a mechanic.

## Cleaning of sewing machine

While cleaning the machine, pay attention to the various parts of the machine, the machine table or stand, the work station, and even your hands, to avoid soiling the material being sewn, prevent accidents and damage to the machine. These directions mainly hold true for the lockstitch machine, but they can easily be adapted to other machine types also. The machine should always be kept covered when not in use to protect from dirt and dust. Before attempting to clean the machine, it is wise to remove the needle to avoid the danger of sewing into the finger during the cleaning process.

### Material required for cleaning

1. Flat paintbrush (½" to ¾" wide)
2. Cleaning solvent or fluid
3. Soft disposable cloth
4. Screwdriver
5. Sewing machine manual
6. Small handy vacuum cleaner

All dust and dirt can be removed by wiping the part out carefully with the cloth, but if the machine is clogged, a more careful cleaning is necessary. Common tools like a small dry brush or old toothbrush or compressed air and a soft cloth are used to remove dust and lint.

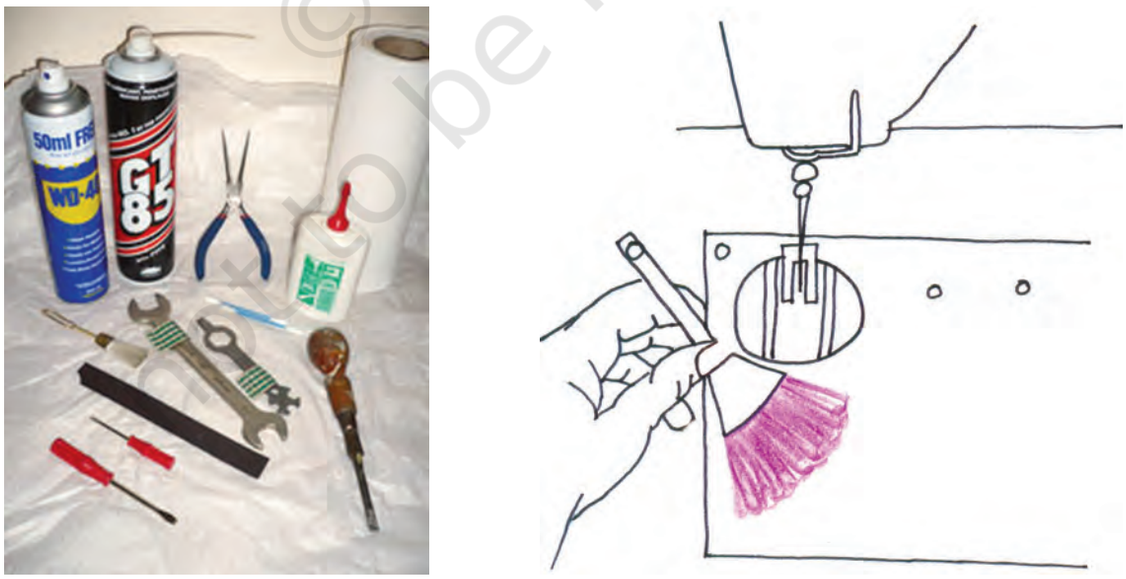



*Fig. 4.1(a, b) Tools for cleaning sewing machines*

## Points to be considered while cleaning

1. Before cleaning any machine, turn it off.
2. Open the slide plate and remove the bobbin case. Then remove the throat plate. Whenever it is required, remove the face plate from the left end of the head.
3. Any lint, dust, or loose threads in the area around the feed dog and rotary hook, shuttle may be brushed or blown away. Do not use anything hard, such as a screwdriver or scissors points, to remove the lint. Instead, carefully use a pointed instrument like a needle or pointed tweezers/plucker to pick out bits of thread and lint that cannot be brushed out.
4. Turn the hand wheel manually to expose any areas that might have been hidden initially. Brush again.
5. Carefully tilt the machine head back until the head rests on the post on the back of the table.
6. Brush out any lint, dust, or threads from the lower part of the machine.
7. Use a soft, thin and clean cloth to remove any lint on the machine parts.
8. Unscrew all plates and screws and the bobbin case.
9. Check the needle to be sure it is clean and the eye is not clogged.
10. Replace the needle, if necessary.
11. Wipe away any excess oil or dust on the head, machine bed, motor, table, and stand.
12. If there is lint between the tension discs and in the thread guides, use thread to floss the tension discs and remove any lint.
13. If you have oiled the machine, sew on few scraps to remove any excess oil.
14. Wash hands after cleaning and oiling the machine.
15. After completing the work, put a piece of fabric under the foot, lower the presser foot, cover the machine, and pick up any trash.



16. For cleaning the machine, it is good to clean one area at a time. Remove only those parts that are detachable, and keep in mind the position and direction of each part that is removed for cleaning. Keep the parts in order to make it easier to attach them.
17. When using a screwdriver, apply pressure on the screw, if a screw does not loosen easily. Soak it in a good quality cleaning fluid available in the market for the sewing machine. Petrol or kerosene can also be used as cleaning fluids. Then set the screwdriver in the slot to loosen the screws if required.
18. Remove all the parts that is, the needle, presser foot, slide plate, throat plate, bobbin case, and the face plate. Put them in the tray and soak in cleaning fluid.
19. Wrap the motor to protect it from oil and cleaning solvent. Ensure that the sewing machine has been unplugged.
20. To clean the feed dog, remove the needle plate of the machine and brush off all lint deposits and dirt sticking to different parts.
21. To clean the shuttle case, remove all the screws holding the shuttle case. Take out the shuttle case and wipe its groove free of dirt, and thread bits.
22. Sometimes loose threads wind around the pivots of the treadle and make the sewing machine hard to run. Thread bits must be removed which are caught in the wheel along with all lint and dust sticking to the treadle parts.
23. Use a cloth or small brush to clean near the needle and feed dog.
24. If the machine starts to run hard, it is an indication that dirt or lint is jammed inside a bearing. In that case, remove the bobbin case to remove all lint and stray threads. Continuously run the machine and flush it with the cleaning fluid until the dirt and gummed oil are washed from the bearing.

25. The bobbin case can be removed from the sewing machine easily. Use a dry brush to clean out all lint. Remove any thread that may be wound up around the hook shaft. In some machines, the hook assembly can also be removed for complete cleaning.
26. Remove bobbin and bobbin case, and clean small thread particles from there.
27. Pull a piece of cloth soaked in the solvent, back and forth between the discs to clean it from dust, lint or any other particles. Repeat with a dry cloth to make sure that no lint or thread is caught between them. To remove any remaining dirt and oil, dip a cloth or brush in a cleaning fluid and scrub all parts of machine that can be reached. Check the lower tension of the bobbin case and the upper thread tension discs. Pull a thread under the bobbin to remove dirt.
28. Clean the hand wheel, washer, and the shaft. Lubricate the shaft with two drops of sewing machine oil and place a small amount of grease on all gears. Reassemble the hand wheel and clutch.

After properly cleaning these areas, reassemble all the parts of the sewing machine and run it. If reassembled correctly, it should run smoothly.

## Oiling the sewing machine

Always keep your sewing machine well oiled. All dust should be removed from the exposed parts at least once every week, and the important parts of the machine should be oiled. Use good quality sewing machine oil. Always remove lint deposits, dust and thread bits before oiling any part of the machine. In order to operate the machine smoothly, it is essential to oil it repeatedly.

### Material required

1. Sewing machine manual
2. Sewing machine oil
3. Soft disposable cloth



## Points to remember while oiling the sewing machine

1. Before oiling, ensure that the sewing machine is turned off.
2. Oil the machine using the directions given in the machine manual. Inspect the condition of all visible parts of the machine every time you oil it.
3. If a manual is not available, oil the machine as per the directions of the teacher/instructor as per the required frequency.
4. Locate oil holes of the sewing machine. They are mostly identified by arrows, or red or yellow paint. Put one to two drops of oil into each hole. Too much oil will clog the machine. Turn the hand wheel manually so that the oil will work its way between the parts.
5. Wipe off all dust and excess oil from the machine or table; clean up any spilled oil immediately.
6. Sew on a few fabric scraps to remove any excess oil.
7. Wash hands after oiling the machine.
8. Excess oil is a major problem that can spoil and damage the fabric.

## Method for oiling of the sewing machine

It is necessary to oil the sewing machine periodically. If the machine is used everyday, oil it once a week. If you do not use it very regularly, then oiling once a month is sufficient. The frequency of oiling depends on its use, and sometimes on the material sewn. To oil thoroughly, remove the upper thread, needle plate, slide plate, face plate, bobbin case, and needle and presser foot. Put sewing machine oil in all oil holes and joints where one part rubs against another. One or two drops of oil are enough for each point. While oiling, turn the fly wheel back and forth to facilitate the flow of the oil to different moving parts. It is necessary to oil the shuttle case. After oiling the points on the head of the machine, tilt the machine head back to oil the points on the underside. On a treadle machine, the belt will have to be released

before tilting the machine head back. Remember to oil the pivots of the treadle. When the machine has been completely oiled, wipe away excess oil and run it slowly for 2–3 minutes on a waste piece of material. Before you close the machine, place a scrap of fabric under the presser foot and lower the needle. The fabric will absorb the excess oil that might drain down through the machine and will prevent the formation of oil spots on your work the next time the machine is used.

If the sewing machine becomes gummed and dirty with oil, put a drop of kerosene or petrol in each oil hole and at joints, and run it rapidly for 1–2 minutes. Then wipe off the oil that oozes out with a soft cloth and re-oil the machine. It will require a second oiling within few hours after this treatment.

Check the machine instruction booklet/manual to determine the types of oil lubricant to use and where to use them. Do not oil the tension discs, the hand wheel release or the belts and rubber rings in any machine.

Run the machine so the oil would be distributed into all the bearings. Use oil freely because all oil has been removed in the cleaning process. For later oiling, one drop of oil on each bearing and in each oil hole is enough.

After oiling the sewing machine, wipe away the excess oil and reassemble the machine. The oil used should be of good quality, preferably regular machine oil, as otherwise it may clog the bearings. Care should be taken to see that too much oil is not deposited in, as it is liable to spoil the cloth being stitched. It is advisable to do a few stitches on a waste piece of cloth until clear stitches are obtained.

## Care and maintenance of sewing machine

Most sewing machines encounter problems that can be traced to poor general maintenance or neglect. But with some simple tools and just a few minutes daily, weekly, or monthly, depending on how much our sewing machine is used, we can help keep our machine running smoothly.



## Handling of sewing machine

### Safe handling procedure of sewing machine

The safe handling procedure of the sewing machine involves:

1. Setting up of the sewing machine
2. Adopting safety measures before starting sewing
3. Adopting safety measures during sewing

#### *Setting up of sewing machine*

(i) Position the machine on a hard flat surface.
(ii) Select and install the needle securely into the needle bar.
(iii) Select the suitable thread according to the type of fabric to be used.
(iv) Wind the thread into the bobbin.
(v) Following the thread guide, thread the machine from the spool pin to the needle.
(vi) Set the machine of required stitch length.
(vii) Balance the thread tension on the sewing machine (adjust the upper tension in relation to the lower tension).

#### *Adopting safety measures before starting sewing*

(i) The sewing machine cord must be in good condition. Switch off the sewing machine before threading the needle, and after every use, turn the machine off or unplug it.
(ii) Ensure that there is enough light while using the sewing machine. Using a sewing machine in poor lighting can lead to any accident or mishappening.
(iii) Keep the feet off the treadle when setting or threading the needle.
(iv) Use the hand wheel to move the needle to its highest position while the fabric is placed for sewing.
(v) One needs to hold the top and bottom loose thread ends before starting the machine.

***Adopting safety measures during sewing***

(i) Practise on a scrap material to check against oil stains, etc.

(ii) Notice the way the sewing machine sounds. If the sewing machine makes some abnormal sounds or seems louder than usual, get it checked by a technical expert.

(iii) Sew at a slow, steady pace and use a needle guard to protect the fingers.

## Handling of material, tools and equipment

### Handling of material

1. Select appropriate needle, thread and stitch length suitable for the different type of fabrics.
2. Practise on the scrap material prior to starting work on the final fabric to avoid oil stains.
3. Also make a trial stitch on the waste fabric.
4. Take care to set the presser foot in a way so as to hold the fabric in place.
5. Position the fabric on the machine in such a way that the larger portion of the fabric falls on the left hand side of the sewing machine.
6. Take care while sewing slippery fabrics, and if essential, use lining to give firmness to the slippery fabrics.

### Care and handling of tools and equipment

***Measuring tape***

It is used for taking body measurements and requires very little maintenance. The tape should be clean to check the accuracy of the markings. After each use, the measuring tape should be rolled or wrapped and kept in a clean box.

***Sewing gauge***

These are hand tools for measuring small areas during sewing. Sewing gauges are handy to have for hand sewing, marking alterations, hemming, checking the width of seam allowances, etc. A six inch aluminium



ruler is the most common gauge. Select a jigsaw puzzle shaped gauge which will have markings for the most common sewing measurements that are either seam allowances, turned under or hemmed. A sliding marker helps to keep the measurements uniform. Do not allow the metal gauges to get bent.

### *Pin cushions*

These hold the pins and needles during working to prevent accidents while working. A magnet attached pin cushion is very helpful in holding the pins but when more varieties of pins are used, it will not help to keep the pins separated. Select a standard pin cushion filled with fine sand, so that the abrasion of fillers may prevent the pins from dust and getting rusted.

### *Hand sewing needles*

These needles are available in varying sizes and points. They guide the thread through the fabric while hand sewing. It is advisable to purchase hand sewing needles of good quality stainless steel material to prevent them from rusting. The needle should always be kept in a dry and clean case. To avoid a finger injury while searching through the loose needles, they may be kept with a small piece of thread passed through its eye. To avoid damage to the point of the needle, it should not be pressed or pricked on a hard surface.

### *Sewing needle threader*

A needle threader is used for threading a sewing needle easily and quickly. The needle threader should have a large enough eye to hold the thread, as forcing the metal wire of the threader can cause it to break. Being very small, it should be kept carefully in a small box to avoid any damage.

### *Seam ripper*

It is used to remove the fine stitches and to pick out single threads. Keep the seam ripper sharp and clean, and use it only for sewing tasks. To prevent injuries and damage, keep the seam ripper covered when not in use. Select an appropriate seam ripper for use as it may cut the fabric while removing the seam. For example, larger,

heavier seam rippers are available for heavy removal jobs or cutting through heavy threads.

### *Dressmaking shears*

Such shears are used for cutting out patterns, fabrics and soft material. Use the shear for cutting fabrics and soft material only. If used on anything other than fabric, (thick sheet, etc.), it will reduce the sharpness of shear or cause it to become blunt, causing uneven cutting, shredding of fabric and hand fatigue. Keep the blades sharp and clean.

### *Pressing cloth*

It helps to remove fabric creases and wrinkles while ironing. A press cloth is essential to protect the fabric from direct contact with a hot iron. Also a see-through press cloth allows one to go through the pressing task through the press cloth. It should always be clean and oil free for protecting the garment from oil and dust.

### *Hams and sleeve rolls*

Hams and sleeve rolls are wonderful for pressing curves. They should always be clean and oil free.

## Practical Exercises

**Activity 1**

Practise the cleaning of sewing machine and its different parts.

**Material Required for Cleaning**

1. Flat paintbrush (½" to ¾" wide)
2. Cleaning solvent or fluid
3. Soft disposable cloth
4. Screwdriver
5. Sewing machine manual
6 Small handy vacuum cleaner

**Procedure**

1. Visit the practical/sewing lab with your teacher.
2. Practise the cleaning of sewing machine and its different parts as per the instructions given in this session.



**Activity 2**

Practise the steps involved in the oiling of sewing machine.

**Material Required**

1. Sewing machine
2. Lubricating oil
3. Cleaning cloth
4. Rough fabric

**Procedure**

1. Visit the practical/sewing lab with your teacher.
2. Place newspapers below the sewing machine so that the floor should not be dirty and the newspapers can be thrown away after oiling.
3. Oil all the parts of machine using machine oil.
4. After oiling the machine, clean the extra oil on the machine.
5. Check stitching on a rough fabric so that the machine is checked for smooth running.

## Check Your Progress

**A. Match the columns**

| Sewing Tools | Uses |
|---|---|
| (a) Pin cushions | 1. Cutting out of patterns and fabrics |
| (b) Seam ripper | 2. Protect the fabric from direct contact with hot iron |
| (c) Pressing cloth | 3. Holds pins and needles |
| (d) Dressmaking shears | 4. Remove fine lines and single threads |

**B. Fill in the blanks**

1. The measuring tape should be clean to check the _____ of the markings.
2. _____ is a hand tool for measuring small areas during sewing.

**C. Questions**

1. Describe the cleaning of the sewing machine.
2. Write about the oiling of the sewing machine.
3. Explain the safe handling procedure of the sewing machine.
4. Write in detail about the care and handling of tools and equipment.

## SESSION 2: MACHINE AND SEWING DEFECTS AND ITS SOLUTIONS

Some of the common defects related to sewing and the sewing machine, the possible causes, and the best possible corrective actions associated with these are given below.

Defect: The machine does not feed the material.

***Possible causes***

(i) The stitch length has been set to zero.
(ii) The presser foot pressure is too low.
(iii) Feed dog is lowered.
(iv) Threads are knotted under the fabric.

***Corrective action***

(i) Set the proper stitch length.
(ii) Set pressure of presser foot.
(iii) Raise feed dog.
(iv) Remove fabric and knotted threads. Then again place the fabric properly.
(v) Place both threads back under the presser foot before starting to sew.

Defect: Machine running heavily

***Possible causes***

(i) Dust or lint clogging under the feed dog
(ii) Insufficient oiling
(iii) Thread caught in the shuttle
(iv) Machine not used for sometime with the result that the parts have jammed

***Corrective action***

(i) Clean the feed dog.
(ii) Oil the machine properly.
(iii) Remove the thread from the shuttle.
(iv) Disassemble the removable parts, clean and oil them.



Defect: The sewing machine does not run.

***Possible causes***

(i) The presser foot is not properly placed and the needle hits the presser foot.
(ii) The needle has come out and is in the shuttle area of the machine.

***Corrective action***

(i) Place and tighten the presser foot properly.
(ii) Remove the needle and insert a new one again, or place it at the right position.

Defect: The upper thread breaks.

***Possible causes***

(i) The threading is not correct.
(ii) The thread has a knot in it.
(iii) The upper thread tension is too tight/high.
(iv) The needle is bent or blunt.
(v) Wrong size of needle
(vi) The needle has been inserted wrongly.
(vii) The needle and thread do not match, and are also not suitable for the fabric to be sewn.
(viii) Started stitching too fast
(ix) Thread take-up lever has not been threaded

***Corrective action***

(i) Thread the machine correctly.
(ii) Remove knots from the thread.
(iii) Make correct the thread tension.
(iv) Replace with a new needle, of good condition.
(v) Replace with a needle of the correct size.
(vi) Insert the needle properly.
(vii) Use a suitable thread and needle.
(viii) Start the machine at a medium speed.
(ix) Check the threading order.

Defect: The bobbin thread breaks

***Possible causes***

(i) The bobbin has not been fully inserted/pushed in the bobbin case.
(ii) The bobbin case has not been threaded correctly.
(iii) The bobbin does not turn smoothly in the bobbin case.
(iv) A lint in the bobbin case or shuttle

***Corrective action***

(i) Securely install the bobbin in the bobbin case.
(ii) Thread the bobbin case correctly.
(iii) The bobbin should not be overwound.
(iv) Check that the bobbin has been wound evenly.
(v) Clean the bobbin case and shuttle, and remove the lint.

Defect: Skipped stitches

***Possible causes***

(i) The thread tension is too tight/high.
(ii) The needle is bent or blunt.
(iii) Wrong size of the needle
(iv) The needle and thread do not match.
(v) The thread take-up lever has not been threaded.
(vi) Light pressure on the presser foot
(vii) Incorrect setting of the needle

***Corrective action***

(i) Correct the thread tension.
(ii) Replace with a new needle of good condition.
(iii) Replace with a needle of correct size.
(iv) Use a suitable thread and needle.
(v) Check the threading order.
(vi) Increase pressure on the presser foot.
(vii) Reset the needle properly.

Defect: The stitches are not formed properly

***Possible causes***

(i) The thread has not been pulled into the thread guide.



(ii) Threading is not correct.
(iii) The bobbin case has been threaded wrongly.

***Corrective action***

(i) Fully pull the thread into the thread guide
(ii) Correct the threading.
(iii) Correctly thread the bobbin case.

Defect: Irregular stitches

***Possible causes***

(i) Incorrect size of the needle
(ii) Improper threading
(iii) Loose upper thread tension
(iv) Pulling of the fabric
(v) Light pressure on the presser foot
(vi) Loose presser foot
(vii) Uneven or overwound bobbin

***Corrective action***

(i) Choose the correct size of the needle for the thread and fabrics.
(ii) Rethread the machine properly.
(iii) Tighten the upper thread tension.
(iv) Do not pull the fabric; guide it gently.
(v) Increase pressure on the presser foot.
(vi) Reset the presser foot.
(vii) Rewind the bobbin properly.
(viii) Remove overwinding of the bobbin.

Defect: Fabric pucker

***Possible causes***

(i) The stitch length is too long for the material.
(ii) The needle point is blunt.
(iii) Incorrect thread tension
(iv) Light pressure on the presser foot
(v) The fabric is too sheer or soft.
(vi) Using two different sizes or kinds of upper and lower threads

***Corrective action***

(i) Decrease the stitch length.
(ii) Replace with a needle of good condition.
(iii) Reset the thread tension.
(iv) Increase pressure on the presser foot.
(v) Use an underlay of tissue paper/backing.
(vi) The upper thread and bobbin thread should be of the same size and kind.

Defect: Bunching of thread

***Possible causes***

(i) The upper and lower threads are not drawn back under the presser foot.
(ii) The placement of the feed dog is down.

***Corrective action***

(i) Draw both threads back under the presser foot.
(ii) Fit the feed dog properly.

Defect: Needle breaks

***Possible causes***

(i) A thin needle was used for sewing a heavy weight material.
(ii) The needle has not been fully inserted/pushed into the needle bar.
(iii) The screw of the needle clamp is loose.
(iv) The presser foot is not the correct one.
(v) The presser foot is loose.
(vi) Pulling of fabric

***Corrective action***

(i) Use the correct size of the needle.
(ii) Properly insert/push the needle in the needle bar.
(iii) Securely tighten the needle clamp screw.
(iv) Use correct presser foot.



(v) Reset the presser foot.
(vi) Do not pull fabric; guide it gently.

Defect: Loud noise is heard and/or knocking noise; machine jammed

***Possible causes***

(i) Dust has accumulated in the feed dog.
(ii) Lint is in the hook and shuttle area.
(iii) The thread is caught in the shuttle.

***Corrective action***

(i) Clean the machine and remove the lint.
(ii) Disassemble the shuttle case and clean it.
(iii) Oil the machine.

Defect: Threading cannot be done

***Possible causes***

(i) The needle is not at the highest position.

***Corrective action***

(i) Turn the hand wheel until the needle reaches its highest position.

Defect: The thread does not enter the eye of the needle.

***Possible causes***

(i) The eye of the needle is clogged.
(ii) The thread is thick in comparison to the eye of the needle.

***Corrective action***

(i) Clogging should be removed by using a fine wire.
(ii) Change the needle.
(iii) Select the thread according to the needle.

*Note:* While there are various defects of the sewing machine, the causes of these may be overlapping that is, the same cause can lead to multiple defects.

## Practical Exercises

### Activity 1

Prepare a chart of the sewing machine and sewing defects. Also mention the causes and remedies for the same.

**Material Required**

1. Chart sheet
2. Pen
3. Pencil
4. Eraser
5. Ruler
6. Markers

**Procedure**

1. List out the common defects in sewing and sewing machine.
2. Write the possible causes and list out the corrective action for the problems.
3. Prepare a chart.
4. Place the chart in the classroom/practical lab.

### Activity 2

Visit a garment manufacturing unit/workshop and attend a demonstration of the defects of the sewing machine and sewing, possible causes and its corrective action.

**Material Required**

1. Notebook
2. Pen
3. Camera (if available/mobile phones with camera)
4. Vehicle (bus) for field visit

**Procedure**

1. Visit a local garment manufacturing unit/workshop for the demonstration with the teacher.
2. Attend a demonstration on the defects of a sewing machine and sewing, causes and corrective action by a technical expert.
3. Prepare a report of the visit.



## Check Your Progress

**A. Match the columns**

| | |
|---|---|
| (a) Poor thread quality | 1. Remove bobbin and bobbin case and clean |
| (b) Tensions improperly set | 2. Replace needle |
| (c) Dirt, lint, or thread in bobbin case | 3. Replace poor thread |
| (d) Blunt or bent needles | 4. Adjust tension |

**B. Arrange the jumbled words**

| | | | |
|---|---|---|---|
| (a) pdese | (e) fyaset | (i) apteroe | (l) niedwr |
| (b) polso | (f) nutlb | (j) ebuasilt | (m) iltn |
| (c) thustle | (g) psipdke | (k) cpkrues | (n) rsehe |
| (d) stfo | (h) kgbiacn | | |

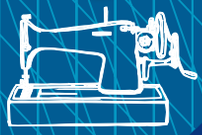
**C. Short answer question**

1. Write short notes on the following machine defects:
   (a) Excessive noise while stitching
   (b) Needle break
   (c) Fabric puckering

**D. Long answer question**

1. What are the common defects that occur while stitching? Write the causes and corrective action for the same.

Unit 5



# Hazards in Industry and Safety Measures

## Introduction

There are different type of machinery that a Sewing Machine Operator uses in the garment industry. Thus, it is very important to have an understanding about the safety and health measures while operating them. Although it is essential that the management take important steps to protect and safeguard the operators from potential hazardous situations, but the best way for any Sewing Machine Operator to be safe and healthy is to be aware of the various occupational hazards associated with sewing machine operation, and work-related illnesses and injuries. Many of the injuries are caused mainly by the Operator's error, carelessness and inattentiveness.

The Operators must be properly guided for the use of all the tools and equipment, machines, their safety measures, and precautions to be taken at the time of working. It should be compulsory for the Operator to follow the basic instruction to use machines, tools and equipment. Suitable furniture, proper ventilation and lighting and efficient safety measures for emergency situations are necessary for the safety and health of the Operators. First-aid kits, safety symbols/signs, fire extinguishers, and alarms are the most important safety measures in the manufacturing units.

## Session 1: Risk and Hazards in Industry

Notes

Risk is a random incident that may possibly occur, and if it occurs, it would have a negative impact on achieving organisational goals.

A hazard is an agent having the potential to cause harm or hurt to the target. We can call the possible source of danger as hazard. The terms 'risk' and 'hazard' are mostly used interchangeably. However, in terms of risk assessment, they are two very different terms. A hazard is any agent which can cause harm/damage/ injury to human beings and their environment. Risk is defined as the probability that exposes one to a hazard which leads to a negative effect.

All industries have different type of tools, equipment and machinery. There is always a risk of hazard while operating machines. They may be physical, biological, chemical, mechanical, etc. It is crucial for all operators to be aware of the risk of hazards associated with the industry they work in. While handling tools and machines, the Operators should follow safety instructions. Specialised training must be given to the Operators to prevent injuries from these hazards. Operators should take precautions to guard against work related hazards and accidents.

Most manufacturing units have similar hazards in their processes and work areas. Hence, it is mandatory to have adequate equipment and facilities in the unit to avoid these hazards. Adequate planning, training and awareness workshops are necessary to train the Operators, in which they must be made aware of various hazards associated with their units, and the precautions to be taken.

All the manufacturing units, whether located in a commercial or residential area, must comply and should have the necessary equipment, like fire extinguishers, hydrants, emergency exits, emergency lights, hooters, first aids, etc. The Operators may suffer many occupational accidents due to the processes and equipment or machines used in the garment industry. It is the prime responsibility of an organisation to provide occupational health and safety conditions to the Operators.

## Type of hazards

In a garment manufacturing unit, all the hazards mentioned in this session may not be common, but awareness about various hazards is essential to be able to deal with them in case they occur. Different work environments can pose different type of hazards and risks to the health of the Operators. Therefore, it is important to identify and address the different type of hazards with appropriate safety measures, not only by the employers but also for each individual to be responsible for the safety and welfare of the self, all persons working in the organisation as well as the environment.

There is always a threat to the health and safety of people at the workplace. These may be chemical hazards, physical hazards, biological hazards, etc. Here we have discussed some hazards keeping in mind the exposure of students of this course towards machines and industry.

### Physical hazards

They often affect many Operators in the workplace, for example occupational hearing loss, postural defects, falls, accidents, etc. Hearing loss is one of the most common problems in a manufacturing unit with heavy noise-making machines like some industrial sewing machines or cutters; postural defects like cervical and bone shape change can occur if a person needs to sit or stand in a particular wrong position for long time. Accidents and falls are also a common cause of occupational injuries and deaths in industries, like transportation, construction, extraction, healthcare, building, etc.

Some of the problems associated with the physical environment at the workplace include:

1. respiratory problems, allergies, skin problem, etc., may be caused due to excessive dust. Adequate ventilation, exhaust fans, etc., are helpful to make the environment clean and dust-free.
2. a low light environment for working, and shortage of eye protective glasses, can cause eye problems.



3. prolonged sitting, and continuous work involving the eye, creates eye problems (strained eyes) and backbone problems for the Operators. Repetitive Strain Injury (RSI) is likely to occur at the workplace due to long hours of sitting to complete the work. Problems like backache, stiffening of neck, cervical and wrist joint problems can also occur during stitching work.

These problems can be solved with the following tips.

1. Always work with the right body posture.
2. Keep the stand/machines at a height till bust level and straight wrist position to avoid bending your neck and back for a long time.
3. Use wrist rests to avoid strain in the hand and wrist joint.
4. Take short breaks from long sittings, maybe after an hour or two, to relax the strain in the back.

## Fire hazards

They are common in those industries that use a lot of flammable material, like cotton, chemicals, etc. Fire hazards occur mainly due to the following reasons.

1. Improper working of fire and smoke alarm bells in industries
2. Absence of fire and smoke alarm systems in many industries
3. Improper maintenance of fire exits or emergency staircase
4. Lack of proper exit route or emergency staircase to reach the place of safety

Every industry should keep fire extinguishers as a safety measure.

*Fig.5.1: Fire extinguishers*

## Biological hazards

These involve hazards due to bacteria, viruses and toxins. It can be due to non-

airy and dark rooms, suffocation (bad ventilation), and unhygienic conditions of washrooms. These also include animal bites and stings, problems from toxic plants, and transmitted diseases through animals.

## Chemical hazards

Some chemicals can cause a hazard in the work area. There are many categories of hazardous chemicals. Certain chemicals are harmful when mixed with other chemicals. Chemical hazards are very common in apparel and textile industry while at the time of dyeing and printing.

A worker in the garment industry should practise caution while handling chemicals. The worker must be made aware of the specific instructions to be followed while handling a particular chemical.

## Psychosocial hazards

This means that the status of mental health and emotional well-being of the Operators in an organisation may not be normal. These could be due to a feeling of job insecurity, long working hours, lack of enthusiasm towards work, frustration about not being allowed to deliver quality product due to pressure of quantitative production, harassment at workplace and poor work-life balance. This aspect should be dealt with care, as these are sensitive issues. Behavioural therapy, like continuous counselling, meditation, yoga, participation in recreation centres, music therapy or occupational care are effective in reducing sick leave days and poor work efficiency at the workplace.

## Electrical hazards

These are common in the textile industry as fabrics, machines and other fire-prone equipment are being dealt with here. It is quite dangerous when an Operator creates an electrical contact with keyed up equipment or a conductor. Electrical accidents mostly occur when the individuals are working around electrical apparatus which is live but they think it is dead. Wrong use of equipment and use of faulty electrical equipment also causes accidents. Working on, or near electric

equipment, without adequate training or appropriate equipment, may be one of the reasons.

Shocks from faulty equipment can lead to brutal and permanent injuries. Due to serious injuries, the chances to fall off from ladders or other work platforms are high. Apart from injuries or accidents, such mistakes or avoidance lead to damage of the plant, machines, equipment and property.

To reiterate, it is the role of the management to provide basic facilities like day care, canteen, rest room, recreational room, dispensary for first aid, etc., so that the Operators focus on their routine work in the units, uninterrupted. Critical emergency essentials, such as alarms, evacuation plans, emergency lights and gathering areas, must be invested in. There is a lot of machinery used in the garment industry. However, before any work starts on a machinery, the Operator should be trained in its proper operations and all safety precautions should be taken. Proper training and demonstration of work technique or process is valuable for each Operator.

**Table 5.1: Some Common Hazards and Potential Accidents and their Preventive Measures**

| Common hazards | Preventive measures |
|---|---|
| Finger and hand injury during cleaning and repair work | The machine must be switched off, with the plug removed, and must be stationary before any cleaning or repair work is started. |
| Eye injury from broken parts accidentally entering the eye | Proper adjustment of the eye guard should be checked before work starts. Safety glasses should be used. |
| Finger injury from the needle | Setting of the finger guard should be checked before work starts |
| Injury from tools and equipment of drafting cutting and measuring tools | Shears and needles should be put at the right place after use. |
| Electrical injury | Never use a machine with damaged covers, cables, switches, etc. Report the damage at once. Never try to repair it yourself. |

| | |
|---|---|
| Internal injury from accidentally swallowed items | Never store items temporarily in the mouth. Place needles, etc., in suitable containers. |
| Tripping and falling in the surrounding work area | The work area must be clean and tidy. |
| Fire hazards: loss of life and damage to machinery due to electric short circuit or welding operation | Place MCB (Motor Circuit Breaker), ACB (Air Circuit Breaker), restrict unauthorised person for welding |

## Practical Exercises

### Activity 1

Prepare a chart of the hazards in the garment manufacturing industry.

**Material Required**

1. Pen
2. Glue
3. Chart sheet
4. Pictures of hazards related to the garment manufacturing industry

**Procedure**

1. Search pictures of various type of hazards in the industry through the Internet and books.
2. Collect pictures of various type of hazards in the industry.
3. Cut the pictures very neatly with scissors.
4. Paste them on a chart sheet.
5. Label them.
6. Place the chart in classroom/practical lab.

### Activity 2

Students will watch a short video on the hazards that occur in the garment manufacturing industry and the safety measures that should be taken. Prepare a report of it.

**Material Required**

1. CD/DVD of short video
2. Internet access for online video
3. CD/DVD player or laptop
4. Projector
5. Screen
6. Seating arrangement for students



**Procedure**

1. The teacher should arrange to make the students watch a short video on the hazards in industry and safety measures.
2. The teacher should organise a group discussion regarding the same.
3. Following the instructions of the teacher, prepare a report on the hazards in the industry and the safety measures.

## Check Your Progress

**A. Fill in the blanks**

1. Excessive dust can cause respiratory problem, _____, skin problem, etc.
2. RSI stands for _____ _____ _____.
3. Biohazards involve contagious bacteria, _____ and _____.

**B. Find the following words from the maze below**

HAZARD, MACHINE, INJURY, ELECTRICAL, ACCIDENT, ALLERGY, DAMAGE, RISK, HURT

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| H | I | N | J | U | R | Y | A | M | E |
| A | A | S | T | R | A | I | N | A | L |
| C | A | Z | K | H | U | R | T | C | E |
| C | Z | D | A | M | A | G | E | H | C |
| I | B | R | L | R | I | S | K | I | T |
| D | M | E | L | G | D | S | C | N | R |
| E | S | H | E | A | R | S | R | E | I |
| N | P | O | R | J | P | K | M | S | C |
| T | Q | P | G | I | S | S | M | S | A |
| S | R | N | Y | N | U | V | N | S | L |

**C. Questions**

1. Define the risks and hazards in the garment manufacturing industry.
2. List out the type of hazards in the garment manufacturing industry.
3. How can the management reduce the risks and hazards in the garment manufacturing industry?
4. Write at least two physical hazards that might be faced by the Operator and give causes and precautions to avoid them.

## SESSION 2: HEALTH AND SAFETY MEASURES FOR SEWING MACHINE OPERATOR

It is always very important for an Operator to be aware of the hazards associated with sewing machine operations as many of the injuries are caused by error, carelessness or inattentiveness on the part of the Operator. The Sewing Machine Operator should take precautions to guard against work-related illnesses and injuries. The Operator must be trained to handle and operate the sewing machine properly and safely. One should follow all safety precautions.

Sewing Machine Operators should follow these safety precautions while working.

1. While sewing always concentrate on the machine and the task at hand.
2. Always use shields and guards while working with the open moving parts of machine.
3. Use safety glasses and earplugs while working on high-speed sewing machinery.
4. Always wear proper footwear to avoid leg and feet injury. The footwear worn should not slip off from the feet while operating the machine.
5. Turn off the sewing machine before oiling it or while changing parts.
6. In the event of a cut wound, or any other injury, immediately report to the group leader. Wounds should be cleaned and covered with a bandage.
7. All tools and machinery required for production should incorporate ergonomic design principles and should not require an excessive force to operate.
8. The tools should be easy and comfortable in holding and using.
9. Work area should be properly designed like enough space for performing tasks, appropriate working height and proper sitting arrangement.
10. Improper furniture and poor ergonomic conditions lead to serious health problems such as musculoskeletal disorders for example carpal tunnel syndrome, lower back pain, forearm tendinitis, neck pain, etc.



*Fig. 5.2: Operators working on a sewing machine*

11. Unpadded stools that may also lack a backrest lead to the Operators having to sit in an uncomfortable position without adequate support for the entire working shift.
12. If there is constant use of pressing irons in sewing units, the humidity level becomes very high, which may create discomfort for the Operators.
13. Be provided with short breaks to prevent muscular pains.
14. Take proper physical rest and mental relaxation in order to prevent injuries.
15. Adopt an appropriate sitting posture while working. Avoid working in uncomfortable and awkward postures.
16. Do not work with hands above the shoulder height on a regular basis. Arms must be placed at a lower level and near to the body. Frequent bending and twisting of wrists, back and neck should also be avoided.
17. Operators should take proper rest. Give your muscles rest during the tea/snacks break, lunches and weekends by doing something different from what is routine.

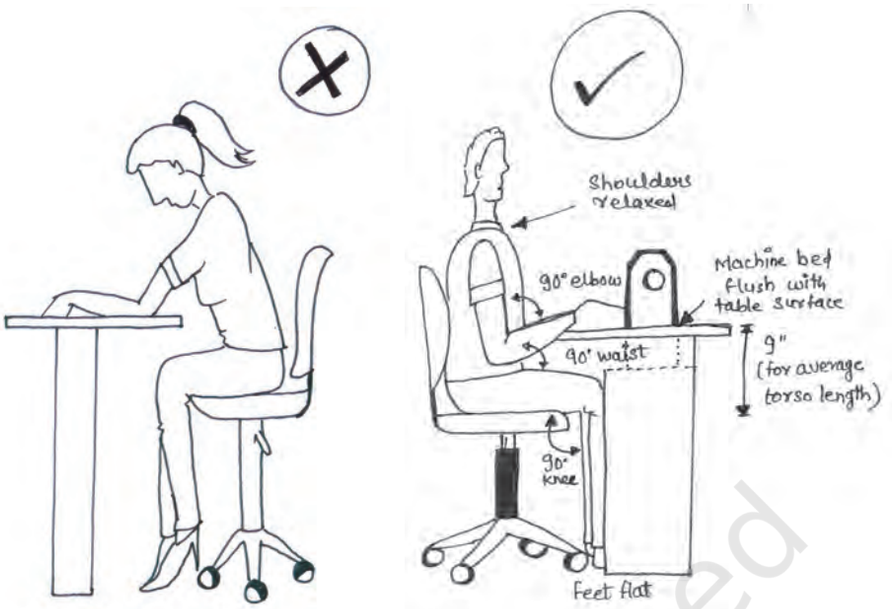



*Fig. 5.3: Sitting position while working on a sewing machine*

## Good lighting

Proper lighting at the workplace is very essential for productivity. Conversely, poor lighting can cause eye strain, fatigue and headache, which results in poor productivity.

### Practices for good lighting

1. There should be an arrangement for proper natural lighting in the sewing department/unit. This may help decrease the electricity bill.
2. Work stations that need more light should be moved closer to the windows.
3. Use a combination of natural and artificial lighting arrangement, and try to adjust the lighting at the work area such as, drafting and cutting.
4. The interior colour of the walls affects the illumination needed. Make sure that the ceilings should be as close to white as possible. Use pale colours on walls.

### Benefits

1. Good quality of work with less faults and high production

2. Decreased tiredness and work-related illnesses, like itching and strain in the eyes
3. Better health of operators will decrease the number of sick leaves, and increase productivity

## Other things to consider

Many a times, chemicals are used for different processing in textile and garment industries. Dyes, solvents and other chemicals are used to create different fabric finishes. Hence, proper ventilation, respiratory protection, and other personal protective equipment should be readily available to protect Operators during chemical processing.

As a lot of work involves close viewing of the fabric, material or garment, eye protection is critical. Operators in the garment industry can avoid eye injuries by using proper shields on high-speed sewing machinery or appropriate safety glasses.

Before using any tool or machine, the Operator should be trained in safe working practices. Some of the measures are given below.

### *Safety measures to prevent accidents with scissors*

Hand scissors can cause accidents when not used properly. Scissors injuries usually happen when the scissors slips during cutting or trimming. In most cases, the blade cuts the Operator's hand and/or fingers. Injuries can also occur to other parts of the body. The following safety measures should be taken.

1. Use suitable storage system, such as racks, boxes, etc., near the working area at a comfortable height to place scissors, blades, etc., after use.
2. Ensure placing lighting fixtures in a way that the light should fall on the working surface from the left side or from the front. This promotes better visibility.
3. Prohibit carrying scissors in pockets, or in the hand when going from one place of work to another.
4. Do not hold scissors with sharp sides up. Do not use it when the middle screw is loose.
5. Fix disposal points for used blades.

6. Use protective footwear with adequate resistance to slipping and penetration from a dropped scissors or other sharp objects.
7. Avoid leaving scissors around the work area. This can injure both the Operator as well as others walking around.
8. Provide even floor surfaces with slip resistance so the operators do not slip.
9. Free the work surface and floor off debris (pronounced as day-bree) and other waste to avoid tripping and falling.

***Safety measures to prevent accidents with needles***

1. Keep needles and pins at a fixed place, such as in a special box, and all small tools in separate bags or boxes. Do not leave them at the workplace.
2. Do not hold the needle, pins, etc., in your mouth or tuck them in the clothes. Do not leave it in the fabric too. An Operator can sew through one's finger.

***Safety measures while using spray guns***

Spray guns are used to get rid off any stains on the fabric that may have been transferred while manufacturing. These guns use a cleaning fluid (many times ethylene) which may cause headache, dizziness and fatigue if inhaled, or spirit which can cause redness and excessive dryness of the skin, if exposed.

Train the Operators in the use of the gun. Spray the cleaning fluid onto a rag and then use the rag to clean, rather than spraying on the garment directly.

***Safety measures while ironing***

1. Practise caution while using a hot iron as it can cause a major injury.
2. Check for any faults with the cord before using it.
3. Turn on and hold the plug with dry hands.
4. Place the iron only on a heat-resistant stand.
5. Ensure that the cord does not touch the iron soleplate while ironing.
6. Select an ironing mode (heating temperature) suitable for the fabric to be ironed.

## Safety and navigation symbols

A signage or symbol is a picture, written word or mark that represents a message. It is important to know the different type of symbols used in a workplace so that they can be followed. There are two type of symbols—safety symbols and navigation symbols. Safety symbols are those used for warning and the protection to be taken. Navigation symbols are used to show the direction or placement of a certain object or department. Some of the commonly used symbols are shown in Fig. 5.4.

*Symbol for explosives or an explosion hazard*

*Sign to prohibit flames and smoking*

*Sign indicates flammable gas*

*Hazard symbol for nonflammable gas*

*Sign for protective eyewear*

*Sign for eye protection required*

*Symbol for gloves required*

*Sign for protective footwear*

*Sign for protective clothing*

*Sign for ear protection required*

*Sign for fire extinguisher*

*Sign for escape route*

*Symbol for first-aid*





*Hazard symbol for toxic*

*Hazard symbol for a corrosive substance*


*Symbol for fire exit*

*Hazard symbol for a harmful or irritant substance*

*Hazard symbol for flammable*

*Hazard symbol for oxidising*

*Warning sign*

*Symbol for no sitting*

*Sign for fire alarm*

*Fig. 5.4: Safety and navigation symbols*

## Practical Exercise

**Activity 1**

Search from the Internet and books, and list out the safety and navigation symbols used by a Sewing Machine Operator in the garment industry. Prepare a chart of the same.

**Material Required**

1. Chart sheet
2. Pictures of safety and navigation symbols
3. Glue
4. Scissors

**Procedure**

1. Search and collect pictures of safety and navigation symbols from the Internet and books.
2. Cut the pictures very neatly with scissors.
3. Paste them on a chart sheet.
4. Label them.
5. Display the chart in the classroom/practical lab.



## Check Your Progress

**A. Fill in the blanks**

1. Operators should wear proper _____ to avoid leg and feet injury.
2. Working with improper and insufficient light results in eye strain, _____ and _____.
3. Operators should take proper physical rest and _____ _____ in order to prevent injuries.
4. Always use _____ and _____while working with open moving parts of machine.
5. Short breaks are necessary to prevent _____ pain.
6. There are basically two type of symbols — _____ and _____.

**B. Short answer questions**

1. Write a short note on good lighting while working in a garment manufacturing industry.
2. Write short notes on any five safety practices while working on sewing machines.

**C. Long answer questions**

1. Why is it important to take health and safety measures for a Sewing Machine Operator in the industry?
2. Write about the importance/benefits of good lighting for the Sewing Machine Operator.

**NOTES**

# Answer Key

**Unit 1: Introduction to Sewing Machine**

Session 1: Sewing Machine and its Types

**A. Fill in the blanks**

1. Domestic
2. Computerised
3. Electronic

Session 2: Terminology Related to Sewing and Garments

**A. Fill in the blanks**

1. (b) 45 degrees
2. (c) Length-wise
3. (c) Hem
4. (a) Hem allowance
5. (b) Frill
6. (c) Muslin

**B. Jumbled words**

(a) Ease (b) Bias (c) Grain (d) Warp (e) Needle (f) Thread (g) Drafting (h) Weft (i) Stitch (j) Pattern

Session 3: Various Parts of a Sewing Machine and its Attachments

**A. Fill in the blanks**

1. (d) Needle bar
2. (c) Feed dog
3. (b) Overcasting
4. (a) Engage stitch mechanism

**Unit 2: Sewing Tools and Sewing Machine Operations**

Session 1: Measuring and Marking Tools and their Usage

**A. Fill in the blanks**

1. Coloured powder
2. Water soluble, air erasable
3. 24 inches
4. French
5. Defect
6. Tracing wheel

Session 2: Cutting Tools and Usage

**A. Fill in the blanks**

1. Notches
2. Seam ripper
3. Pinking
4. Thread cutter
5. Thick felt
6. Scissors

Session 3: Needles and Threads

**A. Match the columns**

(a) 4. safety of the finger
(b) 3. passing the thread through the fabric
(c) 2. threading elastic through loop
(d) 1. punching holes in material

**B. Fill in the blanks**

1. 9, 18
2. Bodkin
3. Thimble

Session 4: Preparation and Operation of Sewing Machine

**A. Fill in the blanks**

1. Foot control
2. Clockwise
3. Reversed

**Unit 3: Basics of Garment Construction**

Session 1: Various Types of Stitch

**A. Fill in the blanks**

1. (b) Permanent
2. (d) Even basting
3. (a) Hem

Session 2: Different Type of Seams

**A. Fill in the blanks**

1. (a) Decorative
2. (b) Lapped
3. (b) Decorative
4. (b) French

Session 3: Edge Finishes

**A. Fill in the blanks**

1. (a) Pinked finish
2. (b) Bound edge seam finish
3. (c) Herringbone
4. (b) Double stitch
5. (c) Fraying

**Unit 4: Care and Maintenance of Sewing Machine**

Session 1: Cleaning, Oiling and Handling of Sewing Machine

**A. Match the columns**

(a) 3. holds pins and needles
(b) 4. remove fine lines and single threads
(c) 2. protect the fabric from direct contact with hot iron
(d) 1. cutting out of patterns and fabrics

**B. Fill in the blanks**

1. Accuracy
2. Sewing gauge

Session 2: Machine and Sewing Defects and its Solutions

**A. Match the columns**

(a) 3. replace poor thread
(b) 4. adjust tension
(c) 1. remove bobbin and bobbin case and clean
(d) 2. replace needle

**B. Arrange the jumbled words**

| | | |
|---|---|---|
| (a) Speed | (f) Blunt | (k) Puckers |
| (b) Spool | (g) Skipped | (l) Winder |
| (c) Shuttle | (h) Backing | (m) Lint |
| (d) Soft | (i) Operate | (n) Sheer |
| (e) Safety | (j) Suitable | |

**Unit 5: Hazards in Industry and Safety Measures**

Session 1: Risk and Hazards in Industry

**A. Fill in the blanks**

1. Allergy
2. Repetitive strain injury
3. Viruses, toxins

**B. Maze**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| H | I | N | J | U | R | Y | A | M | E |
| A | A | S | T | R | A | I | N | A | L |
| C | A | Z | K | H | U | R | T | C | E |
| C | Z | D | A | M | A | G | E | H | C |
| I | B | R | L | R | I | S | K | I | T |
| D | M | E | L | G | D | S | C | N | R |
| E | S | H | E | A | R | S | R | E | I |
| N | P | O | R | J | P | K | M | S | C |
| T | Q | P | G | I | S | S | M | S | A |
| S | R | N | Y | N | U | V | N | S | L |

Session 2: Health and Safety Measures for Sewing Machine Operator

**A. Fill in the blanks**

1. Footwear
2. Fatigue, headache
3. Mental relaxation
4. Shields, guards
5. Muscular
6. Safety, navigation



# GLOSSARY

**Abrade:** *to rub hard or scrub, or wear away by friction or erosion*

**Abrasion:** *the process of rubbing or grinding away the surface of a fabric by friction*

**Anticlockwise:** *in the opposite direction to the way in which the hands of a clock move round*

**Bearing:** *it is a part of a machine that supports another part that turns around.*

**Blunt:** *not having a sharp edge or point*

**Clockwise:** *in the direction of the typical forward movement of the hands of a clock*

**Clog:** *a blockage due to a piling up of some material*

**Coarse:** *rough in texture*

**Conformation:** *it is the manner of formation/structure/form or as of a physical entity*

**Dab:** *to press lightly in a repeated motion with a soft object, without rubbing*

**Damp:** *make something slightly wet*

**Debris (here):** *the remains of sewing material*

**Deflecting:** *a changed direction, or the turning aside of the yarn from a straight course after hitting*

**Descend:** *to pass from a higher to lower place or to move downwards*

**Durability:** *continuing to be used without getting damaged*

**Ergonomic:** *relating to or designed for efficiency and comfort in the working environment*

**Fasten:** *secure the end of a thread with stitches or a knot*

**Fray:** *the wearing out of the fabric at the edge due to friction or constant rubbing*

**Indentation:** *a notch on the edge or surface of something (needle)*

**Intricate:** *very complicated or detailed, having a lot of small parts that are arranged in a complicated or delicate way*

**Latch:** *a fastening that has a bar fitted into a slot and is lifted by a lever or a string from either side*

**Lingerie:** *women's undergarment or the clothing worn in bed, or sleep wears*

**Lint:** *short, fine fibres which separate from the surface of the fabric or yarn during processing. It may be the minute shreds or ravelings of yarn or bits of threads.*

**Locknut:** *a nut so constructed that it locks itself when screwed tight against another part*

**Lubricate:** *to apply a substance such as oil or grease to (an engine or component) so as to minimise friction and allow smooth movement*

**Pliable material:** *the material flexible enough to bend freely or repeatedly without breaking*

**Point:** *the part of the needle that makes the first contact with the fabric and is responsible for how the needle pierces the fabric*

**Pressing:** *apply pressure to (something) to flatten, shape, or smooth it, typically by ironing*

**Ravel:** *it is a thread from a woven or knitted fabric that has frayed. It means to become disjoined thread by thread or fibre by fibre, or fraying*

**Reservoir:** *a place for storing liquid*

**Resilience:** *the ability of a fabric to spring back to its original shape after being twisted, crushed, wrinkled or distorted in any way*

**Rotary hook:** *the part which enters a loop or needle threads, and carries it around the bobbin case to form the lock stitch*

**Scrap:** *a small piece of leftover fabric after the greater part has been used*

**Serrated edge:** *an edge lined with small teeth*

**Shaft:** *a part of the needle between the eye and the point. It is a suitable length for driving the eye and thread through the material*

**Sheen:** *a soft shine on a surface or a smooth and gentle brightness of the surface. It is a quality of things that are shiny, usually with reflected light*

**Slack:** *not taut or held tightly in position, or loose*

**Spill:** *the unintentional flowing of a liquid over the edge of its container*

**Taper:** *reduce in thickness towards one end*

**Termination point:** *the action of coming to a close or end*

**Thumbscrew:** *a type of screw, the head of which is so constructed that it may be turned easily with the thumb and a finger*

**Turning:** *it is the movement in a circular direction wholly or partly round an axis or point. When moved something so that it is in a different position. It is the act or course of one/ something that turns a place of a change in direction.*

**Wooden awl:** *a handy tool for piercing holes for rivets, snaps, eyelets, etc.*



# List of Credits

**Figures**

Chaurasia, Pragati [3.12(a–i), 5.4]

Khan, Zainab [2.5, 2.10, 2.11, 2.13, 2.15, 2.17, 2.19, 2.20, 2.25, 2.26, 2.32, 2.36, 3.1, 3.2, 3.4, 3.5, 3.15, 3.16(a,b), 3.17(a,b), 3.23, 3.24, 4.1(b), 5.3]

Naidu, A. Renu [2.16, 2.18, 2.23, 2.27(a,b,c), 2.28, 2.29(a,b), 2.30, 2.31, 2.35, 2.37, 2.38, 2.39, 2.40, 2.41, 2.42, 2.43, 2.44, 2.45, 3.3, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.13(a,b,c,d), 3.14(a,b,c), 3.18, 3.19, 3.20, 3.21, 3.22, 3.25, 3.26]

**Photographs**

Uppal, Shveta [5.1(a,b)]

Soni, Vinod K. [1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13, 1.14(a,b,c,d,e), 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.25, 1.26, 1.27, 1.28, 1.29, 1.30, 1.31, 2.1, 2.2, 2.3, 2.4, 2.6, 2.7, 2.8, 2.9, 2.12, 2.14, 2.21, 2.22, 2.24, 2.33, 2.34, 4.1(a), 5.2]