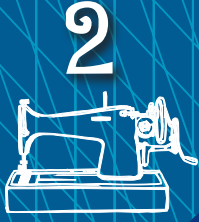


# Unit



## 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.

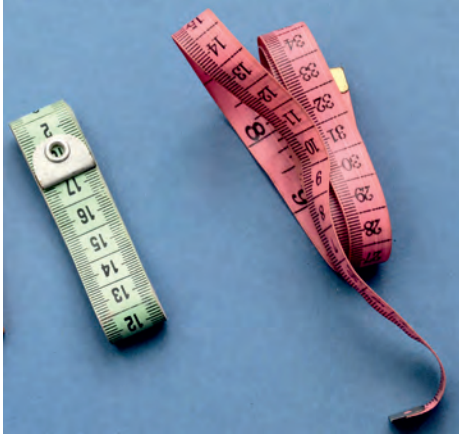


Fig. 2.1: Measuring tape

### Measuring tape

It is a metal tipped cotton or plastic tape to take measurements. Generally, the size of a measuring tape is  $\frac{1}{2}$  inch to  $\frac{1}{4}$  inch wide, 60 inches long and has  $\frac{1}{8}$  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  $\frac{1}{8}$  inch grid. A ruler is convenient for measuring small measurements. A transparent ruler is used to draw straight lines or bias lines.



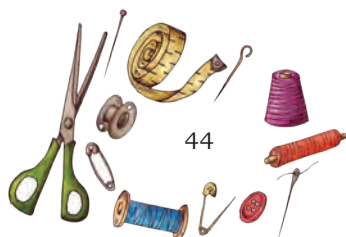
Fig. 2.3: Yardstick

### 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



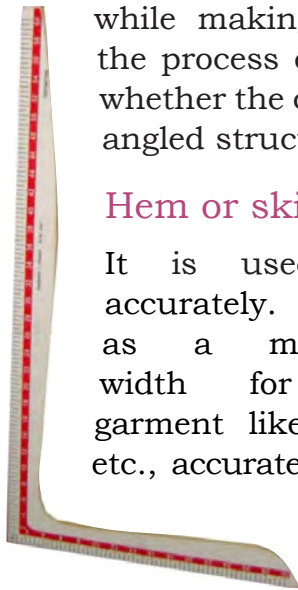


Fig. 2.4: L-square

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).

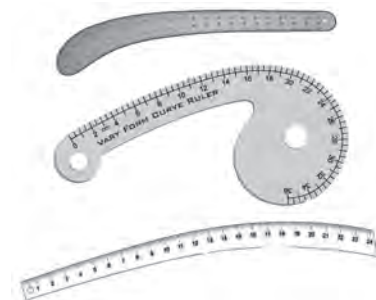


Fig. 2.7: Vary form curve

### 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.



Fig. 2.9: Tracing wheel

## Tracing wheel

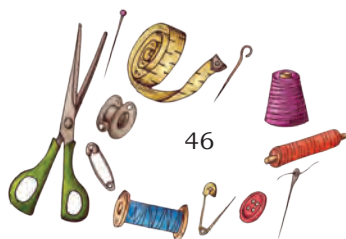
It helps in marking the measurements and pattern on the wrong side of the fabric using tracing paper. Tracing wheels are available in two styles, one with small serrated edge which is appropriate for most fabrics, and another, with a smooth edge used on fine or knit fabrics to avoid snagging of the yarns. 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.



Fig. 2.10: Tracing paper

## Tracing papers and sheets

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).

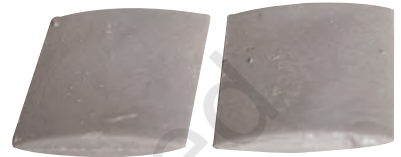


Fig. 2.12: Tailor's wax

## 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).



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

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.

## 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.

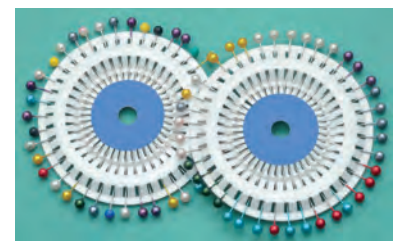
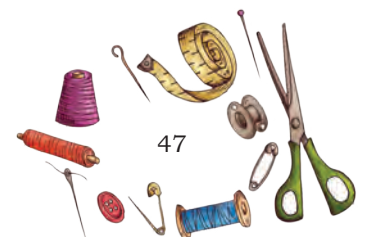


Fig. 2.14: Pins



## 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

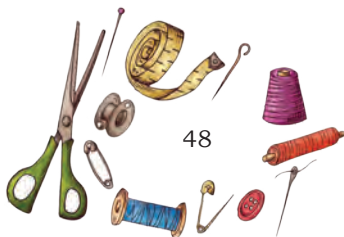
Identify and practise the use of different types of measuring and marking tools under the guidance of the teacher/instructor.

#### 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.

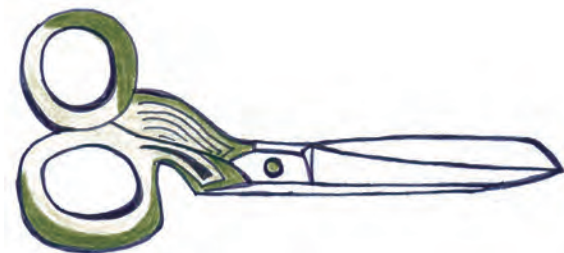


Fig. 2.15: Bent-handled shears



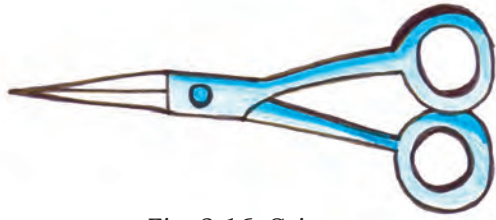


Fig. 2.16: Scissors

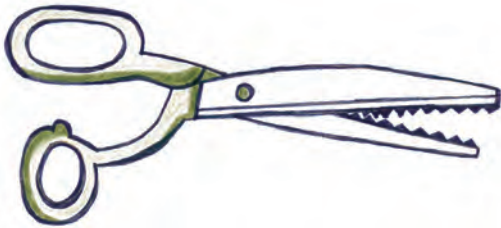


Fig. 2.17: Pinking shears

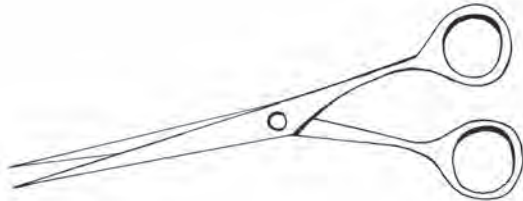


Fig. 2.18: Embroidery scissors

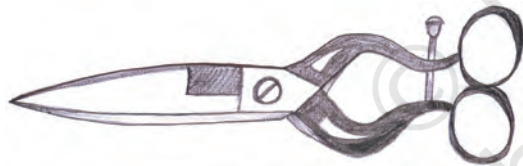


Fig. 2.19: Buttonhole scissors

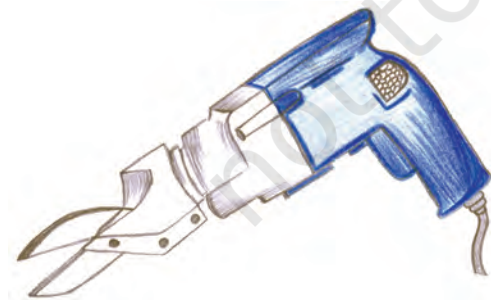


Fig. 2.20: Electronic scissors

## 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.

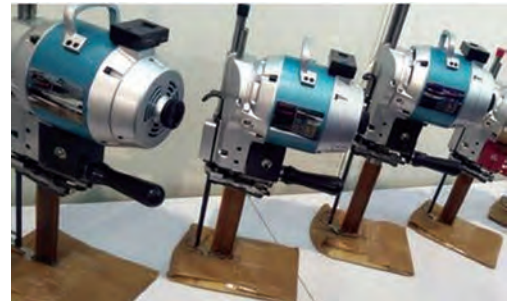


Fig. 2.21: Straight knife

## 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.

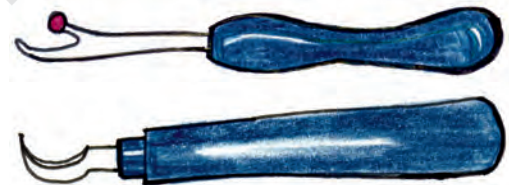


Fig. 2.23: Seam ripper

## 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.

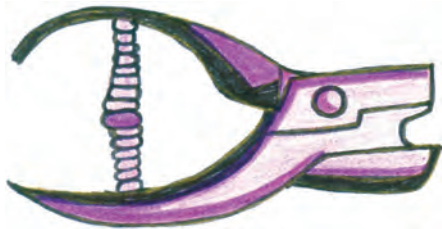


Fig. 2.26: Notcher

## 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

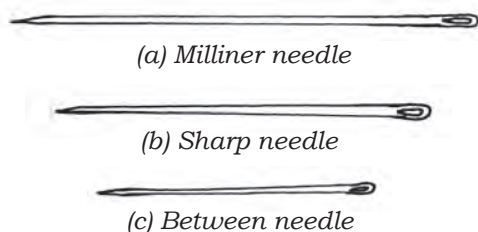


Fig. 2.27(a, b, c): Hand sewing needles

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.

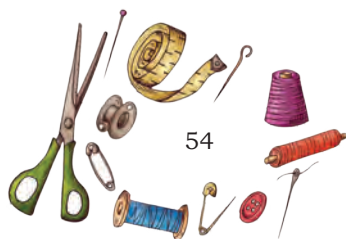


Fig. 2.28: Parts of a hand sewing needle

### 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.

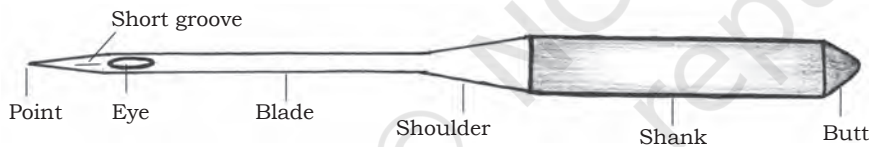


Fig.2.29 (a) A sewing machine needle



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.



## NOTES

### 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.

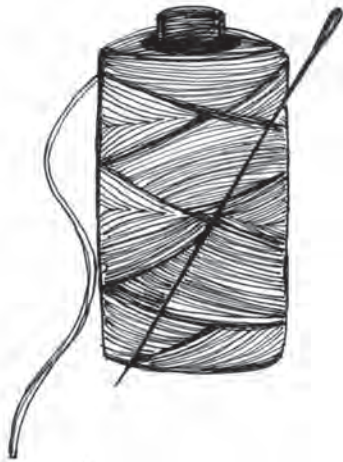


Fig. 2.30: Sewing thread

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).

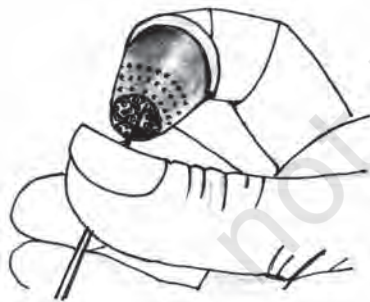
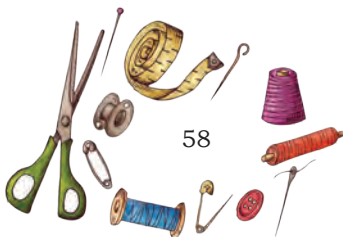


Fig. 2.31: Thimble





## 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



## NOTES

### 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

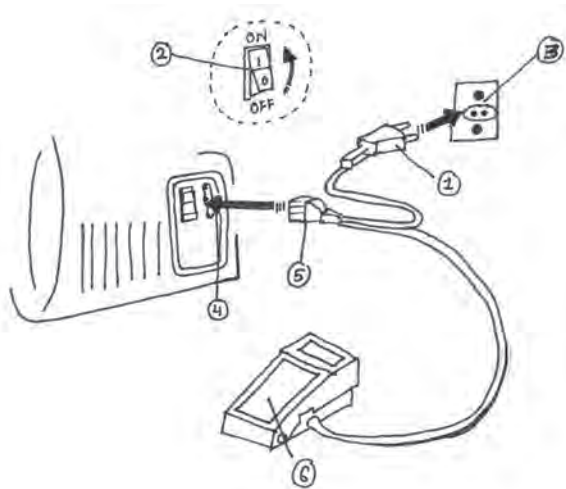
Before starting the operation process in a single needle sewing machine, an Operator should be aware of every aspect relating to the sewing machine. This includes the problems one may be faced with while working too, so that they may be rectified by the Operator or can be reported to one's supervisor.

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.

### (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.

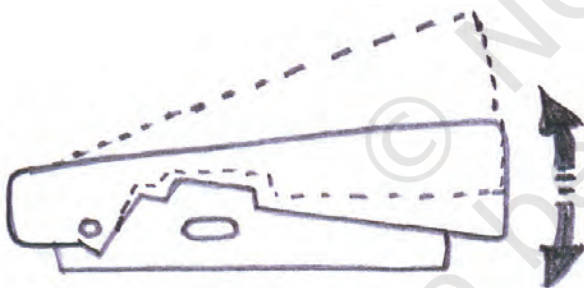
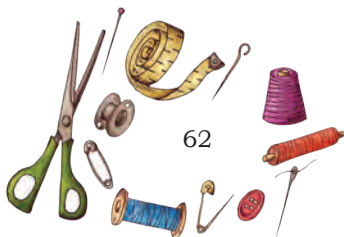


Fig. 2.36: Foot control

### (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.

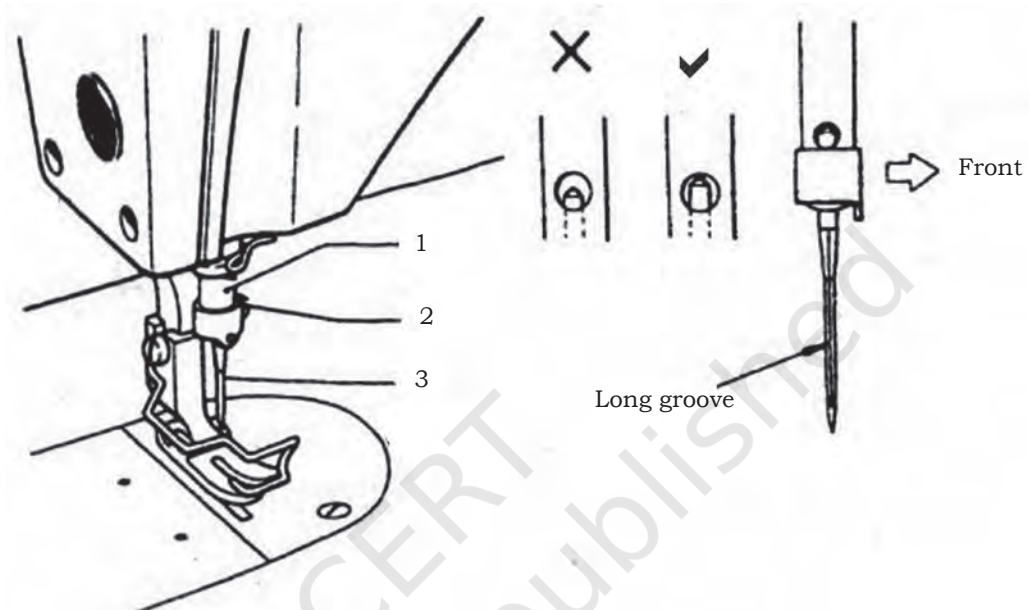


Fig. 2.38: Attaching the needle

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

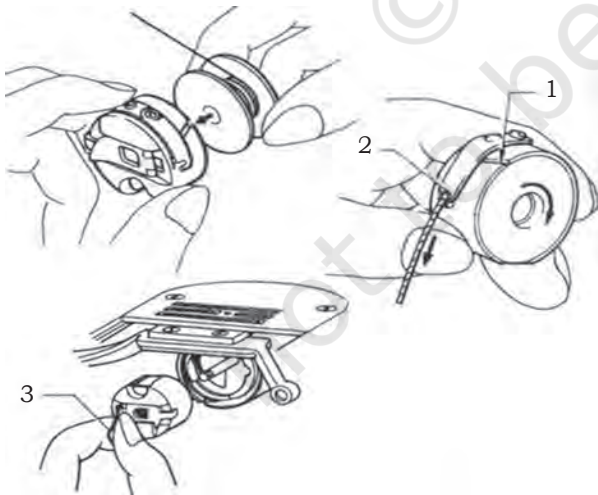
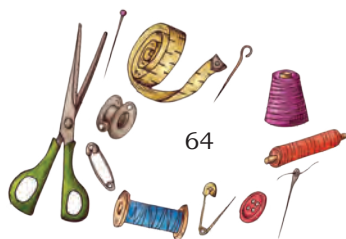


Fig. 2.39: Threading the lower thread

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.

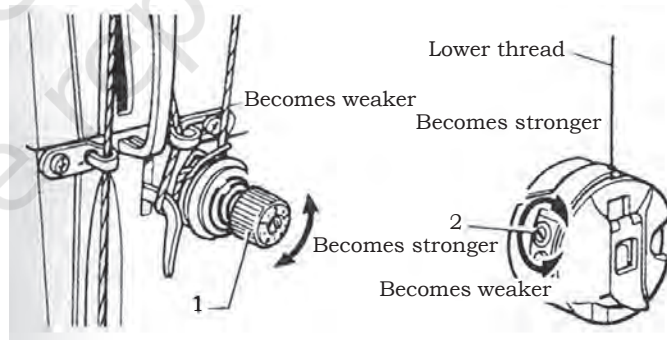


Fig. 2.40: Adjusting thread tension

#### 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



## NOTES

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.

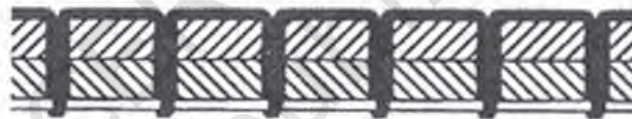
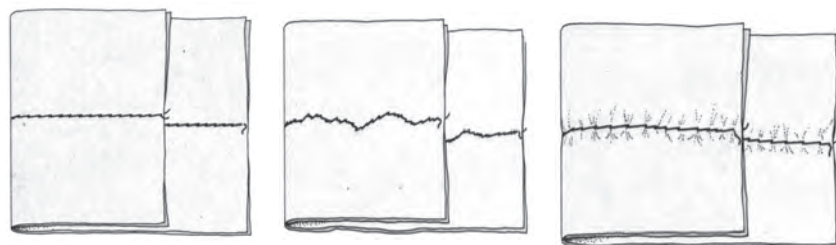


Fig. 2.42: Seams when the upper tension is too loose

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



## NOTES

### (1) 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.

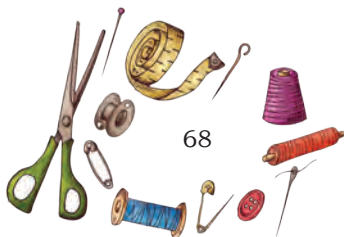
### Operating the sewing machine

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.

