

# **Garment Production**

## **Level-II**



**Based on August 2022, Curriculum Version 1**

**Module Title: -Operating Specialized Industrial Garment  
Machines**

**MODULE CODE: IND GAP2 M05 0322**

**Nominal duration: 50Hour**

**Prepared by: Ministry of Labour and Skill**

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## ACKNOWLEDGMENT

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## ACRONYM

## INTRODUCTION TO THE MODULE

In garment production filed: Operating Specialized Industrial Garment Machines helps to know how to Prepare workstation, work pieces and equipment, how to Perform production assembly tasks, to know how to Check and verify machine performance and Dispatch completed work for garment production filed.

This module is designed to meet the industry requirement under the garment production occupational standard, particularly for the unit of competency: **Operating Specialized Industrial Garment Machines.**

**This module covers the units:**

- work pieces and equipment
- assembly
- machine performance
- Dispatch completed work

### Learning Objective of the Module

**At the end of the module the trainee will be able to**

- Prepare work pieces and equipment
- Perform production assembly tasks
- Check and verify machine performance
- Dispatch completed work

### Module Instruction

For effective use this modules trainees are expected to follow the following module instruction:

1. Read the information written in each unit
2. Accomplish the Self-checks at the end of each unit
3. Perform Operation Sheets which were provided at the end of units
4. Do the “LAP test” given at the end of each unit
5. Read the identified reference book

## Unit one: -Work Pieces and Equipment

This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- Laying out Work pieces or materials
- Laying out equipment's
- Perform Threading and adjusted tension
- Reporting and documenting problems

This unit will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- lay out Work pieces or materials in sequence according to specifications
- set up and adjust Equipment in accordance to specifications for work
- Perform threading and adjust tension.
- Take any machine adjustment as job requirement.
- Report and record any problems

### 1.1. OHS and safety

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OHS includes:-

- Standard operating safety procedures
  - Protection equipment: including personal protective equipment (PPE) for ears, eyes, face.
  - Protective clothing, respiratory devices
  - Protective shields and barriers shall be provided.
  - Before doing work that requires the use of PPE, the trainee must be trained.
- Personal protective equipment
  - Eye and face protection
  - Hearing protection
  - Respiratory protection
  - Wearing apparel
- Safe materials handling
  - Keep the materials in well manner
  - Use the material as enough as required
- equipment or machine safety
  - Every morning the trainees wipe and clean the equipment's.
  - After work, they have to cover the equipment's
- Personal responsibilities for safety
  - Observe all, before, safety precautions related to your work.
  - Report unsafe conditions or any equipment or materials you think might be unsafe.
  - Warn others about the hazards.
  - Report any injury or ill
  - Wear protective clothing
  - Be safety consuls
  - Always inspect equipment and associated attachments for damage before using.
- ergonomic arrangement of workplaces

Ergonomic is a science which is used for arrange the work place. Ergonomics on other hand:

- Combine all of the issues to improve workers efficiency and well being
- Maintain industrial production through the design of improved work places



OHS & Ergonomics applications:

- to satisfy the needs of changing local people's attitudes.
- to change local work methods
- to change the traditional ways of doing things.
- Therefore, OHS & Ergonomic applications are a major source of work place improvement



Fig:-1.1.1. Operators working on industrial sewing machine in a safe workin area

### 1.1.1. Safety measures:

The machine Mechanic working in factories, must follow the following points and adopt safe working practices.

- Disconnect the sewing machine by pulling out the plug from the wall outlet, not by jerking the cord. Jerking the cord can cause the cord to become worn or frayed.
- Disconnect the plug from the wall outlet first then the plug from the machine. Otherwise, electricity continues going through the cord and you could receive an electrical shock.
- Always unplug the machine from the electrical outlet when removing covers,
- lubricating, or when making any other user servicing adjustments
- Place pins, needles and tools in a container when not using them. Do not leave them loosely on the table or on the floor.
- Pins and needles should never be placed in your mouth.
- When not in use, pointed tools should be left closed.
- Handle sharp tools with the handle first.

- When in doubt, ask the instructor.
- Report any injuries or accidents immediately to the instructor. Also, Report a breakage to a tool or m/c to the instructor.
- Wipe up any oil spillage on the floor immediately to prevent anyone from slipping. Keep aisles clear at all times.
- Operate only the machines you have been trained to operate
- Make only adjustments you have been trained to perform
- When on duty wear low shoes & close-fitting clothing. Avoid loose fitting sleeves, sweaters, jewelry, ties, and ribbons when operating the machine. If your hair is long, tie it back.
- Always practice proper posture to reduce fatigue, help prevent accidents and increase efficiency.
- Use both hands to raise & lower the machine head

## 1.2. Works/ activities before production start.

All pieces of Garments are collected in size, color, and quantity, and then ready for the next sewing or sewing step. Basically, this process is done by sewing machine workers. They are given bundles of cut pieces and sew the same piece of garment.

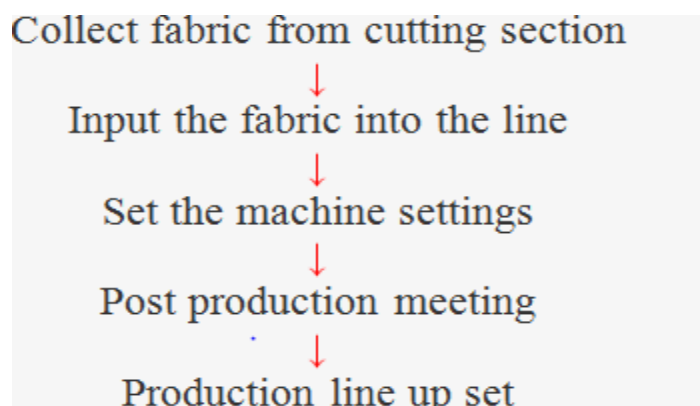


Fig:-1.2.1.Persewing activities

## 1.1. Equipment's

- **Needle:** - are of various types. It is selected according to their application. The sizes mainly depend on the structure of the fabric and the sewing threads used. If the needle is too 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, produce an unattractive seam, cause the seam to pucker, affect the loop formation, and cause skipped stitches. Generally the best choice is depend on the materials we sew and the types of machine required.

- **Thread:** - The selection of thread available for sewing seems to grow on almost a daily basis. New colors, unique finishes and interesting textures can add to the style of our project, but there are other considerations that make a difference in our thread selections. Long staple thread is smoother and creates less lint in our machine. Made of short stales, the thread is uneven in texture and the result is less than perfect stitching. Strong thread that is good for construction, especially on natural fiber fabrics. Mercerized cotton has been treated to be smoother and straighter with less fuzz than other cotton threads. Polyester embroidery 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.
- **Emery bag:** - used to remove rest and sticky deposits from needle
- **Pressing equipment:** - the successes of the finished garment often depend on pressing.
- **Working container:** - a box, basket or bag may be used to keep essential small equipment to gather.
- **Scissors:** - small scissors are handy for clipping and cutting threads.
- **Sewing machine:** - used to assemble the garment pieces with needle and thread, there are different types of sewing machine available in the world of market.

### 1.3. Threading and Thread Tension

#### 1.3.1. Threading the machine

Sewing machine plays an important role in the garments manufacturing industry. There are a lot of sewing machines used in the apparel/garments manufacturing sector.



Before threading the machine, let's get to know the various machine components and small pieces we will be using to get the machine threaded and ready to sew.

➤ **Sewing machine parts and function**

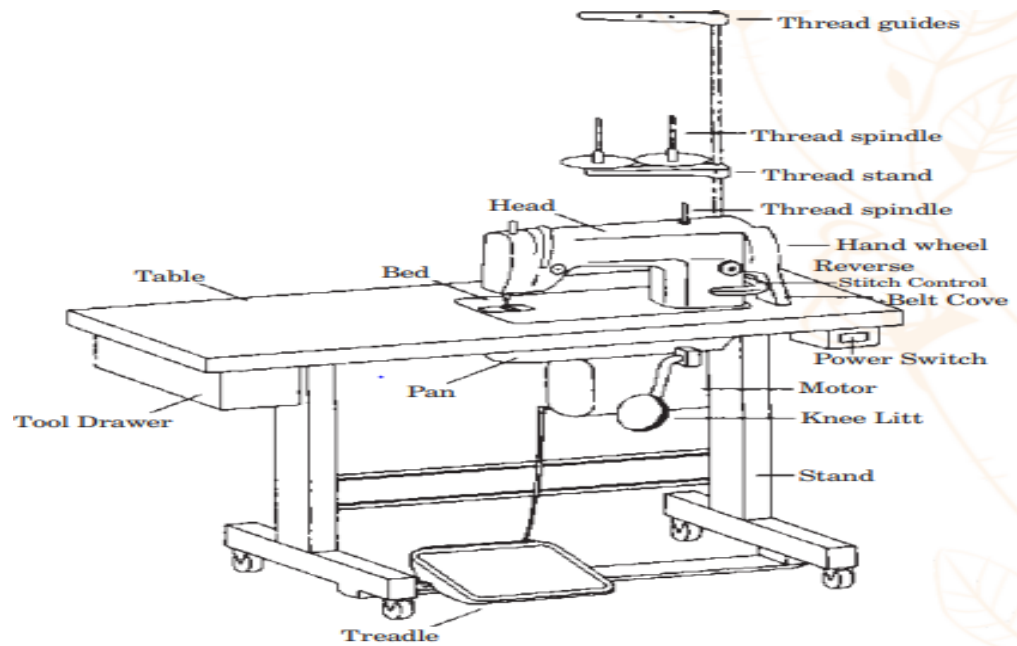


Fig:-1.3.1.Sewing machine parts and

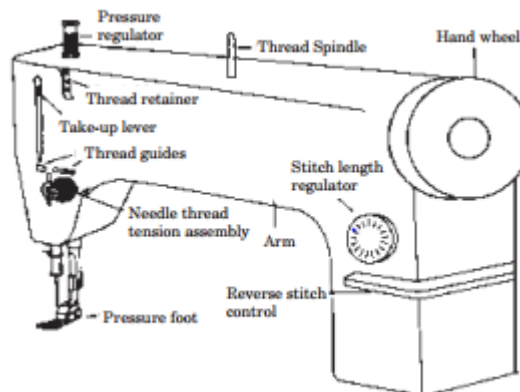


Fig:- 1.3.2.sewing machine head and their parts

- **Arm :** The horizontal part of the head that houses the drive shafts.
- **Pressure regulator:** Control that regulates the amount of pressure on the presser foot
- **Hand wheel:** The part that controls the motion of the machine manually and electrically.
- **Thread retainer:** A three - hole that applies a small amount of tension on the thread so it will flow into the tension discs uniformly.

- Take-up lever: The part that first loosens the top thread during the stitch formation, then removes any slack to set or lock the stitch.
- Thread guides: The parts that guide the thread from the thread cone to the needle. They smooth the thread and protect it from abrasion.
- Presser foot: A device that holds the fabric in place for stitching

### Step 1: Winding the Bobbin

Sewing machines sew with thread coming from the bottom of machine as well as the top. Before loading the bottom thread into the machine, you have to prepare the thread by winding it onto a bobbin.



Fig:-1.3.3.bobbin winding

- Bring the thread down to the bobbin winding area and place the end through the small hole. Loop the thread around the back of the wheel and then towards the front. Pull it tightly so the thread is deep in the groove.as shown in Fig:-1.3.5

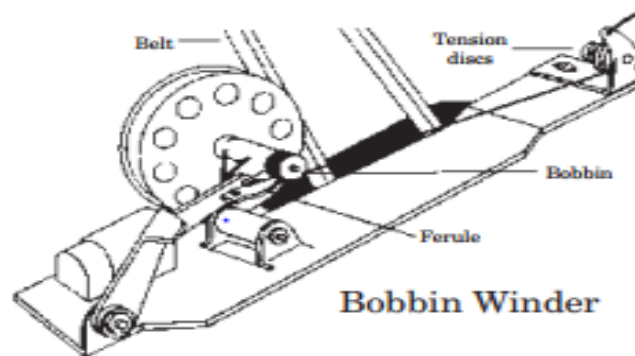


Fig:-1.3.4. Parts of bobbin winder





Fig:-1.3.5

- Grab your bobbin and place it on the black knob for winding. Push it all the way on (to the left). Push the black metal piece connected to it forward. This will switch the machine from regular sewing to bobbin winding mode.as shown in fig.1.3.6.



Fig:-1.3.6

- Wrap your thread under the bobbin and then wrap it around the bobbin manually a number of times. Pull the end through one of the small holes in the bobbin and hold it taught off to the right as shown in fig 1.3.7. Locate the on/off switch or button(s) on your machine and turn on the machine. Use the foot pedal to start winding the bobbin - after a couple seconds, the thread in your right hand should break off and the bobbin with continue to wind. Try to keep it at a medium speed. Note: While your machine is now in bobbin winding mode, the needle (if installed) will continue to go up and down, so keep your hand out of the regular sewing area! This is a good general rule, but keep it in mind at this time.

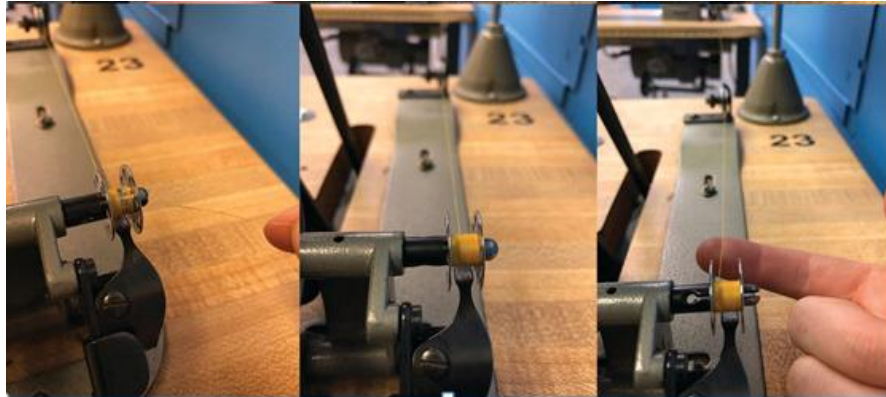


Fig:-1.3.7

Once the bobbin is all the way wound, the piece that you pushed forward in step #3 will automatically bounce back to its original position. Snip your thread to release it. Your bobbin should be wound tightly and evenly. If it is loose and squishy, it has not been wound correctly and you must re-do it because it will not sew correctly and cause you problems if installed. If it is nice and tight and neat, you've wound the bobbin successfully and are ready to install it. Turn off your machine.

### Step 2: Installing the Bobbin

- Position the bobbin so that the loose thread is coming from the top, and facing right. This is super important!! The thread cannot be coming from the bottom and cannot be facing left. Top right only! Place it in this orientation into the bobbin case. Gently pull the thread through the small slit, as shown in fig 1.3.8.



Fig:-1.3.8

- Pull the thread gently to the left and slightly back. With gentle pulling, it will slip underneath the thing metal piece behind the slit. At this point you need to test the bobbin tension. You will do this by holding the loose thread and dangling the bobbin case over your hand. With average/correct tension, the bobbin will slowly fall into

your hand. If it falls super-fast, the small screw on side of the bobbin case should be tightened a bit. If it doesn't fall at all, the screw needs to be loosened. As shown in fig.1.3.9.

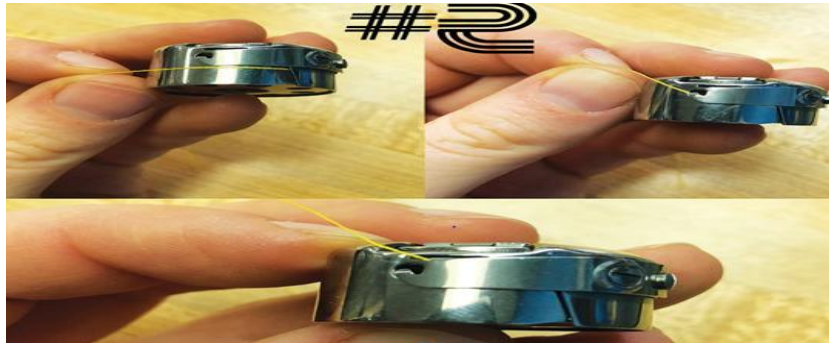


Fig:-1.3.9

- Pulling and holding the little tab on the top of the bobbin case will lock the bobbin into place. As shown in Fig:-1.3.10



Fig:-1.3.10

- Open the throat plate. Look underneath the machine, just under the throat place, and notice the small, bobbin case shaped indentation. This is where the bobbin case goes! While holding onto the lock tab, place the bobbin and bobbin case into the indentation, with the open gap facing up. The open gap will align perfectly with the machine. As shown in Fig:-1.3.11.





Fig:-1.3.11

### Step 3: Threading the Top Thread

- Place your top thread spool or cone on the top thread holder plate. Bring the thread through the wire guides above the plates. As shown in Fig:-1.3.12 (You can put it through one or both, just make sure nothing is twisted or crossing.)



Fig:-1.3.12

- Bring the end of the thread through the small hole on the vertical metal piece on the top right of the machine. You should bring the thread in through the back. Then, from right to left, guide the thread across the top of the small disc attached to this piece. Pull it taught so it your thread is firmly inside of the disc, not just sitting loosely on top. As shown Fig:-1.3.13



Fig:-1.3.13

- Bring the end of the thread over to the metal piece on the top left of the machine with three small holes. Start from the top and bring your thread down through the furthest right hole. Now bring your thread down through the next hole. Bring it down through the third hole. (This small piece may be in a different orientation depending on your machine, most likely vertical instead of horizontal. As shown Fig:-1.3.14

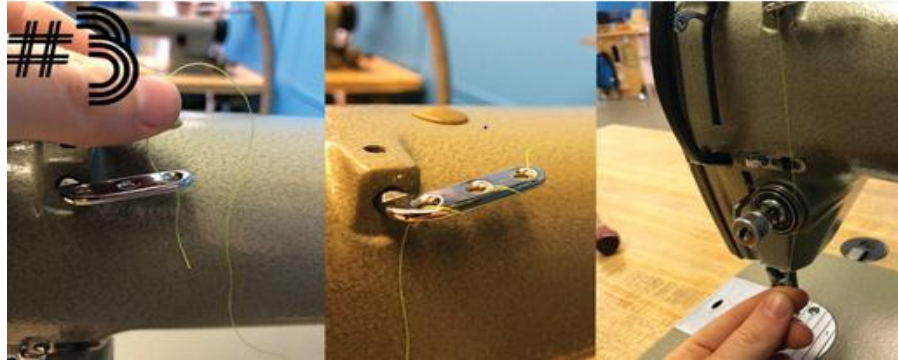


Fig:-1.3.14

- Now we get into some of the thread guides that are all right next to each other, so make sure you do everything in the correct order. Pull your thread down towards the disc just behind the tension knob. Guide the thread through the center of the disc (not behind it; check this). While sandwiched in the disc, pull it under to the left and up, securing the thread in the disc. Now pull the thread down next to the disc and pull it under the shiny metal piece directly to the left of the disc. Now pull it up and under the small metal hook just above the disc as shown in Fig:-1.3.15.



Fig:-1.3.15

- Locate the thread guide with another small hole in it that is directly behind the black handle-like piece on your machine. Thread the end of your thread through this hole from right to left. Pull it down and behind the shiny wire loop location below it a few inches. Pulling the thread tightly behind this loop should situate it in the loop as shown in Fig:-1.3.16.



Fig:-1.3.16

- Right above where you will install your needle, you will see a small wire guide on your machine, Bring the thread behind this wire. The end of your thread should be facing down towards your throat plate.as shown in Fig:-1.3.17.

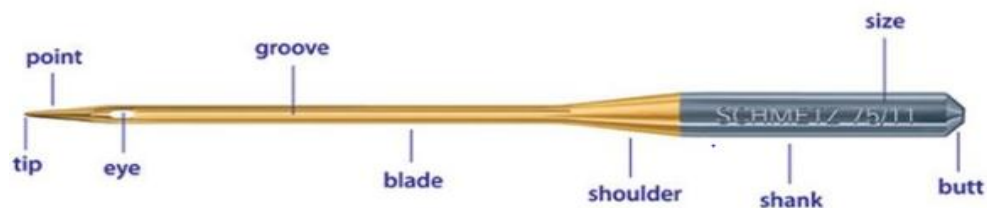


Fig:-1.3.17

#### Step 4: Installing & Threading the Needle

Now that the bobbin is wound and installed, and the top threaded is threaded through all those many parts, you are ready to install the needle.

- Take a close look at your needle. At the pointy end, you will see a small groove that cuts into the needle. This groove is called the scarf. When placing the needle into the machine, the scarf must be facing right. Fig:-1.3.19



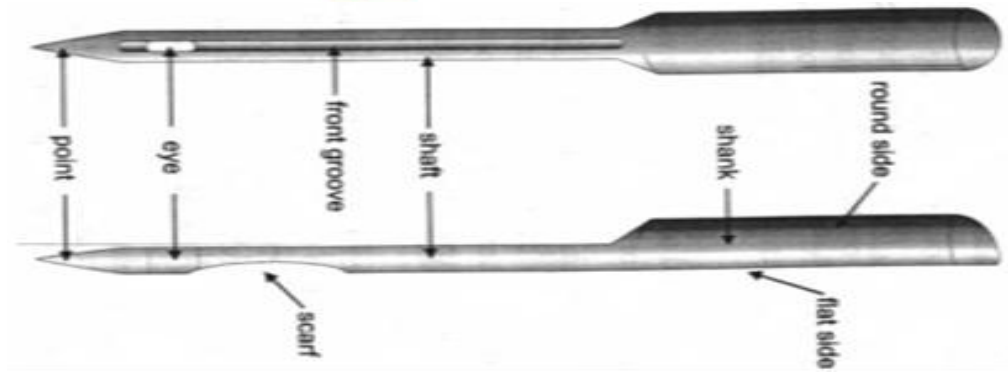


Fig:-1.3.18. Sewing needle parts



Fig:-1.3.19

- Underneath where the thread is hanging is a small hole where the needle fits in. Holding it tightly in your left hand with the scarf facing right, insert your needle into this opening and push it all the way up. With your right hand, grab one of your small screwdrivers and screw the small screw to the right of the needle tightly until the needle is in place. as shown in Fig:-1.3.20. **Tip:** Place a piece of paper or fabric over the throat plate to avoid dropping a loose needle into the machine.



Fig:-1.3.20



- Pull the thread behind the last small metal thread guide. From left to right, thread the end of your thread through the eye (hole) of the needle. Pull the end of the thread to the back, as shown in Fig:-1.3.21.

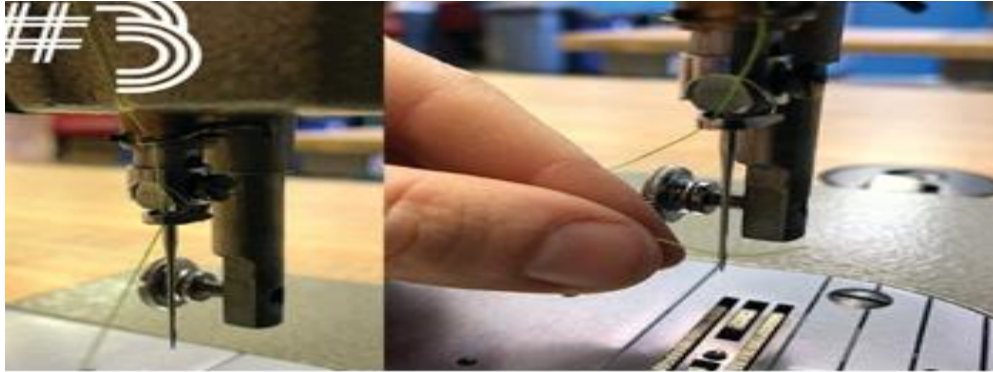


Fig:-1.3.21

### Step 5: Bringing Up the Bobbin Thread

Bringing up the bobbin thread is the final step in threading your machine before sewing. You will be using your hand wheel for this part of the process.

- Keep the bobbin cover plate open. With your left hand, pull the top thread gently to the left/back and hold it in place. As shown in Fig:-1.3.22.



Fig:-1.3.22

- Turn the hand wheel slowly towards you until the thread from the bobbin jumps up from the bottom of the machine. You should see it looped around the top thread in between your needle and the feed dogs, as shown in Fig:-1.3.123.



Fig:-1.3.23

- Use one of your screw drivers to pull the loop out, leaving you with a bobbin thread that is ready to go! As shown in Fig:-1.3.24

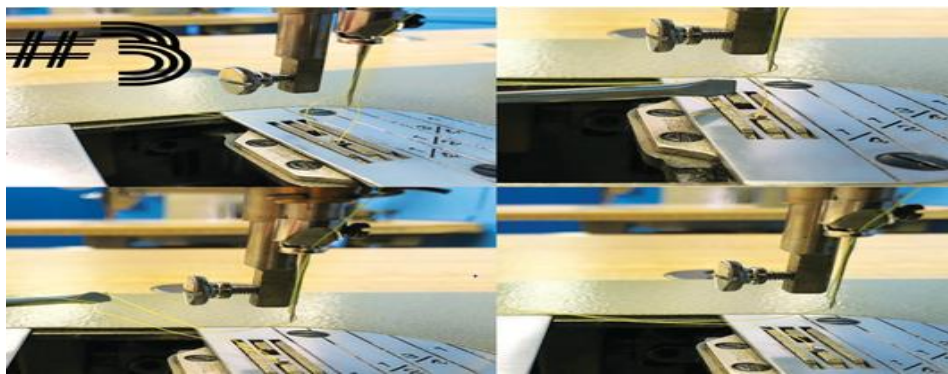


Fig:-1.3.24

- Pull the threads to the back and close the throat plate.as shown in Fig:-1.3.25

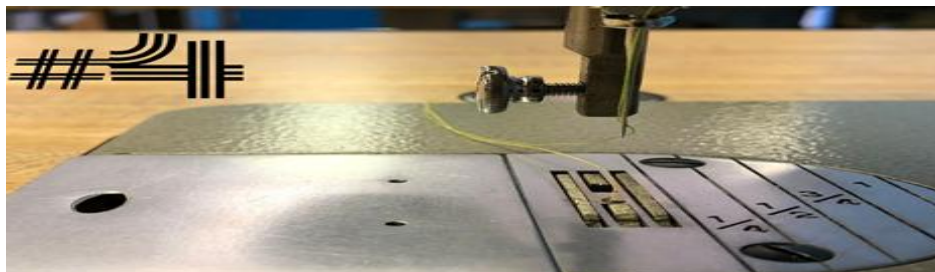


Fig:-1.3.25

### 1.3.2. Thread Tension

#### Thread Tension Assembly

For a good quality of stitching a balanced tension or balanced stitch is desirable, when the tension of the upper and lower tread is balanced the thread interlock in the middle of the fabric to make perfect or balanced.

The tension of the stitch is regulated by two controls (As shown on figure below.)

### Upper thread tension

After lowering the pressure foot, turn the nut to adjust the upper thread tension, for this the nut to the left loose it, turn to the right to tight as shown on figure

### Lower thread tension

It is adjusted by tightening /loosening the screw of the bobbin case as shown on figure

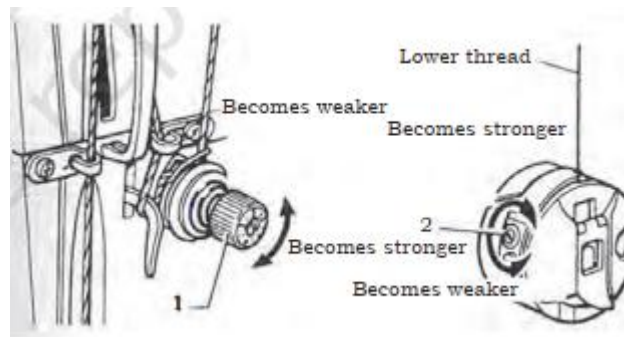


Fig:- Fig:-1.3.26. Adjust thread tension

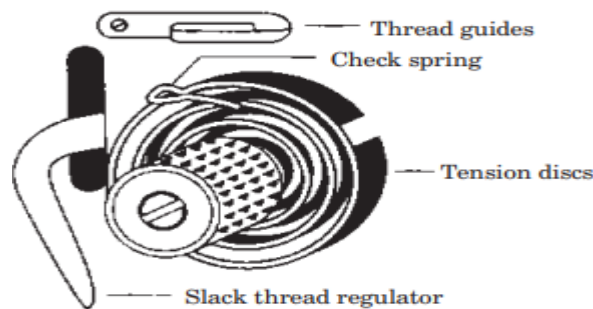


Fig:-1.3.27. Needle - Thread Tension Assembly



Fig:- 1.3.28. Bobbin case and bobbin mechanism

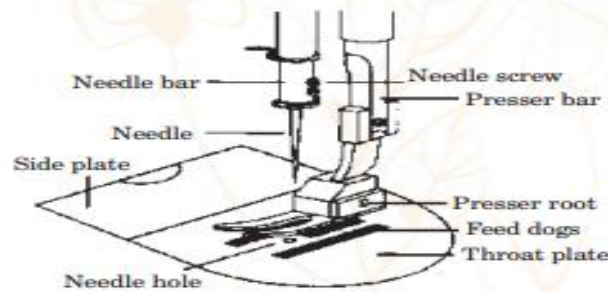


Fig: -1.3.29. Feeding mechanism

#### 1.4. Report and Document Problems

In every field, it's important to minimize as much risk as possible. Documentation is a great tool in protecting against lawsuits and complaints. Documentation help ensure consent and expectations. It helps to tell the narrative for decisions made, and how yourself or the client responded to different situations. In this same manor, it is important to record and report information that can help support the proper treatment plan and the reasoning for such services. There are many legal and regulatory requirements in report and documentation, proper documentation helps to maintain compliance. If documentation isn't up to par it could affect licenses and or accreditation. It would be difficult to defend or explain one's actions to a licensing board without the supporting documentation.

Any professional is always looking for ways to improve, or a better approach, a more successful course of treatment, or fresh ideas to tackle ongoing problems. Documentation is crucial in achieving these measures. When something is successful it's important to document the approach and results so it can be replicated. Documentation will help determine if these were isolated results or a possible approach to treatment that could continually produce successful outcomes.

One of the most important issues is the quality of care. Documentation is the only long term way to assure the quality of care is not only maintained but consistently improved. If there are problems or issues that are hindrance to produce and providing quality product or service, it's important to document it and the progress in rectifying them. When something is identified to be problematic it's crucial to create effective preventative measures.

 **Documentation should be your best friend**



## Self-check-1

### Part-I Matching

Instruction: Match column “B” with column “A”

A	B
-----1. Presser foot	A. Hold the fabric during stitching
-----2. Take-up lever	B. Loosen the top thread
-----3. Thread guide	C. Guide needle thread
-----4. Hand wheel	D. Control the amount of pressure on presser foot
-----5. pressure regulator	E. Control machine motion
	F. Applies small amount of tension

### Test II: short Answer writing

Instructions: Answer all the questions listed below.

1. What is ergonomic?
2. Write at least 5 safety measures in sewing room.
3. List needle parts
4. List the two thread tension and describe it.

Note: Satisfactory rating – above 60%      Unsatisfactory - below 60%

You can ask your teacher for the copy of the correct answers

## Operation sheet 1.1

Machine threading properly.

- **Operation title:** Properly threading the machine.
- **Purpose:** To show how to threading the machine
- **Instruction:** Using the figure below and given equipment's insert the needle in to the machine. You have given 3Mint for the task

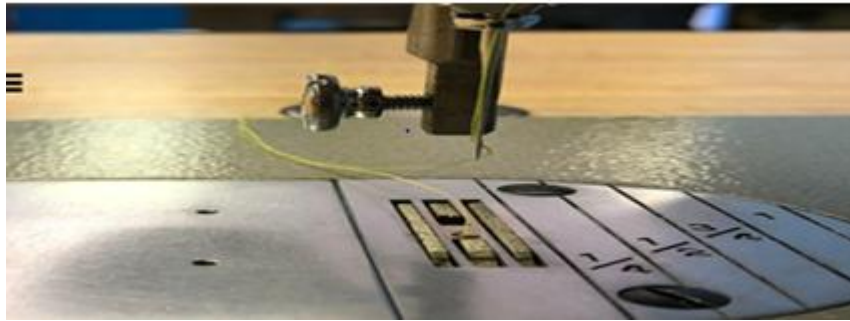


Fig:-1.3.25: Figure given for operation sheet 1.1

- **Tools and Equipment:**
  1. Single needle Sewing machine
  2. Screw driver
  3. Machine needle
  4. Thread
  5. Bobbin with bobbin case
- **Steps in doing the task**
  1. Winding the Bobbin
  2. Installing the Bobbin
  3. Threading the Top Thread
  4. Installing & Threading the Needle
  5. Bringing Up the Bobbin
  6. Thread check the machine

- **Quality Criteria:**

1. During testing the thread should NOT break.
2. The stitch should NOT form pucker.

- **Precautions:**

1. Switch off the main switch before threading the machine.
2. Use the specified bobbin case and bobbin
3. Do NOT operate the machine before checking the correctness of threading.
4. During threading the machine do not put your foot on the pedal.

## Unit Two: - Assembly

This unit to provide you the necessary information regarding the following content coverage and topics:

- Applying OHS Practices
- Performing production tasks
- Assessing work for compliance with quality standards
- Using specialized machines checked and adjusted to ensure optimum performance
- Recording are maintained

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- .Plug-in Power cable on the correct out let
- .Check Switches for correct installation and properly pressed.
- .Perform Production tasks in accordance to requirements and OHS practices
- .Assess Work for compliance with quality standards and production specifications
- .Use specialized machine,
- .Check and adjust machine to ensure optimum performance
- .Maintain records

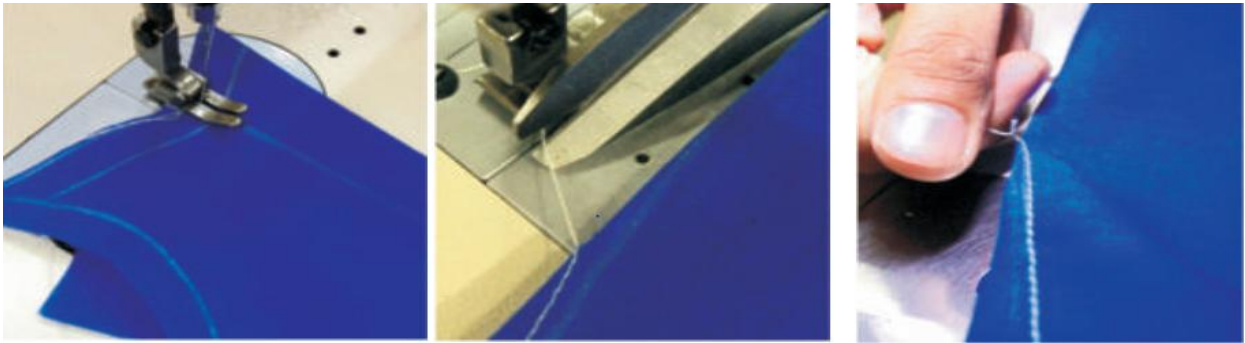
### 2.1. Production Tasks

Major tasks of Production or assembly department are as follows but not limited to these only.

- Line setting
- Marking parts
- Ironing garment components
- Garment stitching
- Checking of stitched garments
- Stitching Adjustment
- Documentation

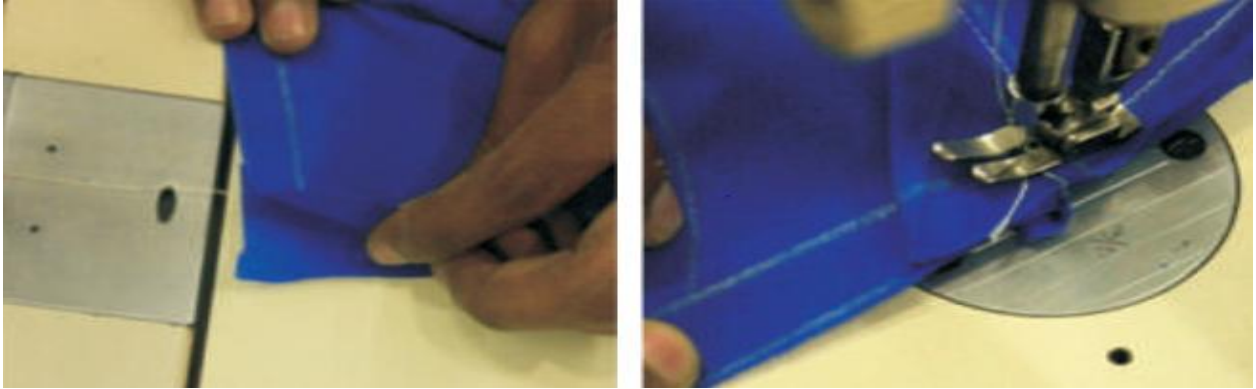
### **2.1.1. Assembling of a Top/Bodice**

Step 1: Stitch the dart starting from the end of the dart leg. Give a back stitch to reinforce the stitch at the dart leg and stitch all dart in same manner. [Do not give back stitch at the end of dart i.e. the vanishing point.] .At vanishing point of dart, leave 1” of extra thread and tie tailor knot or twist to give a clean finish as shown in Fig. 2.1.1



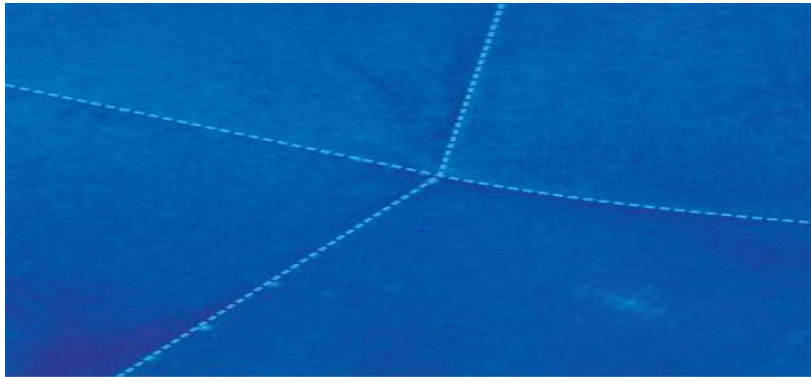
**Fig:- 2.1.1**

Step 2: After closing all darts, give false gathering at the back shoulder to adjust ease. Place the right side of front shoulder over right side of back shoulder and stitch, gently ease in the extra length of back shoulder, as shown in Fig.2.1.2.



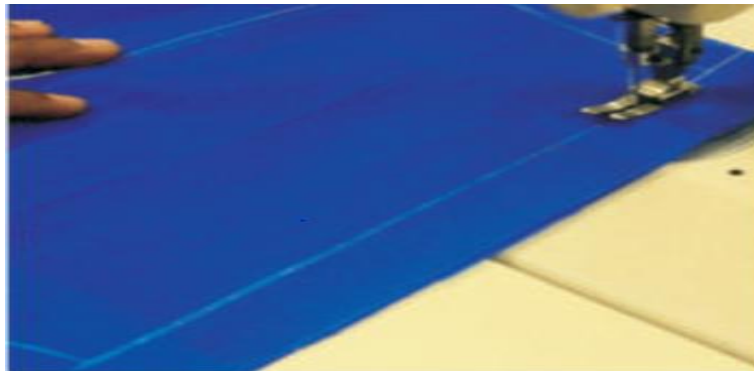
**Fig:- 2.1.2**

While mitering the dart (shown in Fig.2.1.3.), adjust the bulk of dart intake in seam line. To get proper finish, place the dart intake in opposite direction and then sew in the seam.



**Fig:- 2.1.3.**

Step 3: Close side seam of one side of the garment as shown in Fig.2.1.4.



**Fig:- 2.1.4.**

Step 4: Attach invisible zipper at the other side seam by placing the zipper's teeth at the seam line. Insert the zipper teeth into the zipper foot's groove as shown in Fig. 2.1.5. Now, stitch in the ditch, as close to the zipper teeth as shown in Fig.2.1.6.



Fig:-2.1.5.

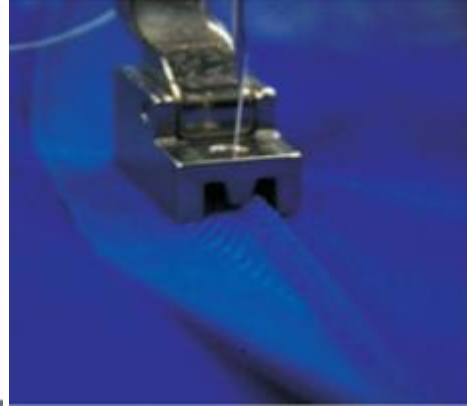


Fig:-2.1.6.

Lift the slider of the zipper and stitch till the slider on the allowance and give back stitch. Now repeat the same step to the other side of the zipper teeth by Insert it to the other groove of the zipper foot as shown in Fig.2.1.8.



Fig:- 2.1.8.

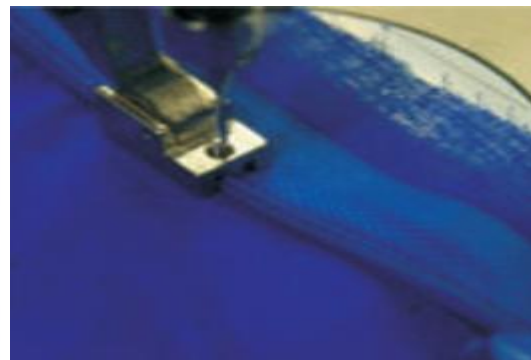


Fig:- 2.1.8

The stitch must be close to the zipper teeth as shown in Fig.2.9. Then, finish the raw edge by folding the extra allowance of fabric twice at a distance of  $\frac{1}{4}$ " and give edge stitch

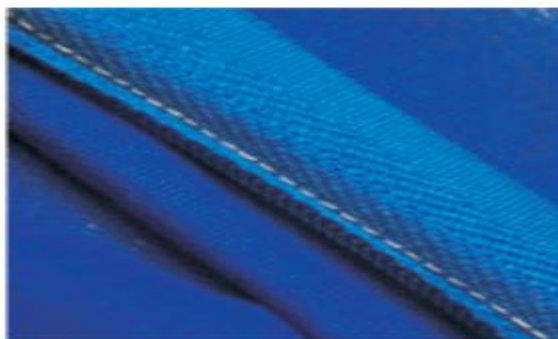


Fig:- 2.1.9

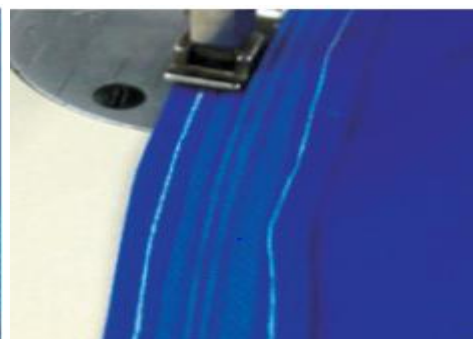


Fig:- 2.1.10

Step 5: Finish the raw edge of shoulder seam and side seam by giving an overlock stitch as shown in Fig.2.1.11.



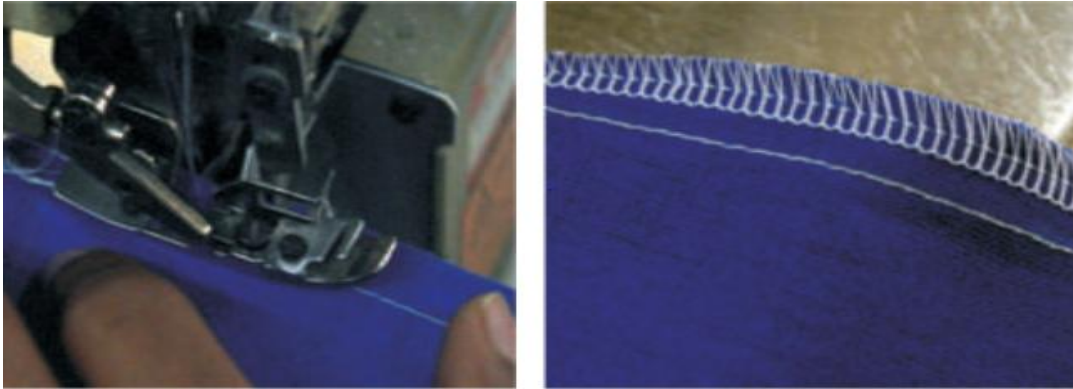


Fig:- 2.1.11

Step 6: Now, finish the neckline with a bias strip. Cut a bias strip as shown in Fig 2.12.

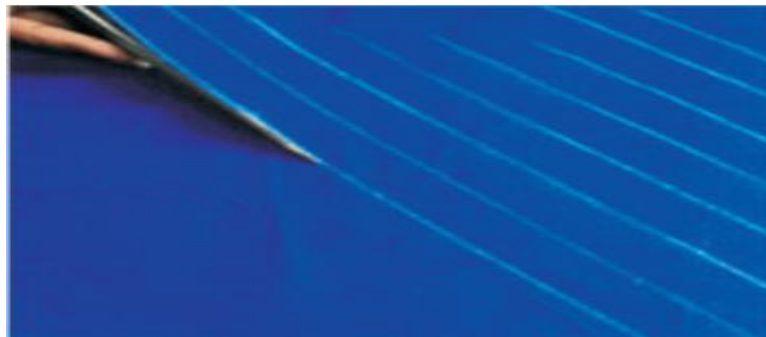


Fig:- 2.1.12

Place the bias strip on right side of the neckline as shown in Fig.2.13. Stitch at a distance of  $\frac{1}{4}$ " as shown in Fig. 2.14.



Fig:- 2.1.13

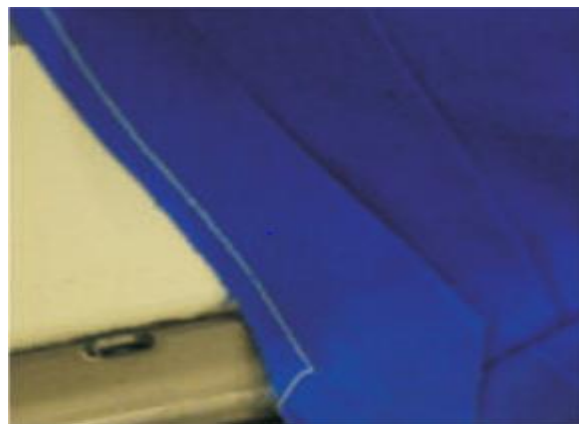


Fig:- 2.1.14

Fold the strip towards the wrong side and give an edge stitch as shown in Fig. 2.15. Fold the raw edge of the strip at a distance of  $\frac{1}{4}$ " and fold the strip once more towards the wrong side



of garment along the neckline and give an edge stitch as shown in Fig.2.16, Fig.2.17 and Fig.2.18 f respectively

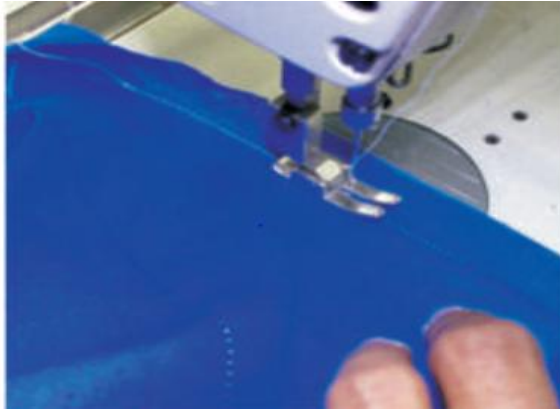


Fig:- 2.1.15



Fig:- 2.1.16

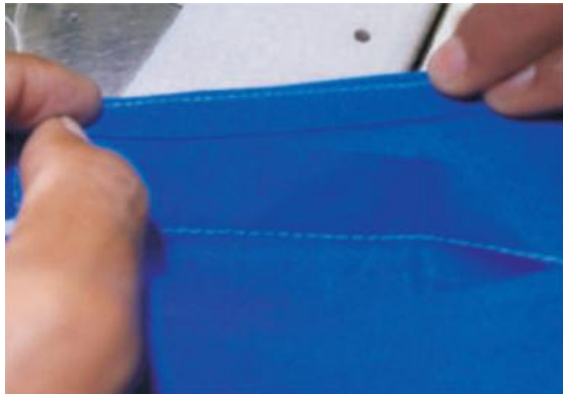


Fig:- 2.1.17

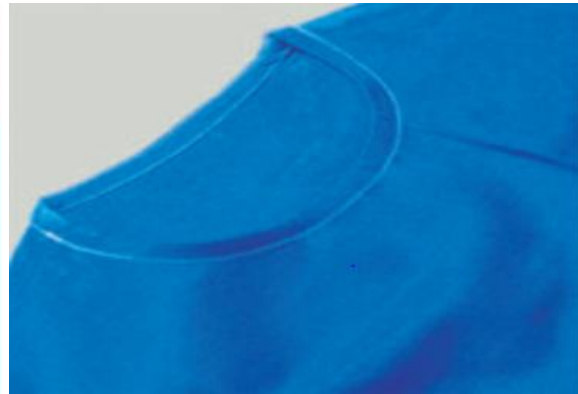


Fig:- 2.1.18

Step 7: Finish hemline by folding raw edge at a distance of  $\frac{1}{2}$ " and again fold  $\frac{1}{2}$ " repeating the step. Give an edge stitch as shown in Fig.2.1.19.



Fig:-2.1.19.

This is a Complete Top/ Bodice. Pressing or ironing is a mandatory at the end of operation.

### 2.1.2. Assembling of a skirt

Skirt generally has one back piece, one front piece and a waistband. You need fabric piece for two lengths of the skirt. There are tremendous possibilities of design variation in skirt. So the generalization may not work for skirts with bigger flares, more panels, different fits and skirts with yokes holding pleats or gathers. The amount of gathers or pleats in the skirt generally determine the fabric required.

Step 1: Stitch all darts as shown in Fig.2.1.20.[Refer to the Dart Finishing as shown in Top/Bodice assembling.]



Fig:- 2.1.20

Step 2: Stitch the side seams as shown in Fig. 5.2.3. Leave 6” to 7” from the waist at the left side seam for an opening and stitch the rest of the seam

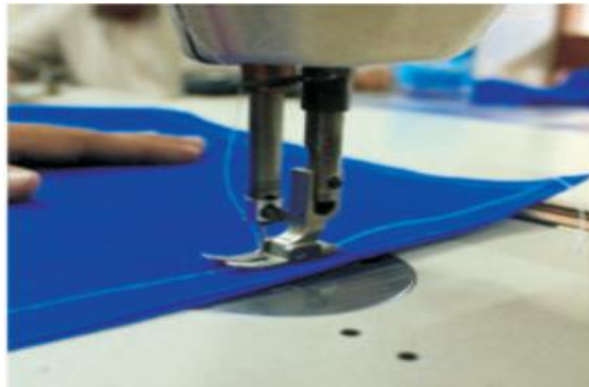


Fig:- 2.1.21

Step 3: Attach zipper to the side seam, as done for bodice/top in previous chapter, same as shown in Fig.2.1.22.

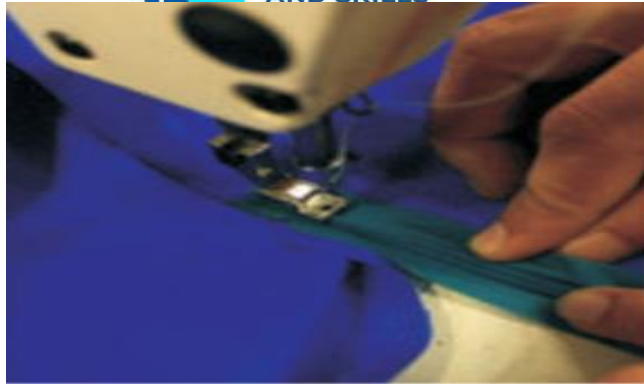


Fig:- 2.1.22.

Step 4: Finish the side seam by over locking as shown in Fig.2.1.23



Fig.2.1.23

Step 5: Attach waist band to the waist as shown in Fig.2.1.24. Place the right side of skirt on top over the right side of waistband (below). Stitch on the stitch line. Then, fold the width of waistband backwards to finish the opening for the zipper. Stitch on the fabric for waistband extension at the opening and then turn the waist band width back so that the waist band is finished. Stitch on the edge of waistband.

Finish the waistband as per your choice, or you can either give double or single stitch as shown in Fig.2.1.25





Fig.2.1.24

Fig.2.1.25

Step 6: Finish hemline by folding twice at 1inch and give edge stitch as shown in Fig.2.1.26



Fig.2.1.26

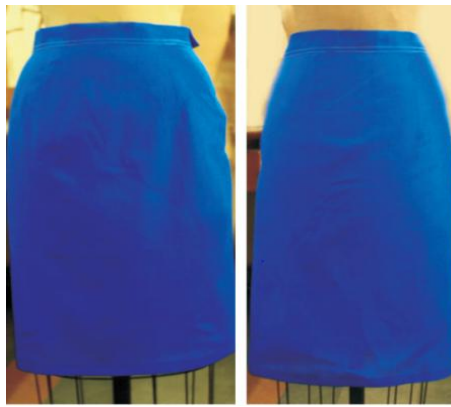


Fig.2.1.27

This is a complete skirt. Pressing or ironing is a mandatory at the end of operation.

## 2.2. Quality Standards

Quality standards are to work well, they must give specific guidelines, so that sewing and design professionals can have a consistent measurement of quality for their products and services. The specific guide lines that can be used as reference when evaluating a garment for meet the quality standards. Each area provides a comprehensive and specific set of standards for each section in a garment's construction.

### **Fabric Coordination and Selection Fabric(s) should:**

- Be suited to the pattern design. (Read the pattern envelope for information concerning one-way designs, napped fabric, knits, etc. Inexperienced sewers should use the fabrics recommended on the pattern envelope.)
- Have the same care characteristics or be easily removed for laundering/dry-cleaning. (This applies to trims also.)
- Be flattering to the personal characteristics, style and coloring of the individual

- Coordinate with one another in terms of design, color, weight and texture.
- Have balanced grain. (In woven fabrics the lengthwise and crosswise threads will be at right angles unless cut on the bias. In knit fabrics the courses and ribs will be at right angles.)
- Have a fiber content and texture suited to apparel design. Have a design that is matched, centered or balanced.
- Be used so that the nap runs in the same direction on all parts of a garment

### **Fabric Preparation**

Fabrics properly prepared should be:

- Preshrunk (laundered or dry-cleaned) using the recommended method of care, including inner fabrics.
- Thread perfect,” with lengthwise and crosswise threads at right angles to one another. To determine this, pull a thread on woven fabrics and cut along a wale or course on knits.
- Made “piece perfect,” with lengthwise and crosswise ends at right angles, if at all possible.

### **Fit**

A properly fitted garment should:

- Be fashionable and have an attractive fit. The amount of ease and fullness changes from year to year according to fashion trends.
- Fit smoothly over undergarments.
- Have the appropriate amount of ease for body movement. Have proper waistline length and fit.
- Have darts and design details that are properly placed.
- Have correct and properly placed shoulder length unless the design dictates otherwise.
- Neck line and armholes that fit the body without gapping or straining.
- Have skirt or pant length appropriate for the style and individual.
- Have sleeve fullness and length appropriate for the style and individual, Hang straight and parallel.

### **Construction Standards**



There are many sewing techniques that can be used. We each have techniques we prefer and some that we don't. Some standards apply to almost all techniques. For example, almost all construction techniques should result in a finish or detail that is inconspicuous, functional and durable.

### **Armholes and Neckline Facing**

Well-constructed armholes and necklines should:

- Fit smoothly neither the neckline seam nor the facing should show from the outside of the finished garment (unless it is designed to be stitched to the outside as a decorative, functional piece).but it depend on customer requirement
- Be the same shape and grain as the edge to be faced (usually 2 1/2 to 3 inches wide and even in width throughout).
- Be flat, smooth and free from bulk.
- Have appropriately finished outside edges (according to fabric type/weight) to prevent raveling.
- Be securely held in place by under stitching and tacking at seams or by top stitching.
- Be interfaced to prevent stretching and sagging, to cushion the enclosed seam, to reinforce the area, to support the facing and garment, and to provide shape.

### **Buttons and Buttonholes**

Well-constructed buttons should:

- Fit the purpose to which they are intended—functional or decorative.
- Be neat in appearance on the right and wrong sides of the garment.
- Be securely fastened with double thread and neat stitches.
- Have a shank (thread or part of the button) to accommodate the thickness of the fabric it will button through.
- Be reinforced, according to use and fabric type, with interfacing and/or another button.
- Be spaced in good proportion between top and bottom opening in relation to the other buttons.
- Be placed in relation to the buttonhole on the center line or lap line. The placket should be smooth and flat so there is no gaping or pulling when buttons are secured in buttonholes.

- Be the appropriate size and style for the garment design and fabric.
- Have no rough edges.
- Be smooth when covered with fabric and have no “shine” or off-color visible from the base.

Well-constructed buttonholes should be:

- Neat in appearance on the right and wrong sides of the garment.
- Flat and attractive.
- Made with the grain of the fabric unless a bias cut garment or unusual design dictates otherwise.
- An equal distance apart, unless spaced for special design effects.
- An even distance from the garment edge and aligned with the center line or lap line.
- Sized in relation to the button size and thickness.
- Applied to an area that has been properly interfaced.
- The same length and width when the same size/shape button has been used.
- Spaced according to the size of the button and garment design/function. Buttons and buttonholes should hold a garment securely closed without strain or tress.
- Positioned so that the button can be secured and will ride slightly toward the garment edge in a horizontal buttonhole and toward the top in a vertical buttonhole.
- Neatly slashed and unsightly threads removed.
- Made with secure stitching and have uniform” lips.”

## Collar

A well-applied collar should:

- Be smooth and free from wrinkles, the outer edge seam should not be visible from the right side.
- Have smooth curves or sharp points (the same shape and length) depending on the type and style of collar.
- Fit the neckline area without unsightly gaps or wrinkles, interfaced properly to maintain shape, under stitched on the outer seam edge to roll under the seam.
- Be well pressed. Darts, Ease, Gathers, Pleats, Shirring, Tucks

A well-constructed fitting dart should:

- Be directed toward the body curve.
- Be tapered so it is smooth and free of puckers.
- Be even and smooth in appearance.
- Have threads secured at both ends.

Well-constructed gathers, pleats, shirring and tucks should:

- Be distributed evenly and/or in accordance with the garment design.
- Be even and smooth in appearance.
- Have ease for comfort but appear as a straight silhouette (pleats).
- Provide relaxed but defined fullness, they may be used in place of gathers or fitting darts (tucks).

### **Fasteners (Hooks and Eyes, Snaps, Self-Gripping)**

Well-constructed, well-applied fasteners should be:

- Appropriate for the garment design and fabric being used.
- Applied to an area that has been reinforced with interfacing.
- Secured so that stitches do not show on the right side of the garment/fabric.
- Appropriately placed so edges are held together smoothly and evenly.
- Use a straight eye when edges lap, round eye when edges meet, hooks and eyes for strain openings, and snaps for areas with little stress. The ball side of a snap and the loop side of a self-gripping fastener are placed on the overlap side.

### **Hems**

A well-made hem should:

- Be inconspicuous on the right side, except when it is a decorative part of the garment design, be an appropriate distance from the floor, even in width and an appropriate depth for the fabric and garment design, free from bulk in seams that fall within the hem area, Have fullness eased in and evenly distributed for a smooth, flat appearance.
- Have an edge appropriately finished for the type and weight of fabric and hem stitch to be used, firmly secured with a hem stitch appropriate for the fabric and the hem edge finish.

### **Interfacing**



A suitable, well-applied interfacing should:

- Be appropriate for the outer fabric's fiber content, care and construction type (knit, woven, non-woven) and for the manner in which it is applied (sew-in versus fusible). Interfacing fabrics range from commercially designed fabrics to self-fabric.
- Be, or have, the same "grain" or "give" as the outer fabric with which it is used.
- Coordinate in color as closely as possible. Use a light color with light-colored fashion fabrics and dark with dark.
- Appear flat and smooth with no bubbles, wrinkles or folds.
- Not be visible or noticeable from the outside/ right side of the garment.

### Markings

Markings should:

- Be appropriate for the fabric.
- Not show on the right side of the fabric.
- Not leave holes or discoloration in the fabric.

### Stitching

A well-made stitch will:

- Use a thread type and needle size appropriate to the fabric and situation for which it is used. Generally, the finer the fabric, the finer the needle and thread. (Thread expands to or takes up the entire area created by the needle.) There should be no excessive holes created by the needle.
- Be a controlled, consistent length appropriate to the fabric and situation for which it is used. As a general rule, the heavier the fabric, the longer the stitch; the lighter weight the fabric, the shorter the stitch. Within this rule adjustments are made according to fabric texture and structure.
- Have equally balanced top and bottom threads that look the same on both sides of the fabric (appropriate thread tension).
- Be the type of stitching (regular sewing machine or overcast/serger) or stitch pattern (standard or decorative) appropriate to the fabric and situation for which it is used.
- Be appropriately secured at the beginning and end of the line of stitching.
- Be neat, straight, and fit the purpose for which it was done (functional or decorative).

### Pressing

A well-pressed garment should:

- Maintain the original texture of the fabric.
- Show no shine or press marks on the right side of the fabric.
- Have no wrinkles or crinkled areas.
- Have seams and darts pressed smoothly on the stitching line, so that the fabric does not fold over the stitching line or look bubbled. Edges of seam allowances and fold edges of darts do not form ridges on the right side of the garment.
- Have no water-spot or steam marks.
- Help create and maintain the proper shape and curve to the garment and the various garment segments (collar, sleeve, etc.).

### **Seams, Seam Finishes, Seam Treatments**

A well-constructed seam should:

- Be smooth and even in appearance on the inside and outside of garment. Machine tension, stitch length and presser foot pressure are properly adjusted to suit the fabric and thread.
- Be even in width throughout.
- Be secure, pressed open (and with no puckers) or pressed properly according to the type of seam it is and the way it is used in garment construction.
- Be stitched with thread appropriate to the fabric type, fabric content and color. (Thread color should match or be slightly darker than the fabric.)
- Have consistent stitch length, flat and trimmed and/or graded, if needed, to reduce bulk, Match fabric designs such as plaids and stripes.

A well-applied seam finish:

- Appropriate to the type and weight of fabric, smooth and neat in appearance inside and out.
- Does not create excess bulk, not visible from the right side of the garment, even in width throughout. Uses reinforcement stitches on areas of stress

### **Sleeves**

A well-constructed and correctly fitted set-in sleeve should:

- Have a smooth, rounded cap with no pleats or gathers unless they are a garment design feature.

- Be applied so that there is ease in the underarm area and in the sleeve cap area.
- Have a good armhole line resulting from straight, even stitching, and well-matched seam lines that conform to the body.
- Have a crosswise grain parallel to the floor, a lengthwise grain perpendicular to the floor, and no diagonal wrinkles.
- Have evenly distributed gathers in gathered set-in sleeves.
- Have seams finished appropriately for the fabric. Be comfortable with no binding.

A well-constructed shirt sleeve should:

- Be correctly positioned on the body.
- Be shaped properly and on-grain.
- Not have gathers or puckers.

A well-constructed sleeveless garment should:

- Hug the body without binding.
- Fit the curve of the arm accurately.
- Have a facing seam that is graded, under stitched, free from bulk, smooth and flat.
- Have the facing tacked loosely at seams.
- Be 1/2 inch from the underarm.

### **Waistband**

A well-constructed waistband should:

- Be smooth, flat, and free from bulk and wrinkles.
- Be even in width according to the garment style.
- Be on-grain and reinforced or interfaced to maintain shape.
- Have under lap under the waistband and extend beyond the placket unless the pattern indicates differently; overlap should be even with the placket unless the pattern indicates differently.
- Have the skirt or pants eased slightly on the waistband.
- Have square corners at the ends of the waistband.
- Be securely stitched with smooth, even stitching.
- Have appropriate fasteners that are properly located and secured in place.

### **Zippers and Zipper Plackets**

A well-constructed zipper placket and well-applied zipper should:

- Be flat when closed and neat in appearance. The zipper should lie smooth without stretching or puckering of the fabric.
- Have smooth, even stitches, evenly spaced from the placket edge.
- Have stitching across the bottom opening 1/8 inch beyond the zipper stop.
- Have thread ends secured and hidden in folds of fabric so that they will not be caught in the zipper teeth.
- Be a weight compatible with the fabric (light with light, heavy with heavy).
- Have seam lines matching, if the zipper crosses a seam.
- Have matching fabric design, if needed, such as stripes and plaids

A well-constructed zipper placket should:

- Be properly prepared and pressed before the zipper is inserted.
- Be sized to the zipper length.
- Leave 1/4 inch at the top of a neckline zipper for a fastener.
- Be the same length on both sides.

A zipper should be:

- Suited in terms of weight, size and length to the garment design, the fabric and the opening location on the garment. Its color should match or coordinate with the fabric color.
- Concealed beneath the edge of a placket overlap from top to bottom.
- Positioned to fit the placket opening. The placket should open to the end of the zipper teeth and close at the top of the zipper. (There should not be a “hole” above a skirt/pant or neckline zipper placement.)

### 2.3. Specialized machines

Special industrial machine is a mechanical (or electromechanical) device that to give a value fabric using thread. Special industrial machines make a stitch, machines exist that stitch using one, three, four or more threads, but the fusing machine do not use thread.

#### 2.1.1 .Fusing machine

Fusing is an alternative process of fabric joining which is widely used to attach interlinings. The fusible interlining consists of a base cloth, which may be similar to that used for a sew-in interlining, but will carry on its surface a thermoplastic resin in the form of dots, which

will melt when heated to a specific temperature and pressure and flow into the fabric to make the bond.

Not all garment fabrics can be fused, and there may always be some situations where sew-in interlining continues to be used, but in the vast majority of garment making today, fusing is the most common process, the reason being both technical and economic. At present, apparel manufacturing cannot be imagined without fusing process

### **The basic fusing parameters**

#### **#1. Temperature:**

Temperature is the most critical parameter out of the other three. It should be necessarily high enough at the glue-line so that the dry thermoplastic resin would change into a partially molten state so that it can flow between the layers. For each resin, there is a particular range within which the glue would achieve the correct level of flow. Any temperature higher than that would give too much flow resulting in strike-back and strike-through along with a reduction in performance. And too low the temperature, the glue will not melt properly resulting in poor flow and thus poor adhesion.

#### **#2. Pressure:**

There should always be a consistent amount of pressure throughout the interlining and the outer cloth for full contact between them. This will ensure a correct transfer of heat to the glue-line along with even penetration of resin among the fiber of outer fabric. If the pressure is too high, it will result in strike-back and strike-through, and if the pressure is too low there would not be proper penetration and thus lower adhesion.

#### **#3. Time:**

Time is very important as it will allow the temperature and pressure to induce melting of the resin and penetration into the outer fabric in order to produce the appropriate bond. Lesser time will result in improper fusing and greater time may result in strike-back or strike-through. The time cycle of any fusible will be determined by

- The type of resin used.
- The type of substrate being used.
- The nature of the outer fabric and the base cloth being used.

#### **#4. Cooling:**

It is done so that the fused assemblies can be handled immediately after fusing. It can be done by passing the fused laminate through water-cooled plates, compressed air circulations and vacuum.

The first three factors are interrelated with each other and any change in one will result in changing the other parameters also provided a limit to the extent to which one factor will compensate for the other.

Garment Fusing Process:

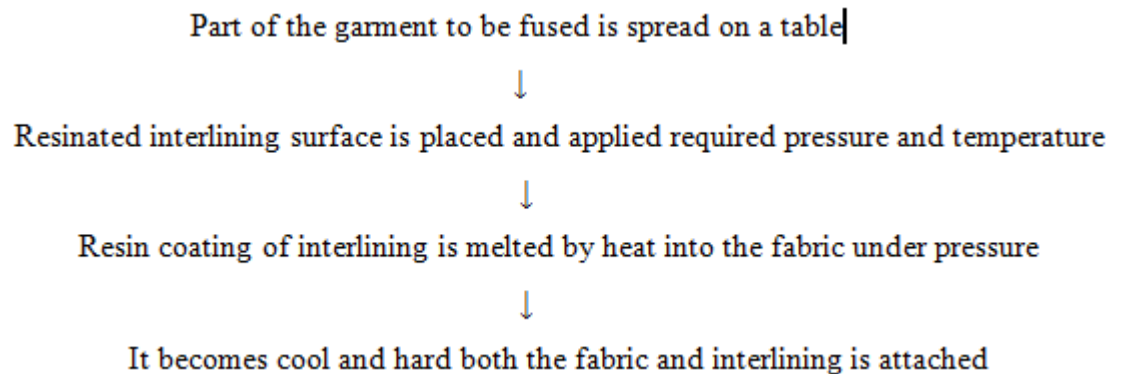


Fig:-2.3.1. Fusing machine

### 2.1.2 buttonholing machine

Working principle of buttonhole machine:

This machine works in cyclic system i.e. during pressing switch after sewing on complete button hole the machine will stop.

In fully automatic buttonhole machine more than one i.e. pre-selected no. of button holes can be sewn in pre-selected distance. In this system no mark is needed on cloth for button hole. In buttonhole machine there is system to make big or small button hole and also to increase or decrease the stitch density. Usually lock stitch or chain stitch is used here.



Button hole can be made before or after sewing. Both systems have some advantage and disadvantage.

If hole is made before then the cut edge is closed in sewing and the button hole is seen very good and clean. But the disadvantage is that after starting sewing there is no chance to change the buttonhole place and cut edge disturbs to sew well due to flagging. But disadvantage is thread of cloth is come out along the sewing line of button hole that looks very bad.

Usually for dense woven and coarse cloth before sewing, for thin cloth after sewing button hole is made.

Main adjustment points of buttonhole machine:

- Thread.
- Tensioner.
- Needle.
- Pressure feed.
- Stitch density and Looper.



Fig:-2.3.2. button holling machine

### 2.1.3 button attaching machine

A button attaching machine is used to sew the button in the garment without damaging it. Various types of buttons like a button with two holes, four holes or shank could be sewn on this machine by making simple adjustments. The sewing action comprises a series of parallel stitches whose length is equal to the distance between the centers of the holes. The needle has only vertical movement but the button moves sideways by means of the button clamp for stitching. A hopper feed is a special attachment that automatically feeds the button to the clamp of the needle point of the machine. With this attachment, the button and needle are automatically positioned and the threads are clipped. Button attaching machine is ideal

for stitching Shirts, T-shirts, and Uniforms etc. It is highly applicable in number of different garment applications.

The feature of button sewing machine is specified here shortly:

- It is a simple automatic machine.
- Button positioning can be automatic.
- Sewing is according to the hole in button and may be cross or parallel.
- Button can be sewn using lock stitch or chain stitch.
- Automatic feeding of the shirt buttons
- Buttons with 2 holes, 4 holes or shanks can be sewn on the same machine.
- Generally the needle has a vertical movement only.
- Button is moved from side to side by the button clamp.
- Machine has a number of stitches. i.e. 16, 24 or 32 are adjusted.



Fig: -2.3.3. Button attaching machine

#### 2.1.4 bar tacking machine

The bar tacking machine is an industrial sewing machine which produces a specified length of zigzag like stitching called bar tack.

These machines are sewing a number of stitches across the point to be reinforced and then Some of the bar tacking are fitted with the following special attachments

- Signals are available and it controlled by special mechanism, when the bobbin thread is below a certain level.
- Automatic thread cutters are available.
- A pedal which opens and close the work clam.

This machine is used for the following application in garment industry.

- Closing the end of the button hole.
- Reinforcing the ends of pocket opening.
- Sewing on belt loops.



Fig: -2.3.4. Bar tacking machine

#### 2.1.5 . blind stitch machine

In blind stitch, the thumb rule is to run the sewing thread at the near surface of the fabric, but not actually through the cloth fabric, in short, the needle catches a thread or two from the surface, without passing the other visible side of the fabric. Blind stitch machine is used to stitch hem in a knitted fabric.



Fig:-2.3.5. Blind stitch machine

### 2.1.6 Cover stitch machine/Inter lock machine

It has good potency and stretches. It can avoid the loose edges. Equipped with decorative lines, it can beautify the stitches. As it has the character of sewing edges and interlocking the overlock stitches, it is also widely used in knitwear production, specific to the neck, wristband of women knitwear, rolling edge, rolling neck, rolling lace, curling edge, split joint and decorative lamp sewing. The reason why interlock-stitched cloth enjoys good stretches is that there are some reserve lines in interlocking stitches. The following one is an interlock sewing machine.

The interlock sewing machine is mainly used for sewing knit vest, sportswear, T-shirt, bra, elastic band surrounding the skirt waist, neck and wristband of other resilient knitwear. It can basically produce the multi-thread chained stitches. Equipped with other supporting equipment, it can be used to sew nylon zippers, embroider lotus-leaf edges. It adopts a totally enclosed automatic cold lubrication system. Its main transmission adopts synchronous belt drive to ensure its speedy transmission and low noise. It can also use improve the low vibration and durability of the machine by choosing



Fig: -2.3.6.Cover stitch machine/Inter lock machine

### 2.1.7 . FOA ( feed of the arm)

The feed-off-the-arm machine is used where a lapped seam has to be closed in such a way that the garment part becomes a tube.

#### **Working Principle of Feed of the Arm Sewing Machine:**

For the formation of multithread chain stitch, two threads that means one needle reaches to its lowest bottom designation entering into the fabric with “needle thread”. Then it stays a little upper. As a result a loop of needle thread is formed.

At the sometimes the thread take-up lever also continuous to go downwards resulting the decreasing of the tension of the needle thread and it helps in formation of the loop of the needle thread. Just the moment of formation of the needle thread loop, the lopper from behind the needle enters into the just produced needle thread loop with lopper thread and goes formed a little. Then, the needle goes upward with needle tread, the fabric also goes forward a step with the help of feed dog and the lopper comes in front of the needle. The movement of the lopper is controlled by avoiding motion. The tension of lopper thread is controlled by changing the passage of thread.

#### **Stitch Description:**

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

#### **Uses of Industrial Feed of the Arm Machine:**

- For making inseam of jeans and sleeve
- Used in long seam of trousers
- Frequently used for joining lace
- Used for joining braid and elastic in the garments.



Fig: -2.3.7. Feed of the Arm Machine



### 2.1.8 . pocket setter/attach

#### Pocket Attachment

Nowadays the highly automated factories ask for programmable automated pocket setter in which a pre-hemmed pocket is loaded to the machine and machine first creases the pocket followed by automatically attaching to front panel without any operator intervention. Among the process of loading, sewing and disposing; loading generally remains manual operation, while sewing and dispose of are mostly mechanized.

For pocket attachment process, the manufacturers have come up with state-of-the-art workstations, which can perform both the operations of creasing and stitching in a cyclic principle, saving on extra machine and operator required for creasing. Apart from reducing the operation time, the workstations are equipped with touch screen control panels with memory card reader, for storing designs for future references.



Fig: -2.3.8. Pocket attached machine

The sequence of operations is as follows:

- The operator loads the shirt/trouser panel;
- The operator loads the pocket piece (pre-hemmed);
- The operator presses the actuator ;
- The machine first creases the pocket;
- Another head then places the creased pocket over shirt/trouser panel and carries to sewing head;
- Sewing of pocket;



- Stacking of sewn piece

### Self-check-1

#### Part- I Matching

Instruction: Match column “B” with column “A”

A	B
-----1. Feed of the arm	A. Widely used in knit wear production
-----2. Bar tacking	B. Hemming
-----3. Button attach	C. Sew button
-----4. Blind stitch	D. Making inseam of jeans and inseam of sleeve
-----5. Cover stitch	E. Reinforcement stitch
	F. Stitching button hole

### Part II: short Answer writing

Instructions: Answer all the questions listed below.

1. List at least six tasks in assembly department.
2. List at least five quality criteria of fitting.
3. List at least five quality criteria of a well-constructed button hole.
4. List at least four quality criteria for a well-applied collar.
5. Mention at least two quality criteria of a well-made hem.
6. Write at least four quality criteria of a well-made stitch.
7. Write at least six quality criteria of a well-constructed seam.
8. Mention the basic parameters of fusing.

Note: Satisfactory rating – above 60%      Unsatisfactory - below 60%

You can ask your teacher for the copy of the correct answers

## Operation sheet 2.1

Bodice assembly.

- **Operation title:** Assembling bodice.
- **Purpose:** To show how to assemble bodice
- **Instruction:** Using the figure below and given equipment's assemble the bodice You have given 3 hour for the task



Fig:-2.1.19.: Figure given for operation sheet 2.1

- **Tools and Equipment:**
  1. Single needle Sewing machine
  2. Overlock machine
  3. Bodice cut component
  4. Thread
  5. Zip
  6. Zipper foot
  7. Seam ripper
  8. Ironing machine
- **Steps in doing the task**
  1. Stitch the dart starting from the end of the dart leg
  2. give false gathering at the back shoulder to adjust ease
  3. Close side seam of one side of the garment
  4. Attach invisible zipper at the other side seam
  5. Finish the raw edge of shoulder seam and side seam
  6. finish the neckline with a bias strip
  7. Finish hemline by folding raw edge

## Operation sheet 2.2

Skirt assembly.

- **Operation title:** Assembling skirt
- **Purpose:** To show how to assemble skirt
- **Instruction:** Using the figure below and given equipment's assemble the bodice You have given 3 hour for the task



Fig:-2.1.19.: Figure given for operation sheet 2.2

- **Tools and Equipment:**
  1. Single needle Sewing machine
  2. Overlock machine
  3. Skirt cut component
  4. Thread
  5. Zip
  6. Zipper foot
  7. Seam ripper
  8. Ironing machine
- **Steps in doing the task**
  1. Stitch all darts
  2. Stitch the side seams
  3. Attach zipper to the side seam
  4. Finish the side seam by over locking
  5. Attach waist band to the waist
  6. Finish hemline by folding twice at 1 inch and give edge stitch.

**Quality Criteria:**

1. Stitch do not be pucker, slip, skip, broken

2. The fitting should be good.
3. The seam should be uniform.

- **Precautions:**

1. Before starting assembly check the component
2. Before starting assembly check the machine

## Unit Three: - Machine Performance

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identified and corrected/adjusted tension faults
- Identified and correcting thread defect performance
- Checking and verifying stitch length to against specifications
- Checking Presser foot selection and performance
- Checking and adjusting Feed dog performance
- Checking and adjusting Pressure of presser foot
- Identifying sewing defects and taken corrective actions
- Identifying and selecting needle types based on the fabric characteristics
- Performing work aids and attachment
- Monitoring machine for correct operation

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Identify and corrected tension faults according to specifications
- Identify and correct defect thread performance
- Check and verify Stitch length against specifications
- Check and change Presser foot as necessary
- Check and adjust Feed dog as necessary
- Check and adjust Pressure of presser foot as required

### 3.1. Adjust Thread Tension Faults

Upper and lower tension must be balanced to produce a perfect stitch. The upper tension is located differently on different machines. It may be on the face plate, on the face of the

needle bar housing, on the front of the needle bar housing, or on the upper arm of the machine head.

The lower tension, located on the shuttle or bobbin case, is adjusted by a screw

If two screws fasten the lower tension spring to the bobbin case, adjust by turning the screw nearest the center of the spring not the screw on the end.

If the lower tension has been disturbed, set both lower and upper tension so there will be a slight drag on each thread. Use the same size thread on both bobbin and spool. After adjusting the tension, take a look at the stitching the machine makes. To help you to see the stitches clearly, use contrasting colors of thread on the spool and in the bobbin. Set the stitch-length control for a medium stitch length. Now inspect the stitching in a perfect stitch, threads are locked in the center, midway between the two layers of cloth, with no loops on the top or bottom of the seam and no puckers in the cloth. The tension of the stitch is regulated by two controls (As shown on figure below.)

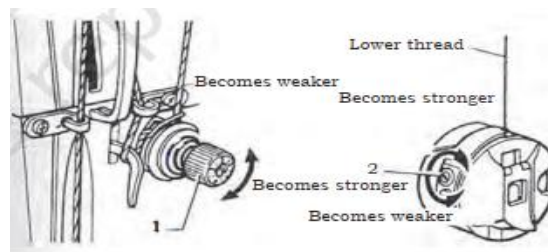


Fig:- 3.1.1.Adjusted thread tension

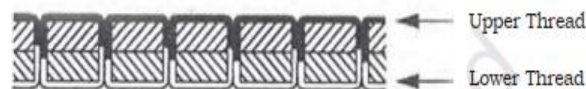


Fig:- 3.1.2. Correct seam



Fig:-3.1.3. Seam when the upper tension is too loose



Fig :-3.1.4. Seam when the upper tension is too tight

### 3.2. Thread Performance

Sewing thread plays an influential role in fabric seam design. Sewing thread tension varies during the sewing process of fabric. Quality of thread should be judged by breaking strength, elongation at break, thread liveliness and twist direction, but other properties of



thread such as lubrication ratio, type of wax applied and thread ply also influence the sewing process and seam quality.

It was established that sewing thread size, structure, fiber type, lubrication ratio, type of finish and twist influences the sewing process. Thread tension in different zone of sewing machine and sewing thread elasticity plays a vital role in achieving good quality seam. Sewing thread construction-like ply needs to be well-thought-out for good seam quality

### 3.3. Stitch length

The stitch length determines how much fabric is fed under the presser foot. When the stitch is shortened, less fabric is fed under the presser foot, and when the stitch is lengthened more fabric is fed under the presser foot.



Fig: -3.1.5. Stitch-length regulator

This device controls the stitch length by regulating the distance which the feed dog moves the fabric for each stitch. As stitch-length regulators control the size of the stitch, they also determine the number of stitches per inch.

Stitch lengths:

- 2mm is the short stitch length that should be used for lightweight fabrics, for satin stitching, and decorative stitching.
- 2.5 - 3mm is the average stitch length range that should be used for medium weight fabrics.
- 4 - 5mm is the long stitch length range that should be used for basting and topstitching.

### Stitch

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

### Stitch per inch (SPI)

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

### 3.4. Presser Foot Selection

The most commonly used feet such as the all-purpose foot, the straight stitch foot, the zipper foot and the buttonhole foot is often included with a new sewing machine.

The all-purpose foot is the foot used the most often and you most likely used it when you made the pyjama, pants.



Fig:-3.4.1. all purpose foot

The straight stitch foot looks a lot like the all-purpose foot except it has a much smaller opening for the needle. This smaller opening allows for better control of your fabric especially when working with finer fabrics.



Fig:-3.4.2. Straight foot

### Over lock foot

It is useful for producing durable finish on seam which fray easily or is bulky. It is suitable for use on a sewing machine and is mostly effective when the fabric is positioned under the presser foots that the stitches form slightly over the fabric edge. Test that you have the correct position and stitch width before you start to sew.



Fig: -3.4.3. Overlock foot

### **Embroidery foot**

It is suitable for shirring fabric. Its design allows the elastic thread to pass easily under the presser foot. On sewing machine 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 the straight stitch machine the elastic is wound around the bobbin.



Fig:-3.4.4. Embroidery 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:-3.4.5. Elastic foot

### **Zipper foot**

It is the footer used for attaching mainly zip and snap tape. Zipper foot has a narrow toe tooth which gives more precision and visibility. The foot needs to be adjusted to the right or to the left to stitch both sides of the zip. This foot also attaches decorative cording and piping.



Fig:-3.4.6. Zipper 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 hemline. Is is best suitable for light weight fabric.



Fig:-3.4.7. Hemmer 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 in every stitch.



Fig:-3.4.8. Gathering foot

### **Zigzag foot**

It is attached to create designs in fabric using zigzag stitches with different width

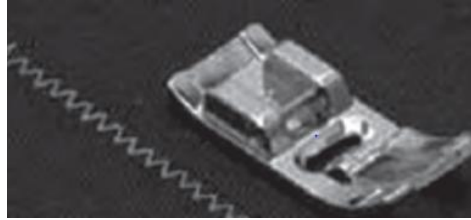


Fig:-3.4.9. Zigzag foot

### **Cording foot**

To attach decorative cords and threads, accord foot is attached to the machine; this foot is design for stitching closed to a raised edge.it is used for applying cord to the seam.



Fig :-3.4.10. Cording foot

### **Decorative tape foot**

This foot is used to fix trimmings and ribbons on the fabric.



Fig:-3.4.11. Decorative foot

### **Button fixing foot**

It can attach two-holed and four holed button to the materials or garments. In this machine the foot holds the button in place and the attached the button to the fabric or garments.

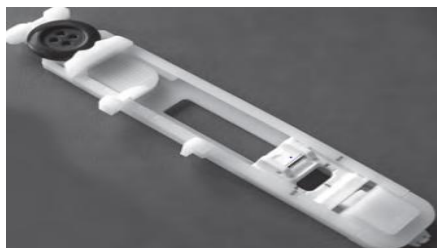


Fig:-3.4.12. Button fixing foot

### branding foot

It allows lot of flexibility while attaching elastic cords,braid or cord.



Fig:-3.4.13.Braiding foot

### Blind hem foot

It is an additional attachment basically used for edge finishing of various apparel like trousers and skirts,home furnishing items like curtains etc.



Fig:-3.4.14. Blind hem foot

## 3.5. Feed dog performance

The teeth on the feed dog should project above the needle plate so that the bottom of the teeth, or serrations, are level with the top of the needle plate when the dog moves the material before the next stitch is made by the needle.

A good general setting is one that results in 10 to 12 stitches per inch of seam. On very thin and fine material, it may be necessary to use a shorter stitch such as 14 to 16 stitches per inch of seam. On leather or vinyl, a longer stitch may be more desirable, such as 6 to 10 stitches per inch of seam.

## 3.6. Pressure of Presser Foot

There should be just enough pressure on the presser foot to hold the fabric on the feed dog so that a uniform length of stitch is made. As a general rule, heavy fabrics require light pressure. Medium weight fabric required medium pressure and light fabrics required high pressure required. Pressure may be increased by pushing down on an inner pin, or decreased



by releasing an outer ring. Some machines may have a thumb screw or a dial to regulate pressure. Check your machine booklet for instructions on how to adjust the presser foot of your machine.

On slippery fabrics, loosely knit fabrics, vinyl, or velvet a roller-type presser foot may produce better feeding than the standard presser foot. When darning, either reduce the pressure on the presser foot or lower the feed dog on machines with a drop feed button, or use a cover plate.

### 3.7. Sewing Defects and Corrective Actions

Sewing defect can be classified as three groups:

- Problems of stitch formation.
- Problem of pucker.
- Damage of fabric on seam line

**Slipped stitch:** Stitches in the seam line are present in a regular manner. If the interloping or interlacing between top & bottom thread of stitch does not take place or missed is known as slipped stitch or skipped stitch. This is serious defect in case of chain stitch than lock stitch. The followings are the causes & remedies of slipped stitch formation.

Table: - 3.7.1.Slipped stitch defect and remedies



No.	Causes	Remedies
01	If hook or looper & needle are not inserted in loop of thread in time.	Examine the setting & timing between needle & hook or looper. Placing the needle properly. More secure needle should be used.
02	Irregular thread tension on upper or lower loop.	The tension of the thread should again be adjusted.
03	Needle deflection.	Needle to be changed.
04	If needle thread loop size is too small.	Needle size & thread size must be adjusted.
05	Flagging of fabrics during sewing.	The pressure of pressure foot must be adjusted accurately. The hole of throat plate & needle size must be adjusted.
06	If the sewing thread is not capable to form loop.	Thread to be changed

#### Staggered stitch:

If the stitches produced by needle are not parallel or become curvy to sewing line is known as staggered stitch.

Table: - 3.7.2. Staggered stitch defect and remedies

No.	Causes	Remedies
01	Needle deflection.	Increase the needle size Tapered needle should be used.
02	Due to wrong blunt needle point.	Needle to be changed.
03	Wrong adjustment of needle & thread size.	Needle size & thread size to be changed.
04	Deflected motion of feed dog.	Motion of feed dog to be adjusted.
05	If fabrics are not controlled properly in the feed mechanism.	The pressure of pressure foot must be adjusted accurately. Feed mechanism to be changed.

#### Unbalance stitch:

This type of defect is found in lock stitch machine. If the interlacement of threads do not take place in the middle (i.e. if the interlacement is taken place in the upper or lower position from the middle) of two layers of fabrics then it is known as unbalance stitch

Table: - 3.7.3. Unbalance stitch defect and remedies

No.	Causes	Remedies
01	Wrong tension of sewing thread.	Setting of proper tension to the sewing thread. Proper care to the twisting of the thread during sewing.
02	Used wrong thread path	Use of right thread path.
03	Wrong adjustment of needle thread path.	Use of right thread path.
04	Snagging of needle with bobbin case & positioning finger.	Bobbin case to be smooth. The positioning finger to be set again.
05	If the thread are not lubricated.	Better qualities of thread must be used. Thread must be lubricated.

**Variable stitch density:** Stitches per unit length should be uniform, If it is not then it is called variable stitch density. The main cause of variable stitch density is irregular feed of fabric due to insufficient pressure of pressure foot. The following are the cause & remedies of variable stitch density formation

Table: - 3.7.4. Variable stitch density defect and remedies



No.	Causes	Remedies
01	Improper unwinding of thread from package during sewing.	The position of thread guide must be 2.5 times higher than the position of thread package. Also proper care should be kept to the thread package not to tiling
02	Twisting of needle thread in the bottom of the thread package.	Foam pad must be used to the bottom of the thread package.
03	Snarling of thread before tension disk.	Winding of more threads in the thread guide & to keep less tension to the tensioning disk.
04	Twisting of thread in the thread guide.	Proper threading of sewing thread during sewing.
05	More tension to the thread.	The tension of thread should be less or use high strength threads.
06	Use of broken check spring.	Check spring to be changed.
07	If the edge of the throat plate, hook point, needle guard, bobbin case, needle groove, needle eye & so on	The edges must be smooth & needle must be changed as needed.
	are sharpened.	
08	Fraying of thread in the needle.	Fine thread must be used or use heavy needle.
09	Thread gets heated more	High quality needle must be used. Needle lubricant must be used. Needle cooler must be used.
10	Hook gets heated more	Lubricant must be available. Examine the distance between the needles & hook.
11	Use of low quality threads.	Thread to be changed.

**Frequent thread breakage:** Frequent breakage of thread especially, when there needs to open out the sewing to solve the problem. The following are the causes & remedies of frequent thread breakage.

Table: - 3.7.5. Frequent thread breakage defect and remedies



No.	Causes	Remedies
01	Wrong winding of threads on to the bobbin.	Proper winding of threads on to the bobbin. Pre-wound bobbin may be used.
02	More tension to the bobbin threads or more rotating of bobbin.	The tension must be adjusted to the bobbin threads. Use of washer to prevent more rotation of bobbin.
03	If the edges bobbin case, looper eye & so on are more sharpened.	The edges to be smooth.
04	Wrong fitting of bobbin case.	Examine the size & type of bobbin. Examine the damaging of bobbin case.

### 3.8. Needle Types and Stitch Length

Table: - 3.8.1. Needle types and Stitch length based on the fabric type



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

### 3.9. Work Aids and Attachment

Work aids are devices which are built into machines, added to them afterwards, attached alongside or made use of in whatever ways a resourceful engineer can devise to improve productivity, improve or maintain quality standards, reduce training time and minimize fatigue for the operator.

Work Aids can be divided into the following categories –

- Folder :-

Folders are used, as their name implies, in situations where fabric must be folded prior to sewing .They vary from the simple fold (which could be achieved by an operator alone, though only slowly and perhaps untidily) to extremely complex combinations of folders (which enable some to be achieved in a fraction of the number of stages that it would take



without the folders) and indeed enable some to be achieved that would not be otherwise be possible at all.

- Binder –

Many folders are available which add further items of self-fabric or other material to a garment and of these, many come into the category are known as Binder. Fabric Edges are frequently bound, either as a means of edge neatening or to create a decorative effect or both



Fig:-3.9.1. Binder

- Hemmer –

Folders which operate on a garment part without any additional material are known as Hemmer

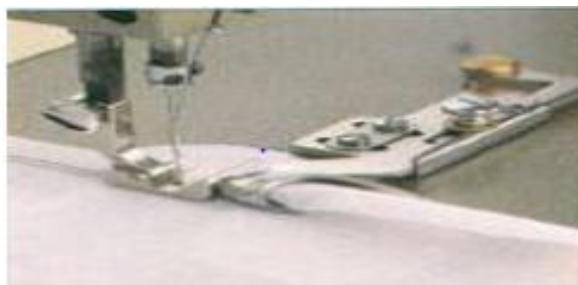


Fig: - 3.9.2.Hemmer

### **Presser Foot:-**

Presser feet can be used as specialized work aids, in addition to their normal function of holding the materials against the feed dog, when the scale of the situation is within the small size of foot. The function of edge guiding can be performed in some circumstances by a special presser foot called compensating presser foot.



Fig:-3.9.3. Different types of pressure foot

• **Guides:-**

Guides are used where sewing must take place in a certain position on a garment. In their simplest form they are edge guides, forming some kind of physical barrier to the edges of the fabric being joined together



Fig:-3.9.4.Sewing guide

### 3.10. Monitoring machine for correct operation

Monitoring helps to identify the unwanted process slow down and its relevant data from the floor directly, so that only we decided to monitor each and every sewing in a floor.

Monitoring will improve any kind of production based system with remarkable improvement in regular production. In the previous scenario the on line monitoring system investigated in apparel industry but nowadays in the same manner we are going to introduce a new monitoring system which is purely concept based control system to alert the people who are aligned with slight lagging habit in the regular manufacturing cycle.

A simple concept based single lamp monitoring system we are going to alert the sewing machine operators.

Each sewing machine is equipped with a kind of signal lamp which is having two color LED light system green and red in color.

The green color indicates the machine is on condition and its working in operation. Other side we can receive the red color indication signal when the machine is on condition but still machine is kept idle or not in working.

This signal will give appropriate indication to the supervising team to monitor and attend the bottle necks in the manufacturing line. From the floor we can receive the signal from our direct vision. These result will activate the monitoring team to attend the slow downs and other kind of issues.

A kind of signal indicating system fixed with our regular industry model sewing machine and its produce a valid signal based on the machine working and idle simultaneously.

Through this, we can eliminate unwanted machine stoppages reflects the productivity gain.

### Self-check-1

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## Part- I Matching

Instruction: Match column “B” with column “A”

A	B
-----1. Slipped stitch	1. Needle deflection
-----2. Staggered stitch	2. Wrong thread path
-----3. Unbalanced stitch	3. Wrong fitting of bobbin case
-----4. Variable stitch density	4. Irregular thread tension on upper and lower thread.
-----5. Frequently thread breakage	5. Use of broken check spring
	6. Stitch per inch

## Part II: True or false

Write true if the statement is correct and write false if the statement is incorrect

1. Stitch per inch is the loop or loops of one or more the threads
2. Stich per inch determine by stitches length
3. Decorative tape foot used to fix trimming and ribbon on the fabric.
4. To sew very heave canvas upholstery fabric the recommended number of needle is nine.

## Part III: Answer the question

Instructions: Answer all the questions listed below.

1. What is work aid?
2. List the sewing defect classification
3. Write the use of blind hem foot
4. Mention at least three sewing work aids

Note: Satisfactory rating – above 60%      Unsatisfactory - below 60%

You can ask you teacher for the copy of the correct answers

## Lap Test:-3.1

: Adjusting the thread tension fault

- Task-1: Check the stitch on pieces fabric.
- Task-2: Check the upper/needle thread tension
- Task-3: Check the lower/ bobbin thread tension
- Task-4: Identify the problem
- Task-5: adjust the thread tension
- Task-4: check the stitch again on a pieces fabric as per the given figure bellows and record the problem.

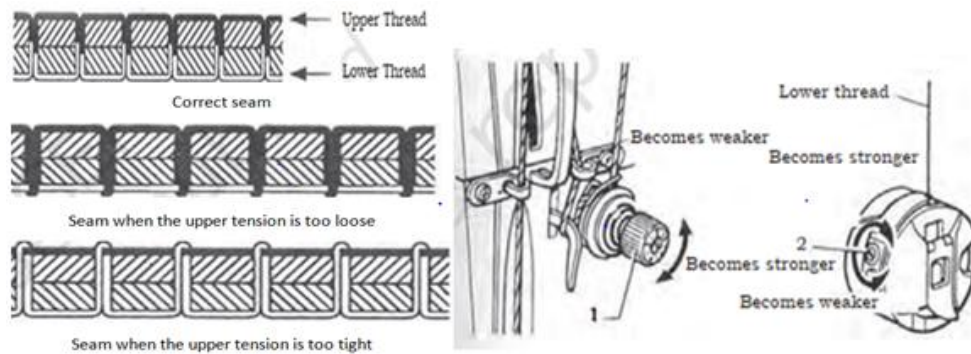


Fig:-3.1.1: Figure given for lap test 3.1

## Unit Four: - Dispatch

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Checking Garments process output with quality standards
- Reporting and recording identified faults
- Completed garments to directed next operation
- Completed Work documentation

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Check Garments/each process output or articles against quality standards
- Report and Record any identified faults
- Direct Completed garments or articles to next operation
- Complete Work documentation as required.

### 4.1. Check Garments Quality with Standards

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Quality checking in garment industry follows a set of common industry standards for quality and how to assess quality in the garment industry.

Some of the primary considerations when judging the quality of a garment include, but are not limited to:

- Differing shades of colors
- Obvious fabric defects
- The quality of fibers
- Exposed notches
- Loose threads and pulled yarn
- Holes, bad stitching, or stains

Aside from the above mentioned points, garments must look right and display the correct formation. They should have suitable physical properties, color fastness, and final presentation. The finishing properties of garments should also be in order.



Fig:- 4.1.1. quality checking

### How to Check the Quality of a Garment?

There are several garment quality control procedures, and optimally these should be taken at various stages of the production, including pre-production level, during- and post-production levels, to check the quality of a garment.

To start off, having a control form for your product is a good starting point. You must ensure all the different parts are of the proper dimensions and made with the correct materials.

#### ➤ Apparel Quality Control in Pre-production

Pre-production apparel quality control is conducted before the production starts. It includes checking if the fabric meets the required standards for:

- Colorfastness properties
- Texture
- Technical properties
- Durability properties
- Detect any loose threads or holes on seams

#### ➤ Apparel Quality Control During Production

Inspection during production is integral to ensuring that garments are produced to meet customer expectations and specifications. It including:

- Visual inspection (e.g., assessing cutting, assembling parts, sewing).
- Measurement.
- Destructive testing.

#### ➤ Quality Control of Finished Garments (Pre-shipment Inspection)

Quality control of finished garments is an inspection before the merchandise are shipped to the customer. This process helps to detect any defects and reduces the risk of complaints from customers.

The inspection process typically includes: visually inspecting the garment for any flaws visible to the human eye finished product, checking the labeling, and counting the items in the production lot.

### 4.2. Report and Record Faults

Records must be maintained to give objective evidence that the specified requirements. There are a number of factors on which quality fitness of garment industry is based such as - performance, reliability, durability, visual, comfortability and perceived quality of the garment. Record and report all details of faults that are happen on the completed garment.

#### ➤ Quality Related Problems in Garment Manufacturing

- Sewing defects/faults
- Color effects /faults
- Sizing defects /faults
- Garment defects/ faults

Sewing defects - Like open seams, wrong stitching techniques used, same color garment, but usage of different color threads on the garment, miss out of stitches in between, creasing of

the garment, erroneous thread tension and raw edges are some sewing defects that could occur so should be taken care of.

- Color effects - Color defects that could occur are - difference of the color of final produced garment to the sample shown, accessories used are of wrong color combination and mismatching of dye amongst the pieces.
- Sizing defects - Wrong gradation of sizes, difference in measurement of a garment part from other, for example- sleeves of 'XL' size but body of 'L' size. Such defects do not occur has to be seen too.
- Garment defects - During manufacturing process defects could occur like - faulty zippers, irregular hemming, loose buttons, raw edges, improper button holes, uneven parts, inappropriate trimming, and difference in fabric colors.

Fault record Card or Chart

Once the faults have been collected they should be written down and recorded on a fault analysis card or chart.

Table: - Fault record chart/ Card

Fault	Appearance	Cause	Effect	Responsibility	Action	Prevention
Split stitch on Linking	Half stitch or part stitch	Failure to place whole stitch on point	Weak part in seam which under pressure will break away	Operative	Remove fabric from points and run on	Check each stitch is on a constructive point

### 4.3. Work Documentation

To achieve the overall objective we shall need to establish document and maintain a system capable of ensuring that products conform in total to standards, specifications and sealed samples

➤ Documentation is essential to quality and process control

There's more than one way to get things done, and you want to give your team the flexibility to approach their work in a way that suits them best. But, at the same time, you want to ensure consistent results especially when it comes to things that you're producing on a regular basis. There needs to be some level of cohesion so that you don't look sloppy or uninformed. Documentation encourages knowledge sharing, which empowers your team to understand how processes work and what finished projects typically look like.

With those resources in hand, your team members don't need to be mind readers to maintain consistency of repeated projects like that monthly report or that quarterly presentation. They still have wiggle room to get creative while confirming that they're checking all of the must-have boxes.

➤ Documentation cuts down duplicative work

How many times have you started a new project only to find out it had been done before?

Companies that use documentation to catalog past projects, collect research, and share decisions benefit by reducing re-work that wastes precious time you could be using elsewhere. Why reinvent the wheel when you can just build on the work that's already happened? With documentation in place, you can refer to past work and learn from it, instead of doing it all over again with the same results.

🚦 Documentation should be your best friend!!!

## Self-check-1

Part- I Matching

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Instruction: Match column “B” with column “A”

A	B
-----1. Check Texture	A. Finished garment quality control
-----2. Check stitch	B. During production quality control
-----3. Check labeling	C. Preproduction quality control
	D. Shipment quality control

## Part II: Answer the question

Instructions: Answer all the questions listed below.

- Mention at least four primary consideration to check the quality of garment
- Write quality related problem in garment manufacturing
- Describe sewing defect/faults
- Describe size defect/faults
- Describe garment defect/faults
- Write the importance of record faults
- Write the importance of documentation

Note: Satisfactory rating – above 60%      Unsatisfactory - below 60%

You can ask you teacher for the copy of the correct answers

## Lap Test:-4.1

Checking garment quality

- Task-1: Check the seam quality of finished garment against the specification.

- Task:-2: Check measurement of the finished garment against the specification
- Task:-3: Check stitch quality of the finished garment against the specification
- Task:-4: Check color variations of the finished garment against the specification
- Task:-5: Check fitting and overall appearance of the finished garment against the specification
- Task-6: Record and documented checking results.

## Reference

1. Garment construction textbook class XI, II-III
2. 2019 asdp-standard of quality
3. Miaoyuanji, customer equipment and production ,shanghai donghua, university press  
2022





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MINISTRY OF LABOR  
AND SKILLS

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