



TRAINER'S MANUAL

MACHINE MAINTENANCE MECHANIC SEWING MACHINES



APPAREL TRAINING & DESIGN CENTRE

Imparting Skills, Improving Lives, Innovating Future

THE CONTENT IS DEVELOPED/COLLATED AS PART OF TRAINING PROJECT
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TABLE OF CONTENTS

1. RESPONSIBILITIES OF MACHINE MECHANIC	19
2. INTRODUCTION TO SEWING MACHINE & IT's COMPONENTS	20
<i>Single Needle Lock Stitch Machine</i>	21
<i>Overlock Machine</i>	23
<i>Flatlock machine</i>	24
<i>Feed of the Arm machine</i>	25
<i>Button Hole machine</i>	26
<i>Button Attach machine</i>	27
<i>Bartack machine</i>	29
3. STITCHES.....	30
4. LUBRICATION SYSTEMS AND MAINTENANCE SYSTEMS.....	34
5.FEED	40
6.MOTORS.....	43
7.SEWING MACHINE BED	48
8.SEWING MACHINE BELT	51
9.NEEDLE	55
10.TECHNICAL ADJUSTMENT OF SNLS M/C	65
11.TECHNICAL ADJUSTMENT OF DNLS M/C.....	66
13.TECHNICAL ADJUSTMENT OF OVERLOCK M/C	67
14.TECHNICAL ADJUSTMENT OF FLATLOCK M/C	68
15. TECHNICAL ADJUSTMENT OF FEED OF THE ARM MACHINE	69
16. TECHNICAL ADJUSTMENT OF BARTACK MACHINE	70

17. TECHNICAL ADJUSTMENT OF BUTTON STTICH MACHINE	71
18. TECHNICAL ADJUSTMENT OF BUTTON HOLE MACHINE.....	72
19. WOK AIDS (ATTACHMENTS).....	74
20. INTRODUCTION TO ELECTRONICS	77
21. INTRODUCTION TO CUTTING AND FINISHINGMACHINES	79
22. SAFE AND SECURE WORKING.....	83

1. RESPONSIBILITES OF MACHINE MECHANIC



CLASS ROOM CONCEPTS

ROLES AND RESPONSIBILITES OF A MACHINE MECHNAIC IN COMPANY

- After completion of this course successfully, trainee will be employed as a Machine Mechanic in garment factory.
- A Machine Mechanic reaches to the company on time (5 minutes before the time scheduled)
- Arrange his machine tool Kit daily before starting the work in given 5 minutes.
- He comes regularly to the company, in case of he wants leave then he informs to his Machine mechanic supervisor first.
- In case of emergency ,& he wants to go to out of company for few hours then he intimate his Machine mechanic supervisor first and take a gate pass.
- He respects his supervisor and in case of any problem related to his work or workstation, he informs supervisor first.
- Create an amicable ambience with his fellow operators.
- Follow the safety procedures which are taught during the training while operating his machine.
- Always wear clean clothes and clean himself daily.

2. INTRODUCTION TO THE SEWING MACHINES AND THEIR COMPONENTS



CLASS ROOM CONCEPTS

MACHINE INTRODUCTION

Following is the list of the machines which will be introduced in the next pages.

(It is advised to the trainers to demonstrate the concepts in the machine room only.)

1. SNLS machine
2. Over lock (all type)
3. Flat lock machine
4. Feed of the arm machine
5. Bartack machine
6. Button stitch machine
7. Button hole machine

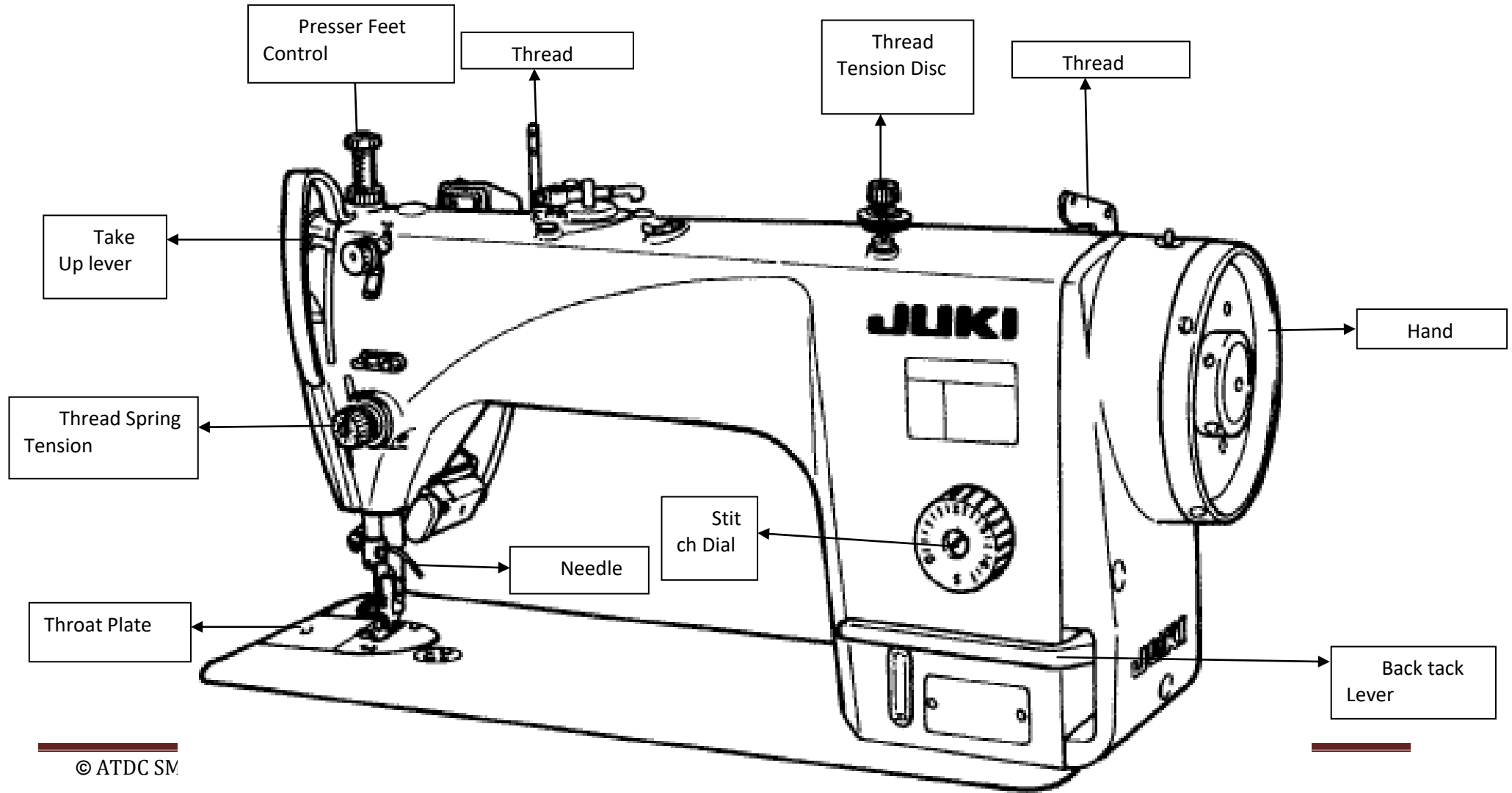
SINGLE NEEDLE LOCK STITCH MACHINE (SNLS)

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



Industrial SNLS Sewing Machine

SEWING MACHINE AND ITS PARTS



OVERLOCK MACHINE –

An over lock / over edge machine is a high speed sewing machine. This is the quickest performing machine for giving over edge stitches.

Over lock Machines Are available in following Specifications-

- 2 T Over lock machine
- 3 T Over lock Machine
- 4 T Over lock Machine
- 5 T Over lock Machine
- 6 T Over lock Machine



Sr. No.	Machine Name	No. Of Threads	
		Needle Thread	Looper Thread
1	2 T Overlock machine	1	1
2	3 T Over lock Machine	1	2
3	4 T Over lock Machine	2	2
4	5 T Over lock Machine	2	3
5	6 T Overlock Machine	3	3

3. Stitches



CLASS ROOM CONCEPTS

Stitches can be divided into the following categories:

100 Class Stitches

Single Thread Chain stitches Using One Needle Thread and One Blind Looper

Diagram	Stitch Class	Thread Count	Typical Uses
	101 Class	One Thread	Basting, or light construction
	103 Class	One Thread	Blindstitch for Hemming
	104 Class	One Thread	Saddle Stitch

200 Class Stitches

Single Thread Hand Sewn Stitches Using One Needle Thread

Diagram	Stitch Class	Thread Count	Typical Uses
	202 Class	One Thread	Basting, Tacking or Repairs

	205 Class	One Thread	Pick Stitch - Topstitching
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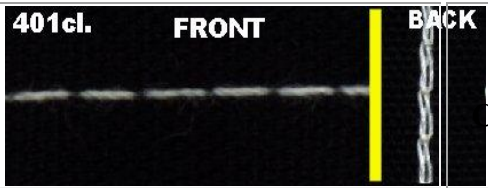

300 Class Stitches

Two or more Thread Lock Stitches Using Needle Thread(s) and One Bobbin Hook Thread

Diagram	Stitch Class	Thread Count	Typical Uses
	301 Class	Two Threads	Seaming Multiple Plies
	304 Class	Two Thread	Zig-Zag Stitch; a stretch lockstitch
	306 Class	Two Thread	Blind Stitch
	315 Class	Two Threads	"Three Step Zig-Zag; a stretch lockstitch with more stretch



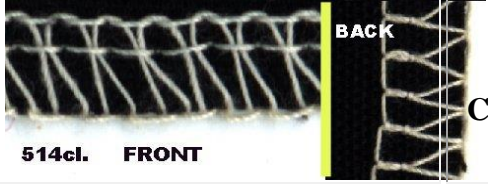
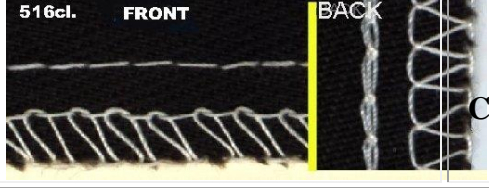
400 Class Stitches

Multi-Thread Chain Stitches Using One or More Needle Threads and One or More Looper Threads

Click to view Diagram	Stitch Class	Thread Count	Typical Uses
	401 Class	Two Threads	Seaming Multiple Plies with moderate stretch
	406 Class	Three Threads	"Bottom Cover Stitch; a (greater) stretch chainstitch

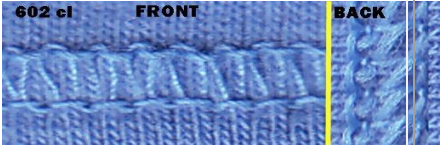
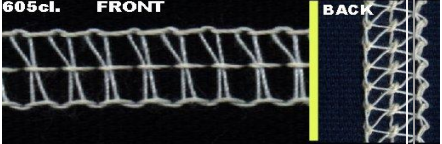

500 Class Stitches

Multi-Thread OverEdge Chainstitches Using Needle Thread(s) and Looper Thread(s)

Click to view Diagram	Stitch Class	Thread Count	Typical Uses
	504 Class	Three Thread	Overedge stitch for Serging and Light Seaming
	512 Class	Four Thread	Mock Safety Stitch for Seaming with wide bite and Greater Stretch for Knits
	514 Class	Four Thread	Overedge Stitch for Seaming with wide bite and Greater Stretch for Knits
	516 Class	Five Thread	True Safety Stitch for Seaming with Good Stretch for Wovens and Knits

600 Class Stitches

Multi-Thread Coverstitches

Click to view Diagram	Stitch Class	Thread Count	Typical Uses
	602 Class	Four Thread	CoverStitch or Seaming Knits
	605 Class	Five Thread	CoverStitch or Butt-Seams
	607 Class	Six Thread	Wide CoverStitch or Butt-Seams

*cl=Stitch Class

4. Lubrication Systems



CLASS ROOM CONCEPTS

OILING SYSTEMS

- A. **Manual oiling system** it requires the operator to oil each point individually, and on a regular (preferred 4-hour) basis.
- B. **Automatic oiling system** it can supply all points of lubrication or can be combined with manual oiling. The oil in automatic systems can be distributed:
1. Through gravity,
 2. Through splash,
 3. Through wicking (such as cotton cord), or
 4. Through pressure supplied by a pump.

All automatic oiling systems require the reservoir to be filled to a certain level with oil. Wick fed systems range from small reservoirs (the wicking itself may serve as reservoir) to more substantial cavities. The smaller the reservoir, the more often oil will need to be added. Larger oil reservoirs of any system type may have marked indicator levels, so that the operator can verify that enough oil is available in the reservoir.

Pressure lubrication systems may have sight windows or bubbles. A flow or splash of oil seen through these windows or bubbles will indicate that there is likely a good pressure of oil in the system. Pressure systems may also have adjustment needles or valves to control the flow of oil to critical points such as the hook race.

Any system can have an oil return mechanism to recirculate oil and to prevent build-up of oil in pockets from which it may leak or overflow. The oil return mechanisms can be gravity flow, wicking, or both. Pressure systems may also incorporate a suction return, operated by the same pump that supplies oil pressure.

Lubrication is necessary for the sewing machine maintenance but at the same time lubrication may be the cause of oil stains in a garment.

To prevent the oil stains in a garment, an advance technology is used .On the basis of that technology, we can divide the sewing machines into the following categories:-

1. Sewing Machine with Lubrication

2. Semi Dry head Sewing Machine
3. Dry Head Sewing Machine

5. Feed



CLASS ROOM CONCEPTS

DEFINITION

Besides the basic motion of needles, loopers and bobbins, the material being sewn must move so that each cycle of needle motion involves a different part of the material. This motion is known as feed, and sewing machines have almost as many ways of feeding material as they do of forming stitches. For general categories, we have: drop feed, needle feed, walking foot, puller, and manual. Often, multiple types of feed are used on the same machine. Besides these general categories, there are also uncommon feed mechanisms used in specific applications like edge joining fur, making seams on caps, and blind stitching.

Feed dog Functions

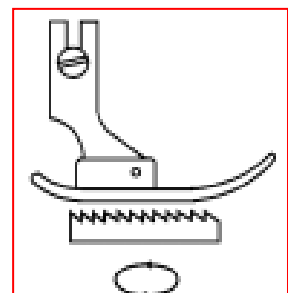
- Makes the sewing product move per stitch.
- Can change amount to move and forms stitches suitable for the sewing product.
- Stretch stitching or gathering stitching can be performed by means of feed mechanism, and prevention of puckering, gathering, etc. can be performed.

DIFFERENT TYPES OF FEED

BOTTOM FEED

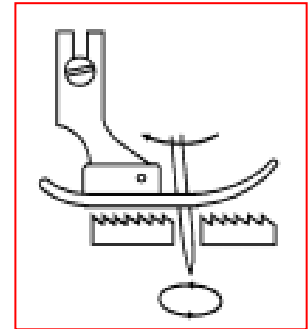
This is the most standard feed mechanism, which feeds material with lower feed dog only.

Uneven material feeding is likely to occur because of bottom feed only. However, sharp curve stitching can be easily performed and material handling is easy.



NEEDLE FEED (BOTTOM FEED + NEEDLE FEED)

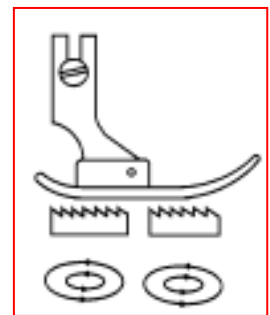
This is the feed mechanism which needle bar moves in synchronization with bottom feed. Feeding force is strong, and this type can feed material more precisely than the aforementioned bottom feed type sewing machine. Uneven material feeding is reduced, but, stitch shrinking due to thread tightness is likely to occur.



DIFFERENTIAL FEED (FRONT BOTTOM FEED + REAR BOTTOM FEED)

This is the bottom feed mechanism, but feed dog is divided into front and rear.

This is the feed mechanism which is possible to intentionally stretch material or gather material by changing feed amount of front feed dog and rear feed dog. This is suitable for sewing elastic knit.



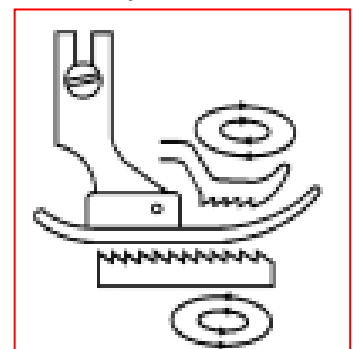
Differential feed ratio (e.g. JUKI over lock sewing machine, MO Series))

Gathering 1: 2 (Max. 1: 4)

Stretching 1: 0.7 (Max. 1: 0.6)

BOTTOM AND VARIABLE TOP FEED (BOTTOM FEED + TOP DIFFERENTIAL FEED)

There is a feed dog on the top side in terms of bottom feed, and top feed amount can be adjusted simultaneously together with adjustment of material feed from the bottom side. Accordingly, this is the feed mechanism which is possible to prevent sewing slippage, and to perform edging contracting or gathering.



6. MOTORS



CLASS ROOM CONCEPTS

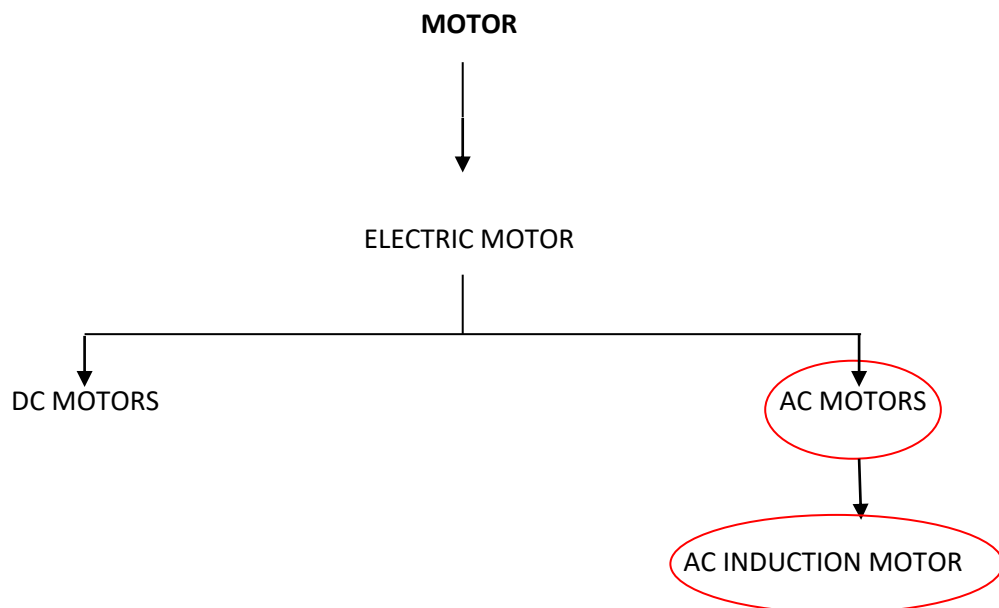
A **motor** is a machine designed to convert energy into useful mechanical motion. Various types of motors are available in the market but Sewing industry mostly uses the electric motor.

An **electric motor** uses electrical energy to produce mechanical energy, usually through the interaction of magnetic fields and current-carrying conductors.

Electric Motors can be classified into two categories:

- 1) **AC Motors**
- 2) **DC Motors**

AC motors are mostly used for the industrial Machinery. AC motors are also available in various categories. AC induction motor is the most common technology used in the Garment industry.



And AC MOTOR is used with the following drives to operate the sewing machine

- Clutch (For clutch Motor)
- SERVO (For Servo Motor)
- Direct Drive

7. SEWING MACHINE BED



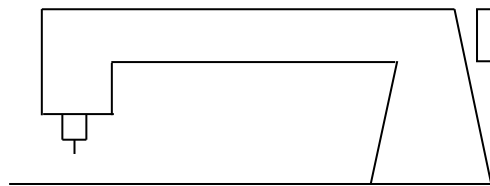
CLASS ROOM CONCEPTS

In fashion manufacture the machines are still predominantly used in their basic forms but, for more specialized garments and those made in higher volume, variations in machine shape are available which enables easier movement of the materials around the machine. These variations primarily affects the shape of the bed of the machine, i.e. the part on which material rest. The best known version is the flat bed and the main alternatives are cylinder bed, Post bed and feed – off- the arm. The blind felling machine is also a special shape, as are the Overedge machines which have no fabric space to the right of the needle.

Following is the classification of different bed type used in machinery.

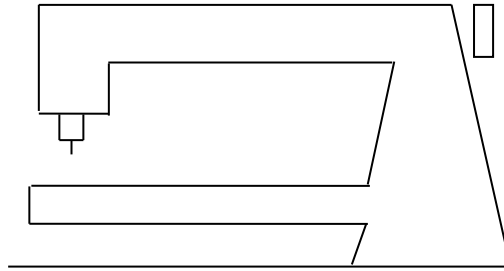
1. FLAT BED

The flat bed is used in the majority of sewing where a large and open garment part can easily be handled past he needle. It provides a suitable surface for much flat sewing and also facilitates the use of markers to control the position of the garment parts, for example, a patch pocket on a shirt front.



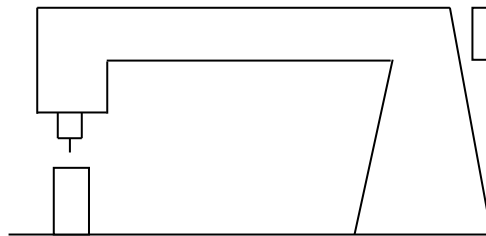
2. CYLINDRICAL BED

These beds are basically used where the parts to be sewn are small, curved or otherwise awkward in shape.



3. POST BED

It has the same applications as cylindrical Bed.



8. SEWING MACHINE BELT



CLASS ROOM CONCEPTS

A belt is a loop of flexible material used to link two or more rotating shafts mechanically. Belts may be used as a source of motion, to power efficiently, or to track relative movement. Belts are looped over pulleys. In a two pulley system, the belt can either drive the pulleys in the same direction, or the belt may be crossed, so that the direction of the shafts is opposite. As a source of motion, a conveyor belt is one application where the belt is adapted to continually carry a load between two points

9. NEEDLE



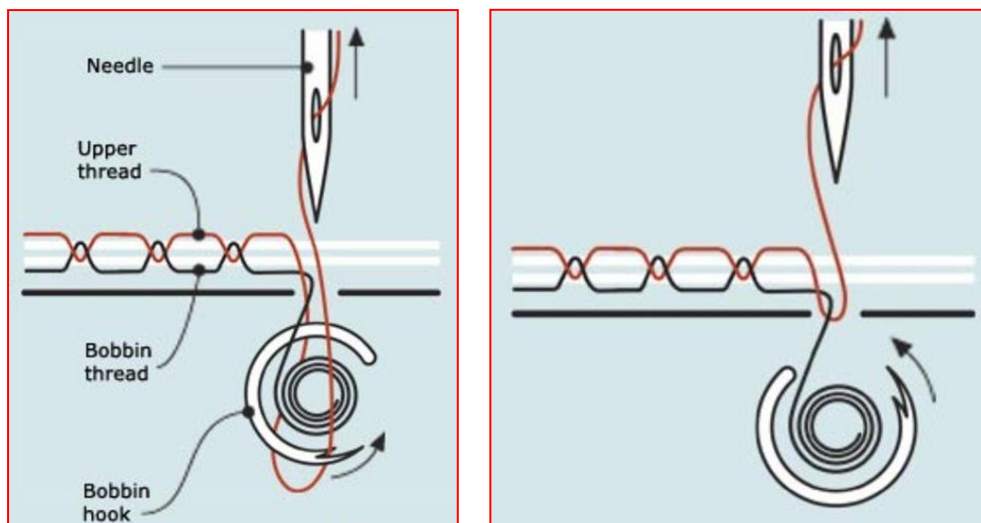
CLASS ROOM CONCEPTS

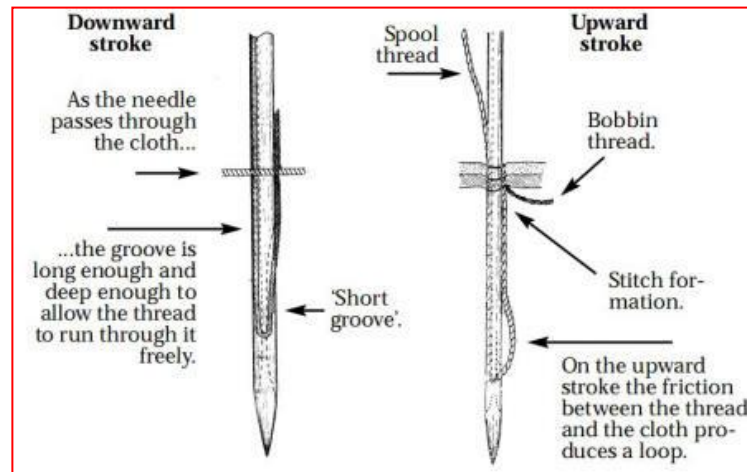
Functions of a needle

The way in which fabric is penetrated by the needle during sewing has a direct effect on seam strength and on garment appearance and wearable life:

The functions of a sewing machine needle in general are:

1. To produce a hole in the material for the thread to pass through and to do so without causing any damage to the material
2. To carry the needle thread through the material and there form a loop which can be picked by the hook on the bobbin case in a lockstitch machine or by the looper or the other mechanism in other machines
3. To pass the needle thread through the looper mechanism other than lockstitch





10. TECHNICAL ADJUSTMENT OF SNLS MACHINE



CLASS ROOM CONCEPTS

Technical adjustments which are to be taught while dealing with SNLS machines are given below. Trainers should keep the following points in mind during the session of SNLS machine.

- First Demonstrate the adjustment then ask trainee to practice on the machine.
- Use the Instructional manual given by the machinery supplier during Session.
- Make sure, all the trainees are able to understand the Instructional manual.

Technical adjustments of SNLS machine

1. Basic Machine Practice (Loop Exercise)
2. Technical Specification
3. Installation of needle
4. Needle bar Height adjustment
5. Hook Set Timing
6. Feed Dog adjustment and alignment
7. Feed Dog Eccentric cam Adjustment
8. Pressure foot to Pressure adjustment

19. WORK AIDS (ATTACHMENTS)



CLASS ROOM CONCEPTS

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 –

1. Folder –

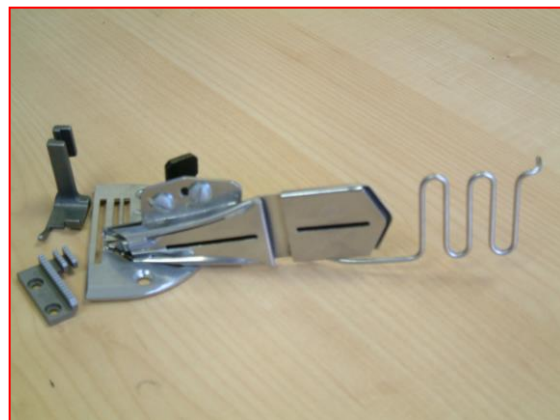
Folders are used, as their name implies, in situation where fabric must be folded prior to sewing .They vary from the simple fold which could be achieved by an operator alone, though only slowly and perhaps untidily, through to extremely complex combinations of folders which enable some to be achieved 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.

Folders are frequently used on machines having more than one needle.

(Note – Choose the folders for the “product” which are being manufactured in the nearby Industry of the centre.)

2. 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 known as **Binder**. Fabric Edges are frequently bound, either as a means of edge neatening or to create a decorative effect or both.



(Note -Use 28mm Piping folder for practice session)

3. Hemmer –

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

(Note -Use Shirt Bottom Hemming folder for practice session)



4. Presser Foot and

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.

(Note -Use Compensating presser feet, Invisible zip presser feet and Half Zip presser feet for practice session)



5. Guides etc.

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

(Note -Use Variation of Straight and curved guide for practice session)



22. SAFE AND SECURE WORKING



CLASS ROOM CONCEPTS

When a machine Mechanic is working in a factory, one should keep the following point in his mind.

1. 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.
2. 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.
3. Always unplug the machine from the electrical outlet when removing covers, lubricating, or when making any other user servicing adjustments
4. Place pins, needles and tools in a container when not using them. Do not leave them loose on the table or on the floor.
5. Pins and needles should never be placed in your mouth.
6. When not in use, pointed tools should be left closed.
7. Handle sharp tools with the handle first.