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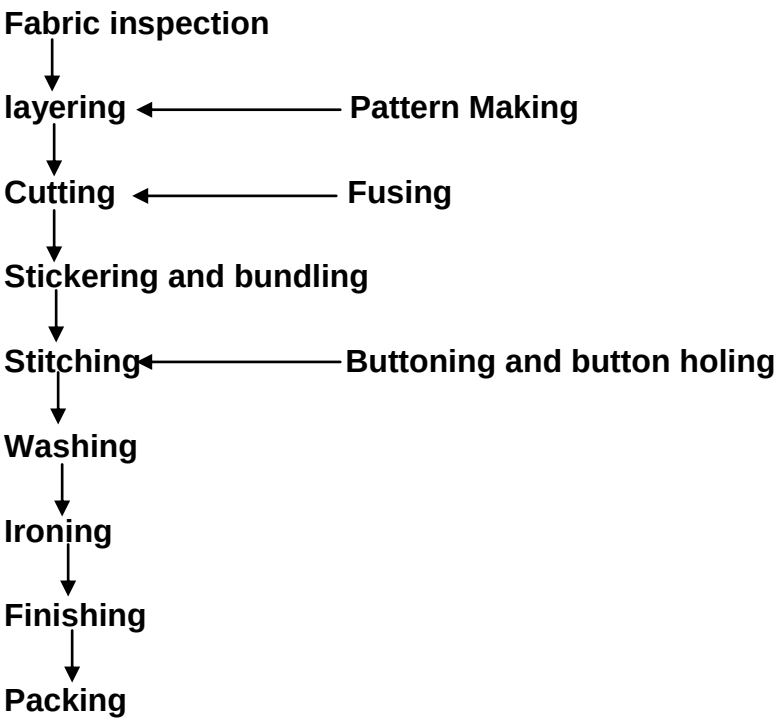
1. Basic Textiles terms

Yarn	Basic raw material for weaving
Type of yarn	Single ply, double ply and multiply
Yarn count	Defines thickness of yarn. Higher the count, finer the yarn
Warp	Lengthwise yarn in the fabric. Pass from weavers beam to cloth roller
Weft (filling)	Widthwise yarn in the fabric. Inserted during picking
Selvedge	Edges of the fabric running lengthwise
Woven Fabric	Woven fabrics are made by using two or more sets of yarn interlaced at right angles to each other.
Knitted Fabric	The knitted fabric is a material with interlaced loops called also knitted fabric (example: knitwears)
Sewing Thread	Thread is a type of yarn used for sewing.

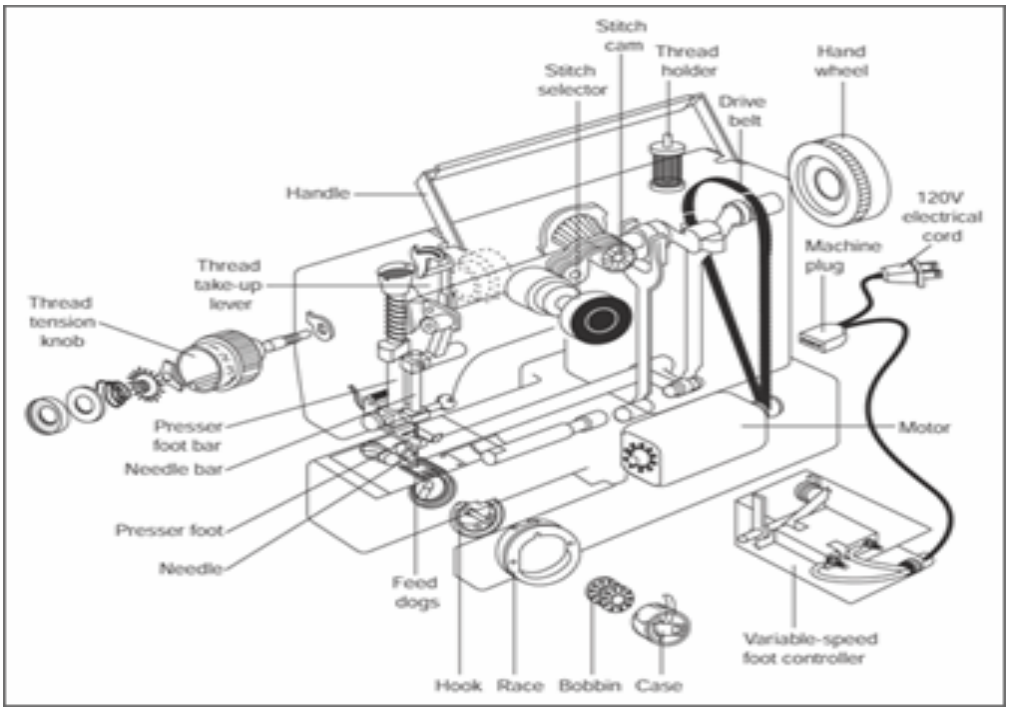
2. Over lock STITCHING

- Stitching is the process of producing garments by joining various components of fabric, either woven or knitted.
- Over lock machine is a special purpose machine used for finishing edges and sometimes for seaming.
- Stitch types in this class are formed with one or more groups of threads and have general characteristics that loops from at least one group of threads pass around the edge of the material.

➢ Sequence of Operations In Garment production



3. IDENTIFICATION OF PARTS OF OVER LOCK MACHINE



➢ Preparation for Stitching

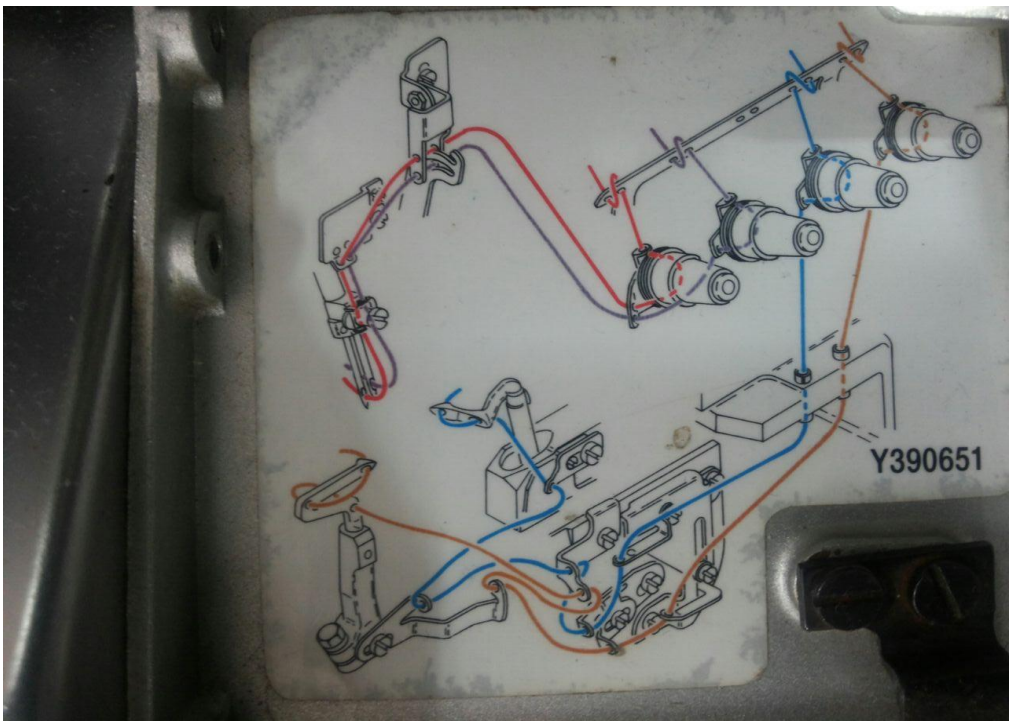
Before starting actual machining, you should check that the needle of the machine is of correct size, is sharp and correctly set. Thebobbin should be evenly set. Briefly, the various steps of prepreparation are:

- Winding the bobbin
- Upper Threading
- Drawing the bobbin thread
- Tension adjustments
- Pressure and feed adjustments
-

Overlock machine feeding system

It utilizes two independently driven feed dogs. The stroke of each feed dog can be adjusted separately. If the stroke of the front feed dog is greater, then the fabric may be gathering as it is sewn. If the rear feed dog has the greater stroke, then the fabric may be stretched to provide a more extensible seam.

- **Threading on Overlock machine**



Threading on Overlock machine Step 1

Threading on Overlock machine Step 2

Threading on Overlock machine Step 3

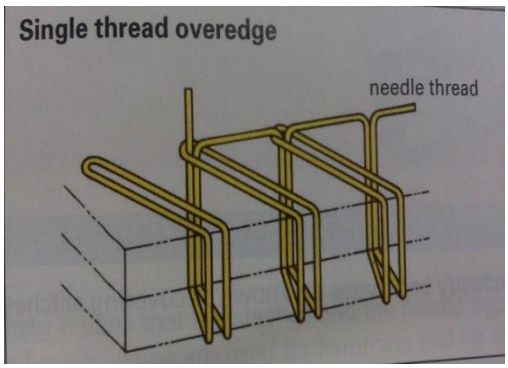
Threading on Overlock machine Step 4

Threading on Overlock machine Step 5

Types of Overlock Stitches

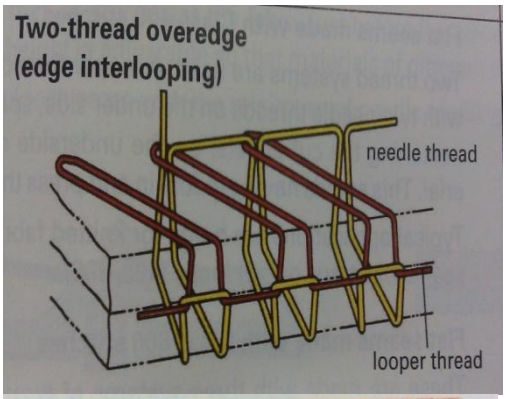
1. single thread overlock:

- One needle and one looper.
- Only used in home application.
- Has little effect on fabric drape.
- Unsuitable for seaming, because does not hold plies securely, causing seam grim when stressed

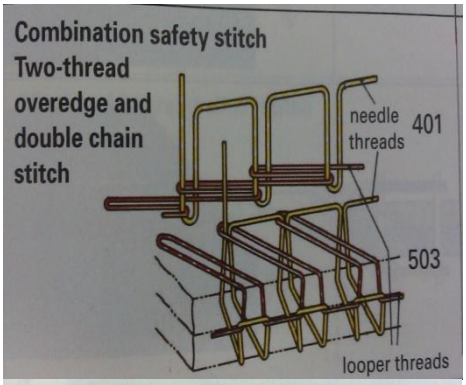


2. Two thread overlock:

- One needle and one looper.
- Best for finishing seam edges and allowances.
- Has little effect on fabric drape, and rarely causes a pressing imprint.
- Frequently used for serging edges on men's slacks, lightweight fabrics.
- Unsuitable for seaming, because does not hold plies securely, causing seam grim when stressed.



3. Three thread overlock:

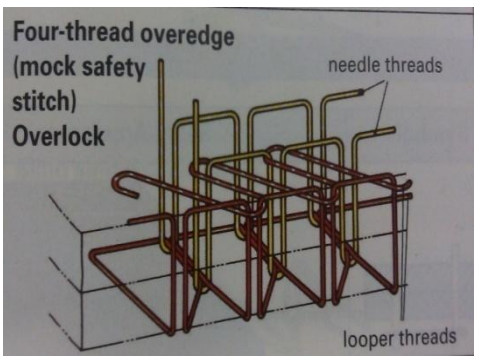


- Stitch formed by interaction between vertical movement of needle and horizontal movement of two loopers.
- Stitch looks the same on both sides
- To make this stitch, the needle thread

  stitches the flies together when it interlocks with the under looped thread on the underside and upper looper thread on the top side.
- Used for finishing edges as a narrow, decorative, rolled edge on napkins and scarves.Most useful for sewing knits and woven.

4. **Four thread overlock**:

- It will stitch a chain stitch or a safety stitch as it stitches and overcasts seams.
- Two needles and two loopers.
- Can be converted to both two and three thread overlock
- All 4 threads are necessary to sew a serged seam.
- Suitable for sewing blouses, shirts, skirts, dresses, pants, lingerie, action wear, swimwear, and even sleepwear.



5. Five Thread Overlock

- A 2-thread chain stitch combined with a 3-thread overlock.
- 2 needles and 3 loopers.
- The left needle and lower looper form a 2-thread chain stitch.

- The seam is very durable, particularly for wovens.
- A very wide seam width is created when the chain is serged with 2 or 3 thread stitch**.**

➢ Flat Lock Machine:

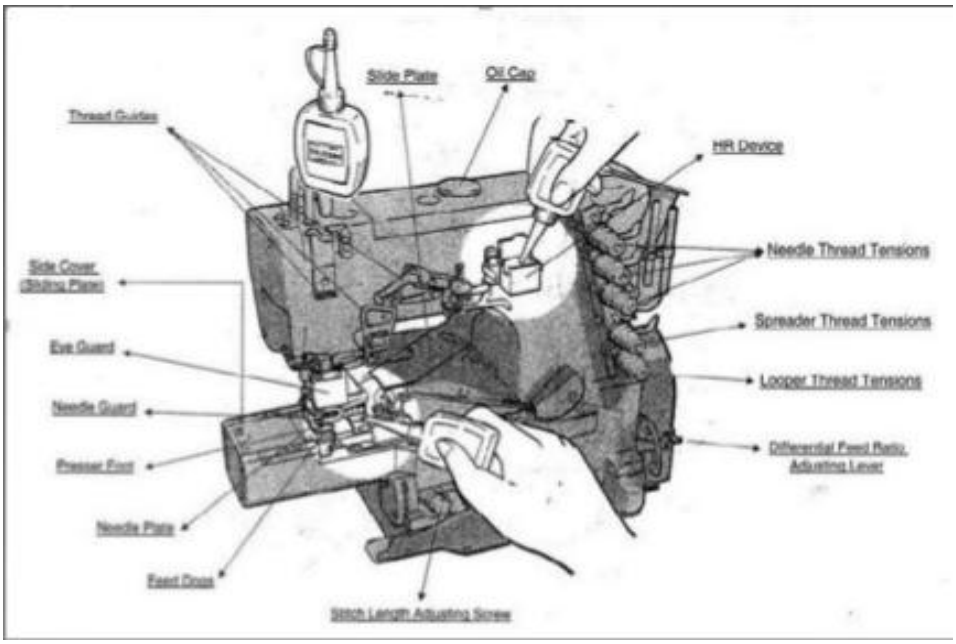
Flatlock stitching is the stitching that looks like overlocking on both sides of a seam and is often used in swimwear, sportswear, on baby's clothes, or just as a decorative exposed seam. It creates a seam that is flat and has the same appearance both inside and out.

Elements in Stitching

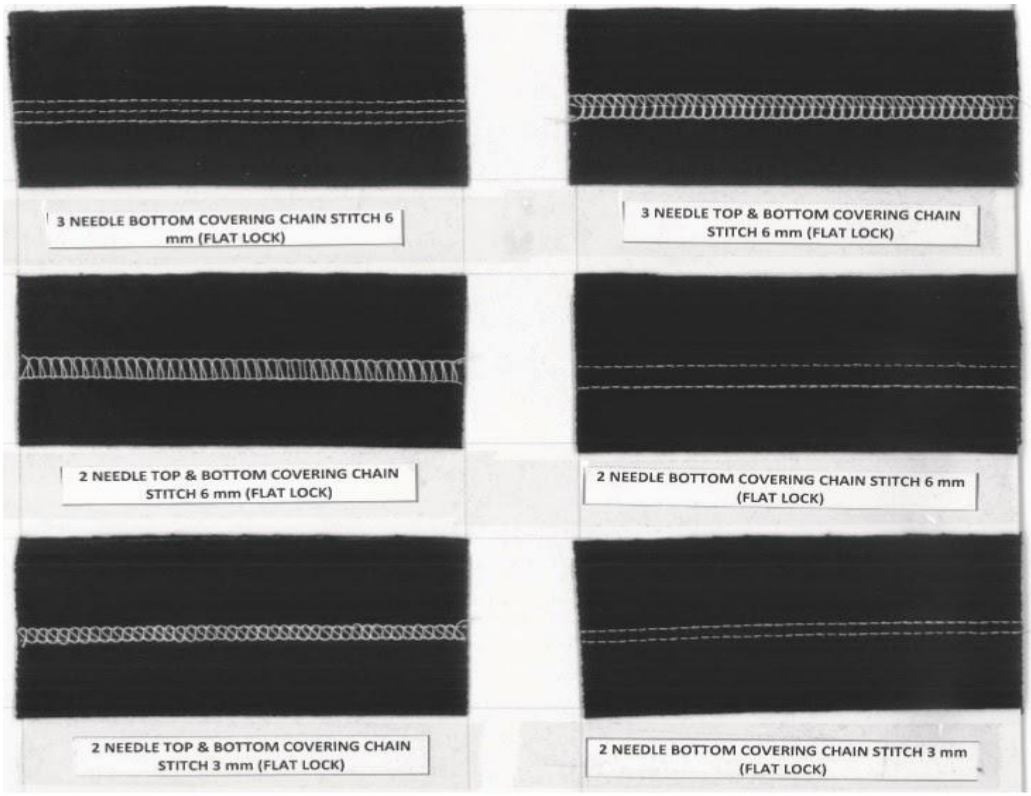
1. Needle
2. Looper
3. Spreader

Multi needle machine may have more than three needles.

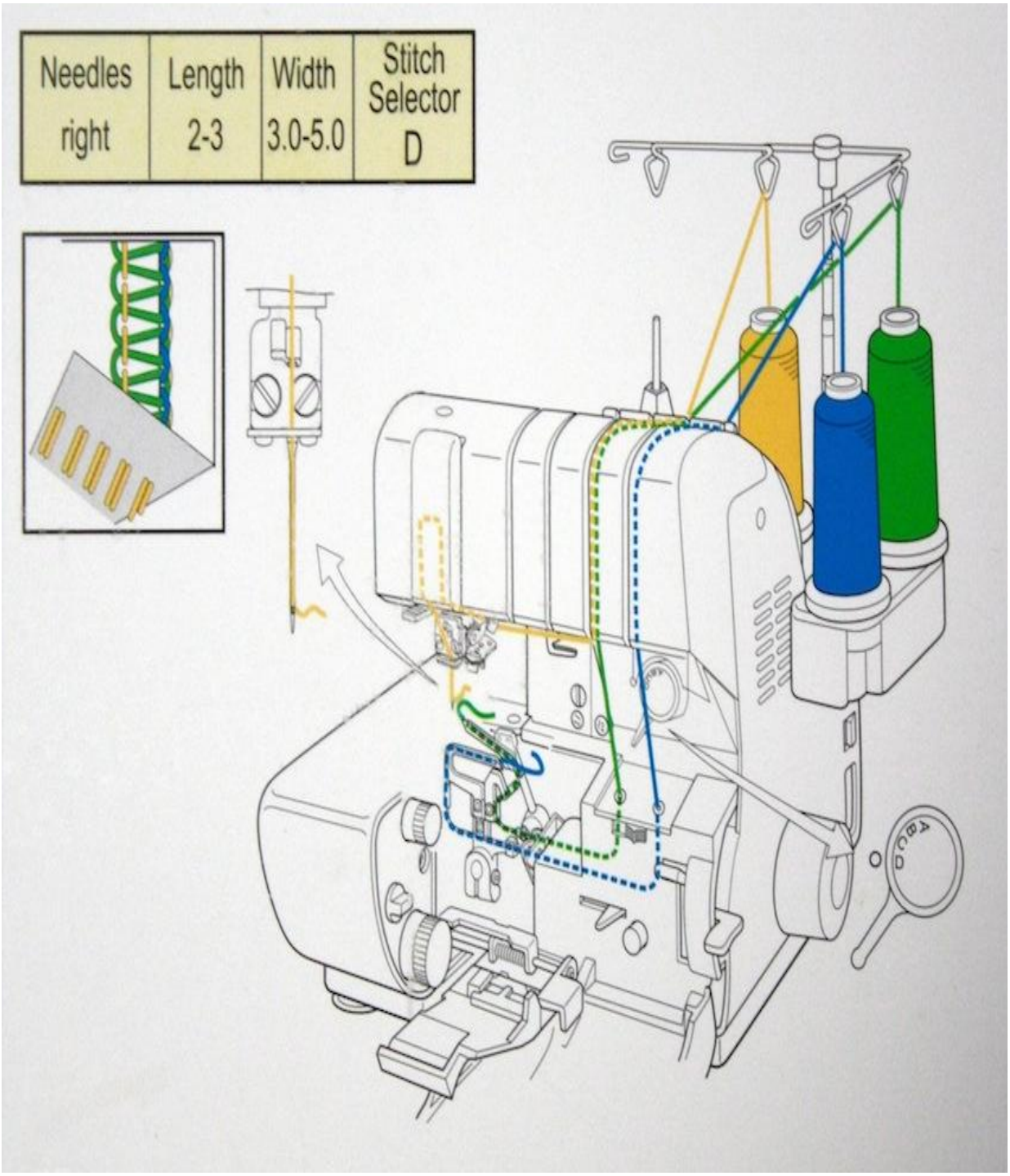
➢ Parts of Flat lock Machine



Stitches Types by Flat Lock Machine



Threading to Flat Lock Machine



Threading on Flatlock machine Step 1

Threading on Flatlock machine Step 2

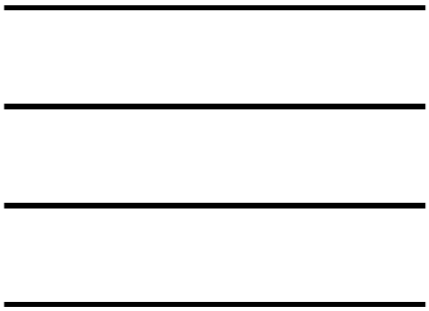
Threading on Flatlock machine Step 3

Threading on Flatlock machine Step 4

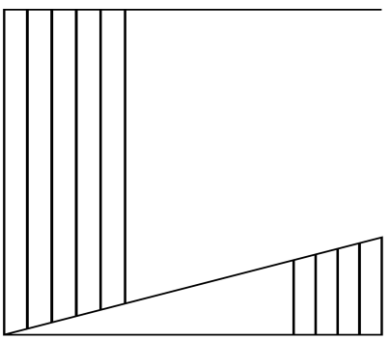
Start Stitching on Flat lock Machine

5 SEAM PRACTICE ON DIFFERENT PATTERNS

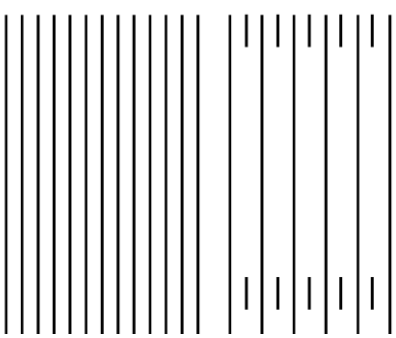
Straight seams



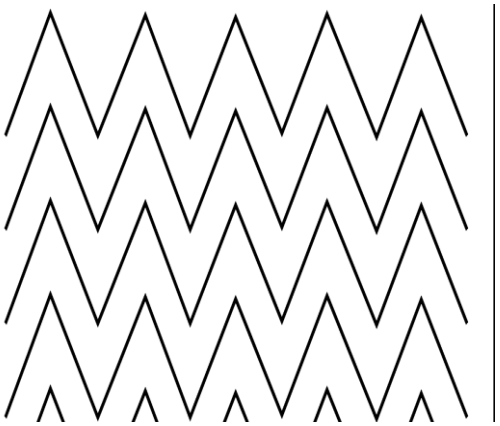
Straight seams end at a cross seam



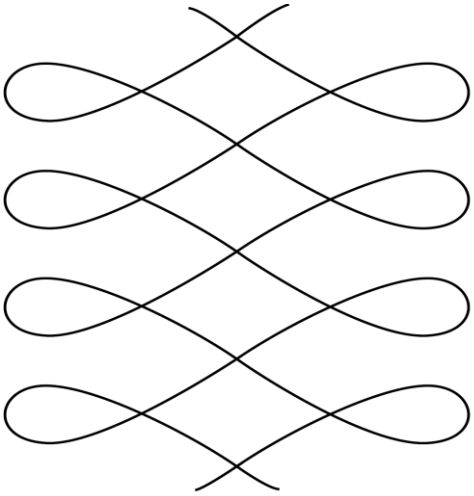
Straight seams with bartacking stitches



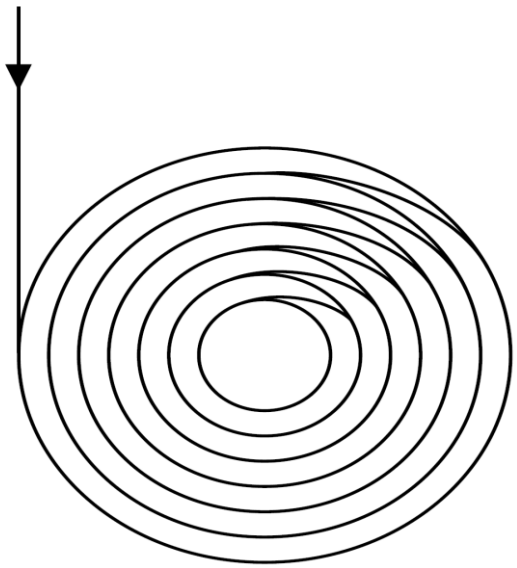
Short zigzag seams



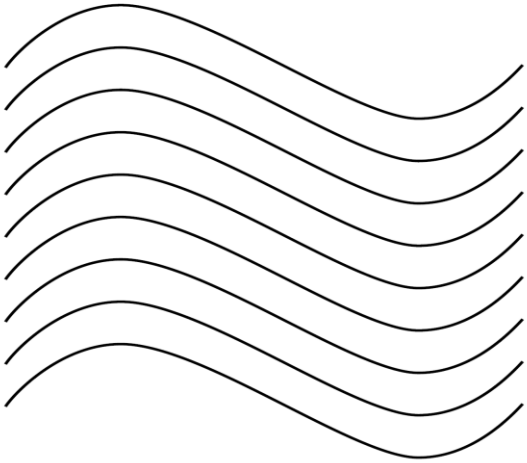
Curved seams in left and right sewing direction



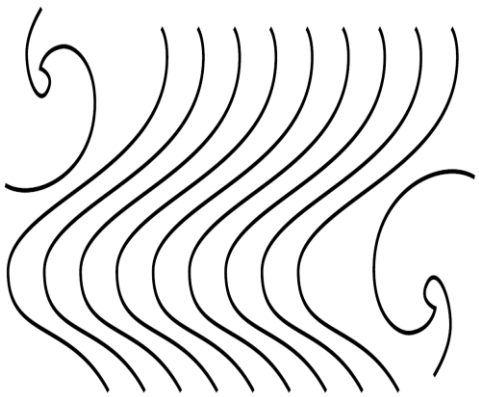
Spiral seams



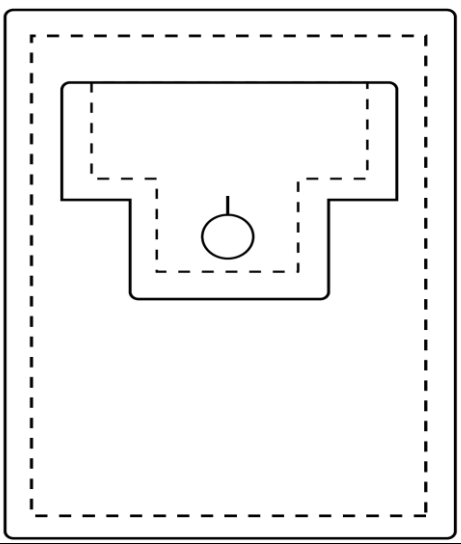
Sinusoidal seams



Various decorative stitches of shoe branch

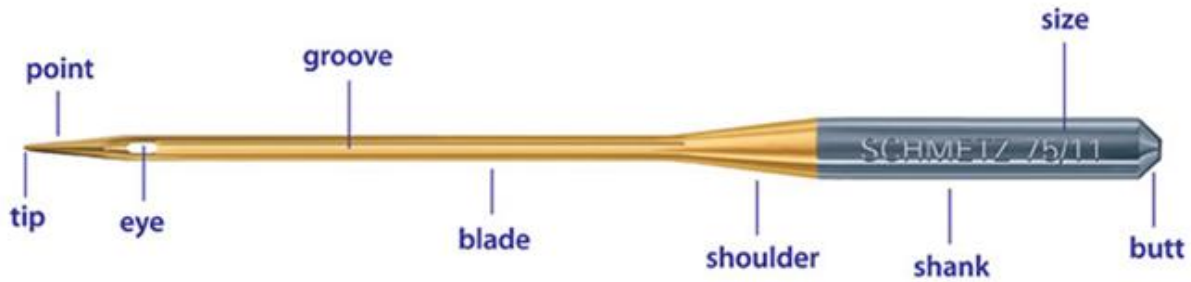


Decorative stitching on an poket

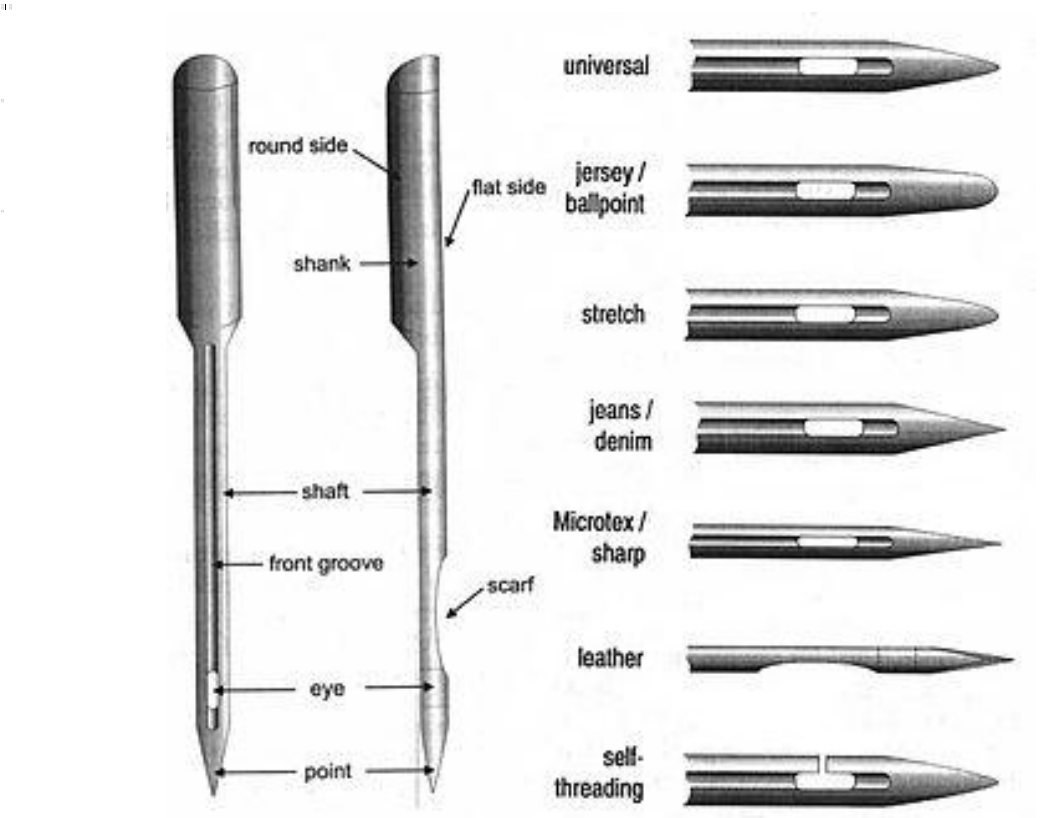


Types of Needle used to swing Different fabrics

Select the type of needle based on the textile construction (i.e knit vs woven), and the needle size is determined by the thickness of the thread and the weight of the fabric used for swing.



There are two needle sizing system :American and European. American Needle sizes range from 8 to 19, and European sizes range from 60 to 120. Larger the number, the larger the blade of the needle.



Commonly used needles and their uses as below:-

Needle	Fabric Uses	Sizes	Description
Ball-point	Knits	70/10 – 100/16	This needle has a medium tip that is a slightly more rounded than a universal needle and passes between the fabric threads instead of piercing them. Ball-point needles ensure more even stitches on coarse and heavy knits and won't damage spandex, interlocks and other knits that snag or run easily.
Sharp/ Microtex	Finely woven fabrics	60/8 – 90/14	These needles feature a narrow shaft and sharper point to pierce the threads of woven fabrics. Use for stitching smooth, finely woven fabrics, such as silk, chintz, lightweight faux suede and microfiber fabrics. Because these needles enable perfectly straight stitching, they're also ideal for heirloom stitching, topstitching, pintucks and edge stitching.
Universal	Knits or wovens	60/8 – 120/19	Point is very slightly rounded for use on knits, but sharp enough to pierce woven fabrics. These needles are available in the widest size range. Use when stitching synthetic or natural wovens and knits.
Denim/ Jeans	Heavy wovens and denims	70/10 – 110/18	These needles have a thick, strong shaft and a very sharp point. They are used for stitching denim, canvas, duck and other heavy, tightly woven fabrics. They are also ideal for stitching through multiple fabric layers without breaking.

- **Determining the Right Needle for a Thread**

  Here's a quick way to determine if the thread and the sewing machine needle are compatible:

1. Take half a metre of the thread being used on the machine and thread it through the eye of a loose needle.
2. Hold the thread vertically with the needle at the top.
   - If the needle is too big, it will drop to the bottom of the thread
   - If the needle is too small, it will stick at the top of the thread
   - If the needle is the right size, it will slowly spiral to the bottom of the thread

   However, a larger-than-normal needle may have to be used to penetrate thicker fabric, or stitch over the top of pronounced or bulky seams.

Measurement Techniques

Measurement Tools and Equipments

TAPE MEASURES: This plastic tape is 60" long with small metal tips on either end. Most tape measures have imperial measurements on one side with the metric equivalent on the other

RULERS: These come in a variety of sizes the most common being the 18" and a yard/meter stick. The 18" ruler is generally made of clear plastic with a 1/8" grid, which allows the technician to see the fabric while he is working.

SEAM or SEWING GAUGE: These small 6" metal rulers have a sliding distance indicator. The seam gauge is used for quick, accurate measurements of small areas such as hems, buttonholes, pleats and trim.

L or FRAMING SQUARE: These 90 metal squares are used for finding and aligning the grain of fabric or to establish the true bias. They are also used in pattern drafting and alteration.

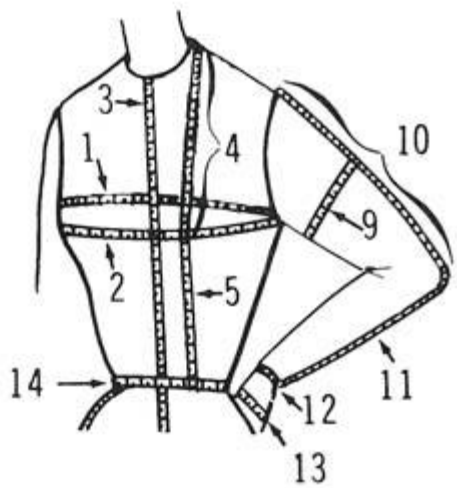
FRENCH, HIP and MISCELLANEOUS CURVES: These tools, plastic or metal, are also used in pattern drafting and alteration. They are also useful for trim or detail application where a curved line is necessary.

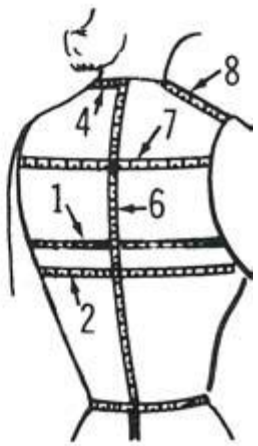
- **WHERE AND HOW TO TAKE MEASUREMENTS**

Measurements can be taken directly on a person for whom the pattern is to be developed

A. Upper Bodice Measurements:

1. High bust: measure around back and chest just above bust, keeping tape parallel to the floor across back.
2. Bust: measure over the fullest part of bust.
3. Center front bodice length – measure center front from base of neck to waistline tape..
4. Length from center back neck to tip of bust – measure from tip of bust around neck to tip of other bust and divide the measurement into half.
5. Length from center back neck over bust to waistline – measure from waistline over tip of bust around neck over other bust to waistline.
6. Center back bodice length – measure center back from base of neck to waist line tape.
7. Back shoulder width – 4 inches below base of neck at center back, measure distance from armhole to armhole, keeping tape parallel to floor and arms relaxed at sides.





8. Shoulder length – neck to arm socket – measure shoulder length from base of neck to arm socket.

B. Sleeve Measurements:

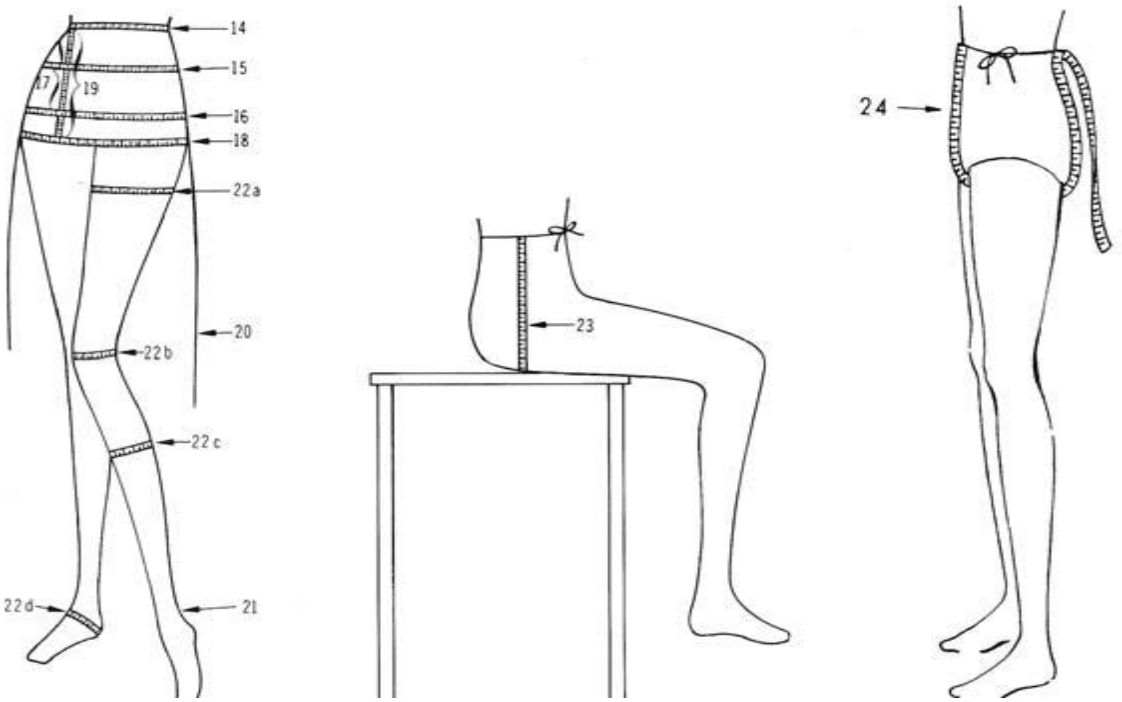
9. Upper arm circumference – with arm bent and fist clenched, measure around fullest part of the upper arm.

10. Arm length - shoulder to wrist – with arm bent, measure from arm socket over elbow to wrist bone.

11. Wrist circumference – measure around wrist below wrist bone

12. Hand circumference – touch thumb to little finger, then measure at the position of greatest circumference.

C. Lower Body Measurment:



13. Waistline – measure waist circumference. Allow enough ease for comfort in wearing finished garment.

14. High hip – measure high hip circumference 3 inches below waistline tape. Keep parallel to floor

15. Hip at fullest part - measure fullest part of hip keeping tape about 7 inches down from waist and mark this point midway between side and center front.tape parallel to floor.

16. Waist to fullest part of hip – measure from waistline tape to hip as determined in step 15.

17. Thigh – slip tapeline down to largest measure of thighs, keeping tape parallel tofloor.

18. Waist to thigh – measure a distance from waist to thigh as in step17.

19. Skirt length – measure from waist to floor at center front, center back, right side and left side. Subtract the number of inches skirt is to be worn from floor. Add hem allowance as needed. 20.Pants length – measure from waistline along side seam to desired length for pants.

21. Leg circumference – measure the fullest part of thigh, bent knee, calf, and instep

➢ Stitching Defects

Sewing defect can be classified as three groups:

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

Problems of stitch formation:

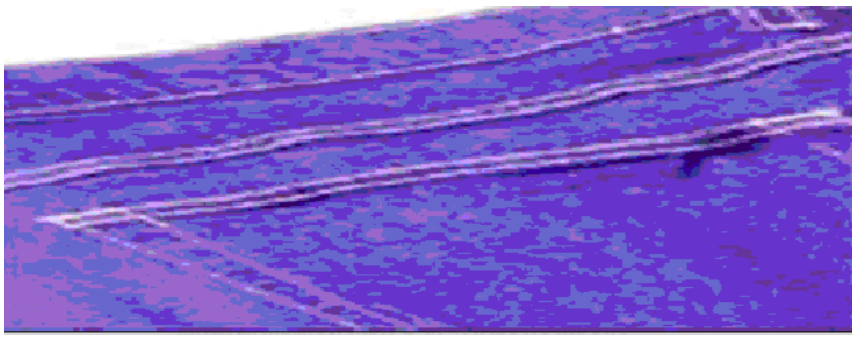
Slipped stitch: Stitches in the seam line are present in a regular wise. If the interloping or interlacing between top & bottom thread of stitch is not take place or missed is known as slipped stitch or skipped stitch. This is more harmful in case of chain stitch than lock stitch. The followings are the causes & remedies of slipped stitch formation given by a table:

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 of 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	Due to needle deflection.	Needle to be changed.
04	If needle thread loop size is too small.	Needle size & thread size must be adjusted.
05	When flagging of fabrics during sewing is happened.	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.:



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 are 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.

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: It must need to be the same amount of stitches per unit length. 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 given by a table:

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 be kept 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 of 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 are sharpened.	The edges must be smooth & needle must be changed as needed.
08	Fraying of thread in the needle.	Fine thread must be used or to be used heavy needle.
09	Becoming more heated of thread.	High quality needle must be used. Needle lubricant must be used. Needle cooler must be

		used.
10	Becoming more heated of hook.	Lubricant must be available. Examine the distance between the needles & hook.
11	Use of low quality threads.	Thread to be changed.

Frequent thread breakage: This breakage of thread again & again during sewing & also, there needs more time & which is harmful for production. Specially, when there needs to open out of sewing to solve the problem. The following are the causes & remedies of frequent thread breakage formation given by a table:

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 the more rotating 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.

Broken Stitches: When stitches are broken during sewing is called broken stitch.
Cause: Where the thread is being broken where one seam crosses another seam (ex: bar tacks on top of waistband stitching, seat seam on top of riser seam.)

Remedies:
Where the thread is being cut, use a large diameter thread on operations.

Make sure the proper stitch balance is being used.

Use needles with appropriate needle point.

At regular intervals on operations change the needles where they are occurring frequently.

Problems of pucker:

Puckering is a wrinkle appearance along a seam line in a smooth fabric. It is one of the frequently occurring defects. Puckering shows that as if there is too much fabric & not enough thread in the seam & as if the thread is drawing the seam in. This is the reason why sewing thread is often blamed for causing puckering though there are other factors as well as for promotion of puckering. They are given below:

1) Fabric structure. 2) Seam construction. 3) Needle size. 4) Material feeding problem. 5) Wrong thread tension & 6) Unsuitable thread.

Reasons of Puckering

Fabric dimensional instability. Extension of sewing thread. Sewing threads shrinkage. Structural jamming of fabric. Mismatched patterns.

Variable or uneven stretch on fabric plies:
Causes:

There is a great possibility of seeing seam pucker in case of more plied of fabrics sewing together.

Due to variable stitch on fabric plies they will not feed equally to sewing m/c & create seam pucker.

This type of pucker is seen for limitation of feed mechanism.

Remedies:

Proper care during sewing.

Use proper feed mechanism.

Fabric dimensional instability:

Causes:

If the shrinkage of sewn fabric plies are not same or equal than Seam pucker will create after washing.

If the shrinkage percentage of area of two pieces fabrics is more than 2, then seam pucker will occur after sewing the fabric together.

Remedies:

Use suitable feed mechanism.

Maintain shrinkage.

Take more care during sewing.

Extension of sewing thread:

Causes:

If the tension on needle thread is higher than under thread then seam pucker will be produced or relaxed.

Due to tension, the length of thread is extended a slight. When the fabric is displaced or descend from the machine after sewing shrinkage of thread & fabric are occurred due to tendency of coming to their original position.

If the shrinkage percentage of thread is higher than the fabric there is happened seam pucker.

Remedies:

To give sufficient thread tension.

To maintain shrinkage.

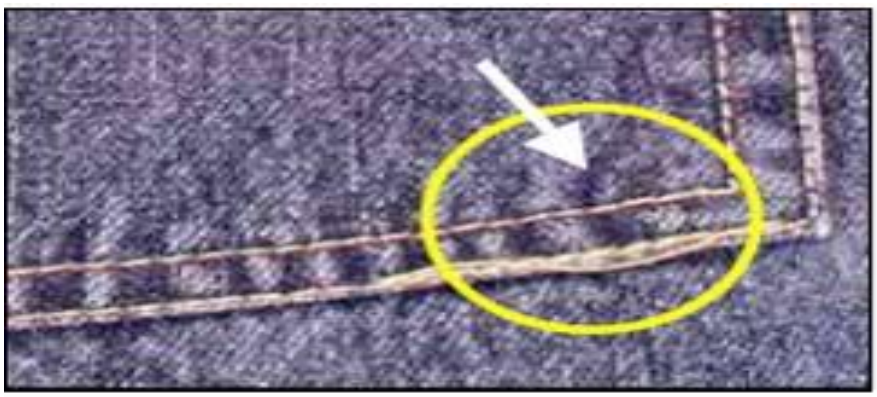
Unraveling Seams:

Cause: Generally occurs on 401 chain stitch seams where either the stitch has been broken or a skipped stitch has occurred. Unless the seam is re-stitched, this will cause seam failure.

Remedies:
Proper machine maintenance and sewing machine adjustments have to be insured;

For correct material handling techniques, observe sewing operators.

Re-stitched Seams: Where there is a "splice" on the stitch line. The seam does not appear to be 1st quality merchandise, if this occurs on topstitching.



Causes:
Thread breaks or thread run-out during sewing.

Cut or broken stitches during a subsequent treatment of the finished product (i.e., stone washing).

Remedies:
Use a better quality sewing thread. To minimize sewing interruptions, this may include going to a higher performance thread specifically designed for that purpose.

Insure sewing machine adjustments and proper machine maintenance.

Make sure sewing machines are properly maintained and adjusted for the fabric and sewing operation.

Observe sewing operators for correct material handling techniques.

Damage of fabric on seam line:

A garment can be rejected due to damage of fabrics or yarn of fabrics in the seam line. This is happened due to wrong needle selection or needle damage. The fabrics are damage due to sew defected needle. But it may be happened in case of new or fine needles. There are two types of fabric damaging are available given below:-

1) **Mechanical damage:** Damaging of fibres or yarns in the fabrics by needle is the entire defects of mechanical damage. The followings are the steps to be taken to keep the fabrics free from this type of defect:

By using perfect size & shape of the needle & needle point without any defect.

By reducing the speed of sewing machine.

By using lubricant.

By testing sew ability before sewing fabrics.

2) **Needle heating damage:** The damage of fabric due to friction occurred between the needle & fabrics. The producing temperature in the needle is very high. The fabric can be damaged with that temperature. There is a less possibility of damaging in case of fabrics made from natural fibres. The following are the steps to be taken to keep the fabrics free from this type of defect:

By reducing sewing speed so that there is less generating heat to the needle. But it is harmful for large production.

By changing needle Size & shape so that there is less generating of heat to the needle.

By sewing smaller length at higher speed.

By flown cool air on the needle during sewing so that the temperature can be controlled.

By using lubricant to the needle.

By using Teflon coated needle.

Defects occurred due to handling, for instance spoilage, staining etc.

Defects occurring due to oil mark.

Defects occurring due to dirty spot.

Size Measurement Faults: During manufacturing of garments size of some parts are measured as requirement. After assembling full garments is also measured so that the dimension of garments is ok. Faults occur in this time is very rare. During size measurement the parts which are measured are – 1) Chest 2) Waist 3) Shoulder 4) Sleeve length 5) Sleeve opening 6) Body length 7) Neck width 8) Front neck drop 9) Back neck drop 10) Collar Height 11) Arm hole 12) Placket length 13) Pocket length 14) Pocket width 15) Bottom part
16) Hem opening –

Garment Twist A rotation, usually lateral, between different panels of a garment resulting from the release of latent stresses during laundering of the woven or knitted fabric forming the garment. Torque or spirally may also be used to refer a twist.

Sewing thread shrinkage:

Causes:
Due to variable shrinkage % of sewing thread & fabric, Seam pucker will create after washing or ironing.

Cotton threads develop puckering when wet or after wash.

Remedies:
To use synthetic thread.

To protect this, it must know about the shrinkage % of fabric & thread before selection to sew.

Structural jamming of fabric:

Causes:
When sewing is done by needle to densely woven fabrics or in which no. of warp & weft yarns are more in one inch, there is happened seam pucker due to shrinkage of fabric.
Remedies:
By using finer thread & needle.

By minimize stitch density.

By cutting & sewing on bias angle.

By using chain stitch instead of lock stitch.

To change fabric (if necessary).

Mismatched patterns:

Causes:
Seam pucker will create when two different size of patterns are sewn together.

The designer is responsible for this. But can be occurred due to wrong selection of patterns.

Remedies:
Experienced pattern designer is needed.

Change or rectify the pattern.

- **Maintenance of sewing machines**

- PREVENTATIVE MAINTENANCE

1. Check to see if the machines are being kept clean
2. Machines should be blown off every day to remove lint and trash
3. On lockstitch machines, the hook should be blown off regularly during the day to prevent lint or dirt from building up in the oil ports in the race of the hook
4. Check to see that the machines are being lubricated regularly Oil levels should be checked daily and additional oil added if necessary ‰

5. Randomly check the oil levels in the machines
6. A high quality white machine oil should be used that will not stain
7. Check availability of proper machine oil in the factory
8. Check to make sure the oil is not contaminated
9. Check to see that oil reservoir pump filters are cleaned regularly

- If compressed air is used, make sure the air system is regulated properly and has humidity dryers, filters and lubricator in the air lines.
- Check for rusted areas due to excessive moisture in production area
- Check Machines for wear on critical moving parts
- Check for shake in needle bar due to worn needle bar bushings
- Check for excessive movement in stitch forming devices, etc.
- Check condition of critical screws
- Check for missing screws
- Check for defective screws that are difficult to tighten properly
- Check condition of mechanics tools to see that they are being maintained properly.

* With buttonhole or other specialized equipment, cleaning of the machine should not be done with compressed air but with a soft bristle brush.

Safety Measure:

- 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. If the equipment does not operate properly, notify the instructor immediately.
- Wipe up any oil specified 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 and when the instructor or supervisor/ assistant is present.ate machines only with permission

Using of Mask

Using waste boxes for collecting loose threads

- Always inspect the m/c before starting to work. Be sure it is clean and threaded correctly, with no loose threads on the pulley belt and all guards in place.Make only adjustments you have been trained to perform
- When sewing on a power m/c, wear low shoes & close-fitting clothing. Avoid loose fitting sleeves, sweaters, jewellery, 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. If possible, adjust the chair height so that your feet rest flat on the floor.

Using of Needle Guard

Using of Motor Pully

- Do not pull your chair forward or toward while operating the machine.
- Use both hands to raise & lower the machine head.
- Always keep your head above the table.
- Keep your feet off the treadle when you are setting or threading the needle.
- Turn off and unplug your sewing machine when you are away from it for more than a few minutes.