Seam Stitches and Finishing Faults and Their Possible Remedies

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We dedicate our project to the employees and workers who are suffering from low facilities and wages, but putting high efforts for the survival of textile industry.

Acknowledgement

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Abstract

The main purpose of this project is the studying of seam stitches and finishing faults in the garments and then prepares the samples of seam stitches and finishing faulted garments and products and then checks the faults of samples by doing standard testing methods. Regarding to this project the study of all possible remedies through the standard testing methods applied for the different type of seams stitches, their problems and their solutions and also to conclude and get the best remedies which can be apply after getting standard testing results.

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1.1- Introduction

In this project, the discussion about both seam stitches and finishing faults. And discuss about the possible remedies of these faults. At the end, apply standard testing methods and procedures on the seam stitches and finishing faults to find their possible remedies. The problem statement regarding to this project is to study the all possible remedies through the standard testing methods applied for the different type of seams stitches, their problems and their solutions and also to conclude and get the best remedies which are apply able after getting standard testing results.

1.2- Objectives

The main purpose of this project is the study of seam stitches and finishing faults in the garments and in other materials and then prepares the samples of seam stitches and finishing faulted garments and products and then check the faults of sample by doing standard testing methods.

- Seam Slippage Test
- Seam Strength Test

1.3- Literature review

"Apparel manufacturing is traditionally very labor intensive due to the extensive style and fabric variation of the products. Most of the sewing machine manufacturers and some of the larger apparel companies have developed semi-automated sewing stations to perform operations which are constant across a large style range. These normally require an operator to load the machine, which then automatically sews and stacks the components. Although such stations improve production efficiency, they remove the almost unconscious operator inspection of the operation. The result is that only major seam faults such as thread breaks are observed. Other faults, skipped stitches or non-included seams for example, may not be detected until the garment is completed or perhaps not until after laundering. At this point, the manufacturer's cost is at a maximum. In order to reduce the number of defective garments it is necessary to develop complete seam monitoring systems that meet the apparel manufacturer's requirements of flexibility, cost, and reliability. Several techniques capable of detecting faulty seams on-line have been investigated which include thread line monitoring and the use of a beta-particle

transmission gauge. Prototypes have been developed for testing and demonstration of these techniques. The details and results of these investigations are provided".[1]

1.4- Apparel/Clothing

A feature of all modern human societies is the wearing of clothing, a category encompassing a wide variety of materials that cover the body. The primary purpose of clothing is functional, as a protection from the elements. Clothes also enhance safety during hazardous activities such as hiking and cooking, by providing a barrier between the skin and the environment. Further, clothes provide a hygienic barrier, keeping toxins away from the body and limiting the transmission of germs.

Clothing performs important social and cultural functions. A uniform, for example, may identify civil authority figures, such as police and army personnel, or it may identify team, group or political affiliations. In many societies, norms about clothing reflect standards of modesty, religion, gender, and social status. Clothing may also function as a form of adornment and an expression of personal taste or style. Throughout history, many materials have been used for clothes. Materials have ranged from leather and furs, to weave and woven materials, to elaborate and exotic natural and synthetic fabrics. Recent scientific research estimates that humans have been wearing clothing for as long as 650,000 years. The textile, textile product, and apparel manufacturing industries include establishments that process fiber into fabric and fabric into clothing and other textile products. While most apparel manufacturers worldwide rely on people to cut and sew pieces of fabric together.[2]

1.5- Sewing

Sewing or stitching or tailoring is the fastening of cloth, leather, furs, bark, or other flexible materials, using needle and thread. Its use is nearly universal among human populations and dates back to Paleolithic times (30,000 BCE). Sewing predates the weaving of cloth. Sewing is used primarily to produce clothing and household furnishings such as curtains, bedclothes, upholstery, and table linens. It is also used for sails, bellows, skin boats, banners, and other items shaped out of flexible materials such as canvas and leather. While sewing is sometimes seen as a semi-skill job, flat sheets of fabric with holes and slits cut into the fabric can curve and fold in complex ways that require a high level of skill and experience to manipulate into a smooth, ripple-free design. Aligning and orienting patterns printed or woven into the fabric further

[1] Reference: J. Lewis Dorrity, "New Developments for Seam Quality Monitoring in Sewing Applications," IEEE Industry Applications Society, 1995 Textile Fiber and Film Industry Conference, May 3, 1995.

[2] Reference: en.wikipedia.org/wiki/clothing

complicates the design process. Once a clothing designer with these skills has created the initial product, the fabric can then be cut using templates and sewn by manual laborers or machines.[3]

1.6- Sewing Machines

A sewing machine is a textile machine used to stitch fabric or other material together with thread. Sewing machines were invented during the first Industrial Revolution to decrease the amount of manual sewing work performed in clothing companies. Since the invention of the first working sewing machine, generally considered to have been the work of Englishman Thomas Saint in 1790, the sewing machine has vastly improved the efficiency and productivity of fabric and clothing industries.

Though some older machines use a chain stitch, the basic stitch of a modern sewing machine consists of two threads and is known as lockstitch. Industrial machines are usually specialized for a specific task, and so different machines may produce a different type of stitch. Modern sewing machines are designed in such a way that the fabric easily glides in and out of the machine without the hassle of needles and thimbles and other such tools used in hand sewing, automating the process of stitching and saving time.

The fabric shifting mechanism may be a work guide or may be pattern-controlled (e.g., jacquard type). Some machines can create embroidery-type stitches. Some have a work holder frame. Some have a work feeder that can move along a curved path, while others have a work feeder with a work clamp. Needle guards, safety devices to prevent accidental needle-stick injuries, are often found on modern sewing machines.

1.7- Types of Sewing Machines

Each machine makes a basic running stitch the same way, with two sources of thread. The top needle takes the thread down into the fabric. It is caught and looped via the bobbin apparatus and then pulled back up. The "feed dog" (a rough edged surface underneath the fabric) moves it along and the next stitch begins. Everything else is different.

[3] Reference: en.wikipedia.org/wiki/sewing

1.7.1- Mechanical Sewing Machines

A mechanical sewing machine is controlled by a rotary wheel. Any adjustment like the tension or the length or width of the stitch is made by moving a dial. These machines are very basic and tend to be less expensive than the other sewing machines.

1.7.2- Electronic Sewing Machines

An electronic machine differs in that there are some functions that can be accomplished by pushing a button. A machine can have a number of motors for various duties and they are run via electricity.

1.7.3- Computerized Sewing Machines

As sewing machines became more complex, more of these motors were added. A computer then coordinates all these functions. Think about a repetitive sequence of stitches being programmed, so you no longer have to replicate these movements over and over again.[4]

1.8- Main Stitching Machines

1.8.1- Chain stitch Machines

It is a sewing and embroidery technique in which a series of looped stitches form a chain-like pattern. Chain stitch is an ancient craft - examples of surviving Chinese chain stitch embroidery worked in silk thread have been dated to the Warring States period (5th-3rd century BC). Handmade chain stitch embroidery does not require that the needle pass through more than one layer of fabric. For this reason the stitch is an effective surface embellishment near seams on finished fabric. Because chain stitches can form flowing, curved lines, they are used in many surface embroidery styles that mimic "drawing" in thread.

[4] [Reference: The Technology of Clothing Manufacturing (2nd edition) by Blackwell Science]

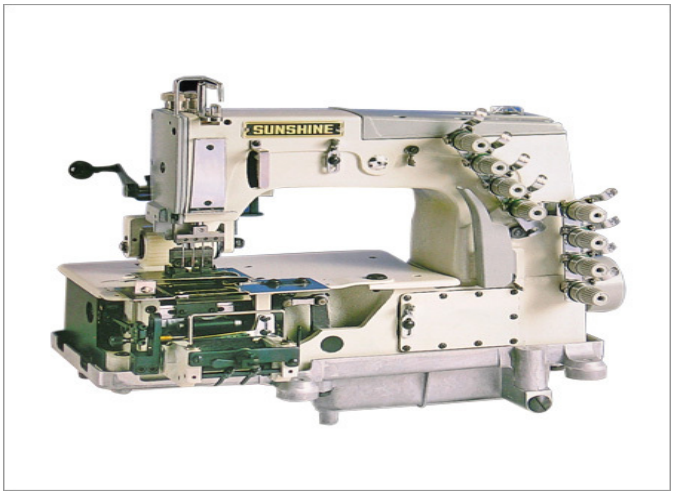


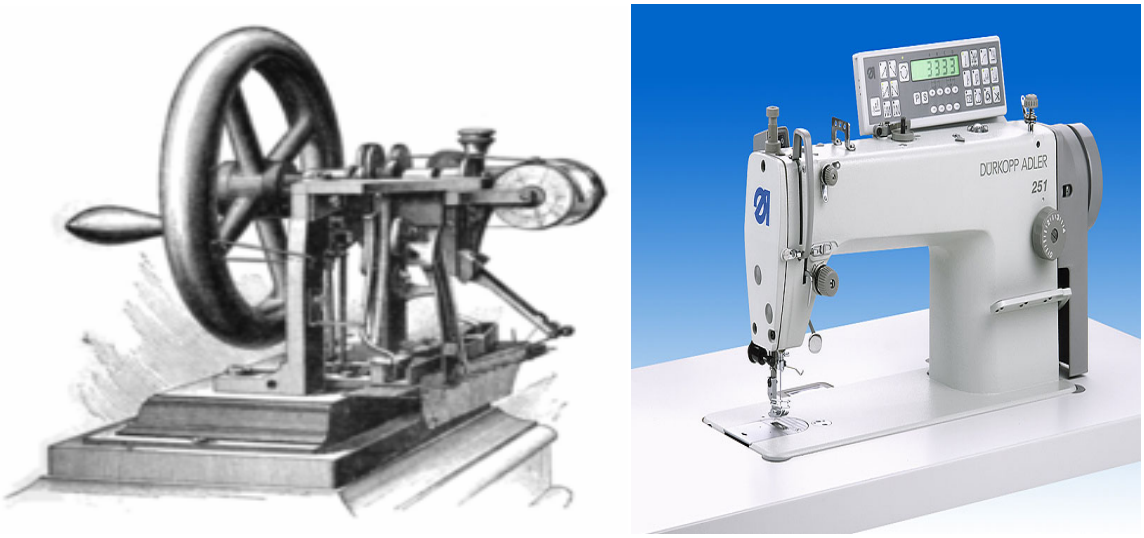
Figure 1.1 and 1.2 chain stitch machines

[Reference: http://images.google.com.pk/images]

1.8.2- Lock stitch Machines

It is the familiar stitch performed by most household sewing machines and most industrial "single needle" sewing machines from two threads, one passed through a needle and one coming from a bobbin or shuttle. Each thread stays on the same side of the material being sewn, interlacing with the other thread at each needle hole. Industrial lockstitch machines with two needles, each forming an independent lockstitch with their own bobbin, are also very common. There are different types of lockstitch industrial machines. The most commonly used are the drop feed for light and medium duty, and walking foot for medium and heavy duty like the Class 7 with an impressive 3/4" foot lift. Lockstitch sewing machines make use of a hook and a bobbin thread to create stitch patterns, whereas chain stitch machines use a looper to form stitches. One of the major drawbacks of chain stitching is that it is very weak and the stitch can easily be pulled apart. In addition to lock stitching and chain stitching machines, there are blind stitch and buttonhole-and-button-sewing machines that use a spreader to create stitches.

On lockstitch machines, make sure the positioning finger is correctly set to allow the thread to pass through the hook with minimum resistance. If the machine has a mechanical opener, set the opener to shift the bobbin case holder so it will allow the thread to pass by the positioning finger with as little resistance as possible. On lockstitch machines, it is sometimes necessary to refine the gib or rail on the bobbin case holder so the thread can be released by the hook sooner in the stitch cycle. This sometimes allows the thread to be set with lighter tension.



Elias Howe's lockstitch machine, invented 1845

Figure 1.3 lockstitch machine

[Reference: http://images.google.com.pk/images]

1.8.3- Overlock Machines

An overlock stitch sews over the edge of one or two pieces of cloth for edging, hemming or seaming. Usually an overlock sewing machine will cut the edges of the cloth as they are fed through (such machines are called 'sergers'), though some are made without cutters. The inclusion of automated cutters allows overlock machines to create finished seams easily and quickly. An overlock sewing machine differs from a lockstitch sewing machine in that it uses loopers fed by multiple thread cones rather than a bobbin. Loopers serve to create thread loops that pass from the needle thread to the edges of the fabric so that the edges of the fabric are contained within the seam. Overlock sewing machines usually run at high speeds, from 1000 to 9000 rpm, and most are used in industry for edging, hemming and seaming a variety of fabrics and products. Overlock stitches are extremely versatile, as they can be used for decoration, reinforcement, or construction.[5]

[5] Reference: www.westsidesewing.com

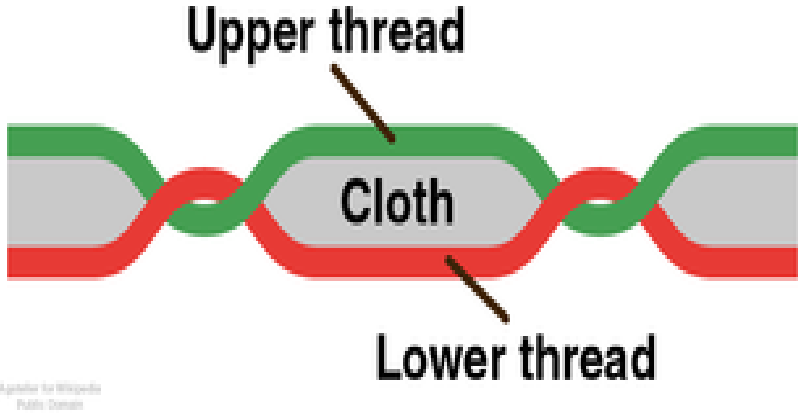


Figure 1.4 overlock thread construction

[Reference: http://images.google.com.pk/images]

Figure 1.5 overlock stitching machines

[Reference: http://images.google.com.pk/images]

1.9- Stitch formation

Sewing machines can make a great variety of plain or patterned stitches. Ignoring strictly decorative aspects, over three dozen distinct stitch formations are formally recognized by the ISO 4915:1991 standard involving one to seven separate threads to form the stitch. Plain stitches fall into four general categories: lockstitch, chain stitch, over lock, and cover stitch.

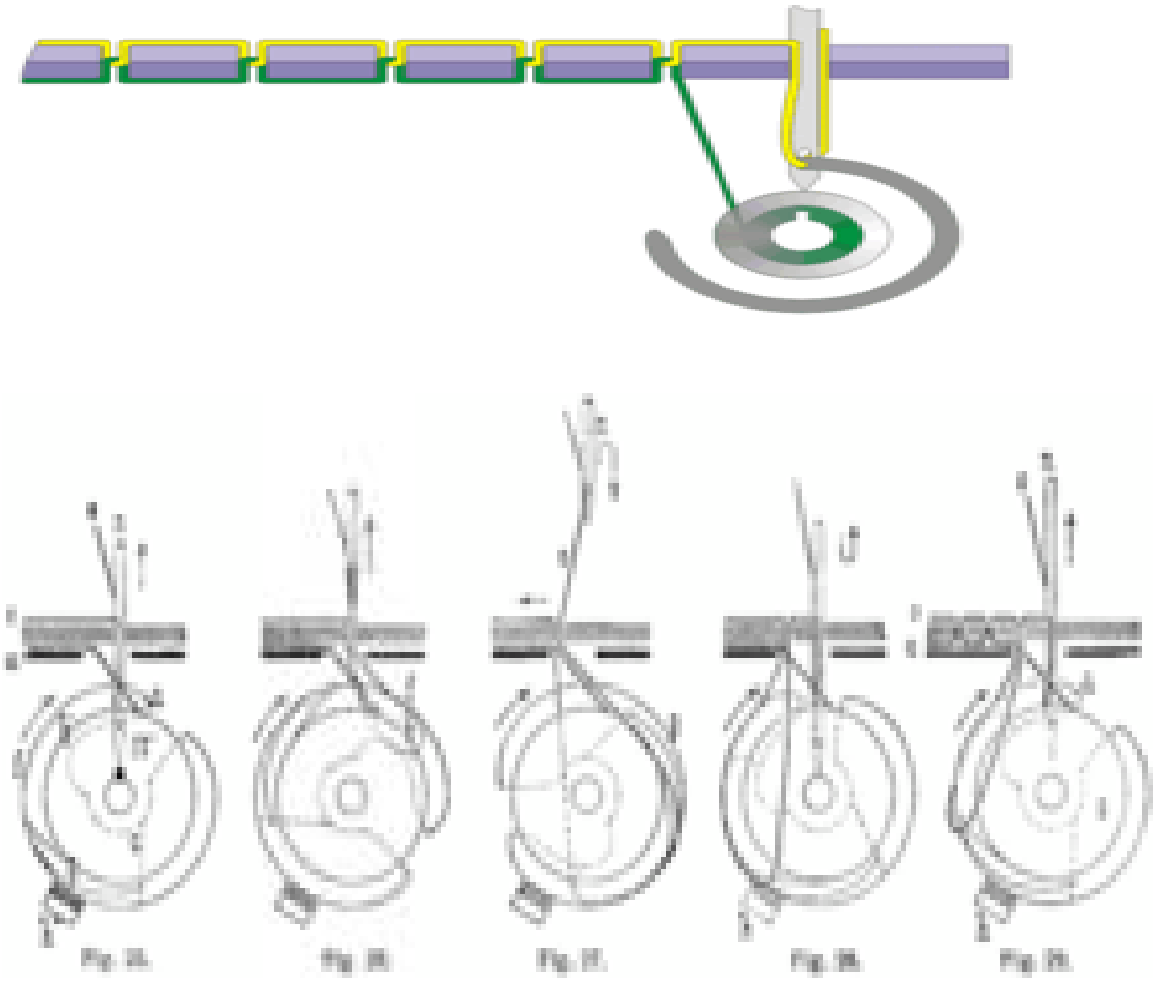


Figure 1.6a and 1.6b stitch formation

[Reference: http://images.google.com.pk/images]

1.10- Seam

Seam is the joint between the two parts of a garment. For the perfect fitting and look of the garment seam appearance and its strength has to be proper. Many factors like appropriate sewing, needle size and its type, fabrics used and its weight, stitches done on the garment, seam construction and tension level of thread influences the strength of seam. The best available option of stitch to ensure strong seams is Locked stitch as in this stitch there is interlocking of the threads which increases the seam strength.

1.11- Types of Seam

1.11.1- Decorative Seam

As the name suggests this seam is done for decorating the garment. This is done on one or more than one layer of fabric through many rows of stitches sewn on them.

1.11.2- Super Imposed Seam

Superimposing the seam is the simplest and widely used type of seam construction. The border of one piece is kept on another piece of fabric, and then sewn together.

1.11.3- Applied Seam

When some outside material other than the fabric itself like lace, patch, etc are sewn on the seam or edge of the garment, it is known as applied seam.

1.11.4- Bound Seam

This seam is also used for decorative purpose. Here the edges are attached by means of tapes or through self binding.

1.11.5- Single Ply Construction Seam

This seam is constructed from single layer or piece of fabric. Generally used for manufacturing belts and belts loops.

1.11.6- Edge Neatening

Here the edges of the fabric are trimmed, hemmed and folded through stitches.

1.11.7- Lapped Seam

This is the strongest type of seam usually used for denims. Here the seam is done on the fabrics overlapped.[6]

1.12- Factors associated with Seam and stitches

1.12.1- Sewing needle

There are many factors associated with sewing needle which are important from the viewpoint for better seam strength and appearance. The diameter of the needle, the shape of its tip and size of the eye hole of the needle affects the seam construction of the garment. The size of the eye hole of the needle should be in accordance with the thickness of the thread. If the needle hole is smaller and does not provide effortless passing of the thread then there is the possibility of wearing out of the thread during use of the garment. And if the needle hole is larger and the thread is finer than the level required, miss-stitch might result due to low quality of loop formation and thread control. Thus proper ratio of size and type of sewing needle and thread is required. Also to avoid harm to the fabric due to excessive heating of needles while stitching special needles have been developed like- titanium nitride coated needle.

1.12.2- Fabric type and weight

Seam strength and its performance also depend upon the various characteristics of fabrics used. The material of the fabric, the type of fabric weave, thread count, the pattern positioning, type of yarn and seam direction.

1.12.3- Type of thread

The type of the thread used, its construction, size and finishing influences the seam strength of the garment. There are many types of threads like cotton thread, polyester thread, silk threads, etc. It is a known thing that polyester thread is more durable than cotton thread. However the type of thread used depends upon the fabrics being used, for e.g. for silk fabrics silk thread is used.

[6] Reference: www.sewing.org

1.12.4- Thread construction

There are different types of thread construction like multifilament, core, spun, textured, etc. Continuous filament core threads provide better seam strength compared to other construction of threads. Different thread sizes are available in market but finest thread are preferred more as longer length of finer threads can be wind around the lockstitch machine and they do not acquire much space in the seam. This avoids seam puckering. Sewing thread's elasticity should match to the elasticity of the fabric used. Also the whole length of the thread should have equal elasticity level throughout its reel which ensures proper stitches. If it is not proper then it could result into tearing of fabric or thread breakage of the garment. Different fabrics require threads of different elasticity, for instance threads used for knitted, synthetic or woven fabrics are different.

1.12.5- Thread tension or Stitch balance

Sewing machine tension should be well adjusted in order to get good stitch. In case of loose thread tension while stitching, it would result into lower seam strength, and if thread tension is high then it might lead to puckering. It is advisable to set medium level of thread tension in sewing machines. Also the parts of the sewing machine should be well oiled and smooth enough to ensure lower loss of thread, smooth and flawless stitching or damage to the thread used.[7]

1.13- Seam Class Guide

SS Class	Superimposed Seams
LS Class	Lapped Seams
BS Class	Bound (Binding) Seams
FS Class	Flat (Butted) Seams
EF Class	Edge Finish Stitching

[7] [Reference The Technology of Clothing Manufacturing (second edition) by Blackwell Science]