

Stitches & Seams Analysis (Ch.14, p. 428~475)

ADM4307 Apparel Manufacturing
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Stitches & Seams Analysis

- Objectives:
 - Define stitch classifications, characteristics, and formation.
 - Identify seam classification, types, and uses.
 - Relate the properties of stitches and seams to production costs, performance, and quality.
 - Examine functions, characteristics, and selection of sewing threads and needles.
 - Examine the relationship between needles, thread, and fabric.
 - Analyze seam appearance and performance.

Stitches and Seams

- Standards that defined stitches and seams:
 - The United States Federal Stitch and Seam Specification (Federal Standard 751a) in 1965.
 - ASTM D 6193, Standard Related to Stitches and Seams
- Definitions
 - A Stitch: is the configuration of the interlacing of sewing thread in a specific repeated unit.
 - A Seam: is a line where two or more fabrics are joined.
 - A Stitching: consists of a series of stitches embodied in a material for decorative purpose or finishing an edge.

Stitches

- Stitch classification is based on:
 - Structure of the stitch
 - Method of interlacing stitch properties.
- Stitch properties:
 - Relate to aesthetics and performance
 - Stitch size
 - Stitch length, width, and depth.
 - Thread tension
 - Stitch consistency.

Stitch properties: Stitch size

- Stitch Length:
 - Stitches per inch (spi)
 - High spi
 - Short stitches: High quality
 - Potential problems (seam pucker or weaken fabric).
 - Higher spi, the more time and thread, high cost.
 - Low spi
 - Long stitches: Lower quality
 - Problems: Less durable, snagging, abrasion, grin-through
 - Fast, less thread, less cost.
 - Example:
 - men's shirts 22 spi vs. 8 spi



Stitch properties: Stitch size

- Stitch Width:
 - Distance between the outermost lines of stitches.
 - Refers to the horizontal span covered in the formation of one stitch.
 - Referred to as gauge, (inch)
 - Example: overedge, zigzag, and cover stitches (1/4 inch)
 - Width dimensions require multiple needles or lateral movement of thread carriers:
 - Example: needle bars, loopers, or spreaders.

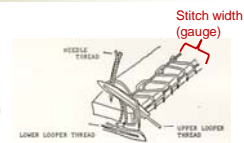
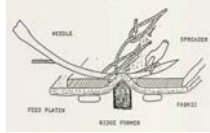


Figure 14-1 Lower stitch-forming devices.

Stitch properties: Stitch size

- Depth:
 - Distance between the upper and lower surface of the stitch
 - Example: Blind stitches (Curved needle with lateral movement)



Stitch consistency: Thread tension

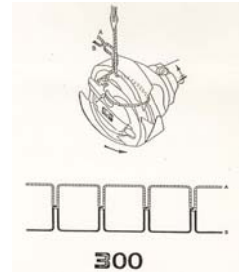
- Stitch consistency
 - The uniformity with which each stitch is formed in a row of stitches.
 - There must be a compatibility of fabric, stitch and seam type, needle, thread, and machine setting.
- Thread tension
 - Thread tension affects stitch formation in 2 ways:
 - The balance of force on the threads that form the stitch.
 - The degree of compression on the fabric created by the threads as a stitch is formed.
 - Too much tension, a tight thread causes:
 - Seam pucker, uneven stitches, unbalanced stitch formation weekend thread, and potentially damaged fabric.
 - Too little tension causes:
 - Excessive looping or loose and uneven stitches.
 - Must have some tension in order for the stitch to form properly.

Stitch classes

- Stitch classes (ASTM D 6193)
 - based on the type of thread formation by a sewing machine
 - Example: a lock stitch machine (300 class)
 - Six classes of stitch types
 - 100 Single thread chain stitch
 - 200 hand stitch
 - 300 lockstitch (formed with needle thread and bobbin)
 - 400 Multi thread chain stitch
 - 500 Overedge and safety stitch
 - 600 Cover stitch or flat seam stitch

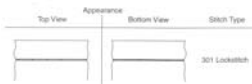
Class 300- Lockstitch

- Use Lockstitch machines: 2 threads to form a stitch.
 - (Needle thread + Lower thread)
 - A rotary hook catches the needle thread loop as it passes around the bobbin and interlocks the 2 threads.
- Lockstitch machine is good for versatility, but time-consuming and costly for an operator.



Class 300- Lockstitch

- The 301 lockstitch (=Plain stitch or Straight stitch)
- See p. 432, Figure 14-2
 - The least amount of thread.
 - Flattest stitch, reversible.
 - Used for top stitching
 - The tightest and most secure stitch
 - For setting zippers and pockets.
 - The 301 is not for elastic or knit fabrics, or bias seams.



Class 300- Lockstitch

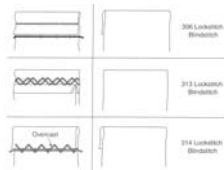
- Zigzag lockstitches (304)

- Examples:
 - Used to sew athletic wear
 - Appliqués, attach lace on lingerie, and faggoting.
 - Decorative stitching.
 - Used to make bar tacks
 - Buttonholes.



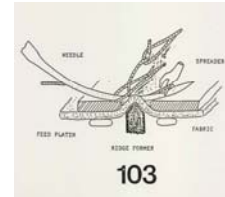
Class 300- Lockstitch

- Lockstitch blind stitches
 - 306, 313, 314
 - Example uses:
 - For linings, the inside components of waist bands for men's dress slacks.



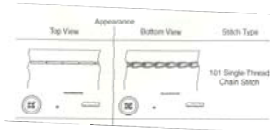
Class 100-Chain stitch

- The class 100 chain stitches,
 - with the assistance of spreader, are formed when **1 or more needle threads** pass through the fabric and form a **loop** on the underside of the fabric.
 - **No lower thread!**
 - Single thread chain stitch is an intra-looping formation.
 - Loop formation allows good elongation and stretch and makes unraveling easy.



Class 100-Chain stitch

- The 101 chain stitch
 - See p. 431, Figure 14-2
 - See <Sample>
 - Pulling a loose thread may easily unravel.
 - Examples:
 - For closing bags of sugar/ Bar tacks
 - Shirring
 - Buttons
 - Buttonholes



Class 100-Chain stitch

- The 103 chain stitch
 - (=Blind stitch machine)
 - See <Sample>
 - A types of blind stitches formed by curved needle, single needle thread, and spreader to form the loops.
 - Examples:
 - For the hem,
 - Tailored jacket lapels
 - Belt loops of dress slacks.



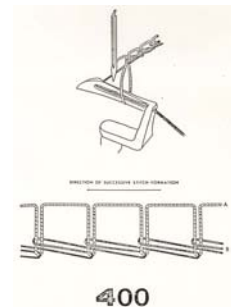
Class 100-Chain stitch

- The 104 chain stitch
 - (=Machine saddle stitching)
 - See p. 431, Figure 14-2
 - Examples:
 - Decorative stitching on western wear
 - Pleated skirts.



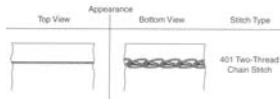
Class 400- Multithread chain stitch

- Stitch class 400 (Multithread chain stitch) required 1 or more needle threads that form loops as they pass through the fabric and inter-loop with the looper thread on the underside.
- Compare to the 100 class,
 - The 400 class is more durable and used extensively on apparel.
 - The 400 class use upper needle thread and a looper to carry the lower thread.



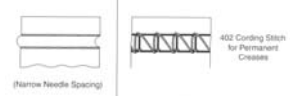
Class 400- Multithread chain stitch

- The 401 Two-thread chain stitch
- = Double-locked chain stitch
 - See p. 433, Figure 14-2
 - See <Sample>
- Appearance is the same as the 101, but the 401 has a loop formation on the underside and More durable.
- The chain stitch elongates when extended.
- Example uses:
 - Good for setting elastic in waist bands or decorative stitching on belts.
 - Parallel rows of stitches for lapped side seams of woven shirts and jeans.



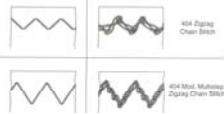
Class 400- Multithread chain stitch

- The 402 cording stitch
 - 2 needle threads that produce two parallel rows of stitching on the face of the fabric.
- Examples:
 - Used for stitching permanent creases



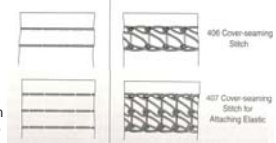
Class 400- Multithread chain stitch

- The 404
- Zigzag chain stitch:
 - More elastic than 401 Two-thread chain stitch.
 - Example uses:
 - Decorative stitching
 - Attaching curtain to the inside of the waist band.



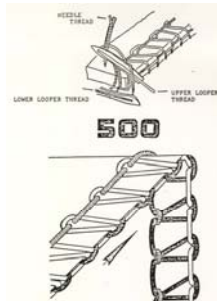
Class 400- Multithread chain stitch

- The 406 and 407
- Cover stitches:
 - See <Sample>
- Examples:
 - The 406 is used to form hems on knit garments, necklines of T-shirts, and attach bindings on men's briefs.
 - The 407 is similar except 3 needle threads and has more stretch, (e.g. for undergarments).



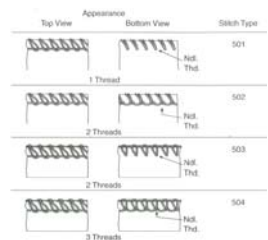
Class 500-Overedge stitch

- The 500 overedge stitch (=Overedge, overlock, serge, overcast, or merrow)
 - Overedge machines trim the edge of fabric and form stitches over the cut edge.
 - A pair of knives and 3 stitch forming devices; a needle to carry the thread through the fabric, a looper or spreader to carry the thread from the needle to the edge of the material on the bottom, and a looper or spreader to carry thread up and over the edge of the material on the top.
 - High thread users and stretch.
 - Chain off the stitching. (continuously run after the fabric)



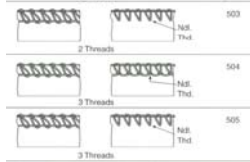
Class 500-Overedge stitch

- Odd numbered (501, 503)
 - "Break open" stitches.
 - Example uses:
 - Edge finishes and hems rather than for seams.
- Even numbered stitch types (502, 504)
 - Much tighter needle thread, hold 2 layer fabrics at actual seam line.



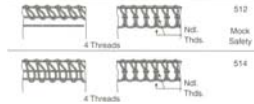
Class 500-Overedge stitch

- The 503, 504 and 505 for Serging.
 - See <sample>
- The 503
 - 1 needle, 1 looper thread for blind hemming and serging, hems on T-shirts, and serging the seams of dress slacks.
- The 504
 - 1 needle, 2 looper threads
 - Seams for knit garments, the most common.
- The 505
 - Box edge stitch
 - For Serging.



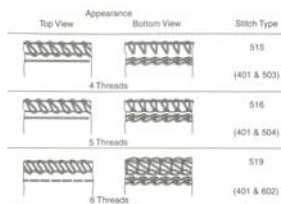
Class 500-Overedge stitch

- The 512 and 514
- Mock safety stitches
 - For seaming knits and woven.
 - 4 threads
 - (2 needle threads, 2 looper threads).
 - The 514: Stronger and more elastic and chains off better than 512.



Class 500-Overedge stitch

- The 515, 516, 519
- Safety stitches
 - Combination of an overedge stitch and a 401 chain stitch.
 - Example uses:
 - Shirts, jackets, blouses, and jeans



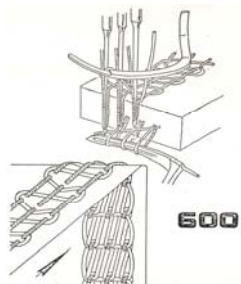
Class 500-Overedge stitch

- The 521:
 - Excellent elasticity and strength for seaming hosiery.



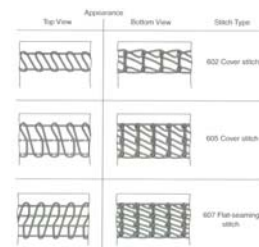
Class 600- Cover stitch

- Stitch class 600 Cover stitch
- (= Flat-lock or flat seam stitches)
 - 2 or more needle loops, inter-looping on the underside, and interlocking on the upper side.
 - Machines are fast and efficient.



Class 600- Cover stitch

- The 602, 605, and 607
 - Strong, elastic stitches to cover raw edges and prevent raveling.
 - Example uses:
 - knits and lingerie
 - The 607 for infant's panties



Seam dimensions


- Seams (3 dimensions): Seam length, width, and depth
 - Affect garment quality, performance, and costs.
- Seam length:
 - Is the total distance covered by a continuous series of stitches. (e.g. shoulder seam)
 - Seam length is a factor in determining stitch types.
- Seam width:
 - Width of a seam allowance
 - Measured from the cut edge of fabric to the main line of stitches.
 - Wider seam allowances may increase cost.
 - The seam heading of a top stitched seam.
 - The distance from the folded edge of the top ply to the first line of stitches.
 - A header reduces the strain on the cut edge of fabrics and makes the seam stronger.
- Seam depth:
 - Is the thickness or flatness of a seam, which are major factors in appearance and comfort of a garment.

Seam classes (ASTM D 6193)

- ASTM D 6193 standard practice for stitches and seams
 - 4 seam classes and 2 stitching classes (See p. 442, Table 14-1)
- Line drawings of seam types
 - (See p. 443, Table 14-3).
 - Line drawings represent cross sections of a seam.
 - Each long line: a piece of fabric.
 - The short lines: penetration of the needle and lines of stitches.
 - Curve lines: a connecting thread between two lines of stitching. (Example: EFd: Edge finish, serging)




SSa (Side Seams of skirts)



EFd (Edge finish, serging)

Superimposed seam (SS)

- Superimposed seam (SS) class
 - Joining 2 or more pieces fabric with seam allowance edges even.
 - Stitches: Sewn with a lock stitch, chain stitch, overedge stitch, or safety stitch.
 - Examples: Side seams
- SSa:
 - Side seams
- SSb:
 - Finishing belt ends, attaching elastic to waistline
- SSc:
 - Ends of waistbands on jeans
- SSD:
 - Seaming, but not widely used.
- SSe:
 - Collars or cuffs, seamed and topstitched.



SSa (Side Seams of skirts)

Lapped seam (LS) class

- Lapped seam (LS)
 - 2 or more pieces of fabric joined by overlapping at the needle.
 - Some are used to reduce the amount of bulk; others for durability, or appearance.
 - Stitches: lockstitch or chain stitch (NOT an overedge stitch)
 - Examples: attaching front bands to shirts, setting pockets, and sewing side seams of quality dress shirts, side seams or inseams of jeans, etc.
- LSa:
 - Vinyl and leathers
- LSB:
 - Attaching curtain to waistband of men's dress slacks.
- LSc:
 - Side seams of dress shirts and jeans
- LSd:
 - Attaching patch pockets and overlay yokes.
- LSe:
 - Attaching yokes

Bound seam (BS) class

- Bound seam (BS)
 - One piece of fabric or binding.
 - Stitches: Lockstitch, chain stitch, or cover stitch (NOT an overedge stitch).
 - Examples: To finish edges or garments ,necklines, short, sleeve on T-shirts, sleeveless tank tops with binding.
- BSa:
 - Edges bound with ribbon or braid
- BSb:
 - T-shirt necklines or sleeve edges with knot trim.
- BSd:
 - Neckline or front edges bound with bias-woven material.
- BSd:
 - Seaming and binding
- BSd:
 - Seaming and binding

Flat seam (FS) class

- Flat seam (FS):
 - Sewing together two butted pieces of fabric, not overlapping
 - Stitches: wide 600 class (Cover stitches)
 - Examples: sweatshirts, lingerie, and long underwear.
- FSA:
 - Raglan seams of sweatshirts.
- FSb:
 - Sweatshirts and underwear.
- FSc:
 - Seams of support garments
- FSd:
 - Sweatshirts and underwear
- FSe:
 - Sweatshirts and underwear

Stitching classes (EF)

- Edge Finishing (EF)
 - Single piece of fabric. (may be folded in a variety of ways).
 - Stitching encompasses a cut edge or provides a finish for a single ply of fabric with a folded-edge.
- EFa:
 - Single-fold hem
- EFb:
 - Double-fold hem
- EFc:
 - T-shirt hem
- EFd:
 - Edge finish, serging
- EFe:
 - Ornamental edge finish

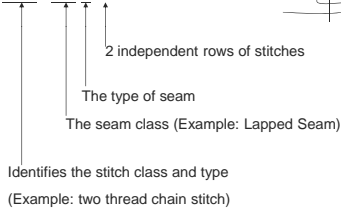
Stitching classes (OS)

- Ornamental stitching (OS)
 - Single piece of fabric. (may be folded in a variety of ways).
 - Examples: For decorative purpose. Jeans pockets, embroidered logos, etc.
- OSA:
 - Decorative sitting on jean pockets
- OSb:
 - Decorative stitching with cording insert
- OSC:
 - Raised stitching without cording insert for backs of gloves.
- OSD:
 - Raised stitching, cording between 2 plies of material
- OSe:
 - Pin tucks on front of blouse.

Specifications for stitches and seams

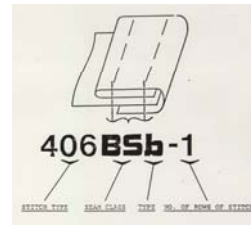
- An example of a specification

○ 401 LSc-2:



Specifications for stitches and seams

- An example of a specification



Example:
Stitch type: 406 Cover seaming stitch (see p. 433)
Seam class: BS (Bound seam)

Lab: Stitch and Seam Analysis

Chapter 8: Garment Analysis and Specification (Inventory) 333

Part 9: Garment Components Assembly Size 14 Mac14271

Component: Pocket No. of pieces: 1 No. of rows: 2 (pocket piece and thread)

Operational Breakdown

Operation #	Operation Name	Attachment Type	Special Instructions
16	Hem pocket	301 EFb	
16	Attach pocket to shirt front	301 LSc	
16	Stitch pencil pocket	301 LSc1	

Operation breakdown:
Determines the sequence of Assembly (list of steps)

Figure 8-2 (continued)
Part 9 of the Garment Analysis and Specification Worksheet

