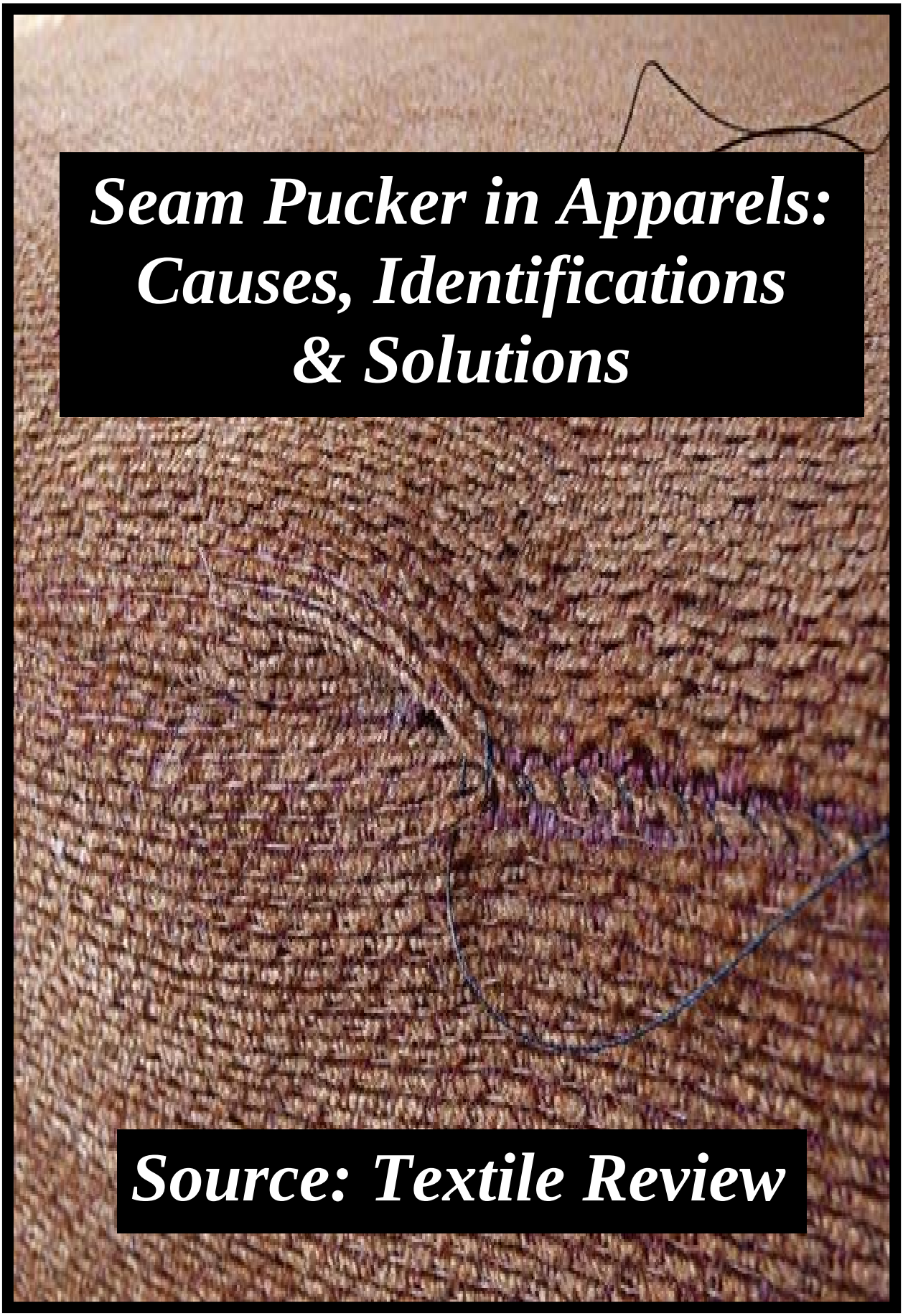

Seam Pucker in Apparels: Causes, Identifications & Solutions

Source: Textile Review

Seam Pucker in Apparels: Causes, Identifications and Solutions

By: S. Hati & B.R.Das

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Seam pucker is the deformation or wrinkling of a fabric along a sewing line. It is identified as a sewability problem about seventy years ago and has been regarded as one of the most important parameter of quality control in garment manufacturing industries. Garments exhibiting pronounced seam puckers are certainly unwelcome by customers, hence causes loss in market value. Here the authors have tried to consolidate the various causes of the seam pucker and vis-à-vis offered the solutions of the respective causes to control the occurrence of seam pucker. The identification methods of various types of seam puckers are also discussed.

The visual appeal of the garment is a principal factor deciding its value. Seam pucker, which is a wrinkled appearance along the seam, influences the appearance to a considerable degree. Seam pucker, identified as a sewability problem about seventy years ago and regarded as one of the most important parameter of quality control in garment manufacturing industries. As defined in oxford dictionary, seam pucker is "a ridge, wrinkle, or corrugation of the material or a number of small wrinkles running across and into one another, which appear in sewing together two pieces of cloth". It is usually caused by improper selection of sewing parameters and material properties, which results in unevenness on fabrics being stitched together, thus impairing their aesthetic values. In severe cases, seam pucker could appear like a wave front, originating from the seam, and extending to the entire piece of garment, e.g., when the seam is the cent ridge linking the two pieces of fabrics in the back of a man's suit. In less severe cases, the wave formation is less pronounced, but nevertheless discernible. Indeed, garments exhibiting pronounced seam puckers are certainly unwelcome by customers [1].

It has been well recognized that elimination of seam pucker entirely is almost impossible, and the common practice is to accept a small amount of pucker is as normal. Hence, in such a scenario the understanding of the root causes of the seam pucker and accordingly finding the solutions for minimizing it highly essential. Here, the authors have undertaken the exercise of consolidating the various causes of seam pucker and different remedial recommendations for minimizing it.

Causes of Seam Pucker

Structural jamming or inherent pucker

During seam formation, stitches are made by interloping of bobbin and needle thread. These sewing threads displace the fabric yarns from its original position. Fabric yarns attempt to return to original position and they are prevented from doing so by the sewing threads. This causes the fabric layers to displace in a plane perpendicular to fabric plane and results in seam puckering. This kind of pucker is visible mostly in tightly constructed fabrics, which do not have enough space to accommodate sewing threads. High stitch density which calls for more space also causes structural jamming in tightly constructed fabrics. This kind of pucker is visible in both sides of the fabric. The severity of the condition depends primarily on the characteristics of the fabric, fibre, the closeness of the

weave or knit and the fabric finish. Relatively coarse fabrics of natural fibres are less likely to experience 'inherent pucker' than tightly-woven synthetics, delicate micro-fibres or fabrics with pucker-sensitive finishes or treatments.

Tension pucker

Tension pucker occurs when sewing thread is under very high tension. Sewing thread extends due to very high tension, afterwards attempts to relax. If elastic recovery of thread and shrinkage of fabric coincides, pucker does not occur. But in most situations recovery of thread is more than fabric shrinkage causing fabric to pucker. This is inevitable from the point of view of sewing operation, which requires higher needle thread tension than bobbin thread tension to snatch the later for stitch formation.

Feed pucker

Differential feed of feed dog produces feeding pucker. During sewing operation, bottom layer fabric is moved forward by feed dog positively. But the movement of top layer fabric is effected through frictional contact between top and bottom fabric. Thus movement to top fabric is not a positive one. The velocity of top layer fabric is generally lower than that of bottom layer fabric. This causes accumulation of bottom layer fabrics and produces feeding pucker, which is visible at one side only.

Shrinkage pucker

Sewing thread shrinkage

High shrinkage potential of fabric is another source of seam pucker. Threads made of cotton and other natural fibres often shrink, when wet. This may cause seam pucker when fabric shrinkage and thread shrinkage differs. This problem can largely be overcome with the use of synthetic sewing threads. These threads are normally dry heat stabilized to withstand up to temperature of 150°C. They may also cause seam pucker during pressing, if the pressing temperature is above heat-set temperature. Sewing thread shrinkage should be compatible with fabric shrinkage. If the sewing thread has a higher shrinkage than the fabric, seams may pucker, when exposed to water and heat. Thread is not only vital to the performance of the garment, but it also affects the ease with which the fabric is sewn.

Identification Tests

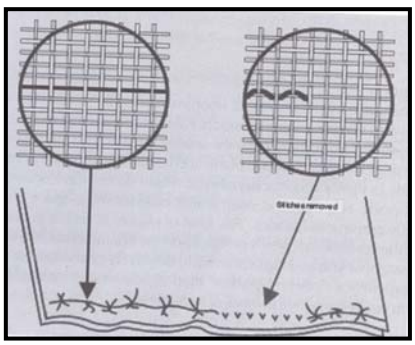

Figure 1: Test for structural pucker

Structural jamming or inherent pucker

To identify 'inherent pucker', carefully cut and remove the stitches in a short length of seam, after first checking for 'tension pucker'. If both the faces of the seam revert to a smooth surface, 'structural jamming' has occurred. The test method is presented in Figure 1.

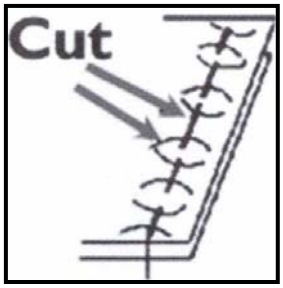

Figure 2: Test for tension pucker

Tension pucker

Carefully clip the thread between adjacent needle penetrations along the seam and observe if the puckering remains in the fabric or goes away. If the puckering is still in the seam after the threads are clipped, then yarn displacement is

the probable cause. Figure 2 represents the method of tension pucker test.

Feed pucker

Make two perpendicular cuts across a sewn seam where the puckered condition is the greatest. Remove the thread in the seam and see if the two plies are of equal length. If one is longer than the other, then the puckering is being caused by uneven ply feeding. Figure 3 shows the test method for feed pucker.

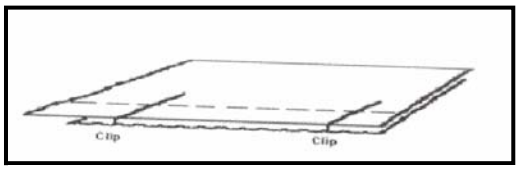

Figure 3: Test of feed pucker

Shrinkage pucker

Using an indelible ink pen, make two perpendicular lines exactly 10 inches apart across a seam that usually exhibits excessive seam puckering after laundering. Connect the marks with a line running parallel to the seam connecting the two perpendicular lines previously made. Now, subject the garment to finishing and pressing cycles and then check the length of the seam again. If there is seam shrinkage, the distance between the two marks will be less than 10 inches. The difference in length divided by 10 will give you the percent shrinkage. Figure 4 shows the test for shrinkage pucker.

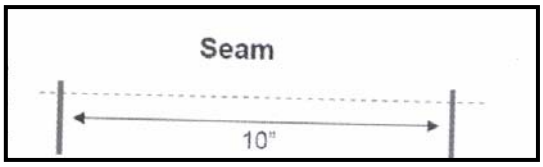

Figure 4: Test for shrinkage pucker

Solutions

Structural jamming or inherent pucker

- Cut and sew on the bias, when possible. By sewing at a biased angle, the needle displaces different sets of warp and weft yarns, thereby significantly reducing the incidence of pucker
- Opt for finer needle and thread sizes
- Reduce the stitch density (stitches per inch), thereby reducing the yarn displaced in the stitch line
- Chain stitch or over-edge stitches will produce less 'structural jamming' than lock stitch
- Avoid multiple rows of stitching, which cause more pucker because the stresses in each row are cumulative
- When topstitching a seam, use the finest thread size possible to assemble the panels sewn prior to the top stitching operation

Tension pucker

- Reduce the tension applied to the thread as it is wound onto the lockstitch bobbin
- Use the minimum tension required to give a neatly wound bobbin
- Loosen the under thread (bobbin) tension spring so that it is as light as possible but without comprising on thread control
- Set the needle thread tension to be as light as possible whilst still achieving a balanced stitch. This will reduce the amount the thread is stretched and improve sewability

- Use a high quality sewing thread with a low friction lubricant applied to it. This will allow the thread to run smoothly through the thread guides and tension controls
- Ensure that the sewing machine feed timing is correctly set, as incorrect feed timing can lead to the need to apply excessive tension to the needle thread, in order to create a properly balanced stitch

Feed pucker

- Use a low friction presser foot
- Adjust presser foot for minimum pressure, whilst still achieving positive, even feed of the fabric
- Raise the back of the feed dog slightly to create a pulling effect away from the needle
- Check the feed dog for correct height, teeth per inch, and number of rows of teeth, appropriate for the fabric and operation
- Make sure the operator is not holding back on either the top or bottom ply
- Check for fabric hanging in any folders that may be in use
- Match up feed and foot
- The throat plate and presser foot should have needle holes approximately twice the size of the needle
- If the machine has both top and bottom feeders, ensure that the timing is correct
- In the case of multiple stitching, sew in one direction only

Shrinkage pucker

- This problem can largely be overcome with the use of synthetic sewing threads. These threads are normally dry heat stabilized to withstand up to temperature of 150°C.
- They may also cause seam pucker during pressing, if the pressing temperature is above heat-set temperature, hence suggested to maintain the pressing temperature below 150°C.
- In case of cellulose based sewing threads, mercerization should be carried out before use to make it shrinkage free.

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