Defects Their Causes and Remedial Measures in Terry Fabric

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Abstract:

Terry towels are often very complex with yarns of different types and colors, in combination with various loop pile and flat structures. Towels are subject to changing fashions, and market is constantly demanding new designs with improved fabric characteristics important to the consumer such as softness and absorbency. In satisfying these requirements, the content and structure of terry towel as well as defect free fabric are critical decisions determining the resulting quality. This paper is an attempt to present a spectrum of defects. It reveals that each defect has to be analyzed in terms of causes of defects by a variety of reasons and the corrective actions taken. Analysis of fabric defects fulfills one of the management objectives to achieve continuous improvement in the product.

Introduction:

The manufacturing of terry towels/fabrics demand for specialize knowledge to avoid the pitfall those are inherent and which causes many problems, right from the weaver to head of department as well as sales staff too. Fabric defect can be defined as an unacceptable textural difference, caused by many factors, that undetermines the quality of fabric. Fabric quality can be quantified as the number of defects per square meter. One of the most elusive and confusing problems faced by textile technologists is the analysis of the fabric defects. To analyze the cause of defect a textile technologist has to make a guess mate of "What could and where had happened" situation to put forth his hypothesis. It may or may not be true reflection of a situation. Properties of raw material, processing deviations in terms of man-machine settings and their interactions with the material, all can contribute to the problem of defect generation. According to a report, fabric faults or defects are responsible for nearly 85% of the defects encountered during the manufacture of garments. Manufacturers recover only 45% to 65% of their profits from seconds or off-quality goods. Identification of fabric defects offers both a challenges as well as opportunity. Challenge comes in the form of pinpointing the exact stage at which the fabric defect got inducted as well as its contributing factors. It provides opportunity to enrich analytical ability and joy of finding the "solution", on one hand and to eliminate or at least restrict to a minimum the occurrence of these defects on the other hand. One usual trouble occurring especially when weaving reversible patterns in two tones, or white and color terry, where one color shows on the face, and the other color on the back side of the terry fabric, or alternately changing from face to rear, is the tendency of color to mix into the part, where only white terry should appear or where color should appear. The smallest spinning slub or knot would to drag back the pile yarn from the loops previously inserted during weaving, and either stops the loom because of the slackened end or make a slight tangle. On the way or another it either causes

an annoyance to the weaver or disturbs the overlay of the terry so as to produce "seconds". No appreciable gain in production, possibly a small loss. Terry fabrics and terry looms / terry weaving machines are subject to most of the problems and the faults those are associated with the weaving of flat fabrics, but there are some additional defects, associated specifically with the three or more pick cycle of terry weaving.

Problems Caused Due to Weft Breakages:

If the loom does not stop "on pick", when a weft break occurs then because of the basic three pick terry structure, it may be necessary not simply to remove, and replace the pick but to remove and replace the whole group of picks so as not to produce faulty or abnormal loops. All picks must be pulled out to find the correct pick for a new start. The ground beam and pile beam are pulled back, but care must be taken when pulling back the pile beam not to pull back too far, or the terry loops left in cloth will be pulled out.

Formation of Cracks When Changing From Border to Pile:

It is usually observed that a visible unsightly "crack" is formed across the full width of fabric when changing from border weave to pile weave but which does not occur when changing from pile weave to border. In order to prevent this defect, it is usual to insert two or some times more "cramming picks" into the border weave immediately before the change back onto terry weave takes place. The method of arranging the change is found to influence its severity.

There are three different ways in which the fallback of reed can be made to operate when changing from border to pile, depending on the point at which the pattern changeover has been made from terry to border and similarly eventually back to terry weave.

The reed falls back for two picks, and then beats up fully after the three picks, which causes the worst "crack". The reed beats up fully on the first pick then fall back on second and third picks, which gives a less pronounced "crack". The reed falls back on the second pick beats up fully on the second pick, and falls back on the third pick. This gives the least pronounced "crack", and if this arrangement is employed in conjunction with the "cramming picks" the crack can be avoided. In first two arrangements, cramming will not cover the crack.

Formation of Random Warp Wise Cracks:

Another type of "crack" that appears in terry fabric, is a gap in the warp direction in the pile, extending typically for 2 to 15 cm. in length and randomly distributed. This gives furrow like appearance in the terry fabric. Such appearances at places giving delusion of missing piles from these portions.This defect is seen more prominently in figured pile fabric than in plain pile fabrics.

Causes:

In figured pile fabric, generally the furrows start at the point of crossover of a pile from face to back or from superficially correct practice of arranging the warp yarns in the reed in the way that gives the most uniform distribution of pile i.e. ground and pile alternately with one of each, in each reed dent. Such an arrangement causes the around warp to occupy the outer position in each dent in one half of the cloth. However, the natural tendency for the cloth to contract at the fell causes the ends to be drawn inwards and the around end being much tighter, tend to move past the pile warps causing them sometimes to change the position.

Remedies:

- To draw two ground ends to a dent, then two piles ends and so on.
- To change the order at or near the centre of reed or shifting the reed sideway relatively to the healds so as to give a one way bias across the whole width but both methods may give rise to the other problems. One of the major problems encountered is that when changing direction of pile for Jacquard figure effects, unsightly line appears in the warp wise direction. These furrows appear in random on the face and the back of the fabric, and are caused by the pile threads tending to migrate from one side to the other of adjacent ground ends.
- In order to prevent unsightly warp wise cracks from appearing in counter changing patterns, it is necessary to separate the pile ends from the ground ends in the dent.
- In order to prevent pile warp ends from migrating around each other, when adjoining ends are forming loops on the same side of the cloth, i.e. lifting together, it is necessary to separate them from each other in the dents.
- It is not necessary to separate the ground warp ends from each other, as they weave in opposing shed all the time, and do not migrate around each other.

Mixed Terry:

This defect known by such names as mixed terry, mingling, dogs teeth etc, while ever present can easily be corrected and not be repetitive trouble. The loosely weighted pile end is likely to be adversely affected by anything, which it may come into contact.

Causes:

- The ground ends being heavily tensioned, and consequently tightly woven, must bear heavily against the sides of reed wires as the shrinkage from yarn spread to cloth width takes place during weaving when the pile end at the right hand side of its adjacent ground end in the dents of the reed, there will be problem. But that applies only to the right hand side of the fabric. The left hand end of the fabric will show mixed or ragged looking terry loops.
- At this left hand side the ground ends are trapping the pile ends against the reed wires. As when the fast pick of the three picks forming the terry weave

cycle, is beaten up to produce the loops, the imprisoned pile ends are nor perfectly looped. They mingled with the other ends, having loose and are pushed out of the position, often being interwoven wrongly, while hanging loosely the loop will go to the underside instead of the top a desired, or vice-versa, thus causing mixed terry or loose loops.

Remedies:

- To draw the pile ends at the right hand side of their adjacent ground ends in each dent in the right half of the towel. Somewhere near the centre, draw one pile – one ground – one pile (p-g-p) in one dent.
- Reversing the last 9 inches while drawing a new set, and where necessary to increase this amount at the loom, on observing full effect.
- In a full harness jacquard pattern fabric is to use the two and two method of drawing the pile and ground ends in the healds, Jacquard harness and reed. Then instead of a ground end another pile end is drawn through the next eye of Jacquard harness. Then draw first ground end through the eye in the healds haft and again another ground end in its respective eye of the ground healds. This across the full width of the yarn spread, the ends will lie "pile, pile, ground, ground" manner.
- "Reversing the drawing" method only be used in good quality terry fabric with fairly fine reeds, and improves terry cover by drawing the ends in one dent. The pile ends are kept free from interference by the tight ground ends, the pile end being protected by the reed wires from the pressure of the ground.

Occasional Imperfect Loops:

The ground ends, being drawn tight against the reed wires, may trap the pile ends occasionally not allowing them to be fully drawn forward into the loops. When this happens to a single end it does not influence the pile beam rotation, and delivery of yarn that is not consumed causes that end to become slack leading to loss of control by the healds or the formation of loops when there should not be one.

Ridgy Terry:

The term "Ridgy terry" is used when whole rows of loops or substantial lengths of rows are formed with non-standard loop length, often alternate rows of different height. The fault is associated with poor pile tension control, and had been blamed on certain types of delivery mechanism. This fault will be referred to in relation to the terry loom.

Uneven Loops:

Spiked ring temples are generally employed on terry looms. Correct setting is especially important because it is found that, if the temples are set too high or impede the movement of the cloth, result in forming uneven loops near selvedges. An obvious possible reason for this is that with an inclined reed the effective full back is a function of fell height. It is also known that the widthwise contraction

caused by crimping and hence stretching of the weft at beat up leads to slackness in this warp threads near the edges of the cloth and leads to the problem in warp control. Because of the high ground warp tension used in terry weaving, the weft crimp and cloth construction are greater that is normally the case, 10% contraction being a typical value.

Dark Streaks:

This type of defect found in the case study of analysis of fabric defects carried out by the ATIRA. The fabric exhibit dark shade warp – way lines of varying width on face side having cut piles and were continuous in the given piece of fabric.

Causes

- As the streaks were parallel and continuous, these would have occurred due to difference in characteristics of yarns used as pile warp.A group of caurse yarns appears lighter and group of finer yarns appears darker in the shade than the body of the fabric after dyeing.
- One of the most prominent causes is the uneven dent spacing or wrong drawing-in of ends through the reed. Such streaks are relatively fine.
- Even a variation nominal count of about 10% is sufficient to generate warp streaks if such yarns get grouped at warping and sizing.
- Differences in lusture, reflectance or differential dye pick up of yarns due to difference in raw materials or blend composition can cause warp streaks.

Remedies:

- Proper drawing-in of ends from the reed and dent spacing should be done properly.
- If possible use group of yarns of same characteristics**.**

Curled and Folded Surfaces:

This defect is characterized by the appearance of curls and creases folds in the selvedges of the fabric after wet processing. Dyeing and printing are uneven in the vicinity of such creases. A selvedge, which gets curled and folded during wet processing, is often slack and wavy and exhibits a corrugated appearance at the grey stage. During wet processing such a selvedge gets further curled and folds itself at places, leading to crease formation after the fabric passes through the squeezing nip

Causes

- Slackness of the selvedge is caused by incorrect choice of selvedge yarn count, twist, weave, drawing and denting order.
- Selvedge folds are also some times caused by improper piece to piece stitching.

Remedies

Proper selection of yarn characteristics, weave, drawing and denting order reduce the chances of folding the selvedge.

Conclusion:

Fabric defects can cause not only loss of profit but also of brand image in the market and in some cases it can push the smaller units into a poor economic situation.

Considering the variability of factors, which contribute to the conversion of raw material into the finished product, it is quite obvious that with slight change in the properties of raw material, machine settings, processing variability etc, a defect causing attributes may get induced at any stages of production.To minimizing occurrences of any objectionable defect and damage, is to record and critically analyze each type of defect as and when it occurs. This may be taken as reference for the future analysis. However in many cases the actual cause is difficult to pinpoint, as similar looking defects could arise due to a variety of reasons.

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