



Analysis Of Textile Wet Processing Defects And Remedies With Precautionary Measures

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Abstract

The scope of the analysis is to minimize the value loss due to occurrence of quality defects during wet processing of textile fabrics. So, processors should take suitable precautionary measures to control the processing defects. Due to the presence of defect, the fabric have to be sold at lower price. Fabric defects can cause not only loss of profit but also affect the 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.

From the analysis, I have found six different wet processing defects. The methodology of the project is discussed below; How to analyse the wet processing defects, Defect removing trails such as chemical tests, physical tests microscopic analysis, Lab processing trials (Lab dyeing), Reason for the defect, Defect removing trials, Precaution and remedies.

According to this analysis we can observe how and when the faults are occurring during the process and how is it possible to control or remove it. These can be used as a tool for analysing textile wet processing defects in textile industry

Keywords: Quality, Defects, Precaution, Dyeing, Contamination

INTRODUCTION

Textile industry is the one among the largest occupational industry in India after agriculture and is responsible for employment of large number of people which includes both skilled and unskilled labours. Over 35 million people in our country depend on

textile industries which is the second largest employment generating sector. So concentration should be given for both the production and quality of textile materials.

Sometimes when defect occurred it will affect both the quality and productivity of the textile material, which creates a huge value loss to the textile industry. In such situation we have find out the defective sources and act for the precaution.

This analysis is explaining the wet processing defect analysis, identification, and how it is possible to control or remove it to overcome these problems. In General there are many reasons for wet processing defect, in my research I have found some of the defects and explained the same in the project report.

developments have given us a wide range of synthetic threads which is most superior to cotton threads.

OBJECT:

The wet processing defects are classified as follows,

- 1.Fibre defect (Fibre problem will creates the wet processing defect) 2.Yarn Defect (yarn problem will creates the wet processing defect) 3.Processing defects
- 2.To Analyze the above problem and find the remedies and precautionary measures

Types of defects:

- White spots observed on the polyester/cotton dyed fabric
- Bleached cotton hosiery fabric was found to have some coloured contaminations
- Polyester dyed yarn having dark spots
- Dark lines observed on the viscose dyed fabric
- Dyed p/c woven fabric having light and dark shade variation in weft way.
- Dull and bright shade variations observed on the mercerised cotton hank yarn sample

Defect I

WHITE SPOTS OBSERVED ON THE POLYESTER/COTTON DYED FABRIC

Cause Identification

Trial 1

The defective portion on the fabric sample was taken, stripped off its colour and re-dyed. Defect exists on the re-dyed sample.

Trial 2

The defective portion of the given fabric sample was taken, One bit was carbonized to remove the cotton component and another bit was dissolved to remove the polyester component.

The 100%polyester sample was found to be free from defect and the white spots exists on the 100% cotton sample.

Trial 3

The white spots noticed on the cotton fabric is taken and the spots were separated, viewed under microscope and found to have more off immature and half matured cotton fibre when compared with the normal portion.

Mercerising treatment (Using 14% sodium hydroxide)

Swelling pre-treatment: Treatment with swelling agents at optimum concentration (e.g. caustic soda of 14% or greater concentration) is effective in swelling the secondary wall of immature cotton and improving its dyeing affinity. On the other hand, dead cotton lacks the necessary cell-wall thickness to be effectively treated penetrates into the cellulose of the fibre.

Trail No.	Type of test	Test result
Trial 1	Stripped and re-dyed	Defect exist
Trial 2	Carbonised(Cotton dissolved)& Dissolution(PET Dissolved)	Defect only exists on the cotton portion
Trial 3	Microscopic analysis	Defect portion found to have immature cotton fibre
Trial 4	Stripped mercerised and dyed	Free From defect

Reason for the defect:

Normally these types of immature and half matured cotton fibre have low affinity towards dyestuff and appear to be light dyed or undyed (white spots).

The maturity difference of cotton fibres is shown in figure below.

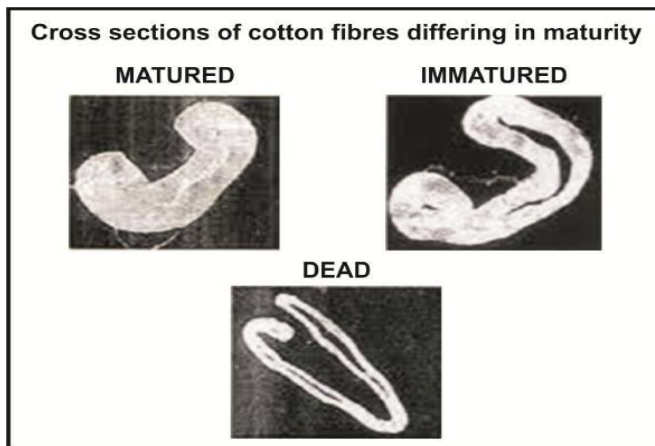
Testing on sewing threads:

In Generally the sewing threads are tested by 2 methods. There are,

- i) Physical test
- ii) Chemical test

Physical Tests

Precaution:



There are several stages in the fibre preparation where an attempt can be made to decrease the amount of the immature and/or dead fibres that are usually clumped together. It is important to try to remove these clumps prior to the carding process. Once they passed the main cylinder of the card with proper setting on flat to cylinder, the clumped fibres go into the subsequently formed yarn and the fabric

Defect II

BLEACHED COTTON HOSIERY FABRIC WAS FOUND TO HAVE SOME COLOURED CONTAMINATIONS

Cause Identification

The fabric was found to have red, blue, black, and brown colour contamination. These contaminations were very tiny and observed only after bleaching process.

The contamination portions were carefully separated (Using higher magnification lens), and viewed under the microscope and further analysis results are as follows.

S. No	CONTAMINATION	OBSERVATIONS
1	Red color contamination	Fibre looks like synthetic fibre, on further fibre identification test confirmed to be polyester fibre
2	Black color	Plain rod like structure in microscope on further analysis confirmed to be

	contaminatio	hair.
3	One blue colo contaminatio	The contamination portion was same as cotton fibre, on further analysis confirmed as stains
4	Brown color contaminatio	Bundle like structure in microscope, on further analysis confirmed to be jute fibre.

Contamination fibre mixing stage analysis:

Red Contamination:

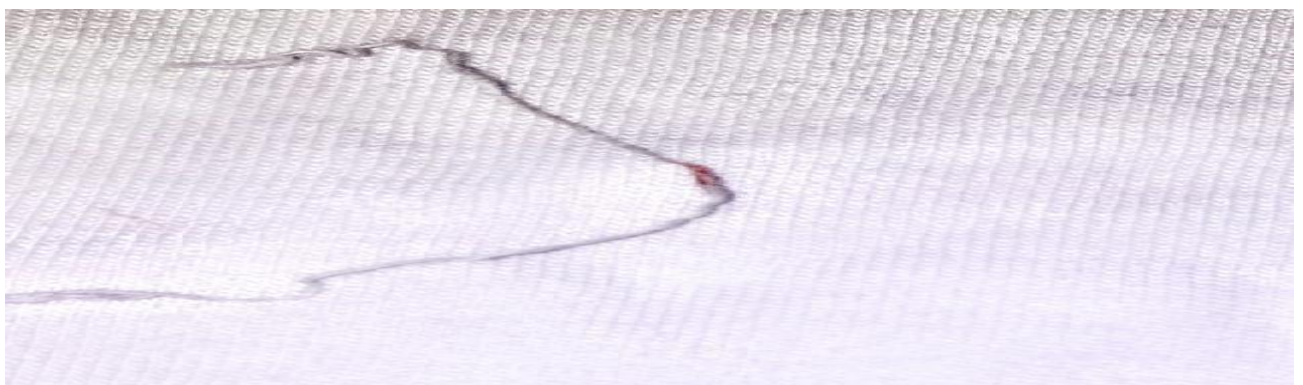
This contamination is due to mix-up of red colour polyester fibre. The contamination portion of the cotton yarn was untwisted and then the red fibre was separated.

process

Towelling fabrics belongs to simple fabrics in which one series of warp The red

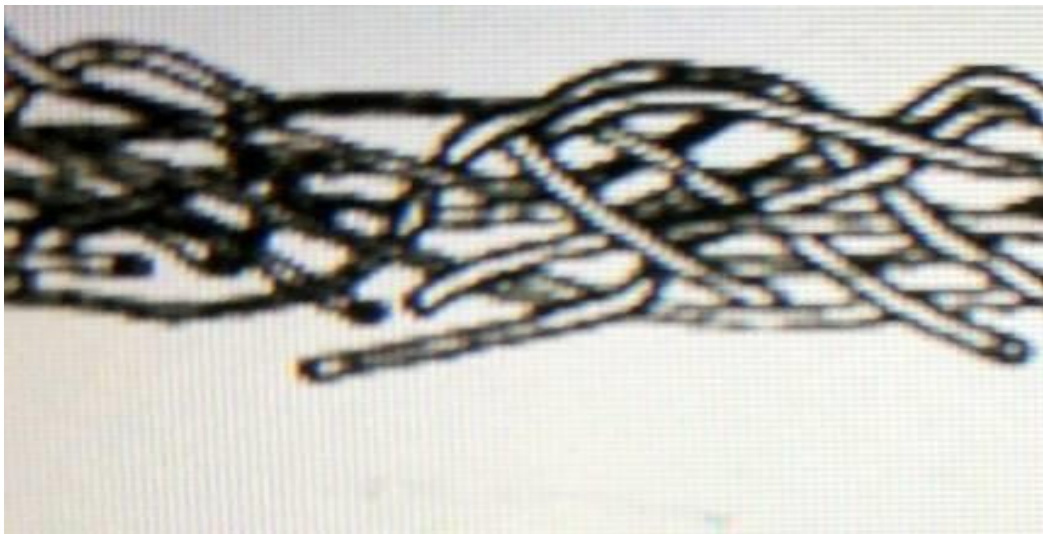


fibre should have mixed in fibre stage. So the defect occurred before spinning



BLACK CONTAMINATION:

This contamination defect is due to mix-up of human hair. The small black hair fibre twisted along with the normal yarn so the defect occurred at the yarn stage (i.e) spinning process.



BLUE CONTAMINATION

The blue colour defect is one of the stains, this stain look like a pen mark, it can be removed by hot soaping treatment.

BROWN CONTAMINATION

This type of contamination is due to mix-up of jute fibre, this fibre slightly stick on the knitted portion. So the defect may be due to mix-up of jute packing material or fly fibre mixed in knitting stage.

Reason for defect

Poor absorbency due to inadequate pre-treatment such as scouring process

The cotton impurities such as oil and wax are not removed completely the wax unremoved area should have less absorbency that creates white patch defect.

Precaution:

- Care should be taken for cleaning of machineries and environment.
- Each stage material inspection should be done carefully.
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Defect III

POLYESTER DYED YARN HAVING DARK SPOTS

Trail 1 The defective portion on the yarn sample was taken and the following treatments were given;

S No	TREATMENT	OBSERVATION
1	<ul style="list-style-type: none">Hot wash with plain water	<ul style="list-style-type: none">Defect exists
2	<ul style="list-style-type: none">Washed with 2g/l detergent at boiling temperature for 30 minutes	<ul style="list-style-type: none">Defect exists
3	<ul style="list-style-type: none">Stripped (Dye colour removed) andre-dyed	<ul style="list-style-type: none">Defect exists

Trial 2

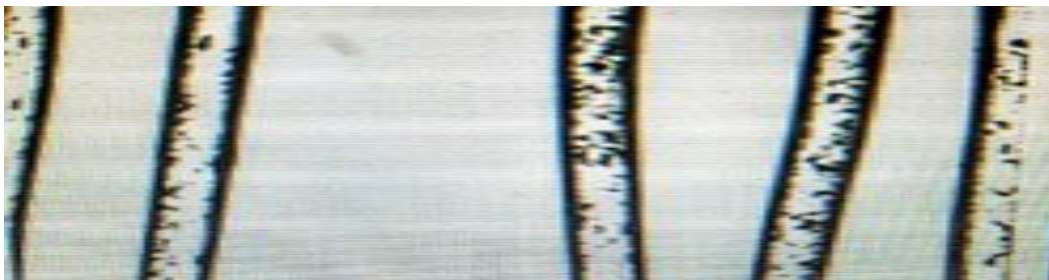
The dark spot portion were separated and viewed under the microscope, the fibre appears to be melted and damaged when compared to the normal yarn.

The normal and defect portion yarns were analysed for the type of material, both are found to be polyester fibre.

Reason for the Defect:

This defect will be due to fibre fusing (melting) problem the melted portion of the yarn creates dark spots. The (Defect) dark spot portion of the fibre is damaged and melted before wet processing (i.e) Fibre stage or spinning process.

Normal polyester fibre longitudinal view:



Precaution:

- Presence of recycled polyester fibres may cause this type of defect, care should be taken in selection of fibres.
- Improper twisting in spinning process.
- Care should be taken for proper denier of polyester fibre supplying.
- Periodical machine cleaning, maintenance is necessary.

Defect IV

DYED P/C WOVEN FABRIC HAVING LIGHT AND DARK SHADE VARIATION IN WEFT WAY

The P/C (polyester/Cotton) dyed fabric sample was found to have light and dark shade variation in weft way.

(Light portion is normal portion and dark portion is defect portion)

Trial 1

The defective portion of the fabric sample was taken, stripped (colour removed) off its colour and re-dyed, defect exists on the re-dyed sample.

Trial 2 The normal and the defective weft way portion yarns were separated, analysed for the Count, TPI (Twist per inch), Blend analysis, and the results are as follows;

S.No	Test parameter	Light portion		Dark portion	
1	Average yarn count				
2	Average single yarn TPI				
3	Blend Analysis	A	B	A	B
4	%Polyester	74.3	72.8	64.4	62.6
	%Cotton	25.7	28.2	35.6	38.4

A-On Dry weight B-On calculated condition weight

Wide variation observed on the blend results (Up to 10% variation observed)

Reason for the defect:

For the above analysis count and TPI results for the normal and defect portion is more over the same. But 10% blend variation will create the light dark shade variation on the dyed fabric.

Precaution:

- Select fibre carefully in blending process
- As there is a chance of manual error during weaving care should be taken to using the correct cheese.

CONCLUSION

wet processing defects are analyzed and conclude the below results :

1. So the defect noticed on the given P/C dyed sample is due to presence of immature and half matured cotton fibre
2. Hence the above contamination defects are due to unclean environment and improper maintenance ends up in the knitting Zone
3. Hence the defect (Dark spots) noticed on the yarn sample due to fused (Melted) polyester fibre.
4. Hence the light and dark shade variation noticed on the given woven dyed fabric sample is due to blend variation of Weft way P/C Yarn.
5. Hence the dark line observed on the dyed viscose fabric is due to mix-up of MODAL Yarn.
6. Hence the defect (bright and dull shade variation) observed on the sample is due to improper mercerising
7. This analysis will be helpful in providing basic skills to identify, analysis, control or rectify the defects and also gives quality control and process control checks to avoid defects. With these information, to minimize consultancy of the textile processing industries by themselves can take measure regarding defects and can rectify the problems to maintain the quality of their finished goods.
8. Finally I think the report will contribute significantly to develop and enrich knowledge on the wet processing defect analysis.

RESULT AND DISCUSSION:

In this project the textile wet processing defects are analysed, and I have taken only ten different types of wet processing defects for a detailed study and their explanations are as follows:

1. Defect caused by white spots in dyed cotton fabric was identified to be because of immature cotton fibre which can be rectified by fabric caustic treatment (Mercerisation) method are analysed.

2. Bleached cotton hosiery fabric have coloured contamination defect. The reasons and removing method are analysed for the above defect.

- 1. Red colour fibre contamination - Removed using polyester dissolving solvent,
- 2. Black hair contamination - removed by chlorine bleach treatment,
- 3. Blue pen mark stain was removed by hot soaping treatment,
- 4. Brown jute contamination - removed by plucking and combing treatments.

- Polyester fibres having dark spots were identified to be due to melted (Fused) fibre mix-up and the precaution method were analysed.
- 3. Dark line in viscose dyed fabric due to modal yarn mix up was identified and precaution method were analysed.
- 4. Dull and bright shade variations in mercerised cotton yarn due to uneven mercerisation was identified and remercerised to minimize the defect.

P/C fabric with weft way shade variation was found to be due to P/C blend variation in weft yarn

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