



P-ISSN: 2349-8528

E-ISSN: 2321-4902

IJCS 2018; 6(2): 3353-3355

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Received: 01-01-2018

Accepted: 02-02-2018

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International Journal of *Chemical* Studies

Usage pattern of cotton blended shoddy yarn for product development in industry

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Abstract

Shoddy is a term used for the category of recycling that “opens” textile waste and used clothing and returns them to fibrous form. In recent years there is need to develop techniques, methods and procedures for eco friendly process products which are environment safe. Recycling is becoming more and more relevant in today society in search for economy and minimal wastage of our resources. Moreover, Synthetic yarn is non bio-degradable and even bio-degradable substances also take a long period to decompose which further leads to pressure on land. Through shoddy industry, bulk of old clothing is recycled and products made from this yarn lead to reuse. In nutshell one may say that the process of shoddy yarn making is totally an eco-friendly process in which the major thrust area is recycling. The research was undertaken to study the usage pattern of shoddy yarn for product development in industries. Ten shoddy industries in Panipat city of Haryana state were selected purposively, to collect information regarding usage pattern of cotton blended shoddy yarn. Data was collected using interview schedule and supplemented with observations. The results revealed that all the selected industries used cotton /cotton blended and wool/wool blended rags as raw material to make the blended shoddy yarn. Other rags used by majority of the industries were acrylic and its blends, polyester and its blends and nylon and its blends. The shoddy yarns were prepared using different blend proportions in 2.5, 4, 6, 8 & 10 counts in 2 ply yarn by all the industries. Prepared yarns and fabrics were tested for physical parameters. Rugs, foot mats and stool mats were the products prepared using cotton blended shoddy yarn with 2.5 and 4 count in all the industries. *Khes*, durries, beach towel with 8 and 10 count was prepared by 50 percent of the industries.

Keywords: shoddy, recycling, rags

Introduction

Textile industry has taken many measures for reducing its negative contribution towards environment, to overcome the problems. One such measure is textile recycling of the used clothes (Anonymus, 2007). The practice of recovering waste is as old as the art of spinning and weaving. Shoddy was invented when old clothes were ground back into a fibrous state that could be re-spun into yarn (Sakhivel *et al* 2012). Shoddy is the fibrous material obtained by shredding unfelted rag or waste. Panipat, in north India, is the world’s largest textile recycling hub, using the eco friendly process to make fabric. It reclaimed as “shoddy”. Shoddy means recycling of rags. The starting point of textiles is yarn making through fibers, which in turn, is the basis of clothing. Yarn is strand of fibers laid or twisted together by a process called spinning. Yarn may be made from one or mixture of the many different natural or manmade fibers varying in characteristic properties, depending upon the source of material. This is an eco-friendly enterprise of recycling these rags by making yarn out of it (Laxminarain, 2010) [4]. The research was planned to study usage pattern of cotton blended shoddy industries.

Methodology

Ten shoddy industries in Panipat city of Haryana state were selected purposively, to collect the information regarding usage pattern of cotton blended shoddy yarn using interview schedule, the data was supplemented with observations. The information included type of rags used as raw material, proportion percentage of cotton blended shoddy yarn, different counts, ply used, weave used and test parameter used for testing yarn and fabric, products prepared using cotton blended of shoddy yarn.

Results and Discussion

Type of rag used as a raw material in industries

It is evident from the data that all the selected industries (100%) used different types of rags as raw material to make cotton blended shoddy yarn. In addition to cotton/ cotton blends and wool/ wool blends, (100%) 80 percent industries also used acrylic/acrylic blends, 70 percent also used

polyester/ polyester blends and 40 percent industries also used nylon/ nylon blends rags as raw material (Table 1). These results are supported by Gupta, M. and Saggi, H.K (2015) [3]. The result of the study revealed that majority of the shoddy units used wool rags and acrylic waste as a raw material in the shoddy industries of Ludhiana and Amritsar.

Table 1: Type of rag used as a raw material in industries N=10

Type of material (blended)	Frequency (f)	Percentage (%)
Cotton / Cotton blend	10	100
Acrylic / Acrylic blend	8	80
Polyester/ Polyester blend	7	70
Nylon / Nylon blend	4	40
Wool / Wool blend	10	100

Multiple responses

Technical processes

After the rags were collected, sorting of the rags according to the colour, quality of available raw material was done in industries. Next step is mixing, is generally done to improve the quality of the fabric as per the requirement. Mixing can

take place at different points along the entire process of making yarns from rags. Sometimes additional blending is done at the mixing stage or at garneting stage to improve the quality of yarn. At that stage, different yarn counts of shoddy yarns were prepared.

Table 2: Proportion percentage of blended yarn with cotton in different yarn counts prepared in industries N=10

Cotton blended shoddy yarn	Blend %	Yarn count (s)				
		2.5	4	6	8	10
		F (%)	F (%)	F (%)	F (%)	F (%)
Cotton +Acrylic	Below 20%	6(60)	10(100)	6(60)	6(60)	7(70)
	20-40%	10(100)	10(100)	10(100)	10(100)	10(100)
Cotton +Polyester	Below 20%	10(100)	10(100)	10(100)	10(100)	10(100)
	20-40%	10(100)	5(50)	2(20)	1(10)	2(20)
Cotton + Nylon	Below 20%	10(100)	10(100)	7(70)	7(70)	7(70)
	20-40%	6(60)	5(50)	5(50)	5(50)	
Cotton + Other fibre	Below 20%	7(70)	5(50)	5(50)	4(40)	4(40)

Multiple responses

It was studied that the selected industries made the cotton blended shoddy yarn in different blends proportion percentage in 2.5, 4, 6, 8 & 10 counts. All the selected industries (100%) made shoddy yarn of cotton with acrylic blend (below 20-40%), cotton with polyester blend (below 20 %) in 2.5, 4, 6, 8 & 10 counts, cotton with acrylic blend (below 20%) in 4 yarn count, cotton with polyester blend (20-40%) in 2.5 yarn count, cotton with nylon blend (below 20 %) in 2.5 and 4 counts. Seventy to forty percent industries made shoddy yarn of cotton with acrylic blend (below 20%) in 10 count, cotton with nylon blend (below 20%) in 6, 8 & 10 yarn count, cotton with other fibre blend (below 20%) in 2.5 yarn count (70% industries). Cotton with acrylic blend (below 20%) in 2.5,6,8 yarn count, cotton with nylon blend (20-40%) in 2.5 yarn count made (60% industries). Cotton with polyester blend (below 20-40%) in 4 yarn count, cotton with nylon blend (below 20%) in 4 & 6 yarn count (50% industries). Cotton with other fibre blend (below 20%) in 8 & 10 yarn count was made by (40% industries). Twenty and ten percent industries also made shoddy yarn of cotton with polyester blend (20-40%) in 6 &10 yarn count (20% industries) and in 8 yarn count (10 % industries).

The results are supported by Gupta, M. and Saggi, H.K. (2015) [3]. The result revealed that polyester yarn was mostly used as raw material followed by wool and acrylic for weaving blankets in shoddy industries Ludhiana and Amritsar.

Table 3: Cotton blended shoddy yarns in different ply manufactured in the industries. N=10

Ply of yarn	Frequency(f)	Percentage (%)
2ply	10	100
4ply	2	20

Multiple responses

The data depicted in the table 3 resulted that all the industries manufactured the 2 ply cotton blended shoddy yarn. Twenty percent industries also manufactured 4 ply cotton blended shoddy yarn as per the requirement of the product to be prepared.

Table 4: Test parameters performed for shoddy yarn in industries N=10

Type of tests	Frequency (f)	Percentage (%)
Yarn count	10	100
Blend test	10	100
Twist per inch (TPI)	10	100
Yarn strength & elongation	10	100

Multiple responses

The results presented in table 4 regarding the test parameters performed to test the prepared cotton blended shoddy yarn in the industries. It was studied from the data that all industries (100%) tested the yarn count, blend test, twist per inch and yarn strength & elongation of prepared cotton blended shoddy yarn.

Table 5: Test parameters considered for fabric for preparing textile products from shoddy yarn in the industries N=10

Type of tests	Frequency(f)	Percentage (%)
Yarn count	10	100
Strength	7	70
Colour	2	20
Quality of spinning	9	90

Multiple responses

The data depicted that yarn count was kept in mind for preparing the textile products in all industries (100%). Ninety percent industries also considered the quality of spinning followed by the strength of yarn (70%). Twenty percent industries also considered the colour for preparing textile products from shoddy yarn as per the requirement (Table 5).

Table 7: Products prepared of cotton blended shoddy yarn in the industries N=10

Products	Counts				
	2.5	4	6	8	10
	F (%)	F (%)	F (%)	F (%)	F (%)
Rugs	10(100)	10(100)	-	-	-
Contour (Toilet rug for seat cover)	2(20)	2(20)	-	-	-
Foot mat	10(100)	10(100)	9(90)		
<i>Khes</i>	10(100)	9(90)	10(100)	6(60)	7(70)
Stool mat	10(100)	10(100)	10(100)	-	-
Durries	-	7(70)	6(60)	5(50)	5(50)
Prayer mat	4(40)	4(40)	-	-	-
Beach towel	-	-	-	5(50)	6(60)

Multiple responses

It was found that shoddy fabric made with different counts was used to make different products. Shoddy fabric with 2.5 counts was used to make rugs, foot mats, *khes*, stool mat (100%) followed by beach towel (40%), contour (20%). Shoddy fabric with 4 counts was used to make rugs, footmat, stool mat (100%) followed by *khes* (90%), durries (70%), beach towel (40%) and contour (20%). Shoddy fabric with 6 counts was used to make *khes*, stool mat (100%) followed by footmat (90%) and durries (60%). Shoddy fabric with 8 counts was used to make *khes* (60%) followed by durries and beach towel (50% each). Shoddy fabric with 10 counts was used to make *khes* (70%) followed by beach towel (60%) and durries (50%). The results are supported by Saini, N. (2018)^[5] that it was found that mainly two type of products (apparel and home furnishing) are prepared in wool blended shoddy industries of Panipat. Different type of products like carpets, mats and rugs with blend of acrylic, polyester and cotton manufactured in shoddy units of Panipat.

Conclusion

Majority of shoddy industries used cotton /cotton blended and wool/wool blended rags as raw material to make the blended shoddy yarn. Other rags used by majority of the industries were acrylic and its blends, polyester and its blends and nylon and its blends. The cotton blended shoddy yarns were prepared using different blend proportions percentage that is cotton with acrylic, cotton with nylon in below 20% and 20-40% in 2.5, 4, 6, 8 & 10 counts in 2 ply yarn by all the industries. Plain and twill weave was used to make shoddy fabric in all the industries. Rib, dobby and jacquard weave also used as per the product requirement. Yarn count and quality of spinning of shoddy yarn was considered for making the products in industries. Rugs, different type of mats were the products prepared in all the industries in 2.5 & 4 count.

Table 6: Type of weaves used for making of cotton blended shoddy fabric in the industries. N=10

Weaves	Frequency(f)	Percentage (%)
Plain weave	10	100
Twill weave	10	100
Rib weave	3	30
Dobby weave	3	30
Jacquard weave	2	20

Multiple responses

The data presented in the table 6 resulted that all the industries (100%) made fabric with plain weave and twill weave followed by rib weave and dobby weave (30% each). Twenty percent industries also made fabric with the jacquard weave for making different products from cotton blended shoddy fabric in the industries.

Fifty percent industries also prepared durries, *khes*, beach towel in 8 & 10 count.

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