

EFFECT OF STRENGTH ON COTTON AND BLENDED MATTRESS FABRIC PRODUCED BY MECHANICAL PROCESSING SYSTEM

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Abstract: *Mattress fabric is one time used fabric. It need not require for washing. In this perspective, a project was taken to replace 100% cotton mattress fabric instead of Jute-Cotton blended mattress fabric. It is seen that Jute: Cotton blended mattress fabric posses similar properties to the 100% cotton mattress fabric. Bursting strength is an important factor for mattress fabric. From the comparison result, it is also seen that the bursting strength of 80:20/Jute: Cotton blended mattress fabric is nearer to the 100% cotton mattress fabric. On the other hand, blended mattress fabric is cheaper than 100% Cotton mattress fabric. Hence, blended mattress fabric may be the replacement of 100% cotton mattress fabric.*

Keywords: *Strength, Mattress, Jute-cotton Union, Mechanical, Warpwise, Waftwise, Bursting.*

1. Introduction

Jute, the golden fibre of Bangladesh has got various inherent characteristics like high tensile strength, low extensibility, long durability, luster and long staple length. It is a textile fibre of good spinnable character [1]. It forms nontraditional and value-added products helping in environment protection and maintaining ecological balance.

100% Cotton is also a natural seed fibre. It is imported from different countries like Egypt, USA, China, and South Africa etc. for making garments. Percentage of cellulose present in Cotton (94%) which is higher than jute (64%). So it is also called cellulosic fibre. That is why price of cotton is higher than jute. Jute is the cheapest natural fibre used for the manufacture of different goods which are highly in demand both in the domestic as well as foreign markets [2]. Jute-Cotton blended mattress cover fabric are cost-effective than the 100% cotton mattress fabric. The newly evolved jute based

blended yarns will be a better raw materials for value added diversified products. Mattress is one kind of diversified product.

Mattress means a bed made of stuffed bag. Generally mattress are prepared by the 100% cotton fabric mattress fabric is a house hold useable fabric. Mattress fabric does not need wash as apparels do. It has to be the power to with stand the load. So bursting strength is an important factor for mattress fabric [3].

As these blended and 100% cotton jute fabrics are environment friendly, biodegradable cheap and can be manufactured on hand as well as on power looms, so a new outlet would be created as on power looms [4,5].

So, in one side the diversification of jute products will be increased and the other side low cost mattress will be produce.

2. Materials and Methods

2.1. Fabrics: 100% cotton fabrics, jute-cotton union fabric.

2.2. Collection of jute and cotton fibre

Jute fibre and 100% cotton fabrics were collected from the local market. Cost of the 100% cotton is Tk.30/ metre

2.3. Experimental procedure

For producing Jute: Cotton blended yarn, the jute fibres (which were collected from the local market) were cut in to pieces of two inch in length by the cutting machine. Then the cutted jute fibres were chemically modified i.e white and softening by the chemicals. The chemically treated jute fibres were dried by the drying machine. After drying the fibres were separated/opened with the opening machine. After proper opening, the chemically modified fibres were blended with cotton at the ratio of

80:20/Jute: Cotton in the blow room section. A fully modern blow room with eight blending chamber is used for uniform blending of Jute and Cotton.

Then the blended lap of blowroom is passed into the carding machine to get the suitable sliver. After that, the blended sliver is passed in to the drawing frame to get the uniform sliver. Finally, Jute-Cotton blended yarn was prepared with the rotor (Open end) machine from Al-Rajee spinning Mill ltd. Katchpur, Narayangonj, Dhaka, 80:20 jute: cotton blended yarns were produced for blended mattress.

Fabric was prepared in the normal power loom of Jute and Textile Produced Development Centre (JTPDC). Then the blended mattress fabric and 100% cotton mattress fabric were tested in the testing department of Bangladesh Jute Research Institute (BJRI). The test results are shown in the table. The physical properties of the mattress fabric through various treatments were tested in the Testing Department of Bangladesh Jute Research Institute (BJRI). The bending length tensile strength and abrasion resistance of the fabric was determined by Shirley Stiffness Tester, Tensile Strength Tester and Abrasion Tester [6].

3. Result

All the tests were performed in the standard testing atmosphere and the results are shown in the table.

Sl. No.	Fabric	Observation	
1.	100% Cotton	Warp count	10s
		Weft count	10s
		End/Inch	38
		Pick/Inch	26
		Wt/Sq.m(gm)	335.5
		Warp wise strength (Kgf)	140.1
		Weft wise strength (Kgf)	130.3
		Blending length (cm.)	3.0
		Abrasion resistance	Very excellent
2.	Jute-	Bursting strength (Ibsq. inch ⁻¹)	149.8
		Warp count	10 ⁵

Cotton blend fabric (80:20)	Weft count	12 ¹
	End/Inch	36
	Pick/Inch	18
	Wt/ Sq.m(gm)	342
	Warp wise strength (Kgf)	138
	Weft wise strength (Kgf)	128.5
	Bending length (cm.)	3.2
	Abrasio resistance	Very excellent
	Bursting strength (Ibsq. inch ⁻¹)	148.5

The relation between the warp, weft & Bursting strength of blended and 100% Cotton mattress fabric is shown in the Fig 1.

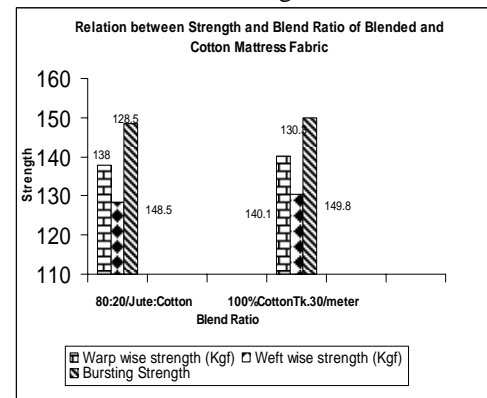


Fig: 1

4. Discussion

In Fig. 1, the horizontal line and the vertical line indicates the blend ratio and strength respectively. For 80:20/jute: cotton blended mattress fabric the warp-wise and weft-wise strength were 36 kgf and 25.19 kgf . For 100% cotton fabric (Tk.30 meter) the warp-wise and weft-wise strength were 40 kgf and 28kgf respectively. Two types of yarn are essential for producing the fabric. One is longitudinal and another is transverse yarn. The longitudinal yarn is called warp yarn and the transverse yarn is called the weft yarn. For mattress cover, the strength of the fabric is an important factor. The strength also depend on the thickness i.e wt/sq.m (gm) of the fabric of same type of yarn [7,8].

From the above results, it is seen that the strength of 100% Cotton yarn is higher than the strength of 80:20/jute cotton blended yarn. From the figure1, it was observed that the wt. of 80:20 jute:cotton blended mattress cover

fabric is higher than that the wt. of 100% Cotton fabric (Tk. 30m⁻¹).

80:20/jute: cotton mattress fabric is also comparable and acceptable for the running items in the Market. As cotton fibre is stronger than jute fibre that is why 100% cotton mattress fabric has shown higher strength than 80:20 /Jute: Cotton mattress cover fabric.

The bursting strength of the 100% cotton fabric (Tk. 30m⁻¹) was 149.8 Ibsq. inch⁻¹. But the bursting strength of 80:20/jute: Cotton mattress fabric was very nearer to the bursting strength of 100% cotton mattress fabric. Bursting strength is a force which is used in a certain length to burst the fabric. It is a very important property of mattress cover. This property has no limit or standard. Higher the bursting strength indicates the good quality of the mattress fabric [9].

The strength of blended mattress fabric was compared to the 100% cotton mattress fabric. When the portion of jute had increased in the blend, the wt. of the matters fabric also increased simultaneously. As the wt. had increased due to thickness of the fabric, the bursting strength had also increased for 80:20/jute: cotton: blended mattress fabric. The 80:20/jute: cotton blended mattress fabric and 100% cotton mattress fabric (Tk. 30m⁻¹) showed very nearer bursting strength.

5. Conclusion

Strength is an important issue for mattress fabric than the other properties of the fabric. Hence, warp wise, weft –wise and specially bursting strength plays the vital role for the longevity of the mattress fabric. Here, the bursting strength of 80:20/Jute:Cotton blended mattress fabrics is very similar to the low price

100% cotton mattress fabric (i.e tk 30 m⁻¹). So, undoubtedly 80:20/Jute: Cotton blended mattress fabric may be the best replacement of 100% low quality mattress fabric and this will help to increase the use of jute based diversified products.

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