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MASHRU FABRIC: INTERFACE CRAFT AND TECHNOLOGY

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ABSTRACT

The main objective of this paper is to know the Mashru fabric as a traditional variety of Indian textiles, the need of invention and its construction. Over here we discussed new materials then the original one. New material will give advantages over the previous materials. The calculations of production cost are also less than the old variety. Introduction of new colours to this quality will invite new customers. This will help Traditional weavers to try new materials and increase new customers.

KEY WORDS: *Handloom, mashru fabric, production technology, silk, traditional textile*

1. INTRODUCTION

Mashru is a Persian word. It means "to allow". In Islamic culture it was forbidden to wear silk directly to the skin, especially during prayer time. So Mashru was specially invented for them, which permitted them to wear silk because it had silk on the outer side of the fabric. The inner side was made up of cotton. Sateen weave was used to weave Mashru fabric. Which gave it maximum silken effect on thesurface and cotton weft can hide. Because of this construction of Mashru, it got immediate popularity in the market. It was the most exported fabric to the Ottoman Empire and the gulf. Indian Mashru fabrics
had simple patterns. It had different numbers of stripes for different varieties. Warp threads were tied and dyed. This type of IkatMashru was known as "Chhada" in Gujarat. Another variety of Mashruis"khanjari". In this quality of Mashru, fabric was determined by the number of wave lines per square unit of the fabric. Mashru was a mixed quality fabric. During that time India had other mixed quality like "Himru". This fabric had cotton warp and silk weft, with plain weave. In today's market it is only manufactured in Aurangabad, and jacquard looms are used to design it. Another variety of mixed fabric was "Sangi". It means together. In this weave two silk warp threads were always working together. It also had a satin weave. British people in 17th century started shipping mixed fabric called "Tapseils" to West Africa, those fabrics
were striped and they had the pattern of single Ikat similar to Mashru fabric. Mashru fabric was used to make jackets, coats, home furnishing etc.

2. PRODUCTION OF MASHRU IN DIFFERENT AREA OF THE COUNTRY:

Previously Mashruwas woven in different areas throughout the country. During 19thcentury there were many centres of Mashru weaving like in Gujarat, Rajasthan, Agra and Varanasi, Hyderabad, Triuchirappalli, Mysore and Madras etc. A century ago mainly warp IkatMashru was there which was separated by brocaded stripes.

Only one variety of Mashru known as “Khanjari " was woven in horizontal stripes. There were some Mashrupatterns which all were in demand in different regions of the country. Like “Katario” and “Sodagiri” in Rajasthan. Arbi and Kamkhi in Madhya Pradesh. Kanki in Gujarat and Rajasthan. Today it has main weaving centres in Mandvi [Kutch] and Patan in Gujarat. Both the centres are weaving different varieties of Mashru. PatanMashru is of 36” or 40” width and made on handloom. They use 120s to 150s rayon warp and 30s cotton in weft. Whereas in Mandvi 21” or 44” width fabric is produced on power looms and fabric will be further finished with block

printing techniques. Mashruwith its new design is attractive and accepted today.

In this research papersimilar process has been followed of Mashru production as the traditional process. The traditional production method is mentioned below.

2.1WEAVING PROCESS OF MASHRU

Very first step of Mashru weaving is to preparewarp yarn. The warp preparators were knownas “tanivala” and the length of warp was about 63 yards. That is equal to 57.58 meters. A traditional pit loom was used with a jacquard arrangement on it. During our research we produced five different varieties of Mashru fabrics with dyed and undyed weft yarn.

2.1.1WARP PREPARATION PROCESS:

Warp threads were led from bobbins or spools and spread on the floor. It passed from the glass ring and wound on a reel. Then the hank was prepared from the reel and taken for dyeing. Warp threads were needed to be tied before dyeing

and it was done by a single woman who did this for Patola in Patan since her young age. (Here in this research we did not use dyed warp.) Warp was needed to stretch out and tiedin a section with cotton yarn. The tied warps were known as chhada and tiers were known as “Patti bandana”. This process was used by traditional weavers. Today plain warps are used for weaving. Rayon 120 denier has been used for warp for this research.

2.1.2WEFT PREPARATION PROCESS:

Weft thread is mostly cotton yarn of count varies from 30s to 32s which is transferred onto the bobbinby a winding machine for Pirn in shuttle. Cotton/linen 33’s count is used for weft. Weft is tried differently with dye and without dye.

2.1.3PREPARATION OF BEAM AND BOBBIN:

Beam was made manually by weavers. Four loops were made for making a beam. Each loop contains 1200 ends (warp), so total ends (warp) on the loom were 4800. Speed of handloom was 6 picks/5 sec =72 picks/ min. (observations taken during research) Weight of empty bobbin is 6 grams. Weightof a full bobbin is 14 grams.

Wait of yarn on bobbin = Full bobbin - Empty bobbin

=14 gm - 6 gm= 8gm

33’s count x 840 yards= 1 pound = 453.6 gram

$= \frac{453.6}{33 \times 840}$

= 0.016gms/yds

So length of yarn in a bobbin= 8 gm/0.016 gm/yds

= 500 yds

457.04 picks per bobbin of 8 gm

2.2WEAVING

Weaving of Mashru was completed on a traditional pit loom. The treadles lay in pits, and warp threads lay across the room. We used five ends of a satin weave. Fabric was collected on the cloth roller then it was cut into five meters long. Then it was washed in cold water and folded while it contained moisture and beaten on the back side of the fabric with a very heavy wooden hammer for about 10 min. This process is known as "kundi" and the person is known as "kundiwala". This process is the type of calendaringprocess which makes all warp threads to be opened and spread evenly on the right side of the fabric.

• Quality of the handloom is improved by using a fly shuttle.

• Even the calendering process in which heavy wooden hemisphere was used

and is improved by adding mechanical support.

• In raw material warp threads are replaced by rayon instead of pure silk.

2.3DYEING PROCESS OF MASHRU FABRICDURING RESEARCH WORK:

Mashru fabrics are dyed by 2 different dyes at Patan in research.

The Vat dye and the Naphthol dye.

Naphthol Dyes:

Azoic dyes are a very versatile dye, butits consumption has declined. The azoic dyes containpigment dyes and vat dyes. Many countries have banned its use. The dyes which belong to the azoic class are not ready to dye colours but are formed in the fibre substance by the dyer from two components.

1) Naphthol and 2) based

This is known as azoic coupling components. The colour can be produced by these colourless components. This component is insoluble in water and so washing fastness of the shades are excellent. However, since the insoluble dye is formed in the fibre substance from water soluble components, it has to be used in aqueous medium. The two compounds combine in the fibre surface and partly suspend in the application bath. This leads to poor rubbing fastness and when dyed stuff is rubbed against any surface some of the pigment is removed from the material by the rubbing surface. Here in azoic coupling component it can be combined with thirty different naphthol and fifty bases. And they give fifteen hundred possible combinations.

Chemicalused: Hydrochloric Acid, Formal dehyde, Caustic Soda, Levelling agent

Equipment used: Beaker, Dyeing-pan, Steel-bowl and mug, Burette, Thermometer, Tripod, Burner

Methods:

Naptholization: it has two methods 1) colddissolving method 2) hot dissolving method. The dyeing process started with first Naptholization, then diazotization. The process was mainly divided into two steps. First naphtolation and then coupling. Naphthol dissolution Naphtolation Diazotization Coupling washing off.

Formula for Calculation of Proportion of Dyes:

For g/l = Recipe amount (g/l) X Total liquor

(c.c.) 1000X stock solution%

For % = Recipe amount X Total Liquor

Washing: There remains a risk of insoluble pigments formed in the liquor during coupling and being deposited on the surface of the fibre, thereby causing poor rubbing fastness. This always happens to a greater or less extent and is more pronounced in heavy shades. Cellulosic yarn dyed with azoic colours are very often used for effect threads and lack of rubbing fastness can cause staining on connecting areas during scouring, bleaching or other finishing operations. Discolorations caused in this manner can be extremely difficult to remove. All azoic dyeing processes are therefore, as a final operation, washed well with soap or some synthetic dispersing agent in a machine giving squeezing. In this research naphtholwas used in a cold dissolving method.Naphthol was pasted with wetting agentcaustic soda added to its clear solution prepared with cold water. Caustic soda was added again for complete dissolution.

Diazotization: Base was added to water. HCL was added to water along with its temperature maintained at 8^0c. The water added to the liquor 300 ml Acetic acid. The bath iskept for 15 minutes.

Material and Method:

Naphtholused: Naphthol ASG

Fabric used: Hand Woven

Fabric type: Cotton Linen/Rayon

Base used: Naphthol BS

Pre-treatment: Bleached Yellow GC, Blue

Coupling:

The Diazonium salt was prepared while the proceeding of naphtolation. The common salt was dissolved in 100 ml water. The naptholated fabric is added to the solution, the diazotizationbase solution. Temperature was kept 8^0c to12^0c for 30mins, the process allowed coupling. Fastness is a very important factor which decides the quality of colours. The washing fastness of colours

developed by this method was good and overall washing fastness of azoic colour is good. The fastness of dry rubbing is always better than the wet rubbing.The overall rubbing fastness of Azoic colour is not very good. Azoic colour is now used to a limited extent.

Vat Dyes: The yellow sample was dyed by using vat dyeing technique. In this method water has to boiled at 60 c to 70 c.

Dye paste has to be made by Turkic oil, Caustic soda, Castor oil and Hydro sulphide for vat dye. Dye paste had to kept for 10 minutes then mix it into the dye vessel at 60 ^{0}c to 70 ^{0}c. The fabric was kept in a dye bath for ten to fifteen minutes. And then it was taken for washing. As the dyeing process completed samples were taken to the Kundi process.

2.4KUNDI PROCESS

The fabric was then taken for glazing. Wheat flour was applied on the fabric and again beaten and compressed, in-between very heavy two wooden pieces. The weight of these wooden pieces was around 50 to 60 kg. Now the fabric is ready for sale. Mashru is known as unique weave because most of Indian weaves are either weft face or balance weave but only some fabrics like Mashru are warp faced. This process of production of Mashruhas been carried out for centuries, but there is no significant change in process.

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3. ADVANTAGE OF SATEEN BASES:

There is less liability of stripes or bars occurring in the cloth as uniform distribution of the threads are more readily secured. A design is more effective because the main feature can be turned and reversed in diverse ways which enables stiffness and sameness of appearance to be more readily avoided. The repetition of the pattern is better concealed.The chief disadvantages are that with the same size of repeat smaller masses are necessary; on the other hand, with the same size of mass, the capacity of the jacquard must be larger which has usually greater expense in cards.

4. BENEFITS OF BLENDING RAW MATERIAL:

When two different fibres are blended together it gives positive performance in fabric. To get fabric with better performance and properties, blending required. According to the end use of the fabric we should combine fibres so that fabric will get desired properties.

Blending can improve spinning and weaving performance as well as it improves uniformity. By bending we can improve texture, and aesthetic value of the fabric. For example, Rayon blended with cotton, the quality will give lustre and softness to the end product. With the help of blending we can reduce fibrecost. Expensive fibreblended with less expensive fibreswill maintain the cost of the materials.To get cross dyed effect, fibres withdifferent dye affinity aremixed together to get unique colour effects.Blending is little complicated and money consuming process, but it gives a combination of properties.

5. DETAILS OF WARP AND WEFT OF FIVE SAMPLES OF MASHRU:

We produced five different varieties of Mashru fabric by changing the material, weave and weft (dyed and undyed). The table shows the details of warp and weft of new varieties of Mashru fabrics.

Sr. No	Type of Fabric	Warp	Weft	Ends/Inch	Picks/Inch
1	Normal Fabric	Rayon 120's	Cotton/linen 33's	102	68
2	Normal Fabric with Dyed Weft	Rayon 120's	Cotton/linen 33's	102	68
3	Spot Figured	Rayon 120's	Cotton/linen 33's	88	58
4	Spot Figured with Dyed Weft	Rayon 120's	Cotton/linen 33's	88	58
5	Wrap way Strip Fabric	Rayon 120's			

Production cost calculations will help us to achieve the cost of the sample produced.

Sample-1 will cost 121.518 Rs/meter, sample-2 159.59 Rs/mt, sample-3 121.48, Rs/mt sample-4 146.29 Rs/mt and sample-5 121.51 Rs/mt.

Detailed calculation is given in the appendix.

6. FINAL RESULT & ANALYSIS:

The samples of fabric produced during the research work were taken to different weavers for ranking the fabric samples from 1 to 5, on the basis of their aesthetic values. Here 1 indicates poor quality of fabric while 5 indicates best quality of fabrics.

Sr. No.	Name of Manufacture	Normal Fabric	Normal Fabric with Dyed Weft	Spot Figured	Spot Figured with Dyed Weft	Spot Figured with Dyed Weft
1	Techno Fabrics	3	2	5	5	5
2	Rajni Textiles	2	1	4	2	4
3	Disha textiles	3	3	3	5	5
4	Prapti Textiles	2	2	5	5	4
5	Shree Chmunda Tex Fab	5	4	2	2	3
6	Anjirwala Fabric	2	2	5	5	3
7	Veer Tex	5	5	3	3	3
8	Madhav Fashion	2	1	5	3	4
9	Meet Fashion	5	5	5	5	3
10	Subham Synthetics	3	3	4	4	5
11	Mital Synthetics	2	2	5	5	5
12	Navkar Textiles	3	3	5	5	5

13	Hari Dhyan	5	5	3	3	3
14	Hari Krishna Silk Mills	1	1	3	3	5
15	Ketan Twisters	3	3	5	5	3
16	Gayatri Textiles	5	5	3	3	4
17	Shree Ashapuri Synthetics	2	2	4	4	3
18	Chauthary Textile (P)Ltd	5	3	5	5	2
19	Shiv Sizers and Twister	4	3	5	5	5
20	Nayan Textiles	3	2	3	3	2

Final Result Total Point	65	57	79	70	74
Average Ranks	3.25	2.85	3.95	3.5	3.7

The results of all these ranking processes are summarised in the above tables.

Spot figure fabric got higher ranking among all. That is 3.95 ranks. Strip fabric and the Spot figure with dyed weft got 3.7 and 3.5 ranking respectively. Simple fabric got 3.25 ranks from weavers.

7. QUALITY PARAMETERS

Some of the selected quality parameters are listed below. The details in the table listed based on the ranking, and detailed discussion with weavers. The highest parameter is cover factor-15 and lowest is lustre and crease recovery-1.

Frequency Out ofTwenty

Texture	Drape	Cover Factor	Crease Recovery	Lustre
5	14	15	1	1

8. CONCLUSION

The table showsthat the best fabric was selected on the basis of the cover factorby the majority of weavers. Second preference is drape and third is better texture of fabric. In short it is considered that, the market trend is based on the better cover factor of the fabric so, on the basis of these ranks we may select the fabrics having better cover factor and drape to capture the market and thereby enhancing the sale of the said quality of fabrics resulting into higher returns on investment (roi). Results obtained during the research work are very encouraging and show very clearly that Mashru is made up of pure silk can replace silk filament with rayon will give better scope.

In India there is a big community called Jain. They do not wear Mashru as it is made up of silk. During the sericulture process (Silk Manufacture Process), silk worms are being killed. The Jain community do not favor"JeevHatya", so they are not willing to accept the silk fabric. The research had changed silk yarn and replaced it with regenerated variety so it can invite this community to be a part of Mashru family. Targeting such dense communities will help us to increase the market size of Mashru. We can definitely increase our market for a new variety of fabric by changing traditional colours of India for example earthy red, rani pink, leaf green, ferozi blue, bright yellow etc, with the colours presentin the global colour palette. We can focus on foreign buyers and invite them to choose these fabrics in their daily life. So by changing the quality of fibres we have tried to reduce the cost of fabric. As material cost reduces, the final cost of fabric will go down. By this, people can buy this variety at a lower price. Regenerated fibres are a blessing for the textile industry because of its property one can easily replace silk.

9. APPENDIX

COST OF PRODUCTION/METER FOR

MASHRU SAMPLE- 1:

Weight of warp per meter of fabric:

Total no. of warp = ends/inch X 39.37

= 102 x 39.37

= 4015.74 warps

Length of warp =Total no. of ends X lengthof

(L1) fabric(1 mt)

= 4015.74 X 1mt

= 4015.74 mt

Weight of warp =L1

(W1)Kg

Count of warp X 840 X 2.2 X 0.9144

(1 yard = 0.9144mt)

Count =5315

Denier

Count = 5315=44.29

120

= 4015.74

44.29 x 840 x 2.2 x 0.9144

= 4015.74

74841.73

= 0.0536 kg

= 0.0536 X 1000 Gms

W1 = 53.6 Gms

Weight of weft / meter of fabric:

Total no. of weft (1 mt) = picks /inch X 39.37

= 68 x 39.37

= 2677.16weft

Length of weft = Total no. of picks X length of

(L2) fabric (1 mt)

= 2677.16 X 1mt

= 2677.16mt

Weight of weft L2

(W2) Kg=

Labour Cost:

Time required producing one meter of fabric:

(72 picks/min is inserted by handloom weaver) (Inch to yard = 1/36)

(Yard to metre = 1x 0.9144)

Production = RPM (p/m) x1 x 1 x 0.9144

(mt) PPI 36

= 72 picks x inch x 1 x 0.9144

picks 36

= 72 x 0.9144 meter/min

68 x 36

= 0.0268 meter/min

Meter/shift = 72 pick x 60 min x 6hrs x 0.9144

68 x 36

= 9.68 mt/shift

0.0268 meter fabric produced in 1 min

1 meter (?)

= 1 x 1

0.0268

= 37.31 min (time to produce 1 mt)

Labour cost/shift (6hrs) = 300 Rs/ shift

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6 hrs x 60mins = 360 min for 300 Rs.

360 min labour cost 300 Rs

37.31 min (?)

= 37.31 x 300

360

= 26.425 Rs (labour cost/mt)

Cost of dyeing of material = 20 Rs / meter Cost of kundi process

5 meter fabric will cost 25 Rs

1 meter fabric (?)

= 1 x 25

5

= 5 Rs

Count of warp X 840 X 2.2 X 0.9144

(1 yard = 0.9144)

= 2677.16

33 x 840 x 2.2 x 0.9144

= 0.0480 kg

= 0.0480 x 1000 Gms

W2 = 48.0 Gms

Total weight of fabric/ meter = W1 + W2

(W) = 53.6+ 48.0

W = 101.6 Gms

Cost of yarn used = 400 Rs/Kg

Cost of material for production of 1 mt of fabric

1000 Gms 400 Rs

(W) 101.6 (?)

101.6X 400 =40.64 Rs

1000

Total labour cost per meter fabric =

weaving cost + fabric dyeing cost + kundi cost

= 26.425 +20 + 5

= 51.425 Rs.

Cost of producing for producing one meter of fabric

= material cost + labour cost

= 40.64 + 51.425

= 92.065 Rs

Miscellaneous = 92.065+ 10 %

= 101.265

Sale price = 101.265 + 20 %

= 121.518 Rs/meter

With the help of same steps of calculations, we have achieved the cost of sample-2 159.59 Rs/mt sample-3 121.48 Rs/mt sample-4 146.29 Rs/mt and sample-5 121.51 Rs/mt.

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