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Integration of Handloom Weaving and Flame Retaradant Finishing on Silk, Cotton and Silk/Cotton (SICO) Fabrics

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Abstract: *Finishing is a process done to enhance the appearance or to impart some special characteristics to a fabric. Normally finishing is done as separate process after weaving. Hand woven textile fabrics do not normally undergo any finishing process after weaving. Through this research integration of weaving and finishing has been developed as novel process. Fire retardency finish normally given to technical textiles and costly fabrics. Handloom saree fabrics are now-a-days are very costly due to its handcrafted work involved in it and high wages required to be paid against the skill of the weaver in weaving it. These high value sarees can be protected against fire accidents, by incorporating with special fire retardant finish during the weaving process itself. This research aims at developing special finishing method, integrating with weaving process on Handloom. The effect of the finish applied through this method on silk, cotton and silk / cotton fabrics have been studied. Further the effect of Flame Retardant finish before &after wash on different washing cycles have also been studied.*

Keywords: *Finishing, flame retardency, hand woven, effect of finish, before &after wash*

1. INTRODUCTION

This research work aimed to incorporate special finish to fabric by integrating, weaving & finishing process at the delivery end of the handloom. Handloom / Hand woven sarees have become very costly due to its handcrafted work and are normally worn during special auspicious occasions like weddings, festivals and important religious functions at home or temples. Accidental fire incidents due to lighting lamp and glowing incense sticks which are normally a part of any auspicious function, cannot be ruled out. It not only causes damage to the costly fabric but also the incidental happenings is considered as inauspicious and makes the wearer upset on the important day and also makes the wearer to be averse on the attire in future also. Thus it is felt that it would be good if fire retardant finish is given to costly handloom fabrics / sarees which are normally worn in auspicious occasions, to prevent them from catching or spreading of fire due to glowing incense sticks or lamps etc. Thus an attempt is made to impart Fire Retardant finish on handloom saree by devising a special method of integrated finishing application in weaving process.

2. Materials and Methods

For this study, rich traditional handloom saree fabrics of three different group of 10 samples in each varieties- pure silk, pure cotton and silk / cotton (sico) have been taken. These saree variety fabrics have been applied with flame retardant finish on the loom by manual application with the help of sponge by weaver himself immediately after weaving, allowed to dry and cured locally by special arrangement, before taking up the woven fabric on cloth beam. Certain modifications done on handloom for curing purpose at the delivery end of loom, hot air is blown from one side on the cloth causing localised curing before winding on the cloth beam. The details of the saree fabrics developed by integrated method of weaving cum finishing process is described in Table 1.

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Table 1- Saree Fabric details which were developed & finished by special method

S.No	Fabric Code	Fibre Content	Specifications				Average Fabric Weight (g/m²)
			Count of Warp	Count of Weft	Reed	PPI	
1	IWFS *	100% Silk	20 / 22 D Silk	20/22D Silk	96	88	50
2	IWFSC *	50 : 50 Silk :Cotton	20 / 22 D Silk	2/100 Cotton	96	72	55
3	IWFC *	100 % Cotton	80	80	80	72	57

* In the above fabric codes, IWF stands for Integrated weaving & Finished Sample, 'S' stands for 'Silk', 'C' stands for 'Cotton', 'SC' stands for 'Silk Cotton'.

3. Results and Discussions

Above three groups of samples consist each of 10 numbers of each variety applied with Flame Retardant Finish during weaving were tested for the efficiency by ASTM D6413 /D 6413M[2,] method. The fabrics were tested for FR efficiency of finish using auto flame chamber inclined at 45°. A standardised flame was applied to the surface of the sample near the lower end for 5 seconds. Finally the time required for flame to proceed up the fabric for a distance of 127mm has been recorded. The flammability of fabrics is measured as length of char in millimetres.

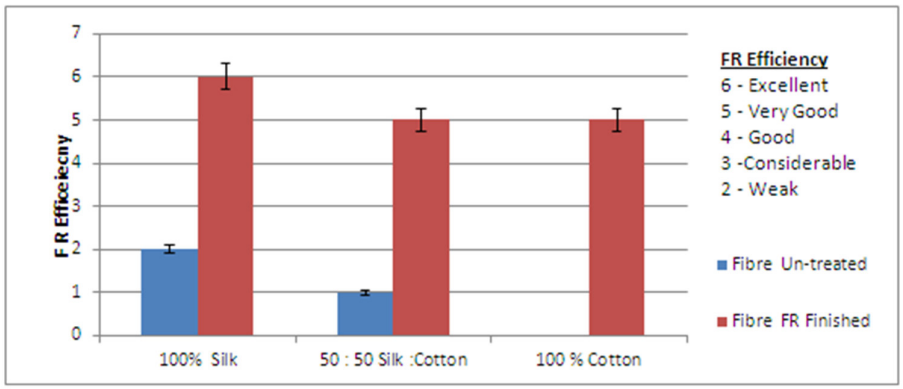

Figure 1.Fire Retardant Efficiency

The Fig.1 shows the fire retardant efficiency of three types of ratio of fibres. 100% silk has excellent flame retardant efficiency and Sico & Cotton has very good efficiency which was applied through novel integrated weaving & finishing method.

3.1 Effect of Fire Retardant Finish after Washing

It is important to know the effectiveness or permanency of finsh after washing. To study this all the samples in three different varieties were tested for their efficiency of finish after wash at different wash cycles. The efficiency tested immediately after 1st washing, 5th washing and 10th washing have been tabulated and bar chart has been prepared based upon the values to assess the effectiveness of finish applied through the novel method.

Figure 2. Efficiency of Finish after different Washing cycles

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Fig.2 shows the efficiency or permanency of finish after different washing cycles. The finish efficiency reduced marginally for all the varieties after 1st wash, but continued with same values except for silk after 5th wash. It reduced further after 10th wash.. The efficiency is better in case of 100% silk and for silk cotton & cotton it is moderate. Thus it can be concluded that the novel method of application of finish integrating weaving with finishing is effective and reduction of effect on frequent wash is within acceptable limits.

4. Conclusion

Three different fibre ratios of Silk and Cotton – 100% silk, 50: 50 Silk: Cotton, 100% cotton saree varieties of hand woven textile fabrics were developed on handloom integrating weaving & finishing processes. All the three groups of varieties of fabrics have been tested for their efficiency of finish applied through the novel method. It was found that the efficiency of all the variety of fabrics were good. 100% Silk showed better efficiency than other varieties. And the efficiency of fabric after many wash cycles – single wash, 5th wash & 10th wash were tested. The efficiency after wash of silk is again better than other varieties. Thus the study shows the new method of integrating weaving & finishing is successful on handlooms.

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