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Journal of the **TEXTILE Association**

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MARCH - APRIL 2013



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INDIATEX 2013

We are glad to inform you that The Textile Association (India), Mumbai Unit is organizing a IndiaTex 2013 Exhibition on 18, 19 & 20th October 2013 at VIA Ground, Vapi Industries Association, Plot No. 135, GIDC, Vapi – 369 195 (Gujarat).

About Exhibition

IndiaTex 2013 is an exhibition for suppliers, buyers, distributors, manufacturers of fabric and textile producers. IndiaTex 2013 is an excellent platform for new product launches, development of new market and business networking. The show will attract large number of businessmen connected with textile production as well as from the trade organizations, financial institutions and marketing experts.

This important textile event is scheduled to attract national & global attention. The exhibits will cover the entire spectrum of textile industry from fibre, yarn, dyes, chemicals, fabric, garment, embroidery, branding, testing equipment to fashion.

IndiaTex 2013 aims at bring technologists and technology service providers under one roof for creating platform for mutual advantage and commercial interaction. This exhibition is a vehicle to put on show the most up-to-date products and services to a specialized and invited visitors which in turn will give a chance to the exhibitors for booking the orders.

IndiaTex 2013 is the first edition of exhibition organized by TAI, Mumbai Unit and will soon become its annual feature of the largest and most prominent textile exhibition in India. This event will prove to be the 'gateway event' to India's large domestic market for both Indian and foreign textile captains.

IndiaTex 2013 will endeavour:

- ↳ To exhibit and demonstration of products
- ↳ To display new technology
- ↳ To promote and stimulate general awareness and demand for new products designed for more efficient textile operations
- ↳ To illustrate to textile executives, technicians, textile professionals and students the progress of research and development in the field of textile industry.
- ↳ To project the expertise, capabilities and achievements of the Indian and international products
- ↳ To highlight the vast market in India and neighbouring countries for advanced textile
- ↳ To exploit the vast business opportunities arising from India's liberalized economic policy aimed at global integration
- ↳ To explore the futuristic potential for growth of the textile industry at the current millennium.

Invitation for Participation

The TAI, Mumbai Unit have set high tradition of organising very successful conferences /seminars and provide maximum publicity and visibility to their valued sponsors. This Exhibition is no exception.

We invite you to exhibit your company's products at IndiaTex 2013 and gain access to high quality buyers. We look forward to hearing from you and assure you our best services at all times.

An Appeal

Your participation in this Exhibition by way of Exhibitors, Sponsorships, Advertisements are required. This Exhibition gives you an opportunity to meet the right path and to exchange the views on technological developments in the field of textiles.

We hereby appeal to extend maximum support to The Textile Association (India), Mumbai Unit for the success of this Exhibition. We look forward to meet you 18, 19 & 20th October 2013 for which pleasure is always ours. Let us join hands for the betterment of textile industry.

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Printed at :
Sundaram Art Printing Press, Mumbai

Published by PAVITRA PUBLISHER
Mr. J. B. SOMA (Publisher)
7A/203, New Dindoshi Giridarshan CHS.,
Near N.N.P. No. 1 & 2, New Dindoshi,
Goregaon (E), Mumbai - 400 065.
M.: 9819801922
E-mail : pavitra1941@gmail.com / jb.soma@gmail.com

JTA is a Bimonthly Publication of
THE TEXTILE ASSOCIATION (INDIA)
Pathare House, 2nd Floor, Next to State Bank of India,
67, Ranade Road, Dadar (W), Mumbai - 400 028.
Phone : (91-22) 2446 1145 • Fax (91-22) 2447 4971
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JTA is Abstracted By :

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Journal of the
TEXTILE Association
TEXTILE SCIENCE | TECHNOLOGY | ENGINEERING | MANAGEMENT

ISSN 0368-4636

March - April 2013
Volume 73 No. 6

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Editorial

India retains its top position amongst the GOTS certified textile firms

Eco-friendly clothing and organic fibres are the buzz words now days, with more and more companies jumping to join the organic band wagon. GOTS is the world's leading textile processing standard for organic fibres, including ecological and social criteria, backed by independent certification of the entire textile supply chain. Global Organic Textile Standard (GOTS) Managing Director, Herbert Ladwig recently commented that, "Increasingly, consumers are demanding ecologically and socially responsible processed textiles and companies are searching for tools to make their supply chains more sustainable. The result is a 'pull effect' and more companies becoming GOTS certified". The detailed report from GOTS management is given in this issue.

GOTS certification is recognized as the leading processing standard for textiles made from organic fibres worldwide. GOTS certification means consumers are purchasing items that are certified as organic from field to finished product. It is a great pleasure to mention that India remained the top country for fourth year in a row and a new record was set by surpassing the 1,000 mark of GOTS certified facilities for the first time (from 955 in 2011 to 1062 in 2012).

As per the survey, the top 20 countries in terms of the total number of GOTS certified facilities were; India, Turkey, China, Germany, Pakistan, South Korea, Italy, Bangladesh, Japan, United Kingdom, France, Portugal, USA, Austria, Netherlands, Greece, Hong Kong, Mauritius, Peru, Switzerland, and Denmark. While the top three countries remained the same as the previous year, Germany rose to 4th place, surpassing Pakistan, and Portugal moved from 20th to 12th place by more than doubling the number of its certified facilities.

Starting point of GOTS development was the international conference on Organic Textiles (Intercot) 2002 in Dusseldorf (Germany). In 2002, representatives from the organic cotton industry, the textile industry, consumers and members of standardisation organisations met to come up with a standard which would be acceptable worldwide. As a consequence of these efforts, the most important development in organic textile standards has been the development of the GOTS by the International Working Group (IWG) on the Global Textile.

GOTS label examines all possible aspects of the textile supply chain from fibre cultivation, textile production, marketing, disposal and social aspects. GOTS is receiving global acceptance and thus facilitating the global marketing of organic (eco-friendly) textiles. Also many eco-labels have been merged with GOTS. It is expected that GOTS will receive the universal acceptance for marketing for organic textiles and it is satisfying to note that Indian Textile Industry is on top in getting its facilities accredited. This only shows the respect of Indian Textile Industry towards its Mother Nature and ethical practises needed to be adopted for future of the industry.

Prof. (Dr.) R. V. Adivarekar,

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Effect of Fibre and Yarn Structural Parameters on the Mechanical Properties of Silk Suture Yarns

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&

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&

Y.C. Radhalakshmi , M.A Joseph

Central Silk Board

Abstract

As sutures are devices to close wounds after an injury or surgery, they must not only possess enough strength to hold tissues securely but also must be flexible enough to be knotted. Thus, the tensile and bending properties are of paramount importance for the success of the suture yarns. In this paper, these properties were measured for silk suture yarns of varying diameter in order to evaluate the influence of fibre and yarn structural parameters on the mechanical performance and knot efficiency. It was observed that coarser suture yarns exhibited higher bending rigidity and greater reduction in knotted yarn strength than the finer yarns. Suture yarns with finer fibres would be ideal as suture material as they would be able to elongate under low loads to accommodate any developing wound edema. It could be deduced from the study that for a particular application, the surgeon must use the smallest diameter suture that will hold the wound tissue in view of better flexibility and knot security of these yarns.

Keywords

Suture, silk, knot efficiency.

1. Introduction

Surgical sutures are defined as sterile filaments used either to hold tissues together until they have healed adequately for self-support, or to join tissues with implanted prosthetic devices [1]. Sutures are characterized as absorbable (naturally biodegradable in the body) or non-absorbable. Non-biodegradable sutures may be of a natural or synthetic variety. The non-absorbable natural sutures are silk, cotton, linen whereas the synthetic ones are polyamide, polyester, polyethylene etc. One advantage of using silk fiber as suture material is that silk is a fiber having flattened sides with an isosceles triangle cross-section and this feature of silk results in formation of a secure knot when tied.

In terms of their physical structure, sutures can be classified as monofilament, multifilament, twisted and braided. Monofilament yarns have relatively high stiff-

ness, which creates problems for surgeons during knotting [2]. Braided multifilament are more flexible than monofilament yarns.

The differences in structure material, structure and size affects the handling properties and the mechanical behavior of the suture. Sutures intended for the repair of body tissues must be non-toxic, have good tensile strength and have acceptable knot-tying and knot-holding characteristics. The tensile strength of suture materials has been identified as critical to secure suturing. The objective of the study was to evaluate the influence of the fibre and yarn structural parameters on the mechanical performances of knotted and non-knotted silk suture yarns of different diameters.

2. Materials and Methods

Five silk braided (100%) suture samples with different specifications were used in this study. The material specifications of the samples used in this study is shown in Table 2.1.

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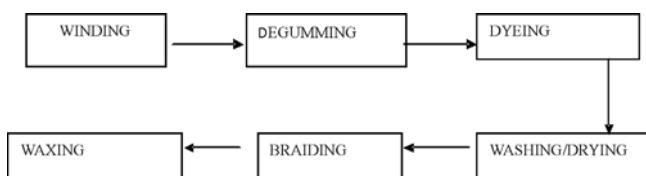
Table 2.1: Silk braid suture material specifications used in this study

Sample No	Yarn diameter mm	Sample weight (gms/mtr)	Composition
1	 0.587	0.23	100% silk
2	 0.500	0.14	100% silk
3	 0.390	0.11	100% silk
4	 0.318	0.06	100% silk
5	 0.232	0.05	100% silk

2.1. Silk braid manufacturing process

2.1.1. Degumming

Silk filaments can be twisted or braided, the latter providing the best handling qualities. The first process in silk braid manufacturing is degumming to remove sericin or silk gum so as to improve the sheen, colour, hand and texture of the silk filament. The gum can serve as a protective layer and is typically left on the silk until it is ready to dye. During degumming two chemicals are mainly used to remove the gum. The chemicals include an alkali and a surfactant. Washing soda or sodium carbonate is used as an alkali while pure sodium lauryl sulphate is used as a surfactant. First the silk is thoroughly wetted using wetting agent and allowed to wet for a few minutes. The sericin immediately starts turning slimy, and the silk under water looks like a loose cloud. The silk is kept for 30 minutes, turning gently at once or twice. After the skein is fully degummed, rinsing is carried out using warm water. Subsequently rinsing in mild citric acid or acetic acid solution would neutralize any residual alkaline present in the material after degumming. After degumming the weight loss is reported to be around 22 % of its original weight. The degumming temperature is maintained around 75-80°C for one hour.


Figure 2.1: Flow chart of silk braid manufacturing process

2.1.2. Dyeing of silk

Silk suture material is dyed using a natural dye called logwood black. This dye is an extract obtained from Hematoxylon campechanum also known as Campeche wood and is native to Mexico and U.S.A. This dye possesses great commercial and tinctorial property. However the color developed on the material depends on the degree of oxidation. A metallic salt like ferrous sulphate is used to improve fastness property of the dye on the material. Through mordant dyeing of logwood black one can attain excellent fastness properties to light, perspiration, washing and rubbing. Dyeing using single-bath process is normally followed for logwood extracts at a temperature of 80°C for one hour. The process includes mordanting and dyeing being carried out in the same bath. After complete exhaustion the silk is given warm water wash and neutralised with citric acid or acetic acid solution. A typical operating process would include,

- Mordanting with metallic salt and a rinse
- Dyeing with a mixture of oxidised and not oxidised log-wood extract(Hematin)
- A rinse in cold water
- Usual softening and reviving

After dyeing the silk skeins are taken for doubling usually carried out to obtain 2,3,4,6 plied filament yarns. A twist in the range of 17-21 TPI is inserted in the strands to impart strength for further processing of material.

2.1.3. Braiding

Silk braid material is the most flexible and supple material used as sutures and is used in cardio-vascular surgery. In the braiding process strands of silk filaments are braided in different directions to form a strong thread which when combined together on a mandrel of a braiding machine is called braided yarn. After braiding the material is subjected to waxing and coating to obtain compliance for maximum surgical handling. The waxing provides smooth flow through tissue while maintaining optimal knot security.

2.2. Experimental Procedure

2.2.1. Fiber tests

Vibroskop 400 was used for determining the titer (linear density), elongation and tenacity of silk fibres. The process of measuring fiber denier serves the purpose of selecting right material with reference to strength, texture used in making a final product. All tests were

performed under standard textile testing conditions of 21 ± 1 °C and $65 \pm 2\%$ relative humidity

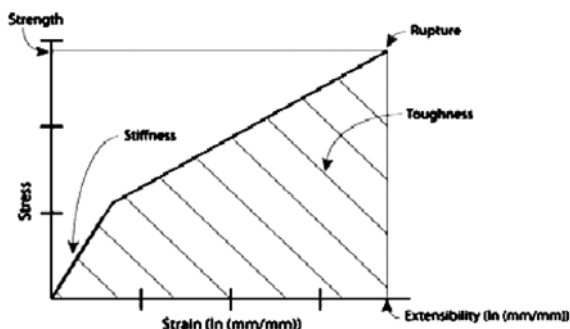


Figure 2.2: Stress- strain graph of tensile tester

The mean fibre test results are shown in Table 3.1. All these measurements were carried out as per ASTM standards.

2.2.2 Yarn tests

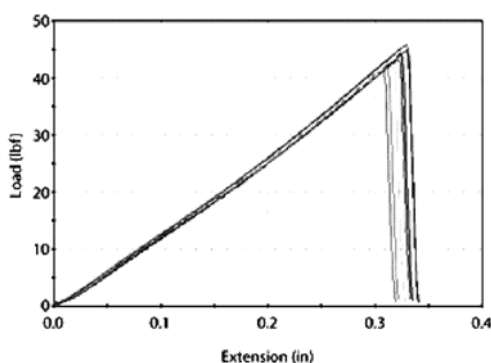


Figure 2.3: Load -extension curves of silk braid filament yarn obtained on INSTRON 6021

The surgeon's knot or friction knot is recommended for tying a lot of materials such as braided synthetic absorbable sutures, coated Vicryl®, polyester, nylon and polypropylene sutures. It is composed of a double throw followed by a single throw; with the right ear and loop coming out on the same side of the knot (Figure 2.4).



Figure 2.4: Sketches of surgeon's knot used for testing knot strength properties

Yarn tests were carried out to ascertain the effect of yarn properties on knot strength of silk suture materials. Instron 6021 was used for measuring single yarn strength, elongation and knot strength of suture yarns. A surgical knot (figure 2.4) was used when testing knot strength of silk suture materials. Yarn bending rigidity and yarn hysteresis tests were tested on KES-FB2 Banding Tester.

3. Results and Discussion

Table 3.1: Silk Fibre and Yarn Properties

Properties	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Fibre denier(gpd)	1.14	1.25	1.20	1.29	1.25
Breaking strength of fiber (gms)	4.13	4.95	4.93	5.38	5.26
Tenacity of fiber(gpd)	3.63	3.99	4.16	4.17	4.21
Elongation at break (%)	11.88	14.74	15.36	14.62	14.71
Yarn diameter(mm)	.587	0.509	0.390	0.318	0.232
Single yarn strength	60.49	43.47	31.10	19.66	13.95
Mean yarn elongation	9.96	9.17	9.97	9.89	9.68
Yarn bending rigidity (g.cm ² /yarn)	0.2170	0.1083	0.0661	0.0314	0.0220
Yarn bending hysteresis- (gf.cm/yarn)	0.5116	0.2461	0.1516	0.0661	0.0612
Knot strength of yarn	42.27	30.60	22.30	14.45	10.43
Mean elongation of knot yarn (%)	5.48	4.43	4.76	4.71	4.63
Modulus young's(N/tex)	5.01	7.22	6.58	8.27	7.30

3.1. Effect of fiber and yarn properties on suture yarn strength

Samples 2, 3 and 5 with nearly the same fibre denier, were made into sutures with different diameters 0.500, 0.350 and 0.232 respectively. Of these samples, it was observed that sample 2 (diameter 0.500) has the highest yarn breaking and knot strength while sample 5 (diameter 0.232) has the lowest strength values. These results clearly show that it is the yarn structural parameter (USP size/diameter) that will play a predominant role in determining the strength of the suture yarns.

Sample 1 with lowest fibre denier (1.14) showed highest yarn strength among all the samples under study. This further accentuates the fact that it is the yarn structural parameter contributing primarily to the strength of the suture yarns.

When the silk filaments are made into yarn and when single yarn is correlated with their knot pull strength, a positive relationship is noted between single yarn strength and knot pull strength of the suture material (figure 3.1).

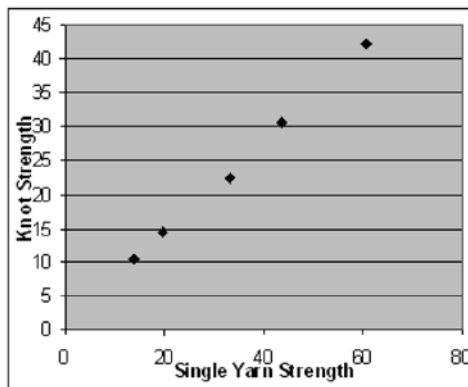


Figure 3.1: Relationship between single yarn strength and knot strength

From the above discussion one could infer that higher single yarn strength would translate to higher knot pull strength for the silk braided suture material. The braided silk suture of diameter 0.587 has the highest breaking elongation value while suture of diameter 0.509 has the lowest value of breaking elongation. This result confirms the results of the previous studies [4] that no correlation exists between the tensile strength of a suture and its elongation.

Tensile properties of sutures are important for the surgeon especially while making a knot. Essentially, the tensile strength of the suture yarns should be greater than the knot strength. If the knotting force is stronger

than tensile strength of suture material, suture can easily break while tightening the knot.

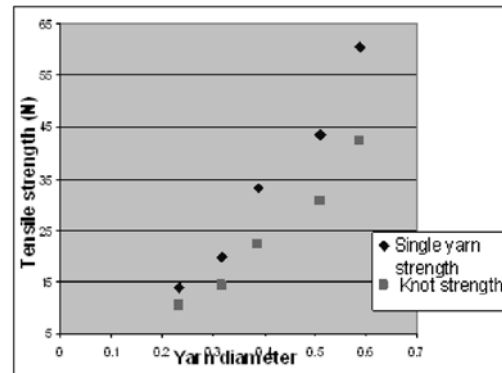


Figure 3.2: Tensile strength of knotted and non-knotted suture yarns

It is observed from the yarn tensile data that for the samples under study, the knot strength is lower than the corresponding single yarn strength (Figure 3.2) indicating that the presence of a knot lowered the tensile strength of the suture yarns. Knotting induces stress in the suture due to bending and twisting and thus when the knotted suture is pulled, stress develops thereby lowering the strength values. These results are in consistent with earlier research findings of knot being the weakest part of any suture when subjected to tension [5,6,7].

The young's modulus corresponds to the elastic region obtained at low load levels and it signifies the geometric transition of the braid. The young's modulus of the suture yarns was observed to depend on the fibre denier (Figure 3.3). Suture yarns with finer fibres were observed to be more easily deformable under low loads than yarns with coarser fibres. In the light of these results, yarns with finer fibres would be ideal as suture material as they would be able to elongate under low loads to accommodate any developing wound edema.

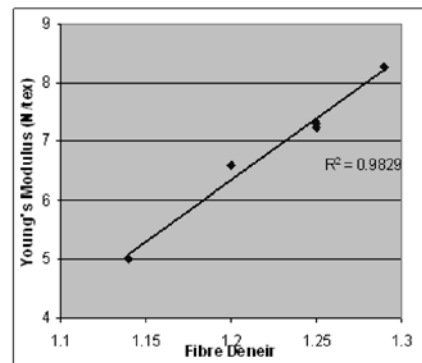


Figure 3.3: Influence of fibre denier on Young's Modulus

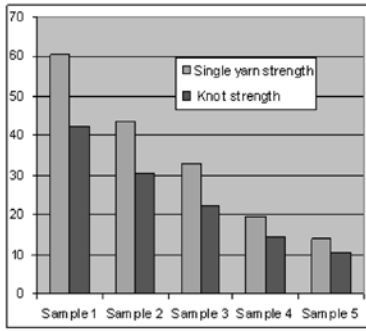


Figure 3.4 : Single Yarn strength and Knot strength of suture yarns

From the figure 3.4, it can be noted that as the suture yarns become coarser, the difference in non-knotted and the corresponding knotted yarn strength becomes greater. This may be due to the fact that for coarser yarns flexibility decreases and thus fastening a knot becomes harder. Hence, for coarser yarns, the knot itself becomes an area of high stress thereby resulting in lower strength of the knotted structure.

Flexibility of the suture yarns is a fundamental property required during knotting operation. Bending rigidity, determined using KES-FB2 Tester, is a measure of the resistance of material to bending by external forces and is related to yarn stiffness. Coarser suture yarns exhibited higher bending rigidity when compared to finer suture yarns. An increase in the size of the suture significantly increased the stiffness. A knotted suture material with a high bending rigidity would resist lying in a sharp bending angle and have the tendency to straighten out within the knot. In other words due to decreased flexibility of the coarser yarns, tightening of the knot would become harder thereby effecting knot stability. Hence, the low bending rigidity of suture yarn of diameter 0.232 would allow a tight knot while the opposite applies to yarn of diameter 0.587.

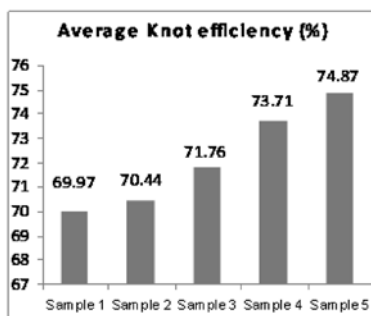


Figure 3.5: Knot efficiency % of suture yarns

The force required to produce knot breakage depends on the type of knot, the suture material and diameter of the suture yarns. The relationship between the ten-

sile strength of unknotted and knotted suture, which is designated as Knot efficiency % [3] has been used for evaluating and rating the performance of surgical knots. Knot Efficiency (%) is defined as the ratio of the tensile strength of knotted suture and the tensile strength of unknotted suture expressed as percentage. It was noted that finer suture yarns exhibited higher knot efficiency (figure 3.5) implying that these yarns would have greater knot strength.

4. Conclusion

The study of the tensile properties of the suture yarns showed that an increase in the size of the suture significantly increased the tensile strength. It was also observed that higher single yarn strength would translate to higher knot pull strength for the silk braided suture material. Coarser yarns exhibited higher bending rigidity when compared to finer suture yarns. The effect of knotting on the strength of various sutures showed that knotting a suture reduced the tensile strength and the reduction rate was higher for coarser yarns. Knot efficiency was higher for the finer suture yarns, implying that these finer sutures will require fewer throws to tie a secure knot and will have higher knot strength. In view of the above results it can be deduced that for a particular application, the surgeon must use the smallest diameter suture that will hold the wound tissue safely and securely without breaking. This is because the finer sutures exhibit greater flexibility and knot efficiency than the coarser sutures.

References

1. Kroschwitz J. I., *Polymers : Biomaterials and Medical Applications*. New York: Wiley, (1989).
2. Saber Ben Abdessalem, Hanen Jeddal, Sondes Skhiri, Jalel Dahmen, Hatem Boughamoura, Improvement of Mechanical Performances Of Braided Polyester Sutures, *AUTEX Research Journal*, **6**, No 3, September (2006).
3. Edlich, R. F., & Long, W. B., *Surgical knot tying manual*. CT (USA): COVIDIEN, (2008).
4. S. Freudenberg, S. Rewerk, M. Kaess, C. Weiss, A Dorn-Beinecke and S. Post, *Eur. Surg. Res.*, **36**, 376, (2004).
5. Rajendran S., Anand S., Developments in Medical Textile, *Journal of the Textile Institute*, **32**, 1-37, (2002).
6. Thacker JG, Rodeheaver GT, Moore JW, Kauzlarich JJ, Kurtz L, Edgerton MT, Edlich RF: Mechanical performance of surgical sutures, *Am J Surg*, **130**, 374-380, (1975).
7. Jin-Cheol Kim, Yong-Keun Lee, Bum-Soon Lim Sang-Hoon Rhee, Hyeong-Cheol Yang, Comparison of tensile and knot security properties of surgical sutures, *J Mater Sci, Mater Med*, **18**, 2363-2369, (2007).



Effect of Vibration at Ring Frame Drafting Zone on Yarn Quality

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&

Elayaperumal Ayyasamy

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Abstract

The effect of vibration at the ring frame drafting zone on the yarn quality was studied by creating vibration at the drafting roller stand of ring frame by a device designed. It was found that the thin place imperfections, short thick faults and long thin faults were higher for the yarns produced with vibration.

Keywords

Accelerometer, Ring Frame Drafting Zone, Vibration, Yarn Classified Faults, Yarn Tensile Property

1. Introduction

Any motion that repeats after an interval of time is called vibration or oscillation [1]. The nature of vibration depends upon the nature of force driving it and on the structure being driven. Quality of product depends upon the raw material being processed. Even if good raw material is used, the condition of machinery influences the quality of product. The vibration generated during running of machine is considered to have important influence on quality of product. It is impossible to damp all the vibrations generated, however, it may be kept low for getting a quality product.

Foster modeled the effect of back bottom drafting roller vibration at speed frame on sliver evenness [2]. Theoretical study on the effect of roller vibration on yarn regularity has been carried out by Catling [3]. Vibration at different elements of the machine may have different influence on yarn quality. Ring rail jerkiness increases the thin places and hairiness of yarn [4]. Roller slip or vibration is one of the eight critical machinery parameters which may vary from spindle to spindle in drafting system for a given mechanical draft distribution [5]. Stick slip vibration is common in drafting but there are also other causes of vibration such as

eccentric rollers, worn gears etc. During the stick and slip phenomena, the draft is high and low respectively [6]. When the rollers are in vibration, the feed material rate is uniform and the acceptance by the delivery rollers is different due to slight change in nip position as the rollers revolve [4, 7]. Though the theoretical work on effect of roller vibration on yarn evenness has been carried out earlier by researchers, the work on quantification of vibration and its effect on yarn quality are not available. In this work, the vibration was introduced artificially on the roller of ring frame drafting system, it was quantified and its effect on yarn quality was studied.

2. Materials and Methods

The vibration was created by an external device at the supporting point of front bottom drafting roller on the roller stand. The vibration created at the supporting point cause vibration to the front drafting roller. For the analysis of yarn properties, the yarns were spun from two spindles nearer to the supporting point where the vibration was introduced.

2.1 Vibration creating device

A vibration creating device was designed as shown in Fig. 1. A four profiled cam was driven by a servo motor. The device was positioned towards the roller stand in such a way that the projections of the cam hit the drafting roller stand during the rotation of the cam. The vibration was created at the front bottom roller due to the hit of the cam. A trial run was carried out at cam speed of 200 rpm, 400 rpm and 600 rpm to find the speed to be used for conducting experiments.

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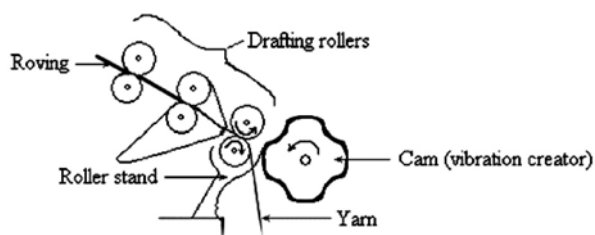


Figure 1: Vibration created at the drafting roller

2.2 Measurement of vibration

For measuring the vibration, a piezoelectric accelerometer (compression type) with data acquisition/ analyzing software was used. The system used for measuring vibration is shown in Fig. 2. Measuring sensor of piezoelectric accelerometer was mounted using adhesive on the cover of the bearing which supports the front bottom roller on the roller stand. The mechanical signals from vibrating surface were converted into electrical signals by the piezoelectric accelerometer. Then the signals were digitalized, amplified and filtered for noises by data acquisition card. The signals from data acquisition card were processed by the software DEWESOFT, which gave the vibration measures as numerical value as well as graph showing vibration versus time/ frequency.

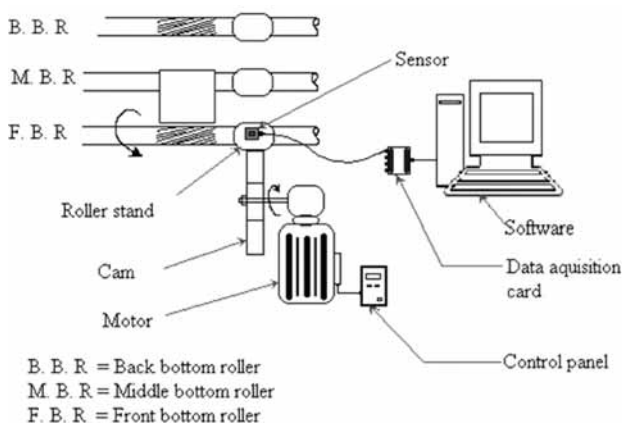


Figure 2: Vibration Measurement System

The system used for measuring the vibration at the ring frame consisted of ,

1. Piezoelectric sensor (KISTLER, Switzerland, Single axis linear)
2. 4-Input USB Dynamic Signal Acquisition (NATIONAL INSTRUMENTS, USA, NI USB-9233)
3. Data analysis software (DEWESOFT 6.4)

Vibration can be quantified by acceleration (g) [1 g = 9.81 ms⁻²], velocity (v) in mm.sec⁻¹ and displacement (s) in μm. With the use of piezoelectric accelerometer,

vibration (g) was measured directly. It is possible to calculate velocity (v) and displacement (s) by single and double integrating of vibration (g) value respectively using DEWESOFT software.

2.3 Yarn sample preparation

Cotton yarns were spun with the process parameters given in Table 2.1. Carded cotton yarn of 20 Ne (29.25 Tex) was produced i) without vibration, ii) at cam speed of 200 rpm and iii) at cam speed of 400 rpm. At the cam speed of 600 rpm, the vibration was so severe to cause breakage of the roller stand. Since the effect of vibration on yarn quality was not appreciable at 200 rpm, the trials for remaining carded cotton yarn of 40 Ne (14.76 Tex) and combed cotton yarn of 80 Ne (7.38 Tex) yarn samples were conducted i) without vibration and ii) at cam speed of 400 rpm.

Table 2.1: Process parameters used for the production of yarn samples

Yarn sample No.	Count of yarn (Ne)	Roving hank (Ne)	Spindle speed (rpm)	Vibration introduced	Cam speed (rpm)	Vibration acceleration (g)
1N1	20	0.98	14500	No	-	0.4
1V1	20	0.98	14500	Yes	200	1.3
1V2	20	0.98	14500	Yes	400	1.57
2N1	40	1.4	16000	No	-	0.4
2V1	40	1.4	16000	Yes	400	1.57
3N1	80	2.8	16000	No	-	0.4
3V1	80	2.8	16000	Yes	400	1.57

2.4 Testing of yarn samples

The yarn samples were tested using a Premier evenness tester (model IQ, version M2.0.1) for unevenness % imperfections and hairiness. The imperfections were measured at all levels, viz. thin: -30%, -40%, -50%, -60%; thick: +35%, +50%, +70%, +100% and neps: +140%, +200%, +280%, +400%. The tests were carried out using the following specification: test speed-400 m/min; test time-1 min; and No. of tests- 10 test per sample. The single yarn tensile properties were measured using Premier tester (model Tensomaxx 7000) with gauge length of 500 mm, testing speed of 5000 mm/min and 200 tests per sample. The yarn faults were measured for samples 2N1, 2V1, 3N1 and 3V1 using Premier Classidata. Statistical significance study was carried out for tensile properties using t- test at 95% confidence level.

3. Results and Discussion

The effect of vibration (acceleration (a) =1.57g) at a cam speed of 400 rpm on the quality of yarn is given in the Tables 3.1 to 3.3. It can be seen from the Table 3.1 that the unevenness U% is higher in 20 Ne and 40 Ne yarns produced with vibration compared to that of the yarn produced without vibration. There is an in-

crease in imperfections measured at -30%, -40%, -60% , +35%, +50%, and +70% levels in the 20 Ne and 40 Ne yarns due to vibration, but the trend is not obtained in the case of 80 Ne yarn. The increment is higher in -30% thin places compared to other levels. There is no appreciable change in hairiness properties due to vibration.

Table 3.1: Effect of vibration on imperfections and hairiness property of yarn

Count Parameters	20 Ne Without vibration (0.4g)	Without vibration (1.3g)	With vibration (1.57g)	40 Ne Without vibration (0.4g)	With vibration (1.57g)	80 Ne Without vibration (0.4g)	With vibration (1.57g)
Um %	14.34	14.50	14.61	17.09	17.11	15.28	15.14
CVm %	18.37	18.46	18.72	21.92	21.91	19.42	19.24
CV (1m) %	5.81	5.97	6.03	6.98	6.72	5.69	5.78
CV (10m) %	3.09	3.33	3.49	3.35	3.00	3.35	3.47
Index	2.54	2.62	2.59	2.14	2.14	1.34	1.33
-30%	4249	4351	4568	7170	7271	5567	5376
-40%	890	913	989	2356	2433	1743	1642
-50%	85	89	94	401	436	325	305
-60%	2	4	5	25	30	32	26
+35%	2087	2106	2179	3387	3440	1935	1889
+50%	629	642	665	1347	1359	528	499
+70%	131	143	137	362	365	95	86
+100%	21	29	21	63	63	18	15
+140%	2181	2199	2300	4498	4586	2359	2230
+200%	557	568	602	1340	1378	731	658
+280%	133	141	143	325	319	228	194
+400%	33	30	35	63	55	65	49
Hairiness	7.22	6.71	7.38	5.67	5.73	3.57	3.61
Sh	1.60	1.51	1.65	1.46	1.48	0.94	0.96
Sh(1m)	0.35	0.29	0.32	0.25	0.30	0.16	0.15
Hairs/100m							
3mm	1003.3	1068.1	1116.0	898.0	887.3	567.6	617.0
4mm	236.4	136.5	268.8	206.9	200.5	119.8	135.6
5mm	35.4	18.8	40.9	28.9	27.8	14.0	15.6
6mm	5.4	3.4	5.2	3.4	3.5	1.6	1.3

Table 3.2: Effect of vibration on tensile property of yarn

Count Parameters	20 Ne Without vibration (0.4g)	With vibration (1.57g)	40 Ne Without vibration (0.4g)	With vibration (1.57g)	80 Ne Without vibration (0.4g)	With vibration (1.57g)
Breaking Force (gf)	421.56	419.14	220.38	226.28	139.36	136.07
Breaking Elongation (%)	5.90	5.80	5.04	5.74	4.77	4.49
Breaking Tenacity (RKm)	14.28	14.20	14.93	15.33	18.88	18.43
Breaking Work (Kgfm)	593.15	588.47	276.93	314.89	167.94	157.88

Table 3.3: Effect of vibration (a=1.57g) on classified faults

Faults	40 Ne Without vibration (0.4g)	With vibration (1.57g)	80 Ne Without vibration (0.4g)	With vibration (1.57g)
A1	5334	15885	862	4280
A2	728	2042	247	813
A3	107	242	58	108
A4	23	57	18	36
B1	348	822	53	218
B2	142	324	58	111
B3	31	55	26	50
B4	15	29	5	15
C1	127	67	19	59
C2	58	38	26	42
C3	8	8	26	24
C4	8	7	15	11
D1	39	2	4	30
D2	27	11	13	11
D3	4	2	8	11
D4	2	4	3	20
E	101	19	10	40
F	54	69	28	107
G	25	1	8	11
H1	77	61	47	36
H2	227	1087	159	997
I1	1	0	0	0
I2	12	0	13	0
A4+B4+ C3+C4+ D3+D4	60	107	75	117
Total faults	7498	20832	1706	7030

Table 3.3 shows the comparison of faults present in the 40 Ne and 80 Ne yarns produced with and without vibration at the drafting zone. It can be seen from Table 3.3 that the total number of faults has increased due to vibration. Objectionable faults (A4, B4, C3, C4, D3 and D4) and long thin fault (H2) is higher for the yarn produced with vibration. The total faults, particularly objectionable faults, long thin faults increases due to vibration.

There is no trend observed in tensile properties though there is a marginal decrease in tensile strength in 20 Ne and 80 Ne yarn produced with vibration.

The effect of vibration on yarn quality is clearly visible in the classified faults than in the imperfections and tensile property. The quality of yarn is not affected upto a certain level of vibration. However, beyond certain level the quality deteriorates. The imperfections and tensile property of the yarn may also deteriorate above the levels of vibration at which this study was conducted.

4. Conclusions

There is no effect on the yarn quality due to vibration upto acceleration of 1.3 g at the drafting roller. However, at higher vibration level of 1.57 g acceleration at the drafting zone, the thin place imperfections measured at higher sensitivity levels and long thin faults in the yarn increases. The classified faults exhibit clear indication of effect of vibration at the drafting zone on yarn quality than the imperfections and tensile characters.

References

1. Rao S. S., *Mechanical Vibrations*, Pearson Education, New Delhi, **11**, (2004)
2. Foster G. A. R., *Journal Textile Institute Proceedings*, **42**, (11), 950, (1951)
3. Catling H., *Journal Textile Institute Transactions*, **49**, (6), T279, (1958)
4. Subramanian S., Nainar M., Palanimurugan M., and Muthumanickam, A., *Indian Journal of Fibre and Textile Research*, **32**, (2), 248, (2006)
5. Agrawal A. K., and Aggarwal S. K., *Resume of papers, 29th Joint Technological Conference of ATIRA, BTRA, SITRA & NITRA*, **9**, (1988)
6. Foster G.A.R., *The Principles of Roller Drafting and Irregularity of Drafted Materials, Manual of Cotton Spinning, Vol. IV part I*, Textile Institute, Manchester, **87**, (1958)
7. Gregory J., and Tyson A., *Journal of Textile Institute Transactions*, **42**, T150, (1951)



Textsmile

Self Control-

People smoke and drink for few days and get addicted to it...we are studying since nursery but still are not addicted to studying!! Thats called 'Self Control'

Sodium Stannate Based Formulation as a Flame Retardant for Cotton

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Abstract

The development of an eco friendly flame retardant (FR) has been an attractive research area for the scientists in recent years. For this purpose, sodium stannate has been investigated by few researchers as an effective eco friendly FR. In this study, the applicability of flame retardant formulated using sodium stannate (SNFR) was investigated. The SNFR has shown balanced performance properties with minimum effect on physical properties of cotton. Lowest char length of 3cm and highest LOI of 33 with strength loss of cotton in the range of 5-6% as against 10-15% of commercial FR has been achieved. Sodium stannate flame retardant (SNFR) treated cotton also offered satisfactory durability to laundering. Urea and Diammonium phosphate (DAHP) in the formulation played a great role to increase the flame retardancy of cotton however, DAHP has also negative effect on strength of cotton necessitating optimization of the recipe.

Keyword

Flame Retardant, Sodium Stannate, Char Length, LOI.

1. Introduction

It is commonly known that considerable loss of life and properties occur due to burning of textile fabrics. Out of these, a significant portion of casualties consists of women and children due to accidental burning of their cloths. Protection of consumers from unsafe apparel is only one area where flame retardancy is needed. The hazard associated with flammable fabrics is dependent on various material parameters such as ease of ignition, rate of heat release, total amount of heat released, rate of flame propagation and heat transfer mechanisms and has been extensively reviewed by various researchers [1,2]. Due to the flammability of polymer materials, loss of life and possessions caused by the fire hazards due to the use of polymeric materials has aroused much concern among government regulatory bodies, consumers, and manufacturers [3,4]. Cotton undergoes degradation on ignition, forming highly combustible volatile compounds mainly levoglucosan with propagation of fire, causing injuries and fatalities in fire accidents [5].

In view of the importance of environment protection, there is a trend to use halogen-free flame retardants

(FRs). Phosphorus, nitrogen and silicon containing compounds are considered as environment-friendly FRs, because their generations bring no harm to ecology when they are burning in a fire. Recent ban of halogen based FRs and toxicity issue related to existing formaldehyde based FRs has made the research for new FRs even more important [6,7,8].

A novel attempt has been made to develop an eco friendly flame retardant for cotton overcoming the disadvantages like reduction in strength and increase in stiffness. Deterioration of fiber hand, and sometimes skin irritation due to the liberation of formaldehyde are also the problems related to some of the commercially used flame retardants like THPC/NH₃ and Pyrovatex. To overcome above mentioned problems Stannate/Phosphate system for cotton has been proved to be effective [9]. Also, application of P-Si FR is successful in imparting flame retardant property on cotton. The flame retardant is applied to cotton with cross linking agent BTCA through padding, drying and curing process. The results showed that flame retardant system could impart durable flame retardancy to cotton fabric. The flame retardant system can catalyse reactions of dewatering and charring effectively since the presence of phosphorous and silicone elements may function in a synergistic manner, which together with formation of 3-dimensional molecular networks with BTCA and cotton fabric, give acceptable durability of repeated laundering to treated cotton [10]. In recent years there

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has been a growing demand for durable and Halogen free FR and hence research has been inclined towards development of Phosphorous-Silicone-Nitrogen compounds [11].

Sodium stannate is an ideal eco-friendly flame retardant agent for cotton fabric. Treatment of cotton with sodium stannate to impart flame retardancy is becoming one of the most interesting areas of research for many scientists [9,12]. Stannic oxide is able to prevent the formation of flammable products, since it acts as a Lewis acid that catalyzes the dehydration reaction of cellulose, forming a protective film of charred materials that prevents the oxygen from reaching the unburned fabric. Also, stannic oxide can conduct and radiate the heat away from the source of ignition [13]. In the present study an attempt has been made to formulate eco-friendly FR based on sodium stannate for textiles and apply the same to explore the potential of the formulations to increase the flame retardancy of the fabrics.

2. Materials and Methods

2.1 Materials

Ready for dyeing 100% cotton (GSM-287) fabric was supplied by Alok Industries, Gujarat. Sodium stannate, ammonium sulphate, citric acid, di-ammonium hydrogen phosphate, sodium hypophosphite, boric acid, urea, phosphoric acid all of LR grade were purchased from S.D. Fine Chemicals, Mumbai. Saraprint AC Binder was supplied by Sarex Chemicals, Mumbai. Standard AATCC Reference Detergent without optical brightener was used for durability studies.

Texttreasure

A: Just look at that young person with the short hair and blue jeans. Is it a boy or a girl?

B: It's a girl. She's my daughter.

A: Oh, I'm sorry, sir. I didn't know that you were her father.

B: I'm not. I'm her mother.

It is easy to hate and it is difficult to love. This is how the whole scheme of things works. All good things are difficult to achieve; and bad things are very easy to get.

2.2 Experimental Methods

2.2.1 Treatment of fabric with sodium stannate flame retardant (SNFR)

Table1

Formulations of Sodium Stannate Flame Retardant (SNFR)

Sr. No.	Application mode	Chemicals	Formulation and concentration in %			
			F1	F2	F3	F4
1	First bath	Sodium Stannate	10	15	15	10
2		Ammonium Sulphate	8	8	8	8
3	Second bath	Di-ammonium Hydrogen Phosphate		7	8	8
4		Boric acid	12	8	6	6
5		Urea			7	8
6		Phosphoric acid				
7		Saraprint AC (Binder)			6	

The prepared FR formulations were applied on cotton by using Pad-Dry-Pad-Dry-Cure procedure in two bath aqueous system. The cotton fabric was initially padded through first bath and dried at 85 °C for 2-3 minutes. This dried fabric was then passed through the second bath, again dried at 85-90°C for 2-3 minutes and then cured at 140-165°C for 2-3 minutes. The fabric was then neutralized with 2 g/l soda ash to neutralize any residual acid present in the fabric and also to remove unfixed deposited FR on the surface of the fabric [12, 14].

2.2.2 Measurement of performance for flammability and wash durability

The FR treated fabrics were tested for flammability performance on vertical flammability tester by standard method ASTM-D 6413. The LOI of the treated fabric was evaluated by standard method ASTM D 2863. To study the durability of flame retardant finish applied on the fabric, samples were washed in washing machine with standard AATCC reference detergent using AATCC 135 standard method.

2.2.3 Measurement of physical properties

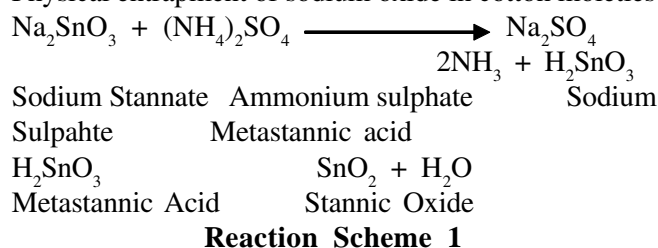
The FR treated fabrics were evaluated for tensile strength by standard method ASTM D 5035. Tearing

strength of treated fabrics was measured by standard method ASTM D 1424. The stiffness of the FR treated fabrics was tested with Elmendorf tester by standard method ASTM D 1388.

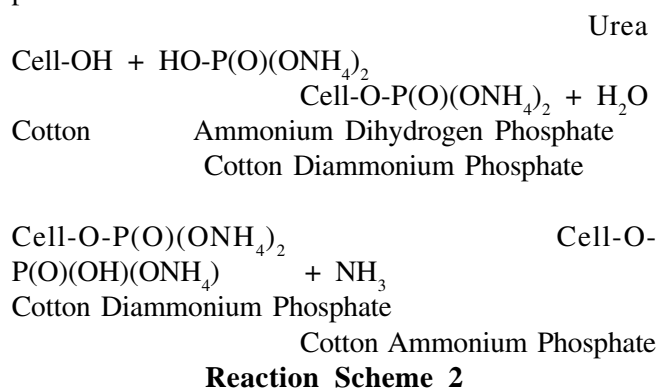
Results and Discussion

In order to elucidate the flame retardancy of sodium stannate based FR, various formulations using sodium stannate were prepared and applied to fabrics.

Physical entrapment of sodium oxide in cotton moieties



When SNFR finish is applied to fabrics, during curing process sodium stannate produces stannic oxide which gets entrapped inside the cotton moieties. Though there are no chemical bonds like hydrogen bond between stannic oxide and cellulose, it is a physical entrapment of FR in fabric moieties. The insoluble stannic oxide formed in the fabric stays within the fabric while sodium sulphate gets washed off in subsequent processing. The reactions involved in the mechanism are explained in reaction scheme 1 & 2.



3.1 Flammability of SNFR treated fabrics

The results of the flame retardancy of the fabric treated with various formulations have been given in Table 2.

Table 2 Performance of SNFR treated fabrics for flammability

Flame Retardant	After flame time (sec)		Char length (cm)		After glow time (sec)		LOI (Vol. %)	
	W0	W1	W0	W1	W0	W1	W0	W1
Control	58		>30		22		18	
F1	10	32	4	>30	10	15	31	29
F2	39	38	>30	>30	6	20	26	25
F3	5	77	3.4	>30	8	7	32	26
F4 (without Binder)	5	49	4.5	>30	4	7	29	26

Note: W0- Before wash, W1- after 1 wash.

Formulation F1 was applied on cotton and positive results in terms of after flame time and char length were obtained. LOI increased to 31 from 18, after flame time was also reduced to 10 sec from 1 min and char length was found to have reduced to 4 cm from >30 cm. Also, afterglow time increased to 10 sec from 15 sec for cotton. High degree of flame retardancy was achieved due to presence of stannic acid and contribution of boric acid in formulation that decomposes and forms a glassy layer on the surface which during burning helps in formation of char along. However, it is seen that the high conc. of boric acid assists afterglow which is undesirable.

The reduced conc. of boric acid to 8% in F2 has shown reduced afterglow time. However, F2 was found to be not much effective in terms of LOI and char length since it did not depict high degree of flame retardancy with LOI only upto 26.

The flame retardancy produced by F2 was not much promising as it showed LOI value of only 26 and 24 on cotton and P/C blend respectively. In addition to this, char length of the F2 treated fabrics also exceeded 30 cm. DAHP phosphorylates with hydroxyl groups of cotton and assist in evaporation of water during burning and leads to formation of char to reduce further propagation of flame. However, DAHP alone could not increase the LOI greatly and could not induce higher flame retardancy to cotton. Introduction of urea was thus important in the further formulations. The effect of Nitrogen-Phosphorous synergism is reflected from this formulation. It is evident that urea and DAHP in combination significantly increased the LOI of cotton to 32. Also, char length was reduced to only 3.4 cm and after flame time and after glow time was only

Textsmile

Boyfriend: Do you think my salary is sufficient for you?
Girlfriend: It's sufficient for me but how will you survive?

5 and 8 sec respectively. Thus formulation 3 is found to be suitable for cotton fabrics. The reason behind this can be sited as urea acts in synergistic manner with DAHP. DAHP being a nitrogen source during burning produces non combustible gases and dilutes the temperature of combustion zone thus enhancing the flame retardancy of cotton [15]. These formulations (F1 & F3) are quite effective on cotton.

Formulation 4 was prepared using the same ingredients as formulation 3 only with lower concentration of sodium stannate and a binder to increase durability. In table 2 results of F4 without binder are shown where it can be observed that performance properties are similar to F3 but nominally lower than F3 due to lower concentration of sodium stannate.

3.2 Effect of binder on FR finish durability with home laundering and flammability

It can be observed that formulations F3 & F4 are similar with just a variation of conc. in sodium stannate. Also from Table 2 it is evident that the flame retardant properties improve with increase in conc. of sodium stannate. Thus a detailed study of effect of conc. of all ingredients of the formulation was planned. Further, due to low durability it was foremost important to include a binder in the formulation.

Table 3 The effect of binder on FR finish durability of cotton

Sample Treatment	After flame time(sec)		Char length (cm)		After glow time(sec)		LOI (Vol. %)	
	W0	W1	W0	W1	W0	W1	W0	W1
SNFR F3 (without Binder)	5	49	4.5	>30	4	7	29	26
SNFR F4 (with Binder)	5	7	3.5	8	3	6	30	28

It was observed that after one home laundering wash the FR finish was leached out from the fabric and removed during the washing when FR applied without binder. As the finish is just physically entrapped inside the substrate and there is no chemical bonding such as hydrogen bonding as in case of Pyrovatex CP and THPC [16], this necessitates binding agent which could hold the stannic oxide inside the fibre firmly. When F4 applied to cotton with binder, it slightly increased the LOI to 30 and also reduced charlength from 4.5 cm to

3.5 cm, after flame time remaining the same for both samples. The effect of commercial binder (Saraprint AC) is clearly seen in the results from Table 3. The sample without binder does not show any sign of durability of finish and after laundering, charlength exceeds 30cm where more amount of FR is leached out of the fabric. Whereas sample with the binder shows lower charlength after wash. Though the exact chemistry of binder with FR finish is not known, acrylate based binder shows a property of binding the FR chemical (sodium stannate radical) to the cotton. The stannic oxide entrapped inside the fibre may be held by the binder or entrapped under the thin film of the binder and giving more wash durability by preventing leaching out of FR finish from cotton fabric.

Table 4 Effect of binder on durability of FR finish on cotton with formulation F4

No.of washes	After flame time (sec)	Char length (cm)	After glow time (sec)	LOI (Vol.%)
W0	5	3.5	4	30
W1	7	8	6	28
W2	12	11	8	28
W3	16	11	7	27
W4	16	13	8	26
W5	23	16	9	26
W6	30	>30	9	25

When FR finish was applied on cotton and washed as per home laundering method, the durability of the finish on cotton is found to be effective only with binder as seen from the Table 3 & 4. After one wash, LOI decreased slightly from 30 to 28. As the number of washes increased, the charlength, afterflame time and afterglow time increased. Upto 5 washes binder performs satisfactorily giving charlength of 16 cm and LOI 26. During washing there is leaching of FR finish to some extent which reduces the conc. of stannic oxide entrapped inside the fibre moieties and thus the reduction in flame retarding properties.

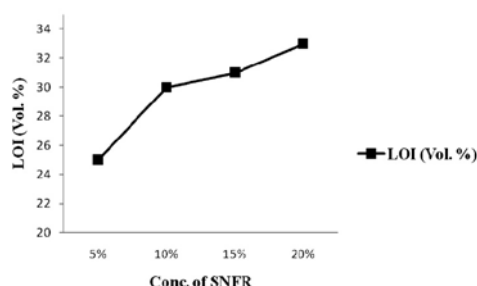
Texttreasure

We will have to repent in this generation not merely for the vitriolic words and actions of the bad people, but for the appalling silence of the good people.

Martin Luther King, Jr.

Table 5 Relation between the conc. of sodium stannate and flammability with formulation F4

Conc. of Sodium Stannate	After flame time (sec)	Char length (cm)	After glow time (sec)	LOI (Vol. %)
5%	34	>30	7	25
10%	7	3.5	4	30
15%	5	3.0	3	31
20%	4	3.0	2	33

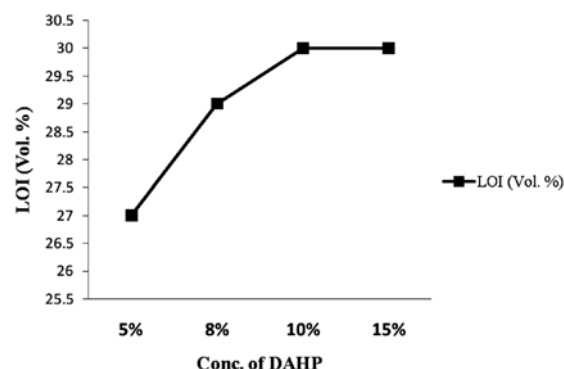

Figure 1: Relation between Conc. of SNFR and LOI of cotton with F4

3.3 Effect of concentration of SNFR and DAHP on flammability of cotton

As evident from table 5 and Fig. 1, with increase in conc. of sodium stannate from 5% to 20%, LOI values also increase from 25 to 33 respectively. Also a reverse but desired trend has been found in terms of afterflame time and afterglow time where, both are decreasing with increasing conc. of FR. Increased LOI is attributed to higher amount of stannic oxide being accumulated in the substrate giving more char residue on the surface of cotton fabric. Stannic oxide is able to prevent the formation of flammable products, since it acts as a Lewis acid that catalyzes the dehydration reaction of cellulose, forming a protective film of charred materials that prevents the oxygen from reaching the unburned substrate.

Table 6 Relation between the conc. of DAHP and flammability of cotton with formulation F4

Conc. of DAHP (%)	After flame time (sec)	Char length (cm)	After glow time(sec)	LOI (Vol. %)
5	10	6	5	27
8	7	4	3	29
10	5	3.5	2	30
15	4	3.1	2	30


Figure 2 Relation between Conc. of DAHP in F4 and LOI of cotton

DAHP has an important role in reducing the afterglow effect by phosphorylation with cotton and hence it is studied with varying conc. of DAHP in formulation F4 to study the effect of DAHP on flame retardancy of cotton. As conc. of DAHP goes on increasing (Table 6 & Fig. 2) from 5% to 15%, LOI is also found to increase from 27 to 30. LOI increased only upto 10% of DAHP and further increase in DAHP did not increase LOI of cotton. This may be due to saturation of phosphorylation of hydroxyl groups by DAHP beyond which no more DAHP is retained by the cotton. Hence optimum conc. of DAHP is between 5-10% only. It has an effect on strength of cotton so it is necessary to use optimum conc. of DAHP.

3.4 Effect of curing temperature on finish retention

Curing of finish at required temperature is also an important step during the application of finish otherwise performance of the treated fabric could be hampered. The effect of curing temp. on LOI of washed samples is reflected in the Table 7.

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Table 7 Relation between the curing temperatures and flammability of cotton fabric

No. of washings	Cured for 3 min at	After flame (Sec)	Charlength (cm)	Afterglow (sec)	LOI Vol.(%)
0	140°C	2	3	2	32
	150°C	5	4	4	30
	165°C	4	15	5	29
5	140°C	28	>30	12	24
	150°C	23	16	9	26
	165°C	20	11	7	28
10	140°C	38	>30	10	23
	150°C	45	>30	8	24
	165°C	25	>30	12	25

Cotton samples treated with F4 when cured at 140°C, 150°C and 165°C for a period of 3 min, higher LOI was retained at lower temperature when samples were not subjected to laundering washes. Curing at 165°C for 3 minutes was proving to be unfavourable as it produced higher charlength and decreased LOI of cotton. The treated samples when subjected to 5 washes showed that more LOI was retained by the sample which was cured at higher temperature whereas sample cured at 140°C gave LOI of 24 and also Charlength of more than 30 cm. After 5 home laundering washes the sample cured at 165°C retained LOI of 28. Curing at higher temperature has led to better entrapment of FR in cotton fabric upto 5 washes but after 10 home laundering washes samples showed decreased LOI retention even at high temperature. At higher temperature extent of adhesion of binder film to cotton and in turn entrapment of chemicals seems to be obviously better during curing and hence better performance.

3.5 Effect of urea on flame retardancy of cotton

The effect of urea on flame retardancy of cotton is studied with three different conc. of urea (Table 8 & Fig. 3).

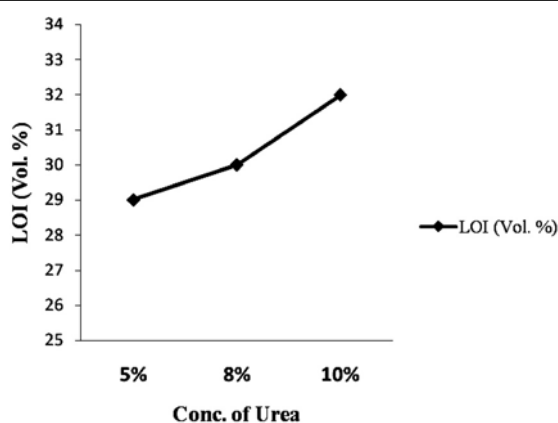
Textsmile

Teacher: Today, we're going to talk about the tenses. Now, if I say "I am beautiful," which tense is it?

Student: Obviously it is the past tense.

Table 8 Relation between the conc. of urea and flammability of cotton with formulation F4

Conc. of Urea (%)	After flame (Sec)	Charlength (cm)	Afterglow (sec)	LOI Vol.(%)
5	8	4.1	4	29
8	5	3.5	3	30
10	5	3.3	1	32
15	4	3.2	2	32

**Figure 3: Relation between Conc. of Urea in F4 and LOI of cotton**

When no urea was used, LOI of cotton was only 26 and also charlength exceeded 30cm. Whereas, with introduction of 5% urea in the formulation LOI increased to 29 and Charlength was found to be 4.1 cm only. Similarly with higher conc. of urea charlength was reduced to 3.3 cm for 10% of urea. Urea acts as an acid acceptor and helps in preventing strength loss but apart from this it also acts as a nitrogen source and assists in diluting the temperature of the combustion zone by producing non-combustible gases, enhancing the flame retardancy of cotton fabric. Urea acts in a synergistic manner with DAHP, and the result of synergistic action in this case exceeds the individual performance of the chemical.

3.6 The effect of SNFR finish on physical properties of cotton

When a finish is applied it affects the physical properties of the fabric and it may not be acceptable if physical properties of the textiles are greatly hampered.

Table 9 Relation between the conc. of sodium stannate and strength of cotton

Conc. of sodium strength	Breaking strength (Kgf)	% Elongation	Tearing strength (kgf)	Bending Length (cm)
Control	66.6	15.8	2.432	3.05
5%	67.5	20.4	2.425	2.65
10 %	68.9	19.6	2.080	2.75
15 %	65.6	18.6	2.010	3.10
20 %	63.2	17.5	1.980	4.0

It is revealed (Table 9) that, as the conc. of sodium stannate is increased, initially it shows increase in the tensile strength upto 10% of sodium stannate but beyond this conc. there is decrease in the tensile strength which is a marginal reduction of 5% when 20% sodium stannate is used. When the tearing strength of the treated cotton was evaluated a decreasing trend of tearing strength with increase in conc. of sodium stannate in the formulation was observed. The reason for this could be attributed to entrapment of higher conc. of FR inside the fibres and some deposition on the surface of the substrate. This may lead to formation of weak points in the chain molecules due to which, sample when subjected to load, the distribution of load in the sample becomes uneven and sample breaks at lower strength.

Stiffness of the SNFR treated fabric is not much affected as seen (Table 9) compared to control sample. With 5% of sodium stannate, fabric rather becomes soft and hand is improved. But at 10% sodium stannate, bending length is increased slightly from 2.65cm to 2.75cm and similar increase is observed for 15 and 20% SNFR. Overall there is not much effect of SNFR on stiffness of cotton and hand of the fabric is almost retained.

Table 10 Relation between the conc. of DAHP and tensile strength of cotton

Conc. of DAHP	Breaking strength (Kgf)	% Elongation
0%	68.9	19.6
5%	60.2	16.7
10%	34.55	14.7
15%	32.8	15.07

It is observed that with increase in conc. from 5% to 15% of DAHP in formulation, the strength of the treated fabric is found to decrease. With 5% of DAHP strength is decreased by 13% but for 10 & 15% of DAHP fabric shows drastic decrease in the strength. The possible reason for decrease in strength is acid tendering of treated fabric during curing [17]. During curing DAHP phosphorylates with hydroxyl groups in the cellulose and simultaneously phosphoric acid is also produced which is responsible for deterioration of fabric. Higher conc. of DAHP may lead to greater acid tendering hence optimum conc. of DAHP needs to be used during application. DAHP in the range of 5-7% was the optimum.

4. Conclusion

The present formulation finds a definite potential of imparting flame retardancy to cotton based home textiles which have considerable market for bed sheets, sofa covers, curtains, mattresses etc. Promising results are obtained without hampering the other desired properties such as feel and handle. The FR finish also showed fair durability to home laundering. Physical properties were also acceptable with optimum conc. of SNFR giving a strength loss in the range of 6-7% as compared to 10-15% in case of commercial FR.

References

1. A. Richard Horrocks, Shonali Nazare and Baljinder Kandola, *Fire Safety Journal*, **39** (2004) 259-276
2. Wulf W, Alkidas A, Hess RW, Zuber N., *Text Res. J.*, **43**(5), (1973),77-88
3. D. J. Irvine, J. A. McCluskey, I. M. Robinson, *Polym. Degrad. Stab.*, **67**, (2000) 383.
4. C. L. Beyler, *J. Fire Protection Eng.*, **11**(4), (2001)
5. J. B. Dahiya and Krishan Kumar, *Journal of Scientific & Industrial Research*, **68** (6), (2009), 548-554
6. Linda S. Birnbaum and Daniele F. Staskal, *Environmental Health Perspectives*, **112**(1), (2004), 9-17
7. Sabyasachi Gaan, Gang Sun, *Polymer Degradation and Stability*, **92**, (2007), 968 -974
8. Richard Horrocks, *Polymer Degradation and Stability*, xxx, (2010), 1-16
9. Khaled El-Tahlawy, Roshdi Eid, Fawzy Sherif and Samuel Hudson, *The Journal of Textile Institute*, **99**(2), (2008), 157-164
10. Xue Zhao, *The Journal of The Textile Institute*, **101**(6), (2010), 538-546
11. <http://onlinelibrary.wiley.com/doi/10.1002/pen.20472/pdf> , assessed 20th March (2011)
12. G.P Nair, *Colourage*, (2000), 21-25
13. G.P Nair, *Colourage*, (2000), 29-38
14. Stephen John Blunden et al. United States Patent No. 6372360 B1
15. H. Horacek and R. Grabner, *Polymer Degradation and Stability*, **54**,(1996), 205-215
16. Weidong Wu, Charles Q. Yang, *Polymer Degradation and Stability*, **91**, (2006), 2541-2548
17. G. Tesoro, *Pure & Appl. Chem.*, **46**, (1976), 239-245

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Soil contamination due to Textile Effluent- Case study on the Printing cluster of Jaipur

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Abstract

Enormous volumes of effluent are generated at different stages of textile dyeing and printing units, as a result of use of copious amount of chemicals and dyes. It results in an ecological risk, as such soils become poor in physicochemical properties, susceptible to erosion, loss of productivity, sustainability and diminished food chain quality. The present study was conducted at Bagru a centre of printing in Rajasthan, Jaipur. Soil samples were collected from contaminated (dye house effluent coagulated soil) and uncontaminated areas (Agricultural land in and around the town) at 0-25cm depth for analysis. Two sites were selected in each area for collection of soil samples in three months mainly August, December and March depending on the period of production of the prints. Before irrigation, waste water was analyzed for selected parameters i.e. pH, BOD, COD, DO, TSS, TDS while in soil samples various parameters analyzed were Alkalinity, Organic Carbon, Nitrogen, Calcium, Magnesium, Potassium and Moisture content and metals like Fe, Pb, Cu, Cd. There was variability in the readings in all the three seasons. The study concluded that the continuous application of effluent appears to deteriorate soil quality in the area.

Keywords

Physicochemical analysis, Industrial effluent,

1 Introduction

Natural dyes are generally of low impact depending on the specific dye and mordant used. Mordant such as chromium is very toxic and has high impact on environment. Textile dyeing industries consume large quantities of water and produce large volume of waste water. Considerable amount of dyes have been noticed in textile waste waters, due to their incomplete use and washing operations. The dye disposed off, can be found in dissolved state or in suspensions in the waste water. These dyestuffs are highly structured polymers and are very difficult to decompose biologically. The most obvious impact of the discharge of dye colored effluent is the persisting nature of the color. It is stable and fast, difficult to degrade, toxic, rendering the water unfit for its intended use. Such dyestuff can reach the aquatic environment, primarily dissolved or suspended in water, since the conventional treatment of waste water from textiles mills and dyestuff factories are unable to remove most of the vat and other dyes effectively. The resulting dye effluents may contain some components of moieties that could be toxic, carcino-

genic or mutagenic to life [1].

The use of effluents for irrigating agricultural land is a worldwide practice. It is especially common in developing countries, where water treatment cost cannot yet be afforded. Irrigation with sewage effluents provide with water, nitrogen (N) and phosphorus (P) as well as organic matter to the soil. All these have beneficial effects on soil biota, at the same time it provides a convenient mean of sewage disposal through land treatment, preventing potential health and environmental hazards, caused by the uncontrolled flow of waste water [1]. With respect to both the quantity and composition, the textile processing wastewater is recorded as the most polluted sources among all the industrial sectors [2]. Many scientists have documented adverse effects of different industrial effluents on the growth of plants. Dye waste water has also been found toxic to several crop plants. The present investigation was aimed at knowing the effect of dye industrial effluent on soil quality [2].

Perhaps one of the industries under the strong radar of the environmental agencies is the dyeing units and the dyestuff industries as a whole. With respect to both the quantity and composition, the textile processing waste-

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water is recorded as the most polluted sources among all industrial sectors [3]. Hence owing to a deep concern on the sustainability of environment, the present study was planned with an aim to determine the physicochemical parameters of the soil contaminated with the dye house effluent.

The study was conducted at Bagru, located in the south-west of Jaipur region at a distance of about 30 kms from jaipur city on national highway (NH-8) towards Ajmer. Dhami kalan is included in bagru town. The revenue area of the town with settlement is 41.65 sq.km. This town is located between north latitude 26°48'07"to 26°50'18" and east longitude 75°32'07"to 75°34'06". The town is famous for its dabu printing. In all there are 250 printing units. Printing is mainly carried out by the natural dyes but some enterprises make use of synthetic dyes. Dye industries required lot of water during dye processing. This untreated waste water was discharged directly into drains that connect the industry to the main drainage network through the nullas in the town. The effluents disposed in open drains are directly used for crops cultivation which affects the nearby agricultural land.

2 Materials and Methods

The study is instigated with an objective to analyze the physicochemical properties of soil (adjoining the textile effluent) of dye house and agricultural region and the water used for irrigation which can help in identification of environmental impacts. Soil samples were collected in three seasons namely August, December and March from four different locations i.e. the immediate effluent site, main drainage, agricultural land where untreated industrial effluent is used for irrigation purpose and a control site.

Reason for selecting the samples in different seasons was the period of production which varies in its activi-

ties, resulting in variation in the amount of effluent discharged. Peak period of production is in March followed by December whereas, August being rainy season results in spreading of the print paste, is the lean period for printing. The soil samples were collected from 0-25cm depth from three locations immediate to dumping site of effluent and agricultural fields which were irrigated with the effluent contaminated water and a control sample from seven kms away from printing cluster for the study. Composite sample for each replicate were prepared, air-dried, gently crushed with a wooden roller and passed through 2 mm sieves. Sieved soil samples (<2 mm) were stored in plastic bags for further analysis. The collected effluent samples have been analysed to determine its physicochemical parameters. Temperature and pH were recorded on the field. The soil samples have been analyzed for physicochemical parameters like alkalinity, organic carbon, nitrogen, calcium, magnesium, potassium, moisture content and metals like Fe, Pb, Cu, Cd. Physicochemical parameters of waste water and soil samples were analyzed by standard protocol [4].

3. Results and Discussion

A huge volume of untreated textile dye waste water is discharged into various drains adjoining textile printing units. Natural Dyes were mainly used for dyeing and printing but along with a heavy usage of mordents and pigments. Untreated waste water was being discharged directly into open drains that connect the industry to the main drainage network in the town. The pH of the sample ranged between 8.43-8.59 in the agriculture soil during the three months whereas immediate effluent was found to be more acidic in the peak production month of December and March being 4.2-4.8. The electrical conductivity which represents total ions concentration ranged from 0.75 to 0.99 μcm^{-1} . This indicated that salts used in the dyeing process are leached out in outlet.

Table 3.1: Physicochemical parameters of the soil samples

Season / Parameters	August				December				March			
	S(1)	S(2)	S(3)	S(4)	S(1)	S(2)	S(3)	S(4)	S(1)	S(2)	S(3)	S(4)
pH	8.59	6.05	8.38	8.48	8.43	4.22	8.05	8.4	8.55	4.8	8.27	8.43
EC	0.753	0.88	0.834	0.76	0.74	0.89	0.84	0.76	0.75	0.88	0.83	0.76
OC	22.96	26.6	26.46	22.9	23.0	27.1	26.98	23.03	22.99	26.7	26.52	23

Chloride concentration was maximum (550mg/lit) as compared to other parameters like Na, Mg and K shows wide variation i.e. 80mg/lit, 100mg/lit and 37.7mg/lit respectively in S2 sample. The data revealed that the soil pH was affected by the application of industrial waste water. The pH of effluent irrigated soil ranged between 8.5 to 8.7 while pH of uncontaminated soil ranged from 8.4 to 8.3, not much difference in the pH of the samples, the reason being long term use of drainage water as irrigating water in the fields. Though the effluent sample was acidic in nature but since the effluent was ultimately led to mix in the main drainage it resulted in increased level of pH. Accordingly crop growth neither needs a high pH (above 8.4) nor low pH (below 5.0) favorable for maximum yield of crops. Electrical conductivity is commonly used as a measure of salinity of soil. Electrical conductivity ranged between 0.75 - 0.99 μcm^{-1} in uncontaminated and contaminated soil samples respectively (Table 3.1).

The maximum electrical conductivity of soil recorded in contaminated soil is 0.99 μcm^{-1} at site-2 while minimum 0.74 μcm^{-1} at site-1, major change was observed in the months of December as is considered the peak time of production. In the contaminated soil, EC increased with the application of effluent as the water having high concentration of salts, particularly Na^+ and Cl^- has significantly increased the salinity as compared to the uncontaminated soil [6]. The higher concentration of cations such as Na^+ and K^+ in waste water led to an increase in EC and exchangeable Na and K in soil irrigated with waste water [5]. Water holding capacity is an index for a number of physical properties. Bicarbonates are directly related to total alkalinity i.e. increase in carbonates and bicarbonates increases the total alkalinity. Bicarbonates of contaminated soil ranged between 520 to 590 mg/kg and in uncontaminated soil ranged between 380 to 480mg/kg. Maximum reading was recorded in immediate effluent soil (590 mg/kg) at S-2, and minimum in control soil S-4 (380 mg/kg). High pH values indicate alkalinity (bicarbonates) problem with sodium ion likely to be the dominant cation in the soil colloid [7].

The readings of organic carbon (OC) are recorded which are ranged in between 22.9% and 27.1% respectively for the control soil and effluent of the immediate soil. Irrigation with waste water increases OC content of soil [8]. The variation in the readings of OC content and EC may be due to long term application of waste water in soil [9].

The application of effluent water markedly increased the available sodium in contaminated soil as compared to the uncontaminated soil. The minimum available sodium was recorded in the control soil which ranged between 35.8 to 56.6 ppm and maximum in effluent soil ranged between 80.3 - 89.7 ppm. Increase in the sodium ion concentration of soil irrigated with waste water can be attributed to minerals in the waste water [7]. High amounts of sodium ions can result in precipitation of calcium and magnesium ions from the soil thus affecting their effectiveness in enhancing physical internal drainage [6].

Table 3.2: Metal Analysis of Soil Sample in August

Metals	Agriculture (S1)	Immediate effluent (S2)	Main Drainage (S3)	Control (S4)
Copper	18	36	131	22
Lead	19	24	36	26
Iron	3289	3132	3906	2597
Cadmium	-	-	-	-
Chromium-	26.2	36.8	-	

Table 3.3: Metal Analysis of Soil Sample in December

Metals	Agriculture (S1)	Immediate effluent (S2)	Main Drainage (S3)	Control (S4)
Copper	20	39	135	23
Lead	22	26	37	28
Iron	3291	3233	3915	2650
Cadmium	-	0.02	0.02	-
Chromium	-	28.2	35.11	-

Table 3.4: Metal Analysis of Soil Sample in March

Metals	Agriculture (S1)	Immediate effluent (S2)	Main Drainage (S3)	Control (S4)
Copper	20	37	133	22
Lead	21	25	36	27
Iron	3289	3135	3910	2601
Cadmium	-	-	-	-
Chromium	-	26.2	34.86	-

High levels of metals were found in the soil mainly immediate effluent and main drainage, the reason being the usage of mordants in natural dyes. Metal content of the soil implied a great variation in the soil content. Readings for copper assessment ranged from 36 to 135 mg/kg from agricultural to main drainage soil respectively. Lead concentration was 19 to 37 mg/kg. Whereas soil sample from the control site showed a high concentration in the amount of Iron as compared to the other three. It was observed that there was a variation in the readings of various parameters in the months of December, March and August in four soil samples (Tables-3.2, 3.3, 3.4). The reason being peak time of production, which resulted in heavy amount of effluent generation as compared to the other seasons.

4 Conclusion

This study has shown that Bagru Textile Printing units discharge effluent with high degree of acidity, chlorides, cations and anions which are not in compliance with standard. The results indicated that the application of industrial effluent affected physicochemical properties of soil. There is an urgent need for proper management practices of waste water for irrigation purpose. The study suggests that the continuous application of effluent appears to deteriorate soil quality as well as fertility of the soil. It is concluded that controlled irrigation with waste water can become an ecologically sound strategy for use of waste water and economically optimum and healthier grain yield of suitable seasonal crops, selection of tolerant crops; treatment of waste water prior to its re-use for irrigation; crop rotation practices.

References

1. De A.K., *Environmental chemistry*, New age international (p) ltd., 1,125-27 (2007).
2. Chang W., Tran H., Park D., Zhang R. and Ahn D., Ammonium nitrogen removal characteristics of zeolite media in a Biological Aerated Filter (BAF) for the treatment of textile wastewater, *Journal of Industrial and Engineering Chemistry*, **15**, 524-528 (2009).
3. Rusan M., Hinnawi S. and Rousan L., Long Term Effect Wastewater Irrigation of Forage Crops on Soil and Plant Quality Parameters, *Desalination*, **215**, 143-152 (2007).
4. APHA. Standard Methods for the Examination of Water and Wastewater, *American Public Health*

5. Rai S., Chopra A.K., Pathak C., Sharma K.D., Sharma R. and Gupta M.P., Comparative Study of Some Physicochemical Parameters of Soil Irrigated with Sewage Water and Canal Water of Dehradun City, India, *Archives of Applied Science Research*. **3**(2), 318 -325 (2011).
6. Ishaya K.S., Maracus Danjuna N., Kukwi and Issac, J. The influence of waste water on soil chemical properties on irrigated fields in Kaduna South Township, North Central Nigeria. *Journal of Sustainable Development in Africa*. **13**(6), 91-101 (2011).
7. Khai N.M., Tuan P.T., Vinh C.N. and Oborn I., Effects of using wastewater as nutrient sources on soil chemical properties in periurban agricultural systems, *VNU Journal of Science, Earth Science*, **24**, 87 -95 (2008).
8. Mojiri A., Effects of Municipal waste water on physical and chemical properties of saline soil, *J. Boil. Environ. Sci.*, **5**(14), 71-76 (2011).
9. Joshi V.J. and Santani D.D., Physicochemical Characterization and Heavy Metal Concentration in Effluent of Textile Industry, *Universal J of Environmental Research and Technology*, **2**(2), 93-96 (2012).

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Recycling of Chicken Feather and Wool Fibre Waste into Reinforced Multilayer Composite - A Review

C. Arunkumar, Hari Shankar Megwal, S.P. Borkar & A.L. Bhongade*

Veermata Jijabai Technological Institute

Abstract

This paper presents a review on the multilayer composite reinforced with chicken feather and wool fiber. This study emphasizes the possibility of recycling waste from poultry and woolen industries. Chicken feathers are disposed into waste stream, land filling and animal feed without any use. In recent survey, about 350 million tones of chicken feathers are dumped as waste in India alone. This creates a major environmental pollution. As an alternative to land filling or animal feed, the feathers can be formed into value-added products finding profit.

Keywords

Multilayer composite, Chicken feather fibre, Sheep wool, Thermal insulation

1. Introduction

Fiber-reinforced composites are modern construction materials from which products that can be used in many areas of technical application are manufactured. These materials are characterized by very good mechanical properties. They are ideal for structural applications where high strength and stiffness are required. The mechanical properties of the composite are defined by the properties of reinforcing fibres and their percentage participation in this material; the full advantage of such materials are obtained when the fibres are optimally distributed and oriented in each layer [1]. A multilayer composite is a structure that includes reinforcements at different scales, bonded together by matrix. Synthetic engineering composites are single-scale structures composed of fibres embedded in matrix [2].

In recent years, attempts are made to improve these synthetic composites by including an additional reinforcement phase at a lower scale, for example by dispersing carbon nano tubes into their matrix. Such modification significantly increases the composite strength and toughness but slightly affects its moduli, which might be attributed to the randomness of the orientation and dispersion of nano tubes [3]. However,

for thermal protection systems, which do not require high mechanical strength, the residual porosity would be beneficial providing the decrease of thermal conductivity through the thickness. Therefore, this kind of composite layers could be integrated into thermal production system [4]. The main application of this chicken feather and wool fiber waste multilayer composite is for thermal insulation and acoustic properties.

Worldwide 24 billion chickens are killed annually and around 8.5 billion tones of poultry feathers are produced. According to a recent report in leading news paper, India's contribution alone is 350 million tones. The poultry feathers are dumped, used for land filling, incinerated or buried, which involves problems in storage, handling, emission control and ash disposal. Discarded feathers also cause various human ailments including chlorosis, mycoplasmosis and fowl cholera [5]. Sheep wool is a natural, sustainable, renewable, theoretically recyclable material and totally biodegradable that does not endanger the health of people or the environment. Both chicken feather and wool fibre has excellent thermal and acoustic insulation property. This type of composite can be used to develop an eco-friendly, light weight acoustic composite from a cheap and easily available material at a lower cost. Both chicken feather and wool fibre has low specific gravity which accounts for the light weight of composite material.

2. Chicken Feather Fibre

Feathers distinguish birds from other vertebrates and

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play an important role in numerous physiological and functional processes. Most adult birds are covered entirely with feathers, except on the beak, eyes, and feet. Feathers not only confer the ability of flight, but are essential for temperature regulation. Feathers are highly ordered, hierarchical branched structures, ranking among the most complex of keratin structures found in vertebrates [6]. There are five commonly recognized categories of feathers: contour, down, semiplume, filoplume, and bristle. The differences in keratin organization result in approximately 30 macroscopically distinct poultry feather types [7].

Contour, or vaned feathers give birds their color and provide the first layer of defense against physical objects, sunlight, wind and rain as seen in Fig. 2.1(a). Contour feathers are found on a birds back, tail, and wings, and are primarily responsible for flight. Each contour feather has a feather shaft and a flat vane extending from it [8]. Down feathers [Fig. 2.1(d)] are smaller than contour feathers and lack barbules and the accompanying hooklets. They are soft and fluffy, located beneath the contour feathers. They provide most of a chicken's insulation. The semiplume [Fig. 2.1(c)] is a feather type that mediates between the categories of contour and down. Semiplumes share characteristics with both; they have a large rachis and predominantly downy vanes.

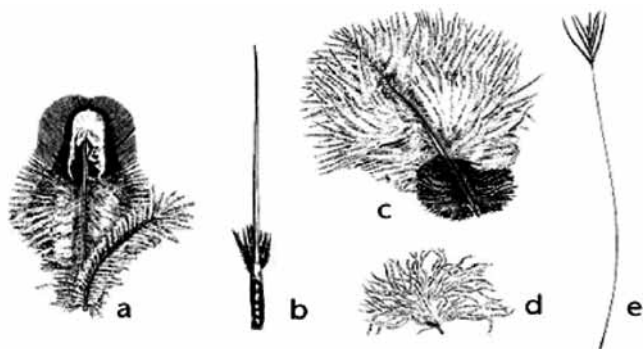


Figure 2.1: The five primary types of chicken feathers: (a) contour, (b) bristle, (c) semiplume, (d) down, (e) filoplume

Filoplumes [Fig. 2.1(e)] are smaller than semiplumes with only a few barb at the tip of a fine shaft. These likely serve a sensory function in chickens, registering vibrations and changes in pressure. The smallest type of feather is the bristle, which is stiff and has few, if any, short barb near the tip. Bristles [Fig. 2.1(b)] are protective in function and are found on a chicken's head, at the base of the beak, around eyes, and covering the nostrils [7].

2.1 Chemical Composition of Chicken Feather Fibre

Table 2.1: Chemical Composition of Chicken Feather

Protein (keratin)	91%
Lipids	1%
Water	8%

The amino acid sequence of a chicken feather is very similar to that of other feathers and also has a great deal in common with reptilian keratins from claws. The sequence is largely composed of cystine, glycine, proline, and serine and contains almost no histidine, lysine or methionine [7, 9].

Table 2.2: Elemental Analysis of Chicken Feather

Element	%
Carbon	47.83
Nitrogen	13.72
Hydrogen	6.48
Sulphur	2.16
Others	29.81

2.2 Chemical structure

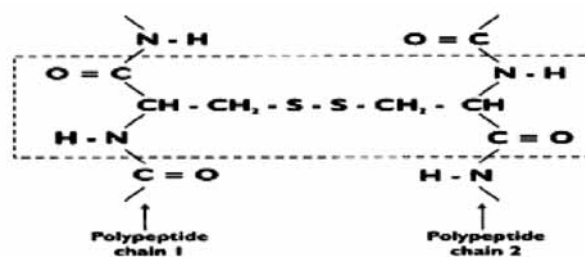


Figure 2.2: The diamino-acid cystine residue linking two polypeptide chains by covalent bonding

The feather keratin can contain both α -helical and β -sheet conformations. Chicken feather fibre primarily consists of α -helical conformations and some β -sheet conformations. Chicken feather outer quill consists almost entirely of β -sheet conformations, and few α -helical conformations are present. Hard β -sheet keratins have much higher cystine content than soft α -helix keratins and thus there is a much greater presence of disulfide (S-S) chemical bonds which links adjacent keratin proteins. These strong covalent bonds stabilize

the three-dimensional protein structure and are very difficult to break. This suggests that chicken feather outer quill would be stronger than chicken feather fibre. However, a study of the thermal properties of chicken feather fractions suggests that outer quill is weaker than fibre and inner quill [9].

2.3 Morphological structure

Feathers, quills and fibres are both made of the protein keratin, the stuff of hair, nails and wool. But the quill is hard and has a disorganized microscopic structure, while the fibres are soft and possess a very orderly microstructure. A single keratin fibre has a maximum diameter of 50 μ m. Quill fractions are composed of both inner and outer quill; outer quill is more densely structured, has less cross-linking property than inner quill. Thus, it is the outer quill component of a quill fraction which is weaker. Outer quill would be weakened by mechanical stresses that the feather fibre and inner quill would be able to withstand. Feathers are extremely light and they are hollow yet very strong. Figure 2.3 shows the physical structure of chicken feather [10].

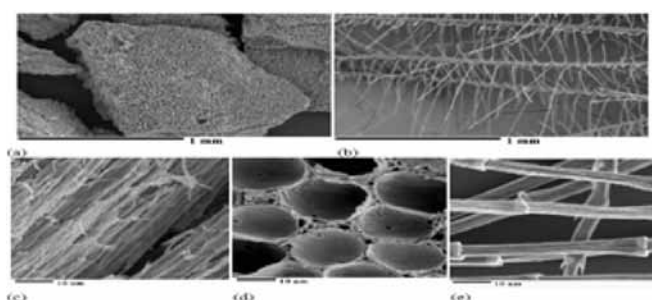


Figure 2.3: SEM images of chicken feather (a) inner quill, (b) fiber, (c) outer quill, (d) inner quill, and (e) fiber

2.4 Physical Properties

2.4.1 Moisture content

Keratin can be considered to have both hydrophilic and hydrophobic properties. While 39 of the 95 amino acids in the keratin monomer are hydrophilic, serine, the most abundant amino acid gives chicken feathers the ability to attract moisture from the air because of the free -OH group on the surface of each serine molecule. Thus, chicken feather fibre may be considered to be hygroscopic. The higher T_g indicates a tighter keratin structure to which water is more strongly bonded. Fibre and inner quill do not begin to lose water below 100°C [7].

2.4.2 Aspect Ratio

Fibre diameters were found to be in the range of 5-50 μ m by scanning electron microscopy. The other fibres were reported to have diameters of 6-8 μ m and lengths of 3-13mm. These values correspond to aspect ratios of 400-2200. It is found that fibres had a constant diameter of approximately 5 μ m and lengths between 3.2 and 13mm. These values correspond to aspect ratios of 600-2600 [7, 10].

2.4.3 Apparent Specific Gravity

The density of the chicken feather fibre is 0.89 g/cm³; it was obtained from Feather Fibre Corporation, by displacing a known volume and weight of the density of solid keratin. It is reported to use fibre of length 3.2-13mm with equivalent amount of ethanol as that of the fibres. The value may be higher due to the presence of shorter fibres (as short as 3.2mm in length). The hollows or voids inside chicken feather fibre may become more accessible to ethanol as fibre length decreases. For a fibre of some critical length, the void inside of this fibre acts as a part of its surface and as a result only the solid matter of this fibre will be accounted for by a measurement of apparent density. Assuming a density of 1.3 g/cm³ for the solid matter of chicken feather fibre (keratin), apparent density results will approach 1.3 g/cm³ as fibre length decreases [10].

2.4.4 Chemical Durability

The structure of keratin, the primary constituent of chicken feathers affects its chemical durability. Because of extensive cross-linking and strong covalent bonding within its structure, keratin shows good durability and resistance to degradation. Efforts to extract keratin proteins from feathers illustrate this point. Extraction is a difficult task because it can only be achieved if the disulfide and hydrogen bonds are broken. It is found that keratin is insoluble in polar solvents, such as water as well as in non polar solvents. The most common method for dissolving feather keratins is solubilization with concomitant peptide bond scission via acid and alkali hydrolysis, reduction of disulfide bonds with alkaline sodium sulfide solutions, or a combination of enzymatic and chemical treatment. Although these techniques are effective for extracting keratin (75% yield), they require extremely high reagent concentrations that are much higher than keratin fibres would ever be exposed to in nature. One can deduce a relatively sturdy, stable protein from this keratin [7].

2.4.5 Thermal insulation

Thermal insulating materials were used to prevent heat loss which can occur by conduction, convection, phase change and radiation, individually or collectively. Heat transfer from one side of the fibre assembly to the another side was a complex phenomenon affected by numerous factors such as density of the assembly, quantity of entrapped air, moisture content and transport and the motion of the contained air. In comparison with wool, the chicken feather surface was more hydrophobic and thus exhibited a better thermal insulation in humid environment [11].

2.4.6 Special properties

The low density, excellent compressibility and resiliency, ability to damp sound, warmth retention and distinctive morphological structure of feather barbs make them unique fibres [12].

The density of chicken feathers is about 0.8 g/cm³ compared to about 1.5 g/cm³ for cellulose fibre and about 1.3 g/cm³ for wool.

The tensile properties of barbs in terms of their strength and modulus are similar but the elongation is lower than that of wool [7, 12].

3. Sheep Wool

The processing of wool fibre and sheep shearing from sheep wool produces waste, which is difficult to use in the textile industry. The aim of the research was the development of thermo insulating material using waste wool fibres [13]. The annual world production of raw sheep wool, according to data of the British Wool Marketing Board (2010), is approximately 1.2 million metric tons. The greatest wool producer is Australia (approx 400,000 metric tons of wool annually); other major producers are New Zealand and China. Approximately 90% produced wool is consumed by textile industry to produce fibres [14].

Sheep wool can be waste product of sheep husbandry along with other keratinous materials such as poultry feathers or human hair [15, 25]. Its utilization creates several serious problems. In normal conditions wool biodegradation is a slow process. Wool before processing contains fats, dirt and other compounds like weeds, feces etc. because of the presence of the fats delaying microbiological decomposition, such raw wool is less suitable for amending growing substrates in short-term vegetable cultivation under glass. Also, sweat wool

is hydrophobic, so the amount of water and nutrient solution it adsorbs is smaller. On the other hand, degradation of washed wool is faster than of sweat wool. However, scouring and washing of the sweat wool is costly and gives rise to new problem; safe utilization of scouring wastes and sludge [25].

3.1 Properties of wool

Wool is one of many natural fibres belonging to the group of protein called α -keratins. Keratins are rich in amino acids containing sulphur (cysteine, cystine, methionine) causing their high chemical resistance (insolubility) and mechanical resilience. The secondary structure of α -keratins is helix [14].

3.1.1 Breathability

Under a microscope, wool fibre is seen to be covered by thin sheath of overlapping scales that act rather like tiny roof tiles. The scale causes liquid water to form beads and roll off. This enables a wool fabric to repel moderate rain and spills. In contrast, wool absorbs water vapour (from the air or from perspiration), through the porous coating over the scales. Hence wool can absorb up to 30% of its own weight in moisture without feeling clammy. Damp wool fabric remains absorbent and comfortable inside because its outer surface releases this moisture through evaporation. Wool fibres strive to stay in balance with the surrounding moisture conditions - this is why wool is said to breathe as it absorbs and evaporates moisture [17].

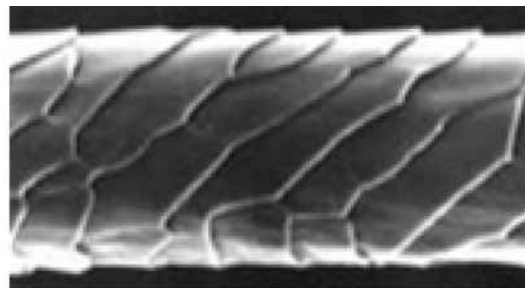


Figure 3.1: A magnified wool fibre

3.1.2 Heat generation

When moisture enters the fibre (for example, when we go outside on cold, damp day), a significant amount of energy is released. This enables a wool jersey or other garment to provide a warming effect while the moisture is being absorbed. Every kilogram of wool generates about as much energy as the human body metabolism produces in one hour. And when you return into a dry, warm indoor environment, the moisture is released and cooling effect is the result.

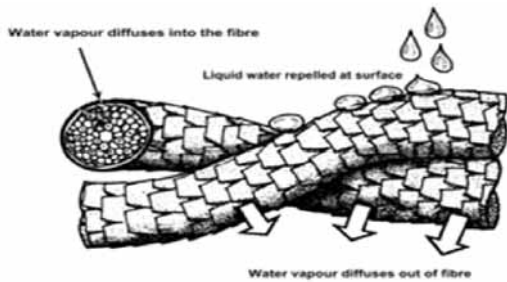


Figure 3.2: Heat generation

3.1.3 Alpha helix of wool structure

At the most basic level, the molecular structure of wool fibres can be likened to a string of beads arranged in a helical path. The helix behaves like spring and gives wool its flexibility and elasticity. The hydrogen bonds (shown as dashed lines), which link adjacent coils of the helix, provide a stiffening effect, especially when the fibre is dry.

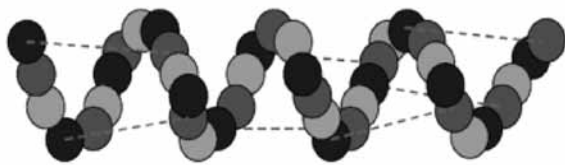


Figure 3.3: Alpha helix of wool fibre

3.1.4 Felting and shrinking

The surface scales of the fibres are also responsible for the unique felting and shrinking properties of wool when wet. As these diagrams show, the edges of the scales catch against those of a neighboring fibre aligned in the opposite direction so that they can easily past each other in only one direction. On the other hand, fibres aligned in the same way will slip past each other easily in either direction. Smoothing the scale edges by applying a special resin coating to the wool fibres prevents shrinkage. Inter-fibre slippage is made much easier.

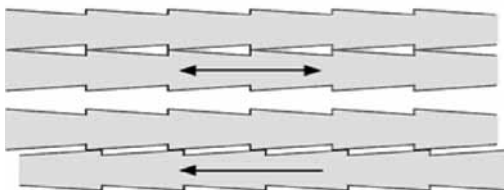


Figure 3.4: Felting and shrinking

3.1.5 Thermal insulation

Wool also provides us with warmth through its insulation properties. In wool garment, the crimp in the fibres makes them stand apart from each other. As a result,

little pockets of still air are trapped between the fibres. This lining of air trapped inside the fabric acts as an insulator (as well as the layer between the fabric and the skin). Still air is one of the best insulators found in nature for e.g. any polar bear or penguin relies on the insulating air layer formed by fur or feathers to keep warm in Arctic conditions [17].

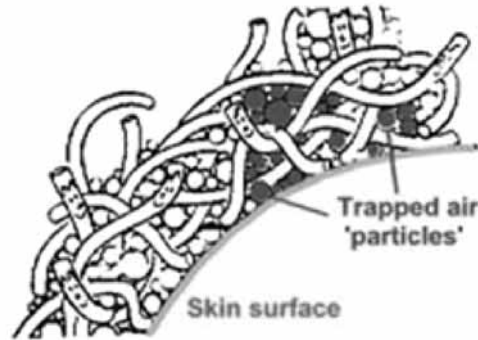


Figure 3.5 Thermal insulation

Wool insulation has a very low conductivity which means it is very difficult for heat to pass from one side to the other. To compare wool to other common insulators examine the table below, here conductivities are given in Watts per meter (W/mK) where the lower value is the better result [18].

Table 3.1: Insulation Material Conductivity (k value)

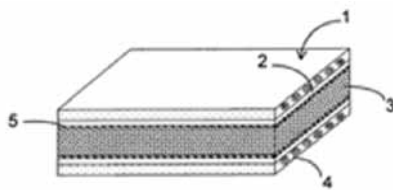
Sheep wool Insulation (Certified Europe wide CE Value)	0.039 W/mK
Glass wool	0.044 W/mK
Mineral (rock) wool	0.042 W/mK
Cork	0.04 W/mK

The above values are typically measured at 0% humidity (i.e. laboratory conditions). Wool is a significantly more effective insulator once moisture is introduced into environment which typically occurs in everyday situations. Your attic may have 60% humidity for example, which will adversely affect materials which cannot absorb this moisture. Wool is a hygroscopic insulator, which means it can absorb moisture without becoming wet to the touch and without affecting its superior performance.

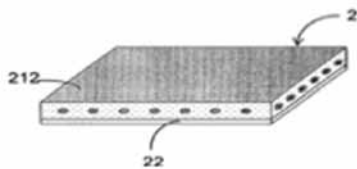
4. Multilayer Composite

Composite sheets with layers possessing different properties are provided which can be compression molded to produce molded panels with smooth glossy surfaces.

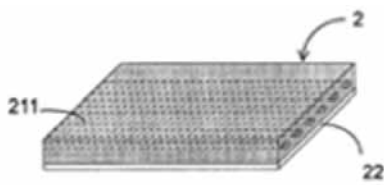
A fibre free outer layer is laminated to bulk layer comprising fibre mat compounded with thermoplastic resin filled with chopped fibres. The fibre free layer has a higher melt viscosity than the bulk layer [19]. The multilayer composite material panel comprises a panel structure that comprises a first composite material layer, an intermediate layer and a second composite material layer in order. Both composite material layers may have same or different constituent materials and layer structures. Each composite material layer may include a fibre reinforced resin layer and a polymeric membrane. The intermediate layer may have one or more layer of porous material. A lamination panel is fabricated by placing the first composite material layer, the intermediate layer and the second composite material layer in the order and binding the layers with affixing means. The multilayer composite material panel so fabricated is light in weight, hard and strong in structure. Figure 4.1 shows the structure of multilayer composite [20].



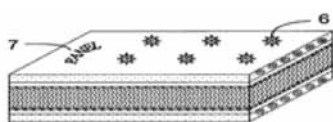
Structure of multilayer composite material



Sheet of composite material layer



Sheet of composite material layer



Patterns printed on multilayer composite

Figure 4.1: 1-Plurality of layer, 2- First composite material layer, 3- intermediate layer, 4- second composite material layer, 221- Fiber reinforced resin layer, 212- Fabric reinforced resin layer, 22- Polymeric membrane

The multilayer composite structures and various thermosetting matrices are important to gain an improved understanding of the toughening of polymeric composites through layering. To impede delamination, the most serious reason for increased degradation of composites, we have developed a toughening technique for thermosetting matrix-composite system, which we have commercialized and are qualified for use in primary structures. Our approach is based on layering in order to toughen the highly stressed interlaminar regions within composites. We applied a tough, resin rich layer between the plies in the composite structure, resulting in a multilayer-laminate structure. This type of lamination can be implemented as heterogeneous or homogeneous structural modifications (see figure 4.2). Generally, conventional, pre-impregnated composites (prepregs) feature equally distributed reinforcing fibres within a matrix resin. Ideally, the prepreg has a constant thickness and the fibres are completely wetted by matrix resin. However, multilayer prepreg is generated by employing a third component, the interleaf or interlayer, which must be placed between the plies. For processing this multilayer prepreg structure, different techniques can be used, depending on the type of multilayer (i.e., heterogeneous or homogeneous) [21].

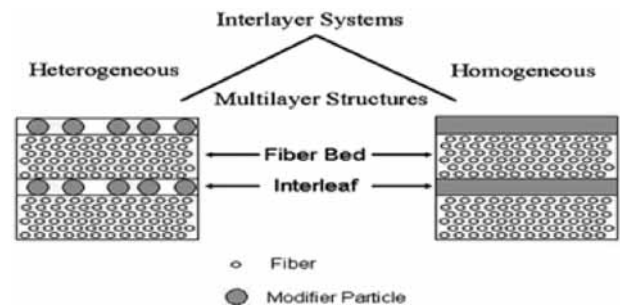


Figure 4.2: Heterogeneous versus homogeneous approaches to layer toughening

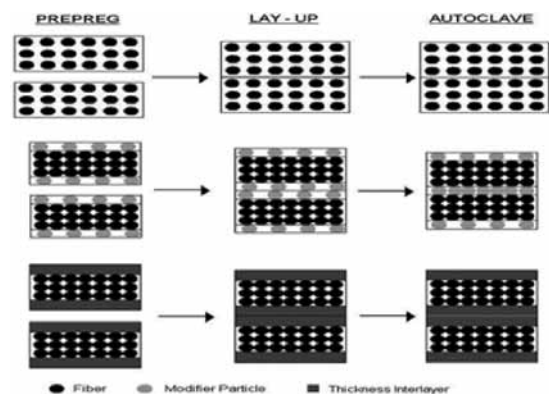


Figure 4.3: Development of conventional and multilayer structured composites

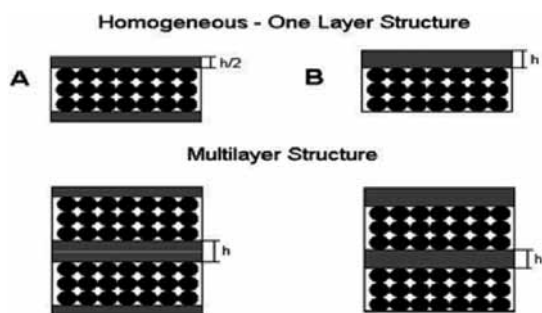


Figure 4.4: Two different approaches to homogeneous-interlayer generation during the impregnation's second pass. Application of (A) half the resin thickness ($h/2$, preferred) and (B) the full thickness only on one side of the fiber bed.

The chicken feather waste can be used as reinforcement in cement bonded composites but only up to about 10% feather content. Boards containing 5 to 10% fibre and/or ground feather were comparable in stiffness and strength properties to commercial wood fibre cement board of similar thickness and density. Increasing the proportion of chicken feather above 10% resulted in significant reduction of MOE and MOR and decreased dimensional stability. Potential use of waste chicken feather as reinforcement in cement bonded composites could benefit the poultry industry by reducing waste disposal costs and gain profit from sale of chicken feather to the building and construction industries [22].

Chicken feather reinforced composite have potential application due to impact behavior. The tensile and flexural properties can be enhanced with increasing percentage of the chicken feather and also with different resin. Another way to enhance the composite properties is to determine an effective treatment to eliminate lack of adhesion between resin and chicken feather [23].

There are new bio-based composites from modified plant oil, halogen-free flame retardants and chicken feather fibres for printed circuit applications. Epoxidized soybean or linseed oils and different types of polycarboxylic anhydrides were used with presence of catalysts. Chicken feather fibres are all natural and these fibres are compatible with several modified plant oil resins. The hollow, light weight fibres innately contain a significant volume of air which made their dielectric constants lower than e-glass fibres. The feather fibres are tough to withstand both mechanical and thermal stress [24].

References

1. Wisniewski J., Optimal Design of Reinforcing Fibres in Multilayer Composites using Genetic Algorithms, *Fibres & Textiles in Eastern Europe*, **12** (3), 47, (2004).
2. Lakes R., Material with Structural Hierarchy, *Nature*, **361**, 511-5 (1993).
3. Benny Bar-on, H. Daniel Wagner, Effective Moduli of Multi-Scale Composite, *Composite Science and Technology*, **72**, 566-573 (2012).
4. Yang W.S., Biamino S., Pandovo E., Fuso L., Microstructure And Mechanical Properties of Short Carbon Fiber/Sic Multilayer Composite Prepared By Tape Casting, *Composite Science and Technology*, **72**, 675-680 (2012).
5. Agrahari S. and Wadhwa N., Degradation of Chicken Feather a Poultry Waste Product by Keratinolytic Bacteria Isolated from Dumping Site at Ghazipur Poultry Processing Plant, *International Journal of Poultry Science*, **9** (5), 482-489, (2010).
6. Yu M., Wu P., Widelitz R.B., Chuong C, The Morphogenesis Of Feathers, *Nature*, **420**, 308-312 (2002).
7. Kock J.W., Physical And Mechanical Properties Of Chicken Feather Materials, A Thesis Presented to the Academic Faculty, Georgia Institute of Technology May, (2006).
8. Bartels T., Variations in the morphology, distribution, and arrangement of feathers in domesticated birds, *Journal of Experimental Zoology*, **298B**, 91-108 (2003).
9. Saravanan K., Dhurai B., Exploration on Amino Acid Content and Morphological Structure in Chicken Feather Fibre, *Journal of Textile and Apparel, Technology and Management*, **7**(3), (2012).
10. Hong C.K., Wool, Development of Bio-Based Composite Materials from Soybean Oil and Keratin Fibers, *Journal of Applied Polymer Science*, **95**, 1524-1538, (2005).
11. Gao J., Yu W. and Pan N., Structures and Properties of the Goose Down as a Material for Thermal Insulation, *Textile Research Journal*, **77**, 617 (2007).
12. Reddy N., Yang Y., Structure and Properties of Chicken Feather Barbs as Natural Protein Fibers, *Polym Environ*, **15**, 81-87 (2007).
13. Zach J, Possibilities Of Using Waste Sheep Wool For Manufacture Of Thermo-Insulating Material,

- Central For Integrated Design Of Advanced Structure, (2009).
14. Mokrejs P., Krejci O., Svoboda P., Modeling Technological Conditions For Breakdown Of Waste Sheep Wool, **4**, 728-735, nov. (2011). [Http://www.rasayanjournal.com](http://www.rasayanjournal.com)
 15. Evans M.R., Karcher D. Properties of plastic, peat, and processed poultry feather fiber growing containers, *HortSci.* **39**, (5), 1008, (2004).
 16. Górecki R.S., Utilization of Waste Wool as Substrate Amendment in Pot Cultivation of Tomato, Sweet Pepper, and Eggplant, *Polish J. of Environ. Stud.*, **19**, 1083-1087, (2010).
 17. www.shearcomfort.com, Canesis Network Ltd, *Wool- The Natural Fiber*
 18. <http://www.sheepwoolinsulation.ie/support/faq.asp>, Wool insulation ltd,
 19. www.google.com/patents/us4716072, Bang M.Kim, *Multilayer Composite Structure for Smooth Surface*
 20. Tai-yan kam, *Multilayer Composite Material Panel*, Patent application publication, jan 26, (2006).
 21. Seferis J., Drakonakis V., Velisaris C., Interlayer Matrix Hybridization Of Carbon-Fiber-Reinforced Composites, Society of plastic engineer and plastic research online.
 22. Menandro N. Acda, Waste Chicken Feather as Reinforcement in Cement-Bonded Composites, *Philippine Journal of Science*, **139** (2), 161-166, December (2010).
 23. Uzun M., Sancak E., Patel I., Usta I., Mechanical Behaviour Of Chicken Quills And Chicken Feather Fibres Reinforced Polymeric Composites, *Archives of material science and engineering*, **52**(2), 82-86 dec (2011).
 24. Zhan M., Bio-Composites from Chicken Feathers and Plant Oils for Printed Circuit Boards, Marriott Inn and Conference Center University of MD University College, June 24, (2009).



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Dr. Vijay D. Gotmare is currently working as an Associate Professor and Head of the Textile Manufactures Department at VJTI, Mumbai. He did his B.Sc. (Tech.), M.Sc. (Tech.) and Ph.D (Tech.) in Textile Chemistry from Institute of Chemical Technology (former UDCT), Mumbai.

His research areas includes, Utilization of textile waste through chemical modification, eco-friendly textile fibres and processes, green technology, functional finishes, high-tech fibres, bio-technology applications in textiles, technical textiles.

He has worked as a project co-ordinator for Alps Industries Ltd., Ghaziabad and has won Best project Award - 2000 on Natural Dyes along with his final year student team. He has also been awarded "Shikshan Rattan Puraskar" along with Certification of Excellence by Indian International Friendship Society, New Delhi.

He is having Lifetime Memberships of various professional bodies like, The society of Dyers and Colorists, UK, Mumbai chapter, Indian Fibre Society CIRCOT Mumbai, Association of Chemical Technologist of India (ACTI) Ahmedabad, Association of Carbohydrate Chemist and Technologist, Dehradun.

In his immense professional service, he has had various major appointments and selection with respect to research activities. He is a member of selection committee for the selection of senior research fellows to work under NATP-ROPS/1 project on 'Natural dyes on textiles' in CIRCOT; has been appointed thrice as an expert member by the Dept. Of Bio-technology, Ministry of Science and Technology, has been appointed as member of Advisory Committee for Research and Liaison at BTRA, has worked as external referee for evaluating Doctorial Thesis in DKTE, Shivaji University, he is also nominated as Sub-Committee Member (Directorate of Science and Technology) Khadi and Village Industries Commission, Govt. of India.

He has two International Publications and 12 National ones and has attended 8 International conferences and 7 national ones.

E-mail : vgotmare@yahoo.com

Some interesting observations and education to textile shop-floor persons (How one can avoid the situations of this type?)

Today's scenario of textile industry has really changed as compared to two decades ago. The shop-floor activity always needs attention since the skilled people are in shortage. GOI is taking efforts in this context and expecting change in the way of thinking of workers and vocational staff. Industry is ever changing towards achieving excellence, better quality controls, using automated machinery, environmental consciousness and following Right First Time (RFT) concept besides giving training to vocational staff from time to time.

I would like to share my shop floor experience in one of the composite units of those days where this kind of unusual situation occurred and whole process house section was finding difficulty in searching solution. These kinds of cases are very rarely discussed in textile books and the students never thought of such problems. I have come across this interesting case where I have learnt and cares were taken to council and educate the workers on various issues which saved the organization from damages and loss. To arrive at some conclusive solution it is extremely important to understand that why such problems occurred, where the things are lagging, how such situation would be avoided in future, etc.

I have experienced very unusual incidence during my stay at one of the textile mills which taught me a big lesson that one should be very alert at working place and observe every movement microscopically. There is a requirement of coordi-

nation among the staff at all the levels.

Case-I: Disappearance of Polyester/Cotton blended fabric.

A 500 mts of Polyester/Cotton blended fabric was disappeared from the process house when we were gathered to take the stock of the processed material. Since the material could not trace after herculean task, then there was an emergency situation in the section. GM called the finishing manager and subordinate staff and asked to investigate the situation. The answer was not affirmative from finishing manager and then the matter became beyond control.

At last the staff from R & D section was called and they were asked to investigate the situation. The job was offered to me. It was my litmus test and challenge also to find appropriate solution to the problem.

The material bearing sort No XXXXX was of warp polyester and weft cotton construction and meant for warp dyed and weft undyed for garmenting purpose. I had gone through the process sequence of the particular sort and found that it is mentioned for carbonization after dyeing and followed by finishing for soft feel. I got the solution immediately and I rushed to carbonizing section where the material was lying as hard mass. The intelligent readers might have understood the situation.

What are the findings of above matter? It is a sheer mistake of

finishing department who ignored the construction details of the fabric and could not identify the wrong sequence assigned to the Sort No XXXXX materials.

I have started giving lectures to shop-floor people on various issues after this event and found improvement in various other matters in understanding quality parameter and ultimately reduction in faults and damages.

A processor needs to know the complete cloth construction theory besides his processing knowledge.

**Case-II:
Multicolored stains/dagi on finished white cotton fabric.**

This is the case from one of the process houses where I was work-

ing as Laboratory in-Charge cum Departmental assistant.

The finish folding meeting was called at one fine morning and a 100% white cotton fabric was placed in front of all of us which was carrying multicolored stains at random places after finishing for anti-crease purpose. The responsible person was scrolled but found no proper answer for the cause. A one man enquiry was setup to investigate the situation.

There were three different dyed spots in pale, medium and dark shades of yellow, brown and navy blue respectively, and the 100% white fabric was ready for easy care finishing purpose. After thorough cleaning of stenter, the supervisor was supposed to start loading

fabric in the order of 100% white, pale shade, medium shade and then dark shade. After grilling concern supervisor, he agreed that the sequence was not followed and he loaded the fabric of dark shade initially followed by medium and 100% white and lastly pale shade. We gathered the situation and found it difficult to rectify the problem.

Observations and Suggestions

The order of loading fabric in such situations has to be given to workers and make them understand that if such damages occurred, it will have no solution. This kind of situation could be possibly avoided through training process. It is necessary to begin the finishing with 100% white fabric followed by pale, medium and dark shade fabrics.

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Value Addition by Special Effects in Garments



In the world of fashion, garment finishing has become a key element of product development. Today's customers demand more value for money through different levels of comforts, durability and functionality. These expectations have led to major opportunities for the textile industry in general and textile finishing in particular. In this world of fashion not only design, style, accessories play an important role but also the material and their finishing which improves the aesthetic appeal of the ready to use product.

In 1960's, the emphasis was primarily on the durable press for garments. During 1980's, the properties like stretch, fragrance, thermal comforts and regulations came into picture and latter on UV-protective finish, anti-microbial, aroma/perfume finish, de-odourising finish, insect/mosquito repellent and flame retardant finish were discovered. The techniques used for denim washing have been extended to other items such as indigo dyed fabrics. With a shift to consumer centric thinking wherein it is the buyers and retailers with whom the decision making rests, process houses and chemical suppliers are constantly striving to innovate or develop new products or concepts for the market. Improvement in functional performance of the garment through specialty finishing has led to the development of up-market and niche products in recent times.

The appearance of garments is enhanced by incorporating different special effects during garment finishing. Some of the latest effects are briefly described as follows;

1. Super-sonic white effect : This uses a mixture of sodium permanganate as oxidizing agent along with viscosity builders. This mixture is applied on denim garments by spray/brush/screen method, dried and then neutralized. It gives a snow-white discharge effect on the applied portion.

2. The Engraver Embellishment effect : The concept here is to retain the base indigo on certain portion of garment and leaving the remaining portion light. A resisting chemical is applied on certain portion by spray/brush/screen method, drying and curing at 150°C. Thereafter, a discharging chemical like potassium permanganate or sodium hypochlorite is sprayed on it. The indigo will remain intact on the resist portion of the garment. This gives a beautiful contrast between dark blue portion (resist portion) and light indigo background.

3. Scratch look on denim : Scratch chemical is applied on denim by a very fine brush to create scratchy effect. Then fabric is dried and cured at 150°C. After this colour is sprayed on it and dried at room temperature and treated with colour fixing agent. It gives a unique scratchy effect on applied portion.

4. Wet look effect : Visual appearance of this garment is pursued as wet, as if water is sprinkled on garment. This effect is achieved by applying wet look chemical, dried and cured at 150°C. The garment is then treated with light bleaching solution (preferably sodium hypochlorite).

5. Shaded fantasy effect : This effect is popular in kids wear. It uses micro-emulsion of metallic sparkle like gold, silver and fluorescent green and yellow. These micro-emulsions are applied onto garments by spray/brush/screen method.

6. Ball blast effect : Ball blasting is nothing but decolourisation of denims and other garments. It is an application of sodium hypochlorite slurries with calcium chloride powder. Thermocol balls are used for mechanical abrasion on the garment surface.

7. Frost Finish : Contrary to the conventional finish on apparels this finish gives the wearer a cool comfort by good moisture transportation, easy evaporation & hydrophilicity. These finishes are ideal for shirts (cotton & blends) and next to skin wears.

The scope of garment finishing is very broad. Only innovative products will be able to open up new markets and new horizons for textile industry e.g Hug shirt, this shirt is a soft lycra shirt with embedded

sensors and electronics that allows wearers to feel the physical closeness of someone else over a mobile phone network. The shirts receive the input of heart beat, touch and body temperature of the other person recreating (through actuators embedded in the shirt) over distance, the pulsation and warmth of a real hug. It is also clear that

there is still a great deal of scope for the introduction of novel chemical finishes with superior performance, greater ease of application and preferably multifunctional properties. However, the influence of environmental issues is clear and environmentally friendly products are preferred. We can use advances in bio-technology, concen-

trated enzymes, eco-friendly chemicals for the improvement of our exports. Integrated finishing treatments will be preferred because of the necessity to provide a quick response to market demands.

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The Textile Association (India)

TAI - Delhi

National Textile Seminar-2013

The Textile Association (India) Delhi successfully inaugurated the "National Textile Seminar 2013" on theme, "Propelling Growth through Innovation", on 12th April 2013 at PHD House, New Delhi. Mr. A. B. Joshi, Textile Commissioner (Government of India) was the chief guest for the occasion. The inaugural session witnessed a wide mix of audience comprising of different stakeholders in the textile value chain from renowned organization and from academia. Mr. Shekhar Agarwal, Group Vice Chairman, LNJ Bhilwara Group was the Guest of Honour. Other dignitaries included Mr. Sudhish Aggarwala, Chairman, NTS-2013, Mr. R. K. Vij, President, TAI-Delhi, Dr Anil Gupta, National Vice President, TAI and Mr Ashish Dhir, Founder and Managing Director, Wisedge Consulting.

Themed "Propelling Growth for Innovation", the seminar started on a welcome note by Mr. Sudhish Aggarwala, who expressed his immense pleasure and extended a warm welcome to all the delegates, panelists and the guests present at the event. In his presidential address, Mr R. K. Vij thanked all the speakers who graciously accepted the invitation. He reinforced that the seminar had been organized with the aim of providing a common platform for the industry stakeholders to get knowledge about latest innovations and developments in the sector.



Dr. Anil Gupta, Mr. Shekhar Aggarwal, Mr. A.B. Joshi, Mr. R.K. Vij and other dignitaries releasing the conference Souvenir

The Textile Association (India) - Delhi awarded Life Time Achievement Award to Mr. K.K Agarwal, Chairman, Alps Industries Limited, Mr. V. Sam Singh, Ex. President & MD, South Asia DU Pont, Prof. G.S. Bhargava, Advisor, Advance Group of Colleges, Mr. P.S. Jain, Trustee, The Textile Association (India) - Delhi and Mr. Dilip Gianchandani, Regional Director, Intertrek India Pvt. Ltd. This was followed by felicitating meritorious students with scholarships worth INR 1,00,000 from the field of textiles.

The Guest of Honour, Mr. Shekhar Aggarwal addressed the audience by focusing on various issues faced by the textile industry to ponder upon which were subsequently taken up during the sessions. Some of the topics included, the expectations of industry from the government, inter sector squabbles, achievement of higher value addition to the end products, labor shortage among others. The Chief Guest Mr. A.B. Joshi followed suit by taking this opportunity to highlight some of the recent significant schemes for the textile industry. He also conveyed that with the kind of stirring support from Indian government the textile industry should now focus on growth through constant innovation, modernization, automa-

tion, induction of new concept and modern technology.



Mr. A.B. Joshi, Textile Commissioner delivering his speech

Towards the end of the inaugural session Mr. D.K. Singh in his Vote of Thanks conveyed his heartiest regards for all the support provided by the sponsors, partners, delegates, guests, media partners and knowledge partner, without whose support putting together this seminar would have been a distant dream. After the Inaugural Session, there was a panel discussion with the first generation entrepreneurs in the textile industry on "How to create best in class textile business: Journey of first generation industrialists". Mr Ashish Dhir, Managing Partner of Wisedge Consulting was the moderator of the session and the panelists included Dr. R. C. Jain, Chairman, TT Group, Mr. K.K Aggarwal, Chairman, Alps Industries Limited, Mr. V.K. Ladia, CMD, Shree Rajasthan Syntex Limited. The discussion was focused on the journey of the three leading industrialists in the textile sector. How they have started their textile business and what all challenges they have faced during their initial days. The spotlight was on the changing industry scenario and industry's inability to attract younger generation. The discussion also covered the lack of proper infrastructure, systems and processes in the industry for the required growth. The panelists also discussed the

problem of labor shortage in the textile sector and that the industry needs to attract labor by opening new training centers, adopting new technology, using modern machineries and working towards the overall human resource management in textile industry.

After the panel discussion, there were research papers presented on Cosmetotextiles "Cosmetics in Textile Applications" from Clariant, "Bio-Innovation in Textile" from Novozymes and "Com4® Yarns - with 4 Spinning Technologies" from RIETER India Pvt. Ltd.

Mr. Emrah Esder, Global Head-Marketing Textile Chemicals, HO-Singapore, Mr. Jayant G Khera, Regional Sales Manager-Textiles and Mr. Prasanta Deka, Head Marketing presented their informative papers respectively. Dr. R. C. Jain, Chairman, TT Group was the session chairman for this session.

After the presentation of research papers, there was 2nd panel discussion titled "Why, how & when to invest in a textile Innovation". This panel discussion was moderated by Mr. Shailesh Kaushik Chairman, Technical Committee, NTS - 2013. The eminent panelists for this session were Mr. Sushil Muhnot, CMD, SIDBI, Dr. M.K. Jain, Ex ED, GACL, Mr. Suneel Sharma, Head, Research & Strategy, Star Union Dai-ichi, Mr. Vijay Bhalla, Director, BECON and Mr. Munish Tyagi, Senior Consultant-Textile industry & projects at Nuovatex Projects Co.

The panel was unanimous in need for innovation for survival and growth and resonated with thoughts shared in inaugural session i.e. need for innovation-across the spectrum-

industry and academia (institutes & research associations) working in sync to develop a synergy and bringing all stake holders on the same page. Mr. Sunil Muhnot, CMD, SIDBI provided very comprehensive information about SIDBI's schemes which have already been successfully implemented in MSMEs. The panelists brought on table innovative funding options to give impetus to innovation, shared the blue print included suggestion of earmarking a percentage of industry's turnover towards specific innovative Research & Development and emphasized that in this competitive world & difficult times a synergy involving all stake holders is only way and only out of box ideas-duly incubated, will show the way forward.

There is no denying the fact that over the years Indian Textile Industry has created a strong industrial culture, pool of skilled manpower and knowledge base. But still, in American parlance, there has not been a "Sputnik Moment" in spite of having century old industry tradition, more than two dozen textile institutes, research associations and centers of excellence. There is alarming shortage of innovative R&D in these institutions. Even if innovative developments take place they do not get translated into reality and commercial exploitation. The investment in real innovation-R&D even in top textile companies is in decimal digit or single digit at the best.

It is time for serious introspection in context of the fact that from general areas like energy, water conservation to specifics like spinning, fabric conversion, chemical processing, functional textiles etc.-there is a whole spectrum, where

even a minor development can lead to significant positive contribution. In this context the industry can provide a ready platform for innovation-R&D-through institute-industry interface; since their own professionals do not find time to indulge in basic R&D because of their preoccupation with routine investigative and troubleshooting activities. In this scenario wise counsel is being solicited from the experts representing the entire spectrum, encompassing core technology to finance & management. Endowed with decades of rich knowledge, wisdom and experience they will focus on grey areas as to bring all stake holders- on the same page and so as to evolve a holistic approach and infuse synergy of Research & Development for fueling the growth engine of Indian economy.

The 3rd panel discussion was titled "Enhancing growth by strengthening buyer-supplier relationship in textile and apparel". The session was moderated by Mr. Ashish Dhir, Managing Partner, Wisedge Consulting. The list of renowned panel members included Ms. Deepika Rana, Executive VP, Li & Fung India Pvt. Ltd, Mr. Anant Sadana, CEO, Apparel United, Mr. Prasham Kamdar, Managing Partner, Ptex Solutions, Mr. Anurag Rajpal, CEO, American Swan and Mr. Shantanu Dugar, Director, Omega Designs Pvt. Ltd.

This session was focused on the empowerment of buyer supplier relationship. The discussion highlighted that the industry should focus on areas like product development and innovations to produce high value added products. Also the industry needs to focus on the qualitative aspects of investments such

as time, money, strategic inputs essential for building a long term relationship.

The 4th panel which was the last panel discussed "Paisa Vasool: Learning and Innovations from various stakeholders in textile and fashion value" was moderated by Mr. Ravindra Singh, Owner, Protech India Ltd. The list of panelists included Mr. Dilip Gianchandani, Regional Director, Intertek, Dr. R.S. Antil, Registrar, Shree Guru Gobind Singh Tricentenary University and Dr. Rajesh Agarwal.

The discussion was focused on how the industry can leverage the talented new generation along with the modern technology and the in-

novations happening in the industry. The discussion also covered the current challenges in the human resource department of textile industry and described how a systematic approach can provide the solutions. The main highlighted point of the discussion was the requirement of the revolutionary changes at the academic front.

The conference concluded with a scintillating fashion show by students of The Technological Institute of Textile & Sciences, Bhiwani and Ginni Devi Modi Girls (PG) College, Modinagar. In all 6 themes were presented by the students of TIT&S which included NISARGA - inspired from nature , SCHLOEN PROSPECT- inspired from shoes , SPARTANS - inspired from the

Spartans , MAOW-E-MANIA -inspired from cats , TRASHION- inspired from reuse of trash and DAZZLING ALLURE - a fusion with jewels. Out of which DAZZLING ALLURE, SPARTANS & TRASHION took away the lime light and were declared to be the Best theme of the evening, unique theme of the evening and the 3rd best theme of the evening respectively, along with a special price announced for one of the dresses from TRASHION. Ginni Devi College also performed brilliantly with their themes. In the end, a cultural show was organized with some innovative and unique dramatic performances by students of TIT&S, Bhiwani.

TAI - Marathwada

A one week interdisciplinary course "Role of Textiles in Water Preservation" was organized by Shri Guru Gobind Singhji Institute of Engineering & Technology, Nanded and The Textile Association (India) Marathwada Unit during 18th -22nd March, 2013 at Nanded. Total 37 participants from institutes, industry and NGO attended it.

It was inaugurated by Mr. Prataprao Deshmukh, Mayor of Parbhani, while Dr. Sandhya Dudhgaonkar was chief guest. Prof. B. L. Deopura was the key note speaker and he also demonstrated the construction of tank for water storage using a novel material. Mr. Ulhas Paranjpe of Jalvardhini Pratishthan, Mumbai presented case studies of tanks constructed using natural fibers in Konkan and Thane region. Prof U. D. Kulkarni,

Department of Civil and Water Management Engineering presented case study of water preservation at CRPF Mudkhed. Prof. S. B. Muttagi, Govt. Polytechnic, Nagpur discussed the significance of fabric structure for water storage structures. Dr. R. P. Nachane, Scientist, CIRCOT, Mumbai elaborated the properties of fibers and yarns required for the water preservation. Dr. I. P. Sonar, COEP, Pune presented the analysis of research project carried out at his Institute where coconut fibers have been used for constructing tanks.

Two field visits were also made during the programme. One was at CRPF camp, Mudkhed where DIG, Mr. Mohane has successfully implemented the tank construction and the water storage is sufficient to take care of nearly 5000 people. The second visit was made to Nagderwadi which flashed on TV during the programme Satyamev

Jayate presented by Mr. Amir Khan. The visits were much appreciated by the participants.

Prof. U. D. Kulkarni and Dr. V. K. Joshi, Secretary, TAI, Marathwada unit were the coordinators of this programme.



From Left: Dr. V. K. Joshi, Prof. U. D. Kulkarni, Chief Guest Dr. Sandhya Dudhgaonkar, Prof. B. L. Deopura, IIT Delhi and Prof. P. Kar of SGGS Institute, Nanded

TAI - West Bengal

62nd Anniversary One day Technological Conference of the Textile Association (India) - West Bengal Unit

62nd Anniversary one day Technological Conference of the Textile Association (India), West Bengal Unit was held on 23rd March, 2013 at the Kennedy Hall of the Dept. of Jute & Fibre Technology, Institute of Jute Technology, University of Calcutta, with the theme "Challenges and Opportunities in Textiles".

Dr. R. C. Tiwari, President, TAI - W.B. Unit in his Welcome Speech congratulated the members for attending the Seminar and hoped that members would participate in the deliberation where some lively papers would be presented by the authors. The Industries especially Jute & other Textile Industries would face the challenges but it would be taken in good spirit to overcome it.



Sri Jiwraj Sethia, Vice-President TAI - W.B. Unit in his address spoke about the challenges from all sectors even from other countries in the Textile Industry but there would be the opportunities which would be undertaken to revitalize the Industry.

Dr. S.K. Bhattacharyya, Ex. Director, NIRJAFT in his keynote

address spoke about the possibility of handling the problems that Industries would face and challenges to be fought when there would be opportunities too. He gave some examples of different countries where those problems were tackled efficiently.



DR. Dhrubajyoti Chattopadhyay, Pro-Vice-Chancellor (Academic) University of Calcutta, inaugurated the conference by lighting the lamp and gave his inaugural address and thanked the organizers for arranging the conference with the theme Challenges & Opportunities in Textiles.

After the vote of thanks by Sri A.K. Roy, Chairman, TAI, W.B. Unit high Tea was served.

First Technical Session started with the following papers.

Chairman Dr. Sadhan Chandra Roy, Prof. Dept. of Jute & Fibre Technology, CU.

Paper 1. A Novel Approach of Automatic Jute Grading using a single Integrated Instrument, Dr. Goutam Roy & Dr. S.C. Saha NIRJAFT.

Paper 2. Indigo-Once the Colour of Kings, Now the King of Colours, Monoleena Banerjee, Free Lance Textile Artist and designer.

Paper 3. Manufacturing of Eri Silk Yam in Ring Spinning System and Evaluation of its acceptance for warm clothings using AHP and NAHP techniques of Multi-Criteria Decision Making (MCDM) approach. Dr. Prabir Kumar Chowdhuri - Silpa Sadan, Visva-Bharati University, Prof. Probal Kumar Majumder - Govt. College of Engineering and Textile Technology, Sreerampur and Prof. Bijon Sarkar, Production Engineering Department, Jadavpur University.

Paper 4. Creative Printing on Handloom Textiles, Dr. Sankar Roy Moulik-Visva-Bharati University, Silpa Sadan and Khusbu Agarwal : Sainthia, Birbhum.

Paper 5. Recent Trends in Value Addition of Garments, Prof. (Dr.) A.K. Samanta, Dept. of Jute & Fibre Technology, C.U & Dr. Sunanda Mitra Roy, Rani Birla Girls College, Kolkata.

2nd Session - Chairman, Dr. Probal Kumar Majumdar, Govt. College of Engineering & Textile Technology, Sreerampur, West Bengal.

Paper 6. Studies on the Dimensional Parameters & Functional Properties of Wool, Polyester and Wool-Polyester Blended Knitted Fabrics, Ms. Ipsita Majumdar and

Prof. Sadhan Chandra Roy, Department of Jute & Fibre Technology, C.U.

Paper 7. Challenges to Apply Eco Friendly Geo-Textiles, Prof. (Dr.) Asok Kr. Majumdar, Principal, Calcutta Institute of Technology, Uluberia, Howrah.

Paper 8. Design Response in Crises : Kantha, Ms. Ahana Majumder, Asstt. Profes-

or, Textile Design, NIFT, Kolkata.

Paper 9. Production of Shaped Garments in Knitting, Prop. (Dr.) Sadhan Chandra Roy, D.J.F.T., C.U.

Paper 10. Development of Conductive Textile by In-Situ Polymerization of Pyrole, Debasis Das, D.J.F.T., C.U. & Rupali Ganguly, Centre for Advanced Material, Indian Association for the Cultivation of Science, Kolkata.

Paper 11. Innovations in Cosmetotextiles for Shapewear, Ms. Sreenanda Palit, Associate Professor, Knitwear, NIFT, Kolkata.

Valedictory session was conducted by Dr. Sadhan Roy and Dr. Probal Mazumdar.

Lucky dip draw amongst the delegates present was done and 3 prizes were handed over. Conference ended with serving of tea. The conference was as grand success with a good number of participants.

<h1>TEXTTEST INSTRUMENTS</h1>		<p>COMPUTER TECHNOLOGY BASED AIR PERMEABILITY TESTER, ONLINE AIR PERMEABILITY TESTER, PORTABLE AIR PERMEABILITY TESTER, AIR BAG TESTER, DIGITAL ELMENDORF, PICK COUNTER, MOISTURE METER</p>	
<p>Air Permeability Tester</p>		<p>Hydrostatic Tester</p>	
<p>Manufactured by : TEXTTEST AG Switzerland. Email : info@texttest.ch</p>		<p>Exclusive agent for India : Thymas</p>	
			<p>PLEASE VISIT US DURING ITME-INDIA NSE, Mumbai 2-7 DEC 2012 HALL No : O1 STALL No : A-28</p>
<p>Elmendorf : Digital Tear Strength Tester</p>	<p>Portable Moisture Meter</p>	<p>Portable Pick Counter</p>	<p>Thymas Electronics Pvt. Ltd., Post Box No. 3744, Vadodara 390007 Ph.: 2351634/2312730 Fax: 0265-2335581 Email : thymasad1@bsnl.in & tepl26@yahoo.com</p>



Trützschler Nonwovens wins bid for universal needle punch line for Centre of Excellence in Nonwoven at DKTE, Ichalkaranji.



Mr. Gurudas Aras receiving the purchase order from Mr. K.B. Awade

In a major breakthrough, Trützschler Nonwovens, through its local partner A.T.E. Enterprises Pvt. Ltd, finalized a prestigious order for universal needle punch line with 'Centre of Excellence (CoE) in Non-wovens' at DKTE. This will be the first such line supply from Trützschler Nonwovens to India.

Committed to set-up a state-of-the-art testing facility for promoting technical textiles in the country, DKTE decided to go for wider width machinery, instead of laboratory scale size. The CoE will serve the industry with facilities for testing, training, technology business incubation, rapid prototyping, research & development, consultancy and support for business start-ups.

To mark this memorable occasion,

DKTE organized a "Purchase Order handing over ceremony" together with a press conference on 14th March, 2013 at its centre in Ichalkaranji. The event was attended by all the trustees of DKTE Society including Mr. K.B. Awade (Chairman), Mr. P.K. Awade (Director), Prof. Dr. P.V. Kadole (Principal), Prof. C.A. Patil (Dean Academics) and the team, while A.T.E. was represented by Mr. Gurudas Aras (Director) along with Mr. Sanjay Murabatte and Mr. Deepak Karade.

Speaking on the decision to select Trützschler Nonwovens as a partner for the universal nonwoven needle punch line, Mr. P.K. Awade, Chairman, DKTE, CoE in Nonwovens said, "Trützschler with its expertise in multiple nonwoven bonding technologies, long reputation in the Indian market along with a **strong sales partner like A.T.E.**, undoubtedly made it their best choice".

Mr. Gurudas Aras received the purchase order and handed over the order confirmation and proforma invoice to Mr. K.B. Awade during

this function. Mr. Aras congratulated the DKTE management for its decision to invest in industrial nonwoven line and conveyed his gratitude for selecting Trützschler Nonwovens as its partner. He further added that A.T.E. and Trützschler Nonwovens share DKTE's vision and will do everything possible to fulfill its dream of establishing a world class CoE, so that all stakeholders will get benefited.

Prof. C.A. Patil, Dean Academics DKTE Society's Textile and Engineering Institute, who has been instrumental in setting up the CoE in Nonwovens said that "A.T.E. with its excellent sales team having domain knowledge in nonwovens, and Trützschler Nonwovens have always shown their interest and willingness to be a part of our CoE". He was glad that they have got a sound and reputed technology partner and a highly reliable sales agency.

The machinery is expected to be delivered by December 2013 and the line is expected to be functional by March 2014.



MLV Textile and Engineering College, Bhilwara Workshop on 'Quality Assurance in Textiles - New Concepts and Techniques'

The workshop on "Quality Assurance in Textiles - New Concepts and Techniques" is being organised by The Department of Textile Technology, MLV Textile and Engineering College, Bhilwara on May 20-21, 2013. In this workshop, quality aspects related to methodology and

techniques adopted in Spinning, Weaving, Chemical Processing, Garment Manufacturing and Technical Textiles will be discussed.

The workshop will provide the platform to the technocrats from industries, academia and researchers/students to interact with each other

on the recent developments taken place in aforementioned areas.

Registration forms for delegates' registration and sponsoring events can be downloaded from the Institute's website: <http://mlvti.ac.in>



More than 300 Indian textile companies at the French technology seminars DELHI and SURAT: March 2013

This March 2013, more than 100 Indian textile producers in DELHI and more than 200 in SURAT attended the seminars organized by the French Trade Commission-Ubifrance & UCMTF (the French Textile Machinery Manufacturers' Association), under the patronage of the Embassy of France in India and the Office of the Textile Commissioner, Ministry of Textiles, Govt. of India. Such a success, although not a surprise, was above expectations.

Five main themes were covered:

- Spinning and yarn processing with speakers from N. SCHLUMBERGER on long staple fibre processes, VERDOL on yarn processing particularly for technical yarns for such applications as tire cord, carpet and glass yarns, twisting and cabling and SUPERBA on their leading technology of heat-setting line for carpet yarns

- Weaving technology with speakers from STÄUBLI the world leader for dobbies, cam motions and Jacquard machines

- Dyeing and Finishing. Three machinery manufacturers CALLEBAUT de BLICQUY and ROUSSELET ROBATEL the innovators on very high density dyeing and ecology associated with

cost savings and DOLLFUS & MULLER, on how to improve the feeling, the shrinkage of woven and knitted fabrics

- Air conditioning and air engineering with speakers from AESA, well known for the perfect humidification of textile plants

- The recycling and sustainable solutions for textile waste by the pioneer, LAROCHE Company.

The seminar was inaugurated in Delhi by H.E. Mr. François RICHIER, Ambassador of France in India. Mr. A.B. JOSHI, Textile Commissioner graced the occasion at Surat. A study by TECHNOPAK was also released at this occasion.

The audience was very interested and many questions were asked. Then the French delegation visited the ATIRA centre at Ahmedabad. Evelyne CHOLET, UCMTF Secretary General, was very impressed by the projects the Indian companies are working on. Once more, she had the opportunity to see that India is a major player in the textile industry and, more and more, in the technical textiles. She analyzes that growth opportunities are considerable as these industries meet the requirements of their domestic markets for higher quality products

and stand up the worldwide competition to take advantage of the globalization of the markets.



The French textile machinery manufacturers, for already a long time they have considered India as a lead market. Very strong ties with industrialists in India already exist and are considered as long time partnerships.

Thanks to local representatives, the regular organization of seminars (2007, 2010 and 2013) in the main Indian textile areas and the participation at many shows, the French machinery manufacturers can offer the service of local partners. Not only their machines are state of the art technologically but the services include quick assistance, spare parts availability, special design, consulting services in such sectors as safety rules and energy savings.

UCMTF website is the portal of the French textile machinery manufacturers; all interested parties are welcome to visit it, www.ucmtf.com

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Global Organic Textile Standard (GOTS) Tops 3000 Facilities in 2012

"Greening" companies/consumers, new processing regions and GOTS representatives drive the increase

The number of facilities becoming certified to the Global Organic Textile Standard (GOTS) increased 11 percent to surpass the 3000 mark in 2012, growing from 2,714 facilities in 2011 to 3,016 facilities in 2012, according to new data from the GOTS International Working Group. GOTS is recognized as the leading processing standard for textiles made from organic fibers worldwide. GOTS certification means consumers are purchasing items certified organic from field to finished product.

The Top Twenty countries in terms of the total number of GOTS-certified facilities were: India, Turkey, China, Germany, Pakistan, South Korea, Italy, Bangladesh, Japan, United Kingdom, France, Portugal, USA, Austria, Netherlands, Greece, Hong Kong, Mauritius, Peru, Switzerland, and Denmark.

While the top three countries remained the same as the previous year, Germany rose to 4th place, surpassing Pakistan, and Portugal moved from 20th to 12th place by more than doubling the number of its certified facilities. In addition, companies became certified to GOTS in 5 countries with no previous GOTS-certified manufacturing (Bahrain, Colombia, Kenya, New Zealand, and Paraguay). GOTS certified facilities are now

located in 62 countries around the world.

Overall, Europe led the way with a 44 percent increase in the number of GOTS-certified facilities from 2011-2012 (506-728). Countries with the greatest increase in facilities gaining GOTS certification in 2012 were (in order by rank) India, China, South Korea, Germany, Bangladesh, and Portugal.

India remained the top country for fourth year in a row -and here too a new record was set by surpassing the 1,000 mark of GOTS certified facilities for the first time (from 955 in 2011 to 1062 in 2012). For the first time GOTS was the supporter of Biofach India in 2012. A very large number of consumers and businesses visited GOTS booth in the fair and interacted with Mr. Sumit Gupta. The interest in GOTS certified organic textile products is on the rise in both consumers as well as industry. India also witnessed an increase of brands and stores selling GOTS certified textiles in retail.

"Increasingly, consumers are demanding ecologically- and socially responsibly-processed textiles, and companies are searching for tools to make their supply chains more sustainable. The result is a 'pull effect' and more companies be-

coming GOTS-certified," says Herbert Ladwig, GOTS Managing Director.

There are now seven regional representatives worldwide who are driving increase in the awareness of certification to GOTS. The newest representative, Shirley Han, was appointed in 2012 to focus on growing awareness of GOTS in China. With this extensive network in place, GOTS and the Soil Association in October 2012 launched the first global organic cotton campaign, asking textile industry leaders "Have you cottoned on yet?" to urge them to sign on and publicly commit to supporting organic fiber production and processing to GOTS.

Also in 2012, the GOTS operating unit changed from a limited liability corporation into a non-profit organization, the Global Standard gemeinnutzige GmbH, the German legal term for a non-profit organization. While financially and organizationally GOTS has always operated as a non-profit, the external documentation has now been formalized.

Detailed information can be found in the GOTS Annual Report 2012, available for download on http://www.global-standard.org/images/stories/gots_ar2012.pdf

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TEXTILE SECRETARY INVITES INDUSTRY FOR SETTING UP TECHNICAL TEXTILES

PHD Chamber of Commerce & Industry organized National Seminar on 'Technical Textiles & Non-wovens: Opportunities & Challenges' on 21st March, 2013 at PHD House, New Delhi.

Technical Textiles (TT) has now become a new way, means and opportunity to the Indian textile industry to sustain the present growth and thrive in near future.

A background paper titled 'Technical Textiles & Innovative Nonwovens: An Overview' prepared by Department of Textile Technology, IIT Delhi and PHD Chamber was released by Ms. Zohra Chatterji, Secretary, Ministry of Textiles, Government of India for its release for the seminar.

Ms. Zohra Chatterji, Textile Secretary to Government of India warmly invited industry to set up units for technical textiles, which is a sunrise industry with potential for exponential growth. She promised all help to the industry in this regard. She was speaking at the National Seminar on, 'Technical Textiles and Non-wovens : Opportunities and challenges' organized by PHD Chamber of Commerce and Industry at New Delhi. IIT Delhi, Textile Department, was the Knowledge Partner for the event.

Texttreasure

"To be yourself in a world that is constantly trying to make you something else is the greatest accomplishment."

Ralph Waldo Emerson



Mr. Vivek Seigell, Mr. Shyam Bang, Ms Zohra Chatterjee, Secretary, Ministry of Textiles, Mr. Sharad Jaipuria, Mr. Sujit Gulati, IAS, Joint Secretary, Ministry of Textiles

Keeping in view the need to create linkages between the raw material suppliers and manufacturers, Ms. Chatterji said "I think raw material suppliers can build linkages with manufacturers. Also there could be better synergies between manufacturers and different departments for giving a boost to this sector." She added, "I urge you to avail of benefits offered by the Government, which includes Technology Mission for Technical Textiles, Technology Upgradation Scheme Fund and Integrated Textile Parks.



Mr. Sharad Jaipuria, Senior Vice President, PHD Chamber offering a memento to Ms Zohra Chatterjee

Inviting industry to play its due role, she said, "I strongly believe that the private sector has a leading role in the development of technical textiles. Therefore, I think more and

more firms should explore opportunities in this sector".

"Technical textile industry market size is expected to reach Rs.1, 58,540 Crore by the year 2016-17 with a growth rate of 20% year on year basis as per a subgroup on technical textile for 12th five year plan", said Mr. Sharad Jaipuria, Senior Vice President, PHD Chamber in the Seminar.

Mr. Jaipuria appreciated the efforts of Government to develop the technical textile sector in India which includes Scheme for Growth and Development of Technical Textiles (SGDTT); Technology Mission on Technical Textiles (TMTT); Technology Upgradation Fund Scheme (TUFS), Scheme for Integrated Textile Parks (SITP), Pilot scheme for Promotion and Application of Geotextiles in North East Region; Pilot Scheme for Promotion and Application of Agrotextiles in North East Region; FDI Promotion Incentives.

Mr Shyam Bang, Chairman, Industry Affairs Committee, PHD Chamber, set the tone of the seminar with Dr. Ashwan Kapur, Managing Director, Uniproducs India Ltd talking on Non-Woven Technical Textiles - Opportunities & Industry Challenges.

A number of presentations on important topics were made at the Technical Session of the seminar which was chaired by Sujit Gulati, IAS, Joint Secretary in Ministry of Textiles Seminar. Mr. Gulati kicked off the technical session with a discussion on "Technology Mission

on Technical Textiles". " Other presentations were "Innovation in Non-woven Technical Textiles" by Dr. V.K. Kothari, Department of Textile Technology, IIT, Delhi, "Emerging Indian market trends in Non-woven Technical Textiles - Opportunities and Challenges" by S.R. Debnath, General Manager, Reliance Industries' "Boosting Domestic Demand of Technical Textiles - Key Growth Factors by Prashant Saxena, General Manager, Indo Rama Synthetic; "Speciality Finishing of Technical Textile" by Rashid Ashraf Khan, Country Head, Eksoy, India and "Cost and Viability Model of a Green Field SME Non-woven Technical Textile Project" by Munish Tyagi, Nuovotex Ltd., New Delhi.



Ms Zohra Chatterjee, Secretary, Ministry of Textiles Mr. Sharad Jaipuria, Mr. Sujit Gulati, IAS, Joint Secretary, Ministry of Textiles

PHD Chamber identified few important issues hindering the growth of the sector i.e. Inadequate awareness about the benefits of technical textiles among end-users; Lower scale of production; Absence of defined standards and regulations; Lack of indigenous availability of specialized raw-materials hampering cost competitiveness; Lack of skilled manpower for new technologies in Nonwovens; Lack of technology/consultancy support to manufacturers; Lack of basic infrastructure and lack of training / educational facilities.

The event had enlisted participation of industry, academia, consultants, who spoke on various aspects of the industry. There has been a wide and growing application of technical textiles like meditech, buildtech, mobiletech, protech, hometech and several others, opening up the possibilities of as wide a range of products like car upholstery to parachutes, shelter fabric to home furnishing, infrastructure to environment to medical products.

There has been a sharp increase in global demand for technical textiles. Indian technical textiles industry is projected to grow to Rs. 1.4 trillion by 2016-17 from its present level of Rs. 570 billion. A host of factors like changing lifestyles of new demographics, huge infrastructural growth and large raw material availability in India would help sustained growth of the industry in India.

PICANOL OF AMERICA

PICANOL OF AMERICA INAUGURATES NEW HEADQUARTERS IN GREENVILLE

Picanol of America on 21st March 2013 opened its new headquarters at 65 Kitty Hawk Road in Greenville. The official inauguration ceremony of the new U.S. headquarters took place in the presence of more than 150 customers. As 2013 sees Picanol celebrating more than 50 years of Picanol in America, the opening of the new headquarters in Greenville represents yet another milestone in its long history in the United States. Picanol of America is focusing on sales of Picanol weaving machines and original Picanol spare parts and accessories, as well as machine repair and training services.

to local customers, Picanol set up its own organization - Picanol of America - on 1 February 1966. Since then, the United States has always proven to be a market of great strategic importance as Picanol has installed tens of thousands of weaving machines at American weaving mills.

The first appearances of Picanol weaving looms in the United States date back to the late 1950s. As far back as 1959, Picanol entered into an agreement with an agency to represent Picanol in the United States and Canada in view of the potential and expected growth of the American market. However, based on a strong belief in developing customer partnerships over the long term and to provide a more proactive and high level of service

"In recent decades, both thanks to and in tandem with our American customers, we have constantly pushed our limits with regard to the performance and versatility of our weaving machines. And it was also due to the confidence and belief of our American customers that Picanol has been able to grow into the world leader that we are today. Furthermore, the successes achieved by Picanol in the United States over the past decades have undoubtedly paved the way for our expansion throughout the rest of the world. With our new headquarters in Greenville, we will make sure that we continue to deliver the very best weaving machines and the highest levels of service to our

valued U.S. customers," said Luc Tack, Managing Director of the Picanol Group.

"We are excited to expand our operations and move to our new facility. The opening of our new headquarters represents another milestone in our long history in the U.S. It is further proof that Picanol of America now more than ever is committed to providing outstanding customer service, the exceptional levels of quality

that Picanol is renowned for, and high added value to meet the needs of our U.S. customers," said Cyril Gu erin, President Picanol of America.

Following the sale of Steel Heddle in September 2011, Picanol had to look for a new site for its gravity point in Greenville. In June 2012, Picanol of America acquired 18,500 sq. ft. of space at the South Carolina Technology & Aviation Center (SC-TAC) to accommodate an

expanded sales, machine repair and spare parts operation that will serve its U.S. markets.

Picanol of America is a 100% subsidiary of the Picanol Group. It currently employs 19 people.

For further information or pictures relating to Picanol of America, please contact:

Erwin Devloo, Marketing Communications Manager, edv@picanol.be

RIETER

Norbert Klapper appointed Rieter Group CEO

The Board of Directors of Rieter Holding Ltd., Winterthur, has nominated Norbert Klapper as Chief Executive Officer (CEO) of the Rieter Group. Norbert Klapper will take up his new duties per January 1, 2014 at the latest. After four years with a dual mandate, Erwin Stoller will then hand over to Norbert Klapper as CEO and concentrate on the Board chairmanship.

Since his additional nomination as Executive Chairman in 2009, Board Chairman Erwin Stoller focused particularly after the Rieter split on

firmly establishing the Group's strategic alignment. These tasks will largely be complete by the end of 2013, so that his dual mandate will no longer be necessary.

Norbert Klapper, German citizen born 1963, graduated at Darmstadt Technical University and was Assistant Professor at Passau University and Munich Technical University, where he received his Ph.D. in economics.

He then joined Arthur D. Little business consultants, where he became Managing Partner for Production und Logistics. In 2000 he

joined the Executive Board of D urr AG, Stuttgart, with responsibility for the two internationally active divisions Services and Final Assembly Systems. In 2005, Norbert Klapper transferred to Voith in Heidenheim, Germany. Since 2011, he is Executive Vice President of Voith Turbo, being in charge of the global railway business which has a size of 480 million EUR on an annual basis.

Norbert Klapper has accumulated widely based international experience in the machinery and plant engineering industry, also in the markets important to Rieter.



The Synthetic & Rayon Textiles Export Promotion Council

The Union Budget for 2013-14 has not made any significant changes for the Man Made Fibre Textile Industry, according to Shri Rakesh Mehra, Chairman of the The Synthetic & Rayon Textiles Export Promotion Council.

Shri Mehra said that there was a strong case for Reduction in Excise Duty on man-made fibre textiles and customs Duty on Man

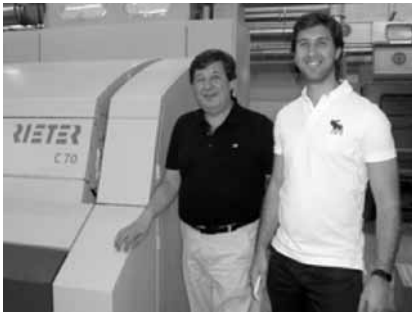
Made Fibres as envisaged in National Fibre Policy so as to bring about parity in various fibres. However, this has been skipped by the Finance Minister. He added that the continuation of the TUF Scheme with greater emphasis on Weaving Sector is a welcome step. The optional route made available for the Readymade Garments is also a step in the right direction.

The SRTEPC Chairman expressed the hope that the much needed incentives for the exporters will be announced in the forthcoming Foreign Trade Policy Wherein the interest subvention scheme will be extended to the entire Textile Sector along with inclusion of all Man-Made Fibre Textiles items under the Focus Product/Market Scheme.

RIETER

Algodonera del Valle, an Argentinian Success Story

04/30/2013 - Algodonera del Valle is a vertically-integrated operation with headquarters in Buenos Aires. Over the last few decades, it has developed into one of the largest textile companies in Argentina by continual investment in spinning, knitting and finishing. The family-run enterprise specializes in the manufacture of soft knitting yarns for the domestic market. The good cooperation with Rieter is an important component for its success.



Left to right: Luis Tendlarz and his son Ariel with one of their Rieter C 70 high-performance cards

Algodonera del Valle is defying the political and economic turbulences which the eighth largest country in

the world is currently experiencing and is modernizing its spinning preparation activities with cutting edge Rieter C 70 cards.

Yarn Production with Rieter Machines in the North

The modern spinning installation consists of a worsted spinning mill with G 33 ring spinning machines as well as a rotor spinning mill with fully automated R 40 and R 60 rotor spinning machines. It is located in Catamarca, a town at the foot of the towering Andes mountain range. There, super-soft cotton, viscose and polyester yarn blends for the company's own circular knitting facility are produced on Rieter machines.

Knitting and Finishing in the South

The yarn produced in the North is subsequently sent on a 2 000 km long journey to Patagonia. In the knitting and finishing plant located there, downstream processing through to the textile fabric takes place. The main sales outlet is the

agglomeration of Buenos Aires, a region in which more than one third of the approximately 40 million strong population of Argentina is resident.

Rieter - an important Component for Success.

Some months' ago, a Rieter symposium on the topics of the C 70 card and the R 60 rotor spinning machine was held in Catamarca. Luis Tendlarz, owner of Algodonera del Valle, also attended: "We have been cooperating with Rieter very successfully for more than 30 years and we are entirely satisfied with the service and technology support provided. Our spinning mill consists almost exclusively of Rieter machines which produce the required soft knitting yarns that we require for our end products. The new C 70 cards have exceeded our expectations in terms of productivity and quality.

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How can Advertising help grow your Business?

A workshop for small & medium enterprises
June 18, 2013, MACCIA, Mumbai

FICCI is of the view that there exists a huge potential for SMEs to reach their desired financial goals through effective Advertisement & Marketing (A&M). In this regard, FICCI has organized the captioned event in different cities of India to provide advertising solutions to small and medium enterprises. So far we have conducted these programmes in Kolkata, New Delhi, Pune and Bengaluru successfully. FICCI is organizing a similar programme in Mumbai on June 18, 2013 at Maharashtra Chamber of Commerce Industry and Agriculture (MACCIA) in Mumbai.

The workshop would address the following:

- ◆ Why advertising is important

for small & medium companies?

- ◆ How to do effective marketing through advertising?
- ◆ How advertising will help in winning new customers?
- ◆ Where and how to advertise with limited budgets?
- ◆ How to rationalize advertising budgets within Television, Newspaper, Radio and Internet?

One of the key highlight of the event includes consultation by media owners (companies from television, radio, newspaper and internet domain) on low cost advertising solutions to suit the pock-

ets of SMEs. So far, more than 400 SMEs have immensely benefited from this exercise.

It is invited your association to partner with FICCI for this event and join hands to support this initiative.

For Registration and more details contact:

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M: +91-98735 50422
W: www.ficci.com

THE TEXTILE ASSOCIATION (INDIA)

Mumbai Unit

organises

India Tex 2013

Textile Exhibition - Fibre to Fashion

Date : 18, 19, & 20th October 2013

Venue : VIA Ground, Vapi Industries Association, Plot No. 135, GIDC, Vapi - 369 195 (Gujarat).

For more information & Stall booking please contact:

The Textile Association (India), Mumbai Unit

Amar Villa, Behind Villa Diana, Flat No. 3, 3rd Floor, 86 College Lane, Off Gokhale Road,
Near Portuguese Church / Maher Hall, Dadar (W), Mumbai - 400 028 (MH)
Tel: 022- 2432 8044 / 2430 7702 Fax: 91-22-2430 7708

E-mail: taimumbaiunit@gmail.com / taimu@mtnl.net.in / taimu@bom3.vsnl.net.in

Website: www.textileassociationindia.com

Haresh B. Parekh, Exhibition Convenor: +9167515676

Anil G. Mahajan, Exhibition Coordinator: +9324904271



The Textile Association (India) Ahmedabad Unit International Conference on Challenges facing Indian Cotton

The Textile Association (India) Ahmedabad Unit organized an International Conference jointly with Textile Manufacturers' Association (TMMA) & Diagonal Consulting (India) and supported by iNDEXTb, Govt. of Gujarat on 9th & 10th April 2013 at Indian Institute of Management (IIM), Ahmedabad. The conference titled "Challenges facing Indian Cotton - Back to glory" was very successfully and entire two days sessions were informative and more than 800 delegates attended.

It is a landmark year for the Indian Textile Industry as The Textile Association (India) completes 75 Glorious years of service to Industry since its inception on 9th April 1939. TAI's Ahmedabad Chapter organized the first conference kick-starting the platinum jubilee celebrations by hosting a 2 day international conference. Hon. Shri Saurabhbbhai Patel, Minister for Environment & Petrochemicals. Govt. of Gujarat was the chief guest and inaugurated the conference. The inaugural session witnessed a wide mix of audience comprising of different stakeholders in the textile value chain from renowned organization. Mr. Maheshwar Sahu (Principal Secretary, Industry & Mines, Govt. of Gujarat) were the Guest of Honour. Other dignitaries included Mr. Hrishikesh Mafatlal (Chairman, Arvind Mafatlal Industries Ltd.), Mr. Ray Butlar (Editor, Managing Director, Cotton Outlook), Dr. P.R. Roy (Conference Chairman), Mr. Bhadrash Mehta (Chairman, Bhadrash Trading Co.), Mr. Suresh Kotak (Chairman, Kotak & Co.), Mr. R.K. Sharma (President, Bajaj Steel Industries Ltd.), Mr. Haresh Lakhani (Chairman, DML Group of Company), Mr. Prabhakar Rao (Chairman, NSL Group), Mr. S. Hari

Shankar (President - TMMA), Mr. D.R. Mehta, National President - TAI, Mr. T.L. Patel, President, TAI Ahmedabad Unit and Mr. V.A. Trivedi, Hon. Secretary, TAI Ahmedabad Unit

An International Conference started on a welcome address by Mr. T.L. Patel, President, TAI-Ahmedabad Unit, who said that "This is our first attempt to host and international conference on cotton industry. The conference has been well supported by Global cotton exporters and trading houses, ginning and spinning machinery manufacturers and all those concerned with the cotton world".

Mr. P. R. Roy, Chairman, Diagonal Consulting and Conference Chairman welcomed Hon. Shri Saurabhbbhai Patel, Mr. Maheshwar Sahu, Mr. Hrishikesh Mafatlal, Mr. Ray Butlar, other dignitaries, guests, & speakers and said: "Cotton Industry is here to stay in India and in the next 10 to 20 years India can become the largest manufacturer and exporter of cotton products globally".



Shri Saurabhbbhai Patel lighting the lamp along with Mr. Maheshwar Sahu, Mr. Hrishikesh Mafatlal other dignitaries

The Guest of Honour, Mr. Maheshwar Sahu addressed the audience by focusing on various issues faced by the textile industry to ponder upon which were subsequently taken up during the sessions. He said that "Gujarat is the undoubtedly the largest producer of cotton in India but beyond Ginning, there

isn't much value addition. In 2012, the state government unveiled a policy specifically to promote the textile industry. "The textile policy has received positive response from the stake holders. The target was to enhance spinning capacity by 25, 00, 000 spindles in the next 5 years. In the recently held Vibrant Gujarat Summit, agreements were signed which can potentially generate investment for capacities in excess of 40, 00, 000 spindle capacity in Gujarat". The government is planning to set-up atleast a dozen textile parks out of which 2 parks have already been sanctioned and 4 more are in the pipeline with all integrates facilities, adds Mr. Sahu.



Mr. Maheshwar Sahu, Principal Secretary (Ind. & Mines), Govt. of Gujarat delivering his speech

The Textile Association (India) - Ahmedabad Unit felicitated Mr. Bhadrash Mehta, Chairman, Bhadrash Trading Co. with Best Cotton Export Performance (India) award, Mr. Suresh Kotak, Chairman, Kotak & Co. with Life Time Achievement award, Mr. Rohit Bajaj, Chairman, Bajaj Steel Industries Ltd with Industrial Excellence Award, which was received by Mr. R.K. Sharma on his behalf, Mr. Harsh Lakhani, Chairman, DML Group of Co. with Glory of Sourashtra in Cotton Export award, Mr. Suresh Amin, MD, Komal Amin Exports Ltd., with Special Appreciation award and Mr. Parth Mehta, MD, Bhadrash Trading Co. with Dynamic Entrepreneur in Cotton Trading award.



Mr. Bhadresh Mehta receiving the award



Mr. Suresh Kothak receiving the award



Mr. M.K. Sharma receiving the award on behalf of Mr. Rahul Bajaj



Mr. Haresh Lakhani receiving the award



Mr. Suresh Amin receiving the award



Mr. Parth Mehta receiving the award

Mr. Hrishikesh Mafatlal gave a very optimistic picture about the future of cotton globally and in India. King

Cotton, he said will remain the preferred fiber. India is uniquely positioned today to become a global player in cotton. Cotton and the textile industry in particular can become the single biggest driver to uplift millions of people from below poverty line. He also stressed the need for sustainable growth and environment protection.

Chief Guest Shri Saurabhbbhai Patel invited the textile industry to take advantage of Gujarat's liberal and friendly industrial policy. He said, "Gujarat was once considered as the Manchester of India, but with the industry downturn many of our mills closed down. Now with the efforts of all stake holders we will able to do wonders. Government of Gujarat is come out with a policy for textile industry in 2012. It is one of the most liberal policies prepared after due consultation with all stake holders".

Apart from being the largest producer of cotton, Mr. Patel said, "The biggest strengths of Gujarat are availability of water, power, land and skilled labor. The government is further strengthening each of these factors to ensure that the state offers the most investor friendly climate thereby stimulating growth. We will be 10 years ahead of other states in terms of availability of power". Gujarat is a power surplus state. It has a total capacity of 18, 000 MW out of which 4000 MW is gas based and have been shut down due to non-availability of gas. The state still has 14, 000 MW against the current demand of 11, 500 MW. Gujarat is working on many new power projects to further increase the total capacity. He particularly referred to the states in the south which are suffering from shortage of power and invited companies to set-up their business in Gujarat or even consider moving their operations completely

to Gujarat. "We understand from reliable sources that some of the major textile units in Tirupur have already purchased land in Gujarat for future expansion", he added.

Towards the end of the inaugural session Mr. V.A. Trivedi in his Vote of Thanks conveyed his heartiest regards for all the support provided by the sponsors, partners, delegates, guests, media partners and knowledge partner, without whose support putting together this seminar would have been a distant dream. After the Inaugural Session, there were paper presentation and panel discussions. In two days conference 5 sessions were planed with panel discussion. On second day during the Valedictory session Shri Kamal Dayani, Industries Commissioner, Govt. of Gujarat was the chief guest for the occasion and was the moderator for panel discussion on National Textile Industry & Gujarat Textile policy. Mr. Prakash Bhagwati, President, Gujarat Chamber of Commerce & Industries was the Guest of Honour.

The Conference generated a lot of curiosity and enthusiasm among ginners, spinners, traders, academicians, students and the Government. All stakeholders were eager to participate in this historic conference as the timing of this programme was unique. During the two days' deliberations there were views from the experts, questions from the participants, discussions with the eminent panelists on the future of Indian cotton and spinning thereof. Right from the agriculture of cotton, plucking of cotton bowls storage and transportation ginning practices and on spinning a broad spectrum discussion took place and views emerged.

At the end of two days conference Mr. V.A. Trivedi presented his Vote of Thanks.

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Allma celebrates the 200,000th cabling spindle together with customers

KEMPTEN, 26 APRIL 2013 - The over 20 years successful story of Allma cabling machines has reached another highlight. Allma is very proud of having delivered the 200,000th spindle to its customer Shenma in China. On 25 April 2013 this event was worthily celebrated at Suzhou works and Shenma was handed over a gold-plated cabling spindle.



Allma celebrates the 200,000th cabling spindle together with customers

Since 1991 Allma has been manufacturing cabling machines for the production of tire cord. With the cabling technology which is more

attractive in terms of economic efficiency and quality, they have replaced the ring twisting technology. Today, the twisting and cabling machines supplied by Allma throughout the world cover about two thirds of the market, in other words two of three tires contain tire cord which has been produced on Allma twisting and cabling machines.

The CableCorder success story continues

For years, Allma has proven again and again its innovation leadership by new CableCorder machine generations. The CableCorder has been designed for high performance in terms of quality, economic efficiency and flexibility. A great number of milestones mark the way of the CableCorder. Increase in productivity, online quality measuring, two-for-one twisting and cabling in one machine are just a few features describing the product devel-

opment.

The year 2011 was an absolute highlight in the CableCorder history when the fourth machine generation

was presented and the Allma CC4 received the Award for Innovation and Excellence. The Allma CC4 allows for energy savings of up to 50 percent compared with other models in the market. Moreover, customers benefit from a considerably reduced noise level and yarn break rates which are further reduced by 50 percent.

Celebration and a great thank you to all customers

In 2012 Allma supplied the 200,000th spindle to its customer Shenma in China. To celebrate the occasion, Allma handed over a gold-plated cabling spindle to the representatives of the company Shenma at the Suzhou Open House on 25 April 2013. On behalf of Allma, Wolfgang Schoeffl, Head of Sales, thanked Shenma and all customers worldwide for their loyalty and confidence.

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Allma TC2 received with enthusiasm at the Open House in Suzhou

KEMPTEN, 26 APRIL 2013 - The new Allma TC2 for industrial yarns was presented at the Open House at Suzhou works in China on 25 April 2013. Invited guests came from China, India and further Asian countries. After the introduction and a tour of the premises, the Allma TC2 was presented in the Suzhou showroom. The new product is characterised by a great number of new technological features and the guests were very impressed.



Allma TC2 is a revolution in the production of industrial yarns

The machine has been designed to meet the high quality demands of today's market and is characterized by its unbelievable flexibility. A

great variety of materials such as PA, PES, CV, PP, PE, AR etc. can be processed on the Allma TC2 in a wide range of very fine to very coarse yarn counts. The ultimate production flexibility is ensured by the autarkic spindle technology and winding units. Customers can react to market requirements and even the smallest lots or samples can be economically produced. Delivery speeds of 450 m/min. are unique in the world.

Allma TC2 received with enthusiasm at the Open House in Suzhou

The PrimePac twist packages pro-

duced on Allma TC2 feature a particularly high and homogenous density and large running lengths thanks to highly precise length measuring. The patented machine concept of Allma TC2 fully complies with today's requirements in terms of ergonomics and handling. The new high-performance twisting machine sets new standards with regard to economic efficiency and production of high-quality twisted yarns. Moreover, the high-quality twist packages ensure bet-

ter unwinding properties and long lengths for further processing and reduction of work involved in packaging.

Allma TC2 successfully proved its performance at the Open House. The machine equipped with different materials impressed the visitors and convinced them by its unique performance. Allma thanked the customers for their visit and the lively exchange of information during the event. Customers are in-

vited to carry out tests with their own materials in the textile-technological centre in Suzhou or Kempten at any time.

For further information, please contact

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RIETER Rieter General Assembly Approves All Board Proposals

The 122st Annual General Meeting of Rieter Holding Ltd shareholders today approved all proposals by the Board of Directors. Shareholders voted Dr. Dieter Spälti to the Board of Directors for another 3-year term of office, and approved a dividend payment of 2.50 CHF per registered share.

The 122st Annual General Meeting of Rieter Holding Ltd was attended by 576 shareholders representing 46.5 % of share capital. They approved all Board proposals, the Annual Report with the annual accounts and consolidated financial statements for 2012, and formal discharge of the Board of Directors and Group Executive Commit-

tee members for the business year 2012. Consultative approval of the Compensation Report was confirmed by a 79.68 % majority of those present. A dividend of 2.50 CHF per registered share was approved for payment from capital reserves without deduction of withholding tax.

Shareholders voted Dr. Dieter Spälti to the Board of Directors for another 3-year term of office. In his review of the current situation, Executive Chairman Erwin Stoller confirmed prospects for the business year 2013 as announced at the Rieter Results Press Conference on March 21.

About Rieter

Rieter is a leading supplier on the world market for textile machinery and components used in short staple fiber spinning. Based in Winterthur (Switzerland), the company develops and manufactures systems, machinery and technology components used to convert natural and manmade fibers and their blends into yarns. Rieter is the only supplier worldwide to cover spinning preparation processes as well as all four final spinning processes currently established on the market. With 18 manufacturing locations in 10 countries, the company employs a global workforce of some 4 700, about 27% of whom are based in Switzerland. Rieter is listed on the SIX Swiss Exchange, under ticker symbol RIEN.

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The Textile Association (India)

www.textileassociationindia.org

The Textile Association (India), a largest professional organization having more than 23000 memberships with 27 affiliated units, is committed to promote and protect trade, business and trading activities in textile industry. Now TAI has launched their website with significant progress and increased its reach with Content Management System (CMS), completely new revamped website. TAI is moved a step ahead and enable advertising opportunities on website to interested industrialists and advertisers along with several informative wings. The information on website will benefit various segments of the Textile Industry & it will add lots of value to industry as a whole.

This will be a mouthpiece of the

textile and clothing industry for incisive and detailed coverage, highlighting all the aspects of interest to the textile fraternity. There is satisfactory traffic of visitors from India and abroad among industry leaders, textile associations, cotton and textile traders, equipment manufacturers, experts and Government officials.

ABOUT WEBSITE

- ◆ Website provides updated information of Association's activities, Members data, Publication etc.
- ◆ Updated Industry data, News & Statistics of Indian Textile industry
- ◆ Expert views, Opinions, Market information and Technological developments happen-

ing in Textile industry across the world

- ◆ Serving vast audience within textile industry including textile processors, manufacturers, retailers and other industry segments
- ◆ An avenue for members to promote their products and services
- ◆ Banner advertising options & sponsoring various sections of website
- ◆ Human resources supply wing for job placement services
- ◆ Online e-Journal of the Textile Association (JTA).
- ◆ Informative Knowledge technical articles & Texperiences
- ◆ B2B Opportunities
- ◆ And many other features

BENEFITS	SITE TRAFFIC DETAILS
<ul style="list-style-type: none"> ◆ Global presence ◆ Perfect target audience ◆ Long term relationship with industry body ◆ Creative ways to utilize medium ◆ Staying ahead of competition ◆ E-mail marketing to TAI members ◆ Press Releases ◆ Special company listing on members page ◆ Banner ads ◆ Much more at glance 	<ul style="list-style-type: none"> ◆ 20,000 page views / month ◆ 00:05:32 - time spent / visitor ◆ 65% new visitors every month ◆ 80% traffic is from India ◆ 77% traffic is organic - through Google Search

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Site Flash Area	Rollover	220x60	4	10
Sidebar Middle	Rollover	220x60	4	10
Footer	Footer	105x70	10	1

For more details contact

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FORM IV (See Rule 8)

Statement about ownership and other particulars about Newspaper
JOURNAL OF THE TEXTILE ASSOCIATION

1. Place of Publication : The Textile Association (India), Central Office
Pathare House, R. N. 6, 2nd Floor, Next to State Bank of India, 67,
Ranade Road, Dadar (W), Mumbai - 400 028.
2. Periodicity of Publication : Bi-Monthly (Six issues in a year)
3. Printer's Name : Shri Ashok Bagwe
Nationality : Indian
Address : Sundaram Art Printing Press
12, Wadala Udyog Bhavan, Naigaum X Road, Wadala, Mumbai - 400 031.
4. Publisher's Name : Shri J.B. Soma
Nationality : Indian
Address : 7-A/203, New Dindoshi Giridarshan CHS. Ltd. New Dindoshi MHADA Colony,
Near NNP No. 1 & 2, New Dindoshi, Goregaon (East), Mumbai - 400 065
5. Editor's Name : Dr. Ravindra V. Adivarekar
Nationality : Indian
Address : Dept. of Fibres & Textile Processing Technology
Institute of Chemical Technology, Matunga, Mumbai - 400 019
6. Name and address of individuals who own the newspaper and partners holding more than 1% of the total capital : The Textile Association (India), Central Office
72-A, Santosh, 2nd Floor, Dr. M.B. Raut Road,
Shivaji Park, Dadar, Mumbai - 400 028

I, J.B. Soma, hereby declare that the particulars given are true to the best of my knowledge and belief.

Mumbai
1st March 2013

(Sd/-)
J.B. SOMA
Publisher

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RESULTS OF ATA PART - I, (Old) PASSED/ATAHE CANDIDATES DECEMBER, 2012

Centre / Result	PASS	ATAHE
Ahmedabad	Nil	2012/OA/01
Bhilwara	Nil	Nil
Coimbatore	Nil	2012/OA/10
Nagpur	2012/OA/21	Nil

Registered	Appeared	Passed	ATAHE
05	04	01	02

RESULTS OF ATA PART - II (Old) PASSED CANDIDATES DECEMBER, 2012

Centre	Spinning	Weaving	Chemical Processing	T.T. & Q.C.
Ahmedabad	Nil	Nil	Nil	Nil
Bhilwara	Nil	Nil	2012/OA/701	Nil
Coimbatore	Nil	Nil	2012/OA/710	Nil
Delhi	Nil	Nil	Nil	Nil
Ichalkaranji	Nil	Nil	Nil	Nil
Indore	Nil	2012/OA/601	Nil	Nil
Mumbai	Nil	Nil	Nil	Nil
Nagpur	2012/OA/530	2012/OA/611 2012/OA/612	2012/OA/720	Nil

Roll Nos. 2012/OA/510 of Coimbatore Centre will declared on completion of ATA Part-I.

Candidate	Spinning	Weaving	Chemical Proce	T.T. & Q.C.	Total
Registered	04	04	03	Nil	11
Appeared	04	04	03	Nil	11
Passed	01	03	03	Nil	07

The Textile Association (India) - Central Office

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Tel: 022-24461145, Fax: 022-24474971, E mail: taicnt@gmail.com

RESULTS FOR GMTA SEC A/B/C/D (OLD) PASSED CANDIDATES DECEMBER, 2012

Centre	Section - B	Section - C			Section - D	Section - E
		Spinning	Weaving	Chem. Proc.		
Ahmedabad	Nil	Nil	Nil	Nil	Nil	Nil
Bangalore	Nil	Nil	Nil	Nil	2012/BAD/02	Nil
Bhilwara	Nil	Nil	Nil	Nil	Nil	Nil
Coimbatore	Nil	Nil	Nil	Nil	Nil	Nil
Delhi	Nil	Nil	Nil	Nil	Nil	Nil
Ichalkaranji	Nil	Nil	2012/ICC/20-W	Nil	Nil	Nil
Indore	Nil	Nil	Nil	Nil	Nil	Nil
Mumbai	Nil	2012/MUC/01-S 2012/MUC/02-S	Nil	Nil	2012/MUD/20	Nil
Nagpur	2012/NAB/10	2012/NAC/10-S	Nil	Nil	Nil	Nil

Candidates	Section - B	Section - C	Section - D	Section - E	TOTAL		
		Spinning	Weaving	Chem.Proc			
Registered	02	03	05	Nil	04	Nil	14
Appeared	02	03	05	Nil	04	Nil	14
Passed	01	03	01	Nil	02	Nil	07

RESULTS FOR GMTA (REVISED) SECTION A/B PASSED CANDIDATES DECEMBER, 2012

Centre	Section - A	Section - B	TOTAL
Delhi	Nil	2012/NDEB/01	01
Indore	2012/NINA/10 2012/NINA/11 2012/NINA/14	Nil	03

Candidates	Section - A	Section - B	TOTAL
Registered	09	01	10
Appeared	05	01	06
Passed	03	01	04

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Tel: 022-24461145, Fax: 022-24474971, E mail: taicnt@gmail.com

RESULTS FOR ATA PART - I (Revised) PASSED/ATAHE CANDIDATES DECEMBER, 2012

Centre / Result	PASS	ATAHE
Ahmedabad	2012/NA/01, 2012/NA/02, 2012/NA/03 2012/NA/05, 2012/NA/06, 2012/NA/07 2012/NA/08	2012/NA/04
Bangalore	2012/NA/21	
Bhilwara	Nil	2012/NA/25
Coimbatore	Nil	Nil
Delhi	2012/NA/32	2012/NA/30, 2012/NA/33
Ichalkaranji	2012/NA/43, 2012/NA/50, 2012/NA/53, 2012/NA/54 2012/NA/55, 2012/NA/56, 2012/NA/57	2012/NA/40, 2012/NA/41, 2012/NA/48 2012/NA/58, 2012/NA/59
Indore	2012/NA/61, 2012/NA/62, 2012/NA/63 2012/NA/64	Nil
Mumbai	Nil	2012/NA/72
Nagpur	2012/NA/80, 2012/NA/82	Nil

	Registered	Appeared	Passed	ATAHE
Total	45	40	22	10

RESULTS FOR ATA PART - II (Revised) DECEMBER, 2012

Centre / Result	PASS	ATAHE
Ahmedabad	2012/NA/501, 2012/NA/502, 2012/NA/503 2012/NA/504, 2012/NA/505, 2012/NA/506 2012/NA/507, 2012/NA/508, 2012/NA/509 2012/NA/510, 2012/NA/511	Nil
Bangalore	2012/NA/520	Nil
Bhilwara	2012/NA/531	2012/NA/530
Coimbatore	Nil	Nil
Delhi	Nil	2012/NA/553, 2012/NA/554
Ichalkaranji	2012/NA/560, 2012/NA/564, 2012/NA/567 2012/NA/568, 2012/NA/572	2012/NA/561, 2012/NA/565, 2012/NA/566 2012/NA/574
Indore	2012/NA/581, 2012/NA/582, 2012/NA/585 2012/NA/586, 2012/NA/587	2012/NA/580, 2012/NA/583, 2012/NA/584
Mumbai	Nil	Nil
Nagpur	2012/NA/81, 2012/NA/590	Nil

	Registered	Appeared	Passed	ATAHE
Total	45	44	25	10

The following candidates result with held for non receipt of Industrial Report:

2012/NA/530- Bhilwara Centre, 2012/NA/540 Coimbatore Centre & 2012/NA/551 Delhi Centre.

RESULTS OF ATA PART - III (Revised) PASSED CANDIDATES DECEMBER, 2012

Centre	Yarn Manufacture	Fabric Manufacture	Textile Wet Processing	Knitting & Garment Manufacture
Ahmedabad		Nil	2012/NA/802	Nil
Bhilwara	Nil	2012/NA/710 2012/NA/711	Nil	Nil
Coimbatore	Nil	Nil	Nil	Nil
Delhi	Nil	Nil	Nil	2012/NA/901
Ichalkaranji	2012/NA/610	Nil	Nil	Nil
Indore	Nil	Nil	Nil	Nil
Mumbai	Nil	Nil	Nil	Nil
Nagpur	2012/NA/620 2012/NA/621	Nil	Nil	Nil

Candidate	Yarn Manufacture	Fabric Manufacture	Textile Wet Processing	Knitting & Garment Mfg.	Total
Registered	05	06	06	01	18
Appeared	05	06	06	01	18
Passed	03	02	01	01	07

The following candidates result with held for non receipt of Industrial Report:

2012/NA/801 - Ahmedabad Centre

2012/NA/810 - Bangalore Centre

2012/NA/820, 2012/NA/821 & 2012/NA/822 of Delhi Centre.

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Schedule of A.T.A. Part-I, II & III (3-Years New Course)- December 2013

ATA Part-I	Time 10.00 a.m. to 1.00 p.m.	ATA Part-II	Time: 2.00 p.m. to 5.00 p.m.
Date	Subjects	Date	Subjects
23.12.2013	Basic Engineering Sciences	23.12.2013	Principles of Yarn Manufacture
24.12.2013	General Engineering	24.12.2013	Principles of Fabric Manufacture
25.12.2013	Textile Fibres	25.12.2013	Principles of Textile Wet Processing
26.12.2013	Elements of Textile Technology	26.12.2013	Principles of Textile Testing and Statistics
27.12.2013	Elements of Comp. and its Applications	27.12.2013	Industrial Organization and Management

ATA Part-III - Time: 10.00 a.m. to 1.00 p.m.

Compulsory Subjects

23.12.2013	Elements of Technical Textiles
24.12.2013	Man-Made Fibre Technology

Optional Subjects

Date	Yarn Manufacture Group	Fabric Manufacture Group	Textile Wet Processing Group	Knitting & Garment Manufacture Group
25.12.2013	Process Control in Yarn Mfg.	Process Control in Fabric Mfg.	Wet Processing-I	Knitting Technology
26.12.2013	Modern Yarn Manufacture	Modern Fabric Manufacture	Wet Processing-II	Garment Technology

Schedule of ATA Examination December 2012 - A.T.A. Part-I & II OLD COURSE [Time 10.00 a.m. to 1.00 p.m.]

Monday, 23rd December 2013	Textile Fibres
Tuesday, 24th December 2013	Principles of Spinning
Wednesday, 25th December 2013	Principles of Weaving
Thursday, 26th December 2013	Principles of Chemical Processing

A.T.A. Part - II [Time 2.00 p. m to 5.00 p.m.] OLD COURSE

Monday, 23rd December 2013	General Engineering
Tuesday 24th December 2013	Indian Text. Industry & Mill Management
Wednesday, 25th December 2013	Group-I Spinning [S-I] Spinning Preparatory Group-II Weaving [W-I] Weaving Preparation Group-III Chem.Proc.[CP-I] Fibre, Bleaching & Finishing Group-IV Text. Test. & Q. Cont. [TTQC-I] Testing & Statistics
Thursday, 26th December 2013	Group-I Spinning [S-II] Ring Spinning & Doubling Group-II Weaving [W-II] Weaving Machines Group-III Chem. Proc.[CP-II] Dyeing & Printing Group-IV Text. Test. & Quality Cont [TTQC-II] Quality Control

Note: This is the last examination for the ATA Part-I/II (Old course). Candidates who do not clear this examination in this year will be required to join the ATA Part-I Revised course.

1. Last Date for receiving applications at unit **25th July 2013**
2. Last Date for receiving all the applications with late fee at unit **25th August 2013.**
3. Last Date for receiving applications at the central office **25th September 2013.**

Dr .H. V. Sreenivasamurthy
Chairman, P. A. C.

Dr. G. S. Nadiger
Co-Chairman, P. A. C.

V. D. Zope
Hon. Gen. Secretary

The Textile Association (India) - Central Office

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Schedule of G.M.T.A. (Old) Examination December 2013

Section - A	Time 10.00 a.m. to 1.00 p.m.	Section - B	Time: 2.00 p.m. to 5.00 p.m.
Date	Subject No & Title	Date	Subject No & Title
23.12.2013	A-1 English	23.12.2013	B-1 Statistics
24.12.2013	A-2 Physics	24.12.2013	B-2 Gen. Engineering
25.12.2013	A-3 Mathematics	25.12.2013	B-3 Text. Physics
26.12.2013	A-4 Chemistry	26.12.2013	B-4 Mech. of Text. Mach.

Section - C - Time: 10.00 a.m. to 1.00 p.m.

Date	Spinning Group	Weaving Group	Chem.Proc.Group
23.12.2013	SC1 - Advanced yarn Mfg.	WC1-Advanced Fab. Mfg.	CPC1-Ele.of Chem. Engg
24.12.2013	SC2 - Mod. Yarn Prod.	WC2-Mod. Fab. Production	CPC2-Chem.of Int. & Dyes
25.12.2013	SC-3 - Proc. Control .in Spg.	WC3-Proc. Cont. in Wvg.	CPC3-Chem. & Eval. of Text. Aux.
26.12.2013	SC-4 - Engg. Desg. of Tex. Struc.	WC4-Engg. Desi. of Text.	CPC4- Advanced Chem. Proc.

Optional Papers

27.12.2013	SO1-Spg.of Man-made Fib.& Bl	WO1-Knitting Technology	CPO1-Control Mechanism & Instrume.
28.12.2013	SO2-Long Staple Fibre	WO2-Wvg.of Fil.& Text.Yarn	CPO2-Ele.of Poly.Chemistr
29.12.2013	SO3-Theory & Desi.of . Tex.Mac	WO3-Q.Cont.of wov & Non. wov	CPO3-Ble.Dye, Print & Finig.
30.12.2013	SO4-T.T. & Q.C.	WO4-Geo.Text & Ind.Fab	CPO4-Compu.Colour Mach.
Section - D		Time [2.00 pm to 5.00pm]	
27.12.2013	D1- Data Pro.& Comp. Program	28.12.2013	D2- Manmade Fib Prod & Properties
29.12.2013	D3- Ind. Engg & Mill Management	30.12.2013	D4- Mill Org. & Proce. Control

Schedule of G.M.T.A. (Revised) Examination December 2013

Section - A	Time 10.00 a.m. to 1.00 p.m.	Section - B	Time: 2.00 p.m. to 5.00 p.m.
Date	Subject No & Title	Date	Subject No & Title
23.12.2013	A-1 Engineering Physics	23.12.2013	B-1 Yarn Manufacture
24.12.2013	A-2 Engineering Chemistry	24.12.2013	B-2 Fabric Manufacture
25.12.2013	A-3 Engineering Mathematics	25.12.2013	B-3 Textile Wet Processing
26.12.2013	A-4 General Engineering	26.12.2013	B-4 Apparel manufacture
27.12.2013	A-5 Professional Orientation	27.12.2013	B-5 Textile Testing
Section - C		Time 10.00 a.m. to 1.00 p.m.	
Date	Subject No & Title		
23.12.2013	C-1 Textile Fibre Science		
24.12.2013	C-2 Polymer Technology		
25.12.2013	C-3 Textile Engineering Mechanics		
26.12.2013	C-4 Applied Statistics		
27.12.2013	C-5 Data Management and Information System		

1. Last Date for receiving applications at unit **25th July 2013**
2. Last Date for receiving all the applications with late fee at unit **25th August 2013**.
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Hon. Gen. Secretary

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Date : 18th June, 2013

Venue : Maharashtra Chamber of Commerce, Industry & Agriculture (MACCIA), Fort, Mumbai.

Contact : Mr. Varun Parihar, Sr. Asstt. Director Advertising & Marketing Division Federation of Indian Chambers of Commerce & Industry (FICCI) Federation House, 1, Tansen Marg, New Delhi - 110 001

Tel.: +91-11 23487394, 23487519,

E-mail : varun.parihar@ficci.com, am@ficci.com

The Southern Gujarat Chamber of Commerce & Industry (SGCCI) presents

International Textile Expo 2013 - 5F Textile Expo

Date : 06th-08th September, 2013

Venue : Surat International Exhibition and Convention Center (SIECC), Surat, Gujarat India

Contact : Mr. Paresh Patel, The Southern Gujarat Chamber of Commerce & Industry Sumruddhi, Makkai Bridge, Nanpura, Surat - 395 001, Gujarat, India

Tel. : +91 261-3090122, Fax: +91 261-2472340

M. : +91-97123821937

E-mail : marketing@sgcci.in, Website: <http://www.sgcci.in>

Texfair 2013 - Largest Expo of Textile Machinery, Accessories & Spares

Date : 13th to 16th December, 2013

Venue : CODISSIA Trade Fair Complex, Coimbatore

Contact : The Southern India Mills' Association 41, Race Course, Coimbatore - 641 018

Tel. : +91-0422 4225333, Fax: +91-422 422536

E-mail : texfair@simamills.org

The Textile Association (India) - South Gujarat Chapter hosting 11th International & 69th All India Textile Conference

Theme: "Indian Textiles: Global prospects and Perceptions"

Date : 20th & 21st December, 2013

Venue : The Gateway (TAJ) Hotel, Surat, Gujarat, India

Contact : Mr. Viren Jariwala, Hon. Secretary The Textile Association (India) - South Gujarat Chapter Kanjibhai Desai Hall, Samaj Shikshan Bhavan, Opp. Museum Chowk, Surat - 395 003, Gujarat, India

M. : 09099025253

E-mail : viren1001@yahoo.com

The Textile Association (India) - Mumbai Unit

organises

India Tex 2013 - Textile Exhibition - Fibre to Fashion

Date : 18, 19, & 20th October, 2013

Venue : VIA Ground, Vapi Industries Association, Plot No. 135, GIDC, Vapi - 369 195 (Gujarat).

Contact : Mr. Haresh B. Parekh, Exhibition Convener - +91-9167515676

Mr. Anil G. Mahajan, Exhibition Coordinator- +91-9324904271

The Textile Association (India), Mumbai Unit
Amar Villa, Behind Villa Diana, Flat No. 3, 3rd Floor, 86 College Lane, Off Gokhale Road, Near Portuguese Church / Maher Hall, Dadar (W), Mumbai - 400 028

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E-mail : taimumbaiunit@gmail.com, taimu@mtnl.net.in, taimu@bom3.vsnl.net.in

Website : www.textileassociationindia.com

ABROAD
12th Asia Textile Conference - ATC 12

Theme : "New Prospects on Textiles"

Date : 24th to 26th October, 2013

Sponsor : China Textile Engineering Society

Contact : China Textile Engineering Society 6F., Main Building, No.3, Yanjingli Middle Street, Chaoyang District, Beijing 100025, China

Tel : +86-010-65917740

E-mail : atc12china@vip.126.com

Website : www.atc12.org

International Nonwovens Symposium 2013

Date : May 15-16, 2013

Organized by the International Association Serving the Nonwovens and Related Industries (EDANA), Russia.

Contact : edana.org.

Website : <http://www.edana.org/education-events/conferences-and-symposia/event-detail/international-nonwovens-symposium-2013>

Sustainable Technologies Seminar

Date : May 21, 2013

Venue : Nanjing, China Organized by the Italian Association Of Textiles Machinery Manufacturers (ACIMIT) and the Italian Trade Promotion Agency (ICE), Nanjing, China.

Contact : Website: <http://www.acimit.it>

Hightex 2013

Date : May 29, 2013 to June 1, 2013

Venue : Nanjing, China Organized by Teknik Fuarcilik, Tuyap Fair, Convention and Congress Centre, Istanbul, Turkey.

Contact : Website: <http://highhtex2013.com/>

Techtextil 2013

The show is aimed towards exploring new materials and concepts related to textile industry.

Date : June 11-13, 2013

Venue : Messe Frankfurt Frankfurt, Germany

Contact : Michael Janecke
Brand Manager Techtextil

Tel. : + 49 69 75 75-67 10

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