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JOURNAL OF THE TEXTILE ASSOCIATION

VOL. 71 NO.5 JANUARY - FEBRUARY 2011

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PREMIER iQ2 with innovative features and unique graphical representation unveils the knowledge base of the future. ***iQ2***, the Quality Expert analyses the test data, trouble shoots the exceptions and provides a ready to use platform of unrivaled Knowledge base to accelerate the process of understanding and the corrective response time

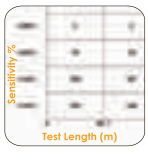
VL Curve Analysis
Automatic Variance Length (VL) Curve analysis of the defective Spinning process / department

Drafting Wave Analysis
Automatic analysis of the drafting wave to identify the defective draft zone

Intelligent Alerts
Intelligent alert prompts the user to look into specific 'exceptions' while testing

Thin (-25%)
Thick (+25%)
Neps (+100%)

Hyper Sensitive Imperfections
Thin -25 %, Thick +25 % and Neps +100 % opens up new process control possibilities



Imperfection Distribution
Independent distribution charts for Thin, Thick and Neps enable the user to visualise whether the fault is clustered or spread across the test length

Additional Options

Hairiness Index, Hair Count and Hair Severity

Fabric and Black Board Simulation

Slub and Fancy Yarn Measurement

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Discussion Topics

- The resurgence in Indian Textiles and Apparel industry
- Value Chain Integration to produce what consumer wants
- Emerging Potential in Specialty Textiles
- International Success Stories
- Indian Success Stories
- Collaborative Strategies with Global Buyers
- IT applications in Industry
- Impact of Global Economic Environment
- Modernization and Advancements in Technology, Research &
- Development and New Quality Standards

CONFERENCE OBJECTIVE

The objective is to provide an interactive opportunity where the entire textile fraternity can benefit by meeting one another, knowing one another. The conference will also provide a unique opportunity for Indian and International trade associations, export councils, policy

WHO ALL WILL ATTEND

The conference shall bring together all textile and apparel industry stakeholders like mills owners, corporate houses, CEOs, trade associations, export councils, policy makers, sourcing brands, buying houses, industry

Conference Chairman

Arvind Sinha, Business Advisors Group

Conference Conveners & Managers

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- India's largest business platform for Textile Machinery and Accessories
- 750 exhibitors from 40 countries representing the entire range of textile machineries, accessories and innovative technologies
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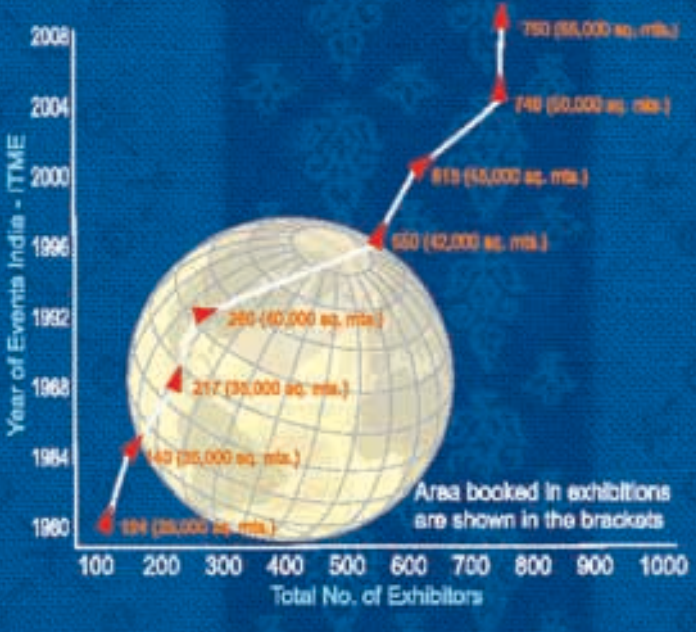

OBJECTIVES

- To provide an ideal platform for product launches, commercialization of innovations and business networking for textile engineering sector
- Present new market opportunity in India and neighboring countries and act as a catalyst to Textile and Textile Engineering Industry
- To showcase new technology and innovations in textile engineering from world over under one roof

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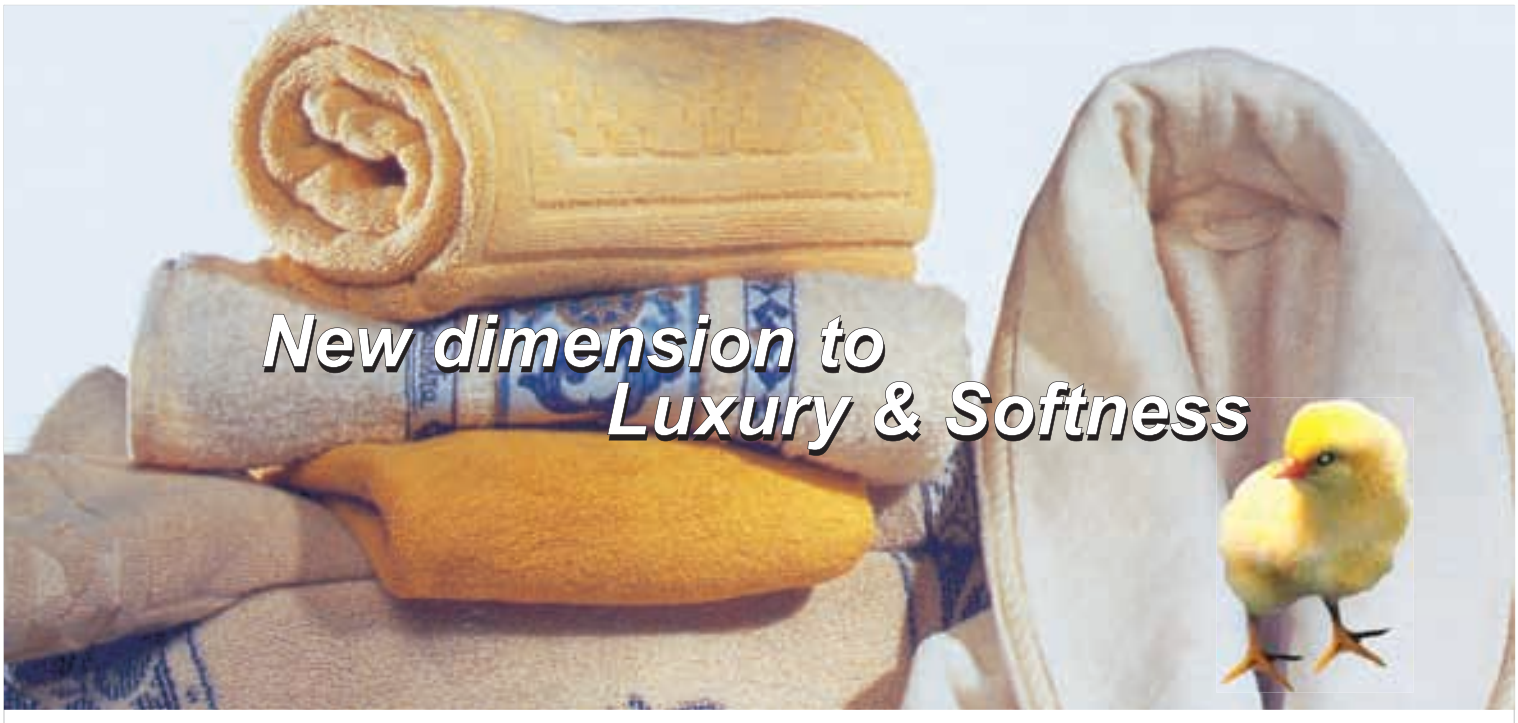

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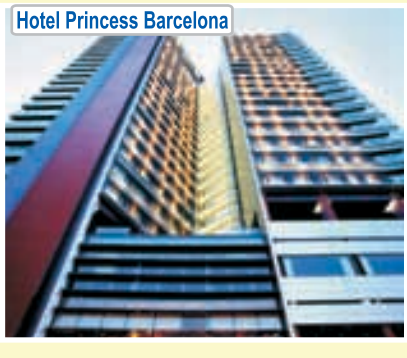

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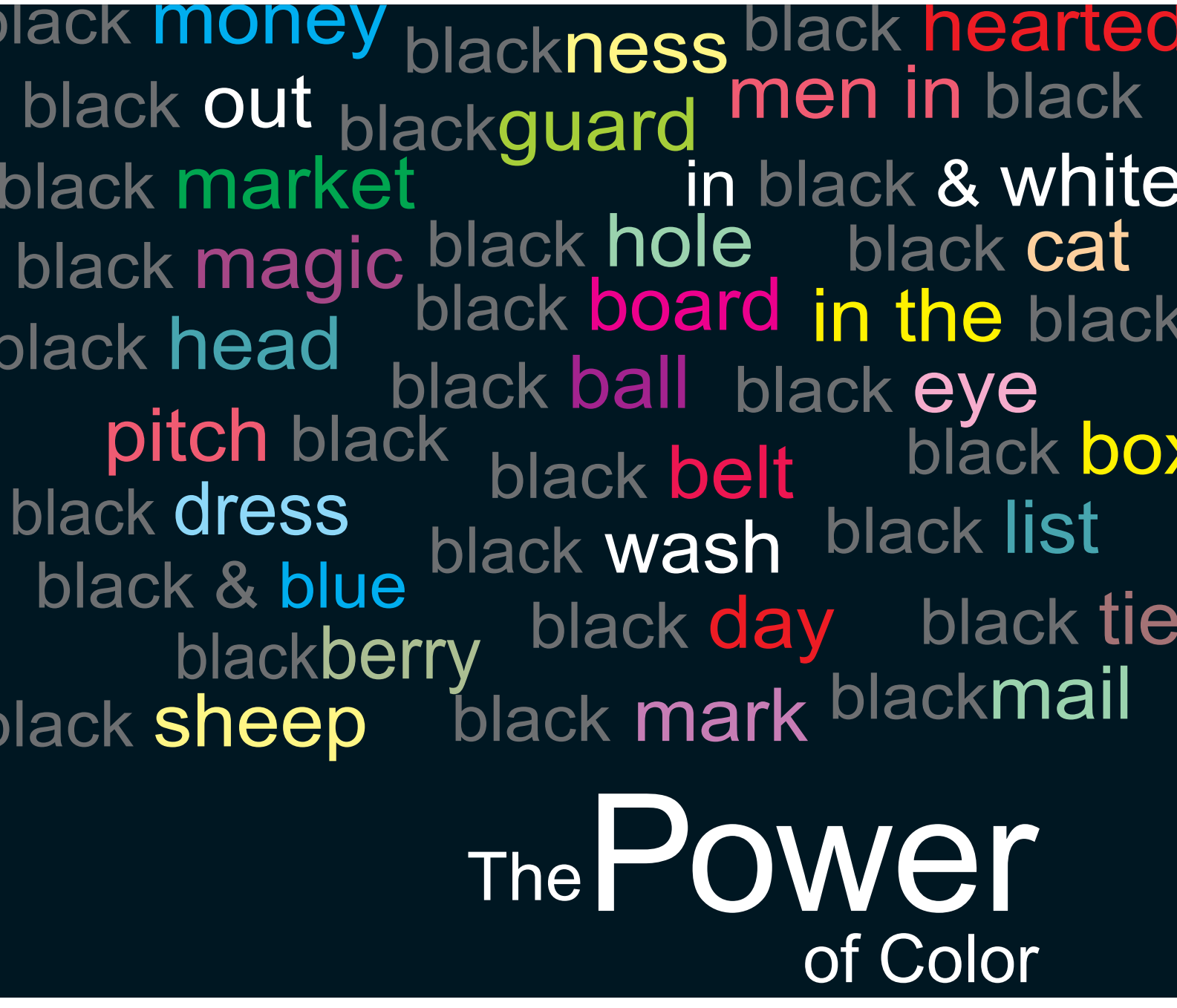

Sometimes somber, sometimes mysterious – BLACK is considered the negation of colour. Black is both negative and positive. On the one hand, this rich colour is linked with fear, mourning, and the unknown; on the other hand it is often used to denote power, elegance and formality.

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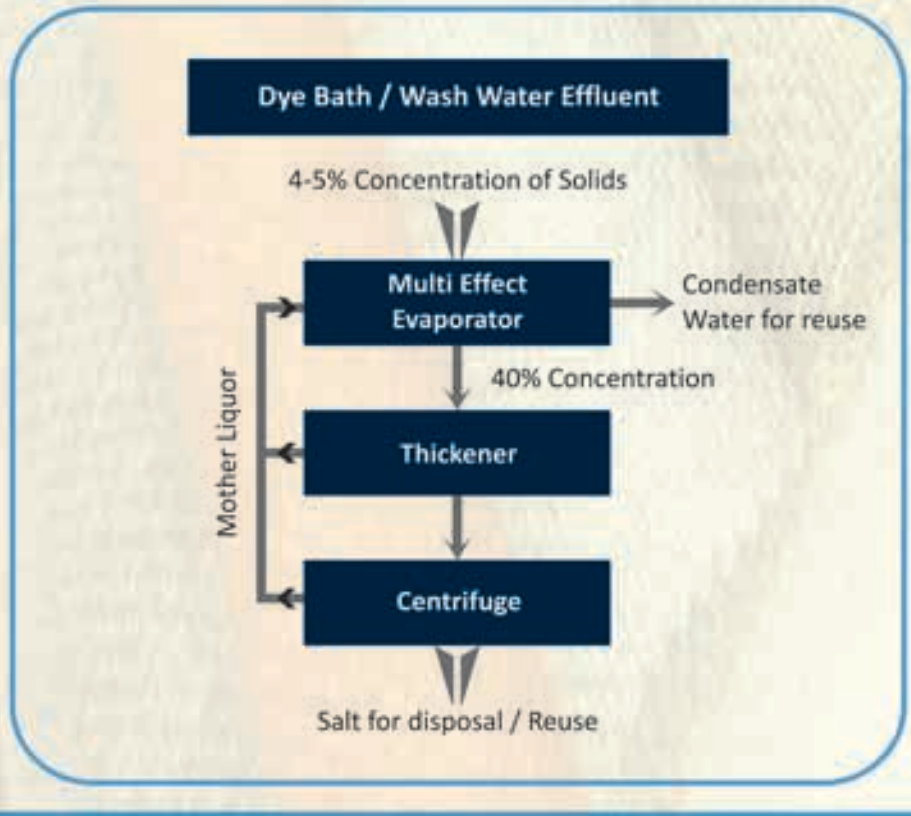

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Editorial

Union Budget : Sweet & Sour

Presentation of Union Budget 2011 was under unusual circumstances this year as the Central government has its back to the wall. The evils of corruption and uncontrollable inflation have tarnished the government's credibility. With every passing month, the perception of governance and reforms deficit are growing stronger. Under prevailing environment it could be said that the Central Budget presented by Finance Minister is a mixed bag for Textile and Clothing industry.

Finance Minister Pranab Mukherjee in Budget 2011-12 imposed 1 per cent excise duty on 130 items, including hand- made carpets. Earlier, the segment was exempted from the tax. The carpet industry employs around 3.5 million persons and exports goods worth Rs 3,000 crore each year to countries like the US and Russia. The Ministry of Textiles in its response said it would ask its finance counterpart to roll back the proposed one per cent excise duty on handmade carpets as it will hurt the labour intensive sector.

Allocation of Rs. 300 crore to NABARD in phases for handloom cooperative societies will also be helpful to a large number of handloom weavers once the Scheme is finalized and announced by the Ministry of Textiles. The financial support from NABARD could help the revival of unorganized players in the handloom industry and evade mass unemployment in the sector.

Optional tax levy at 10% has been made mandatory on branded garments and made ups. Higher taxes on branded garments and made ups will eat into the profits of the sector. This will affect those who have presence in branded garments, made ups and textile retailing by the higher lax levy.

Surcharge on domestic companies is reduced to 5% from 7.5%. The lower surcharge could have a positive impact, albeit nominal, on the profits of the smaller players in the sector.

The reduction of excise duty on 40 specified textile machinery from 10 to 5% needs to be welcomed. However, the impact of this reduction will be limited, since most of these machines are not manufactured in India. The imposition of 5% excise duty on automatic looms and projectile looms would add an avoidable duty burden on the machinery industry which will impact fabric manufacturers.

The provision of around Rs.3,000 crore for TUFS, under general expectation of scheme to be ended by March 2012 is heartening, but government should resume fresh sanctions under the Scheme at the earliest as these have been kept under suspension for a long time now, and many industrialists are waiting to make such investment.

All in all, the Budget though not exciting, but does address some of the issues of the industry. It goes without that its sweetness will also have patches of sour tastes too.

Prof. Dr. R. V. Adivarekar
Editor, JTA

Melt Processing of Polyacrylonitrile (PAN) Polymers

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Abstract
Carbon fibers are finding a wide variety of applications in the industrial sector, which encompasses the high-tech aerospace and defence areas, increasingly the shipping, sporting and medical fields as well. One of the major shortcomings that limit the potential widespread use of carbon fibers in commercial applications is their prohibitive cost in comparison with other structural materials like glass fibres and steel. Polyacrylonitrile (PAN) polymer degrades before melting and thus melt spinning is not preferred. Current carbon fiber productions from acrylic fibers employ wet or dry spun PAN-based precursors that require expensive solvents and costly solvent recovery methods causing environmental pollution. Melting point of PAN can be reduced by disturbing intra and interchain interaction between nitrile groups. This can be achieved by incorporating suitable comonomers or by using plasticizers like water or organic solvents. Thus melt spinning becomes feasible and production cost can be minimized and it will be possible to produce low cost carbon fibre precursors. Melt spun PAN will be suitable for other applications like nonwovens, membranes, outdoor fabrics and filters.

Keywords
Environmental pollution, Melt spinning, Polyacrylonitrile, Wet or dry spinning

1. Introduction

Polyacrylonitrile-based textile fibers are well known and, indeed, currently account for nearly 6 billion pound per year worldwide. [1] A small fraction (~30 million pounds) of these materials is used as a precursor to carbon fibers. It is well known that the free radically produced polyacrylonitrile displays a glass transition temperature (Tg) of around 105°C and a melting point of around 300°C. For PAN polymers the complex reaction of intra and intermolecular cyclization, which is referred to as 'stabilization' in the carbon fiber community, occurs at 220°C or higher and prevents thermoplastic fabrication by economical and environmentally attractive melt spinning process.[2] Hence (PAN) polymer precursor fibers are solution processed in the presence of toxic, environmentally unfriendly organic solvents [3]. Generally PAN polymers are processed by wet, dry or dry- jet-wet spinning methods. The solvents for polyacrylonitrile (PAN) generally belong to two classes. The first type consists of aqueous ionic-media such as $ZnCl_2$ and NaSCN. Secondly, polar organic liquids containing carbonyl (C=O) groups, such as dimethyl formamide and dimethyl acetamide, are used as solvents. These solvents are usually used in the range of 70–93 weight % and 7–30 weight % polymer to permit processing at temperatures well below the onset of the crosslinking reaction [4]. Large amount of solvent is required for processing small amount of solid polymer in solution spinning operation. This necessitates the recovery and reuse of the solvents and thus solution spun PAN fibre cost is very high. High cost PAN precursor fibre increases the cost of carbon fibres. As an illustration, carbon fibers could be up to 10 to 20 times the cost of glass fibers on a weight basis, although this ratio is lowered when normalized on a modulus basis [5]. Carbon fiber composites cost is at least 20 times as much as steel, and the automobile industry is not interested in using them until the price of carbon fiber drops from $8 to $5 (and preferably $3) for a pound [6]. It is in this regard that melt spinning of PAN precursors seems to be the better alternative for reducing the cost of the final carbon fiber product. In the latter case, we are dealing with higher amounts of PAN concentration (100 weight % of the PAN polymer) as opposed to 7–30 weight % typically used in solution spinning. The solvent recovery process is eliminated (lowering the capital costs), which reduces the downstream processing costs and makes the PAN precursor manufacturing process an environmentally benign one. Moreover, it is believed that the melt-spun PAN fibers, as opposed to the conventional solution spun fibers, would be essentially void-free, leading to

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less severe conditions and lesser times for the stabilization and carbonization steps, which translates to better savings for the entire process [5]. Generally two approaches [7] are used to reduce the melting point of PAN polymers and to prepare stable melt, which can be melt processed. First one is the use of suitable comonomers or termonomers [8-23] in particular amount to disturb the crystal structure and nitrile-nitrile interactions, so that stable melt can be formed at reduced temperatures. Second is the use of non-solvents for PAN polymer like organic plasticizers [24-33] or water [34-45] to decouple the nitrile-nitrile interactions. Different researchers [46-53] have modified the spinning machines aiming at high production rate, production of profiled fibres and for improvement of the filament uniformity. On the cost basis, melt processable PAN is comparable with other commodity fibres like polyesters and polyamides [23]. Melt spun PAN can be used for manufacturing nonwovens, membranes [23], carbon fibre precursor [54-55] and electret filters [56].

2. Solid State Structure of Acrylic Polymers

PAN polymers are produced by free radical polymerization which generally gives no or little stereo-regularity. A complete atactic polymer should have concentration of hetero, syndio and isotactic triads in the ratio of 2:1:1which is found in case of PAN as 5:2:3, not markedly different from expectations for atactic case. The distinguishing feature of nitrile group is the very high dipole moment with a magnitude of 3.9 Debyes, which governs the chain conformation for isolated PAN polymer chain. The key factor controlling the fiber structure is the interaction energy between nitrile groups. The interaction energy can be either attractive or repulsive depending upon the distance of separation. If the backbone chain were placed in a plane zigzag arrangement, then the adjacent nitrile groups would fall into a parallel alignment, thus giving the net repulsion. The chain potential energy can be lowered by placing the adjacent nitrile groups as far as possible and this will require that the backbone chain become helical (Fig. 2.1). In helical arrangement, all nitrile groups point outside and when nitrile group on other chain come closer, they get arranged in antiparallel orientation to give net attraction.

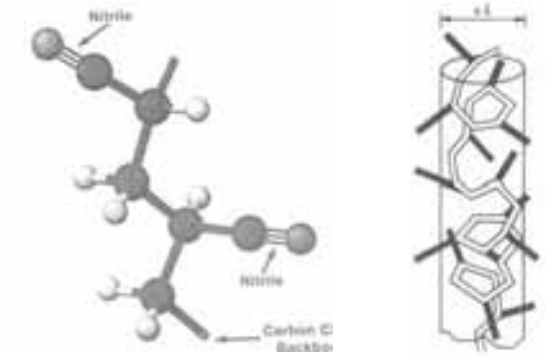

Fig. 2. 1 Conformation for isolated PAN Chain

Two phase model is the framework for formulating structure-property relationship of fibers. The majority of textile fibers have a morphology that can be described by the classical two-phase model for semicrystalline polymers. For acrylic fibers, discrete amorphous and crystalline phases are not clearly seen. The PAN morphology has been described as "amorphous with high degree of lateral bonding" or as "two dimensional liquid crystalline like structure with many defects" (Fig. 2.2)[7].

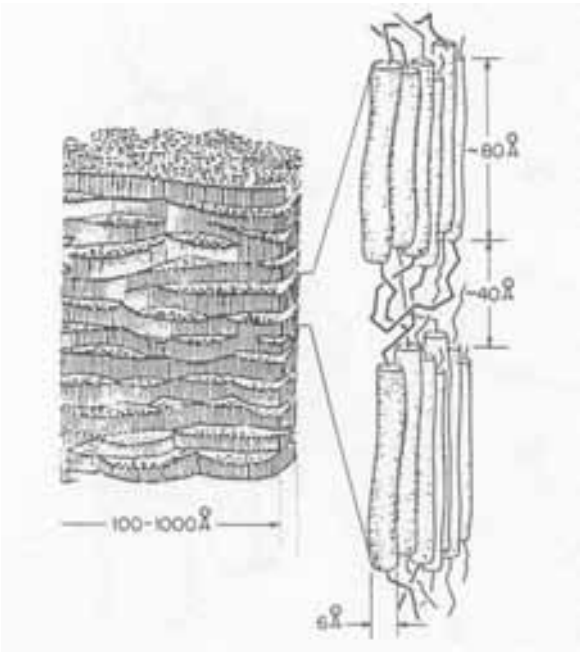

Fig. 2.2 Two phase model for PAN

3. Theories to Reduce Melting Temperature for Polymers

When PAN is analyzed by differential scanning calorimetry (DSC) using normal scanning rates of 20°C/

min, the cyclization reaction produces a large exotherm and no melting is observed. PAN does not exhibit regular 'melting' thermograms, except when using DSC at a high ramp heating rate of 160 ºC/min, where it shows what appears to be an endotherm prior to exothermic degradation reactions. The first order thermodynamic melting transformation, is defined by

$$\Delta T_m = \Delta H_m / \Delta S_m$$

Where ΔT_m, ΔH_m and ΔS_m are the temperature, enthalpy and entropy of melting, respectively. However, the increase in entropy during melting is small, which has little effect on lowering the T_m. To bring the melting point of the polyacrylonitrile below 200ºC, the intramolecular interactions of the CN dipoles must be disrupted. This can be done chemically with the addition of comonomers. Addition of comonomers increases the distance between the CN pendant groups and disrupts the sequences of CN. In terms of equilibrium melting, the interchain interactions between polar nitrile substituents, which must be incorporated in the PAN crystals, are expected to contribute primarily to the enthalpy of melting. The change in entropy upon melting, on the other hand, is associated mainly with disordering the intrachain PAN conformations. Another way of weakening the interactions between the CN dipoles is by surrounding the CN groups with other dipoles. Some of the molecules for this task would be water, which forms hydrogen bridges to the nitrogen atoms. Water is very mobile and it takes up little space and diffuses through the melt easily and rapidly. The polyacrylonitrile molecule becomes helical because of the strong electrical interactions between neighbouring CN dipoles. The helices are not destroyed in the melt but the intramolecular interactions are diminished. Although it is a good option for the task, there are others also, including glycols and glycerin. These compounds form hydrogen bridges with the nitrile groups via their hydroxyl moieties. The reduction in the dipole interaction depends on the dipole moment. One attractive feature of the use of water and glycols is the fact that they can easily be removed from the fibers afterward. Flory proposed the theory for melting point depression of a polymer by diluents. This theory predicts the dependence of melting point on the volume fraction of the diluent, which in this case is the solvent.

$$1/T_m - 1/T°_m = [RV_u / \Delta H_u V_1][V_f - XV_f^2]$$

where,

T_m and $T°_m$ are the melting points of the polymer with diluent and pure polymer respectively. R- Gas constant, ΔH_u- Heat of fusion per mole of crystalline repeat unit, V_u and V_1 - Molar volumes of the repeat unit and diluents, V_f - Volume fraction of the diluents, X - Polymer diluents interaction parameter. Flory asserts that comonomer interruption and shortening of the length of the crystalline monomer sequences, reduces the number and average size of crystallites because chain segments on the crystallite surfaces have larger free energy and smaller crystals with a larger surface to volume ratio have a reduced melting point. Specifically, the crystallizable monomer sequence length decreases linearly with the addition of the comonomers.

$$1/T_m - 1/T°_m = [R/\Delta H_u] * X_B$$

where,

Tm and Tmº are the melting points of the copolymer and homopolymer, respectively, R- universal gas constant, ΔH_u - heat of fusion per mole of crystalline repeat unit, and X_B - mole fraction of the minor non-crystallizing comonomer. Furthermore, for non-random copolymers, Flory proposes that the melting point depression depends on the sequence propagation probability and not the overall comonomer composition (X_B). Eby, on the other hand, proposes that the comonomer may be partially incorporated into the crystal lattice as defects and extends Flory's theory by adding a parameter that accounts for the degree of lattice disruption. Eby states that the efficacy of the particular comonomer to depress the melting point is to a first approximation proportional to the molar volume of particular comonomer. Frushor developed a novel thermal analytical technique that utilizes water to depress the melting point of Acrylonitrile (AN) copolymers. As the water content is increased, the melting point of the copolymer decreases continuously, till the critical concentration of water is reached. The critical concentration shows dependence on the composition of the PAN. Incorporation of comonomer decreases the critical water concentration and also the melting point. Frushor demonstrated evidence in support of the Eby's theory with a melting point depression constant, which indicates the degree to which comonomers disrupt the crystalline lattice, based on the molar volume of their side groups. The melting point depression constant can be used in a generalized melting point equation for acrylic copolymers of any order

$$1/T_m - 1/T°_m = \sum_{i=1}^{n-1} K_i X_i$$

where,

T_m and T_mº are the melting points of the copolymer and homopolymer, respectively, K_i and X_i are the melting point depression constants and the mole fraction of the i^{th} comonomer, and n is the order of the polymer (n= 2 for a copolymer, 3 for terpolymer) [7].

4. Copolymerization to Impart Melt Processability

A small side group such as chlorine moiety of vinyl chloride, for example, or the absence of any side group as in ethylene, results in the disturbance of one nitrile-nitrile coupling due to the absence of nitrile group at that position. A large group, on the other hand, such as phenyl, sulfo-phenol, or halogenated phenyl group as an example can sterically hamper coupling over a considerable length of polymeric chain to which it is attached [8]. In 1954 Weinstock et al [9] produced copolymers of acrylonitrile and methacrylonitrile containing 15-30 parts of methacrylonitrile and melt processed into filaments. In another study [10], statistical (random) melt processable AN/MA copolymers were synthesized by solution, redox and suspension methods. The melt viscosity of 85/15 copolymer was fairly stable for 30 min (typical dwell time in an extruder) at 220°C. Char yield was independent of comonomers concentration and found to be approximately 50% which is ideal for carbon fiber production. Copolymers [11] of acrylonitrile and methyl acrylates were studied. It was found that increasing the MA content from 7 to 10 mol % or more causes the melt viscosity to drop by several orders of magnitude. As the amount of chain transfer agent and/or initiator increases, molecular weight and intrinsic viscosity decreases which helps in melt spinning. Addition of photosensitive comonomers like ABP was found to be desirable for photo cross linking the fibre to make precursors that will have enough mechanical strength to resist fusing during stabilization step and more suitable composition was found to be AN/MA/ABP in the molar ratio of 85/14/1. Jorkasky et al [12] described multi-polymer comprising about 85% to 92% by weight polymerized acrylonitrile monomer and about 8% to 15% by weight copolymerized olefinically unsaturated monomer like acrylates, methacrylates, acrylamide, vinyl acetate, vinyl chloride etc. 85AN/15MA polymer resin having molecular weight of about 55,000 was melt spun at a temperature (224 °C) to achieve melt flow without degradation in a screw extruder. Curatolo et al [13] described the method of forming melt processable copolymers comprising methacrylonitrile (10 to 80%) and acrylonitrile (20 to 90%) for producing multiaxially oriented films. Polymerization of methacrylonitrile and acrylonitrile was carried out by incremental addition of methacrylonitrile, as it is less reactive than acrylonitrile to control the sequence length of each comonomer in the resulting polymer. It was found that the amount of comonomer is very important but at the same time the sequence length of monomers and comonomers in the polymeric chain plays vital role in deciding melt processability. Smierciak et al [14] details the process of 'starved' or 'scavenged' emulsion polymerization in which the rate of addition of acrylonitrile, methacrylonitrile and olefinically unsaturated monomers are controlled and are kept less than or equal to the rate of polymerization. This process claims that it is possible to produce homogeneous terpolymer in which the units of acrylonitrile, methacrylonitrile and olefinically unsaturated monomers are interdispersed randomly throughout the polymerized chain in relatively small monomer units resulting in a thermally stable melt processable multipolymer. Their latter patent [15] details the process of making melt processable multipolymer by starved polymerization technique, comprising 50-95% polymerized acrylonitrile and 5-50% polymerized olefinically unsaturated monomer. Three types of acrylic copolymers [16] were prepared containing 5-25 mol % Methyl Acrylate (MA), Vinyl Acetate (VAc) and Acrylamide (AM) comonomers by aqueous precipitation polymerization method. It was observed that the decomposition temperature of AN/MA increases significantly with the increase of MA content. The effect of various comonomers on delaying the decomposition/ cyclization reactions varied in the order MA>VAc>AM. With increased comonomer content, it was observed that the decomposition temperature of AN/MA increases, that of AN/VAc increases first and then it is decreased, whereas, in the case of AN/AM it is initially decreased and then it is increased. Incorporation of 15 mol % of MA can improve the decomposition temperature to 321°C and depress the melting point to 174°C. In another study, [5] three different kinds of comonomers MA, Isobutyl Acrylate (IBA), and AM were studied. It was seen that MA was found to be suitable for enabling the melt processing of PAN, in terms of melt viscosity, time stability and char yield. Below 10 mol % of MA, the PAN copolymer exhibited no flowability, even at very low molecular weights (20,000). The long-range order inherently present in PAN is speculated to be broken down at a critical value of about 10 mol % MA at 220°C in the PAN-based system, enabling its melt flowability. The molecular weight cutoff for the 90/10 mol % AN/ MA system was about 50,000 at 220°C, whereas it was increased to about 100,000 in the presence of 15 mol % MA comonomer. AM comonomer was not found to improve the melt processability of the PAN system because of extensive crosslinking and IBA was not suitable due to low char yield. Another study [17] revealed that emulsion polymerization of 85-88 mole % AN, 11-14 mole % MA, 1 mole % acryloyl benzophenone (ABP) gives the melt processable acrylonitrile copolymer

suitable for carbon fibre precursor. In another study [18] 2, 3, 4, 6 arm star polyacrylonitrile homopolymer and copolymer were synthesized and studied for their thermal behavior. Thermal analysis showed that Tg was found to lie in the range of 85-95°C, with no clear trend and bulk material showed no improved melting. Copolymers [19] of AN/ MA and AN/MA/ABP terpolymers having higher and lower molecular weights were synthesized at molar ratios of 85/15 and 85/14/1, respectively. This study has identified the temperature and time dependence of shear viscosity ç as well as the temperature and angular frequency dependence of complex viscosity ç*. Results suggest that copolymerization with ABP significantly increased the thermally induced kinetics of crosslinking for high molecular weight terpolymer and melt stability was found to be less. AN/ MA copolymer and both terpolymers appeared to be suitable for melt processing at temperatures between 200 and 220°C. AN–MA copolymer [20] in the molar ratio 85/15 containing 5–25 wt% of microencapsulated phase change materials (Micro-PCMs) were melt spun. It was found that, melt flow index initially increases for low concentration of Micro-PCM as they act as plasticizers and then reduces as the Micro-PCM hinders the chain mobility. It was also found that with increasing the concentration of Micro-PCM, fibre crystalinity and mechanical properties reduces. Hutchinson et al [21] studied the structure property relationships between melt-processable high-acrylonitrile copolymer (MPHAC) and commercially available dry spun Dralon filaments. In these cases, the tenacity was found to be highly dependent on the degree of order present in the melt spun filaments. The Dralon fiber has shown a relatively high index of paracrystallinity (IP), but lower tenacity than does MPHAC, since paracrystalline order (PO) is presumably driven by the interaction between dipoles, an AN sequence length of approximately 36 in Dralon as opposed to 13 in the MPHAC filament. Short AN sequence in MPHAC leads to high paracrystalline order in these fibers. The PO increases with draw ratio, while hot godet draw imparts a significantly higher degree of PO. Finally, no significant changes in molecular weights were observed between initial MPHAC resin pellets and ''melt'' processed filaments. The orientation and crystal size study [22] of a series of melt-spun high acrylonitrile AMLON (commercial melt processable PAN) was carried out. It was found that orientation of the AMLON fibers is as good as or better than that of commercial solution-spun fibers. Post-drawing has a dramatic effect on molecular orientation. Heat setting was found to increase the crystal size without sacrificing orientation. Higher molecular weight increases orientation. While commercial solution-spun fibers have rough grooves and an irregular shape, the melt-spun fibers are relatively smooth and cylindrical. The cross-section of the fiber can be adjusted easily by die design. In another study [23] it was found that the tenacity of Amlon (commercial melt processable PAN) fibers were on average higher than a commercial solution spun fiber.

5. Melt Spinning Using Organic Plasticizers

Green et al [24] describes the process, in which acrylonitrile polymerization was carried out in presence of plasticizers like cyclic ethylene carbonate or tetramethylene cyclic sulfone or N-acetylmorpholine to produce melt processable plasticized PAN polymer. For emulsification of polymer/plasticizer mixture, non-solvent like hexane or heptane was used during polymerization. This method resulted into melt processable PAN/plasticizer mixture containing 30-60% PAN and remaining plasticizer. In another patent [25] a mixture of 40-65% PAN was mixed with plasticizers like ethylene cyclic carbonate or gamma-butyrolactone or ethylene cyclic sulfite and then melt processed. Hare et al [26] detailed the process of making PAN fibres having crimp and resilience like natural wool fibres. Melt spinning of PAN homo and copolymers having polymer concentrations of about 40-70% plasticizers like N-acetyl morpholine, keeping spin stretch ratio more than 30, spinning was carried out at 1000-7000 ypm. Filaments were then allowed to shrink in hot water or air under slight or no tension conditions to yield crimped fibres. Farago et al [27] detailed the polymerization for melt processable PAN homo and copolymers in dimethyl sulfoxide or succinonitrile or dimethyl sulfoxide dimethyl sulfone as plasticizers for the polymer. This plasticized melt was spun at very high spinning speed up to 4000 ypm. Opferkuch et al [28] proposed the method of melting PAN homo and copolymers at atmospheric pressure using organic liquids, having dielectric constant preferably higher than 30. The melt thus formed was used for making textile filaments and molds using commercial melt processing machines. Daumit et al [29] describe the melt spinning of polyacrylonitrile using plasticizers comprising acetonitrile, C_1-C_4 monohydroxy alcohol and water for manufacturing PAN as a carbon fibre precursor. In another patent [30], the use of nitromethane and nitroethane in place of acetonitrile was suggested for melt plasticization of acrylic copolymers. Similar patent [31] details the melt spinning of PAN copolymer for carbon fibre precursor. PAN copolymer was melted using 14-21% acetonitrile and 15-23% water as plasticizer, then

extrusion was carried out in the filament form followed by plasticizer evaporation and drawing. The process claims that the resulting filaments are ideal from carbon fibre precursor point of view. Bashir et al [32] studied the compression molding of concentrated solutions of polyacrylonitrile (PAN) in two organic solvents; gamma butyrolactone (gBL) and ethylene carbonate (EC). It was found that these solvents form the complexes with PAN polymeric chains. Differential scanning calorimetry showed gel-melting endotherms on heating and crystallisation exotherms on cooling for compression molded films. Kanishke et al [33] described the plasticized extrusion of the PAN homopolymer and propylene carbonate (PC). The plasticized melts showed shear-thinning behaviour. It was feasible to extrude the PAN-PC (50:50) plasticized melts up to 220°C; although at this temperature the effect of solvent vaporization became noticeable in the form of bubbles on the filament surface. Above 220°C, degradation reactions occurred, even for the short time-scale (~ 5-10 min) which is needed to empty the barrel. These degradation reactions led not only to discoloration of the fibre, but also to an increase in viscosity with time. In another study [17], carbon dioxide (CO_2) was used as plasticizer for AN copolymers to an extent that facilitates processing at reduced temperatures. A batch saturation method to absorb CO_2 in AN copolymers was developed. Reduction in processing temperature was found to be directly proportional to the amount of CO_2 absorbed.

6. Melt Spinning Using Water

In 1952 C. D. Coxe [34] first discovered that water can hydrate the pendant nitrile groups of PAN, by decoupling the nitrile-nitrile associations. The melting point thus, can be significantly lowered, and hydrated PAN can be melt extruded without significant degradation. Such hydrated form of PAN could be extruded using elevated temperature and pressure resulting in fibrillar material suitable for making paper or in strands of fused and sintered or foamed particles. However, such a process was unable to produce fibres for textile applications. George et al [3] developed the continuous method for making fibrous filamentary material suitable for paper products. In this method, PAN polymer is mixed with water containing sodium carboxymethyl cellulose which is heated in the pressurized vessel and extruded in restricted area where high velocity steam is directed in transverse direction to the extrudate imparting it suitable draw ratio. The bonded fibrils so formed can be separated by beating or other abrasive methods. For the first time Blickenstaff [8] provided the clear understanding of water-polymer interactions at different time, temperature and pressure conditions and detailed substantially single phase hydrated melt using appropriate amount of water and temperature, comprising polymers or copolymers of acrylonitrile containing at least 80 mol % of acrylonitrile units. The filaments spun from such a composition are characterized by sheath-core structure (due to very fast evaporation of water from filament surface), surface striations, micro voids in core and diffused visible light reflectivity. Density of sheath was higher than core, which led to high bending modulus of the filament. Drawback of the process was that the loop tenacity of these filaments was poor. Due to voids in core, these fibres required large amount of dye to achieve desired shades and obtaining heavy shades such as blacks and navy blues was impracticable [35]. To overcome this problem, acrylonitrile copolymer was prepared using suitable amount of hydrophobic and hydrophilic comonomers. Single phase fusion melt was then prepared using amount of water in the lower half of range necessary to provide melt. This melt was then extruded in steam pressurized zone where rate of evaporation of water from filament surface was controlled by saturated steam and hydrophilic monomer in the copolymer structure to give void free filaments. Hirotaka et al [36] detailed the process of making homogeneous single phase melt of PAN homo and copolymers. In this process, polymer/water crumbs containing 30-60% by weight of PAN polymer was dewatered at 140° C above its autogenous pressure to yield homogeneous melt containing 70% polymer concentration. Colemn et al [37] propose the use of terpolymer containing 80-95 weight percent of acrylonitrile, 4-19 weight percent of hydrophobic monomer and 1-10 weight percent of hydrophilic monomer. Goodman et al [38] suggested the addition of 3-7% compatible solvents like 2-pyrrolindone ethylene carbonate and tetramethylene sulphone in the single phase hydrated melt of PAN to improve the loop tenacity of the filaments. With this invention still solvent recovery and pollution problem were not solved. Cline et al [39] stated that PAN copolymer containing 91% AN and 9% other comonomers with 23 μeq/g enolizable groups, 15-70 μeq/g thioether ends and 3 μeq/g oxidizable hydrolysis fragments shows better single fusion hydrated melt stability and good melt color. Porosoff [40] provided a process for preparing PAN fibre which comprises extruding a single phase fusion melt of acrylonitrile copolymer and water through spinnerets directly into the steam pressurized solidification zone wherein temperature, pressure and saturation of steam is maintained so as to keep extruded filament in plasticized

form and then drawn to spin stretch ratio of at least 25 and generally in the range of 25-250. Filaments thus produced have shown straight and loop tenacity of textile interest. Kreahling et al [41] developed two stage drawing process, for single fusion melts of PAN copolymer. In this process, spun filaments were drawn to draw ratio of at least 5 in first stage and total draw ratio of at least 25 was achieved by maintaining appropriate draw ratio in the second stage of drawing. Straight and loop tenacity of the resulting filament was comparable to the commercial PAN filaments. In another study [42], low molecular weight copolymers of acrylonitrile having number average molecular weight in the range of 6000-15750 was melt spun from homogeneous fusion melt of an acrylonitrile copolymer and water. The stretch ratio of at least 25 was applied to extruded filaments in steam pressurize zone. Filaments were having the properties of textile interest. DeMaria et al [43] described a process for producing an acrylonitrile polymer fibre from a single phase melt of acrylonitrile polymer and water. This single phase melt comprising 83.2 parts by wt. of acrylonitrile terpolymer and 16.8 parts by wt. of water was extruded in to a steam pressurized solidification zone maintained under conditions of temperature (167°C), pressure (13 psi) and saturation that enabled the nascent extrudate to solidify and to retain sufficient water to remain in a stretchable plastic state. The extrudate was wetted in the solidification zone with hot water and stretched in at least two stages to provide the molecular orientation. The total stretch ratio achieved using wetting with two hot water sprays was 50.88 as compared to 25.68 when no hot water wetting was used. The resulting filament from the modified process had significantly higher straight tenacity, hot-wet initial modulus and was void-free. Streetman et al [44] developed the self crimping melt spun PAN fibre for better aesthetic value, based on differential thermal shrinkage principle. This method uses a heterogeneous mixture of 80-90% PAN copolymer and 10-20% incompatible polymer like commercially available acrylonitrile grafted starch or polypropylene, then spinning this hydrated mixture followed by heat treatment to give self crimping filaments. In their latter patent [45] they have covered other incompatible polymers like Polyethylene, Nylon and Polyesters.

7. Modifications in Spinning Machines

Different researchers have modified the spinning machines aiming at high production rate, production of profiled fibres and improvement in the uniformity of filaments. Pfeiffer et al [46] successfully spun the hydrated melt of PAN copolymer of kinematic molecular weight in the range of 30000-60000 through spinneret plates having orifice diameter in the range of 60-160 micron and orifice density of 18 per sq.cm. to increase productivity. Pfeiffer et al [47] developed the new spinneret plates having 25-50 orifices per sq.cm. and capillary diameter of 200-400 micron for spinning homogeneous fusion melt of polyacrylonitrile and water. This design increased the productivity by 180%. Pfeiffer et al [48] have shown that, a spinneret plate having multiple capillaries per counter-bore can be effectively used to melt spin fusion melt of acrylonitrile polymer and water without sticking together. Production rate can be increased by providing large plurality of orifices in the single spinneret assembly. At the same time it becomes difficult to maintain uniform back pressure over all the orifices and leads to non-uniform diameter of extruded filaments. Siegman et al [49] designed the spinneret assembly wherein tapered passageways and distribution chambers of diminishing length are arranged in such a manner as to provide uniform backpressure over all the orifices, so that extruded filaments of uniform diameter can be produced. Pfeiffer [50] designed the spinneret assembly for spinning hollow PAN fibre from hydrated single fusion melt. In another patent Pfeiffer et al [51] developed fibres of open cross sectional shape by inserting removable pin in the counter bore of the spinneret, from single fusion melt of PAN copolymers. Klausner et al [52] described the process of continuous extrusion of single fusion melt of PAN in horizontally disposed extruder. In the said process, porous plug of composition to be extruded is formed between compression zone and melting zone. Linear rate of advancing for porous plug was equal to the rate at which condensed vapors move towards the feed zone so as to prevent water escape. Young et al [53] developed the vertically disposed compression zone and claimed the advantages that polymer powder as well as granules can be processed, pressure generated in the compression zone is sufficient to provide single fusion melt and hence no need of auxiliary pumps, no need of forming porous plug and the fibres spun thereof have less bubble counts.

8. Cost Analyses and Potential Market for Melt Spun PAN

The benefits of melt processing, aside from mechanical enhancements, are cost driven. The least expensive manufacturing route is synthesis of the polymer followed by direct conversion to fibers. Cost predictions of melt processable high acrylonitrile are based on raw materials and estimated conversion costs for polyethyleneterephthalate, polypropylene and polyamides. The

results are presented in Table 8.1[23]. PAN scores over other two predominant precursors for carbon fibres namely viscose rayon and pitch, mainly because of the following advantages, 1) Its structure permits faster rate of pyrolysis without much disturbance to its basic structure and to the preferred orientation of the molecular chains along the fiber axis present in the original fiber 2) It decomposes before melting 3) Higher degree of preferred orientation is possible during spinning 4) It results in high carbon yield (50-55%) when pyrolyzed to 1000°C and above [2]. Comparative study of [54] Mitsubishi® PAN (95% PAN, 5% methyl acrylate) pre-spun fiber, isotropic pitch and Amlon® (80% PAN, 20% methylacrylate) which is a melt spinnable PAN precursor, was carried out to produce carbon fibers. However, heat treatment trials showed that standard oxidative stabilization of a melt-spun PAN is likely to require process times in the order of days and concluded that slight modifications of the chemical compositions of isotropic pitch and Amlon® PAN are likely to make them practical for industrial applications. Grove et al [55] explored the feasibility to produce carbon fibers using water plasticized melt spun PAN based precursors and succeeded to gain reasonable strength, up to an average of 15 cN/dtex , Young's modulus from 1080 to 1310 cN/dtex , and sonic moduli in excess of 1000 cN/dtex from experimental acrylonitrile-based, plasticized melt spun precursors. Thermoplastic polyacrylonitrile [23] is likely to find application in the larger field of composites and carbon composites. Due to the exceptional UV resistance in acrylic fibers, their fabrics will find use in many outdoor applications. Primarily, products include awnings, convertible automobile covers and marine textiles woven mainly from ring-spun yarns. To date, almost all acrylic fiber nonwovens are constructed from wet-lay, air-lay or carding processes. However, the amount of melt spun nonwoven production (at least in the U.S. and Canada) has steadily increased. A thermoplastic polyacrylonitrile would potentially open up the melt spun industry to acrylic for fabrics, filtration and high tech products including carbonized fabrics. Membranes are constructed in many forms for specific properties and applications. One of the methods that pertain to fibers is hollow fiber membranes (HFM). HFMs are advantageous because they allow a high modulus composite with high surface area. Dugan [56] disclosed the electret filters made up of multicomponent splittable fibers such as melt processable polyacrylonitrile as one and polypropylene as other which lie towards more negative side on the tribo-electric series as compared to polyacrylonitrile.

Table 8.1. Raw materials and conversion costs for major thermoplastic polymers

Polymer type	Raw Cost (¢/lb)	Conversion cost (¢/lb)	
		Resin	Fibre
PET	36	40	Staple 19, Filament 27
Polypropylene	22	15	N/A
Nylon-6	72	53	Filament 21
Nylon-66	117	21	
Amlon (Melt Processable PAN)	30	45-65	Staple 20 to 30, Filament 30 to 45

9. Conclusion

Polyacrylonitrile shares a huge market as textile fiber, as well as carbon fiber precursor. By using melt spinning, the problems of environmentally harmful solvents, higher capital and operating costs can be solved. Melt-spinning is inherently less expensive than solution-spinning because it eliminates the extra cost of solvent handling and it also operates at much higher throughputs. Two approaches can be used to reduce the melting temperature for melt spinning of the PAN polymers, namely; 1) use of a melt assistant, such as water, or other organic plasticizers and 2) the use of suitable comonomers to reduce the long-range order, simply by increasing their concentration and subsequently reduce melting point as well as to give stable melt for processing. Experimentally, positive birefringence values has been found for melt spun PAN, which indicate high orientation of the polymeric chains in melt spun fibers. Again, the cross-section of the fiber can be adjusted easily by die design. Melt spinning of PAN can significantly reduce the cost of carbon fibers. Moreover, it is believed that the melt-spun PAN fibers, as opposed to the conventional solution-spun fibers, would be essentially void-free, leading to less severe conditions and lesser times for the stabilization and carbonization steps, which translates to better savings for the entire process. Apart from carbon fiber precursor, melt spun fibers can be used in spun bonded nonwovens and other applications which will give low cost products.

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Basalt Fiber

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Abstract
Nature is constantly providing various resources for making textile materials for variety of applications. Though many textile fibers in the nature are available in the fibrous form itself, nature also offers raw materials that can be modified and formed into a filament in a way similar to the melt and solution spinning of other textile fibres. Basalt fiber is a material made from extremely fine fibers of basalt, which is composed of the minerals plagioclase, pyroxene, and olivine. It is similar to carbon fiber and fiberglass, having better physico-mechanical properties than fiberglass, but being significantly cheaper than carbon fiber. It is used as a fireproof textile in the aerospace and automotive industries and can also be used as a composite to produce products such as camera tripods. Basalt fibre offers an alternative to carbon and glass in the filament winding of compressed natural gas cylinders. Basalt-based materials are environmentally friendly and non-hazardous.

Key words
Basalt continuous filaments, Magma, Composites, Melting, Crystallization

1. Introduction

Basalt originates from volcanic magma and flood volcanoes, a very hot fluid or semi fluid material under the earth's crust, solidified in the open air. Basalt is a common term used for a variety of volcanic rocks, which are gray, dark in color, formed from the molten lava after solidification [1] .Basalt rock-beds with a thickness of as high as 200 m have been found in the East Asian countries.

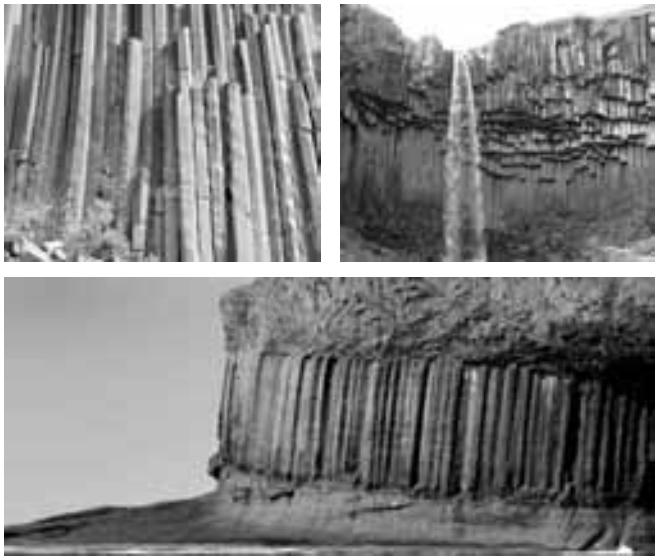

Fig.1.1 Sources Of Basalt Fibre [2]

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1.1. Chemical Composition Of Basalt Rock

Table No.:-2.1 Chemical Composition Of Basalt Rock [3]

Chemical	%
SiO_2	52.8
Al_2O_3	17.5
Fe_2O_3	10.3
MgO	4.63
CaO	8.59
Na_2O	3.34
K_2O	1.46
TiO_2	1.38
P_2O_5	0.28
MnO	0.16
Cr_2O_3	0.06

3. Spinning Of Basalt Fibre

Though basalt stones are available in different compositions, only certain compositions and characteristics can be used for making the continuous filaments with a dia range of 9 to 24 microns. Compounds present in the basalt rock may vary, especially the SiO_2 content depending on their nature and origin. Basalt rocks with SiO_2 content about 46% (acid basalt) are suitable for fibre production. [3]

Basalt continuous filaments (BCF) are made from the basalt rocks in a single step process melting and extrusion process. Technological process of manufacturing basalt filament consists of melt preparation, fibre drawing (extrusion), fibre formation, application of lubricants and finally winding [4]. Basalt

fibers are currently manufactured by heating the basalt and extruding the molten liquid through a die in the shape of the fibers (Figure 3.1). Crushed rock materials are charged into the bath-type melting furnace by a dozing charger, which is heated using air-gas mixture. Crushed rocks are converted into melt under temperature of 1430°C - 1450°C in furnace bath. Molten basalt flows from furnace through feeder channel and the feeder window communicates with recuperator. The feeder has a window with a flange connected with slot-type bushing and is heated by furnace waste gases. The melt flows through the platinum rhodium bushing with 200 holes (500 is possible), which is heated electrically. The fibers are drawn from the melt under hydrostatic pressure and subsequently cooled to get hardened filaments. A sizing liquid with components to impart strand integrity, lubricity and resin compatibility is applied and then filaments are collected together to form a 'strand' and forwarded to the take up device to be wound on to a forming tube. The forming package is often referred to as 'forming cake'. The dried cakes are ready for further processing. [4]

Basalt twisted yarn is produced by twisting the basalt roving. Twist provides additional integrity to the yarn before it is subjected to weaving. Basalt Cut Fibre is produced from continuous basalt filament, chopped to a specific fiber length in a dry cutting process [5].The moisture content of the final material lies in the range of less than 1% and with sizing add on levels ranging from 1.0% - 2.0%. The very high melting temperature of basalt rocks makes the process more complicated than that is normally used in the case of glass. Molten basalt is non-homogeneous in nature, which leads to non-uniform temperature distribution during production stage. This requires a very precise temperature maintenance and control system at multiple stages [5].

The main problem that is frequently encountered during the manufacture of basalt fibers is the gradual crystallization of various structural parts like plagioclase, magnetite, and pyroxene. This arises mainly because of difference in the crystallization temperature (Tc) of the different components, which varies from 720°C - 1010°C (magnetite Tc - 720°C, pyroxene Tc - 830°C and plagioclase Tc - 1010°C). Fresh basalt fibers are practically amorphous when they are rapidly quenched, due to the action high temperature these fibers develop the ability to crystallize partially. A slow cooling of these fibers leads to more or complete crystallization to form an assembly of minerals. [6]

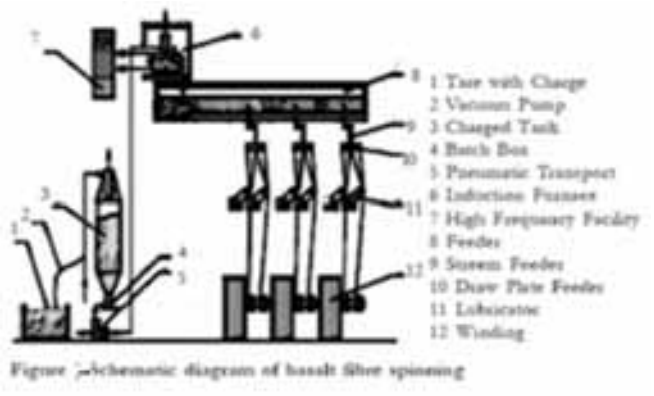

Fig. No.:-3.1 Spinning Of Basalt Fibre

4. Physical Properties Of Basalt Fibre

Table No.:- 4.1 Physical Properties Of Basalt Fibre [7]

Property	Value
Density, g/cc	1.95 - 2.75
Tensile Strength, Mpa	1200 – 4840
Compressive Strength, Mpa	420
Bending Strength, Mpa	800
Elastic Modulus, Gpa	89
Elongation at Break, %	3.15
Moisture at 65% RH, %	< 0.1
Maximum Application Temperature, ^{0}C	982
Sustained Operating Temperature, ^{0}C	820
Minimum Operating Temperature, ^{0}C	-260
Melting Point, ^{0}C	1450
Thermal Conductivity, W/m K	0.031 - 0.038
Glow Loss, %	1.9 - 2.0
Sound Absorption Coefficient	0.9 - 0.99
Loss Angle Tangent Frequency, MHz	0.005
Relative Dielectric Permeability, MHz	2.2
Limiting oxygen index (LOI)	>70

Basalt fibre (BF) can be blended with polypropylene/ polyamide (PP/PA) by homogenization of the components in a twin-screw extruder followed by injection molding [8]. In order to determine their static and dynamic mechanical properties tests have been performed on composites with different PA (0, 10, 20, 30, 40, and 50 wt %) and basalt fibre (0, 10, and 20 wt %) contents [8]. Composite properties such as tensile and flexural strength, stiffness and fracture toughness have been calculated. It has been realized that the composite structure is very sensitive to the ratio of PA content. In case of small PA content (10–20 wt %), PA and basalt fibre have been experienced to form a kind of random network structure inside the PP matrix. This method could be improving the mechanical properties of the composite despite the relatively short fibre length.

These results have been supported by acoustic emission (AE) tests and scanning electron (SEM) micrographs [9]. Fig. No.:- 4.1 (a) and (b) shows that the fibre content influences the values of the critical stress intensity factor considerably both in case of static (Fig. 4.1 a) and dynamic (Fig. 4.1 b) loading.

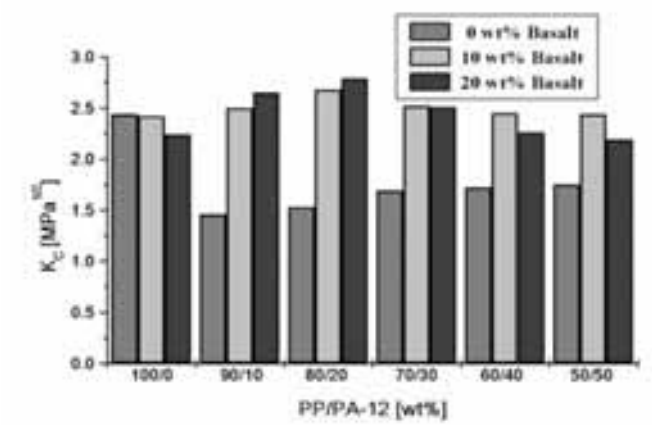

Fig.No.:-4.1 (a) Critical fracture toughness of basalt fibre reinforced PP/PA blends, static

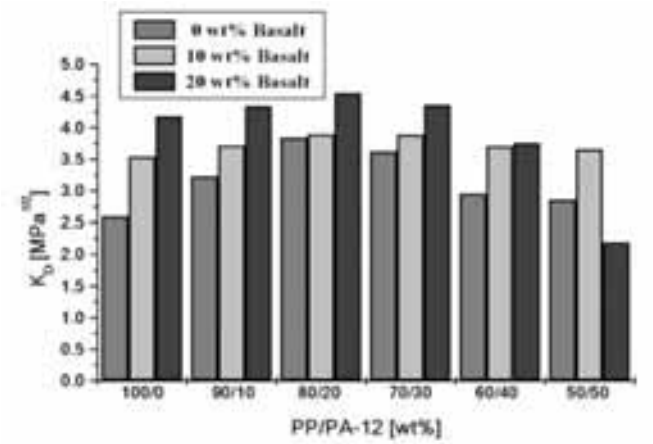

Fig.No.:- 4.1 (b) Critical fracture toughness of basalt fibre reinforced PP/PA blends, dynamic

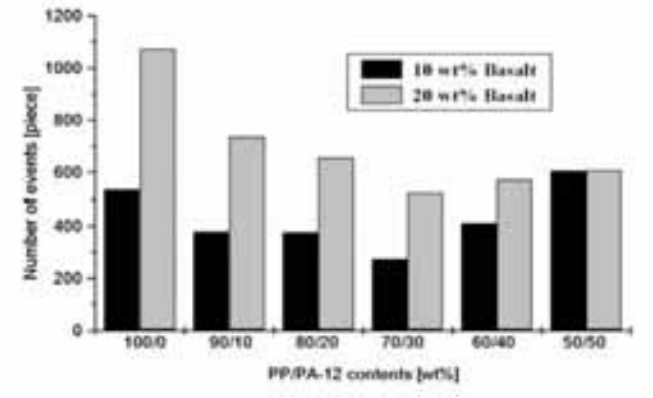

Fig. 4.2 Cumulative number of events in basalt fibre reinforced PP/PA blends.

Fig.4.2 shows the number of detected events as a function of PA and basalt content. The most events can be seen in case of composites with 100% PP content both in case of composites with 10% and 20% basalt content, while the fewest events were detected in case of composites with 30% PA content. The results show well that when fibers separate or pull out from PP there are more events when failure occurs concerning PA/basalt. In case of the 30% PA content a few events are resulted by the PP/PA interfacial separation, which involves great plastic deformation, hence does not induce acoustic signals, as an opposite to fibre/matrix failure where friction induces a large number of events.

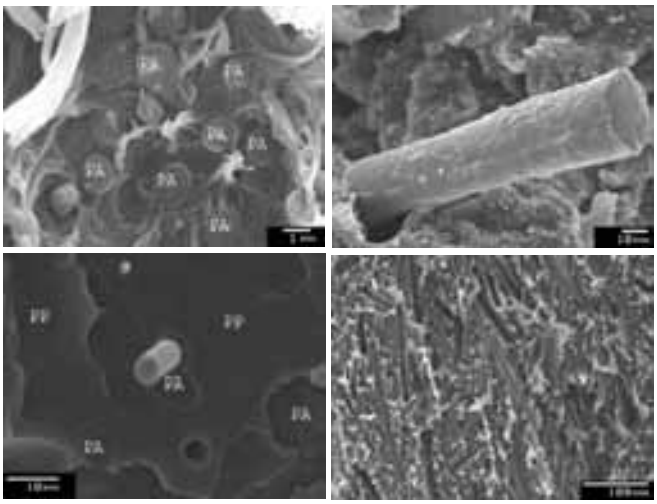

Fig.4.3 SEM pictures taken of the fracture surface of SEN-T specimens cut out from the basalt fibre reinforced PP/PA matrix composites with and without fibers type 40wt% PA(a), 10 wt% PA and 10 wt% fibre (b) 40 wt% PA and 20 wt% fibre (c), and 50 wt% PA and 20 wt% fibre (d) [14].

5. Applications

Basalt Products have wide prospect of application in various industries.

- **Machinery construction[10] :** Composite materials, constructional materials, constructions suitable for environment with strong vibrations & alternating load, grids for reinforcement of cutting wheels, sound-proof materials, heat insulation of thermal equipment, filters for cleaning of waste gases from dust and industrial drains.
- **Motor-car construction[11] :** Used in a wide range of products for automotive industry: heat isolation material for manufacturing of automobile mufflers, panels, screens, plastics, reinforcing material for shoes & disks, constructional plastics, nonflammable composite materials, cords for automobile tire covers, chopped strand for

reinforcing plastic etc. Also used for production of fuel tanks, LPG & compressed NG cylinders. Anticorrosive, with great dispatch and wears proof coverings of the bottoms of cars.

- **Shipbuilding [12] :** Seawater proof composite materials & products, heat & sound isolation for ship installations & equipment, heat-insulated plates for ship hulls & engine compartments, constructional materials. In construction of small ships – for construction of ship hulls & additional structures, as well as corrosion-proof, reinforced paint & varnish coverings of ship hulls & additional structures.
- **Carriage building :** Composite constructional materials & products, heat & sound isolation, reinforcement of constructional plastics, nonflammable composite materials, electro-isolating materials, stable paint & varnish coverings.
- **Aviation industry and rocket production[13] :** Heat and sound isolation linen for motor & hull, constructional composite & high-temperature materials.
- **Power :** Heat insulation of thermal equipment for steam boilers, turbines, heating mains, high-voltage.
- **Atomic engineering [14] :** Nonflammable heat isolation & constructional materials, fire-prevention doors, cable corridors, radioactive protection materials.
- **Electronic industry :** Reinforcing material for production of plates, electro-insulation materials, construction material for cases for electronic equipment.
- **Chemical industry :** Production of chemically proof materials & products: pipes, tanks for aggressive liquids, acids, alkalis, chemical fertilizers, pesticides, poisonous substances. Chemically proof covering for tanks, pipelines, metal constructions, Ferro-concrete constructions, filters for cleaning from dust & industrial drains, high-temperature filters.
- **Petrochemical industry[15] :** Chemically & wear proof coverings of tanks, pipelines, oil pipelines; nonflammable coverings & composite materials; fire-proof composite materials, oil pipes.
- **Metallurgy :** Thermo-insulation materials for thermal equipment, furnaces, recuperators, pipelines, communications, filters made from CBF for filtration of metals melt during molding, filters for clearing of waste gases from dust at ore-mining & processing plants, filters for sewage treatment.
- **Cryogenic technologies & equipment :** Thermo-insulation materials for production of squeezed gases liquid oxygen, nitrogen, etc.
- Fire-proof materials [16]
- **Building materials :** Building constructional and facing plastics; reinforcing plaster grids; warmed panels for construction of prefabricated houses, floors, dropped ceilings, fireproof walls, fire-resistant doors, building plastics. Basalt-plastic reinforcement for bridges, tunnels, railway sleepers, metro, construction materials. Reinforcement for asphalt-concrete coverings of roads, runways of airports. Waterproof rolled and sheet materials, roofing materials, hydraulic engineering construction, including reinforcing materials for construction of dams, irrigation materials.
- **Port constructions, sea platforms [17] :** Reinforcing and constructional materials made from basalt-plastics; paint & varnish proof coverings of bridges & tunnels; main construction projects; waterproof coverings for Ferro-concrete installations; nonflammable and heat-resistant paints & varnish coverings.
- **Ceramics & porcelain :** Thermo-insulation of furnaces & equipment during production of ceramic & porcelain products, bricks & ceramic tiles.
- **Agriculture :** Grids for strengthening soil; tanks for storage and transportation of liquid chemical fertilizers and pesticides; material for hydroponics for cultivation of bacterial cultures, sprouts of plants etc.
- **Municipal services :** Materials for cleaning installations; big pipes for water supply & sewage; Filters for air clearing & liquid environments, municipal drains, cleaning installations, etc. Basalt fiber is the main material used for filtration of emissions & drains, and at the moment it does not have any real alternative.
- **Home appliances :** Sanitary products, thermo insulation of gas and electric ovens, stoves etc.

6. Conclusion

In the coming years basalt fiber has a great role to play in the field of composites. Basalt fibers are used in a wide range of application areas such as the chemical, construction and marine sectors, not to mention the offshore, wind power, transport and aerospace industries. This is due to their superior properties: not

only do they boast good mechanical and chemical resistance, but also excellent thermal, electric and acoustic insulation properties.

Acknowledgement

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Texttreasure

"Victory goes to the player who makes the next-to-last mistake."

- Chessmaster Savielly Grigorievitch Tartakower (1887-1956)

An Artificial Neural Network System for Prediction of Dimensional Properties of Weft Knitted Rib Fabric

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Abstract
The objective of this paper is to propose an artificial neural network model to predict the dimensional properties of weft knitted 1X1 rib structure made from 100% cotton ring spun yarns. The factors investigated were yarn count, structural cell stitch length, course and wale density and areal density in different relaxation conditions. The artificial neural network model was compared with experiment set of inputs to predict the dimensional properties, demonstrating that the neural network model produced highly reliable results.

Keywords
Artificial neural network, Course and wale density, Areal density, Fabric relaxation, Prediction

1. Introduction

A great deal of attention has been paid by many research workers on dimensional properties of weft knitted fabrics since Chamberlain [1] deduced some very simple relationships between linear-dimensions of fabrics, loop length and diameter of yarn. Studies by Munden [2] have shown that the dimensions of plain knitted wool fabrics are dependent only upon the length of yarn knitted into each loop, in a minimum energy level.

Munden's [3] further experimental studies have indicated that course density, wale density and loop length must be related to each other by constants and have the following relations:

$Kc = c \times l$….. (i)

$Kw = w \times l$…. (ii)

$Ks = S \times l^2$ …(iii)

$$Kr = R = \frac{c}{w} = \frac{Kc}{Kw} \quad \text{…..(iv)}$$

Where c is the number of Course per unit length, w the number of wales per unit length, S the Stitch density or number of loops per unit area, l the loop length and Kc, Kw, Ks and Kr are constants and are called as dimensional parameters of knitted fabric.

Knapton et al [4] found that both the dry and wet relaxed state of the plain knit loop shape were unpredictable. The K-values in these states were dependent upon certain fabric and machine variables, particularly take-down tension and processing tension. They suggested some form of fabric agitation to allow the loops to attain minimum energy state within the fabric using a tumble drying technique to allow drying without felting. This state was defined as "fully-relaxed". Nutting and Leaf [5] developed base equations with yarn diameter for double knit structures by a theoretical approach. Knapton et al [6] introduced a new term called "structural knitted cell" (SKC) which is the length of yarn occupied in a repeating unit of structure. Further work of Woolfardt and Knapton [7] introduced a three dimensional loop model based on the same principle introduced by Munden but modified with certain assumptions related to geometrical configuration of the knitted stitch. The effective loop length in this case is the length of yarn in one SKC which is defined as the structural cell stitch length (SCSL or lu).

$Uc = cu \times lu$ ….. (v)

$Uw = wu \times lu$ …. (vi)

$Us = cu \times wu \times lu^2$ …(vii)

$$R = \frac{cu}{wu} = \frac{Uc}{Uw} \quad \text{…..(viii)}$$

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Poole and Brown [8] carried out studies on 1X1 rib structures and used all cotton and cotton blends yarns. The produced "u" and "K" parameters of cotton are shown on Table 1.1.

Table – 1.1: Values of "U" and "K" for 1X1 cotton rib structure

	Parameters						
	Uc	Kc	Uw	Kw	Us	Ks	R
Dry-relaxed (Cotton)	8.20	4.10	5.69	2.85	46.70	11.67	1.44
Wet-relaxed (Cotton)	9.64	4.82	5.90	2.95	56.88	14.22	1.63
Fully-relaxed (Cotton)	10.19	5.09	5.99	2.99	61.04	15.26	1.70

Artificial Neural Network (ANN) is a useful and powerful tool used in textile industry for forecasting of characteristics of textile materials, classification and defect analysis, identification, process optimization and planning. Researchers have already tried to use ANN to predict thermal resistance of textile fabrics[9], spirality of knitted fabrics[10] and many other characteristics of textile materials. The advantage of neural networks is the ability of representing complex relationships and their ability to learn these relationships directly from the data being modeled.

2. Materials And Methods

2.1. Yarn and Fabric Samples

In this work, totally 12 samples were developed to cover possible range of 1X1 rib circular knitted fabric. Three yarn linear densities of cotton were selected (20^s, 30^s and 40^s Ne). The fabrics were developed with four levels of tightness factor for each count. All the samples were knitted in 24-inch diameter circular double jersey knitting machine having 60 yarn feeders. After conditioning, the samples were given wet relaxation treatment to reduce the stresses put on by the machine components.

Further, the samples were subjected to relaxation treatment to bring them to "fully relaxed state" using Starfish procedure [11].

2.2. Test Methods

The stitch length of samples was measured with a scale for an average of 100 loops. The course and wale densities were measured as per ASTM D 3887. The areal density (g/m^2) of the samples were measured as per ASTM D 3776. Also, the dimensional parameters of the samples were measured at three different stages of development as mentioned below

i) Dry Relax (DR): The fabric is placed in a standard atmosphere 25° ± 2° C and RH 65% for 24 hours to relax in dry state.

ii) Wet Relax (WR): The fabric is soaked in water for 12 hours at a temperature of 30°C. Then the material is hydroextracted, dried flat in oven at 60°C and conditioned in a standard atmosphere 25° ± 2° C and RH 65% for 24 hours.

iii) Fully Relax (FR): This is also called "Reference State" of the fabric. The processed fabric is

Table – 2.1 : Training set dimensional parameters

S.no.	Actual count (Ne)	SCSL (cm)	Wales/cm			Courses/cm			Areal Density (g/cm^2)		
			DR	WR	FR	DR	WR	FR	DR	WR	FR
1	18.7	0.61	9.4	10.1	10.2	13.7	15.6	16.8	264	290	321
2	18.7	0.65	9.1	9.5	9.6	12.6	14.2	15.8	249	271	298
3	18.7	0.68	8.9	9.3	9.5	12.1	13.6	15.1	237	260	286
4	18.7	0.70	8.8	9.1	9.1	11.7	12.9	14.6	230	250	276
5	28.9	0.52	10.7	11.4	12	16	18.1	19.4	192	214	228
6	28.9	0.54	10.2	10.8	11.5	14.8	16.5	17.7	181	204	218
7	28.9	0.57	10.1	10.6	11.2	14.1	15.9	17.5	175	197	214
8	28.9	0.62	9.9	10.1	10.5	13	14.6	16.6	169	191	205
9	38.6	0.52	10.6	12.1	12.5	15.9	17.6	18.4	142	161	180
10	38.6	0.54	10.4	11.7	11.9	14.8	17.1	18.2	140	153	174
11	38.6	0.56	10.3	11.2	11.5	13.8	16.5	18	136	146	168
12	38.6	0.59	10.1	10.7	11.1	12.9	15.2	17.2	126	132	156

Table – 2.2 : Test set dimensional parameters

S.no.	Yarn count (Ne)	SCSL (cm)	Wales/cm			Courses/cm			Areal Density (g/cm^2)		
			DR	WR	FR	DR	WR	FR	DR	WR	FR
1	20s	0.68	8.5	9.1	9.3	11.8	13.4	14.7	221	243	266
2	22s	0.64	9.0	9.7	9.9	12.6	14.3	15.6	213	236	257
3	25s	0.63	9.2	9.8	10.1	12.8	14.5	15.9	192	208	229
4	30s	0.56	10.2	10.7	11.3	14.2	16.3	17.6	170	192	207
5	34s	0.52	10.5	11.7	12.1	15.5	17.6	18.7	161	180	197
6	40s	0.53	10.9	11.7	12.0	15.2	17.2	18.9	136	142	168

subjected to washing at 60° C and tumble drying until dry at 70° C. This treatment cycle is repeated for three times. Then it is conditioned in a standard atmosphere for 24 hours.

2.3 *Artificial Neural Network (Ann)*

Artificial neural networks are computational networks which attempt to simulate, in a gross manner, the networks of nerve cell (neurons) of the biological (human or animal) central nervous system. This simulation is a gross cell-by-cell (neuron-by-neuron, element-by-element) simulation. It borrows from the neuro-physiological knowledge of biological neurons and of networks of such biological neurons. It thus differs from conventional (digital or analog) computing machines that serve to replace, enhance or speed-up human brain computation without regard to organization of the computing elements and of their networking. It borrows from the neuro-physiological knowledge of biological neurons and of networks of such biological neurons. It thus differs from conventional (digital or analog) computing machines that serve to replace, enhance or speed-up human brain computation without regard to organization of the computing elements and of their networking [12]. The model of simple neuron is given in Fig. 2.1.

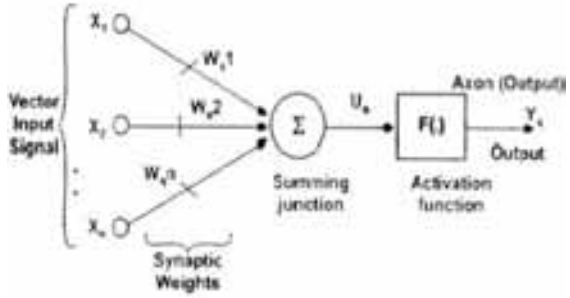


Fig. 2.1. Simple Neuron model

2.4. Back Propagation

The back-propagation algorithm is the most commonly used training method for the ANN models. The generalised delta rule basically performs a gradient-descent on the error surface. The training occurs in two phases, namely a forward pass and a backward pass. In the forward pass, a set of data is presented to the network as input and its effect is propagated, in stages, through different layers of the network. Finally, a set of outputs is produced. The mean square error (mse) is calculated from the difference between actual output and the network output.

$$mse = \frac{1}{Q}\sum_{k=1}^{Q}\{t(k) - a(k)\}^2 \quad \text{..... (ix)}$$

In the backward pass, this error signal is propagated backwards to the neural network, and synaptic weights are adjusted so that the error signal decreases with each iteration process and the neural network model comes closer and closer to produce the desired output. The necessary corrections in the synaptic weights are carried out by the delta rule.

2.5. Case Study

In the present study, the linear density of yarn (Ne) and loop length are input parameters. The network consisted of three layers with two hidden layers. The input layer had two input nodes (equal to input parameters), while the output layer neuron was nine in this network. The number of neurons in the hidden layers was 7 and 4. This number was established by training the neural network system with various numbers of hidden layers and obtaining the best possible correlation coefficient. The learning consisted of 121 cycles for the achieved network. The architecture of the network is shown in Fig. 2.2 and the learning graph is shown in Fig. 2.3.

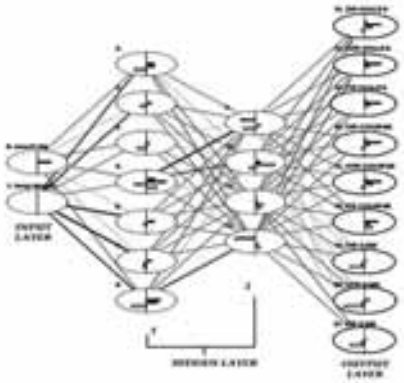


Fig. 2.2. Architecture of the three-layered neural network

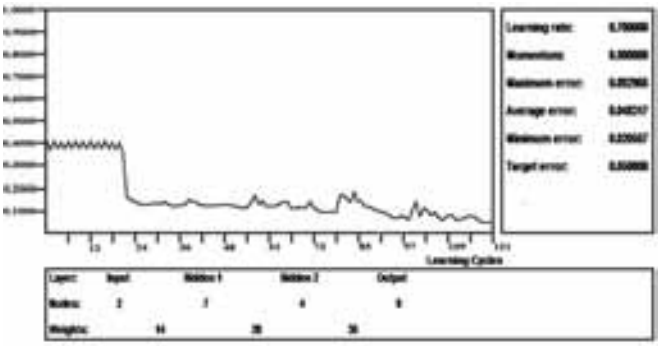
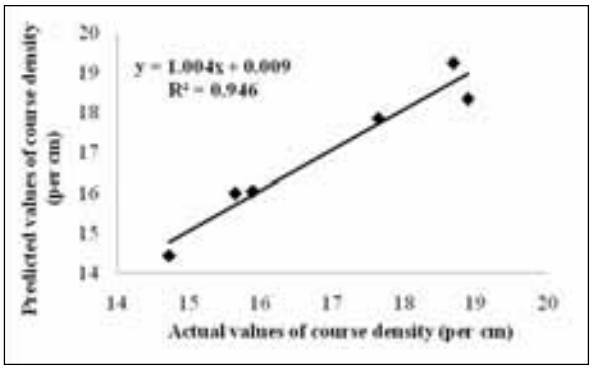


Fig. 2.3. Learning graph

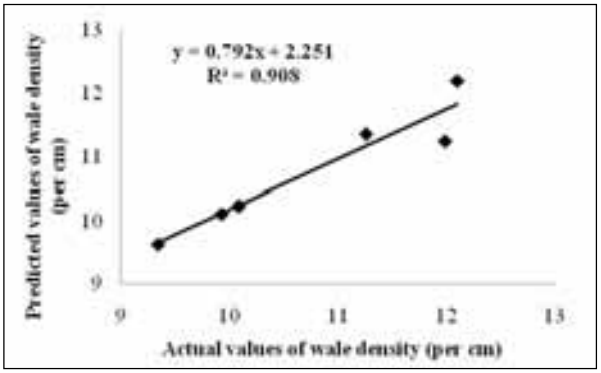
3. Results and Discussion

The performance of a trained neural network can be measured by the errors of training, validation and test sets. The developed network system with 11 hidden neurons in two hidden layers gave the best prediction results with an average error of 0.048317. In the test set,

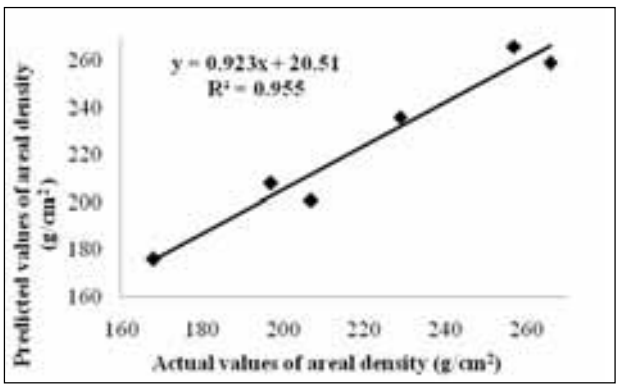
six samples were considered covering the possible range of yarn counts and tightness factor and the results of wale density, course density and areal density were achieved for three relaxation stages. The correlation coefficients for predicted and actual values are very high. The coefficients of determination showed that, the predicted values are very well tracking with the actual values. The Graph 3.1, Graph 3.2, Graph 3.3 are showing the relationship of actual and predicted values of course density, wale density and areal density respectively. The R^2 values for these predictions are 0.946, 0.908 and 0.955 indicating higher reliability.



Graph 3.1. Correlation between actual and predicted values of course density



Graph 3.2. Correlation between actual and predicted values of wale density



Graph 3.3. Correlation between actual and predicted values of areal density (g/m²)

4. Conclusions

Using artificial neural network system we studied the dimensional parameters of 1X1 rib knitted fabric with three yarn linear densities and twelve stitch lengths. The output of course density, wale density and areal density at three stages of fabric development, i.e., dry relax, wet relax and fully relax clearly showed high correlation coefficient values ($R^2 > 0.9$). The study shows that artificial neural network can be used to predict the dimensional properties of weft knitted fabrics satisfactorily.

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Dyeing Performance of Novel Bisazo-Bisazomethine Dyes on Polyester and Nylon Fabrics-II

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Abstract
Novel bisazo-bisazomethine disperse dyes were prepared by the coupling of diazotized solutions of various aromatic amines with 4,4'-{1,4-phenylenebis[nitrilomethylylidene]}diphenol (Schiff base). Above Schiff base was prepared by the condensation of 4-hydroxybenzaldehyde with 1,4-diaminobenzene. The resultant dyes were characterized by elemental analysis, IR and ^{1}H NMR spectral studies. The UV-visible absorption spectral data were investigated in dimethylformamide (DMF) and are discussed in terms of structure property relationship. The dyes when applied on polyester and nylon fabric gave light yellow to reddish brown shades having fairly good to good light fastness, very good to excellent washing, perspiration and sublimation fastness and good to very good rubbing fastness properties.

Keywords
Bisazo-bisazomethine, disperse dyes, nylon, polyester, Schiff base.

1. Introduction

Azo disperse dyes are marketed as commercial dyes since long back. It have phenolic moiety bearing hydroxy group(s) as an auxochrome [1-5]. Much attention has also been given towards bisazo disperse dyes as dyeing materials [6-11]. In addition, there are several reports regarding bisazomethine (bisanil) dyes in which imine group formed by Schiff reaction of aromatic aldehyde with aromatic amine[12-14]. However, there are no any reports regarding bisazo-bisazomethine disperse dyes in which both bisazo and bisazomethine chromophoric groups lying in a single molecular framework. Hence, the present communication comprises synthesis of a series of bisazo-bisazomethine disperse dyes based on 4,4'-{1,4-phenylenebis[nitrilomethylylidene]}diphenol (Schiff base). In addition to characterization of the dyes, they have been tested successfully as disperse dyes for polyester and nylon fabrics.

2. Experimental Materials and Methods

All the chemicals used were of analytical grade and were further purified as and when required. 1,4-diaminobenzene, 4-hydroxybenzaldehyde, different aromatic primary amines, sodium hydroxide, sodium nitrite, hydrochloric acid were purchased from local market. The organic solvents used were purified by standard methods[15]. The aromatic amines used for diazotization are listed in Scheme 1. Melting points were determined by open capillary method and were found uncorrected. The visible absorption spectra of all dyes obtained for solution (1×10^{-4} gm/ml) prepared in DMF and were recorded on a Carl Zeiss UV/VIS Specord spectrometer, and elemental analysis was carried out on Perkin Elmer CHNS/O Analyzer 2400 Series II. Infrared spectra were recorded on a Perkin-Elmer Spectrum GX FT-IR model between 4000 and 400 cm^{-1} using a KBr pellets and ^{1}H NMR spectra were recorded on Bruker DRX-400 FT-NMR spectrometer at 400 MHz using in DMSO-d_6 solvent (Chemical shift in ä ppm). The purity of all the dyes was checked by TLC[16] using chloroform:methanol (4:1) solvent system. The C, H, N contents of Schiff base and bisazo-bisazomethine disperse dye were carried out on perkin Elmer CHNS analyzer 2400 series-II. The number of azo group in each disperse dye was determined by the reported process[17], indicating that there are two azo group (-N=N-) present in the disperse dye molecule. Fastness to light of dyed patterns were assessed in accordance with method developed by Park and D. J. Smith[18-20], sublimation and perspiration fastness test were carried out in accordance with

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BS:1006-1978, washing fastness test in accordance with IS:765-1979[21] and fastness to rubbing was tested using Crockmeter (Atlas) in accordance with ATCC-1961[22]. The dyeing of polyester fabric was carried out according to method described in the literature[23]. The percentage dye bath exhaustion (%E) and percentage dye bath fixation (%F) of the dyed fabric was determined according to the known method[24].

2.1. Synthesis of 4,4' - {1,4-phenylenebis [nitrilomethylylidene]} diphenol (Schiff base)

The title bisanil compound was synthesized by the reported method [25]. Accordingly, solution of 1,4-diaminobenzene (2.16 gm, 0.02 mol) in absolute alcohol (50 ml) was prepared. To the above solution an ethanolic solution (100 ml) of 4-hydroxybenzaldehyde (4.88 gm, 0.04 mol) was added slowly under stirring to produce a yellow crystalline solid product upon cooling at room temperature. The product thus obtained was filtered, washed with ethanol and dried in a vacuum desiccator. Yield: 85.00% m.p. 210-212 ^{0}C (uncorrected). The proposed synthetic route is shown in Scheme 1. Elemental analysis : Found: C-75.69%; H-4.80%; N-8.68% ; $C_{20}H_{16}N_2O_2$ (Expected C- 75.94%; H-5.06%; N-8.89%). IR (KBr, cm^{-1}): 3018 (aromatic); 832 (aromatic substitution.); 1602, 1505 (C-C multiple bonding aromatic); 3620, 1187, 1305 (phenol free O-H, O-H bending, C-O stretching); 1645 (>C=N- stretching).

2.2. Synthesis of the bisazo-bisazomethine disperse dyes

Diazotization: Diazotization of various aromatic amines (listed in Scheme 1) was carried out by the reported method[26]. The clear diazonium salt solution thus obtained was used immediately in the coupling reaction (Scheme 1).

General coupling procedure: The coupling of above mentioned diazotized aromatic amines were carried out by the reported method [26]. Accordingly, the general procedure adopted for coupling reaction is given below:

4,4'-{1,4-phenylenebis[nitrilomethylylidene]}diphenol (SB) (3.16 gm, 0.01 mol) was dissolved in 25 ml sodium hydroxide (1.0 M) solution. The obtained clear solution was cooled in an ice-bath and the diazonium solution of 4-methyl aniline was added drop wise over a period of 30 min with vigorous stirring. The pH of the mixture was maintained between 8.0 and 9.0 by simultaneous addition of the 10% (w/v) sodium carbonate solution. Stirring was continued for further ~2h by maintaining the temperature at 0-5 ^{0}C. Then the pH of reaction mixture was maintained at 7.0 by addition of dilute acetic acid (2 M) solution. Thus the dye D_1 was precipitated out was then filtered off, washed with distilled water until it was free from acid and salt and, then it was dried at 50 ^{0}C in an oven. The obtained dyes were recrystallized by ethanol. Following the above procedure, other bisazo-bisazomethine disperse dyes D_2-D_{10} were synthesized using diazotized various aromatic amines and bisanil compound as a coupler. The synthetic route is shown in Figure 2.1.

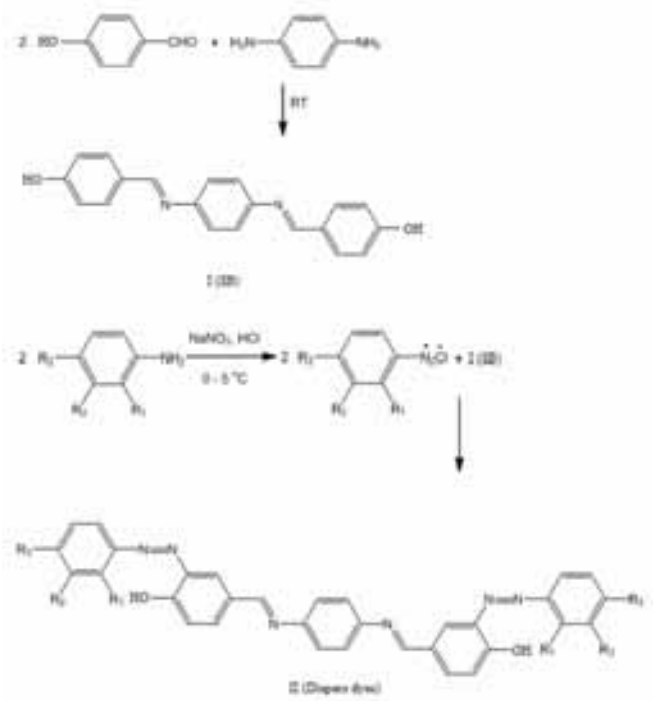


Figure 2.1 Synthetic route for the preparation of bisazo-bisazomethine disperse dyes (D_1-D_{10})

Where substituent R_1, R_2 and R_3 of aromatic amines are given below :

Dye No.	R_1	R_2	R_3	Amines
D_1	H	H	CH_3	4-methylaniline
D_2	H	H	H	Aminobenzene
D_3	H	H	NO_2	4-nitroaniline
D_4	H	NO_2	H	3-nitroaniline
D_5	H	Cl	H	3-chloroaniline
D_6	NO_2	H	H	2-nitroaniline
D_7	H	H	Cl	4-chloroaniline
D_8	H	H	OH	4-hydroxyaniline
D_9	H	OH	H	3-hydroxyaniline
D_{10}	H	H	Br	4-bromoaniline

The purity of all the dyes were checked by TLC using chloroform : methanol (4:1) solvent system. The melting

points of the purified dyes were measured and are uncorrected. The visible absorption spectroscopic properties of the dyes were recorded in DMF solution.

3. Results and discussion

3.1. Preparation of dye D_{1-10}

The key intermediate, bisanil compound I was satisfactorily prepared. Various substituted aromatic amines were diazotized effectively at 0-5 ^{0}C by sodium nitrite and hydrochloric acid. In order to determine the end point of diazotization, it was found useful to check for the presence of unreacted diazo component no longer persisted on TLC, the diazotization was ended. The diazonium salt solution was used immediately, since this decomposed on standing, even when cold. Subsequent coupling reactions took place readily on adding the resulting diazonium salt continuously to the solution of coupling component in sodium carbonate. Coupling was usually accompanied by some evidence of decomposition; however 60-96 % yield (except D_2) of the dye were usually obtained by careful addition of the diazonium salt solution at 0-5 ^{0}C to a solution of coupling component.

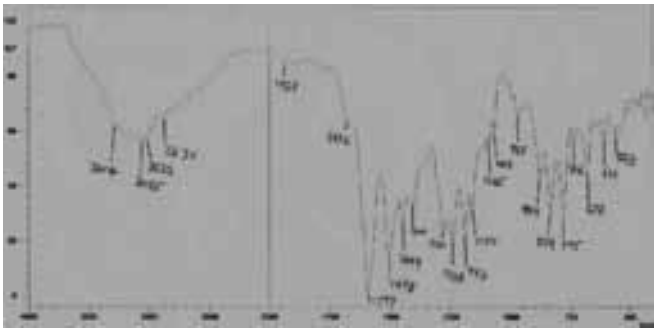
3.2. Physical properties of dyes

All the dyes were obtained as amorphous powder ranging in colour from yellow to reddish brown. The purity of the dyes was checked by TLC using chloroform : methanol (4:1) solvent system. When adsorbed onto silica chromatography plates, the dyes produced a single spot. All the dyes are soluble in acetone, DMF, ethanol, acetic acid and insoluble in water, ether, n-hexane etc. Elemental analysis data are given in Table 3.1.

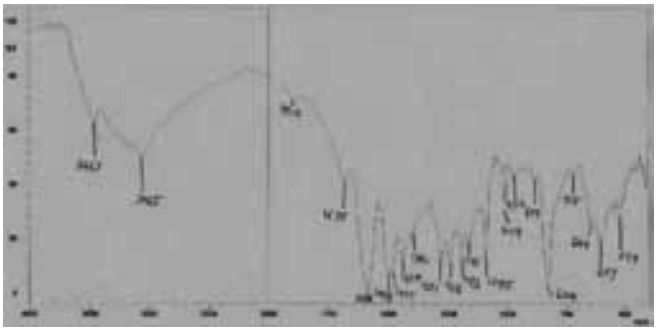
3.3. IR and ^{1}H NMR spectra

The infrared spectra of dyes D_5 and D_7 are shown in Figure 3.1. The data of IR spectrum features of all disperse dyes are shown in Table 3.2. Examination of the IR spectra of all the bisazo-bisazomethine disperse dyes reveals that all the spectrum shown some identical bands due to the presence of aromatic nuclei, azomethine and azo group in most of the disperse dye molecules.

Figure 3.1 : IR spectra of bisazo-bisazomethine disperse dyes D_5 and D_7



IR spectrum of D_5



IR spectrum of D_7

Table 1 : Elemental analysis data of disperse dyes (D_1-D_{10}).

Dye No.	Molecular formula	Molecular weight gm/mol	Melting point (^{0}C)	Yield (%)	Rf value	% C		%H		%N		%X (Cl, Br)	
						M	F	M	F	M	F	M	F
D1	C34H28O2N6	552	135-137	78	0.85	73.91	73.71	5.07	4.97	15.21	15.10	-	-
D2	C32H24O2N6	524	230-234	40	0.80	73.28	73.05	4.58	4.34	16.03	15.88	-	-
D3	C32H22O6N8	614	138-140	60	0.88	62.54	62.45	3.58	3.24	18.24	18.09	-	-
D4	C32H22O6N8	614	140-143	80	0.87	62.54	62.35	3.58	3.32	18.29	18.05	-	-
D5	C32H22O2N6Cl2	593	155-157	84	0.90	64.75	64.55	3.70	3.42	14.16	14.01	11.97	11.69
D6	C32H22O6N8	614	130-133	89	0.83	62.54	65.44	3.58	3.26	18.24	18.03	-	-
D7	C32H22O2N6Cl2	593	170-173	85	0.89	64.75	64.60	3.70	3.31	14.16	14.00	11.97	11.77
D8	C32H24O4N6	556	138-140	76	0.82	69.06	69.00	4.31	4.06	15.10	14.85	-	-
D9	C32H24O4N6	556	130-135	96	0.87	69.06	68.95	4.31	4.09	15.10	14.82	-	-
D10	C32H22O2N6Br2	682	150-155	88	0.83	56.30	56.15	3.22	3.06	12.31	12.04	23.46	23.20

M= maximum, F= found.

Most of the spectrum comprise: A broad band at 3400-3600 cm^{-1} mainly arise due to free or hydrogen bonded –OH (phenolic) group. The bands appeared at ~1600 and ~1500 cm^{-1} is due to aromatic stretching of the double bond. The variable bands at 1690-1640 cm^{-1} and 1630-1575 cm^{-1} are considered due to presence of azomethine and azo groups respectively. In addition to this the IR spectrum of the disperse dyes have shown the characteristic absorption bands due to presence of $-NO_2$, -CI, -Br groups at 1570-1500 cm^{-1} and 1370-1300 cm^{-1}, 800-600 cm^{-1}, 600-500 cm^{-1} respectively. The substituents present at the para to the azo group in a diazo component of disperse dyes have shown characteristics absorption band at 830 cm^{-1}. The ^1H NMR features of all the disperse dyes are shown in Table 3.2.

3.4. UV–visible spectra

The absorption maxima ($ë_{max}$) of disperse dyes (D_1-D_{10}) fall in the range of 356-415 nm as shown in Table 3.3 and UV-visible spectra of all dyes are shown in Figures 3.2 and 3.3. As far as absorption maxima are concerned $ë_{max}$ are directly proportional to the electronic power of the substituents in the coupled ring system since the coupled component is identical in all the disperse dyes, the presence of electron donating or electron attracting groups did not bring about any bathochromic or hypsochromic shift. However considerable bathochromic shift observed in the disperse dyes D_1, D_5, D_7 and D_{10} because of *o*- and *p*- directing groups present on the aromatic ring, also deepen the colour The value of the logarithm of the molar extinction coefficient (log å) of all the dyes were in the range of 4.01-4.41, which consistent with their high absorption intensity. One cause of the increased intensity might be attributed to the greater planarity of the dyes because of the lower steric interaction of a phenyl ring compared to naphthyl ring.

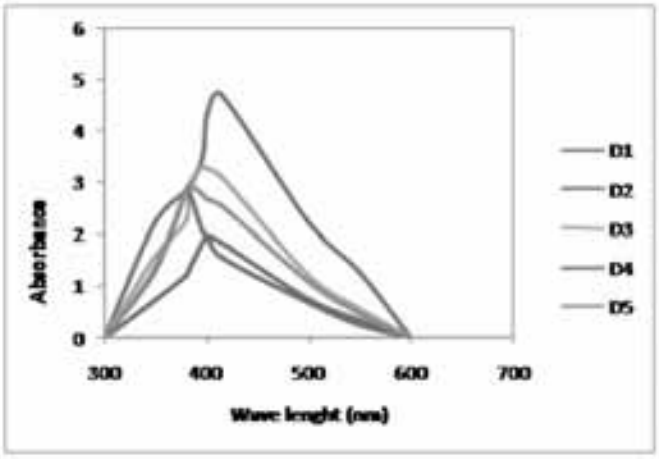


Fig. 3.2 : UV VIS spectra of bisazo-bisazomethine disperse dyes.

Table 3.2 : IR and ^1H NMR data of disperse dyes (D_1-D_{10}).

Dye no.	IR (KBr): í(cm^{-1})	^1H NMR (DMSO-d_6) (chemical shift in δ ppm)
D_1	3031 (C-H), 2950 (-CH_3), 1662 (>C=N-), 1590 (-N=N-), 1610, 1445 (C-C), 3550,1325 (O-H & C-N)	2.30 (6H, s, Ar-CH_3), 6.6-8.3 (18H, m, Ar-H), 8.48 (2H, s, N-CH), 12.97 (2H, s, Ar-OH)
D_2	3040 (C-H), 1660 (>C=N-), 1605 (-N=N-), 1506, 1441 (C-C), 3500,1331 (O-H & C-N)	6.74-8.09 (20H, m, Ar-H), 8.44 (2H, s, N-CH), 12.98 (2H, s, Ar-OH)
D_3	3030 (C-H), 1663 (>C=N-), 1597 (-N=N-), 1602, 1450 (C-C), 3575,1330 (O-H & C-N), 1506,1360 (C-NO_2)	7.0-8.28 (18H, m, Ar-H), 8.48 (2H, s, N-CH), 12.97 (2H, s, Ar-OH)
D_4	3022 (C-H), 1672 (>C=N-), 1597 (-N=N-), 1605, 1505 (C-C), 3304,1270 (O-H & C-N), 1540,1337 (C-NO_2)	6.98-8.44 (18H, m, Ar-H), 8.50 (2H, s, N-CH), 12.99 (2H, s, Ar-OH)
D_5	3065 (C-H), 1672 (>C=N-), 1597 (-N=N-), 1498 (C-C), 3304,1270 (O-H & C-N), 672 (C-Cl)	6.99-8.10 (18H, m, Ar-H), 8.45 (2H, s, N-CH), 12.97 (2H, s, Ar-OH)
D_6	3035 (C-H), 1660 (>C=N-), 1600 (-N=N-), 1610, 1500 (C-C), 3601,1320 (O-H & C-N), 1560,1357 (C-NO_2)	6.96-8.05 (18H, m, Ar-H), 8.47 (2H, s, N-CH), 12.96 (2H, s, Ar-OH)
D_7	3065 (C-H), 1675 (>C=N-), 1586 (-N=N-), 1586, 1498 (C-C), 3467,1271 (O-H & C-N), 607 (C-Cl)	7.17-8.06 (18H, m, Ar-H), 8.48 (2H, s, N-CH), 12.98 (2H, s, Ar-OH)
D_8	3130 (C-H), 1662 (>C=N-), 1597 (-N=N-), 1591, 1495 (C-C), 3540,1290 (O-H & C-N)	6.81-7.99 (18H, m, Ar-H), 8.47 (2H, s, N-CH), 12.97 (2H, s, Ar-OH), 10.84 (2H, s, Ar-OH terminal)
D_9	3130 (C-H), 1652 (>C=N-), 1597 (-N=N-), 1610, 1510 (C-C), 3500,1304 (O-H & C-N)	6.83-7.74 (18H, m, Ar-H), 8.45 (2H, s, N-CH), 9.91 (2H, s, Ar-OH terminal), 12.98 (2H, s, Ar-OH)
D_{10}	3040 (C-H), 1660 (>C=N-), 1595 (-N=N-), 1601, 1485 (C-C), 3595,1325 (O-H & C-N), 552 (C-Br)	7.18-7.94 (18H, m, Ar-H), 8.43 (2H, s, N-CH), 12.96 (2H, s, Ar-OH)

Abbreviations in ^1H NMR data : s, singlet; d, doublet; t, triplet; m, multiplate.

Table 3.3 : Absorption maxima (λ_{max}), intensity, exhaustion and fixation of disperse dyes.

Dye no.	Absorption maxima (λ_{max})/ nm in DMF	log ε	Disperse dyeing on polyester		Disperse dyeing on nylon	
			%E	%F	%E	%F
D_1	415	4.415	73	76	74	79
D_2	401	4.012	74	76	73	88
D_3	397	4.307	70	75	76	82
D_4	380	4.241	70	73	68	95
D_5	383	4.243	67	74	65	78
D_6	379	4.225	74	67	66	80
D_7	384	4.240	71	67	68	81
D_8	391	4.252	65	63	74	82
D_9	389	4.204	68	77	65	82
D_{10}	356	4.263	65	73	72	86

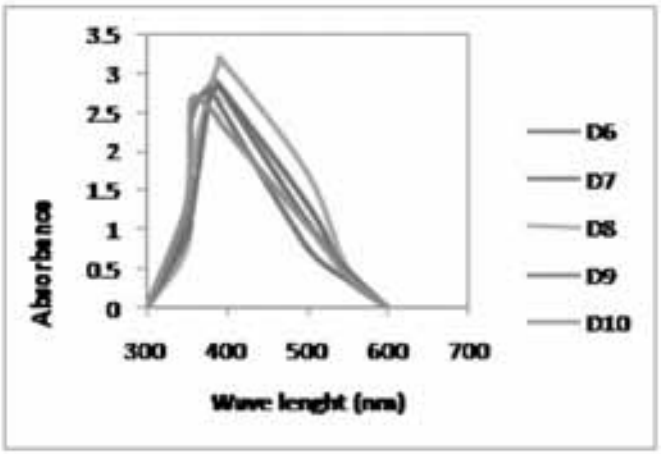


Fig. 3.3 : UV VIS spectra of bisazo-bisazomethine disperse dyes.

3.5. Dyeing properties

All the dispersed dyes were applied at 2% depth on polyester and nylon fabrics. The percentage of exhaustion and fixation of the dyes D_1-D_{10} for polyester fabric ranges from 65% to 74% and 63% to 77% for polyester fabric respectively and 65% to 76% and 78% to 95% for nylon fabric respectively as given in Table 3.3. These dyes gave a narrow range of colour ranging from yellow to reddish brown with good levelness, brightness and depth on the fabric. The variation in the shade of the dye fabric results from both the nature and position of the substituent present on the diazotised amine. The dyed fabric have fairly good to good light fastness; very good to excellent washing, perspiration

Table 4 : Dyeing properties of disperse dyes.

Dye no.	Colour shades on polyester/ nylon fabric	Dyeing on polyester fabrics							Dyeing on nylon fabrics						
				PF			RF				PF			RF	
		LF	WF	A	Al	SF	Dry	Wet	LF	WF	A	Al	SF	Dry	Wet
D_1	Brown/Yellow	5	5	4	5	4	4	4	5	5	5	5	4	4	5
D_2	Light brown/ Reddish brown	5	5	4	4	4	4	4	5	4	4	5	4	4	5
D_3	Greenish yellow/ Greenish brown	5	4	5	5	5	4	5	5	5	5	5	5	5	5
D_4	Yellow/Light yellow	4	5	4	5	4	3	4	5	5	4	5	4	4	5
D_5	Dark yellow/ Brown	4	4	5	5	5	4	4	5	4	5	5	4	4	5
D_6	Yellow/ Light yellow	5	5	5	5	4	3	5	5	5	5	5	5	4.5	5
D_7	Orange yellow/ Yellowish brown	5	4	5	5	5	4	4	5	4	5	5	4	4	5
D_8	Yellowish orange/ Brown	4	3	4	4	5	4	4	5	5	4	4	5	4.5	4
D_9	Orange/ Reddish brown	5	5	5	5	4	3	5	5	5	5	5	5	5	5
D_{10}	Yellow/ Brown	4	5	4	5	4	3	5	5	5	4	5	5	4	5

(LF = Light fastness, WF = Washing fastness, RF = Rubbing fastness, PF = Perspiration fastness, SF = Sublimation fastness, A = Acid and Al = Alkaline.)

and sublimation fastness and good to very good rubbing fastness properties. All the fastness properties shown in Table 3.4 are interrelated since they depend among other things, on the rate of diffusion of dye in the fabric. This rate is a function of the geometry of the dye molecule. The concentration of dye in the fabric appeared to be the most influential factor in the fastness of the dyeing a remarkable degree of levelness after washing was observed. This may be attributed to the good penetration and affinity of the dye for the fabric structure.

4. Conclusion

The symmetrical bisazo-bisazomethine disperse dyes have been synthesized and characterized. These dyes give mostly yellow, orange and brown shades on polyester fabrics, and yellow and reddish brown shades on nylon fabrics having overall good fastness properties. The nature of the substituent in the coupling component has little influence on the visible absorption and the shade of the dyed fabric. The exhaustion and fixation of these dyes are very good; this indicates that the dyes have good affinity and solubility with the nylon fabrics. The remarkable degree of levelness after washing indicates the good penetration and affinity of these dyes to the fabrics. The instrinsic conjugation in the dye structure results in the good colour strength.

Acknowledgements

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Textsmile

To the optimist, the glass is half full.
To the pessimist, the glass is half empty.
To the engineer, the glass is twice as big as it needs to be.

Consumer Awareness Towards Ready Made Garments

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Abstract
Clothing offers a vast array of goods which are different in kind and quality. As wide ranges of garments are available in the market and hundreds of new products are added everyday, a consumer is totally confused in making the right selection for the end use. Even literate consumers are facing similar problem. They also face problems in care of apparel and ability to understand the care labels and symbols. Selected consumers were educated to bring awareness of selection, factors to be considered in selection, care labels and care symbols. Better results were obtained through the programme. Consumer awareness was created and it was felt very useful by them.

Key words
Consumer, Readymade garments, Labels, Selection, Symbols

1. Introduction

Consumers are individuals who purchase for the purpose of individual or household consumption. Consumer buys a product looking for certain specific qualities from that product. He must get what he desires, for which he pays. A supplier has to provide the product to the satisfaction of the consumer. The consumer may not be aware of the quality he is supposed to get. Consumers are the largest group & vital segments in a country but being not well organized have to suffer due to lack of awareness and also of delay in the disposal of their complaints by the consumer courts. It is therefore necessary that awareness be generated among the consumers [1, 2]

Justin Herald quotes ***"what you see is not what you get"*** True to these words, advertisements do not give all the information that a consumer needs to know or wants to about a product. Some of the common methods of exploitation are false and incomplete information, misleading information on quality, durability, and safety. Hence consumer awareness is essential.

Women as consumers are powerful catalyst as individuals and in groups in creating a healthier attitude for themselves, their families, their communities and nation. Women are 'double consumers'-they make decisions not just for themselves but for their families as well. A women's experience as a consumer is the basis for her further involvement in consumerism. Women play a key role as consumers. They need to be concerned with the quality of goods, rising prices, purchase, short measures and services [3, 4].

Clothing along with food and shelter has been recognized as one of the basic necessities of every individual and it fulfils many of his physical, social, psychological, emotional, aesthetic and economical needs. Changing life styles, technological development in textiles and international trade have brought about changes in the clothing preferences of the present day consumers. Consumers with the same needs may want different clothes depending upon their cultural background, age, socio-economic status and personality [5]. The consumer tends to prefer clothing that is aesthetically attractive, socially acceptable, physically comfortable, psychologically gratifying, economically obtainable and at the same time easily maintained. Factors that could influence consumers clothing preferences are breathability, flexibility, lightweight, greater comfort and easy maintenance. Climatic conditions, geographical differences, activities, interests and opinions influence clothing practices and preferences. The main source of clothing is by outright purchase of readymade apparels.

2. Need for the study

Textiles and clothing offers a vast array of goods which are different in kind and quality. This is an area for which a consumer is constantly exposed to make a selection. As wide ranges of fabrics are available in the

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market and hundreds of new products are added everyday, a consumer is totally confused in making the right selection for the end use. Even literate consumers are facing similar problem. They also face problems in identification of fibers, care of apparel and home textiles. Hence education in this field is imperative. Moreover, it is a topic of prime importance especially in developing countries like India.

3. Methodology

To know about consumer awareness on readymade garments survey was conducted using an in-depth structured interview schedule. Eluru city belonging to West Godavari district of Andhra Pradesh was selected for this study. Thousand women consumers were interviewed to draw data from all parts of the selected areas using the prepared interview schedule. Survey was conducted by using closed end questions. . First part of the schedule was framed to gain information about socio-economic profile of the consumers and second part contained purchasing habits of the consumers. Face- to face in- home survey method was used to elicit information from the selected home makers for this study [6].

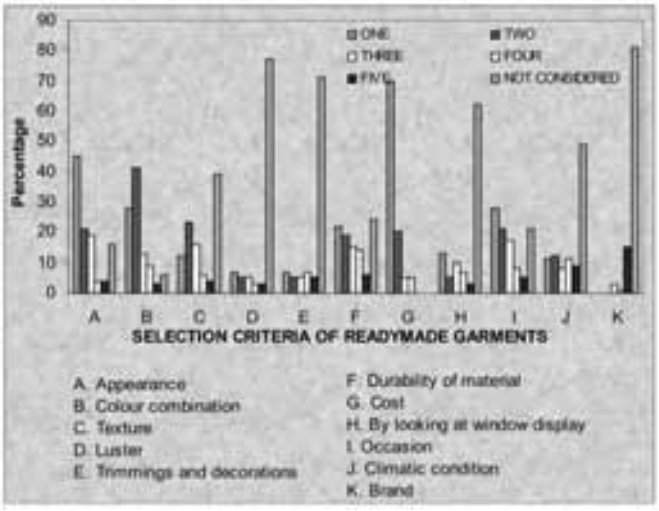
4. Results

4.1. Socio-economic profile of the selected respondents

From the survey it was clearly evident that 52 per cent of the 1000 selected subjects were housewives and living in as nuclear family by 74 per cent. Size of the family was 2-4 members by seventy per cent. Ninety four per cent were above 18 years of age and 35 per cent of them are first child in their families. Thirty nine per cent of them were postgraduates or professional degree holders but 59 per cent were unemployed. Fifty per cent of the respondent's economic status was high income group and are involved in moderate work by 56 per cent.

4.2. *Selection Criteria of Readymade Garments*

S. No.	Criteria considered for Selecting ready-mades	(N=1000) order of priority (in per cent)					
		One	Two	Three	Four	Five	Not Considered
1	Appearance	45	21	19	4	4	16
2	Colour combination	28	41	13	9	3	6
3	Texture	12	23	16	6	4	39
4	Luster	7	5	5	3	3	77
5	Trimmings and decorations	7	5	5	7	5	71
6	Durability of material	22	19	15	14	6	24
7	Cost	70	20	5	5	0	0
8	By looking at window display	13	5	10	7	3	62
9	Occasion	28	21	17	8	5	21
10	Climatic condition	11	12	8	11	9	49
11	Brand	0	0	3	1	15	81

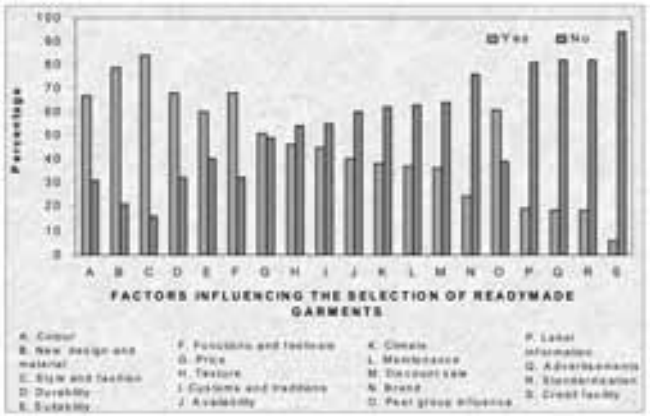


Textsmile

An engineer, physicist, and mathematician are all challenged with a problem: to fry an egg when there is a fire in the house. The engineer just grabs a huge bucket of water, runs over to the fire, and puts it out. The physicist thinks for a long while, and then measures a precise amount of water into a container. He takes it over to the fire, pours it on, and with the last drop the fire goes out. The mathematician pores over pencil and paper. After a few minutes he goes "Aha! A solution exists!" and goes back to frying the egg.

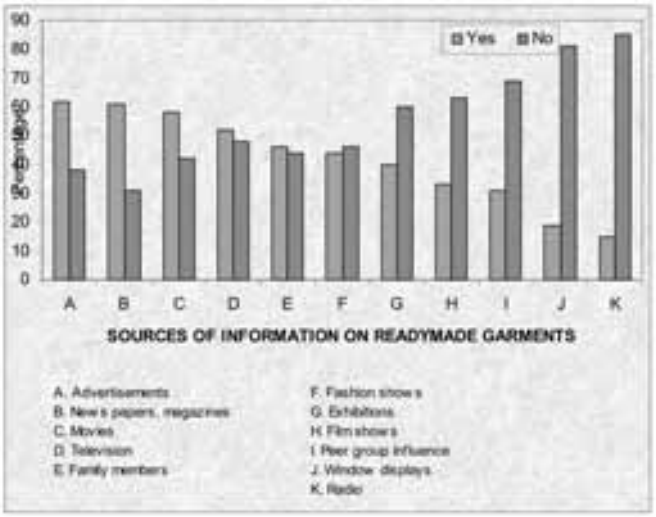
4.3. Factors Influencing The Selection of Readymade Garments

S.No.	Factors	(N=1000) Response (per cent)	
		Yes	No
1	Colour	67	31
2	New design and material	79	21
3	Style and fashion	84	16
4	Durability	68	32
5	Suitability	60	40
6	Functions and festivals	68	32
7	Price	51	49
8	Texture	46	54
9	Customs and traditions	45	55
10	Availability	40	60
11	Climate	38	62
12	Maintenance	37	63
13	Discount sale	36	64
14	Brand	24	76
15	Peer group influence	61	39
16	Label information	19	81
17	Advertisements	18	82
18	Standardization	18	82
19	Credit facility	6	94



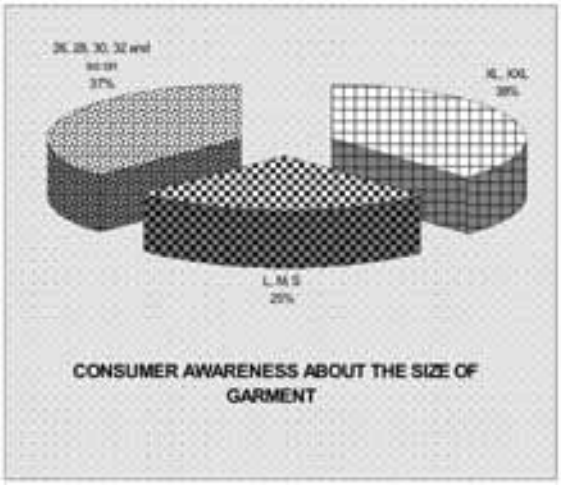
4.4. *Sources of Information on Readymade Garments*

S.No.	Source of information	(N=1000) Response (per cent)	
		Yes	No
1	Advertisements	62	38
2	News papers, magazines	61	31
3	Movies	58	42
4	Television	52	48
5	Family members	46	44
6	Fashion shows	44	46
7	Exhibitions	40	60
8	Film shows	33	63
9	Peer group influence	31	69
10	Window displays	19	81
11	Radio	15	85



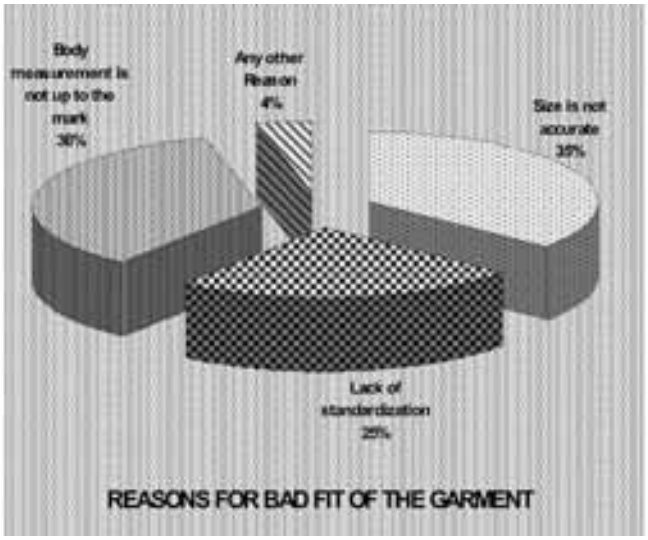
4.5. Consumer Awareness About The Size of Garment

S. No.	Size of the garment		(N=1000) In percent
1	Do you check the size of the garment?	Yes	90
		No	10
2	XL, XXL,L	38	
3	L, M, S	37	
4	26, 28, 30, 32 and so on	25	



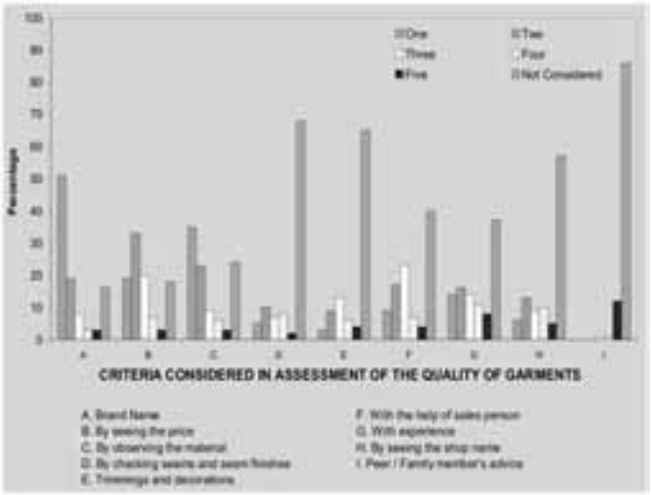
4.6. Reasons for Bad Fit of The Garment

S. No.	Fit of the garment		(N=1000) response in percent*
1	If selected according to size mentioned fit is good:	Yes	72
		No	28
2	**Reasons for bad fit of the garment**		
	Size is not accurate		35
	Lack of standardization		25
	Body measurement is not up to the mark		36
	Any other Reason		4



4.7. *Criteria Considered in Assessment of The Quality of Garments*

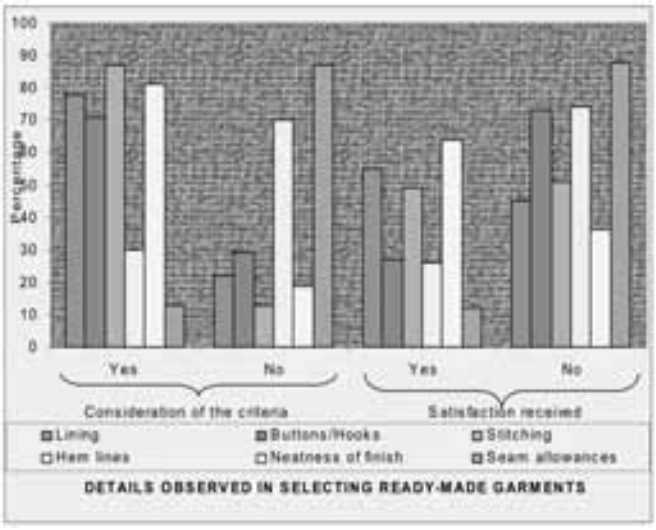
S. No.	Assessment of quality of the garment	Order of Priority (in percent)*					
		One	Two	Three	Four	Five	Not Considered
1	Brand Name	51	19	8	3	3	16
2	By seeing the price	19	33	20	7	3	18
3	By observing the material	35	23	9	6	3	24
4	By checking seams and seam finishes	5	10	7	8	2	68
5	Trimmings and decorations	3	9	13	6	4	65
6	With the help of sales person	9	17	23	7	4	40
7	With experience	14	16	14	11	8	37
8	By seeing the shop name	6	13	9	10	5	57
9	Peer/family member's advice	0	0	1	1	12	86



4.8. *Details Observed in Selecting Ready-Made Garments*

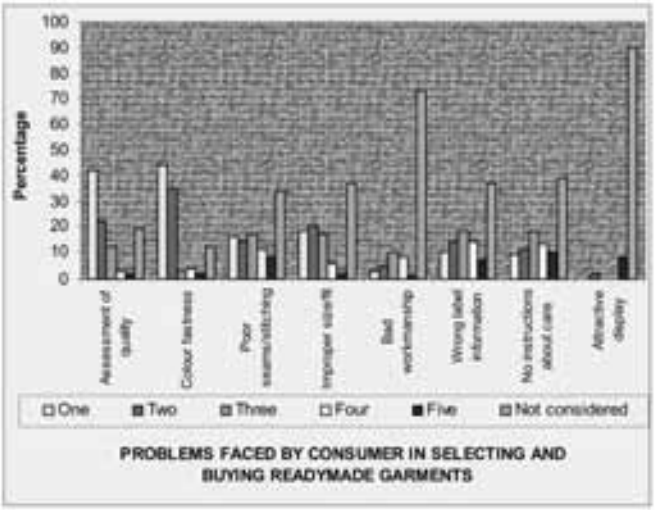
(Yes - 54%; No - 46%)

S.No	Selection criteria of Ready-mades	(N=1000) Consideration of criteria			
		During purchase (%)		Satisfaction in usage (%)	
		Yes	No	Yes	No
1	Lining	78	22	55	45
2	Buttons/Hooks	71	29	27	73
3	Stitching	87	13	49	51
4	Hem lines	30	70	26	74
5	Neatness of finish	81	19	64	36
6	Seam allowances	13	87	12	88



4.9. *Problems Faced by Consumer in Selecting and Buying Readymade Garments*

S. No.	Problems faced in the Selection of ready-mades	Order of Priority (in percent)*					
		One	Two	Three	Four	Five	Not Considered
1	Assessment of quality	42	22	12	3	2	19
2	Colour fastness	44	35	3	4	2	12
3	Poor seams/stitching	16	14	17	11	8	34
4	Improper size/fit	18	20	17	6	2	37
5	Bad workmanship	3	5	10	8	1	73
6	Wrong label information	10	14	18	14	7	37
7	No instructions about care	9	11	18	13	10	39
8	Attractive display	0	2	0	0	8	90



4.10. ***Awareness of Symbols Used on The Labels***

Able to follow care particulars given in the label (Yes - 39%, No - 61%)

S. No.	Awareness of Symbol	In Percent*		S. No.	Awareness of Symbol	In Percent*		S. No.	Awareness of Symbol	In Percent*	
		Yes	No			Yes	No			Yes	No
1		12	88	2		3	97	3		5	95
4		12	88	5		7	93	6		42	58
7		4	96	8		0	100	9		4	96
10		0	100	11		2	98	12		0	100
13		1	99	14		2	98	15		1	99
16		1	99	17		0	100	18		1	99
19		0	100	20		1	99	21		2	98
22		3	97	23		2	98	24		2	98
25		13	87	26		12	88	27		11	89
28		5	95	29		7	93	30		3	97
31		4	96	32		22	88	33		10	90
34		0	100	35		0	100	36		0	100
37		1	99	38		0	100				

* Multiple responses

Texttreasure

"Glory is fleeting, but obscurity is forever." - ***Napoleon Bonaparte (1769-1821)***

4.11. Awareness of The Terms Used on Labels

Awareness of the terms used on labels (Yes - 76%, No - 34%)

S.No	Awareness of terms	(N=1000)	
		Yes	No
1	Do not wring	65	35
2	Drip dry/Wash and wear	42	58
3	Do not bleach	64	36
4	Dry Cleaning	81	19
5	Do not press	11	89

The overall findings were:

- In selection of readymade garments first priority was given to cost and appearance by 70 and 45 per cent respectively. Factors influencing the selection of readymade garments were mainly Style / fashion, new design / material, durability, functions/festivals, colour, peer group influence, suitability by 84, 79, 68, 68, 67, 61 and 60 per cent respectively. All the other factors were considered by various percentages ranging from 51 to 6 per cent respectively.
- Advertisements, magazines, movies and television were the main sources for information on fashion as stated by most (62, 61, 58 and 52%) of the respondents.
- Regarding size particulars of ready made garments 38 per cent of the respondents were aware of the terms XL, XXL and L.
- Main reasons for bad fit of ready made garments was size not accurate and body measurement was not up to the mark by 36 and 35 per cent each.
- Fifty one per cent of importance was given to brand name in assessment of quality of readymade garments.
- Eighty seven per cent of the respondents consider quality of stitching while purchasing readymade garments. But they obtained only 49 per cent satisfaction in usage. Neatness of finish is second factor considered by 81 per cent while selecting but they gained 64 percent satisfaction in usage.
- Problems faced by respondents while selecting and buying ready made garments were colour fastness (44%), assessment of quality (22%), wrong label information (18%) and no instructions about care (18%).
- Respondent's awareness of care symbols was very meager. Among 38 care symbols listed, 42 and 22 per cent of them are aware of the symbols () and () Common label information followed by the respondents were dry cleaning by 81 percent, do not wring (65%) and do not bleach (64%).

5. Conclusion

Main criteria considered in selection of readymade garments are cost and sources of information are advertisements, newspapers and magazines. Problems faced in selecting and buying readymade garments are quality and colour fastness. Respondents do not understand most of the care symbols given on labels. While purchasing saris cost and type of print is considered, colour fastness was judged by experience.

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Textsmile

Old grad comes to visit the campus, talks with a philosophy professor who is grading a test.

"Why this is the same test that I took here 30 years ago! They're exactly the same questions. Don't you think that the students know the questions by now?"

"Don't worry," said the professor. "We keep the questions, but we change the right answer."

Creativity and Innovation : Key Drivers of Success

Dr. Naresh M. Saraf

Born in Mumbai (1957) Dr. Naresh Mahaverprasad Saraf, is a Executive Director (Technical) in Sarex, a family owned company. He did Ph.D (Doctorate of Philosophy) from UDCT, Mumbai and he is Youngest Ph.D from university of Mumbai, Mumbai (1980).

He is Fellow of The Textile Institute (FTI), Manchester, U.K., Fellow of The Royal Society of Chemistry, Cambridge, U.K. , Fellow of The Society of Dyers & Colourists (FSDC), Bradford,U.K., Senior Member of The American Association of Textile Chemists & Colorists, U.S.A. , Member of Indian Standard Institute, Patron Member of ACTI, Referee for Ph.D Thesis for Bombay University.

He has nine textile books and two manuals in his credit and published more than 35 national and international review and research papers.

Through the medium of five trusts, all founded by Mahavirprasad G. Saraf , Dr. Naresh Saraf is helping in generating and executing their welfare schemes in the city in fields like social, educational, religious, health & medical, art, literature and culture, handicaps rehabilitation, women and children welfare sports promotion etc. without any discrimination to caste, creed or religion.

The scope of fibre science is very broad. Innovation is the key factor for operating successfully in any market. Only innovative or solution providing products will be able to open up new markets and new horizons for the textile industry.

In the textile industry the challenge for companies today lies in bringing to market a stream of new improved value added products. The textile industry of the future looks very promising- something to revive our spirits considering the facts that it is based on obsolete technology.

However, the textile industry requires to shift its emphasis from "quantity" to "quality" and adopt itself to the dynamism of the market economy. The role of the textile finishers has become increasingly demanding and requires a careful balance between the compatibility of different finishing products and the application processes used to provide textiles with desirable properties.

Market trends along the entire textile industry value chain, especially in the home textiles and apparel markets, have placed increased demands on formulators for multifunctional finishes that should provide:

- Environmentally sustainable and safer solution to the different processes.
- Improved comfort through excellent softness, wickability and water absorbency, antimicrobial, stain release property

Today's main focus is on modernization in Textile industry in weaving, chemical processing and finishing & testing laboratory.

In view of this we have set-up new well equipped State-of –art *Technical service laboratory* (TSL) accreditated by *Marks & Spencer*.

We are constantly engaged in developing value added products or solution providing products for offering solutions to the industry problems as discussed below:

TEAR STRENGTH IMPROVER:

We have developed a cure to minimize the strength loss that might occur in spite of preventive measures. Different treatments such as exposure to alkalies, oxidizing agents, resins, enzymes, heat radiation and mechanical finishes that may lead to degradation. Even a slight deviation in processing may lead to unacceptable loss of strength and other undesirable effects.

Sarex has the product range to improve tear strength to achieve improvement in tear strength, individually as well as in combination depending upon fabric quality.

LOW THERMOMIGRATION FINISH

The term 'thermomigration' of dyes is currently used to describe the phenomenon in which movement of disperse dyes out of synthetic fibres or their blends during application of different finishes at high temperatures or during storage takes place.

Such dye migration results in change in shade, water-spotting, inferior fastness of dyed and finished fabrics, mark- off of prints and staining on adjacent garments made from synthetic fabrics during simultaneous washing in washing machines.

There are several factors causing Thermomigration. Finishing agent is one of the factor which enhances the Thermomigration. There is no auxiliary to prevent this problem during thermosol conditions with finishing agent.

Sarex has developed as finishing agent which does not allow dye to migrate irrespective of the conditions and imparts good softness.

PHENOLIC YELLOWING QUENCHER

Yellowing of white & pastel coloured textiles & garments has been a problem for many years in the textile industry. The majority of yellowing problem is not due to the yellowing of fibre substrate or textile finish but the yellowing of phenolic antioxidants of packaging materials containing BHT (Butylated Hydroxyl Toluene) which is presence of NOx turns the fabric yellow.

Such situations are much more common in cold countries where the warehouses or households require atmospheric heating and hence, resort to direct heating. Indirect heating systems would mitigate this problem.

Automotive emissions and propane burning-both sources of oxides of nitrogen-are most prevalent in all urban environments. The alkaline condition enhances the reaction between the phenol and oxides of nitrogen and possibly in cotton textiles. This is because, the fabric is processed predominantly in an alkaline medium and unless it is fully neutralized with speciality acid; it would tend to get alkaline while in storage, and become more prone to yellowing. This is particularly true in case of whites. We, at the Sarex developed Phenolic Quencher to prevent Phenolic yellowing of fabric in presence of finishing agents.

REDYEABLE SILICONES

Silicone softeners have been used in textile processing for more than 20 years, due to their ability to impart superior softness, slippery feel to textile fabrics. Although, Silicone softeners are recognized as superior softness, conventional amino silicones, have many limitations such as compatibility of silicone with different additives in recipe, stability of emulsion and hydrophilicity.

One of the important drawback of silicone is due to hydrophobic nature, the correction of shade is major concern. Many times dyers would like to correct the shades after finishing with silicone softeners. If the fabric is treated with silicone softener it must be removed with stripping agents. Silicones are not removed completely by stripping agents and therefore some part of it remains

Sarex has a solution for redyeing of the shade without stripping of silicone. It is a new generation of silicone specially developed for correction of shades. on to the fabric, due to its hydrophobicity redyed fabric will be uneven.

CLOROX FASTNESS IMPROVER

Chlorinated Pool water fastness is getting more importance in Terry Towel industry for swimwear, beach wears and also for yarn dyeing.

Tap water in cities is normally disinfected to kill bacteria with chlorine at some ppm levels. When this water is used for laundering, it can cause discolouration or fading of colours. Water in swimming pools can contain over 5 ppm of activated chlorine for disinfecting, and sometimes the shower used for cleaning hands and feet before entry into the swimming pool has an even higher concentration. This water can cause discolouration and fading of colour when it comes in contact with dyed material.

The fading or discolouration is due to oxidation caused by the active chlorine. The colour fastness of reactive, direct, metal complex and acid dye is very poor. Beach towels, swimming suits made of cotton and/or polyamide which are dyed or printed with these dyes are sensitive to high chlorine content in pool water and laundry wash liquors. Hence it is essential to confirm the fastness to chlorinated pool water of these merchandise.

Sarex has a unique solution by offering high quality Clorox Fastness improver that meets the requisite specifications of our customers for their applications. Fabrics, garments, home textile and medical textile articles finished with Saradye PLE exhibits excellent resistance to bleaching and fading to accidental exposure to chlorine containing substances.

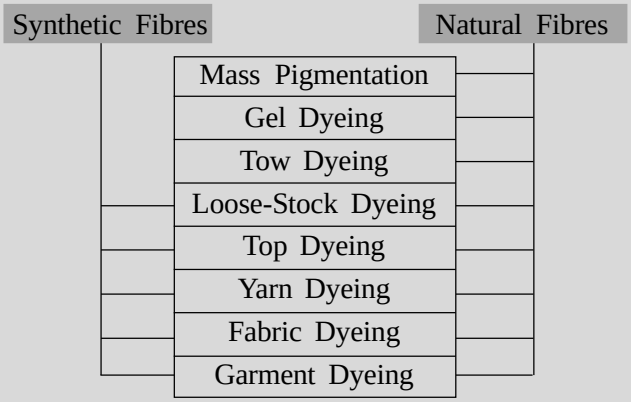
Also, there are many more specialty finishing agents, such as mosquito repellents, Antimicrobial agent, stain releasing agent etc. to offer solution to the textile industry.

Dr. Naresh M. Saraf
FRSC, FTI, FSDC, FAIC
Executive Director
e-mail : sales@sarex.com

Coloration of Textile

The textile business requires for aesthetic reasons the coloration of the raw materials at various stages of manufacture. The point of coloration determined by many factors but mainly economic and fashion considerations dictate the route of processing.

The major routes to achieve the coloration of textiles



Mass Pigmentation

Mass pigmentation was a natural development following the commercial manufacture of synthetic fibres. A dye and pigment is incorporated into polymer solution (in the case of viscose, acetate, acrylonitrile) or into the polymer melt (in the case of polyamide, polyester, polypropylene) prior to the formation of filament. The addition of inorganic and organic coloured pigments to the polymer solution is a relatively simple means of coloring the extruded filament. The final product is characterised by the very high level of colour fastness which could be achieved, with the pigment entrapped within the polymer. Methods of adding the pigment to the polymer mass varies from manufacturer to manufacturer. The principal man-made fibre coloured by means of this technique is regenerated viscose, with the pigment being added into the cellulose xanthate solution prior to spinning and coagulation into sulphuric acid. The pigments selected have to be stability to relatively high concentrations of both sodium hydroxide and sulphuric acid, these being the solvent medium and the coagulating agent respectively. The major drawback to mass pigmentation is the high percentage of transitional material which results from a bulk production run and the large volume committed to the color and the contamination of the total system from polymer solution storage to coagulation bath.

Gel Dyeing

The introduction of colour at the polymer stages of synthetic -fibre manufacture is now, well understood and practiced as a commercial operation. Addition of the colorant to the product at a later stage rather than into the mass of polymer was a natural progression. The economic disadvantages of bulk-polymer coloration for short runs to the same colour were realized but not easily overcome. By far the most successful applications have been in the acrylic field where the system of spinning lent itself to the application of soluble dyes. This involves passing an acrylic tow, whilst in the gel state, through a dyebath containing dyes with affinity for acrylic fibres. The dyes selected for this process, almost all of which are modified basic dyes, must have good solubility at a low liquor ratio as well as sufficient stability to avoid significant change in colour of the coloured tow when subjected to further processing. Dye is adsorbed very rapidly and efficiently because of the readily accessible structure of the polymer in the gel State. Conditions of application are closely guarded industrial secrets and differ from one manufacturer to another.

Loose-stock dyeing

Fibre or loose-stock dyeing is a one of the oldest methods of coloration for textiles, starting from the simple hand-stirring of a heated cauldron, to the highly sophisticated machinery of today. In many ways, loose-stock dyeing is less critical than other techniques of dyeing. The colour can be corrected when the product is being either dried or blended prior to yarn spinning, permitting a high proportion of blind dyeings and maximum utilization of dyeing machinery. Dyeing cycles are reduced to a minimum and often the fibres are merely hydro-extracted prior to delivery to the spinning mill. Preparation processes are now almost unnecessary for man-made fibre, but impurities must be removed from natural fibres before dyeing. Dyes used in stock and loose-stock dyeing are selected on a very competitive basis, but the normal fastness requirements for a particular end-use must be satisfied, and the demands on the dye are least in this method of coloration. In addition to economic advantages on this scale, batchwise dyeing has improved in turn-round time as dyeing cycle times have been reduced. Loose-stock dyeing has been achieved in three ways are blind dyeing, combining processes together, i.e. softener application in the cooling cycle, and high temperature dyeing.

Top Dyeing

The dyeing of tops is a necessary service to the yarn making industry. The top, whether of natural fibres or converted man-made fibre tow, must be kept in good condition throughout any wet processing prior to its conversion first into sliver and finally into singles yarn. Coloration at the top stage allows the spinner to obtain various colors which are blended into a multi-colour yarn. As top dyeing was developed to serve the worsted spinning industry, it is natural that wool was the first substrate to be processed by this route. More recently polyester has followed wool as a top dye candidate, mainly because of the industry's interest in polyester-wool suitings.

Tow Dyeing

Various methods are available for tow dyeing and the principle routes are:

Batchwise	*Semi-Batchwise*	*Continuous*
Packing	Padding	Pad-Steam-wash-dry
Dyeing	Autoclave Steaming	(All continuously)
Hydroextraction	Washing	
Drying	Drying	

Tow dyeing has been a requirement for the worsted spinning system. It was realized that high quality coloured yarns could be produced by two route which compared favourably with yarns produced by conventional routes. Both batchwise and continuous methods are available and a survey of the situation shows that initially tow was dyed batchwise. Then came the advent of sophisticated continuous dyeing machines which brought a revolution to this method of coloration. Once the equipment had proved that the dyed product would satisfactorily convert on the various stretch/break machines, then the industry invested heavily in this area. Batchwise dyeing of tow has found favour more recently because of the requirement in certain sectors of the industry for small lots of dyed tow. The quality of the product has improved and successful conversion on stretch/break equipment can be achieved. The economics of this route are very favourable when comparing dyed weights of one tonne and below

– By Neha Khurana & Chet Ram Meena

The Textile Association (India)

TAI - South Gujarat Unit

The Textile Association (India) – South Gujarat (Surat) and Kushal Network of Textile (KNOT) jointly organized an interactive workshop on "INTERNATIONAL MARKETING" (with reference to Textile Industry) on Saturday, 22 January '11, at Textile Association Hall, Kanjibhai Desai Bhavan, Chowk, Surat.

Shri Girishchandra H. Bhatt, President, TAI-S.G. Unit welcomed delegates from surat industry.

Dr. Girishbhai Kazi, a renowned name in the field of Medical Science in Surat region was the Chief Guest. In key-note address he explained the role of textile in medical science and the need to go in international market. He also introduced other speaker, Shri Rameshbhai Shah.

Shri Rameshbai Shah (Ohio, U.S.A.) conducted this workshop and shared his very informative views and presented his presentation on International Marketing. He explained very well the importance of International Business. He explained various examples of International Marketing during workshop. He emphasized the entrepreneurs to use lap-top & internet in large scale to increase their business at international level.

Concluding remark was given by Shri Rajnikant Sheth, Chairman, TAI - S.G. Unit. Vote of thanks was given by Shri Minesh V. Adhvaryu, Chairman, KNOT and Hon. Treasurer, TAI - S.G. Unit. Shri Neerajbhai Modi, Hon. Secretary, KNOT – conducted & led the program as MOC of the program in his artistic & poetic way which made this program an unforgettable one.

TAI - Ahmedabad Unit

TAI-Ahmedabad Unit has performed the following Activities

- Shri V. A. Trivedi, Hon. Secretary and other officer bearers attended a Seminar on "Growth & Opportunities for Technical Textiles-An International View" at Hotel St. Laurn on 20th Nov.2010, Ahmedabad. The Seminar organized by Government of Gujarat, as part of Vibrant Gujarat – 2011, 5th Global Summit and supported by CII, PWC, ATIRA & MANTRA.
- At the seminar mainly discussed on Various applications, issues and concerns along with emerging trend of Technical Textiles.
- Shri V. A. Trivedi, Hon. Secretary and some of Mng Committee Members attended one day regional workshop on "Waste Minimization/Cleaner Production/Resource Efficiency and Eco-Friendly Products Promotion" held on 30th Nov,2010 at Hotel Fortune Landmark, Ahmedabad. The workshop organized by National Productivity Council, Gandhinagar and supported by Ministry of Environment and Forests Government of India.
- Shri V. A. Trivedi, Hon. Secretary and Office bearers attended a road show on "Scheme For Integrated Textile Park" held on 3rd Dec,2010 at Auditorium, ATIRA, Po. Ambawadi Vistar, Ahmedabad. The program inaugurated by Smt. Panabaaka Lakshmi, Hon'ble Union Minister of State for Textiles, while Chief Guest was Shri A. B. Joshi, Textile Commissioner, Ministry of Textiles, Govt. of India.
- Else, Smt. Rita Menon, ISA, Secretary, Ministry of Textiles, Shri V. Srinivas, IAS, Jt.

Secretary, Ministry of Textile, Govt. of India are addressed in the occasion.

- Shri V. A. Trivedi- Hon. Secretary, A. D. Patel- Hon. Treasurer and M. S. Patel- Jt. Hon. Secretary of The Textile Association (India) Ahmedabad Unit attended Tex-Po,2011 textile trade fair and exhibition organized by Rotary Club Jetpur, Gujarat on 4th January,2011.

- Shri V. A. Trivedi- Hon. Secretary of The Textile Association (India) Ahmedabad Unit attended "Business Development Programme for Cotton Technologies" held on 7th Jan,2011 at Ahmedabad Management Association, Vastrapur, Ahmedabad. The program organized by Zonal Technology Management and Business Planning & Development unit at CIRCOT, Mumbai in association with Fibre2fashion. Dr. A. J. Shaikh, Director of CIRCOT, Mumbai delivered welcome & Inaugural Address while Dr. S. Sreenivasan, Former Director, CIRCOT, Mumbai delivered an overview of cotton technologies during the programme.

- Six eminent speakers delivered their speech on Renewable Energy Technolies for Large Scale Utilization-Biomass power generation system and Bio gas plant, Solar powered sprayer and vertical rotor partner for cotton fields, Autogrooving machine for roller ginning, Manufacturing of particle board from cotton stalk, Cotton bale tagging and caliberation cotton standards, Eco friendly bio scouring technology suitable for adoption by SMEs.

- Dr. N. Shanmugam, Sr. Scientist of ZTM-BPD unit , Mumbai delivered the vote of thanks.

- Shri V. A. Trivedi- Hon. Secretary attended a Seminar on "Business Opportunities with African Countries" and an Interactive Meeting with High Level Delegation from Trinidad & Tobago held on 11th Januaru,2011 at Hotel CAMBAY GRAND, Thaltej, Ahmedabad. The both meeting organized by the Associated Chambers of Commerce and Industry of India, Ahmedabad. The seminar and interactive meeting was very useful for the participants. The seminar addressed by High Commission of Zambia, Mr. Aloys Rubuka, H.E. The Ambassador, Embassy of Republic of Burundi, Mr. Amadou Moustapha Diouf, H. E. The Ambassador Embassy of the Republic of Senegal, Mr. Nkurunziza Williams, H.E. The Ambassador, Embassy of the Republic of Rwanda, Mr. Robert Techie-Menson, H. E. The High Commissioner, High Commission of the Republic of Ghana, Mrs. Zewide Gennet, H.E. The Ambassador, Embassy of the Fedetal Democratic Republic of Ethiopia, Ms. Urvashi Ramnarine, Hon'ble High Commissioner, High Commission of Trinidad & Tobago.

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- Shri V.A. Trivedi, Hon. Secretary and office bearers of TAI-Ahmedabad Unit Visited & attended "Global Manufacturing Technology Show and Vibrant Gujarat 2011 the Global Business Hub, 5th Global Summit" held on 10-13th Jan, 2011 at Mahatma Mandir, Gandhinagar, Gujarat. Shri Narendra Modi, Hon'ble Chief Minister, Gujarat State inaugurated the function. All Textile leaders, Businessman from India as well as from

overseas countries attended this function. During the meeting proposed MOU was done in Textile & Apparels sector.

- Shri A.D. Bhagat-Vice President of TAI- Ahmedabad Unit attended a Seminar on "Competitiveness through Collaboration" Industry-Academia Congregate held on 22nd Jan, 2011 at Senate Hall, Gujarat University jointly organized by Dept. of Chemistry School of Sciences Gujarat University, Ahmedabad and The Association of Chemical Technologist-India(ACTI), Ahmedabad.

- 66th All India Textile Conference held on 28-29th January, 2011 at Bangalore in NIMHANS Convention Centre. The conference organized by The Textile Association (India) Karnataka Unit. From Ahmedabad Unit 33 members attended the said conference, among them Office bearers and some of the Managing Committee members of Textile Association (India) Ahmedabad Unit also attended.

The Textile Association (India) Ahmedabad Unit achieved THE BEST UNIT TROPHY for the year 2009-10 during the inaugural function of 66th AITC on 28th Jan, 2011 at Bangalore.

Dr. Sheshadri Ramkumar is one of the Patrol Members of The Textile Association (India) Ahmedabad Unit who has awarded Hon. FTA for the year 2009-10 during the 66th AITC.

Meeting of the 8th Managing Committee Member of TAI-Ahmedabad Unit held on 21st Feb,2011 at AC meeting room of Association. 21 members attended the said meeting and discuss about the routine agenda as well as about the forthcoming WTC to be held on 6-7 May, 2011 how it can be helpful and success by the TAI-Ahmedabad Unit.

TAI - Viderbha Unit

Conducted Seminar on Development in Components for Higher Spinning performance

The Textile Association (India) – Viderbha Unit had organised a seminar in association with Oerlikon, Textile Components, Germany on "Development in Components for Higher Spinning Performance "recently at Hotel Airport Centre Point, Nagpur.

Mr. Hemant Sonare, Hon. Secretary of The Textile Association (India) - Viderbha in his welcome address informed objective of organising this seminar for spinning sector .He highlighted importance of quality enhancement in the global competitive market .He appealed all the delegates to adopt quality standards for spinning machines in the spinning mill by using the latest state-of-the-art production textile components for profit maximization. Mr. Hemant Sonare gave a brief account of all the activities of TAI - Viderbha & informed about other successful events conducted by The Textile Association (India) - Viderbha. Mr. Rajiv Kumar Dubey, President of TAI - Viderbha who presiding over the function welcome all the guest and highlighted past achievements of TAI-Viderbha. He shared his vision regarding development of Viderbha textile industry & promised all type of cooperation to Oerlikon group .

Dr. Keshav Raj Kranthi, Director, Central Institute for Cotton Research, Nagpur is the Chief Guest for the function. In his inaugural address, Dr. Keshav Raj Kranthi enlightened the participant delegates with thought provoking speech regarding recent development in Cotton research &

(Left to Right) -Dr. K.R. Kranthi (Chief Guest & Speaker), Hemant Sonare , Volker Brand, R.K. Dubey, Selim Zeydanli, Joachim Herzig, B. Thiyagarajan)

productivity. Dr. K.R. Kranthi presented background information and issues concerning Indian Cotton for deliberations. Dr. Kranthi said that issues like shrinking area under indigenous Desi cotton should be addressed more vigorously. He emphasised on a paradigm shift needed to ensure sustainability in production systems with efforts focused on farmer empowerment.

Expressing his views on development of the region, Dr. Kranthi said, growth of industry and agriculture should go hand in hand. He said in the near future with superior fibre quality in high density planting India would able to produce almost double cotton yield of the current production. He said India has all the potential to develop into a world leader on cotton production. There was a large gathering of 250 textile professionals of the region.

Volker Brand, Manufacturing Head, Accotex division gave brief introduction about Oerlikon Textile Components, Germany. Mr. Brand given detail introduction of Oerlikon Textile Components with its well established product lines & quality determining components for all filament and staple fibre spinning applications. He said highest quality and reliability are the common characteristics of all Oerlikon products for improvement of yarn quality. He provided information about worldwide manufacturing product line offering of components for the textile industry.

Mr. Joachim Herzig, Production and Development Head, Texpart division, Oerlikon Textile Company, Germany in his technical presentation talk about increasing demand of modern ring spinning machines worldwide with regards to yarn quality and process reliability . He said, the latest technology installed and have proven themselves million fold in daily use in textile mills worldwide.

Mr. Selim Zeydanli, Sales Director. Texpart Division, Oerlikon Textile Components, Germany provided valuable inputs about Zero unwinding parts & Cots and Apron. He has given recommendation for use of these parts for longest life time, perfect flexibility for constant yarn quality .He shared in-depth information regarding latest innovation for higher yarn quality & productivity.

Mr. B. Thiyagarajan, Zonal Manager, Oerlikon Textile Components during open discussion emphasised on use of top-quality Oerlikon components & its reputation for superior quality production across the globe .He proposed vote of thanks after the technical session.

The seminar was very much interactive & informative. Several distinguished spinning technologists, administrators, managers, representatives from different leading spinning units were participated in this deliberation. Mr. M. Jayraman & Mr. R.K. Mishra, Director, Spin free has taken sincere efforts for the success of the program. S/s Deepak Kulkarni, S.P. Gadge, M.V. Gokhale, Ajay Ghorpade, L.S. Nagada, Brijmohanji Agrawal, Jayant Nagrare & Nagraj Kalal and others were prominently present on this occasion.

Conducted National Fashion Conference Garment-FRA 2011

The Textile Association (India)-Vidharbha unit recently organised a National Fashion conference "Garment –Era 2011 in association with Texcellence Garmentic Advisor,a new initiative of Texcellence Institute of Design, Nagpur on Fashion –Garment industry: Opportunities & Road Ahead at Hotel Airport Centre point, Nagpur.

Hemant Sonare, Hon. Secretary of Textile Association (I)-Viderbha began the proceedings by announcing about the bold objectives of the conference. He briefly elaborated TAI's initiative, he said this mega conference broadly focus on exploring the opportunities and prepare garment & fashion professionals of the region appropriately for the road ahead. He termed this conference a "Conference with a Difference" by saying that most of the conferences dealt with technical or productivity related subjects, but the primary objective of this conference is to deliberate the less discussed key issues concerning the growth of the industry in Central India and bring fourth solutions for the sector as a whole. This conference ,he said presentations will delve on discussing challenges as well as huge opportunities in this aspiring sector by industry experts from all across India. He encourages participants of this conference to put up their queries to these experts. He appealed all the delegates to go for fashion & garment entrepreneurship and promised all type of support to

Dr. Pallavi Darade (addressing the conference), Sarita Karandikar, Hemant Sonare, Nien Siao, D.S. Kulkarni, Ranjan Vasishtha, Shakeel Iqbal.

budding entrepreneurs who wish to start their own business in this aspiring sector.

Prof. D.S. Kulkarni, Vice President, who presiding over the function welcome all the guest and highlighted past achievements of TAI-Viderbha .He shared his vision regarding development of fashion & garment industry of the region. He gave a brief account of all the activities of TAI-Viderbha & informed about other successful events conducted by Textile Association (I)-Viderbha. He said that the feast of knowledge will be given today at this platform to the participants from the eminent authorities. He statistically highlighted current position & career growth opportunities available in this sector for new entrepreneurs & women's.

Dr. Pallavi Darade, Additional Commissioner of Income Tax, Range 4, Nagpur, (Additional charge of Range-3, Wardha & Yawatmal) is the Chief Guest of this conference. In her inaugural address, she appreciated efforts of the organisers for organising such a unique conference at Nagpur. She enlightened the participant delegates with thought provoking speech regarding recent development in fashion and clothing industry. She appealed all the participants to take advantage of this rare opportunity to listen all high quality experts in the area of quality improvement, productivity enhancement, technology up gradation & capacity building. She spoke on the strengths of the domestic & international market opportunities & potential of women's employment share in this industry .She said , this conference is providing single platform for exchange of information, ideas and experience sharing with Fashion Gurus from all across India, who have rich expertise & experience in the field of fashion and garment industry. She expressed the involvement & Participation percentage of working women's in this industry is much more compare to any other industry. She added this industry will contribute strongly for empowerment of Women's of the region in coming future. She said, the fashion & clothing fraternity of Viderbha can get benefited by enhancing their cumulative strength by organising & attending such conferences in future. Dr. Darade said that issues like women empowerment should be addressed more vigorously. She emphasised on an available opportunities for women's in this aspiring sector. Expressing her views on development of the region, Dr. Darade said, for growth of the industry such initiatives are welcome move.

This event had covered a gamut of contemporary presentation topics by experts which bring out new ideas and business opportunities for new entrepreneurs. The inaugural function of the conference comes to an end with the vote of thanks from Prof.M.V.Gokhale, Hon.Jt.Secretary of TAI-Viderbha.

The first technical session was started immediately after the Inaugural session. This session was moderated by Vice Chairman Textile Association (India)-Viderbha & Sr.Manager, Raymond Textile Ltd, Mr.M.M.Birader. With him were, Prof. Nien Siao, Professor & Head of fashion Design department & Prof.Sarita Karandikar, Associate Professor & Course leader, from Pearl Academy of Fashion, New Delhi.

Addressing large gathering of Fashion professionals & Garment entrepreneurs of the region. Prof.Nien Siao, Professor and head of Fashion Design Department, Pearl Academy of Fashion, New

Delhi expressed her concern over the social & environmental issues. She said sustainable development has become a buzzword in the present times due to the emergence of these concerns. She said , Increasing pollution from vehicles and industrial units, deforestation, excessive use of chemicals, plastic, metals and other non-biodegradable material, expanding landfill sites are leaving devastating impacts on the environment. Extensive use of natural resources and superfluous production & use of man-made articles along with tremendous waste generation is adversely effecting the environment. This has intensified the need to minimize the environmental damages and make the earth a better place to live not only for the present generations but also for the future generations to come. She said, it is as important to the success of a sustainable clothing future for making consumers aware of the environmental impact of their 'fashion habits.While elaborating green revolution in fashion industry, she said being green and ethical across the clothing supply chain it is no longer an option but a commercial and environmental necessity.

Next on the agenda was a brilliant presentation by Prof. Sarita Karandikar, Associate Professor & course leader from Pearl Academy of Fashion, New Delhi. In her presentation on 3 F's of styling : Fashion, Fabric and Forms ,she elaborated on issues related to Purchasing power, travel opportunities and asprational acquisitions to bridge the gap between these needs and demands. The pace to instant gratification of all wants and desires is increasing and hence the need to match that pace through styled perspectives to attract the consumer is important.

She added, the availability and accessibility of fashionable clothing and the wide platform of aesthetic consumer demands have further increased competition in the market. Brands and malls are opting for favorable strategies to get the attention of the consumer and the only way to do it is by putting best foot forward through style and image to create fashion with complementary forms and fabrics. She said Fashion with relevant fabrics and forms are key catalysts to contemporary styling to enhance our images and to motivate to compete in a society that is highly competitive and status conscious.

The post lunch and the second technical session saw once again, a collection of luminaries from the industry on the dais. This session was moderated by renowned textile consultant of the region Prof.S.P.Gadage. He started session with his introductory remark ,he said all facets of the industry from textiles , garmenting, technology, Manpower & marketing will be presented in this second technical session .With him were, Mr. Rajeev Sadhwani Head –West region Mehala Machines India Ltd, Prof.Shakeel Iqbal, Associate Professor, National Institute of Design, Hyderabad, Mr.Ranjan Vashishta, Chief Consultant.LBM Consulting Group, Gurgaon. , Mr.Sanjeev Bhartiya Vice President, Uniworth Textiles Ltd.

Rajeev Sadhwani, Head, West Zone, Mehala Machines India Ltd .began with a presentation which delved at length on technological advancement in garment industry. He spoke about rapid development happening in garment industry and urged participants to follow and adopt the new technology to enhance productivity as well as quality. He said, technology combined with aesthetics is promoted through multiple media exposure.

Next on the agenda was a session of Mr.Ranjan Vasishtha,Chief Consultant,LBM consulting Group,Gurgaon on 'Opportunities & Challenges being faced by Garment Industry. In his presentation he said India has all the potential to develop as a leader on Garment production. He said strong desire is required to solve a particular problem and a fundamental perquisite for successfully applying Lean Principles in garment industry. He elaborated concept of Value addition and applied everyone to avoid Un-necessary Material Movement , Man Movement & Inspection. He said, Fashion is changing faster and faster, as a result most of the famous worldwide brands are moving from 2 seasons to 4 seasons. He said from past 120 days requirement for a new style, now buyers are requesting 60 to 70 days only.

As a result, they are requesting from garment manufacturers more flexibility and shorter lead time.

Shakeel Iqbal, Associate Professor, National Institute of Fashion Technlogy, Hyderabad spoke on Value Addition & Entrepreneurship opportunities in Textiles.He shared in-depth information with

participants regarding latest innovation for higher yarn ,fabric quality & productivity. He said, as one moves across the value chain ie.fabric and garments, the opportunities are more for profit maximization. The last session was presented by Mr.Sanjeev Bhartia, Vice President, Sales & Marketing of Uniworth Textiles Ltd. He spoke on latest fashion trends, consumer preferences & briefed participants about available career opportunities in marketing sector in the clothing & garment industry.

It was followed by Valedictory function, Well-known Advertising Photographer of the region , Mr.Vivek Ranade was the chief Guest of this occasion. Prof.D.S.Kulkarni summarised all the presentations in his concluding speech .Mr.Vivek Ranade appreciated efforts of the organisers & advised participants to follow their goals.Hemant Sonare, Hon.Secretary, Textile Association (India) –Viderbha thanked the speakers and all the delegates for making this conference a big success.

The Conference was very much interactive & informative. Several distinguished fashion designers, garment manufacturers, boutique owners, retailers, academic institutions, faculties, fashion & textile technology students from all across Vidharbha were participated in this deliberation.

The conference was concluded with brilliant Fashion Show extravaganza. This show was organised by Texcellence Institute of Design, Nagpur in association with Kanhya City, a project by Jham builders & developers Nagpur. The student designers from Texcellence Institute of Design displayed their innovative & creative designs in front of all the participants. The show was well appreciated by all the delegates. Ajay Ghorpade, R.K.Mishra, Rachana Sonare took extra pain for the success of the event.

THE TEXTILE ASSOCIATION (INDIA)

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TAI PUBLICATIONS

Spinning of Manmade Fibres and Blends on Cotton System — Rs. 150; $ 30

K.R. Salhotra, 3rd Edition, 2004, Pages 332

This extensively revised version lucidly explains the phenomena underlying the spinning processes of the cotton system. Crucial points that may escape attention owing to the pressure of managing production are identified for control and improvement of quality and productivity. A must buy for technologists and managers of manmade fibre spinning mills, and also for students.

A General Equation for Estimating Yarn Tenacity — Rs. 100; $20

T. A. Subramanian, 2006, Pages 150

This research monograph is an excellent example of how good quantitative theory helps mills to reduce costs while achieving the desired tenacity in cotton yarns. Cotton spinning mills with sophisticated fibre testing instruments can save cotton costs up to 4% using this prediction equation.

Comprehensive Handbook of Spinning Maintenance — Rs. 400; $ 80

Neeraj Nijhawan, 2006, Set of 3 Parts, Pages 820

Every spinning mill on cotton and manmade fibres can assess its level of excellence in maintenance management and most will be able to improve it using Part 1. Parts 2 and 3 not only make available widely scattered use-worthy information, but also give several directives for ensuring that the work practices are right.

Fundamentals of Design for Textile and Other End Uses — Rs. 495; $ 95

J.W. Parchure: 2009, Pages 80

Multi-coloured and hard bound. This book is useful for all interested in printing on cloth, paper and the like: students of technology, home science, and even housewives interested in embroidery.

High Speed Spinning of Polyester and its Blends with Viscose — Rs. 450; $ 90

S.Y. Nanal, 2009, Pages 134

Hard bound. Practical guide to spinning mills for increasing profitability by increasing productivity at ring frames, not just for polyester blends, but also for all staple fibres. A must for every progressive spinning technician and for top managements of spinning mills.

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TAI - Mumbai Unit

Seminar on 'Evolving Trends in Management for the Textile Industry'

The Textile Association (India), Mumbai Unit organized the Seminar "Evolving Trends in Management for the Textile Industry" on 18th February 2011 at Hotel Inter Continental the Lalit, Mumbai.

Mr. C. Bose, President, TAI, Mumbai Unit welcomed the Hon. Chief Guest, Mr. Hrishikesh Mafatlal, Vice Chairman & Chief Executive, Arvind Mafatlal Group of Companies, Chief Guest Mr. Man Mohan, Chief Operating Officer, Polyester Sector, Reliance Industries Ltd., Guests Mr. Subodh P. Sapra & Mr. Manish Kiri, Speakers, Press, Media and delegates.

Releasing book of papers

Lighting of Lamp by Chief Guest and others

Mr. V. C. Gupte Chairman, TAI, Mumbai Unit and Convener of the seminar gave the brief of the event. He said that The Indian Textile Industry has come a long way from a traditional family managed business to a professionally managed business. He said that from the traditional merchant oriented business to specific & consumer oriented business has forced the textile industry to change its face. Every segment or department of professionally managed textile industry is now handled by skilled workers and professionally specialized managers. He added that every role requires a specialist and everyone in the value chain requires a totally commercial thinking. The working style of old textile culture has undergone drastic changes because of rigid quality norms coupled with strict delivery schedules. Commercial negotiations and face-to-face discussions with the export buyers, forced the textile managers to be professional, skillful and techno-commercially sound.

Mr. Hrishikesh A. Mafatlal, Vice Chairman & Chief Executive, Arvind Mafatlal Group of Companies while taking historic perspective of the textile business said that in the old era the business was operations oriented and was handled by trade wholesalers. Overall it was sellers market with lesser sensitivity in quality and services. He said during that time there was more loyalty to individual than the institution. With the globalization in 1990 the transformation of textile business took place from a seller market to a buyer market. In this new era introduced rigid quality norms, strict delivery schedules, supply chain management, ecological standards and the most important competitive pricing.

Shri Hrishikesh Mafatlal delivering his inaugural speech

Mr. Mafatlal said that with growing size and complexity of businesses family management did not have the required skills and hence the professional managers were introduced. He said that the textile business becoming more knowledge based, people from other industries started entering in to this field. This was the time when HRM was first time introduced in the textile industry. These changes like selective hiring, extensive training, sharing information, employment security and reduction of hierarchy levels brought the professionalism in the industry.

Mr. Mafatlal said that market and consumer oriented approach and leadership changing from authoritative to delegative and participative levels were brought to the industry. He said that the changes in last two decades in financial structuring of the companies raised the capital and hence more public limited companies were established. Mr. Mafatlal said that these are the enduring qualities for any organization – large or small – and often define success over the long run.

Mr. Man Mohan, Chief Operating Officer, Polyester Sector, Reliance Industries Ltd. while addressing stressed that there is an opportunity to work end-to-end in the textile pipeline to satisfy the retail consumer. Retailers of today are aligning themselves to new consumer trends and have become far more demanding; they are interested in just– in–time delivery at their stores.

The present day consumer is having varied options in front of him. They want clear brand value and offerings. They connect with numerous brands. Even after purchasing, the consumers may remain engaged, publicly promoting or assailing the product's they've bought. So it is up to us how we project our products and create a bond with the customer to have a long term relationship instead of just a buy-sell deal, he added. Indian textile and apparel market, Mr. Man Mohan informed, has the potential to reach a size of USD 220 billion by 2020 with a CAGR of 11% from the current level of around USD 70 billion. The exports are likely to go up from the current level of USD 23 billion to USD 80 billion by 2020.

The major growth driver is the favorable demographics in India. India boasts of being a young country with a median age of around 26 years. With the emergence of a new and young consuming class, domestic consumption is expected to swell manifold. However, the challenge in front of us is to provide affordable quality products to the masses which are at the bottom of the pyramid. Also not to forget, this process has to be environmentally sustainable and economically justifiable, RIL COO pointed out. The companies which successfully re-invent themselves have one trait in common. They tend to broaden their focus beyond the financials and manage to track the competition in their industry. They continuously renew their capabilities and nurture talents to overcome competition. High performance companies need professionals who can grow a new business and not just manage an old one, Mr. Man Mohan added.

Mr. Subodh P. Sapra felicitated by Chief Guest with The Life-Time Achievement Award

Mr. Manish Kiri conferred with Industrial Excellence Award

The Textile Association, Mumbai Unit has set a precedent by felicitating the textile professionals for their outstanding contribution in the field of textile industry. In this Seminar, the TAI Mumbai Unit felicitated Mr. Subodh P. Sapra, Former President – Polyester Sector, Reliance Industries Ltd, with The Life-Time Achievement Award. The Industrial Excellence Award was conferred on Mr. Manish Kiri, Co-Chairman, DyStar World.

In all, there were 8 technical papers presented during the seminar.

Mr. Rahul N. Mehta, Managing Director, Creative Casualwear Pvt. Ltd. spoke on "Traditional Family Management versus Professional Management". Mr. Mehta highlighted good and not so good points of both the systems in his inimitable style. In fact he made a perfect start for the Seminar.

Mr. Manohar Samuel, Jt. President (Strategic Marketing), Grasim Industries Ltd. presented the paper on "Branding and Global Positioning – Indian Textile Industry". Mr. Samuel made a few important observations which received high response from the participants.

Mr. T. Murugan, General Manager - Sales & Marketing, Lenzing Fibers – India made the presentation on "Preference of Manmade Cellulosic Fiber – Tencel". There were convincing reasons for the management for the new generation fibre.

Mr. V. C. Gupte, Head-Colour Business, Advanced Graphic Systems presented the paper on "Colour Management in Textile Industry". He covered two important aspects of colour management – Measuring Colour and Managing Colour.

Mr. R. Rajaram, President – Processors & Systems, Alok Industries Ltd. expressed his views on "Strategic Conversations on Human Resources". He spoke on Motivators & Hygiene factors. Mr. Rajaram also mentioned on the expectations from HR Today & profile of HR professional. He ended with delivering growth through HR.

Mr. Venu Nair, Director, Marks & Spencer India Pvt. Ltd. & Head of Region, South Asia Sourcing Offices made the presentation on "Supply Chain Management – Retailers Perspective". Mr. Nair covered the salient aspects of supply chain management, wherein the vendor list is ever-increasing and also multi-country which requires very skillful handling.

Mr. Simon Collinson, Director, DyStar Textile Services and General Manager, DYStar Textile Services (Shanghai) Co. Ltd., China made the presentation on "Resource Management – through implementation of environmental friendly products and optimized processes".

Mr. Prabhat K. Trivedi, General Manager, Technical Services – Quality, Clariant Chemicals (India) Ltd. expressed his views on "Cost, Cash and Ecology Management".

All the Papers received very high response from the participants. There was good interaction between participants, who posed many questions to the speakers and the same were answered very promptly by them.

At the end, Mr. A. V. Mantri, Hon. Secretary, TAI, Mumbai Unit proposed a vote of the thanks.

The Seminar was grand success and was attended by over 250 participants.

Audience attend the Seminar

The Textile Association (India)

TAI SHALOM 2011 Fashion Show

The Textile Association (India), Central Office organized for the first time in association with PVP, SNDT Women's University, Juhu, Mumbai by the graduating students of B.Sc. Fashion Design Department on February 23, 2011 at St. Andrews Auditorium, Bandra. The young and talented graduates of PVP SNDT institute presented their collections at Shalom 2011, the stage that showcases them at their creative best.

As fashion industry thrives on creation, and talents are vital for its success. To complement and strengthen fashion talent on the road to further success TAI has decided to organize a fashion show jointly with S.N.D.T. College, a fashion teaching institute. This is our beginning for skilled students to exhibit their ability and flair.

The TAI Shalom Fashion show was entirely designed, set-uped and presented by the institute. The main pillars behind this are the B.Sc. Fashion Design Dept. Core Team of Ms. Jinal Sangani (H.O.D.), Ms. Shraddha Vohra and Ms. Nivedita Mohanty along with a strong force of visiting faculty have helped the students to emerge with triumph. It is important not to live down to expectations, but to go out there and do something remarkable. Behind this team Ms. Varsha Jain, Principal PVP Institute and Ms Chandra Krishnamurthy Vice Chancellor SNDT University were for guidance and support.

20 students showcased 10 collections to renowned guests and the jury. These designers went beyond expectations and crossed new territories of construction and creativity. Eminent designers like Archana Kochhar, Kunal Rawal and Dilber Asli were mentors to these students who guided them through this entire rigorous and detailed process. The jury panel included Ms Lina Tipnis, Mr. Randeep Hooda, Mr. Arvind Sinha, Ms Meher Castelino and Ms Gayatri Ruia who helped judge the winners for the awards.

Shalom is the stepping stone to a career in fashion excellence for these young designers. Every collection had an individualistic charm that spoke of the versatility of the designers and the education they have received. The collections were an amalgamation of their Indian aesthetics and Contemporary experiences. Arts and Crafts like Mithila and Origami, classics like the Game of Chess and Shakespeare to modern day Vegas were some of the varied themes at this fashion event. Sirisiti by Swati Jain and Sneha Khanchandani, the jury favorite, was a collection which brought together the traditional techniques of fabrics weaving and modern draping - a creative tribute to the cultural state of Tripura where the inspiration came from. MetroMotive by Tanya Baptista and Tanvi Kakar was SNDT's first complete menswear collection inspired from the Indian Railways which the jury appreciated for details and clean silhouettes and which the audience loved for its ramp appeal. All garments reflected the detailed learning of pattern making, draping, textiles, color and the understanding of bringing together these various elements in co-ordination to create perfectly balanced collections. The students scored in both creative and technical aspects.

The show was graced by the presence of Chief Guest Mr. D.R. Mehta, President, Mr. K.D. Sanghvi, Chairman, Mr. V.D. Zope, Hon. Gen. Secretary, TAI and Mr. J.B. Soma, Convener Fashion Show.

The suitable Trophy was presented to the Show Winners

Best Collection:	-	Sirisiti - By Swati Jain and Sneha Khanchandani
Best Mélange of Textiles:	-	Sirisiti - By Swati Jain and Sneha Khanchandani
Best Creativity:	-	Faltenage - By Geet Punjabi and Anushree Agarwal
Best Accessorized Collection:	-	Sirisiti - By Swati Jain and Sneha Khanchandani
Best Surface Ornamentation:	-	Gitandia - By Sonakshi Gurejja and Danielle Flanagan
Best Color Co-ordinated Collection:	-	Rangavarnam - By Akruti Sheth, Priyal Patel and Apurva Chawathe
Best Theme Interpretation:	-	Faltenage - By Geet Punjabi and Anushree Agarwal
Most Innovative Collection:	-	The Royal Gambit - By Dhvani Motani and Neekita Kenkre
Most Commercially Viable:	-	MetroMotive - By Tanya Baptista and Tanvi Kakar

And Special Jury Award for Research & Indepth Study of Textiles – Swati

The auditorium was full of audience. The show was appreciated by the gathering. More than 700 viewers were present.

Highlights of Fashion Show

The Textile Association (India) 66th All India Textile Conference

"Expanding Sustainable Limits to India's Positioning in Global Textiles and Clothing"

The 66th All India Textile Conference was held at Bangaluru on 28th and 29th January 2011 hosted by The Textile Association (India) – Karnataka Unit on the theme "Expanding Sustainable Limits to India's Positioning in Global Textiles and Clothing" at NIMHANS Convention Hall Bangalore.

Dr. Y. N. Gangadhara Shetty is hounered by Chief Guest.

Inaugural Programme of Conference

On 28th January 2011, on the inaugural function, Dr. Vijay Kumar, Chairman of TAI - Karnataka Unit and also the Organizing Secretary of the conference welcomed the Chief Guest Hon'ble Minister for Handloom and Textiles Sri Govind Karjol, Dr. Y. N. Gangadhara Shetty, Chairman, Ramkumar Mills, Bangalore, Recipient of Honorary Membership Shri. M. Prabhakara Rao, the Chairman of NSL group. He also welcomed Shri D.R. Mehta, TAI President, Shri Ashok Juneja, Vice President, Shri K.D. Sanghvi, Chairman, Shri V.D. Zope, Hon. Gen. Secretary, Office Bearers of TAI – Central Office, G.C. Members and all eminent speakers, invitees and industrialists from all over the country.

Smt Panabaaka Lakshmi, Honourable Minister of State for textiles, Govt. of India was the Chief Guest and Sri. K. Rahman Khan, Deputy Chairman, Rajyasabha were the Guest of Honour.

During briefing about the conference, Shri T.G. Mruthyunjaya, the President of the Karnataka Unit and the Conference Chairman explained about the theme of the conference.

Shri Ashok Juneja, Vice President of the Textile Association (India) explained the mission and activities of the Association. Mr. D.R. Mehta, National President of the Textile Association (India) gave a brief about the forthcoming World Textile Conference.

The conference honoured Dr. Y. N. Gangadhara Shetty, Chairman, Ramkumar Mills Bangalore for his meritorious service to the textile industry and also for the social works.

The conference also honoured Prof. B. Basavaraj in his absence for the services done for the textile Association and the textile Education. Prof. B. Basavaraj could not attend the function due to his illness.

Mr. M. Prabhakara Rao gave the Commemorative speech and Sri Ashish Dhir, Associate Vice

Chief Guest Sri Govind Karjol & other guests lighting the lamp.

President of Technopac Advisors gave the B.K. Mehta memorial lecture.

There were 25 speakers, and all were invited speeches. The topic for the speech was given to the speakers considering the theme of the conference and care was taken to see that papers included from raw materials to final fashion.

Another significant feature of the conference was the panel discussion held on the first day. The Panel discussion was monitored by Sri Ashish Dhir, and the panel members included Sri H.S. Bhaskar, Dr. Sheshadri Ramkumar, Sri. Pradeep Kumar Badami, Sri. Karunesh, Dr. K.R. Kranti.

The Honorary Membership of the Association was conferred to Sri. M. Prabhakara Rao, the Chairman of NSL group considering his work of integrating from seed to fashion and his contribution for making Guntur as a major textile centre in a short span of time.

Shri Mandava Prabhakar Rao is the scion of a reputed agricultural family, hailing from Guntur District in Andhra Pradesh. Shri Rao is an alumnus of Benares Hindu University and stood second in the University in B.Sc (Agriculture) and achieved 1st rank in M.Sc (Agriculture). He is also a recipient of Gold Medal and Merit Scholarship in his Post Graduation.

Following his father's footsteps, he took up the family managed seed company after completion of his education in 1982 and developed the company Nuziveedu Seeds Pvt. Limited into a leader in Indian seed industry. Nuziveedu Seeds Pvt. Ltd enjoys the largest market share for hybrid Cotton seeds in the country and is the first Indian seed company to achieve a turnover of Rs. 500 Crores and is racing to become Rs. 1000 Crore seed company by 2012. The cotton hybrids developed under his guidance by NSL i.e., Bunny and Mallika are the most popular hybrids combining high yield, pest and disease tolerance and quality fiber resulting in rapid and widespread adoption by the farmers. It goes to his credit that Nuziveedu Seeds Pvt. Limited is the Winner of DSIR – National Award 2002 instituted by the Ministry of Science & Technology, Government of India for the R & D achievements of the company. The prestigious annual biotech industry survey - Bio Spectrum - ABLE Biotech Industry Survey - 2008 and again in 2010 has adjudged Nuziveedu Seeds Pvt Ltd as the "No 1 bio-agri Company of India for the year 2008" and 2010.

Shri Rao was the First President of National Seed Association of India and also a member of Board Management of Acharya N.G.Ranga Agricultural University, Hyderabad, India for the second time in succession. He is a seed industry representative on Cotton Advisory Board. He has served the Central Seed Certification Board constituted under Seeds Act by Dept. of Agriculture & Cooperation, Ministry of Agriculture, Govt. of India twice.

He has also participated in several international and national conferences on seeds held in India and abroad in the last 25 years. He presented several papers both in national and international forums. At present, he represents India in the Board of International Seed

The Honorary Membership – Shri M. Prabhakara Rao

Federation (ISF, World Seed Association)

In addition to his contribution to the seed industry, he has also contributed for substantial industrialization by making combined investments of about Rs. 10,000 Crores in Renewable Power, Thermal Power, Textiles, Integrated Sugar Factories, IT Infrastructure in the form of IT Parks, IT SEZs etc.

Shri M. Prabhakar Rao is at the forefront of discharging Corporate Social Responsibility initiatives and has established a charitable trust, Mandava Foundation which plays a key role in the development of Rural India by contributing in the sectors of Education, Health Care, agricultural productivity initiatives etc.

The Textile Association (India) considers it a privilege to bestow the prestigious Honorary Membership to Sarva shri Kasturbhai Lalbhai, G.D. Birla, Arvind N. Mafatlal, Naval H. Tata, Padampat Singhania, Neville Wadia, Gaur Hari Singhania, Abhaykumar S. Kasliwal, Dhirubhai H. Ambani, Shambhukumar S. Kasliwal, S. P. Oswal, Shri L.N. Jhunjhunwala, Nitin Kasliwal and others. TAI congratulate for this achievement.

The Honorary Fellowship of TAI – Dr. Sheshdri Ramkumar

Dr. Sheshadri Ramkumar, Associate Professor, Texas Tech University was conferred with the Honorary Fellowship of the Association for his significant contribution in academic field..

Dr. Seshadri Ramkumar is currently a tenured associate professor of nonwovens and technical textiles at Texas Tech University, USA. He manages the Nonwovens & Advanced Materials Laboratory at The Institute of Environmental and Human Health at Texas Tech University, USA. He is instrumental in the establishment of the nonwovens laboratory at Texas Tech University. He also serves as the Co-Chairman of the India Committee of the USA based Association of the Nonwovens Fabrics Industry (INDA). In January 2007, he served as the coordinator and tutor for INDA's first nonwovens training workshop in Mumbai. In October 2007, he served as the Co-Chairman for INDA's "Link with India," first international nonwovens conference in India. For nearly a decade, he has been playing a key role in spearheading the growth of technical textiles sector in India. He created the ATNT "Advances in Textiles, Machinery, Nonwovens and Technical Textiles," international conference which is conducted in India. Through the ATNT conferences he has brought INDA-USA, Industrial Fabrics Association International, Technical Association of Pulp and Paper Industry to India.

Dr. Ramkumar was invited by the Office of Textile Commissioner to lecture in India's one of the first nonwovens awareness programs in Surat and Ahmedabad. He with help from Bangalore based TecniTex Nonwovens Pvt. Ltd., coordinated with the Office of Textile Commissioner, Government of India in offering the INDA's first geo-textiles training workshops in India. He serves as the course tutor for the internationally acclaimed INDA's nonwovens training program which is offered through TecniTex Nonwovens Pvt. Ltd., in many cities in India. Through these nonwovens and technical textiles awareness programs he has collaborated with many academic institutions In India and organizations such as TAI-Ahmedabad, ITAMMA, CII, FICCI, SITRA, etc.

He invented the patented "Fibertect" nonwoven decontamination wipe which is finding a myriad of applications in military, industrial and homeland security sectors. In 2009, Dr. Ramkumar received two major awards for his nonwoven wipe research. Texas Tech University recognized him with the Chancellor's Council Distinguished Research Award, which is the highest research award of the Texas Tech University. Lubbock chapter of Achievement Rewards for College Scientists awarded the Scientist of the Year for 2009, which is a distinguished research recognition normally given to senior and distinguished scientists for life time research work.

Dr. Ramkumar serves in the editorial boards of many international journals and magazines such as the Journal of Engineered Fibers and Fabrics, AATCC Review and Textile Review. He regularly writes a monthly article under the heading "Ramkumar's Corner," for the Ahmedabad based Textile Review magazine.

The Textile Association (India) congratulate him for this prestigious award and he will be among others who have been conffered the Hon. FTA in the past are Dr. P.R. Roy, Dr. M.D. Teli, Dr. M.M. Gharia, Dr. A.N. Desai, Dr. S.M. Ishiaque, Dr. Darlie O. Koshy, Dr. V.K. Kothari, Dr. G.S. Nadiger and others.

Service Gold Medal (Instituted in memory of Hon. Maj. R.P. Poddar) – Shri C. Bose

Mr. Chidambaram Bose was given the Service Gold Medal recognition of his services to the Association.

Mr. C. Bose worked at various senior positions in the prestigious organizations like DCM, J.K. Synthetics, Nirlon and Reliance Industries for about 32 years. He was responsible in developing world's largest texturising facilities. Presently he is the Proprietor of M/s. Bose & Co. which is a Technical Consultant firm. He has to his credits various patents on texturising and also has published number of technical papers.

He has organized five consecutive international seminars on "Texturising" from the year 2001 to 2005 in the upcoming textile region of Silvassa & Daman. He is the member of editorial board of technical journals and is a visiting faculty on many Textile Department / Universities. He is a governing council member of reputed Management colleges.

He has widely traveled all over the world in connection with the business & technology up gradation and is the life member of International Council of Consultants.

He is the President of TAI, Mumbai Unit since 2005 and was instrumental in successfully organizing two All India Textile Conferences in Mumbai. For his outstanding services to the Textile Industry he was conferred with "Honorary Fellow of Textile Association" in the year 2003 by The Textile Association (India).

Recipient of Service Memento (Instituted by Shri H.A. Shah) – Shri R.R. Gosai

Mr. R.R. Gosai is a qualified textile technologist with 40 years professional experience in the industry where in he rose from Shop floor production supervisor to Director of a reputed group of a textile companies. Besides production field, he too worked in Textile R & D and Consultancy field with International Company. He is also on a panel of textile consultants at World Bank.

At textile association, he is patron member from last 10 years and represents Mumbai Unit as Vice Chairman for last 4 years. Before that he was General Secretary of Central Office. He initiated formation of Gwalior Unit during his tenure at Aditya Birla Group.

He has presented many technical papers at national and international textile conferences and seminars. He has also authored two technical books on machinery maintenance published by BTRA.

Widely traveled world over, Mr. Gosai is presently engaged in providing consultancy in textile management subjects and his specialization is Strategy Formation for Growth and Designing of New Textile Plant.

Recipient of Service Memento (Instituted by Shri J. J Randeri) – Shri Sameer Dua

Mr. Dua has more than 20 Years of Experience of Sales and Marketing of Textile Spinning Machinery and Accessories. During his Bright and Illustrious Career, he has worked with Top Companies in the Field of Spinning Machinery in India

He started his Professional Career as Marketing Engineer Trainee in

Award received by Shri A.V. Mantri, Hon. Secretary on behalf of Shri R.R. Gosai

Mr. Sameer Dua is a B. Tech (Textiles) from 1990 Batch of T.I.T & S Bhiwani.

Year 1990 with M/s. Kunal Engineering Company Limited, a Leading Manufacturer of Textile Spinning Accessories at their Bangalore Office.

While at M/s. Kunal Engineering - In a short span of 5 Years and thanks to his Sheer Hard Work, he was transferred to New Delhi Office as Assistant Manager- Marketing. In Year 1995, Mr. Sameer Dua became a Life Member of the Textile Association (India) at its Delhi Unit.

In Year 1997, he joined M/s. Kirloskar Toyoda Textile Machinery Limited (KTTM), a Joint Venture promoted by M/s. Kirloskar Group, India and Toyoda Automatic Loom Works Limited, Japan at the New Delhi Office as Deputy Manager (Marketing). M/s. KTTM is a Leading Manufacturer of Spinning Machinery in India.

Mr. Sameer Dua became a Member of the Managing Committee of TAI - Delhi Unit in Year 1998, Joint Secretary in same Year, Hon Secretary in Year 2001, Vice Chairman in Year 2003 and Chairman in Year 2006. Mr. Sameer Dua is serving TAI- Central Unit as Governing Council Member from Year 2007 till date. During his 15 Years of Association with TAI, he has made significant contribution for the Growth of TAI.

Award is receiving by Unit President, Vice President, Chairman, Hon. Secretary & others

The Best Unit Award – Bigger Unit

The Textile Association (India) – Ahmedabad Unit was awarded the Best Unit Award for seventh time after 1994-95 among all 27 Units for all round best performance & activities done by the Unit during the year. Ahmedabad Unit is established in the year 1948 and now hey have more than 4118 members. The Unit organizes a number of Seminars, Conferences, Exhibitions, Various Festivals, get together etc. Unit also publishes their News Letter.

The Best Unit Award–Smaller Unit

The Textile Association (India) –

Award is receiving by Unit President & others

PHC Unit was awarded the Best Unit Award for third time after 2001-02 among all 27 Units for all round best performance & activities done by the Unit during the year. PHC (Punjab, Himachal Pradesh & Chandigarh) Unit is established in the year 1989 and now hey have more than 434 members. The Unit organizes a number of Seminars, Conferences, Exhibitions, Various Festivals, get together etc.

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InFashion thumps the city India's Premiere Textiles and Ingredients show scheduled from 15th -17th March 2011 at Bombay Exhibition Centre, Goregaon, Mumbai

Every Industry aims at growth and expansion and the same applies to the textile Industry. This year Infashion 2011 has provided the platform to meet this objective. One of the ways to bring about a difference in any Industry is Innovation and InFashion 2011 is based on this exact theme. It's an event which hosts the entire textile & apparel manufacturing & fashion fraternity together – under one roof – to buy, source & view everything that contributes to the business of Fashion.

InFashion is the only platform that showcases latest innovations in Textile & Apparel industry in South Asia. It brings together all the leading Retailers, International & Domestic Brands, India's biggest Garmenters, Merchandisers and Fashion Designers on a single networking platform to relate and connect to contribute towards an inclusive growth of the Indian textile industry.

According to Mr. Rajeev Chawla, Sr. Vice President Marketing & Sales, InFashion 2011, *"InFashion offers multiple unique opportunities for buyers to network, empower with latest information and create thought leadership in areas of trend forecasting, opportunities in Denims and building Innovation Ecosystem through a dedicated Trend Theatre, Conference on Innovations in Textiles & Apparel and Magic of Denim."*

This year, InFashion will connect the entire industry together on a common ground to innovate and grow. It brings together leading Global and Domestic Brands, Exporters, Buying Houses to source the latest in Fibre to Finish. The participating companies cover the entire value chain of Textile and Apparel showcasing the most diverse range of new and innovative fashion ingredients and services from Fibre.

The leading companies like Siyarams, Donear, Birla Cellulose ,Damodar, Bhaskar, True Value, Harry Collection , Linen Club, Linen Fiesta, Bombay Rayon, DSM Suitings, KG Fabrics Ltd, Mandhana Industries, Ram Vijay, SGS silk Mills, Topman Fabrics, ASM Industries, Nimbark Fashions, Vishnulene , Fashion Factory,Asmara), Supriya Silk Mills, Fashion Accessories, Pal Fashions, NandGanesh ribbons, Mahajan Silk Mills, Screen arts, Qmax Synthetics, Orosilber, Raj rayon, Scottish Yards , Madeira, Shree Vallabh International, Wonder Weaves, Alfa Industries , Delight Apparels, TH Textiles , Heemy Digital ,Super Choice, GM Fabrics, Sagar Twisters, Silverline Fabrics, Kriplon Synthetics,Sanathan, Texperts, Nirvan, Mitva Fabrics,Sutlej,Napoleon,Carolon,Dicitex, D'Decor ,Empitex , Beekalene, Sarvodhey, LNJ Bhilwara , Santosh, Chinar, DNH, Honesty, I Ball , Bombay Subsription,and many more....have their names associated with InFashion. *Exhibitor List correct at time of going to print. (Subject to change).

Birla Cellulose, the Aditya Birla Group's umbrella brand of cellulosic fibres and Federation of All India Textile Manufacturers Associations, have tied up as strategic partners of InFashion 2011. Through this association, Birla Cellulose and FAITMA plan to leverage InFashion platform to support the growth of the textile and garment manufacturing in India.

The main objective of this conference is to bring together industry, innovators, research organizations and academia involved in meaningful discussions on existing innovations in textile, apparel & retail industry. Which will further enhance exploration of possibilities for new product development, tapping domestic and global market potential all through innovation. This will finally enable in developing a suitable strategy for the overall development of textile fashion business.

They key highlights of this year's InFashion show include:

- International Exhibition showcasing the latest Innovations in Fibre to Finish
- Trend Theatre
- Asmara Lounge
- Conference on Innovations in Textiles and Apparels
- Magic of Denim, a dedicated section on Denim Ecosystem
- Fashion Show with leading Indian Brands

InFashion 2011 will take place from March 15, 16 & 17 at the Bombay Exhibition Centre, Mumbai

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"Budget 2011-12 - a step in the right direction", Shri V.K.Ladia,Chairman SIRTEPC

The Union Budget for 2011-12 announced by the Hon'ble Union Finance Minister Shri Pranab Mukherjee has allocated Rs.3100 crores for the Technology Upgradation Fund Scheme (TUFS). "This is a positive measure which will help the textiles sector to Aplement their expansion and modernization programmes", said Shri V.K.Ladia, Chafrman of The Synthetic & Rayon Textiles Export Promotion Council(SRTEPC).

He urged the Government to remove the freeze on fresh sanctions under the TUF scheme at the earliest.

The Optional Excise Duty on Manmade Spun yarns and fabrics has been retained at 10% which according to Shri Ladia is a step in the right direction. However, the Chairman SRTEPC pointed out that the conversion of optional duty of 10% to mandatory duty on branded textiles made ups will have an adverse impact on this sector which is highly labour intensive. He said bulk of the fabrics used in the manufacture of such made ups are cleared under t-he optional route at zero duty and hence the manufacturers will hardly be able to avail of any Cenvat Credit.

The Chairman, SRTEPC also appreciated the Budget proposal to introduce a scheme for the refund of service tax paid on the services used in the export of goods on the lines of the Drawback rates. "This is a very good step ", observed Shri Ladia. He pointed out that service tax refund is a cumbersome procedure and the exporters find it extremely difficult to get the refund. He urged the Govt to put in place the proposed system for the refund of service tax at the earliest.

Shri Ladia also lauded the move to introduce a self-assessment system under which I expoirtars anul importers %vould thornsolvoc assees their duty liabilities while filing their declarations in the EDI system. "This will greatly help the exporters in saving time and also in reducing the transaction costs" said the Chairman, SRTEPC.

BELGIAN TEXTILE TECHNOLOGY: PERFECT DIAMONDS

"Belgian Textile Machinery industry meets key decision makers of the Indian Textile Industry"

Strong track record

The Belgian machinery industry, including the textile machinery, is the fastest growing industrial employer in Belgium. The last 5 years an annual growth rate of 4.5% was achieved and its world market share rose with 10%. An important driver for that performance was the doubling of investments in the mechatronics industry over the 1998-2007 period. To position its customers in the pole, the Belgian mechatronics industry is strongly R&D driven. It invests 7% of its added value on R&D and employs over 10% of the total Belgian research head count. The industry accelerated its research efforts on energy efficiency in the last decade and achieved an average energy consumption reduction for its products of 15%. The long term strategy directs the Belgian mechatronics industry towards continuous strategic and open innovation to accelerate its product development rate and provide its customers with leading edge technology. The Belgian mechatronics industry is the nation's 3th exporter.

India road show

From February 28 to March 4 2011, a delegation of the Belgian textile machinery industry will key decision makers of the Indian Textile Industry. The road show visits Ludhiana, New Delhi, Mumbai, Coimbatore and Bangalore. The Belgian textile technology industry will present its newest developments in the areas of flat and pile weaving technology, jacquard technology, weft feeders, finishing machinery, weaving accessories, textile inspection and control systems, textile industry automation, carding technology, extrusion and filtration technology. Belgian textile technology developers will show the latest technology for the production of clothing fabrics, interior textiles (upholstery, carpet …) and technical textiles. They will interact with the Indian textile industry to select effective technologies that answer Indian industrial needs. Belgian technology providers will support the Indian textile industry in the achievement of its strategic goals to reduce raw material waste, energy and water consumption and to increase competitiveness. Some key Belgian companies participating in the road show are Bekaert, Bonas, Picanol and Van De Wiele. More information and registration for the road show via www.symatex.be or contact info@symatex.be

NITRA

The 9th Convocation of NITRA for the academic year 2009-10 was held on Saturday, the 15th January 2011 at NITRA, Ghaziabad. Shri Shishir Jaipuria, eminent industrialist and Chairman, NITRA graced the occasion. Also present were eminent industrialists Shri R.L. Nolkha, Dy. Chairman NITRA and Shri K.K. Agarwal, Vice Chairman, NITRA. 191 students from 11 programs were awarded certificates and medals in this year's convocation. The Chairman also released seven latest technical books published by NITRA.

(L-R) Dr. J. V. Rao, *Director*, NITRA, with G.C. Members Sh. Shishir Jaipuria, *Chairman*, Sh. R. L. Nolkha, *Dy. Chairman*, and Sh. K. K. Agarwal, *Vice Chairman*

Shri K.K. Agarwal, Vice Chairman, NITRA, in his welcome address opined that the impact of global demand recession observed in 2008-09 has faded out and Indian textiles industry is again back on the growth track. He mentioned that, NITRA's alumni strength at present is more than 1500 and they are well placed in the industry, both in India and abroad. Apart from rich experience in training, another plus for NITRA is its close proximity to India's garment and apparel hubs of Delhi, NCR, Jaipur, Ludhiana and Panipat. This location advantage undoubtedly makes NITRA as the most ideal institute for youngsters to undergo training and start a career in textiles and apparel industry. He mentioned that NITRA had also taken up the task of preparing quality technical publications and today would release seven new books authored and compiled by NITRA scientists and faculty from Anna University, Chennai and Dayalbagh University, Agra.

Dr. M. S. Parmar, Asst. Director, NITRA, Sh. Shishir Jaipuria, *Chairman*, Sh. R. L. Nolkha, *Dy. Chairman*, and Sh. K. K. Agarwal, *Vice Chairman*.

Director NITRA Dr. J,V. Rao mentioned that today NITRA had set benchmarking standard in professional training and offered 12 industry oriented techno-management programs on regular, part-time and distance learning modes, covering the areas such as textile/garment manufacturing, textile/garment designing, merchandising, quality assurance, garment finishing and sewing machine operation & maintenance. He informed that more than 100 renowned apparel and textiles exports companies had recruited NITRA alumnus in the past seven years. Apart from the regular students, the DLP students also excelled in their career after updating their knowledge from NITRA.

A section of industrialist and pass out present in the occasion

Dr. Rao expressed happiness that NITRA would be training 16,500 people in next five years under Integrated Skill Development Scheme launched by MoT in July 2010. Under this scheme, NITRA proposed to conduct 98 training programs, 64 for textiles and 34 for technical textiles sector. The programs would be conducted in NITRA head office at Ghaziabad and its seven power loom service centres. He also spoke about the "Centre of Excellence" set up at NITRA in collaboration with IIT, Delhi for carrying out R&D and training in protective textiles. He informed that in the current year, NITRA was working on 5 projects in the areas of fusible interlinings, Flex fabric, IRR Fabric, Blackout Fabric and Nuclear Biochemical (NBC) fabrics besides the 4 research projects that were started last year. Further, NITRA had also submitted a detailed project on "Energy Water Carbon Accreditation program for textile supply chain- Design Phase" to MoT.

A fresh pass out interacts with NITRA GC Members, Sh. Shishir Jaipuria, *Chairman*, Sh. R. L. Nolkha, *Dy. Chairman*, and Sh. K. K. Agarwal, *Vice Chairman*.

Shri Shishir Jaipuria, Chairman, NITRA in his convocation address said that the Indian textile industry is the second largest employment provider in the country that directly and indirectly employed 35 million people. As per a recent survey, this sector alone generated 1.52 lakh jobs between July '09 and June'10. He informed that, the size of India's T&A Industry is targeted at US$ 220 billion by 2020, out of which export share would be US $ 80 billion. This would increase India's share of textile and apparels in the world trade from the current level of 4.5% to 8%. However, in order to achieve this growth, investments to the tune of US$ 68 billion would be required by 2020. It is estimated that once this investment was made, this industry would generate an additional 10 million direct and 20 million indirect employments.

The Chairman also opined that by 2012, India would overtake China in terms of growth. At the same time, the already high demand for Indian professionals would go up further in the international market. He opined that the textile industry has globally shifted towards Asia with India, China, Bangladesh, Vietnam, Pakistan and Sri Lanka becoming lead players. In India, the apparel sector in particular is growing robustly and had become the most potential producer of export items. Besides EU and US, new markets such as Japan, South Asia, Australia, Latin America and South Africa had been tapped to promote exports. Sh. Jaipuria also informed about the major policy initiatives taken by the ministry to augment T&A industry and expressed happiness over industry's continuous support to meet ministry's policy objectives.

While talking about NITRA he opined that the textile ministry and the textile industry had been always encouraging institutes like NITRA, that had taken initiatives in skill development and manpower training activities, specially at shop-floor and supervisory level for the T&A industry. He was happy to inform the gathering that NITRA had already invested Rs. 3 crores and had earmarked another Rs. 2.5 crores for the up-gradation of physical and academic facilities such as modernizing the existing training infrastructure, especially the laboratories for offering better hands-on training. The Chairman expressed that these would enhance industry confidence in NITRA's programs and industry will continue to support NITRA by recruiting its students in large numbers.

Sh. R.L. Nolkha, Dy. Chairman NITRA, while proposing the formal vote of thanks, appreciated NITRA's manpower training activities and thereby creating job opportunities for youngsters. He asserted that NITRA's initiatives would definitely support the existing govt. initiatives for manpower training and thus would benefit the textiles industry.

Wanjie Group from China concludes major order with Oerlikon Neumag

During the visit of the vice prime minister of China, Li Keqiang to Berlin, Germany, on January 7th 2011, the company Wanjie Group signed a major order with Oerlikon Neumag for the supply of machines and plants for the production of polyester staple fibers in the presence of Germany's foreign minister Mr. Guido Westerwelle.

Together with another five German companies, amongst others Volkswagen AG and Daimler AG, contracts amounting to approximately 4.6 billion Euro were concluded with Chinese representatives, during a meeting at the Foreign Office.

Apart from the supply of machines and plants for the production of polyester staple fibers, the order amounting to tens of millions, also includes all the necessary engineering services under Oerlikon Neumag's supervision and coordination. The plant will be erected in Zibo City, Shandong Province, at the end of 2011 and should be starting with the production of fibers for the textile industry in the first half of 2012.

L to R - Chairman of the Wanjie Group and Gerrit van Loenen (right), Sales Director from Oerlikon Neumag signed a major order for the supply of machines and plants for the production of polyester staple fibers in the presence of Germany's foreign minister Mr. Guido Westerwelle (middle).

In Shandong Province, which is the main region for cotton cultivation and processing in China the Wanjie Group has the largest market share of the staple fiber production for textile applications. "We have great confidence in companies like Oerlikon Neumag", emphasised the Chairman of the Wanjie Group Sun Qiyu. "From past orders, we know the smooth project procedure, the high-performance machines and the unproblematic production of high-quality fibers which is guaranteed when purchasing an Oerlikon Neumag plant".

Germany's foreign minister Mr. Guido Westerwelle (left) and Sun Qiyu (right), Chairman of the Wanjie Group seal the contract.

"The Chinese market is highly competitive especially for us as plant manufacturers", said the Business Unit Head of Oerlikon Neumag, Georg Stausberg. „For the Oerlikon Textile Business Unit Oerlikon Neumag with an export share of nearly one hundred per cent for synthetic staple fiber plants, we are extremely pleased about this order from China which is one of the fastest economically growing country worldwide. With each new project from China, we can learn from our important trading partner in order to, in future, also be able to act competitive in the global market", said Thomas Babacan, CEO of Oerlikon Textile and COO of OC Oerlikon.

Shake hands between Vice Prime Minister of China, Li Keqiang (left) and Sun Qiyu (right), Chairman of the Wanjie Group.

The segment for staple fiber equipment of Oerlikon Neumag had a successful year 2010 with projects like the worldwide first plant with a daily capacity of 300 tons or compact machines for the production of specialty fibers (bicomponents). All in all, in 2010, staple fiber plants with more than half a million tons annual capacity were sold worldwide by Oerlikon Neumag.

About Oerlikon

Oerlikon (SIX: OERL) is a leading high-tech industrial group specializing in machine and plant engineering. The company is a provider of innovative industrial solutions and cutting-edge technologies for textile manufacturing, thin-film coating, drive, vacuum, solar energy systems and advanced nanotechnology. A Swiss company with a tradition going back 150 years, Oerlikon is a global player with around 16,000 employees at 157 locations in 36 countries and sales of CHF 2.9 billion in 2009. The Company invests more than CHF 200 million annually in R&D, with over 1 200 specialists working on future products and services. The operative businesses rank either first or second in their respective global markets.

For further information please refer to:

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MMF textile exports hit by sharp increase in raw material prices

Unlike most other sectors of Indian industry and exports, the Indian MMF textile sector remained unaffected by the recent global financial crisis and even achieved positive growth until recently, said Shri Vinod K. Ladia, newly elected Chairman of The Synthetic & Rayon Textiles Export Promotion Council.

Exports during 2009-10 registered a growth of nearly 7% at Rs.16,861 crores (US$3534 million) as against Rs.15767 crores (US$3426 million) during 2008-09.

However of late, the MMF textile exports have started to experience the worst ever crisis due to global as well as domestic factors. As a result exports of MMF textiles declined by 1% to Rs.3852 crores during April-June 2010-11 from Rs.3898 crores in the corresponding period last year. The export scenario further worsened as exports dropped by around 20% to Rs.3464 crores in the second quarter of 2010-11 as compared to exports at Rs.4910 crores during the same period of the last fiscal year.

It may be pointed out that, exports to even establish markets like the UAE and Saudi Arabia besides upcoming and growing markets like Pakistan and Afghanistan witnessed a negative growth during this period. While external factors like the global economic slowdown, sluggish recovery in the US and the European markets, intensifying competition from China are some of the reasons for the fall in exports. What has been crucially affecting the exports of MMF is the abnormal and unprecedented increase in the prices of raw-materials such as fibre and yarn.

The drastic reductions in the Duty Drawback rates and the appreciating Rupee against the US Dollar have further aggravated the situation for the exporters of Synthetic textiles. According to the SRTEPC Chairman, exports of MMF textiles are likely to fall short of the target of US$ 3.7 billion fixed by the Government for 2010-11. The Government's ambitious plan to increase exports to US$ 7 billion by the year 2013-14 will also be hit.

Prices of polyester staple fibre have been increasing on a daily basis. Polyester yarn prices have gone up by 40% from October this year. Further, the exporters have also reported about the non-availability of fibre & yarn on time with the supplies by the manufacturers becoming erratic and unreliable. This is making it difficult for the exporters to plan their shipments and to adhere to the delivery schedules prescribed by the overseas buyers.

In this context the Council has sought the intervention of the Government in stabilizing the fibre & yarn prices and to ensure its availability for export production at international prices. SRTEPC has also urged the Government to immediately increase the Duty Drawback rates for 2010 -11.

THE TEXTILE ASSOCIATION (INDIA)

(an ISO 9001:2008 certified association)
Organizes

WORLD TEXTILE CONFERENCE

The Textile Association (India) – Central Office is organizing a global level conference, for the first time in India, on a much larger scale and in a much broader format than our regular annual conference; World Textile Conference, it's to be held in Mumbai on May 6 to May 7, 2011 at Intercontinental, The Lalit, Sahar Airport Road, Andheri (E), Mumbai. The theme of this conference is "Vision 2020: Emerging New Opportunities Worldwide and Challenging Business Strategies."

The aim of the conference is to provide an interactive opportunity, and to create a very positive atmosphere where the entire textile fraternity can benefit by discussing, meeting and knowing each other and enhance our cumulative strength.

The conference is expected to be the largest convergence of cohesive forces and intends to bring together all textile industry stakeholders like mill owners, corporate houses, trade associations, export councils, policy makers and industry leaders, CEOs, and senior professionals from the national and international industry and discuss large opportunities face to face. The two-day conference will have eminent speakers, panelists and moderators including international experts to share their vision before an august audience of over 500 delegates.

Objectives

The objective of the conference is to create a very positive atmosphere and to provide an interactive opportunity where the entire textile fraternity can benefit by meeting one another, knowing one another. The conference will also provide a unique opportunity for Indian and international trade associations, export councils, policy makers and industry leaders and professionals to discuss large opportunities face to face.

Convergence of Cohesive Forces

The conference shall bring together largest convergence of cohesive forces of of about 500 high profile delegates from Textile and Apparel industry stakeholders like mill captains, corporate houses, textile and apparel industries, Trade Associations, Export Councils, Policy Makers and industry leaders, CEOs, and other senior professionals and leading quality machinery manufacturers from the national and international industry.

The conference Programme

- Shifting focus towards Asia and India in global sourcing, India emerging as strong alternative. Resurgence in Indian textiles- a time to invest!
- Is industry integrated in Value Chain to maximize growth? Need for balancing fiber requirements. Industry leaders & trade bodies need to unify sectors across value chain and fibers? Are fabric produces focusing apparel sector enough?
- Change in consumer perspective from need to want is forcing a change in value chain from supply led demand to demand led supply.
- Large Emerging Opportunities in Apparel Fabrics, Home Textiles, Camouflage and Defence Fabric and Technical / Specialty Textiles.
- The Challenges and Opportunities for textile exports in the context of WTO Rules.
- International Success stories of China, Korea, Taiwan and new economies like Vietnam, Turkey and Bangaladesh attracting investments as case studies.
- Indian Success Stories in Textiles, Apparel and Fashion retail. Is India ready to acquire western companies to set global footprints?
- Collaborative and partnering strategies with global buyers and retailers – where does India find its mark – High volumes at low prices, or / and small quantities and more designs?
- Why IT in Indian Textiles and Clothing has not been overly successful?
- Impact of global economic environment in currency fluctuations and new financial reporting systems like IFRS.
- Can Ethical and Sustainable business be profitable business?
- Modernization, Advancements in Technology and R&D business (investments and ROI) perspective analyzed focus on New Quality Standards.

The Eminent Speakers

Mr. Julian Ellis, Chairman, Ellis Developments Ltd, UK
Mr. Adrian Wilson, Smart Textiles and Nanotechnology
Mr. Jiri Militky, Dean, Dept. of Textiles, University of Liberec, Czech Republic
Mr. Colin Purvis, CIRFS: European Man-made Fibres Association, Brussels

Prof .Mr. Pertti Nousiainen, Fibre and Textile Materials, Tampere Uni.,Finland.
Mr. Robert Antoshak, Managing Director at FCStone Fibers & Textiles, USA
Mr. Andrew Olah, President- Olah Inc and organizer, Kingpins show
Mr. Robin Anson, Textile Intelligence, UK
Mr. Shishir Priyadarshi, Director, WTO, Geneva
Dr. P.R. Roy, Director, fibre2fashion
Prof. (Dr.) M.D. Teli, Dean, ICT
Mr. K. Ramchandra Pillai, CMD, NTC Ltd
Dr. Seshadri Ramkumar, Nonwovens & Adv. Mat. Lab., Texas, USA
Mr. Manish Mandhana, Joint MD, Mandhana Industries
Mr. Ashesh Amin, CEO, SKNL
Mr. R.S. Bachkaniwala, Chairman, India ITME Society
Mr. Khurshed Thanawala, M.D., Oerlikon
Mr. Kim Gandhi, The Textile Institute, Manchester
Mr. Premal Udani, Chairman, AEPC
Mr. Rahul Mehta, President, CMAI
Mr. Prem Malik, Vice Chairman, CITI
Mr. S.K. Gupta, Group CEO, Raymond UCO Denim
Mr. Arvind Sinha, Business Advisor Group
Mr. R.D. Udeshi, President – Polyester Chain, Reliance Industries
Mr. Martin Jones, Marks & Spencer
Mr. Thorsten Allenstein,MD India-Sri Lanka, Triumph
Mr. Enrique Silla,President, Jeanologia, Spain
Mr. Andre Leroy, Chairman Apparel & Footwear Committee American Chamber of Commerce, HK

During such a high profile Conference, one of the important features will be the Souvenir, which will be published on this occasion and it will consist of the vital information about the Textile Association (India), Abstract of Technical Papers to be published and advertisements of different companies and firms.

Mr. D.R. Mehta, President TAI appeals to support and co-operate to make this mega conference a grand success. Your Co-operation will be solicited in the following ways.

- *by encouraging maximum friends to register as delegates*
- *by inserting the advertisement in the Souvenir & Book of Papers*
- *by accepting to be Sponsor or Patron to this event*

For more details contact: Organizers
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Also visit our website: www.textileassociationindia.org

Sad Demise

D.P. Kelkar
04-02-1927–08-03-2011

As person with impeccable record as a student as well as an Administrator, Mr. D.P. Kelkar was a bright student as he graduated from Victoria Jubilee Technical Institute (VJTI), in Textile discipline – Bachelor of Textiles (B.Tex) with a First Class (Disq.) first rank in 1950. This was the first batch of B.Tex of Mumbai University. He also did his post graduate diploma in Industrial Engineering and Statistical Quality Control.

Mr.Kelkar started his career in Modern Mills Ltd. (Sirur group) and gradually rose in the post of General Manager of Minerva Mills, Bangalore. He later tried his stint in government mills – Pratap Mills, Amalner and Bharat Textile Mills, Mumbai. He ultimately rose to the post of Chairman & Managing Director of N.T.C. (S.M.) Ltd. and then N.T.C. (N.M.) Ltd. Mr. Kelkar was associated with revival of number of sick textile units both in Maharashtra and Madhya Pradesh on behalf of I.D.B.I.

Mr. D.P. Kelkar was an efficient administrator with lot of patience and management skills. He was abundant knowledge of cotton and marketing. He was also associated actively in construction of School Building & Office in Ratnagiri.

Mr. Kelkar leaves behind a irrevocable gap in textile industry.

May his soul rest in peace.

New Office Bearers of SRTEPC

Shri V.K. Ladia

Shri VINOD K. LADIA ELECTED AS SRTEPC CHAIRMAN

Shri Vinod K. Ladia, Founder and Chairman of the Udaipur-based Shree Rajasthan Syntex Limited (SRSL Group) have been unanimously elected as the Chairman of The Synthetic & Rayon Textiles Export Promotion Council (SRTEPC) on 27th December 2010. The Council is engaged in the promotion of exports of synthetic & rayon textiles and exports of these items at present amounts Rs.19,775 crores.

Shri Ladia is a Graduate from Textile Institute of Technology, Bhiwani and a Post Graduate Diploma in Business Management (MBA) from Indian Institute of Management, Ahmedabad.

He started his career in the year 1968 as a Officer on Special Duty with M/s J.K. Synthetics Limited, Kota and was subsequently made In-charge of all Commercial activities of the J. K. Group including Nylon, Polyester, Polyester Staple Fiber and Tyre cord business.

Shri Ladia is also the President of Indian Spinners' Association and the former Chairman of Confederation of Indian Textile Industry (CITI) and Rajasthan Textile Mills Association. Before taking over as the Chairman, Shri Ladia has been associated with the SRTEPC as the Vice-Chairman for two years and the member of the Committee of Administration for a long time.

SRSL Group is a leading supplier of polyester-viscose yarn apart from being largest exporter of polypropylene yarn from the country.

Shri Ambuj Kasliwal

Shri AMBUJ KASLIWAL ELECTED SRTEPC VICE-CHAIRMAN

Shri Ambuj Kasliwal, Director of S. Kumars Nationwide Ltd., has been unanimously elected the Vice-Chairman of The Synthetic & Rayon Textiles Export Promotion Council (SRTEPC).

Shri Kasliwal, who has travelled widely, has over 30 years of experience in international marketing of textiles. Shri Kasliwal has a long association with the Council and has been a Vice-Chairman for two years and member of its Committee of Administration for a period of nearly 25 years.

Priyadarshini's Profit for Q3FY11 up by 6%

Hyderabad based, Priyadarshini Spinning Mills Ltd., one of India's leading producers of Polyester/viscose blended yarn manufacturing has shown increase in Net Revenue by 6 % when compared with the last quarter of current financial year, from Rs 65.17 Crores for the quarter ended September 30, 2010 to Rs 68.87 Crores for the quarter ended December 31, 2010.

The Company has reported a PAT for Nine months ended 31st December, 2010 of Rs 7.86 Cores on a turnover of Rs 187.18 Crores showing an EPS of Rs.7.10.

Highlights

	Quarter ended 31.12.2010 (Rs. Crores)	Quarter ended 31.12.2009 (Rs.Crores.)
Sales	68.87	53.08
Profit after tax	2.26*	(1.20)
Earning Per Share(Rs)	2.04	(1.08)

Includes adjustment of deferred tax asset of Rs.1.61 Crores

The turnover has gone up by 30% whereas the EBIDTA has gone up by 47% over the corresponding quarter in the previous year. The EPS at Rs.2.04 for the quarter is up from Rs. (1.08) from the same quarter in the last year. The results from both the segments viz., Spinning & Yarn Dyeing have shown significant rise and the Company expects to do better in the future.

Commenting on the results, Mr. Harish Cherukuri, Managing Director of Priyadarshini Spinning Mills Ltd. said, "The Company has achieved satisfactory results in the current quarter and looking to improve its quality, productivity and profitability. Further The Textile industry is doing well. We hope to satisfy our stakeholders with our consistent performance next quarter."

About Priyadarshini Spinning Mills Limited

Incorporated in 1981, with the capital investment of Rs 800 lakhs, today Priyadarshini Spinning Mills is a listed company and has a turnover of nearly Rs 240 Crores. The company's primary manufacturing activity consists of yarn manufacturing and yarn dyeing. The company has a capacity of 82,000 spindles and manufactures 35 tons of yarn every day. This capacity is spread over two yarn manufacturing facilities. Priyadarshini manufactures 100% cotton and synthetic blends in various qualities. With a capacity of 10 tons/day cotton yarn dyeing, it produces 100% cotton, 100% cotton mercerized, 100% Polyester and 100% Viscose in batch sizes ranging from 20kgs to 1 ton. It also exports to countries in Europe, Middle East, Turkey and Russia amongst others.

The company is an ISO 9001 certified company and their cotton yarns have OEKO Tex 100 certification.

Strategic tie-up between A.T.E., India and Century Way Enterprise, Hong Kong for 'Laibao' rapier weaving machine

In a strategic tie-up, A.T.E. Enterprises Private Limited, India, has joined hands with Century Way Enterprise Ltd., Hong Kong, for sales and marketing of Flexible Rapier weaving machines laibao in India, Bangladesh, Nepal and Sri Lanka. Century Way, Hong Kong, is a well established rapier loom manufacturer with its manufacturing facility located in China.

A.T.E. will be marketing the flexible rapier weaving machines 'Laibao' GA 737, GA 737A and G 737 J/S models in India, Bangladesh, Nepal and Sri Lanka through its strong sales and service network.

The weaving industries in these markets have long been looking for a simple to operate, latest technology weaving machine at an affordable price. The 'Laibao' brand weaving machine from Century Way is here to fill this long felt need.

What is more important for customers is that complete service and spare parts support will be offered by A.T.E., which will ensure prompt and hassle-free support to the customers.

Ideas are no one's monopoly : Meswani

"As young India will become richer before it becomes older they will take India and fashion to a different horizon even better than Italy today. This is my conviction," opined Mr. Nikhil Meswani, Executive Director, Reliance Industries Limited.

Delivering the Chairman's address at the Indian Fashion Forum (IFF) organised by Images Group, Mr. Meswani observed that unlike commodity business, fashion was subjected to a different set of challenges. The climate of openness means diminished loyalty to brands and greater receptiveness to new brands and product features. Therefore, there was an urgent need to think out of the box to meet the challenges ahead for the marketers, he stressed.

Stating that innovative solutions were needed to venture into unexplored territories, RIL ED stressed that being innovative helps to set the right trend in fashion business. My son, Mr. Meswani said, always feels that he does not have adequate options like my daughter, when it comes to dresses. May be there are more male designers who think only about females while female designers don't have time to think beyond designing their own dresses. This, however was not true because fashion trends are largely defined by the more beautiful gender, he pointed out.

Citing the Indian textile and apparel compendium 2010, Mr. Meswani said informed that womens' wear was expected to grow faster than mens' wear. Thereby share of mens' wear was expected to fall from 43% in 2009 to 37% in 2020. In view of this falling trend, there is a need to be innovative to make men come out to halt the drop in their share, he stressed.

Even though RIL is the largest polyester fibre and yarn manufacturer in the world, Mr. Meswani confessed that he had seen more than 20 shades of white and may be 40 shades of black and he still struggled to understand what is correct black and white. "I am yet to see perfect white shirt," he emphasized.

Innovation was therefore of paramount importance. However it should not lead to absurdity as they say many times in Bollywood that good copy is better than bad original, said Mr. Meswam.

He defined innovation with reference to fashion as "the ability to determine what a consumer wants even before he can articulate it. Thinking ahead of consumers by taking calculated risks. Risks, which always provide disproportionate returns."

Quoting RIL Founder Chairman, Mr. Dhirubhai Ambani, "Think big, think fast, think ahead. Ideas are no one's monopoly," Mr. Meswani said that good companies strive to satisfy demand while great companies create demand. Robust GDP growth, aspirations of young population and rise in consumerism, Mr. Meswani said, will boost Indian demand for fashion products. And winners in this industry will be only those who have an eye on the future. Like those who rapidly adapt to market needs with innovative products and processes and continuously hone up competitive skills, he added.

While concluding, Mr. Meswani said: "Fashion business will have to be based on future trends and not on past trends. Demand projections by most consultants will always be beaten. The opportunities for us are to tap the potential unheard of, to explore a new horizon. We are going to witness an unprecedented demand for the first time in the history. India's hour has arrived. It is for us to bring in fashion back to India."

China-Textile industry profits up 53.55%

Textile industry profits leaped 53.5% or 69.8 billion yuan to 200.4 billion yuan in the first 11 months, reports China Business News, citing the Ministry of Industry and Information Technology. During the first eleven months of 2009, the figure fell 25.4%.

According to one analyst, the industry as a whole has trended upwards, and rising costs have lead each link in the industrial chain to successively raise garment prices. During that interval, upstream sectors such as raw materials, cotton spinners and chemical fiber firm's notched considerable profits, while downstream garment companies also gained by jacking up retail prices. A rebound in orders also boosted textiles' profitability.

One industry informant said profits from cotton yarn sales are now several times higher than in 2009. Downstream companies still need to absorb this and other costs and have so far lifted retail prices by 20-30%.

A.T.E. & DyStar Training Extends Its 1st Program for Textile Processing Students on 4th Feb 2011 in Coimbatore

Ever since the launch of the training program for the textile industry, the joint efforts taken by A.T.E. Enterprises Pvt Ltd and DyStar India Private Limited, in the service avenues of helping industry and institutions through their joint venture banner 'Training School' has received overwhelming response. After the successful program carried out in prominent textile centers like Tirupur, Mumbai and Ludhiana, the module for students was launched in a reputed institution in Komarapalayarn on 4th Feb 2011.

200 budding textile technocrats from Erode district from various colleges like SSM College of Engineering, SSMITT, Erode Institute of Technology, Bannari Amman Institute of Technology, and PSG Tech have interestingly attended the training on "THE BEST PRACTICES OF PACAKGE DYEING" covering the Fundamentals, Chemistry and Process of Package Dyeing. While the process and chemistry aspect was jointly presented by Dr. Siva Rama Kumar Pariti C.Col A.S.D.C, Manager Laboratory/DTS and by Errol Fernandes, Manger Business Development, DyStar. The machinery aspect was handled by G. Elango, Deputy General Manager, A.T.E. Enterprises Pvt Ltd (Textile Engineering Processing - southern region). While summing up the proceedings N. Somasundaram, Coimbatore Branch Manager of DyStar thanked the organizers and the students for their active participation.

Students were ecstatic and enthusiastic about the benefits they got from this program. Many students came up with a request to conduct many such programs on various processing topics to get the know how from A.T.E and DyStar.

ADVERTISEMENT INDEX

Rieter inaugurates new manufacturing unit in Maharashtra

Rieter India Pvt. Ltd., a subsidiary of Rieter Group of Switzerland, officially inaugurated its manufacturing unit at Wing in Maharashtra on 9th Feb, 2011. Erwin Stoller, Chairman of the Board of Directors of Rieter Group in the presence of several leading customers as well as Swiss and Indian dignitaries inaugurated the plant.

More than 70 leading customers of Rieter were present to grace the occasion. The new plant manufactures components, parts and assemblies for Ring Frames as well as other textile machines. The ceremony also marked the launch of first RSB-D 45 model of autoleveller Draw Frame. Michael Enderle, CMD, Rieter India, welcomed the cust6mers and guests and Sudhir Jalan, Co-Chairman of Rieter India, stated the advantages of Swiss quality and precision in his introductory speech. Rieter Chairman Frwin Stniler- Peter Gnaeai, CEO of Textile Division, H.E. Philippe Welti, Ambassador of Switzerland to India, Werner Nilevergelt, Consul General at Mumbai plus a Swiss Government delegation for Vocational Educational Training (VET) reinforced the richness of Rieter as a Swiss brand.

Speaking at the event, Erwin Stoller, looked back on Rieter's association with India, its relationship with Indian customers and its decades-long close collaboration with Lakshmi Machine Works. Around 30 years after setting foot into the Indian market, Rieter underlined its long-term commitment to the Indian market and customers by setting up its own Indian subsidiary, Rieter India Pvt. Ltd. In August 1995 with sales, support and service teams.

He pointed out that with the advent of EoU's in the 90's, Indian customers realized the viability of imported spinning machines and the demand for Rieter machines witnessed significant gains thereafter. Stoller also stated that the rapid increase of the GDP, combined with the increasing purchasing power of the population in India and China, led to a higher demand of superior quality textile products in these countries.

S. P. Oswal, Chairman, Vardhman Group and amongst the early customers for G 32 Ring Frames produced in India, complimented Rieter for its role and support to the Indian textile industry. He highlighted that Rieter had played a crucial role in enhancing Indian capability in cotton yarn production by providing knowhow and support to LMW more than 45 years ago. This helped India to enlarge their presence in world cotton yarn trade from less than 10% to over one fourth of international trade. He also encouraged Rieter to enlarge the product portfolio of machines produced in India. Philippe Welti, the Ambassador of Switzerland in India said that the inauguration of the manufacturing unit was an important day for Rieter and the Swiss textile machinery industry. While referring to the speeches made by Sudhir Jalan and Oswal, he was happy to note that his role of promoting Swiss quality and Switzerland as a country, was being performed by the other speakers on the dias.

Stoller mentioned that between 2001 and 2005 Rieter increased its holding in the German company Suessen in steps to 100%. With this acquisition Rieter added a manufacturing site for textile machinery in Wing, Maharashtra. In order to give evidence to the increasing importance of the Indian market and to ensure Rieter's presence in the country on a long-term basis, investments were stepped up in the last two years. The company upgraded and expanded its production facilities at Wing, Satara in Maharashtra and in addition, another textile machinery, manufacturing unit was set up in Koregaon Bhima, Pune.

Rieter offers four spinning technologies from a single source: ring spinning, compact spinning, rotor spinning and air-jet spinning. Yarns produced on Rieter,machines are familiar under the following brand names: Rieter compact yarn, Com4® and Rieter rotor yarn ComfoRo®. The novel yarn produced on the new air-jet spinning machine is marketed under the name ComforJet®.

The offerings of Rieter Textile Systems rang, from complete installations from raw material to end product, subsystems, machines, components, wear and tear parts as well, as spare parts to accompanying services from pre sales to after sales.

Rieter's Business Group Technology Components & Conversion (TCC) develops, produces and distributes technology components to running spinning mills and OEMs on a worldwide basis. TCC is globally the largest provider of technology components and the only supplier who can act along the whole textile value chain.

In both divisions, Rieter Textile Systems and Rieter Automotive Systems, the Rieter Group is underlining its determination and motivation to grow its solid base in the country. Currently, around 1'500 people across 8 locations are employed. The plan is to further increase the headcount, investments and product range in the medium term.

The Rieter Group operates internationally, developing and producing sophisticated systems solutions for the textile and automotive industries, In the 2010 financial year Rieter generated sales of 2'585.8 million CHF with some 12'800 employees worldwide. The Textile Systems Division accounted for 870.4 million CHF and the Automotive Systems Division for 1'715.4 million CHF of these total sales.

Textile Excellence Bangladesh Edition Launched

3i Publishing Pvt Ltd has launched Bangladesh Edition of Textile Excellence which is a leading trade publication for the textile & clothing industry in India. The new publication Textile Excellence Bangladesh Edition has been launched in the beginning of February 2011 to cater to the growing need of information and intelligence by the Bangladeshi Textile & Clothing industry.

3i Publishing Pvt Ltd, the owner of Textile Excellence, has taken the initiative to extend the brand to a growing Bangladesh market with customised content that would meet the necessity of a credible textile and apparel trade journal in the country. The new publication will reach almost every decision makers in Bangladesh every month with relevant industry information, market intelligence and technical knowledge on specific subjects. Also, Textile Excellence Bangladesh Edition would be a platform and a conduit for the marketers to reach out to large Bangladeshi Textile & Clothing industry. The publication would specifically assist Indian companies that are targeting Bangladeshi textile industry as potential customers.

Being in the service of Indian textile & clothing industry for over 8 years, Textile Excellence has contributed hugely to the industry by assisting in informed decision making may it be at enterprise level or in the administrative or policy making level. Bangladesh Edition aims at achieving even greater heights following a proven path that mother brand has travelled.

Textile Excellence Bangladesh Edition would also work closely with the textile industry on the both side of the border to facilitate better business co-operation between India and Bangladesh to make both textile manufacturing heavyweights to become even larger player in the global trade.

For Further Information, please contact:
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Textile Excellence Bangladesh
Technical Textile & Nonwoven Excellence
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ICAHT-11

Conference Announcement & Call For Papers

7th International Conference on Apparel & Home Textiles
30th September & 1st October, 2011
At India Habitat Centre, New Delhi.

Theme "Make Competition Irrelevant"

The conference allows us to access the collected wisdom, learning and conclusion of the large resource pool which is globally available

Host: Okhla Garment and Textile Cluster
The global apparel manufacturing industry is expected to grow more than ever in times to come. According to an estimate, the global apparel industry will reach a value of US $ 1800 billion by the end of 2011. The apparel manufacturers are now adopting new techniques to increase their trade. New business models and competitive strategies are used to enhance profits and growth.

The conference is intended to cover all aspects of the apparel industry, including the problems of small-scale enterprises in the developing world, the barriers which are hindering the growth of this industry, the strength and weakness of the manufacturers in different region, globalization issues, resource and manpower scarcity, quality of the product, trade laws, adopting new techniques to improve productivity, managing global supply chain and finally changing apparel industry trends with ever-changing fashions.

The conference aims to provide an environment for academics, researchers and practitioners to exchange ideas and recent developments in the field of apparel manufacturing. The conference is also expected to foster networking, collaboration and joint effort among the conference participants to advance the theory and practice as well as to identify major trends in apparel manufacturing.

The Convention will be a great opportunity for international trade fraternity to know the dual strengths that India can offer, not only as a great supplier base, but also as a fashion destination for international brand A few quick facts about last year's version ICAHT 10 of the conference:

- 400+ people attended over the two days
- More than 50% of attendees were garment industry professionals
- As many as 50 of our attendees were garment Industry owners
- 71% of our attendees were senior level persons
- 25+ speakers shared knowledge & case studies over 2 days
- 70% of last year's attendees said they would like to attend and probably or definitely recommend the conference to a colleague

Who will you meet when you attend the OGTC event of 2011?

Last year, the seniority of our delegates was as follows:

Testimonials
I greatly enjoyed participating in the Conference, which I felt to be an excellent mix of presenters and Chairpersons, very enjoyable and informative, and I am sure all participants benefited greatly from attending. I believe it was one of the best organised Conferences I have attended and that the OGTC will continue to be a driving force in the Indian market development when delivering such beneficial activities as this. Paul Frank Bowes, PFB Productivity Services Ltd.

Community protests have started influencing the behaviour of corporate decision makers. Responsible profits will have to be the only standard in tomorrow's world. It is believed that sustainability will become a reality .With factors like climate change, resource scarcity and energy prices all contributing to opportunities, the need of the hour it seems is 'ecological capitalism'. While the market for green opportunities is still small, it's definitely one that is growing rapidly. And if some money is made on the way to saving the planet and its people, surely it's alright.?

It can be said that in future, the factors that will affect the rise or fall of the Clothing Industry of sourcing countries include labour standards, tariff

preferences, access to materials and supplies, political and economic stability among others.

It is now the time to identify the Differentiating Edge and Strategise For Tomorrow's Business

At 7th International Conference on Apparel and Home Textiles ICAHT 11 scheduled on 30th Sept & 1st Oct 2011 it is planned to discuss and deliberate that with an effective policy, swift implementation of new technologies, processes, concepts and productive use of international forums, India can establish its position as an innovator

Key Issues to be Addressed in ICAHT 11

1) Building Global Competitiveness
2) Carbon Responsible / Carbon Footprint
3) Corporate Responsibilities
4) Human Trafficking
5) Innovative Marketing
6) Lean Manufacturing
7) Change Management
8) Product Development & Forecasting
9) Quality as a Culture
10) Responsible Fashion
11) Innovative Finance
12) Supply Chain Management

Who should Attend

The garment industry owners, their CEO's, industry professionals, academicians, representatives from industry associations, researchers, consultants, service providers, final year and post graduate students etc.

Day One - 30th September, 2011

1) Presentations from international and Indian invited speakers from varied fields of management, manufacturing, marketing, social responsibility etc. And
2) Fashion show will follow the presentations
3) On the sidelines of the conference there will be a Poster Presentation to encourage the research & postgraduate students a poster competition on the conference theme will be held where 3 best poster presentations will get cash reward.

Day Two - 1st October, 2011

Specific workshops are arranged on selected areas from the above list by eminent experts from India and Abroad for specific skill professionals.

Workshops- A Special Feature of ICAHT 11

It may not be out of place to mention that the concept of workshops and general interest presentations is a novel concept adopted by OGTC and has been found extremely beneficial to the industry in terms of specific skill up-gradation and creation of general awareness in the present times, which are really termed as knowledge economy.

For further details if any contact:

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BEKAERT
better together

Bekaert launches TN60 flat tops for ELS cotton yarns in Indian textile market

New flat top design leads to a smoother carding process and enhanced high sliver quality

Indian spinners of superfine combed cotton yarns who use extra long staple cotton like DCH, Giza and Pima can now achieve a smoother carding process with superior quality thanks to Bekaert's brand new TN60 flat tops. TN60 is a series of high density flat tops that have been especially developed to meet the high standards of Indian cotton spinners of superfine combed yarns for applications such as high value shirting fabrics, sewing thread, high quality dress fabrics etc.

Improve your process and product quality

"The TN60 flat top is the highest density top in the market today," says Mr. B.L. Bhattak, Bekaert Sales Director for India & South East Asia. "Their optimized gradual setting patterns and improved tooth design lead to several important benefits for the spinning process:

Apart from achieving a superior yarn quality (Ne80s, Ne100s and finer) on ELS cottons , the TN60 tops create a high sliver quality, efficient nep removal and reduced loading, all of which will significantly improve your carding process and the durability of your tops. Practically this means that by using TN60 tops you will not only be able to offer your customers high quality yarns, you will also save time and money on maintenance and processing." TN60 flat tops were designed in close co-operation with Bekaert's technology center in Belgium and are exclusively produced in Pune, India. First trials by several Indian spinning mills have already shown very positive improvements in both quality and productivity causing a growing confidence of the market in the merits of the TN60 tops.

Enhance your reputation

According to Filip Verhoeve, Global Sales and Marketing Head of Bekaert Carding Solutions:

"The development of the new flat tops is a direct result of the thorough technical know-how and high manufacturing quality that is so typical for the Bekaert organization. By placing high priority on meeting the market's needs, customers are more and more relying on Bekaert's innovative carding solutions."

"Being on the foreground of the production of ELS cotton yarns, India has a good reputation in the international textile markets for producing high value superfine combed cotton yarns." Mr. Verhoeve continues: "In this aspect, Bekaert's TN60 series is the perfect complement for cotton spinners to defend this reputation."

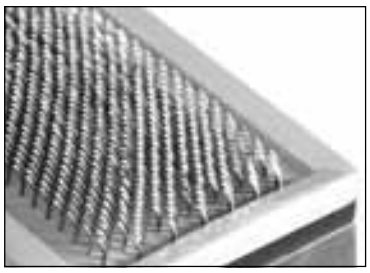
For more information about the TN60 flat tops series and our services contact Bekaert via mail at bl.bhattak@bekaert.com or via phone at +91 9922956256

About Bekaert

Company profile

Bekaert (www.bekaert.com) is a global technological leader in its two core competences: advanced metal transformation and advanced materials and coatings, and a market leader in drawn wire products and applications. Bekaert (Euronext Brussels: BEKB) is a global company with headquarters in Belgium, employing 25 000 people worldwide. Serving customers in 120 countries, Bekaert pursues sustainable profitable growth in all its activities and generates annual combined sales of • 3.3 billion.

Bekaert: the reliable partner for your card wire needs



Bekaert reinforces its status of independent and recognized leader in the card clothing business through partnerships with textile machine builders and customers world wide. Thanks to our technical know-how, our in-house developed machinery, our careful wire rod selection and our thorough understanding of the drawing, shaping, punching and heat treatment processes we can create a card wire that meets your expectations.

KIND ATTENTION

Many of the TAI Members have not intimated us about the changes in their personal profile. We request all the TAI members to send us their present profile in the following format to enable us to update our records and to upload the same on our website www.textileassociationindia.org. Please extend your co-operation to serve you better.

Name: _____
TAI Unit: _____ Type of Membership & No.: _____
Designation: _____ Section: _____
Organization: _____
Organization Address: _____
_____
Tel.: _____ Fax: _____ Mobile: _____
E-mail: _____
Residential Address: _____
_____
Tel.: _____ Fax: _____ Mobile: _____
E-mail: _____
Date of Birth: _____ Blood Group: _____

(Please visit TAI website and check your profile on Membership page)
Send it to

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CONGRATULATION

Mr. Pramod R. Kakkanvar

Shri Pramod R. Kakkanavar has been awarded with "Priyadarshini Indiragandhi Award – 2010" by International Integrity Peace & Friendship Society, Bangalore, in reorganization of his outstanding services to society in the chosen field of activity. The award was presented by the hands of Shri M. Veerappa Moily, Hon'ble Union Minister for Law & Justice, Govt. of India on 20th November 2010 at Bangalore.

Shri Kakkanvar is a Textile Engineer, employed in the Central Govt. under the Director, CSTRI, Central Silk Board. He is a thorough textile professional and was awarded a Silver Medal at the All India Textile Conference held at Ichalkaranji (MS) in 1996. He has an uniqueness of being the second person to have completed the GMTA Exam conducted by the Textile Association (India).

Mr. Kakkanvar is an accomplished Tabla player and has accompanied famous Gazal singers on many occasions.

The Textile Association (India) takes this opportunity to wish him all the success in his future carrier and endeavors.

INDIAN

InFashion – International Trade Exhibition

Date: 15-17th March 2011
Venue: Bombay Exhibition Centre,
Western Express Highway,
Goregaon (E), Mumbai , India
Contact: Mr. Adarsh Verma,
Project Manager (Sales & Marketing)
Image Exhibitions
(A Division of Image Multimedia Pvt. Ltd.)
S-78, 2nd Floor, Okhla Industrial Area,
Phase-II, New Delhi – 110 020 India
Tel.: +91 11 26384298, 26385660, 40525000
Fax: +91 11 40596842, M.: +91 9999251621
E-mail: adarshverma@imagemultimedia.in,
info@imagemultimedia.in
Website: www.indiainfashion.com,
www.imagegroup.com

World Textile Conference - Organized by The Textile Association (India) – Central Office

Theme: "Vision 2020: Emerging New Opportunities Worldwide and Challenging Business Strategies".
Date: 6 &7th May 2011
Venue: Hotel Intercontinental, The Lalit,
Sahar Road, Andheri (E), Mumbai, India
Contact: Mr. Sanjay Chawla, - Conference Convener
The Textile Association (India) – Central Office,
Pathare House, Next to State Bank of India,
67, Ranade Road, Dadar (W),
Mumbai – 400 028
Tel.: 022-2446 1145, Fax: 022-2447 4971
M.: 9322874471
E-mail: taicnt@mtnl.net.in, sychdfu@yahoo.com
Website: www.textileassociationindia.org

Fashioning the Future – Fibres & Yarns Expo 2011 (6th Edition)

Date: 14th-to 16th April 2011
Venue: Expo Centre, World Trade Centre,
Cuff Parade, Mumbai – 400 005
Organizer - TecoyaInfotech
Tel.: +91 22 66978535, Fax: +91 22 2879 3022
E-mail: tecoya@vsnl.com

INDIA ITME 2012 – Textile Machinery Exhibition

Date: 02-07th December 2012
Venue: Bombay Exhibition Centre,
Western Express Highway, Goregaon (E),
Mumbai, India
Contact: Executive Director
India International Textile
Machinery Exhibitions Society
76, Mittal Tower, B Wing, 7th Floor,
Nariman Point, Mumbai – 400 021 India
Tel.: +91 22-2202 0032, 2282 8138, 2285 1579
Fax: +91 22-2285 1578
E-mail: contactat@india-itme.com
Website: http://www.india-itme.com

INTERNATIONAL

MEGATECH PAKISTAN 2011 -
9TH Edition of the International Machinery Exhibition of Garment & Textile Technology
Date: 3-5th March 2011
Venue: Expo Centre, Lahore
Organizes: Pegasus Consultancy (Pvt.) Ltd.
2nd Floor, Business Centre, Mumtaz Hassan Road, Karachi – 74000 Pakistan
Tel.: +92 21-111 734 266,Fax: +92 21- 3241 0723
E-*mail:* info@megatechpakitan.com

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