Report on the Symposium on

MEDICAL TEXTILE

“APPLICATION & OPPORTUNITIES”

Tuesday, 14TH July 2015

MCA Banquets, Mumbai Cricket Association (MCA),
Bandra-Kurla Complex (BKC),
Mumbai.

Submitted to

Smt. Kiran Soni Gupta
Textile Commissioner
Office of the Textile Commissioner
Ministry of Textiles

Submitted by

Indian Technical Textile Association (ITTA)
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Background

A Medical Textile Symposium was organized by ITTA jointly with SITRA on 14th July 2015 at MCA, BKC, Mumbai. The theme of the symposium was on new Applications & Opportunities of medical textiles. The symposium was supported Regional Office of the Textile Commissioner.

Medical textiles, also known as Healthcare textiles, are one of the fastest growing segments among all Technical textile categories. The total market size of Medical Textiles is expected to grow from Rs.3322 Crores in 2012-13 to Rs.4283 Crores by the year 2015-16 at a compounded annual growth rate of 15%. The market can grow further if more awareness is created in the healthcare industry about the features of innovative products, cost efficiency and other benefits. Medical Textiles are wound care products, baby and incontinence diapers, sanitary napkin, surgical sutures, disposables, surgical dressing, artificial implants, etc. They are available in woven, knitted, non-woven forms produced from natural and synthetic fibres.

Objective

The objective of the Symposium is to create awareness to the delegates on the advanced Medical Textiles applications, their functional requirements, market potential, standards, raw materials used and latest manufacturing techniques to cater to the needs of healthcare industry. Also the knowledge acquired on various areas would help to initiate the process of product development which would eventually lead to emergence of opportunities for increased the use of medical textiles.

Eminent speakers from both the medical textiles producers, health care industry and Doctors from reputed hospitals, are invited to make presentations on the following topics of interest to the Industry, followed by panel discussion:

- Users’ Perspective, Needs and Standards
- Artificial Implants
- Advanced Wound Care
- Infection Control.
The symposium was inaugurated by **Chief Guest** – Smt. Kiran Soni Gupta, Textile Commissioner and by **Guest of Honour** - Dr. Snehalata Deshmukh, Former Vice Chancellor, Mumbai University. In her address, the Textile Commissioner said that the Technical Textiles are growing at a faster rate and to further accelerate the growth the Ministry of Textiles, Govt. of India launched various schemes for the promotion of different segments of technical textiles. She also appreciated the efforts taken by ITTA in organizing the symposium jointly with SITRA-COE on Medical Textiles and suggested that such seminars should be organize in other major cities in India as well.

The Special Invitee- Sri B.B. Bharti, Joint Textile Commissioner also addressed the delegates and said that the Meditech is one of the fastest growing segments of technical textiles. The various topics chosen on medical textiles in this symposium are very interesting, which will give insights into number of new field of applications.

The Medical Textile Symposium received overwhelming response from the health care and technical textile industry and more than 120 delegates attended the symposium. The event was sponsored by Reliance Industries Limited, and KOB.
L-R: Dr J. T. Vyas, General Surgery, Nanavati Hospital, Sakthivel Perumalsamy, Head-COE,SITRA, Coimbatore, Dr. Narendra Mehta, Senior Surgeon, Lilavati Hospital and S. Sundara Moorthy, Head – Healthcare Consulting Division, BDB India.

The first technical session was chaired by Dr. Narendra Mehta, Senior Surgeon, Lilavati Hospital, Mumbai

**RECENT TRENDS IN MEDICAL TEXTILES**

Dr J. T. Vyas, General Surgery, Nanavati Hospital

Dr Vyas presented the current status and future needs of the health care industry in India. The awareness on the use of medical textiles to be created among the Doctors and Hospital staff and their technical and commercial advantages to be demonstrated. He emphasized the need to develop medical textile products in India in the areas of Implants, advanced wound care, smart textiles, etc. Many of these products are imported to our country today. The standards of all medical textile products also to be formulated.
MARKET OVERVIEW OF MEDICAL TEXTILE IN INDIA
S. Sundara Moorthy, Head – Healthcare Consulting Division, BDB India

Estimated market size for Medical textile Industry in India for the year 2014 was Rs 3600 - 3700 Crore. MAJOR GROWTH DRIVERS OF INDIAN MEDICAL TEXTILES SEGMENT - Growing needs for better and convenient primary wound dressing materials, Use of smart textiles in healthcare field, Increasing number of cardiac surgeries in India (~ 5 million to ~ 8 million patients by 2018), Growing Disposable Income Increases Accessibility Towards Medical Textile Products, Increasing Consciousness Among People With Regard to Personal Care and Hygiene, Aging Population (96 million to ~168 million by 2026), Developments happening in the Textile scaffolds, Increasing usage of contact lenses (18-30-year-old consumers especially females). Initiatives which will impact on the consumption: Universal Health coverage scheme, 100% FDI is allowed under automatic route, Support to PPP model to improve availability of healthcare services, Tax support for hospitals setup in rural areas (under 80-IB), Incentives and tax holidays for medical travel facilities.

MEDICAL TEXTILE STANDARDS DEVELOPED BY SITRA
Sakthivel Perumalsamy, Head-COE,SITRA, Coimbatore

The existing Standards for Medical Textile Products in India are available for very few products. Barring few there did not exist any specification for these products, nationally as well as internationally. There is a lack of guidelines for ideal set – up and processing of Medical Textile products as regards, raw material, machinery, process parameters, quality, cost, etc.

TX 36 Sectional Committee for Formulation of standards for medical textiles comprising of industry, research and academia has been formed under recommendation of Ministry of Textiles to expedite the process of standardization for Medical Textiles products.

The objectives of this Committee are: Studying the relevance of existing Indian standards for meditech products, Need for amendment of existing standards in the present context, Identifying the areas where standards for meditech products do not exist, writing down standards and specifications for meditech products that need to be proposed. Number of standards have been published by BIS, whereas many are in draft stage.

The second technical session was chaired by *Dr. Hemant Bhansali*, Mumbai.

**RECENT DEVELOPMENTS IN HERNIA MESH**
*Dr. A. Ramamoorthy*, A. R. Surgery, Coimbatore

He talked on ABDOMINAL WALL HERNIA which are of four types- GROIN, PELVIC, ANTERIOR and POSTERIOR. Early 1800s Surgeons used gold wires followed by lead, aluminium, brass and silver coils on the floor of Inguinal canal to buttress repair. In 1948, modern nylon darn slopes in different directions were used so that threads interweave technique, to form Permanent "lattice work". Then came SECOND GENERATION MESHES made of Polypropylene or Polyester, which were Light weight, Less foreign body material and Large pore size. They are made in single or double layers.

The mesh size in hernia repair has increased over the years to facilitate a wide contact area between mesh material and host tissue to promote tissue in growth and vascularisation. But
this also leads to more possible risk for the nerves in the inguinal area. There seems to be an association between post-operative pain and choice of mesh material and mesh fixation.

He concluded that if we could artificially produce tissue of the density and toughness of fascia and tendon, the secret of the radical cure of the hernia repair could be discovered.

**DEVELOPMENT OF AN INDIGENOUS GEL SEALED LARGE DIAMETER VASCULAR GRAFT FROM PET TEXTILES**

Dr. Roy Joseph, Scientist E, SCTIMST, Trivandrum

Tubular devices used to replace diseased or damaged or blocked artery. They are made out of Polyethylene terephthalate / PTFE. PET grafts are made from woven or knitted fabric which are Porous and permits tissue in-growth and have Porosity for blood seepage after implantation. The production process of vascular graft starts with PET filament, woven into small size flat tubes and then crimped to make the final graft. In-house designed spray coating unit is developed for making Hydrogel coating of crimped grafts.

Biocompatibility Evaluation was done following ISO 10993 standard in which 12 Major biological effects are considered. By considering these twelve effects, we pretty much cover anything a device that can do to mammalian tissues, organs, or the body as a whole. Preclinical evaluation was successfully done in pigs upto 6 months. Now the product will go through various approval processes before commercially sold to market.

**SITRA’S RESEARCH IN MEDICAL TEXTILES**

Sakthivel Perumalsamy, Head-COE, SITRA, Coimbatore

The paper discussed Implantable and Non - Implantable medical products developed by SITRA. In implantable categories they developed Hernia Mesh, Bifurcated Vascular Grafts, Bared, Bi-Directional Surgical Sutures, Rotator Cuff Repair Devices. Hernia repairing Mesh is developed using PP mono filament yarn. The mesh fabric was knitted on a tricot warp knitting machine using Compound needles. The Atlas structure is found to be ideal for the Mesh. Polypropylene meshes have high biocompatibility and resistance to action of the tissue environment.

SITRA developed polyester woven Bifurcated Vascular prosthesis which can be used as replacement material for vascular diseases. Knotless sutures were made through introduction of bi-directional barbs into absorbable monofilament suture. Developed double layered embroidered structure with polyester filament yarn for rotator cuff repairing devices.

SITRA’s Research on Non - Implantable include wound dressings using spunlace nonwoven fabrics by using 100% polyester spunlace fabrics for wound contact layer and back layer is
made of 100% bamboo spunlace as an absorbing layer. Also developed Drug loaded chitosan coated cotton gauze with 2 types of drugs, viz, Tetracycline hydrochloride and Oxytetracycline hydrochloride, PVA/Silver nitrate & PVA/Chitosan wound care dressings, 3D Compression Bandages for Lymphedema, Orthopedic Shoes, Leuko-depletion Blood Filter, Nanofinished woven surgical gown and Mopping Pad/Laparotomy sponge.

TECHNICAL SESSION III- Advanced Wound Care


The third technical session was chaired by Dr. Sharad Seth, Mumbai

WHY SINGLE-USE MEDICAL NONWOVENS?
Sudisha Bholia, Ahlstrom Group, Delhi

Ahlstrom developed full product range of Spunbond & SMS nonwoven fabrics treated with Antistatic, Absorbent, Alcohol repellency, etc for medical applications, such as- Surgical
Gowns/Drapes, Scrub-suits and Sterile Barrier Systems. Lint is a source of infection since bacteria can use it as a carrier. Re-usable fabrics generate lot of lint during washing process and Nonwoven fabrics typically have low lint. The products meet Global Regulatory Standards like, AAMI PB 70/CEN standards for drapes and gowns and EN 868-1 and EN 868-2 for sterilization wraps.

It is emphasized that Most hospitals should practice single use nonwoven gowns/drapes when the patient has either HIV/Hepatitis or other serious infections. Various studies indicate that when total costs (Including, storage, inspection, Laundry, etc) are calculated single-use fabrics are generally lower cost than re-usables. Ahlstrom Nonwoven is designed specifically for single-use Medical applications, and are the preferred choice to protect the patient and healthcare workers in the fight against Hospital Acquired Infections.

POLYESTER FIBERS FOR MEDICAL APPLICATIONS
Tarun Jagga, Reliance Inds. Ltd., Mumbai

The market Size of global Medical Textiles products is 8.2 Billion USD, whereas it is only 0.51 Billion USD in India, which shows a huge scope of opportunity in this segment. Reliance has developed a range of polyester fibres which are suitable for a wide range of Medical Textiles applications. They are - Polyester staple fibre of 1.2,1.4,1.5 D, HiCover Spunlace, HiAbsorb Spunlace, Anti-microbial Spunlace, Micro-denier and Recron® FeelFresh for producing Hygiene products, Wipes, Doctor’s Gown, Surgical masks, crepe bandages, incontinence Diapers.

ULTRA-FRESH -AN EXTRA LEVEL OF PROTECTION
Barrie Clemo, Thomson Research Associates, Canada

The major problem in the hospitals is Hospital acquired infections (HAIs) and cross contamination, which cost over $30 billion per year in US. The patients are getting sicker in the hospital than they were when they went to hospital. Many people work in a hospital environment and they come in contact with many patients. Although they are suppose to wash their hands between every patient, they often don’t have time to do so. Textiles hold bacteria and can pass it to the next person. About 20-40% of HAIs are caused this way.

Sterilisation is an effective and quick tool to disinfect the medical textiles before use but they are not durable, so inherent antibacterial treated products like, Ultra-Fresh gives an extra level of protection. He recommended to use Quantitative testing methods / standards-
ISO20743/JIS1902, ISO22196/JIS2801, in which the number of bacteria on a sample is measured and it can be done with any kind of bacteria.

**EFFICACY OF NON WOVEN IN INFECTION CONTROL**
*Cdr. Manoj Kumar, Hitex Healthcare, Mumbai*

The surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place and the major sources are from HEPA filter, improper hand washing, instruments, drapes, machines, etc. The paper discussed on the advantages of non woven disposables- better barrier properties, low linting as compared to woven linen, ready to use, sterilized by professionals, tailor made for a particular procedure and easy to dispose. It reduces the turnaround time and thereby more number of surgeries can be conducted.

Hitex in Europe has developed margin drapes which are far more effective using modified cellulose in the drape. it has ability to drain the wound to obtain a dry operative field and maintains an acidic pH, Bactericidal & Haemostatic.

**TECHNICAL SESSION IV- Infection Control using specialty barrier fabrics**

The fourth technical session was chaired by Dr. J T Vyas, General Surgery, Nanavati Hospital, Mumbai

FUNCTIONALITY IN TEXTILES: A PERSPECTIVE ON HEALTHCARE PROTECTION
Raj Varghese, Archroma, Mumbai

The paper talked about functions, the ones which come immediate and essential are barrier protection, hygiene protection, strength, flexibility, blood repellence, alcohol repellence, antistatic, hydrophilicity, anti bacterial & anti fungal. The different chemicals which are used for these functions are: Preparation chemicals – for clean & absorbent textiles, Fluorochemicals - for repellence protection & barrier to fluids, Polymers - for strength & flexibility, Antistatic Agents - helps dissipation & so no build up of charges, Anti microbial Systems - to offer resistance to microbes.

He emphasized that medical garments must meet the highest standards of hygiene. The chemical solutions combine water, oil and alcohol repellency with antimicrobial features of Medical Gowns & garments made of polypropylene, polyester, cellulosic & others.

INNOVATIVE BANDAGES AND ANTIMICROBIAL WOVEN FABRICS
Paresh Patel, CEO, Surgicotfab Textiles, Ahmedabad

Threat of microbial infection is increasing day by day in our daily life. Hospital Acquired Infections [HAIs] is a leading challenge for hospitals and fabric is one of the major source of infection. Thus it is essential to prevent the microbial infection in Hospital Fabrics, School Uniforms, Corporate Offices, Hotels, and Service Industries.

The BESAFE as inherent zinc fiber antimicrobial fabric, presented by Mr Patel, is not topical or surface coated fabric. It is a fabric in which a fiber that combines natural cellulose with Zinc, thus making it an inherent Zinc fiber fabric. BESAFE Fabric was extensively tested and certified by leading laboratories like, Universitätsklinikum Jena - Germany, Jena, Biotech Testing Services – Mumbai, Centre of Excellence for Medical Textiles - (SITRA) Coimbatore. The BESAFE Fabric as per reports is evaluated for Antimicrobial activity by JIS L 1902 : 2008 and the test has shown >4 log reduction towards both Staphylococcus aureus and Klebsiella pneumoniae. Functional properties are tested to remain effective for more than 200 washes & 100 Autoclaving.
WEARABLE PHYSIOLOGICAL MONITORING SYSTEM
Dr. K. Mohanvelu, Defence Research & Development Organization, Bangalore

Life support systems and Biomedical Devices developed for Armed forces were discussed. Various Physiological and Physical Sensors are developed by DEBEL. The Wearable Physiological Monitoring System is a washable, mesh-like shirt that uses embedded sensors to collect and continuously monitor physiological signals. The data collected can be correlated to produce an overall picture of the wearer's health, as well as his or her physiological status, such as determining the onset of fatigue. The acquired data with the geo-location of the wearer is transmitted wireless, for monitoring by medical personnel.

The LifeShirt, developed by them, is a lightweight, machine washable, comfortable, easy-to-use shirt with embedded sensors. To measure respiratory function, sensors are woven into the shirt around the patient's chest and abdomen. A three-lead, single channel ECG measures heart rate, and a two-axis accelerometer records patient posture and activity level. Optional peripheral devices measure blood pressure and blood oxygen saturation.

Development on Smart vest Prototypes- the fabric is made of Polyester and Cotton Knitted Lycra with 100% Stainless Steel Conducting Threads. Complete system was developed, validation carried out and now exploring for civilian applications.

PANNEL DISCUSSION

The Panel discussion was moderated by Mr. Mahesh kudav, Board Member of ITTA and the panelists were Mr Ajay Sahani from Fibretex Personal care, New Delhi and Mr Pranay Shahu from Advance Technical Textiles, Welspun, Mumbai. They took number of questions from the audience and the discussion was very lively.

The panel deliberated mainly on the opportunities and challenges on the Medical Textile industry.
It was concluded that this industry is rising very rapidly, more and more hospitality industry should make use of these materials in one hand and on the other hand, medical textile manufacturers should focus on development of new products, import substitution, etc.

FEED BACK FROM THE PARTICIPANTS

The feedback from the participants was very encouraging and most of them mentioned that they have learnt many new technical subjects which they will be able to utilize in their business for growth. Some of the feed backs received by email are quoted below-

1. “Kindly accept my sincere gratitude for having organised the symposium. All of us who attended, came back enriched and with a wider horizon as far as Technical Textiles in Healthcare industry is concerned. Looking forward to such interaction in future as well.”

2. “This is to congratulate you and your team for the well-planned and well-organized Symposium on Medical Textiles Applications and Opportunities. It was a good opportunity for us to meet professionals and different stakeholders of the Medical Textile Industry. Looking forward to continued interactions in future.”

3. "Information shared in Symposium on Medical textiles was very relevant & eye opening. We could get few leads for our PSF Business also.”

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