

Successfully transforming your business to technical textiles

A two-day symposium, the fourth in a successful series designed to help companies successfully transform their businesses from traditional to technical textile markets and to maintain their competitive edge once they had done so, was held on 22–23 March 2007. Adrian Wilson reports from Porto in Portugal.

Building on the success of previous events held in the UKⁱ, Czech Republicⁱⁱ and Belgiumⁱⁱⁱ, the fourth *How to Enter Technical Textiles Markets* symposium proved to be the most successful of this series of events organized by International Newsletters to date, attracting more than 140 delegates to Porto in Portugal.

Porto is Portugal's second largest city, with in excess of 300 000 inhabitants, and it is close to the heart of the country's textile industry. Moreover, it is an attractive venue to visit: Porto's old town won *World Heritage* status in 1996 from the United Nations Educational, Scientific and Cultural Organization (UNESCO). Finally, the ambience of the Le Méridien Park Atlantic Hotel provided an excellent atmosphere in which to encourage discussion among the participants—a key goal of the organizer.

The programme was organized in two parts:

- on the first day, the conference was devoted largely to an examination of all of the key parts of the supply chain, from chemicals and raw materials through to finished consumer products, including the views of end-users, as well as the latest processes and technology trends currently influencing them;
- the integration of electronic switches and sensors into clothing and the growing potential for technical materials for the medical market were two important sectors examined in more detail on the second day (and these will be covered in the second part of this report in the next issue).

SETTING THE TONE

In his keynote introduction to proceedings, Conference Chair Roshan Shishoo of Shishoo Consulting provided a comprehensive overview of today's US\$1.6 billion global textiles industry. Total world fibre consumption is put at around 59 Mt and the global production of woven fabrics alone is set to reach more than 35 Mt by 2010, he told the international audience. Asia, of course, is the key region for growth.



Porto is close to the heart of Portugal's textile industry and its old town provides an attractive venue to visit. The ambience of the Le Méridien Park Atlantic Hotel, a short walk away, also helped provide an excellent atmosphere in which to encourage discussion among the participants—a key goal of the symposium's organizer.



Industry developments, Shishoo said, were being driven by both a technology push – advances made in polymer science and technology, chemical technology and fibre, yarn and fabric forming techniques – and at the same time, market pull from consumers. Environmental considerations and concerns are also currently influential factors.



To further encourage debate and the active participation of the delegates, all the speakers from each of the four half-day sessions gathered together to take part in a moderated discussion forum with questions from the conference floor. Speakers from the first session, above (left to right) are Roshan Shishoo, Steve Warner, Rule Niederstadt, Barry Davies, Michael Jänecke, Stephen Coulson and Pierre Wiertz.

Some important market drivers for new technical textiles include near-future life styles and fashion, a better quality of life for the elderly population and increased leisure time, Shishoo continued. Further stimulus is coming from the highly functional sports, leisurewear and personal protection areas.

A combination of these has led to new properties in fibres and fabrics that can now be, for instance, hydrophobic or hydrophilic, anti-bacterial, have barrier properties while retaining an ability to release moisture (breathe), antistatic or stretchable.

Environmental factors

As far as environmental drivers are concerned, Shishoo predicted that fibres based on renewable resources are likely to gain ground in the coming years. Examples he cited included:

- Cargill Dow's Ingeo—a polylactic acid (PLA)
- DuPont's Sorona—based on 1,3 propanediol (PDO).
- Lenzing's Lyocell—a lyocell.

However, later in the same day, Pierre Wiertz of nonwovens body EDANA spoke of the need to “correct the misconception about sustainability and renewable resources. Renewable is not necessarily synonymous with more sustainable, as is evident when considering the overall impact of cotton on the environment” Wiertz said, adding that other industries were less subject to question about this than the nonwovens sector, yet not as advanced in research and development (R&D) for alternatives.

He specifically named the thermoplastic polymer Nodax from Procter and Gamble and the polyhydroxyalkanoate (PHA) called Biopol from Metabolix as two advanced biopolymer technologies currently at the pilot stage that would

be coming to market in the near future. “If you look at wood pulp, viscose and PLA, it's clear the nonwovens industry has a range of alternatives for the future” he added.

Benefits of plasma

Three emerging technologies currently under development and commercialization were also identified by Shishoo:

- plasma treatments;
- nanotechnology (both nanocoating and electrospinning); and
- microencapsulated finishing technology.

Plasma treatment is a fast, flexible and versatile technology for adding functionality to textiles using either non-polymerizable gases or graft polymerization employing monomers. As an effective surface engineering tool, it has a low environmental impact and allows the elimination of the noxious chemicals that are currently employed in other sur-



Conference Chair for all four events in the series, Roshan Shishoo, delivering the opening address on the morning of the 22 March and outlining the main themes and goals of the symposium, under the watchful eye of Session Chair Colin Purvis.



Taking up the challenge of expanding on one of the technologies identified by Shishoo as a key to future success, Stephen Coulson described the work of his company P2i with plasma treatments. After the session, Coulson listens here to further questions from the delegates during one of the breaks.

face treatments and coating/laminating processes. Suppliers of atmospheric pressure plasma systems include AcXys, Ahlbrandt and Dow Corning, while machinery is being developed and supplied by Europlasma and P2i.

P2i was represented at the Porto conference by Technical Director Stephen Coulson, who explained that the company is a spin-out from the UK's Ministry of Defence R&D laboratories at Porton Down^{iv} with the mission of commercializing the Ionmask process, originally developed for the protection of military clothing from chemical and nerve agents.

The company is involved with contract work and R&D, process optimization, commercial scale-up, the design and manufacture of equipment, production trials and the provision of a licensed turn-key plasma process based on this liquid repellent technology. P2i has been involved with customization for a diverse range of applications and is currently focused on the markets of footwear, performance textiles, bioscience and filtration, Coulson told the Porto conference.

In respect of footwear, Ionmask treatment can provide a range of desirable properties including:

- high levels of liquid repellency;
- higher durability than existing dynamic water resistance (DWR) products;
- improved breathability;
- increased stain resistance; and
- enhanced surface beading.

In addition, it allows the production of lightweight components with improved fit.

Various regional markets were described in detail by Messe Frankfurt's Michael Jänecke (right) and Steve Warner (below right) of the Industrial Fabrics Association International.



TECHNICAL TEXTILE MARKETS WORLDWIDE

In many developed countries technical textiles now account for an average of 40% of both production and consumption, according to Michael Jänecke of Messe Frankfurt, the organizer of the *Techtextil* trade shows. Within the European Union (EU) in 2003 there were approximately 2500 companies either exclusively or partly involved in this sector, which was worth €26.2 billion that year, he said.



“These materials are going into many different industries, and reaching them all is the basis of the *Techtextil* user-oriented concept” said Jänecke.

This view was endorsed by Steve Warner, President of the US-based Industrial Fabrics Association International (IFAI) who said that the industrial textiles market was also a very difficult one to define: “It embraces many niche markets, from comparatively low-technology flags and banners to new energy markets. There is generally a lack of consensus on the scope of the market and also a lack of good measurable data. We have to ask where exactly the value is in the chain, and to reach out to real market drivers, such as architects and engineers.

“We have to look at both stand-alone end-products and components, and some materials go through multiple distribution channels or are subjected to multiple operations before being part of the final product” he noted.

Russia

In responding to the increasingly international spread of technical textiles, Messe Frankfurt continues to expand its presence around the world. *Techtextil Russia 2007*, for instance, takes place from 29–31 May, held concurrently with *Telogreyka*, an international exhibition for uniforms and corporate clothing, and *International Industrial Week* (see also, pages 2–8, this issue). The combination of these three fairs is designed to attract a large number of trade visitors, buyers and manufacturers from Moscow, regions of Russia and members of the Commonwealth of Independent States (CIS).

With a population of 143.1 million people and annual growth at 5.2%, the Russian market, Jänecke predicted, is poised to boom^v. According to preliminary customs statistics for January–September 2005, imports to Russia were worth \$54.5 million, an increase of 34.7% on the same period of 2004, with those of textiles, fibres and footwear growing considerably. The Russian Government has also recently removed custom duties on imported textile equipment.

In the past three years, light industry production in Russia has continued to decrease, with the textile sector falling by 12.7% and apparel by 27.4%; at the same time, prices have risen. “Local production in the textile and apparel industry is going down and imports have started to gradually dominate the market” said Jänecke. “Russia’s industry can’t meet demand and many companies there are now looking for partners to make investments.”

Later in the day, Director General of the European textiles association Euratex, Bill Lakin, added “Russia is now the third biggest market for European textiles and apparel. This would have been unthinkable five years ago.”

India

Messe Frankfurt is also to hold the first *Techtextil India* on 10–12 October this year, in parallel with Indian editions of its *Heimtextil* and *Texworld* shows, at the Bombay Exhibition Centre in Mumbai.

The proportion of textiles used for technical purposes in India currently amounts to at most 17%^{vi}, representing a world-market share of only 3%, but the production of technical textiles in India is still in its infancy and as yet is unable to meet this comparatively low demand for products. It is, however, poised to emerge as a major growth area and could be worth around US\$7 billion this year.

Current incentives for doing business in India include a concessionary rate of just 5% duty on specified production machinery, which is much lower than in the past, and also concessionary rates for many high performance fibres and yarns.

Jänecke said the current areas of demand include geotextiles, especially for road and railway construction, agricultural textiles, automotive^{vii} and medical materials^{viii} and textiles for environmental protection, waste-water and dust filtration.

US markets

Jänecke also presented details of the markets in the USA and China, where *Techtextil* events will be held in 2008, while Warner provided further statistics on North America.

The US textile industry, he pointed out, still consists of more than 10 000 companies, employing almost a million people, yet just 50 of the largest now hold 60% of the market share.

Speciality fabrics are definitely replacing commodity fabrics, but in general textile production fell by 2% in 2006 and 6% in 2005. Despite this, in excess of \$30 billion has been invested in new textile plants in the USA over the last decade.

Nevertheless, more than 350 plants are known to have closed over the same period and imports now account for 25% of the US market. And, in the past five years, China’s imports to the USA have increased by between 30–40% every year.

Specific growth markets identified by Warner were digital printing applications, military/law enforcement, safety/medical, disaster relief and prevention, smart fabrics and sun protection.

“There has been huge growth in digital printing in the USA” he said, adding that the retail value of the wide-format graphics printing market had climbed from \$19 billion



As with the other speakers, EDANA’s Pierre Wiertz was kept busy in discussion during the event’s breaks.

in 2002 to a projected value of \$30 billion this year, representing a 9% annual compounded growth rate. The largest sectors for these products are point-of-purchase (PoP) and trade show graphics, and growth has been down to a combination of factors including new large format capability on fabrics, increased printer resolution and output speed, new inkjet printing technologies, improved textile coating technologies, and not least, the cost of equipment: the price of good digital printing machines, he said, has fallen over the past five years from above \$250 000 down to between \$40–80 000. Annual growth for wide-format for the next few years is forecast to be 14%.

On a more depressing note, Warner pointed out that the industrial fabrics industry thrived on wars and natural disasters. While only accounting for 3% of the US military's budget, industrial textiles are supplied for a wide variety of applications^{ix} including:

- combat and flight uniforms;
- helmets;
- flak jackets;
- extreme weather gear;
- parachutes;
- inflatables;
- bullet-proof vests;
- chemical protective suits;
- personal flotation devices;
- tents and shelters;
- ammunition bags; and
- aircraft fuel cells.

The *Berry Amendment* and the *Buy American Act* are effective in securing a domestic supplier base in the USA, with just 0.2% of total purchases of foreign textiles and related-products being made by the US military. Efforts are currently being made to extend the *Berry Amendment* to homeland security needs, but at the same time, the USA is dependent on foreign textile machinery as well as dyes and chemicals that go into military textile applications.

During later discussions, Warner provided two concrete examples of US companies who had transformed themselves through concentration on industrial fabrics. These were Glen Raven^x, now a leader in performance fabrics and J.P. Stevens, which has emerged as the largest supplier of various safety components worldwide.

Programme for Thursday 22 March

Session 1:

New markets and opportunities for the modern textiles industry

Chair: Colin Purvis, CIRFS/EATP

Keynote paper:

The modern textiles company in 2007: moving forward in a challenging world, Roshan Shishoo, Shishoo Consulting

- *Current state of the key markets*, Michael Jänecke, Messe Frankfurt
- *A view from North America: niche market outlooks for technical textiles*, Steve Warner, IFAI
- *Raw materials and nonwovens markets: competitiveness issues for technical textiles*, Barry Davies, CMAI Group
- *Strengths, weaknesses, opportunities and threats in nonwovens*, Pierre Wiertz, EDANA
- *How chemicals and raw materials can add value*, Rule Niederstad, Huntsman
- *How plasma treatments can add value: highly water-resistant footwear through plasma enhancement*, Stephen Coulson, P2i

Panel discussion with Roshan Shishoo, Michael Jänecke, Steve Warner, Barry Davies, Pierre Wiertz, Rule Niederstadt and Stephen Coulson

Lunch break

Session 2:

How to build competitive advantage

Chair: Helder Rosendo, CITEVE

Keynote paper 2

How Europe is responding to the challenge: innovation, Bill Lakin, Euratex

- *What can testing do for you?* Rob Croskell, SGS
- *What are performance fibres and how do they add value?*, Colin Purvis, CIRFS/EATP
- *Modernizing through the exploitation of information technology*, David Cullis, XeBusiness
- *How we got started in technical textiles and what we learned along the way*, Temo Fernandes, Fifanta

Panel discussion with Bill Lakin, Rob Croskell, Colin Purvis, David Cullis and Temo Fernandes

CONFERENCE DINNER

Sponsored by the Banco Espirito Santo



Barry Davies made the case for the Middle East being the most cost-effective region in the world for nonwovens manufacturing.

On a similar subject, Telmo Fernandes introduced his local company Fifanta, which also made the switch from commodity textiles to specialized needlepunched materials for quilts and home furnishing products during the 1990s, followed by further investment in nonwovens machinery for the production of geotextiles.



Representing one of the companies from the Porto region, Telmo Fernandes gave a brief case study of how Fifanta had transformed itself to a producer of technical products and told delegates what lessons had been learned during the process.

NONWOVENS

The value of the global nonwovens industry was \$15.9 billion in 2004, representing 110 billion square metres (4.4 Mt), according to Wiertz, adding that it is forecast to grow by an annual 7.1% up to 2009, reaching a value of \$22.4 billion, 163 billion square metres (6.3 Mt).

In speaking of the general aspects of this industry, Wiertz said there was certainly no more room for investment in the manufacturing of commodity products, before exploring various issues:

- how long it will be before the exhaustion of petroleum-based polymers and fibres?;
- what is the correct approach to address this major change?;
- common misconceptions about what nonwovens are; and
- the distinctly separate identity of nonwovens from textiles.

Middle East emergence

Barry Davies of UK industry consultancy CMAI Europe, meanwhile, made the case for the Middle East as being currently the most cost-effective region in the world for nonwovens manufacturing. Davies' assertion began with a comparison of costs to produce a tonne of chemically bonded carded polyester in four key regions, based on the price of raw materials, energy and labour, and other fixed costs. On this basis:

- the USA came out the most costly, at around \$2600–2700 a tonne;
- Europe and China dipped below \$2500 a tonne. Europe currently benefits from lower raw materials costs and China from cheaper labour, despite having higher power costs than either the USA or Europe;

- the Middle East, however, dipped well below the \$2000 a tonne level and still fared better than elsewhere once duty and freight were added into the equation.

Duty and freight charges were shown to make the cost of selling nonwovens into Europe much more expensive for both China and the USA than producing them in Europe itself, but the Middle East still came out much lower, even lower than Europe's own production.

Davies pointed out that the cost of manufacturing carded, chemically bonded polyester^{xi} in Europe is significantly higher than spunmelt production, requiring bonding resin, more power and more labour, adding to overall costs.

Nevertheless, of the anticipated total global production of 4.7 Mt of nonwovens in 2007, the Middle East region will account for just 4%.

The good news for European and US spunmelt producers, however, is that by 2011 polypropylene is on course to regain its historic price advantage, which is something from which they will benefit most.

PERFORMANCE FIBRES

Colin Purvis is Director General of two European bodies:

- the Comité International de la Rayonne et des Fibres Synthétiques (CIRFS) represents the 75 companies responsible for Europe's man-made fibres industry, which has an annual output of 4.6 Mt and annual sales of €13 billion;

- the European Association for Textile Polyolefins (EATP) covers fibres and textiles made from polypropylene (PP) and polyethylene (PE), and represents 150 companies responsible for an annual 2.5 Mt output and €3.5 billion sales.

In Porto, Purvis spoke of the potential of new performance fibres to find new markets, first mentioning new run-flat tyres based on the latest European viscose technology as a key emerging technology. "Will they become another substantial business like airbags?" he asked, concluding "At this time it's hard to know, but highly possible."

The latest synthetic turf was another innovation mentioned, with advances made particularly in the area of colour retention.

All fibres in effect perform, Purvis said, yet some are specifically selected for technical performance rather than their aesthetics. Among the most recent of these highlighted was electro-conductive polymers, while bicomponents were already said to have completely changed what is possible in the industry.

Purvis also said that the market for antibacterial fibres in Europe now amounted to an annual 40 kt.

CHEMICALS

Rule Niederstadt of Huntsman explored the issue of how chemicals and raw materials can add value along the processing chain.

"Energy costs can't be controlled, but cost savings can be made in a number of ways, including reducing the number of process steps required" he said, citing coating as of key importance the stringency needed in the correct selection of chemicals. Process redesign, he continued, can reduce costs, in a number of ways:

- cutting the number of production steps;
- reducing or eliminating evaporation of water and solvents;
- increasing processing speeds and throughput.

Such measures are in general most suitable for textile articles with high volumes, standardized fabrics allowing tailor-made solutions, or coating processes with high add-on value.

With annual sales of US\$30 billion Huntsman has grown through a series of acquisitions and has achieved an annual compound growth of 24% over the past few years.

Two other factors necessary for success in technical textiles in the present climate were identified on the first day of the Porto conference as testing and information technology (IT):

- Rob Croskell of international testing house SGS put the case for testing as a necessary practice in determining the expected performance of a given product, its critical function often undermined by a sense of legislative necessity;
- David Cullis of XeBusiness detailed both the immediate and less apparent advantages of a fully-integrated IT network along the process and supply chain. "Not getting the IT right in your company could be a very expensive mistake" Cullis told the conference.



Rob Croskell from SGS (above) put the case for the importance of testing in a technical textiles environment; while XeBusiness' David Cullis (below) highlighted the advantages of a modern information technology system.



EXPLOITATION OF INNOVATION

Discussing Europe's response to the changes in the textile industry, Bill Lakin opined that "Globalization is not a fact of life. It should be a two-way street, but at the moment we are hamstrung by our inability to export to a range of markets."

Lakin's presentation centred on the current LEAPFROG initiative, which he described as the biggest ever research project in Europe, bringing together 35 partners from industry and academia representing 11 European countries. Euratex coordinates the project, which has a total budget of €23 million, of which up to €14 million is funded by the European Commission (EC).

LEAPFROG's goals include:

- a step-change in productivity, quality and cost-efficiency in the garment manufacturing process through radical re-engineering and intelligent automation of garment-making processes;
- a radical move towards rapid customized manufacturing;
- a paradigm change in customer service and customer relationship management.

"European apparel manufacturers are severely handicapped in terms of high wages" said Lakin "and LEAPFROG is looking to take the labour out of the equation by identifying new areas of potential demand, including a move from commodities to special applications, entirely new applications and the move to customization from mass production."

One potential solution to the current dilemma, Lakin said, would be in the formation of large European groups with the critical mass to effectively compete.

"We should not go overboard on Europe's ability to innovate" he told delegates. "We may have pioneered the industrial revolution, but we didn't invent maths, medicine or fireworks, and have still not put a man into orbit. So we need to be modest and have to push forward into areas where we do have a lot."

Conference Chair Shishoo had also touched on the subject of innovation by saying – referring specifically to such topics as microencapsulated finishing, laser welding and chromic materials that respond to stimulus – that "Future textiles rely on the proper exploitation of innovation."



Inside the conference room at Le Meridien Hotel, Porto.



Director General of the European textiles association Euratex, Bill Lakin, discussed Europe's response to changes in the global marketplace for textiles. Seated to his right is the Session Chair, Helder Rosendo, General Manager of CITEVE—Technological Centre for the Textile & Clothing Industries of Portugal, the local hosts of the event.

Further information

In the second part of this review, June 2007 issue, Adrian Wilson will look at the second day of the Proceedings, which took the themes and ideas raised here and looked in more detail at the specific markets of smart and intelligent, and medical textiles.

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