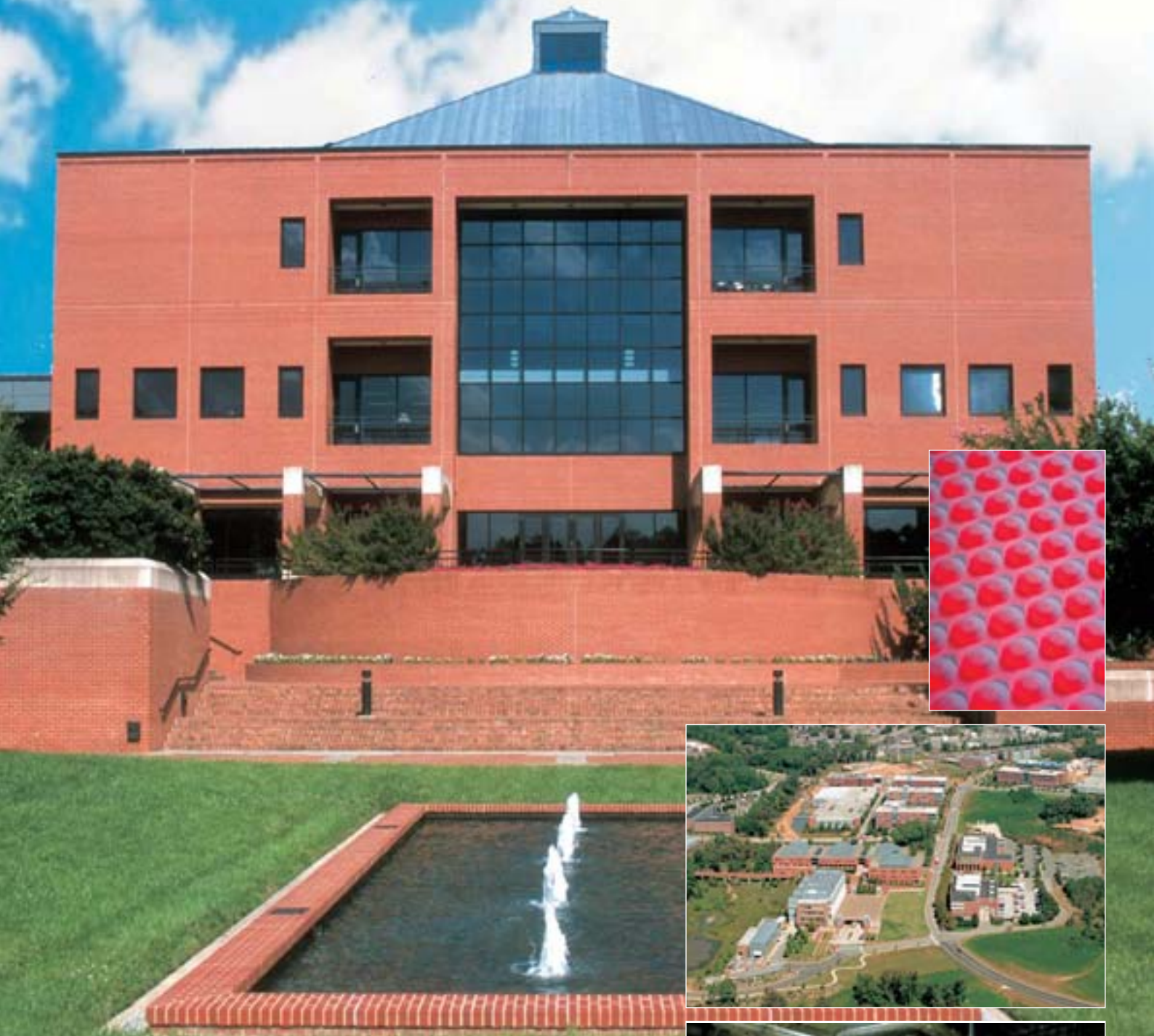


nonwovens report: international



Wake County
North Carolina
The US Nonwovens hub



Nothing could be finer

North Carolina – the 'Tar Heel State' – has attracted investments by nonwovens and disposables companies approaching US\$350 million over the past couple of years. What's its secret? Mike Cole reports.

"Nothing could be finer than to be in Carolina."

The old music hall song could easily serve as the modern-day anthem for a dynamically-growing nonwovens industry bubbling up in North Carolina.

If the past few years are any indication, the state is markedly claiming a stake as the nonwovens hub of the United States, becoming a top choice by multinationals.

A wave of nonwovens companies have recently either expanded or built new facilities in the state or announced intentions to do so. The impressive list includes the following high-profile corporations:

- Jacob Holm Industries, the Switzerland-headquartered producer of specialty hydroentangled nonwoven roll goods opened its first US manufacturing facility in the western North Carolina region of Asheville in late 2005, creating 70 new jobs while investing \$50 million.
- Livedo Corporation chose Wilson, North

Carolina for its first-ever manufacturing city located outside its native Japan. The producer of adult incontinence products and other nonwovens invested an estimated \$35 million in establishing its US presence a year ago.

- Following a 2003 announcement, AFG Wipes Inc., headquartered in Tel Aviv, Israel, located its first US operation in Reidsville (Rockingham County), bringing 200 jobs.
- Spuntech Industries, a 10-year old manufacturer of fabric for wet and dry wipes, with main operations in the Upper Galilee region of Israel, selected Roxboro, North Carolina for its first US manufacturing facility. Established in late 2005, it created 60 new jobs.
- The American subsidiary of Israel-headquartered Avgol Industries, which

makes lightweight nonwoven materials for products such as diapers and crop protection covers, is expanding its existing manufacturing facility in Mocksville, adding 40 jobs during the next three years and investing \$27 million into the area. The company made the announcement in March 2005. It originally acquired the Mocksville facility from Unifi in 2001.

- PGI one of the world's leading producers of nonwovens for use in medical, hygiene and industrial applications is expanding its operations in Mooresville in mid-2006 with the installation of a second production line, creating 49 jobs and investing \$40 million during the next two years.
- Goulston Technologies and Polyvel (of Hammonton, NJ) announced in August 2005 that they formed a joint venture, based at Goulston's Monroe, NC headquarters, to manufacture and market melt additives for the global synthetic fibre industries and non-woven industries, in an effort to offer value-added melt additives for their customers.

Sizeable

Rory Holmes, president of INDA, The Association of the Nonwovens Fabrics Industry, which is headquartered in Cary, North Carolina, said data compiled by his trade organisation revealed that five out of 25 nonwoven companies that announced plans to locate in the United States during

2005 chose North Carolina – a sizeable proportion amongst 50 states.

What’s driving the migration to North Carolina over attractive surrounding Southeastern states and other regions of the US?

Interviews with several nonwoven executives reveal an eclectic yet commonly shared list of motivations. Reasons stated range from the state’s already-established technological and manufacturing presence, to an ambitiously financed, organised and even global campaign by the North Carolina commerce department to lure companies to the state. Motives as simple as the state’s quality of life were also cited.

“In our case, the main reason was that traditional connection between North Carolina and the textile industry in general,” said Ron Broshi, vice-president of sales for Spuntech. “The other reason was the package and incentives that North Carolina offered to us, simple as that.”

Mr Broshi said Spuntech chose North Carolina after considering offers from several other states, including Pennsylvania, Virginia, West Virginia, New York, Connecticut and South Carolina.

Assistance

The recent nonwovens wave to North Carolina has come under Governor Mike Easley, elected in 2001. His office has lured several of the companies to North Carolina through vehicles that include a ‘One North Carolina’ fund created to provide lucrative financial assistance to businesses or industries that he deems to be vital to the state’s economy.

“In dealing with the (North Carolina) department of commerce on a regular basis, I think they’re very aggressive,” Rory Holmes commented. “They do some

Nonwovens Growth in the Tarheel state

Data provided by the North Carolina Department of Commerce reflects that the state has become a main hub in the United States for the growing global nonwovens industry. Data below reflects the date each company announced that it would build new operations or expand on existing operations in North Carolina. County location within North Carolina is also included.

Date	Company	County	Jobs	Investment (US\$ million)	Country
11/17/2003	AFG Wipes	Rockingham	200	25-30	Israel
7/14/2004	Livedo	Wilson	75	35	Japan
7/13/2004	Jacob Holm	Buncombe	70	40	Switzerland
6/30/2004	Dalco Nonwovens	Catawba	200	7	US
12/08/2004	Kimberly Clark Corp	Davidson	0	40	US
03/02/2004	Avgol America Inc	Davie	25	25	Israel
1/23/2005	Spuntech Industries Ltd.	Person	65	30	Israel
2/17/2005	DSM Dyneema	Pitt	60	50	Netherlands
3/14/2005	Avgol America	Davie	25	25	Israel
3/22/2005	Polymer Group Inc.	Iredell	49	40	US
11/21/2005	DuPont	Lenoir	66	55	US
Totals			835	347	

Source: North Carolina Department of Commerce

interesting and innovative things (to recruit companies) that you don’t find in other places.”

Deborah Barnes, a spokeswoman for North Carolina’s department of commerce, indicated that the state was organised in recruiting the three Israeli-rooted companies – Avgol, AGI Wipes, and Spuntech – simultaneously, before eventually receiving commitments

from all of them.

“In a nutshell, much of our success in this area can be traced to our long history in the textile field and the support we have in place to bring these very desirable companies and jobs to our state,” she said.

Grassroots

Further support comes from the smaller regional commerce departments in North Carolina in addition to the one operated by the state.

“In our situation, local groups played a large role,” said Patrick Hagan, a former executive of Livedo who was based at the company’s new North Carolina facility.

Mr Hagan (who left the company shortly after being interviewed) said: “The Wilson Economic Development Council had pre-constructive sites available within Wilson County that allowed us to expedite an otherwise much longer development plan.”

Illustrating the North Carolina commerce department’s global efforts to lure companies to the state, Mr Hagan noted



Left: Rory Holmes: “It’s just an absolutely wonderful place to live.”

Middle: North Carolina Governor Mike Easley’s, office has lured several of the companies through vehicles that include a ‘One North Carolina’ fund.

Right: PGI’s Dennis Norman: “When you’re looking for the centre of an intellectual knowledge base for the nonwovens industry, between that consortium at North Carolina State and INDA, it is clearly all right there.”

that the state maintained an office in Tokyo that aggressively markets the state to Japan investors.

"The associates of that office were extremely competent," he said, "and went to great lengths to introduce Livedo to a variety of possible sites in North Carolina. Their help, combined with the excellent opportunities in North Carolina, ultimately convinced Livedo to make the right choice."

Utilities

In North Carolina, other wide-reaching support for nonwoven companies has come in the form of generous utility assistance – beyond a \$1.12 million grant from Buncombe County where Asheville, NC is located, Jacob Holm Industries also received free hookups from local natural gas and water companies.

Dennis Norman, the vice-president of strategic planning and communications at PGI, and the company's Mooresville plant manager, Chris Scurron, credited in-state energy provider Duke Power for providing favorable rate allowances for electricity.

"For us choosing where to add a production line was kind of a toss-up between here and Waynesboro (Virginia)," Mr Scurron, said, referring to the locale of another PGI manufacturing site. "The North Carolina incentives were definitely helpful and then Duke Power was very willing to help us in terms of utilities. I'd say in a nutshell that made a difference in our decision to expand here in Mooresville."

Research triangle

Mr Norman said Mooresville's close proximity to the Raleigh 'research triangle' was also a top selling point. Along with INDA, he noted that the active Nonwovens Cooperative Research Center (NCRC) is also located in Raleigh, at North Carolina State University's college of textiles (*see separate feature on page 12 of this issue*).

"North Carolina is focused on getting manufacturing jobs into the state," Mr Norman said, "and on top of that, when you're looking for the centre of your intellectual knowledge base for the nonwovens industry, between that consortium at North Carolina State and INDA, it is clearly all right there."

Rory Holmes said that the large existing nonwovens base in North Carolina was also enticing new companies.



Above: Construction underway at PGI's plant in Mooresville, North Carolina with an additional production line expected to come online by the third quarter of 2006. The investment in the new line is estimated at \$40 million.

Below: Official opening of the new Jacob Home plant in Asheville.



"We at INDA track businesses around the country that represent the whole value chain of the nonwovens industry," he said, "not just manufacturers but equipment suppliers, people who buy fabric, sales offices and distribution centers, etc. Out of all those businesses throughout the United States 10 percent of them are in North Carolina."

A skilled and technologically proficient labour pool has also apparently been a consideration for companies choosing North Carolina, Mr Holmes added. "Many of the skills required for textile operations such as material handling and carding are also used in the nonwovens industry," he said. "Then you have the local university system with 16 campuses offering training programmes. As a result there's a built in-population of qualified labour candidates. This is all part of the incentive."

Computer skills

PGI's Chris Scurron said the state also provides a sufficient computer-skilled labour force.

"Our manufacturing process we have is very capital intensive versus a traditional textile operation which is very manual and labor intensive so we're looking at people who are capable of operating PLC equipment, for instance. We are able to find that here in Mooresville. Despite a decline in the value of manufacturing jobs in the US, we are able to find the people with the skills we need here."

Michael Norboge, vice-president of Jacob

Holm Industries' personal and home care division said the company chose its Asheville location after exhaustively evaluating 18 locations in six different states in the Southeastern United States.

"We needed access to skilled labour and engineering services, construction services and ongoing support services that were familiar with these types of continuous nonwovens production processes," he said.

Intangibles

Considering intense recruiting among states, intangibles such as weather and quality of life often become critical and decisive criteria in the selection process, a development that apparently has worked in North Carolina's favour according to executives who were interviewed.

Mr Norboge said Jacob Holm's ultimately selected Asheville, over one other finalist site in Eastern Tennessee.

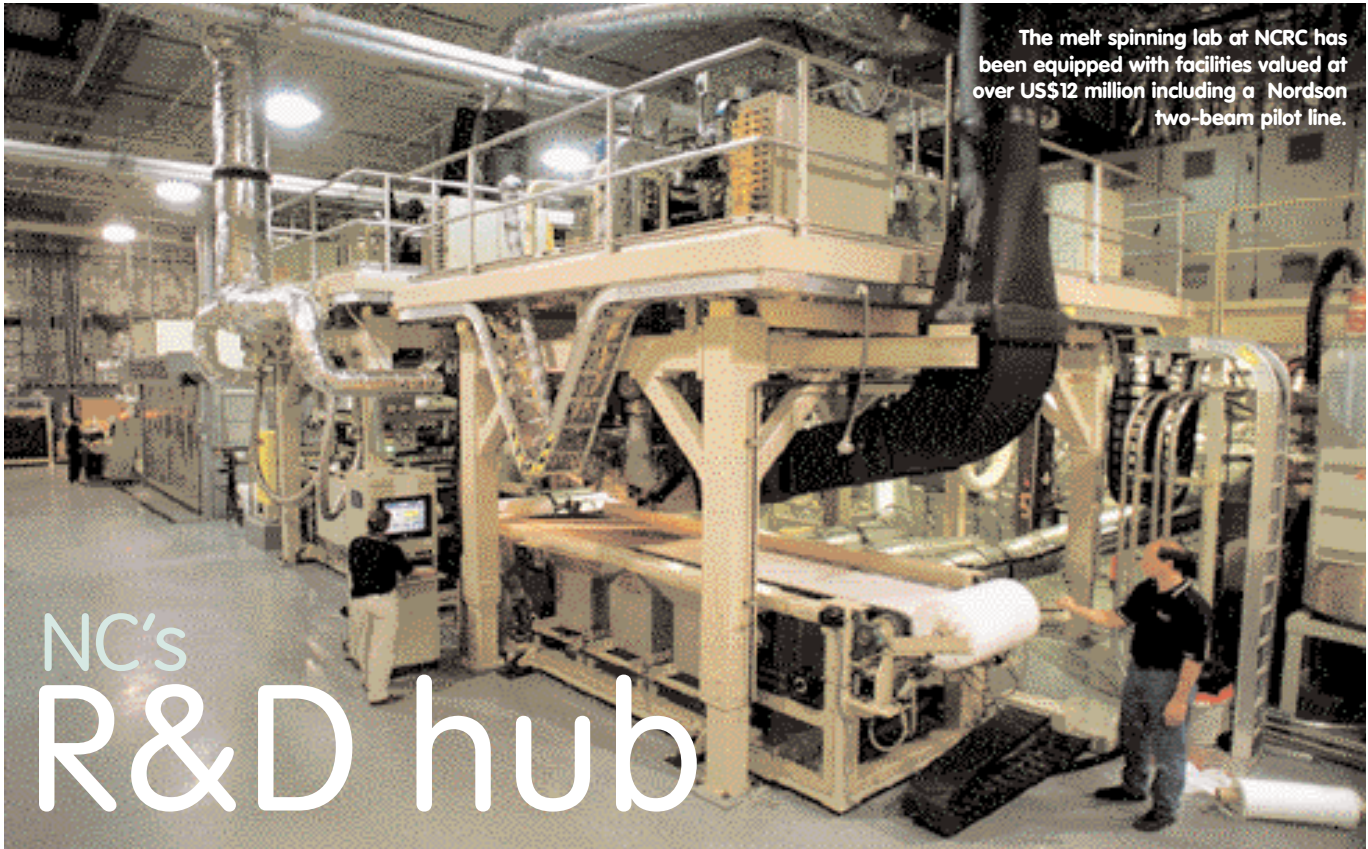
"It really came down to a lot of touchy feely stuff," he said. "What type of community is it to live in? Is it a type of community where employees are going to be comfortable living and working in? Is it a community which our suppliers and customers are going to be comfortable visiting us? Does it have reasonable airport access? Does it have reasonable oceanport access? Does it have reasonable road access? What is the standard of living? What is the cost of living in that area? There were about 14 such parameters that were considered for each location, and following those we made the decision that our home would be in North Carolina, in the Asheville area."

Quality of life

He added that the "quality of life in Mooresville and the surrounding Charlotte-metro area was key in the expansion. The schools are great and it's a good housing market."

Mr Holmes, a transplant to the state and a native of the northeastern state of New Jersey, said the quality of life factor, while being underestimated, has definitely propelled North Carolina's success as a recruiter of nonwovens companies.

"It is just an absolutely wonderful place to live," he said. "We enjoy favourable weather. We still have four seasons but the winter is short-lived. It's not a long grey season. I think that goes a long way. I'm certainly pleased that I live here."



The melt spinning lab at NCRC has been equipped with facilities valued at over US\$12 million including a Nordson two-beam pilot line.

North Carolina State University's Nonwovens Cooperative Research Center (NCRC) is playing a pivotal role in the region's nonwovens development. Adrian Wilson reports.



For Dr Behnam Pourdeyhimi, left, the current director of the NCRC at North Carolina State's College of Textiles, there are a number of clear reasons for North Carolina's success in attracting investment from the nonwovens industry.

"First, the State is very supportive of the industry at both County and State levels and the Department of Commerce and County Economic Development groups provide help and assistance to new companies," he says. "At the same time, here is where it all happens. Many of the key suppliers and technical needs of the industry can be met within a short radius of North Carolina or the neighbouring states.

Dr Pourdeyhimi adds that partnerships are another key factor, with universities and the Department of Commerce and Economic Development groups working

together.

"The nonwovens trade organisation, INDA, has become the economic and lobbying arm of the industry and the partnership between INDA and NCRC is a strong one. The Research Triangle Park area is also home to NCRC, INDA, NC State, UNC Chapel Hill, Duke, AATCC, TC2 and many other textile-focused organisations, so it's where help can be found with almost any conceivable need."

Finally, there is the work of the NCRC itself.

"This is where companies come for assistance with training, product development, analytical services, in-plant training, research, and recruitment of new personnel," says Dr Pourdeyhimi. "NCRC has become the research arm of the industry and a world class resource."

R&D on the doorstep

Established as a State/Industry-University Cooperative Research Center in 1991, NCRC now has an annual budget of US\$1 million. Core funding comes jointly from

the State of North Carolina and fees of local businesses who recognise the value of having advanced and independent R&D facilities on their doorstep – literally all nonwovens-related companies in the region hold active membership.

Other non-core funding is received in grants and contracts from individual companies for pilot line operations and testing and analytical services.

NCRC member companies enjoy significant discounts on the work carried out within the company's labs.

Spunmelt

The melt spinning lab at NCRC has been equipped with facilities valued at over US\$12 million.

A Nordson two-beam pilot line, at 560mm wide, processes homopolymer or bicomponent polymer spunmelt, using either meltblown or spunbond technologies. The line produces fabrics in spunbond, meltblown, and spunbond-meltblown combinations from 5-100 gsm. Bicomponent combinations encompass sheath-core, side-by-side, islands-in-the-sea and segmented pie filaments, aided by the technology of Hills Inc., the acknowledged leader in this field.

This equipment can be operated at full

commercial throughput speeds (approximately 300m/min), but only requires a material width of half a metre, allowing relatively low volumes of raw materials to be employed for producing working prototypes.

In addition, the lab has a Fleissner hydroentangling unit, calendering, through-air bonding and drying, and high-speed winding.

Drylaid products

The second phase of the NCRC's new staple nonwovens laboratory became fully operational at the end of 2005, following the installation of an Asselin pre-needler and a Profile crosslapper from the same company.

The staple nonwovens laboratory already houses a variety of staple web formation technologies and plans are now being made for a third phase installation to include a Perkins four-roll calendar, other oven bonding technology, and an advanced needlepunching system.

Analytical services

Analytical services are carried out at NCRC in the following main areas:

- Physical/mechanical
- Fluid Transport
- Heat Transfer
- Barrier and Filtration
- Imaging/Microscopy
- Chemical Analysis

A dedicated fluid dynamics lab carries out specialised work on dispersion, fluid flow, hydro jet and polymer flow, a vast

range of image analysis and surface science work is done in a second dedicated lab, and polymer characterisation in a third.

Industrially relevant

Core research programmes at NCRC are initiated from the suggestions of members and focus on industrially-relevant problems. While the resulting intellectual property belongs to NC State, all full members receive a non-exclusive, non-royalty bearing license for internal use and the right of first refusal to license any technologies exclusively.

One recent example of this is in the exclusive license to the patent-pending deep moulding technology obtained by Freudenberg Nonwovens, which has led to the formation of the Novolon Dimensional Fabrics Division.

This technology was developed by Dr Pourdeyhimi and Dr Trevor Little at NCRC and Freudenberg is now manufacturing the three-dimensional Novolon products at its plant in Durham, North Carolina, with application targets focused on medical, home furnishings, automotive and apparel end-uses.

2006

There are three clear objectives for Dr Pourdeyhimi and the team at NCRC in the coming year, the first being the establishment of the Nonwovens Institute as an expansion of the focus and mission of NCRC.

The third phase of the development of the staple nonwovens lab will also be

completed.

The main goal, however, is to expand membership in order to represent the whole industry and not just a portion of it.

In addition to his leadership of the NCRC Pourdeyhimi, the William A. Klopman Distinguished Chaired Professor of Textile Materials at the North Carolina State College of Textiles, is also the current Associate Dean for Industry Research and Extension.

Prior to joining NC State, he was a professor at the School of Textiles and Fibre Engineering at the Georgia Institute of Technology and served for eleven years on the faculty in Textiles and Materials & Nuclear Engineering at the University of Maryland.

Dr Pourdeyhimi was the recipient of the 1994-1995 Distinguished Achievement Award by the Fiber Society and has served as its president. Asked what he thought the influence from the fibres industry on nonwovens would be in years to come, he said he felt that, with a few exceptions, there is little or no significant innovation in the fibres area.

"One can point to Wellman, Fiber Innovation Technologies, and FiberVisions as the primary innovators for fibres intended for the nonwovens industry. Both fibre producers and polymer suppliers recognise the need for new and novel fibres and we have begun to see a return to basic research in this area."

"With the increase in the use of spunbond/meltblown spinnelt technologies, I believe we will start to see many new innovative materials from Eastman, Arkema, BASF, DuPont and others in the near future. Additionally, the use of additives which enhance fabric performance will continue to grow. These are also most compatible with the spinnelt processes."

Most product innovations in the industry, he adds, are being driven by converters such as P&G, KC, Clorox, Unilever and most innovations in formation/manufacturing are driven by machinery makers.

"There is little or no materials innovation at the moment and this is where universities and materials suppliers can make a significant difference."

Dr Pourdeyhimi's own research interests are in the area of nonwovens, materials, biomaterials, failure mechanisms, special fibre-based structures, instrumentation,



Fleissner AquaJet hydroentanglement line at the NCRC melt spinning lab

software algorithms, optics and image analysis and he has acted as consultant to many bodies and major corporations.

Innovation and technical superiority, he asserts, are what will keep the nonwovens industry in areas like North Carolina, and within developed countries like the US and those in Western Europe and Japan.

“Nonwovens are engineered, multi-functional materials which depend on innovation. The commodities will be taken over by those who can produce them the cheapest. That is not where our future lies.

“In this country, we have saturated areas such as medical, and hygiene. Over 90% of all such products are nonwovens. There is no such thing as medical textiles anymore when it comes to hospital supplies and similar products. In the industrial sector, nonwovens account for less than 50%, and the apparel area is less than 10%, mostly as interlinings. These are the two next BIG areas for nonwovens.”

Techtextil North America

At the forthcoming TechTextil North America in Atlanta (March 28-30) a full symposium session has been organised by NCRC, to showcase its work on technical nonwovens, in addition to developments by NCRC industrial partners. The full programme of this event, which takes place on Tuesday March 28, is as follows:

1. From Disposable to Re-Usable – Implications

Subhash Batra, NCRC

The nonwovens industry has excelled in providing solutions for many sectors of the industry. These are most notable in the disposable products arena. As these markets are saturated, attention will have to be focused on value added, cost-effective durable products. Examples include the apparel and the home furnishing markets. The challenges faced by the industry will be examined and reviewed.

2. Hydroentangling – A Path to Technical Nonwovens

Hooman Tafreshi, NCRC

This work reports on the characteristics of water flow through hydroentangling nozzles and their resulting water jets. Effect of nozzle geometry and operating pressure is discussed and correlations between theory and experiments are presented. The consequences of ‘jet-streaks’ on the fabric surface are also discussed.

Highest calibre graduates

Asselin-Thibeau, of the French headquartered NSC Group, is investing both in executive involvement and in financial contributions towards installing Profile high speed crosslapping and pre-needling machinery in the NCRC staple fibres laboratory. “At Asselin-Thibeau we have always had high regard for the calibre as well as the range of skills of the graduates coming from NC State University, and when we were approached by NCRC to offer help in upgrading their laboratories it was done with a great deal of interest,” said Jean-Noël Cozon vice-president of sales for N. Schlumberger (USA) Inc.

This will allow students to make use of the laboratory under production conditions which are more scalable to industrial levels, as well as to become familiar with the type of equipment being currently used in industry.

“This complements certain selected co-operative development work within our own laboratories for NCRC projects,” Mr Cozon added. “The benefit to NSC Nonwoven of being associated in a forum or ideas where major nonwoven producers and suppliers are directing the focus of academic research is particularly exciting, as it carries the promise of real scientific progress and innovation on a scale which few individual companies can easily achieve by themselves.

“In contributing to the investment in the NCRC, Asselin-Thibeau believes it is underlining and strengthening its position as a leading supplier of nonwoven staple-fibre technologies (carding, crosslapping, needlepunching, direct-lay carding, airlay or tow-lay systems) to the managers of the nonwoven industry of the future.”

3. Commercially Feasible Strong Nano Fiber Based Nonwovens

Behnam Pourdeyhimi, NCRC

This paper describes the use of bicomponent fibre technology to produce micro and nano fibre nonwovens. These nonwoven structures are composed of small, yet strong fibres leading to strong fabrics capable of carrying significant loads compared to other nonwovens and the more traditional fabrics made from similar materials. The challenges involved in producing such structures will be discussed.

4. High Strength Durable Coated Fabrics Made From Nonwovens

Svetlana Verenich, NCRC

Coating is a simple way to significantly improve tensile properties of fabrics. This work considers an application of different formulations on bicomponent fibre nonwoven via padding and knife-over-roll. The implications of these coatings on the tensile properties of nonwoven substrate are therefore discussed.

5. Advances Made In Micro-Denier Durable Nonwovens

Robert Groten, Freudenberg Evolon

Special properties like comfort, sound absorption, and UV protection etc. of micro fibre fabrics show advantages with regard to standard fabrics. While the durability of micro filament fabrics like woven or Evolon are improved compared to micro fibre fabrics, it is difficult to obtain properties of standard-denier fabrics. We want to present improvements obtained

regarding tear strength, pilling resistance and stretch and recovery towards the applications which require improved properties.

6. Deep Molded Nonwovens – The Next Dimension

Carol Clemens, Novolon Dimensional Fabrics,

Freudenberg Nonwovens

This paper describes a process that transforms a two dimensional nonwoven substrate into a three dimensional product. The creation of 3D structures from 2D nonwovens can create a wide spectrum of performance characteristics. The process can produce a wide range of general purpose and proprietary geometries. As would be expected, the selection of the substrate, the pattern, and the processing parameters can be used to create an exceptional range of 3D structures that meet an enormous range of performance specifications.

7. Nonwovens with Stretch and Recovery

Ed Thomas, BBA Fiberweb

Since the early sixties, apparel has been the “promised land” for spunbond nonwovens, but the lack of stretch and recovery has continually thwarted achievement of that vision. Recent advances in process technology and materials are now showing significant promise. This paper will highlight the evolution of the technology as well as present its current state and applications.

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Wake County Economic Development

Jeff Denny

800 S. Salisbury Street

Post Office Box 2978

Raleigh, North Carolina 27602-2978

www.raleigh-wake.org

919.664.7043 jdenny@the-chamber.org

North Carolina State University

Dr. Ted Morris

NCSU Campus Box 7012

Raleigh, North Carolina 27695

919.513.0388 ted_morris@ncsu.edu