Dressing for Success

Paper machine clothing makers tell us that making high quality paper and controlling production costs begins by selecting the right fabric.

By John O’Brien, Managing Editor

Productivity, efficiency, improved paper properties, better fiber retention and drainage, reliable and predictable life expectancy are just some of the items on a papermaker’s punch-list for today’s paper machine clothing (PMC) companies.

_PaperAge_ approached several of the industry’s PMC companies and asked them about some of the more prominent areas of concern that papermakers have when it comes to forming, pressing and dryer fabrics. Participating in the discussion were: Albany International, AstenJohnson, Kufferath, Tamfelt, and Weavexx.

Steve Cole, director of technology at Weavexx, said that the mills continue to stress the importance of high quality, saleable tons, overall machine efficiency/productivity, and predictable/economic life for machine clothing. “The customers in the market we serve are constantly striving to improve their competitive positions within their own corporations as well as against the rest of the world,” explains Cole. “So being able to make paper at the highest quality levels under constant scrutiny of ever-increasing costs remain at the center of discussions.”
Stan Malanoski, technical director, Dryer Fabrics for Albany International agrees that efficiency and cost remain a top priority for papermakers. “There continues to be tremendous pressure in the paper industry to operate at the highest efficiency and the lowest cost,” he said.

In the forming section, improving paper properties is high on the papermaker’s list says Bruce Janda, product business leader – Forming at AstenJohnson. “When it comes to forming, papermakers ask, ‘How can we improve paper properties such as print smoothness while controlling costs?’” Janda says.

Dr. Wolfgang Heger, head of R&D at Kufferath, agrees, “In terms of formation, many papermakers, especially manufacturers of fine papers, focus on low marking tendency as a key criterion in assessing a forming fabric’s suitability for their paper machine. Only low marking tendency allows a surface uniformity that ensures good printability, and thus satisfies papermakers’ end customers,” Dr. Heger says.

Seppo Holkko, executive vice president, PMC Division of Tamfelt pointed out that all issues related to productivity and efficiency are natural discussion points with the mills. “Runnability without breaks at ever increasing production speeds is a very important feature of any fabric to a papermaker as well as reliable life expectancy. Fast start-up of a new press fabric also contributes to the paper output as decreased machine speed would easily deteriorate the production budget. And high dryness after forming and press section is of vital importance for papermaking profitability,” Holkko added.

So, what, you may ask, are the producers of PMC doing to satisfy their customers’ demands?

FORMING FABRICS
In forming fabric technology, Weavexx is applying fabrics with higher fiber support and thinner caliper for increased drainage capacity, smoother sheet surfaces, and increased couch consistency. “Our patented Huytexx and Synergie, and now Vortexx styles, push the technology envelope even farther to help our customers achieve new levels of performance in the printing/writing and newsprint segments,” Steve Cole says. “Titan HTX also provides unprecedented results in the packaging segment while Vantage 16T and Synergie T are making similar strides in the tissue market,” he adds.

Bruce Janda explains that AstenJohnson has also focused on improved fiber support in its forming fabrics. “AstenJohnson introduced the InTegra® SF forming fabric about two years ago to give the papermaker increased fiber support. This has been successful in improving print smoothness and first pass retention,” he notes, adding that the company’s new InTegra® CenTec” forming fabric offers even more fiber support.

Wolfgang Heger from Kufferath said that formation properties have considerably improved due to triple-layer, self-support binding (SSB) designs. “SSB fabrics, such as our GEOFLEX X 325® have significantly reduced marking tendencies, primarily because of the fine surface weave on the paper side.

“In order to improve fiber retention properties, papermakers generally require finer fabric designs. The fiber support index varies according to fabric type. At Kufferath, regular double-layer and long-floating double-layer fabrics achieve maximum FSI values of about 120, while SSB fabrics’ FSI start above 120 and reach up to 200,” Heger said.

Seppo Holkko of Tamfelt also stresses the importance of good fiber support when it comes to selecting a forming fabric. “With a high speed paper machine, improved fiber support is achieved with our new patented forming fabric, HiSpeed,” says Holkko. “In the very first production runs it also gave much improved formation and increased dryness after the forming section,” he notes.

Stan Malanoski from Albany points out that although triple-layer forming fabrics once revolutionized papermaking, Albany’s new InLine forming fabric designs are further changing the industry by improving sheet quality, productivity, and reducing energy.

“The InLine utilizes a patented, integrated, machine direction binder system,” Malanoski says, adding that “the result is straight-through drainage in a very compact structure. This combination allows the InLine design to provide
High drainage capacity, improved couch solids, and lower drive loads,” he explains.

PRESS FABRICS
In the area of press fabrics, Weavexx continues to apply more seam felt technology, particularly trending towards historically “endless-only” positions. “Since the introduction of our patented compressible Seamexx TX, many customers are now realizing the operational and safety benefits of seam felts on positions that cannot successfully run traditional seam felts,” Cole says.

“Our exclusive Huyperm and Huyperpunch-D offer the benefit of enhanced sheet quality across all grade segments by providing ultra-high pressing uniformity to a variety of press fabric styles,” Cole points out. “Our newest style, Axxelerator, was developed specifically for enhanced pressure uniformity by combining a totally new co-planar long-float weave structure with our unique batt surface manufacturing techniques to provide a very high-performance design for the most demanding highly loaded late press positions,” he added.

At Albany, Malanoski says his company’s Multiaxial Press fabrics have been a big success in the mills. “Steady-state pressing, improved runnability over time, and increased dewatering capabilities have contributed to cost savings of several hundred thousands of dollars annually on some high-speed machines.”

In addition, Albany recently introduced a new technology platform that includes nonwovens in products called DynaPlane and HydroCross. “While relatively new, these products are showing a lot of promise,” Malanoski added.

Richard Delage, product Business leader – Press at AstenJohnson, reminds us that the more things change the more they remain the same in the press section, i.e. increasing press fabric life, reducing energy consumption, and improving sheet properties.

“Unfortunately, these objectives can be contradictory,” says Delage. “The same press fabric design solutions that reduce energy consumption and improve sheet printability may have a negative impact on effective operational life,” he explains. “However, improved materials, manufacturing techniques and press fabric design alternatives are now bridging the gap.”

“Another balancing act involves the relationship between bulk and dryness. This is an area where shoe press technology is very beneficial. This presents new press fabric design challenges, Delage says, adding, “AstenJohnson is meeting those challenges, especially for complex applications such as the single nip shoe press.”

At Tamfelt, Holkko said his company’s Transmaster Open (TMO) for press applications offers papermakers fast startup, improved paper quality and long life. “All important qualities in demanding press positions,” he adds.

DRYER FABRICS
According to Bill Dunleavy, product business leader at AstenJohnson, a top priority when it comes to dryer fabrics is offering papermakers a product that resists contamination, or as he put it, “cleanability.”

“It is generally recognized,” Dunleavy says, “that contaminant build-up on a fabric will impede overall machine production efficiencies with negative impact on: (1) Drying/Energy... permeability reduction results in higher steam consumption and/or speed loss; and (2) Uptime... increased sheet breaks, sheet drop-off, threading issues, etc. For these reasons keeping the dryer fabric clean is an ever increasing focus area.

“We have developed a number of product designs specifically engineered in either weave structure or material components to be less prone to contaminant build-up such as our MonoTierPlus™ CR fabrics woven on the patented MonoTier™ weave platform,” Dunleavy contined. “These fabrics incorporate contaminant resistant filaments woven with large ribbon-like yarns. This structure eliminates the small
nesting areas of a conventional weave pattern that tend to trap contamination, which can be difficult to clean with modern shower systems,” he explained.

Steve Cole at Weavexx echoed the importance of designing cleanability into dryer fabrics. “In the dryer section, we continue to supply more SoilMaster designs for contamination resistance, and Exxtreme designs for enhanced hydrolysis resistance on the most demanding sections,” Cole said, adding, “Our Blue Maxx SSU is also providing improved performance on single tier/unirun positions where sheet transfer, stability, and quality requirements are paramount.”

Daniel Perron, technical director, Tissue at Albany said that his company’s new Aeropulse dryer fabric has been designed to improve dryer pocket ventilation without creating sheet handling issues. “The application of this product has resulted in reduced humidity in the dryer pockets, which ultimately has led to steam savings and/or productivity improvements representing millions of dollars in annual savings.”

**FUTURE TRENDS**

With increasing paper machine speeds and width, and continuously growing demands in paper quality and characteristics, what might papermakers expect to see in the future from the producers of PMC? According to our roundtable of experts, the consensus is further development and continued use of PET and PA-based materials, along with advancements with nanotechnology applications to base materials.

“The technology of materials used for manufacturing felts/fabrics goes to tailor-made raw materials,” Weavexx’s Steve Cole says. “Besides the trend to finer materials and fibers with tighter diameter tolerances, the trend goes to more abrasion resistant materials with improved stress characteristics and higher temperature resistance,” Cole explains.

“For the future, PET and PA-based materials as well as copolymer material will be the major material base,” Cole says. “And, research work with polymer centers and institutes also shows interesting potential to new technology for manufacturing fabrics/felts,” he adds.

Kufferath’s Dr. Heger agrees, “PET and PA remain the best yarn materials for the foreseeable future, with certain improvements possible in the base properties.”

Stan Malanoski from Albany includes new resins, which are constantly being introduced in the industry. “Many of these materials have proven to hold up well in the harsh environment of a paper machine,” he says. “The challenge is to produce fabric components from these materials with the desired paper machine clothing mechanical and processing properties while providing consistently superior papermaking.”

Malanoski adds that PPS and PCTA are good examples of higher technology materials now being used to replace standard polyester and improve hydrolysis resistance.

Graham Jackson, vice president – Advanced Product Development at AstenJohnson believes one of the key areas for improvement in PMC is fabric uniformity, “as made,” and during operation on the paper machine. “Materials will play a key role in advancements in this arena,” says Jackson.

And nanotechnology is the area that PMC producers say is playing an exciting role in the development of customized PMC materials. “Recent advances in nanotechnology offer further refinement to our alloying expertise,” Jackson confirms.

“To accomplish the higher fabric fineness and uniformity needed in forming, a new engineered polymer technology has been developed to provide increased modulus and stretch resistance,” Jackson says. “Without this material, we could not provide the fabric fineness and caliper needed for the most demanding paper grades and machines,” he explains.

“Fabric uniformity can also be lost over life from contamination, which is invariably uneven. By developing a profiled yarn in dryer fabrics, we generate a smart surface capable of reducing contaminant buildup, Jackson says. “This can be further enhanced with a nanotechnology-based coating that provides both hydrophobic and oliophobic characteristics capable of improving fabric cleanability,” he added.