



WEAVING

Technical fabric photograph
courtesy of Smit S.p.A.

Weaving Technical Textiles

Textile World explores the growth of the woven technical textiles sector from leading weaving machinery suppliers' perspectives.

By Jim Borneman, Editor In Chief

Technical textiles are a much-heralded segment of the industry, synonymous with opportunity, innovation and profitability. Although there is a technical component to virtually every textile product, technical textiles stand out with either a high-performance application end-use or a rigid slate of specifications that must be achieved in order to perform properly.

Woven technical textiles capitalize on a long tradition of incorporating weaving machinery innovations with developments in fiber, yarn and finishing to achieve state-of-the-art products. In a brief survey of weaving machinery producers conducted by *Textile World*, there is consensus that this is a vital sector that continues to optimize weaving machinery developments, particularly with air-jet and rapier machines, to drive the business forward.

A Healthy Segment

"Technical fibers, technical yarns and, at the end, technical fabrics have been growing year by year thanks to

specific features that such technical articles can exploit," said Luciano Corain, president, Smit S.p.A., Italy. "As a consequence, the weaving machine has been developing [with] a kind of Darwinian evolution in order to specialize its ability and make available more and more sophisticated performance, in line with the requests of such an important niche market.

"Technical fabrics include a very wide range of types, ranking from the heaviest to the finest, with extreme variation of material, count and type of yarn — and the weaving machines must be able to handle all of them, from metallic to glass, from carbon to aramid or synthetic as well as natural fibers," Corain continued. "Besides the specific features of the frame and the technological geometry of the machine itself, the weft-insertion technique and the control means of the weft-transfer devices are of primary importance."

According to Riccardo Mautino, marketing manager of Italy-based Pro-

matech S.p.A., the market can be divided into two segments from the weaving machinery manufacturer's perspective. "On one side, there are all the products made starting from new fiber and yarns, or that must respond to particular requirements like flame retardancy, strength or permeability," Mautino said. "On the other side, there are all the special fabrics like geotextiles and tire cord. The first type doesn't need particular modification of the weaving machine, while the second sees the weaving machinery manufacturer deeply involved in the modification of the standard loom to be adapted to the different requirements."

Japan-based Tsudakoma Corp.'s Norio Yamashita, manager of the sales promotion section of the sales department, observed, "We see a trend in the abilities that our users require to respond to wide fabrics, high density, high tension, fine yarns with low tension, and special materials. As far as quality is concerned, the strength and the air permeability of the technical textiles are sometimes quantified for evaluation of the specifications. They are different from apparel fabrics, which emphasize sensuous evaluation. For weave, almost all the technical fabrics are plain. However, the shedding motion must be chosen according to the user's needs. The crank shedding motion is chosen for speeds, and the cam shedding motion is chosen for high density."

Global Effects

According to the machinery suppliers, the stability of the North American and European technical textile markets are apparent.

"The main markets are still the United States and European countries like Germany, France and Belgium, but other markets like Turkey, China and India are interesting developing markets in this sector," said Peter Brust, executive vice president of Charlotte-based American Dornier Machinery Corp. "In total, the interest regarding technical textiles has noticeably risen within the last few years, although we, as a niche producer of weaving machines, have always been strong in

the technical textiles sector, thanks to Dornier's flexible filling insertion systems. In [Dornier's] portfolio, the share of weaving machines for technical textiles increased from 17 percent to 25 percent within the last year."

"We see growth in Eastern and Western Europe and North America in almost every segment except glass-fiber-based fabrics," reported Filip Lombaert, market manager, technical textiles, for Belgium-based Picanol NV. "China is particularly active but seems to choose both local as well as imported machinery, depending on end-uses. The Indian market seems to need some technical fabrics, but a large part is still imported. There is good activity in Korea, Taiwan and Japan in general. Russia is mainly active in polyester-based fabrics.

"There is a need for high-speed and flexible weaving machines," Lombaert added. "High speed because some segments become more and more commodity. And flexible because people want to be able to react to sudden changes in the market."

Smit's Corain views it this way: "Technical fabric is a specialized application requiring most times deep know-how, which can't come from improvisation but must come from tradition and long-standing technological development. Newcomers are uncommon in this field, even if business-wise it looks attractive, so areas for technical fabrics are mostly those with tradition in this respect, like the United States, Europe, Japan, Korea and Taiwan, without forgetting that others are pushing to develop and expand in such applications."

"Europe, Korea and Japan are the countries where

we receive the higher demand for machines suitable for technical textiles, while China is growing also in this sector," Promatech's Mautino said. "The main reason is the demand from other sectors. Automotive, construction, agriculture, among other sectors, have expanded in each country."

Switzerland-based Sultex Ltd. reports steady growth, with Turkey, India and China as emerging markets. "This sector has the biggest growth potential of all," commented Fritz Legler, vice president, head of sales, marketing and service, Sultex. "Projections go from 2 to 4 percent per annum with new materials and technologies — like, for example, using more electronics or fiber-optical materials — will enhance this segment. Furthermore, new applications — for example, nanotechnology — will help users apply targeted finishes to specifically engineered textiles."

Picanol

Summarizing Picanol's machinery offerings in this segment, Lombaert said: "Picanol always offered solutions for certain segments in technical textiles. Since 2000, however, after the acquisition of Guenne, Picanol decided to explore the market more actively. This coincided with the fact that a large portion of existing Western European weaving plants moved into technical textile markets under pressure of globalization. Picanol has been successful by the introduction of high-speed solutions in both air-jet and rapier technology.

"In some technical textiles, the weft yarn is suitable for air jets, and the OMP800 air jet, introduced in 2005, therefore is very successful in tire-cord,

air-bag, car-seat and parachute fabrics. Speed and a reliable and sturdy machine design with high beat-up power is offered. Sumo direct drive that reduces power consumption and maintenance costs is appreciated in technical textiles as much as in other markets," Lombaert said.

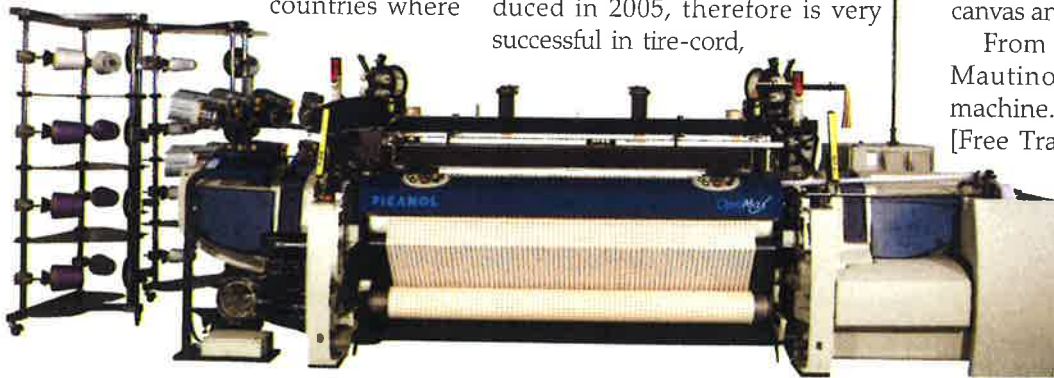
For rapier applications, Picanol recently introduced the Optimax flexible rapier. "The Optimax offers a wider range of applications, mainly due to its versatile gripper system, and offers much more beat-up power thanks to the new arrangement of the sley drives and a new shed geometry," Lombaert said. "The new widths of 430 and 460 centimeters open new fields of application in technical textiles. The high-speed leno system on Optimax — the Optileno, available in single- and double-beam arrangements — can be transformed in two hours towards normal frames. It offers the highest speeds in leno weaving on rapiers.

"The Omni-Jet air jet, assembled in the Chinese plant in Suzhou, will become more and more successful in electro-glass and gauze fabrics since it simply offers the best price/performance ratio, and makes use of OMP-800 technology," he added.

Promatech

From Promatech's Somet line of rapier machines, Mautino said: "In the technical textiles sector, the most diffused loom is the Alpha PGA — thanks to its mechanical principle and the widest versatility for a negative rapier weaving machine. The Alpha PGA finds important and wide applications in the glass-fiber sector, air bag and automotive textile products, heavy canvas and fabrics with aramid fibers."

From Promatech's Vamatex line, Mautino pointed to the Silver HS machine. "The Silver HS, in the FTS [Free Transfer System] execution, is particularly appreciated for the weaving of high-density fabrics or with parallel filament yarn products." The FTS version is also noted for production with delicate yarns, even in wide fabrics.



Picanol's Optimax offers wide working widths suitable for technical applications.

Smit

Corain pointed to Smit's long tradition in the development of weaving machines for technical fabrics, with key technical features like weft insertion grippers and relevant control system, shed geometry, reed beat-up and warp control.

"All these allow Smit to offer a positive solution to the requirements coming from mine heavy conveyor belts to finest mesh for bolting cloth through fabric for composite, electronic boards, air bag, synthetic as well as metallic filters, respecting all the technical and quality specifications required," Corain said.

"Smit has developed a range of machines suitable for four different lines of application, one of which is the GS900T, a gripper weaving machine for technical fabrics.

"All Smit machines share a common platform designed and developed aiming to make available the proper competitive solution to different requirements of each specific application," Corain said. "It is worth pointing out on this subject that important applications such as heaviest and finest fabrics require by chance similar design solutions, matching well in the GS900T."

Sultex

Sultex's Legler remarked that clients are looking at heavy-duty applications like densely picked, multi-layer, pick-insertion fabrics woven very wide. "The marketplace tends to invest in projectile weaving machines up to 6.5-meters-wide," he said. "The projectile weaving machine P7300HP is predominantly used in this field [technical textiles] due to its flexibility, sturdiness and quick turnaround time.

"Floor coverings — in flat constructions or leno weaves — heavy-duty filtration materials, geotextiles and agrotexiles are almost uniquely woven on projectile machines," Legler said.

"Other applications like OPW [One Piece Woven] air-bag constructions favor rapier weaving machines. Sultex's rapier G6500s are used by



Tsudakoma's ZAX9100 air-jet weaving machine is suitable for producing tire cord and glass-fiber fabrics.

leading weavers around the globe in fields like air bags — flat or OPW — coating fabrics, wire fabrics, finest filter applications, canvas, sail cloth and so forth."

Tsudakoma

Tsudakoma's Yamashita said it is "indispensable to respond to the increasingly diversified yarns and new materials. For this purpose, we think binding the know-how of not only weaving, but also preparation process is important. It is Tsudakoma's advantage having accumulated the know-how to be the textile machinery specialist that can provide both preparatory machines and weaving machines."

For technical textiles, Yamashita referred to Tsudakoma's ZAX9100 air-jet looms for products such as tire cords and glass-fiber fabrics. He referenced Tsudakoma's ZW408 water-jet looms for air bags and products using flat yarns.

"Better quality and performance including running costs are required more [and more]," Yamashita said. "The production field by rapier looms has gradually shifted to the air-jet and water-jet looms field. We think this tendency continues further. For example, air bags are woven by water-jet looms, glass-fiber fabrics by air-jet looms, tire cords by air-jet looms and so forth."

Dornier

Dornier is well-known to weavers in the technical textiles market. "With our system family of rapier and air-jet weaving machines, we have two different filling insertion systems that

complement each other for all kinds of technical textile production," Brust said. "The whole range of extremely heavy fabrics, open mesh fabrics and very dense fabrics can be produced with these machines."

Regarding the future, Brust said: "In our opinion, this sector will rise even more in the future due to developments in other industries and market sectors. Demands for higher security standards will, for example, cause a higher request for ballistic fabrics. Environmental considerations will lead to more sophisticated filtration systems. Rising energy costs will create demands for lighter composites for airplanes. Also, in the leisure activities, lighter and more sophisticated components are required."

Staying Ahead Through Innovation

With key weaving machine manufacturers excited about technical textiles, the future, from a technology standpoint, is bound to hold promise for those weavers looking ahead. The opportunity to develop innovative products in a growing global market is sure to attract new companies and competition to the technical textiles marketplace. Innovation will be the differentiator for those companies that want to stay on the leading edge of technical textile product life cycles and avoid the trap of commoditization. The partnership between weavers and weaving machine producers plays a key role in making sure weaving machine technology is pushed to its limits and technical solutions become applied technologies. **TW**