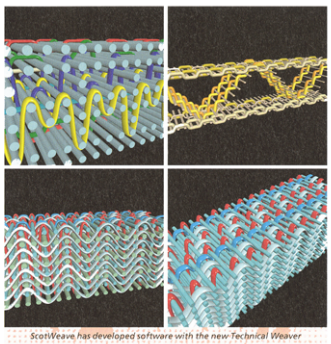
Fibres & fabrics

BY PHILIPPA WATKINS

Extraordinary technical advances, as well as the spur of severe competition, have resulted in an acceleration in the production of new textiles, which can be applied to a huge range of end products. Textiles contribute to almost every part of our daily lives, particularly with the advances of 'technical textiles', which have been seen as the saving of the textile industry.

Also thanks to advances in processing, is the high quality and 'exquisite workmanship' of fashion fabrics seen throughout the production chain - in ever finer and lighter yarns, creative weaving and knitting production and the clever and innovative finishes, which featured strongly on fashion fabrics for summer, noted particularly from Italian mills at textile fair **Milano Unica**.



ScotWeave has developed software with the new Technical Weaver program technical textiles designers who produce fabrics for industrial and commercial end uses.

TEXTILES IN 3 DIMENSIONS

Fineness and lightness are highly desirable characteristics, not only for fashion fabrics, but also for 'technical' fabrics for applications, which take qualities far further than just being a textile ie, 'composites' for the aerospace industry.
At the first conference on **3D Fabrics** and their applications, held recently in Manchester, the technical advances to produce the complex multi-layered woven or knitted textiles, used in an increasing number of technical applications, were demonstrated and discussed.
While there are examples of 3D layered fabrics, throughout textile history - such as cut velvet - the possibilities offered by multi-layered fabrics, according to Prof. John Hearle, were only truly recognised in the 1980s, leading to a flurry of innovation.
Early developments were made on specially built machines. But, more recently, developments have been possible on commercial weaving, braiding and knitting machines, which require minimal adaptation for the production of 3D fabrics, particularly when advances in CAD-CAM can be exploited.

3D weaving, as multilayered woven interlocked structures, plays an increasingly important part in the automotive, marine, rail and aerospace industries, as reinforcement for formed resin composites as well as seating and insulation. The benefit of using textile structures is their lightness and flexibility, a big advantage, particularly for the aerospace industry.

Knitting in the round
Knitting is also well adapted to making shaped 3D fabrics - historically seen in shaped hand knitted socks, superseded by machine capability to make shaped shells. Now shaping has been superseded again into knitting an entire complete garment without any seams at all, the principle and development of which, was charted by Jimmy K C Lam of the Institute of Textiles & Clothing, Hong Kong Polytechnic University.
Japanese knitting machine manufacturer **Shima Seiki** has developed the WHOLEGARMENT knitting machine technology, which can create an entire garment on an electronic machine, with minimal or no cutting and sewing process, thus eliminating much of the labour. It also benefits the garment itself, resulting in better fit and comfort through 3D shaping, improved draping through elimination

Shima Seiki

of seams, and minimum materials usage. The reduction in sewing and linking processes also means faster production, less dependence on diminishing skilled labour sources, and of course, savings in labour costs. Thus, seamless technology provides benefits all round.
This is a technology, which Shima Seiki has been pioneering since its first introduction in 1995. The first product was a seamless glove, which could be considered a miniature version of a whole jumper.

Knitted 'Spacers'
Knitted **'Spacer fabrics'**, another form of 3D textiles, described by Prof. S. C. Anand, are light with low bulk density and flexibility and can be produced in a wide range of thicknesses from 2mm to 65mm. These characteristics make them suitable for a wide range of applications, including clothing, footwear and accessories. Spacer fabrics are used, for instance, in bras and footwear - the mesh fabric found in the upper part of a trainer is actually a spacer fabric. They can be used for medical purposes, automotive seating, or any application requiring light and flexible bulk for comfort and protection.
Mostly warp knitted, but also structured through weft knitting, spacer fabrics consist of two separately produced fabric layers, joined back to back, which are spaced apart at a chosen depth. The fabric can be in any material depending on characteristics required, and each layer can be in a different material.

HIGH PERFORMANCE

Hi-tech swimsuit rockets ahead
For **Mectex** of Italy, specialist in advanced technical performance fabrics, particularly for extreme sports, a key focus has been on lightness, made possible through advanced technologies.
Now, swimwear brand **Speedo**, in collaboration with Mectex, has launched the LZR Racer, made from an ultra lightweight, very smooth, water repellent, fast drying fabric called SUPERBIFLEX VELET PLASMA TEFLON, produced by Mectex uniquely for Speedo. Launched to celebrate its 80th birthday, Speedo claims this to be the world's fastest swimsuit -

Mectex / Speedo