

An opportunistic time for composites

The global composites market, a relatively young and dynamic industry with strong growth rates and attractive margins, offers a range of opportunities and benefits for companies in adjacent markets looking to diversify. **Peter George**, director, Future Materials Group, explains why many technical textile companies are considering composites and the issues these organisations face in making a market entry

The overall global composites market is a US\$25 billion industry with an impressive growth rate of around 9% per annum. With good value propositions and sustainable margins, it is clear to see why diversification into composites, especially by those already skilled in the processing of fibres, can be

seen as such an attractive strategic option.

The balanced international spread of the composites industry (32% North America, 20% Europe and 43% Asia) also offers new regional entrants a pathway to further worldwide expansion in composites (or their existing industries). Digging deeper,

though, reveals a wide ranging market covering applications including aerospace, automotive, defence, oil and gas, sports and leisure and many others. However, it is not just these existing opportunities that present an argument for market entry. The composites world is also in a relatively dynamic period at this time with significant new trends in use, process and properties apparent as well as significant growth potential.

Key drivers

So, what are the drivers for those considering entry into the composites market? Lightweighting in transport applications is often cited as a key driver. However, across many markets, the introduction of composites is also being driven by a desire to exploit other properties such as long term durability and reduced production and maintenance costs. There is also an interest in exploiting composites anisotropic properties where strengths can be focused in the directions needed by the use of increasingly sophisticated structural engineering and additive manufacturing. As a result, existing materials are in many



Peter George from Future Materials Group

appropriate cases being replaced with composite solutions, leading to strong growth in composites markets sitting alongside the traditional mainstays of aerospace and automotive.

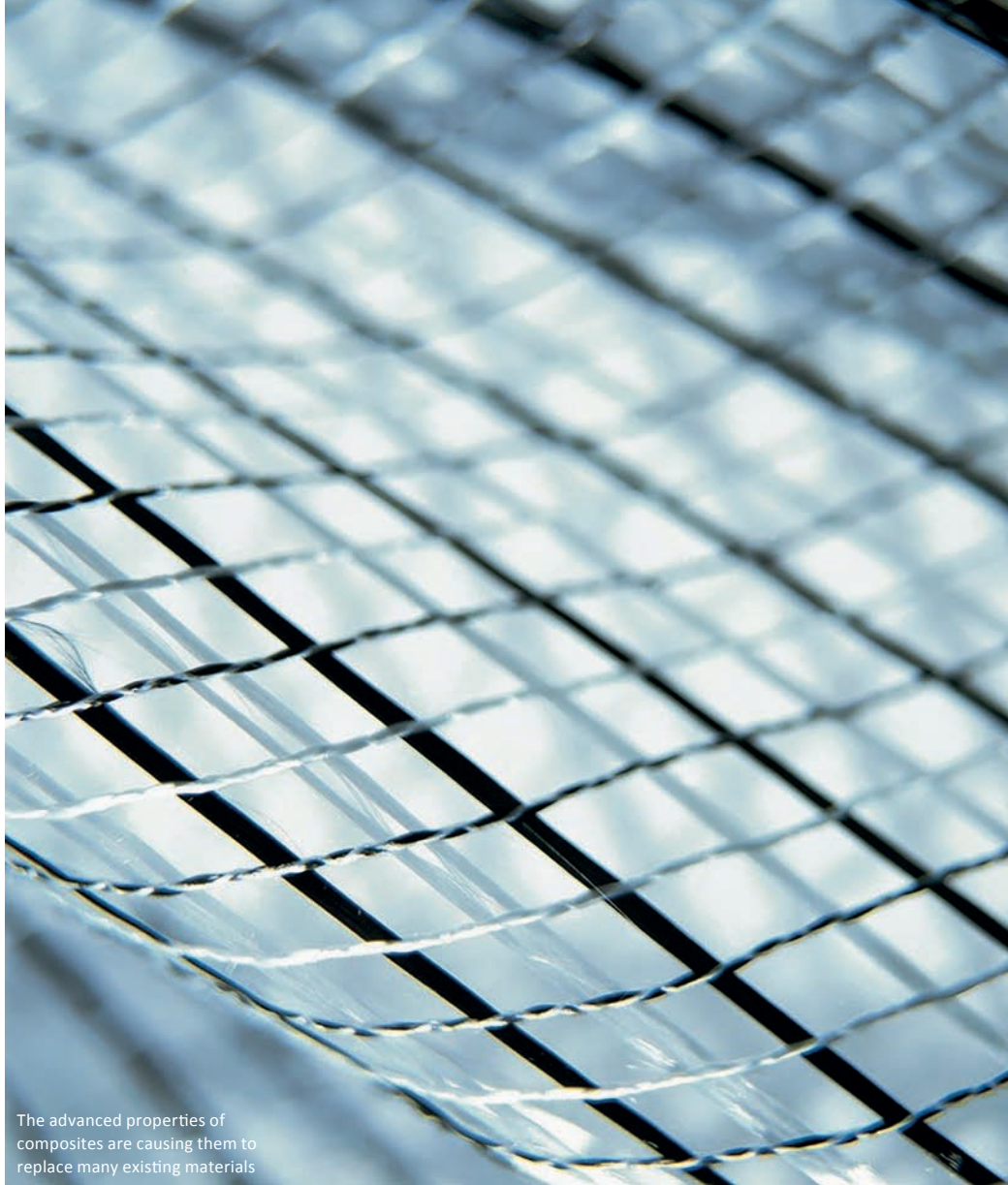
Further developments in the composites world are chiefly driven by a desire to reduce processing/cycle times, a significant element of overall part cost, and developments are focused mainly on the matrix resin and the reinforcements that these matrix resins bind together. We now see a growing interest in thermoplastic matrix composites and new thermosets being developed alongside the more traditional epoxy and polyester resin systems. Reinforcement format – from nonwoven short length fibres to multiaxial or woven fibre architectures – is another key research area as manufacturers push to reduce cost and increase processing ease and speed. There is inevitably a tradeoff between optimised properties of the final composite and optimised processing to get there, the strategy depending on the industry in particular and its emphasis on economies of multi-unit production or economies of material use.

All of these developments and changes in processing and materials technology mean that the composites industry requires a highly flexible supply chain, which in turn presents opportunities for new entrants that are able to provide that flexibility.

A search for efficiency and value

No single element is fuelling the current interest in composites within the technical textiles industry – on the contrary, a number of factors are combining to make the new market appealing:

- Environmental considerations such as sustainability and recyclability, are driving



The advanced properties of composites are causing them to replace many existing materials

the trend to work with annually produced natural fibres that can utilise the expertise of textile producers who already process a wide range of natural fibres for other markets.

- Sound understanding of the design properties and characteristics of composites using short fibres can help adoption of more rapid moulding processes by manufacturers moving towards short fibre composites (virgin or recycled) to increase efficiency. It also opens up the fibre sources to naturally shorter length ones as well as to recycled, chopped long fibres.
- It has also been seen that new avenues in fibre and matrix development may demand experience of process 'outsiders', such as specialists in nonwoven thermoplastic fibres, which are themselves ultimately used as the matrix binder when remelted.

- Technical textile providers may be keen to take the step into composites if there is an opportunity to add value to their products by transitioning a material from a low cost industrial fibre, used (for example) for insulation, to a higher margin composites solution such as a reinforcement fibre with new fields of design and control to produce the consistent results needed.

Ultimately, the composites industry is happy to encourage such diversification as long as the cost saving and efficiency gains allow it to expand into new markets where existing processes are currently out of the required price range, and particularly when they are large markets with above general GDP growth rates (eg construction, automotive and transport) that have to be much more cost sensitive than the pioneering composites users such as aerospace and sporting goods.

Overcoming the barriers to entry

Understanding the differences within the composites market represents possibly the biggest challenge for those looking to enter. Whether considering the markets themselves (direct customers and consequent users further downstream in the value chain) or the composite technologies, there are many differences to technical textiles.

For instance, manufacturing processes can vary immensely. Structural design is also potentially more challenging in terms of final part performance with design techniques like sandwich structures preferred in many cases over simpler monolithic parts. End products might need to be consistently lighter, stronger or stiffer than current processes can deliver, forcing a tightening of tolerances or a process development to meet the new precise requirements.

It is also not sufficient to just have a good value proposition to enter a market. The change this new entrant brings has to benefit all other players in the value chain or they will block the move, especially if they have fixed overheads paid by the traditional process being replaced. Entry into a value chain may then involve finding alternative routes to reach the end user to work around blockers with other new players.

Another barrier may simply be that other players in the value chain downstream see the new offering as risky and have to demand higher margins for their step in the chain to compensate for the higher risk of failure. This 'risk premium' can in some cases overshadow the original benefit of the new fibre, composite or process. A good example is where a novel composite sheet material was only finally successfully adopted by the value chain when the material suppliers found (founded actually) a new component part maker to process the material as an alternative to the traditional route.



Lightweighting in transport applications is a key driver of composites



Sustainability is one appealing aspect of what the composites market is bringing to textiles

Whilst none of these challenges are insurmountable, they require consideration and expertise and some advance thought. Several recent examples of successful composites market entry have overcome the knowledge barrier and fast tracked their market understanding by acquiring existing composites companies. Companies with a strong position in, for instance, acoustic or thermal insulation, packaging, filtration and other non-structural applications for woven or nonwoven fabrics can find the move into the more structural use demanded by a composite a dramatic but feasible jump, involving acquiring or learning not only technical aspects of this market but the landscape and values of the composite

supply chain.

When considering who is going to be best placed to make the most effective and profitable move into composites though, it is clear that those technical textile companies that have prepared well and built a thorough knowledge base will be the ones to achieve successful diversification into this field.

Only by understanding market segments, their specific needs, interests and reasons for resistance to changes, can the new player identify their target position and then, whether acting alone, or via merger or acquisition, develop their pathway into composites.