



UK composites down the line

FEATURE

Liz Nickels

A UK composite parts manufacturer has experienced a 50% growth over six months. Liz Nickels spoke to Rockwood Composites about what prompted the growth, and what the future brings.

Rockwood Composites, based in Newton Abbot, UK, is a manufacturer of composite components using both compression and bladder molding using pre-preg composite material in metal tooling (Figure 1).

Compression molding works by placing composite materials on a tool, which is then forced closed within a heated press to make parts that are solid or which have a lightweight foam core. Components with undercut and side features can all be molded using tooling with collapsing cores and side action tooling, according to the company.

In comparison, in bladder molding, an inflated pressure bag provides the consolidation pressure in the molding process, and the surface in contact with the bladder is not controlled by tooling. Rockwood reportedly also makes parts using both compression and bladder molding processes within the same component.

Major growth

In September 2019, the company announced that it had increased in its workforce by 50% in the previous six months. It also installed two new large presses that take tools with overall maximum dimensions up to 1500 × 1000 × 500 mm and operate up to 100 tonnes with 220 °C of multi zone heating (Figure 2).

The company uses the presses to apply heat and pressure needed to cure raw composites materials into components and structures for industries such as aerospace, defense, nuclear energy and medical technology. It also possesses four smaller presses with the same temperature capacity that support tools up to 500 × 500 × 500 mm and 75 tonnes.

Rockwood reported that it had also invested in an additional CNC machining center from UK machine specialist Hurco. The

machine features CAD-CAM in conjunction with CNC machining to produce three-dimensional tooling and is also used for detail machining of the molded parts. Its CNC machining capacity now includes vertical mills up to 760 × 400 mm and turret mills to 1200 × 400 mm.

According to the company, its increase in personnel and processes could open new applications in the aerospace, defense, fusion energy, cryogenics and composites sectors.

'The composites industry, particularly the aerospace sector, is experiencing rapid growth, and we are seeing this with more enquiries and more orders,' said Mark Crouchen, MD of Rockwood. 'We consistently reinvest in Rockwood to ensure we continue to supply our customers with dedicated engineering support so that they can fully benefit from the unique advantages of compression and bladder molding.'

Aerospace molding

This followed news in April 2019 that the company had formed a partnership with Haeco Cabin Solutions to design and manufacture the surround seating system and undertake tool design and make tooling for aerospace seat shells and consoles. Rockwood had to design a lightweight structure with enough modularity which would allow Haeco to contend with future permutations of the product.

In October 2019 the company delivered its 2,500th part to Roxel, a European manufacturer of tactical propulsion systems (Figure 3). The parts, made of a high temperature glass fiber reinforced epoxy pre-preg, include covers and screens for air to air and air to ground missile systems.

I spoke to Mark Crouchen about the company's growth and his vision of the future.

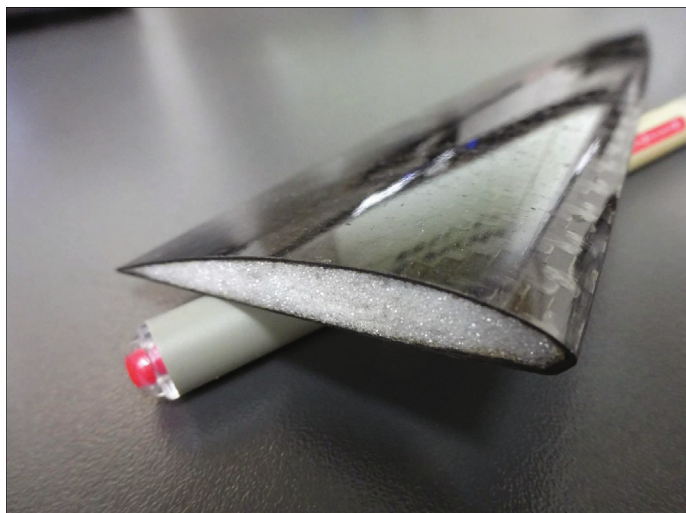


FIGURE 1

Rockwood makes a variety of composite parts.

What has prompted the company's growth?

It's multi-faceted – but one part of it is that some work was delayed over Brexit uncertainty, and this work has now come through, and it's all coming through together at one point in time. Another element to it is our work with Haeco in the US manufacturing aircraft interiors. The product that we've been jointly working on seems to be very much a best seller, and although the aircraft has not yet been launched, there is already an extremely large amount of interest. So, from a manufacturing point of view, our 50% growth might turn into 100% growth. It's going to be quite an interesting year.

What's unique about the parts you've developed with Haeco?

Haeco patented a surround system design of a business class seat, but with the surround attached. Usually in these sorts of prod-



FIGURE 2

Rockwood has installed a new 100 tonne press to make composite parts.

ucts, the surround is bolted to the plinth of the seat, which is the floor of the aircraft. In attaching it, there is more space and you can effectively get more people in the aircraft. It's also a cost driver, in that the amount of qualifications required to clear the parts for flight is reduced as well. That's a double whammy, and those two benefits are being recognized, and it seems to be well received.

Is aerospace your most important business at the moment?

Aerospace and defense are important segments for us, but we don't only concentrate on them. We're very broad-based and we're not sector specific at all. So, for example, we supply parts and tools for the medical market, and we're the sole supplier to one company in the UK that makes metrology probes. We are basically a batch manufacturer and obviously the more continuity we can get or see in the batches, and the longer they run for, the better. However, certainly aerospace, defense and aircraft interiors are by far the largest areas we've got coming up in the next 12 months.

Is the focus on design what makes the company stand out?

Yes, that's a very key element of what we do. Not many people understand what you can achieve with the types of molding we offer. Therefore, we end up supporting our customers to improve the structures that they want, in terms of the processing that we can apply. Because customers often don't really understand how to process composites, we can be involved at the early stage of their design and development activities. Doing this ensures that we end up manufacturing something that's good quality and good consistency at the prices that we and the customer find acceptable. So it's a symbiotic relationship. We want to make sure that designs are manufacturable, but we also want to make sure that the customer is going to be happy to pay a price that we all agree upon. Often companies will design a product and then put drawings out and models out, not really knowing how it's going to be made. So, we try and circumvent that by getting involved at an early stage and because our processes are so flexible, we can combine various manufacturing techniques.

Do you also have to promote the benefits of composite material over metal?

Typically, companies are very good at understanding materials because they can access data sheets online – but they don't really appreciate that what you see on a data sheet isn't necessarily what you get in a component. Often, the size and shape of the component they want is not manufacturable with the materials they hope to use. So, we discuss it, get involved with the engineering, and suggest alternative ways which allow them to be cheaper. We do get involved closely with our customers in terms of what they're physically trying to achieve, what sort of structure it is, what sort of performance it needs to achieve, what sort of weight, what stiffness, what



FIGURE 3

Rockwood Composites delivered its 2500th part to Roxel.

cost – and all these things need to go into a melting pot before an solution can be found.

What's unique about the bladder molding process?

The process involves applying heat and pressure to a pre-preg through a silicone bag in a mold. The autoclave process is similar, in that there is air pressure on a diaphragm, and it's heated in an oven, but with bladder molding there can be a more intricate bag running internally inside a product, which effectively pushes the material against the sides of the mold making any shape you want. This also makes a complete structure. You're not effectively making two shells that then need to be bonded together, which is typically what happens with an autoclave part.

Are there any other benefits of bladder molding?

You can make very complex shapes that are one piece, such as tubes, helmets, and so on. One benefit is that you can combine compression molded parts with bladder molded parts in the

same tool, the same process. You are controlling all the surfaces, not just one or two surfaces during the molding phase.

Does it also help with lightweighting the parts?

Yes, because it's not a case of making two shells and then bonding them together at a later stage. Since you're making it in one component right from the outset, there's no bonded joints. There's also no risk of bonded joints de-bonding.

What are your plans for the company over the next 10–20 years?

I'm more worried about next year! Well, we're not really going to be changing, we're perhaps going to be doing more of the same. We are fundamentally a batch manufacturer that supports its customers in the engineering of their parts and the same customers keep coming back. I see us doing very much more of the same, although the aircraft interior parts segment might get much bigger for us if some of these future projects come off. There is a cost driver in terms of the aircraft interiors that we might not be able to achieve while manufacturing in the UK, so we are investigating a low-cost manufacturing alternative at the moment. So, although the activities in the UK probably are going to change, they might get slightly bigger, it's quite likely we'll have a low-cost manufacturing option for what we do in the UK.

How has Brexit affected you so far and how will it affect the company in the future?

This is a difficult question. I don't think it's really going to affect us – I say that not knowing really what's going to happen. We supply components to various companies around the world as well as the UK, and we've spread our skillset quite far afield, so I think that we're in a good position. Some markets might go up, some might go down, and costs might change slightly. I don't think aerospace and defense is going to change too much.

Rockwood Composites; www.rockwoodcomposites.com