

Machining with robots can overcome composites industry challenges

As the benefits of using composites become more valued in many diverse sectors, industry needs to boost production significantly. **Jason Barker**, Founder and Chief Technical Officer at CNC Robotics, believes that a wider use of robots across many areas of composites manufacture can generate increased productivity and also improve consistency and quality.

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The key benefit of robots is their flexibility. They can be used at many stages in a manufacturing process, including braiding textiles to form reinforcement, the production of models, patterns, moulds and fixtures, and for

trimming and drilling composite parts. Depending on the volumes required, one robot can be fitted with different accessories to undertake a variety of operations or a series of robots can be used with each one dedicated to particular tasks.

They are also, in many cases, more cost-effective than machine tools, typically costing around half the price of a machining centre with a similar working envelope. The superior rigidity of machine tools does allow them to work to higher levels of precision and to cut harder materials. However, robots are capable of processing most materials used in composites manufacture and of working to the levels of accuracy required normally.

Identifying the business benefit

While robots are being used successfully for the production of all the different types of tooling used in the industry, their use in the finishing of components usually offers the biggest benefits. Tooling often only needs to be made once, while

many hundreds of parts might need to be finished. Most composite parts require trimming and drilling after they have been formed. Robots can usually match the performance of machine tools for these tasks and their flexibility offers major advantages.

In cases where a few simple operations are needed, it can take as long to load and unload each part as it does to process the part. A robot can be equipped to place the part on the fixture, check that it has been positioned correctly, carry out the drilling and trimming, and place the part ready for its next operation. Thus, it can remove tedious manual work and improve consistency, as well as driving up productivity.

With more complicated operations, the multiple degrees of freedom of the robot mean that it can trim and drill more complex components in a single set-up than even a five-axis machine tool. In addition, robots can be made even more capable with the addition of accessories like rotating tables, while the size of part they can handle can be extended by placing them on rails. The latter approach is often the only way to process the larger items needed for wind turbines or for the marine industry. These accessories also provide a relatively inexpensive way of increasing the robot's capabilities as a company wants to take on larger or more complicated parts.



Jason Barker,
Founder and Chief
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CNC Robotics

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Programming robots used to be a major hurdle but that has been made easier thanks to the software now offered by leading CAM developers. The combination of the robot and the software gives the equivalent benefits to those gained when programming machine tools, including the ability to create toolpaths directly from CAD models, together with options to simulate and optimise the programme on the computer. These options help to ensure that the robot will operate efficiently and safely, giving the desired productivity and accuracy when moving from the computer to the shop floor.

Delivering customer value

CNC Robotics has delivered multiple successful projects in the composites industry built over the last decade, installing systems for all types of application.

One of these projects was to provide Suprema Marine with a robotic system to aid plug manufacturing and enable model-making for each boat. The robot is capable of processing composites, including carbon-fibre reinforced materials, and plastics, meaning all trimming operations can be undertaken quickly and accurately with a single unit.

Suprema Marine's use of robots in machining is part of a broader approach to their use in automating specific tasks in boat building, including the application of gelcoats to fibreglass hulls and decks. As well as helping the company to produce an affordable yet high quality yacht, the introduction of this robotic system frees up the Suprema Marine team from one of the messiest steps in the production process.

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Although the workboats built by CTruk are totally different from Suprema Marine's luxury yachts, the company approached CNC Robotics with similar aims. CTruk needed to increase output to meet the demand for its products and was looking at ways to increase automation within its manufacturing process and to remove manual operations. CNC Robotics designed a bespoke trimming and milling solution, based around a six-axis robot arm and track, that allowed CTruk to increase output, while also improving accuracy and consistency.

As well as introducing new systems, CNC Robotics also undertakes upgrades of existing equipment. This approach proved successful in a project for Linecross Group, one of Europe's leading manufacturers of polymer and composite products, with a diverse client base including luxury car makers Bentley and Aston Martin. CNC Robotics reviewed their existing equipment and looked to enhance and refurbish where possible to provide a cost-effective solution. We replaced the robot arm and track system, and created a waterjet cutting and trimming cell that used some existing elements coupled with our latest technology. The upgrade provided additional capacity for Linecross, improved efficiency and increased accuracy.

As with other novel technologies, the key to the successful introduction of robots is having detailed knowledge of current levels of performance and clear goals to be achieved. Once we know our clients' ambitions, we can ensure they are realistic at a reasonable cost. We can then develop a system to meet their needs.



More information www.cncrobotics.co.uk