



AW101: Tods has built on its success with the heavy lifter by achieving structural composite certification from AgustaWestland

A different class

Composite structures designer and manufacturer W & J Tod (Holdings) stands as an example of high technology development success in the SME supply chain. Richard Winterbottom, operations director of its aerospace division tells Simon Lott how this progress has been made.

Tods was founded in 1932 and by 1952 had built the first glass-reinforced plastic boats in the UK. Since then it has been fully focused on composite structures in their various forms. With a long history in the defence and naval sectors, the company has been using its experience to make substantial inroads into aerospace, where it now offers composite structures, testing and design for manufacture.

“The demands OEMs are placing on suppliers are of course very exacting standards of on-time delivery and quality as a minimum, but increasingly it’s coming down to responsiveness and communication, particularly in the ever rigorous drive for lightweight materials,” Winterbottom explains. “There’s a lot of value engineering going into components and this has accelerated the move towards composites. We are even seeing increasing numbers of components that although they have reached a certain level of maturity are still being changed to accommodate composites into their designs. In these instances

it’s our rapid product production capability that enables them to take advantage of the opportunities that are available without causing undue delay and the associated costs.”

This situation continues to become ever more pertinent as OEMs change from being manufacturers to being system integrators and place greater focus on project management. This goes as far as wanting suppliers such as Tods to validate products themselves as well as a demand for more complex assemblies from suppliers who would also have to acquire the associated metallic parts, fixtures and fittings to deliver complete assemblies. This has increased the challenge for Tods’ supply chain management capabilities.

There is now a trend for customers looking to deal with organisations with breadth as well as depth to their abilities as part of ongoing supply chain rationalisation initiatives, and the current focus for Tods is to expand its current capabilities as it begins to offer end-to-end solutions from design right

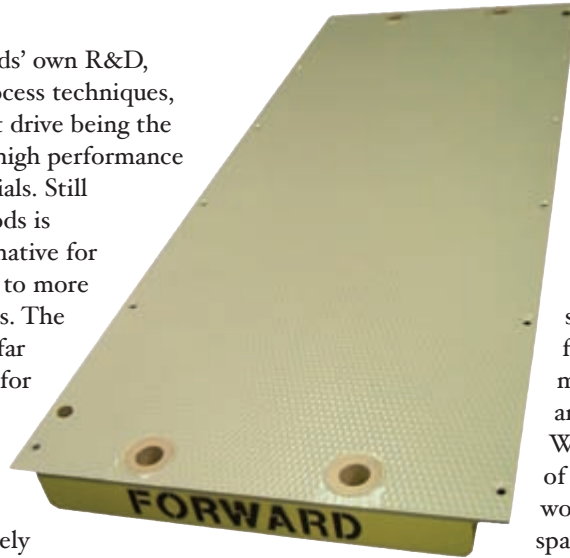


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through to test. In addition, Tods' own R&D, concentrated on developing process techniques, feeds into this, with the current drive being the adoption of thermoforming of high performance thermoplastic composite materials. Still currently a niche technology, Tods is advocating this as a viable alternative for certain applications as opposed to more familiar epoxy-based composites. The most significant application so far has been to supply heat shields for the Airbus A400M. In addition to meeting the obvious temperature requirements, they offer a further weight reduction and constitute relatively high volume work once the main schedule begins. The company has also redesigned interior seating arrangements such as flat beds for long haul flights. These are set in a herring bone shape so the seat fittings are no longer connected with the hard points on the floor of the aircraft. This structure offers a more flexible, modular design. As far as structural integrity is concerned, the components have been through rigorous qualification, reaching 16g in dynamic testing and 9g in static testing.

The out-of-autoclave techniques used to produce both thermoplastics and some carbon fibre structures are also a large part of Tods' development plan. Winterbottom expands: "Traditionally, composites require a high tooling cost and quite slow processing with autoclave curing. We're developing technologies around pre-heated tooling and fast cycle pressing technologies. Something that might have taken seven hours to lay-up and six to eight hours in an autoclave can be produced from flat sheets in a matter of minutes."

The next big goal for development however would be to remove the necessity for prepregged materials, which would be cheaper and faster. The development would also improve the formability of the materials and ensure that the structural strength of complex shaped components is



AW101 flooring: Incorporating thermoplastic skins onto aluminium honeycomb cores

not compromised by deformation of the reinforcing fibres.

Tods added a further string to its bow when it received approval from its largest aerospace customer, AgustaWestland for structural composite parts, including flooring for the AW101, and has secured the design for manufacture of the cockpit door, cabin roof and IRS fairings for the Future Lynx project. Winterbottom adds: "It's been the high level of investment, made possible through our early work when we began by making low complexity spares for AgustaWestland, that's given us the opportunity to become a major supplier of Class A structures to them."

Complementing its organic growth and also made possible through and in support of the AgustaWestland relationship, Tods has recently invested in a new testing laboratory where the majority of its products are now put through their paces. This furnishes it with industry standard capabilities to reduce cost and increase throughput in the qualification of structures as well as offering NDT techniques such as ultrasonic and radiography required to check the setting of composites. "The nature of our business has developed significantly and we are working closely with aerospace primes providing digital design for composite solutions and are considering new materials all the time," Winterbottom explains. "The number of new materials coming to the marketplace is the limiting factor because of the cost of qualification, so the laboratory will bring significant savings."

As for the raw materials market, he concludes: "Because the likes of Airbus have announced major delays to scheduled programmes and there's a degree of fluidity in the schedule, we're reaching a position where prices have artificially inflated and come back down again. The raw materials for composites are not immune to that of course and I would expect that for the next two years there will be an overcapacity that will take some time to level out and catch up. I don't know whether or not it will have a significant impact on prices, but it will ease the difficulty of sourcing in the supply chain. One advantage we also have is by aligning ourselves with larger customers further up the supply chain, we can leverage the greater purchasing power of partners, enabling us to make the most of economies of scale. Through strategies like this and substantial investment we ultimately want to become a premier source for solutions in composites by proving top quality engineering and service by investing in complete end-to-end services for design, manufacture and product validation." |

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IRS fairing: Digitally designed for AgustaWestland's Future Lynx by Tods