

# Smart moves at Bowmill

The removal of old machines and installation of new ones in a new, efficient layout was meticulously planned and executed by Bowmill Engineering and C Dugard. *Machinery* reports

**B**owmill Precision had just four days to accomplish the removal, relocation, installation and commissioning of 24 machine tools and install and commission four new Dugard Eagle vertical machining centres, while maintaining a no-compromise kan ban delivery programme of assembled landing gear kits and assemblies for Airbus A320 aircraft.

Adding to the company's tactical problems, every process change was subjected to rigorous 'Delta First Article Inspection' (see box item, page 38) to enable Bowmill to comply with customer-driven quality procedures.

In the event, the Poole, Dorset-based specialist aerospace contractor met the challenge successfully, as managing director David Boucher, outlines: "We have to deliver 16 sets of Airbus A320 kits that include slave links, lock-up bolts and complex bracketry direct to line to Messier-Dowty every 10 days, and we've a significant record of achievement backed by endorsements from the customer for 100 per cent on-time deliveries. Because we obviously did not want to fail in our commitment, we had to carefully plan the changes to improve workflow and efficiency and re-arrange the shopfloor, to enable us to meet increased deliveries to Messier-Dowty."

## ORDER INCREASED BY A THIRD

Messier-Dowty, the world-leader in landing gear manufacture, requested Bowmill Engineering to quote against increasing its existing contract by a third and at the same time add a previously fabricated part that had to be machined. "This meant we had to purchase

## Bowmill beginnings

Bowmill Engineering is a £4.5 million turnover company employing 78 people and evolved from what David Boucher maintains were very humble origins back in 1970 when founded by his father, Victor.

"Our first customers were local companies Normalaire Garrett and Flight Refuelling, and the standard of work demanded by them made our name in the industry. This led to expansion and a decade of rapid growth as we became a strategic supplier for almost every flying control installation during the 1990s," Mr Boucher explains. Since 2000, the progress of the company has included the acquisition of Bowmill Metal Treatments, and it is still expanding under a continuous improvement strategy.

"The plan now is to develop as a niche supplier providing a valuable 'integrator' service to customers involving in-house treatments, machining, assembly and test." There is a joint venture underway with a North American company and a progressive engineering project in South Africa – all this being managed while the business maintains a specialist service to its small spread of quality-driven blue-chip customers.



additional machine tools. This would usually be straightforward, but with the constraints of space on the shopfloor, it meant a significant reorganisation," explains Nick Epps, operations director.

"From receipt of the contract we had just five weeks to re-map and re-organise. From our previous experiences with C Dugard – already having nine Dugard-supplied machines on the shopfloor – we decided to make use of their experience in planning and re-siting machines to enable us to meet the tight schedule."

The company is an avid believer that using multiple machines sourced from

the same supplier creates the same 'partnership' and working relationship that Bowmill, in turn, has with its customers. "There is a lot of choice from the breadth of the Dugard Eagle range and other machines available from the company. We know the machines' fitness for purpose; they have a good reliable life span with high functionality without the complications of technology for technology's sake. Our business is to manufacture precise components from raw material – Dugard has an established reputation in providing equipment that will assist us in our objectives."

A series of meetings was set up with Dugard engineers and other key suppliers to carefully plan the strategic moves. Bowmill managers and the 'Lean Improvement' team wanted to create a turning cell, extract and part-exchange a redundant large Quasar horizontal machining centre and insert three of the new Dugard Eagle machining centres into a milling line.

The difficulty was that the Quasar was in the centre of the workshop and so 24 machines had to be taken out of service and moved to temporary locations to allow for the new installations. Then all the machines affected had to be reinstalled and commissioned – and all in a window of just four days. Finally, plans were laid and all the machines were decommissioned early on a Thursday morning with production reinstated by the Monday morning.

"Dugard worked extremely closely with our engineers and everyone knew what had to be done, from emptying the coolant and disconnecting the machines

### First article inspection

AS 9102/En9102/SJAC 9102 is an international standard for First Article Inspection (FAI), developed by the International Aerospace Quality Group (IAQG – [www.sae.org/iaqg](http://www.sae.org/iaqg)). The IAQG chartered a multi-member writing team with representatives from several member companies to write the standard. The standard outlines the documentation and inspection requirements when performing First Article Inspection of aerospace components.

A Delta FAI procedure is required after the initial FAI following any changes to the production process and this includes machines being moved.

right through to where they could be stored to provide access," says Mr Epps. "We also had to install a new power switchboard, the floors had to be repainted with new gangways, then machines reconnected and levelled. Once completed, the next phase involved programming, retooling and commissioning the new machines which had to meet quality approvals. But by the Monday, we were ready for production."

The new Dugard Eagle installations comprised two Eagle 660 and two Eagle 850 vertical machining centres. An

identical Eagle 660 machine had already been installed but the specification of one of the new 660's was enhanced with a four-axis unit.

At Bowmill Engineering machining complexity and strict surface finish requirements are regarded almost as normal working practice covering a diverse range of products including vital parts for flight control that encompass a broad spectrum of machining disciplines, assembly and test operations.

### COMPLEXITY AND PRECISION

One of the new 850 Eagles, therefore, was also specified with the added flexibility of four axes of movement and a 10,000 rpm spindle option to improve production of complex aluminium barometric instrumentation components. These are made in batches of 30 to 50 parts which include 1.5 mm, 3.0 mm and 4 mm diameter dowel and bearing diameters made to tolerances of just seven microns. Positional tolerances are within 0.025 mm.

"The installation and production down time would have been significantly increased with the end result compromised without the input from C Dugard," Mr Epps summarises. "Their assistance was invaluable to us in securing the delivery of the project and long-term contracts which will help maintain our UK skill base in what is becoming an ever more challenging global industry." □



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