

# Rise of the machines

## Technical article



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Today, more than ever, customers demand not only quality and volume from precision machining but also the best possible price. By investing in the latest technology, component manufacturers are able to offer customers the accuracy they require at the rates they demand.

Although efficient manufacturing processes such as aluminium die casting results in a near to net part shape, the limited accuracy of the process means machining is required. These additional processes must be carried out with precision machining but there is a pressure on cost that drives the customer to demand faster more cost-effective processes.

Over recent decades, new milling machines have increased capacity without compromising accuracy, offering precision machining at the right price. For example, vertical milling machines with a fifth axis have brought faster, more cost-effective service to our customers.

To meet the needs of customers, manufacturers must examine how the advanced capacity and capability of milling machines has increased output and provided the best possible service



in precision machining. An on-going investment in advanced, state-of-the-art, fully automated manufacturing systems enables component manufacturers to meet worldwide demand by providing exceptionally high quality manufacturing services with fast turnaround. And for customers who require precision engineering operations, such as complex machining, cleaning and pressure testing of volume aluminium die castings, this can mean both speedy service and reduced costs.

This is illustrated by our own experience. For example, Dawson Shanahan has been machining aluminium for 25 years. At the beginning of the mobile phone boom, as masts were springing up across the globe, there was big demand for aluminium microwave components. To meet this need, we invested in a zero tool change Anger milling and drilling machine – the only one in the UK at that time – with a 36,000 rpm spindle speed. The challenge in machining aluminium for mobile phone mast components was to provide a high volume of tiny features, which required a high spindle speed that the Anger could provide. The zero tooling change was achieved by multiple components held in a ladder, indexing to the fixed tool spindles. Our machine provided the customer with high volume, high quality parts but it was only the beginning of what was to become a far greater investment.

One application where fast precision engineering can offer huge benefits to the customer is in the machining of aluminium die casting for the automotive industry. As mentioned above, although aluminium die casting results in a near to net part shape, the



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limited accuracy of the process means machining is required. And as machines have progressed it has been possible to increasingly add speed and volume to accuracy. The Mitsubishi twin pallet horizontal milling machine was superseded by the Heller twin pallet horizontal milling machine to increase output, and yet again by the Brother vertical milling machine with a fifth axis. This fifth axis indexes the part into different positions so that, rather than using angled heads to drill certain holes, which slows the production process, it is possible to move the component relative to the spindle. This machine increases output yet further and provides customers with the best possible service.

In addition to precision machining, automotive die castings for engines require further processes to ensure the components can be reliably installed into a car engine, such as cleaning. Innovative engineers have not only advanced machinery but also helped meet the high cleanliness specification and solve cleaning issues for this application by designing and manufacturing in-house fixtures to ensure swarf particles are not left in the finished part. Some precision engineering firms are also capable of assembling of bushes and avseals into the machined castings, or even designing assembly fixtures that

ensured a finished part will not leave the plant with a bush or avseal missing.

Further value-added services deliver real technical and commercial value to customers of precision engineered components. These can include a complete project management capability, with teams working alongside the customer from the early stages of the conceptual or design phases, through to manufacturing prototypes and beyond. These teams have the goal of designing-out cost, improving component functionality, performance and reliability, and reducing time to market.

By investing in the latest technology, component manufacturers are able to offer customers the accuracy they require at the rates they demand. Today, more than ever, customers demand not only quality and volume from precision machining but also the best possible price. To keep costs down, precision engineering firms are constantly working on ways to provide savings by increasing throughput. One way is to reduce production time by investing in machinery that requires less time for tool changes, so that actions can be performed simultaneously by multiple spindles while the part itself is moved into place. Modular, multi-station CNC machining centres, offering high-speed milling with previously unheard of short cycle times, now provide

customers with the highest degrees of precision, volume and flexibility. These machining centres offer multiple fixtures mounted on a central trunnion, served by machining stations consisting of CNC spindle units that hold multiple tools and have independent X, Y and Z axis movements. With such machines, a complex finished engine part can be machined, giving a significantly increased output compared to other standalone machining configurations.

Dawson Shanahan has 25 years' experience in high speed machining on horizontal and vertical twin pallet milling machines and precision turning. We have been investing in our precision machining capability for decades and continue to expand our UK engineering facilities, furthering our already considerable abilities to develop and manufacture high quality, customer-specified components and assemblies that deliver exceptional value. We invest heavily in advanced CNC machine tools, support systems and in our teams of highly skilled design, production and quality engineers. In particular, we operate dedicated manufacturing cells, including unmanned FMS cells for both milling and turning, plus multi-spindle machining centres with virtually zero chip to chip tool change and high speed spindle speeds. Combined, these result in high output at exceptional quality and at low part cost.

