Pump up the volume

The accelerating pace of high volume milling

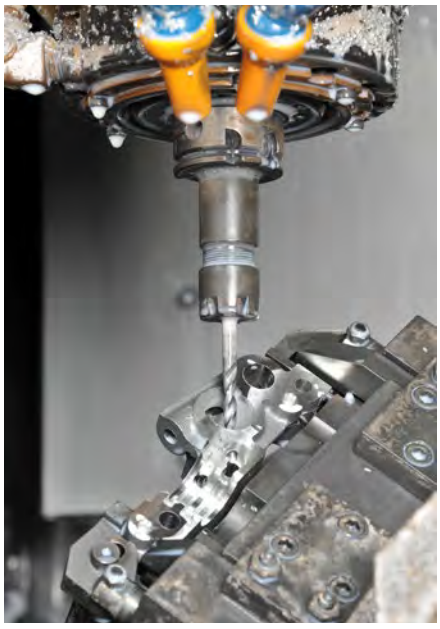
Dawson Shanahan
Precision Engineering & Cold Forming

Although already renowned for its unique combination of in-house cold forming, precision CNC machining and assembly techniques, Dawson Shanahan's recent acquisition of 2 Triflex Modular multi-station CNC machining centres means it can now provide simultaneous five-sided machining without re-clamping.

The Triflex is a truly state-of-the-art engineering asset that can be used to manufacture a wide range of materials, and is particularly suitable for machining high volume aluminium die castings. This white paper looks at the developments in high volume machining over recent years and explains why sophisticated machines such as the Triflex are meeting the needs of customers by providing cost-eff ective, high volume production services.

Precision

Dawson Shanahan's on-going investment in advanced, state-of-the art, fully automated manufacturing systems has enabled the company to meet worldwide demand by providing exceptionally high quality, ISO approved manufacturing services with fast turnaround. This includes



precision engineering operations, such as complex machining, cleaning and pressure testing of volume aluminium die castings.

We have 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 – with a 36,000rpm spindle speed. The challenge in machining aluminium for mobile phone mast components was to provide a high volume of tiny features, and that 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 of the early aluminium die castings we machined was for the white goods industry. Dyson required closely toleranced bores in a die casting and we achieved this by machining on high precision Swiss Kummer twin spindle lathes.

Volume

Dawson Shanahan then moved into machining of aluminium die casting for the automotive industry. Although aluminium die casting results in a near to net part shape, the accuracy of the process means machining is required. Having proved its ability to machine Aluminium we invested in a Mitsubishi twin pallet horizontal milling machine that gave them the right blend of precision and accuracy.

As volume increased yet again, we invested in a Heller twin pallet horizontal milling machine to increase our output from 12 to 26 parts per hour through multi part fixtures mounted on a tombstone. When volume went up yet further, we installed a Brother vertical milling machine with a fifth axis. This fifth axis indexed the part into different positions so that, rather than using angled heads to drill certain holes, which slowed the production process, we were able to move the component relative to the spindle.

This machine increased output up to about 32 parts per hour and provided our customer with the best possible service.

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Cleaning, assembly and pressure testing

Our capabilities go beyond machining; Automotive die castings for engines require additional processes to ensure the components can be reliably installed into a car engine. Our engineering innovation has enabled us to meet the high cleanliness specification and solve cleaning issues by designing and manufacturing in-house fixtures to ensure swarf particles are not left in the finished part. Assembly of bushes and avseals into the machined castings has also been a challenge we have successfully met. Evidence of our engineering innovation was also demonstrated by the design and manufacture of a poka-yoke assembly fixture that ensured a finished part would not leave the plant with a bush or avseal missing. Experience in pressure testing has been extensive in our medical product and automotive die castings.

Quality

In order to meet the high quality requirements of the automotive industry we have invested in the people and equipment to provide the quality demanded by the industry. Quality systems such as APQP, PPAP, FMEA, real time SPC are backed up by quality accreditations TS 16949, ISO 9001, ISO 14001 and ISO 13485 (medical). Investment in scanning CMM machines with bespoke fixtures enables our quality team to measure all part features and report dimensional and SPC data.

Cost

By investing in the latest technology, we have been able to offer our 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, we are constantly working on ways to provide that saving 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.

The Triflex: High Volume, cost-effective, precision machining

In 2013, Dawson Shanahan invested in 2 Triflex Modular multi-station CNC machining centres, offering high-speed milling with previously unheard of short cycle times, even compared with the impressive results of our existing machines. The Triflex will provide customers with the highest degrees of precision, volume and flexibility, increasing output by 300% over an existing configuration machining the same aluminium die casting.

The modular machine consists of four fixtures mounted on a central trunnion, which indexes 90 degrees. The fixtures can index independently in increments of 1 degree. These fixtures are serviced by five machining stations consisting of CNC spindle units that hold eight tools and have independent X, Y and Z axis movements. As each fixture holds two parts for operations one and two, a complex finished engine part can be machine giving an increased output of 300% compared to other standalone machining configurations. The machine is backed up with a fully automated conveyor and wash system feeding a 3 station pressure tester.

We have 25 years' experience in high speed machining on horizontal and vertical twin pallet milling machines and precision turning. The acquisition of these Triflex Modular multi-station CNC machining centres is the latest step in the continuing expansion of Dawson Shanahan's UK engineering facilities. They are an important addition that furthers our already considerable abilities to develop and manufacture high quality, customer specified components and assemblies that deliver exceptional value.

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