



Enhancing machining capability

The addition of Lehmann rotary tables upgrades three-axis VMCs to five-axis working

A member of the prestigious Russell Group, the University of York has more than 30 academic departments, among them the university's Department of Chemistry. This department's research groups cover a wide variety of disciplines, including atmospheric chemistry, renewable technologies and both medical and neuro-imaging, all of which are supported by the work of a multi-disciplinary mechanical workshop.

Led by senior technician Mark Roper, the workshop undertakes a wide range of projects, including designing and building bespoke instruments and apparatus for research and teaching purposes. Given the diverse demands placed on this workshop, the flexibility of its machine tools is vital to effective operation; and when the need arises to purchase new equipment, Mr Roper looks for cost-effective products that add value and that increase the workshop's machining capabilities — as demonstrated by the recent purchase of a PL Lehmann CNC rotary table (www.lehmann-rotary-tables.com).

Fitted to the Workshop's DMG Mori CMX 600V, a three-axis vertical machining centre (VMC), the Lehmann TF-507510 model was chosen because it provided the required levels of precision, ease of use and flexibility. Moreover, its low-profile design ensures minimum intrusion into machine's work envelope, optimising the space available for spindle and tool movement.

Mr Roper said: "Our DMG Mori CMX 600V VMC has a work envelope of 600 × 560 × 510mm, and its 900 × 560mm table has a maxi-

mum load capacity of 600kg; and while this VMC's specification allows us to produce a wide range of complex and accurate three-axis work, we recently looked to further expand its capabilities into 3+2-axis work by the addition of a CNC rotary table.

"We have enjoyed trouble-free operation with an older Lehmann CNC rotary table for over 10 years, but wanting to make sure that we purchased the correct product for our requirements and received best value for money, we also looked at other brands and models. However, having considered the merits of several CNC rotary tables we decided that the Lehmann TF-507510 was ideal for our use.

"Given the amount of one-off components we produce and the very small production runs we perform, we need each of our machine tools to provide the best possible levels of adaptability. Our Lehmann CNC rotary table has made a significant contribution in this area as it allows our three-axis DMG Mori VMC to now perform efficient five-sided machining in a single set-up and to eliminate steps in our production process'. Furthermore, the rigidity of our TF-

507510 CNC rotary table, together with its high clamping forces, allows high cutting forces to be applied and high-precision workpieces to be produced."

The TF-507510 CNC rotary table, as purchased by Mr Roper, is based on a solid steel base plate that has two through bores, clamping elements and 'T'-slot fittings. Secure clamping is assured by the use of a pneumatic-hydraulic system that applies a holding torque of up to 800Nm, while a high-level of precision is aided by the use of a PGD (preloaded gear drive) backlash-free long-life gear unit. Moreover, Lehmann says the extra available machining space that results from the use of compact CNC rotary tables means that additional work-holding devices can be located alongside them inside VMCs.

"When involved in series production, the combination of a VMC and Lehmann CNC rotary table provides a major advantage over the use of a five-axis machining centre. By mounting additional work-holding next to the rotary table, a virtual six-axis condition is created. Following the five-sided machining of a workpiece located on the rotary table, machining operations can be performed on the next workpiece in a batch that is held in the adjacent work-holding unit — without interruption."

'Astronomical' advantage

Another company to benefit from five-axis machining by fitting a Lehmann TF-507510 CNC rotary table to a three-axis VMC — this time a Bostomatic high-speed milling machine

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— is Thomas Keating Toolmaking Ltd, which is located in Billingshurst, West Sussex, and under the current leadership of managing director Richard Wylde — the fourth generation of the Wylde family to be running the business over the past 75 years. In addition to serving a wide range of industries, including the medical, aerospace and motor-sport sectors, the company is also a specialist designer and manufacturer of scientific ground- and satellite-based ‘THz instruments’.

To meet the demanding nature of the machining required when manufacturing scientific instruments, Mr Wylde recognised the need for a five-axis machining capability. However, rather than invest in a five-axis machine tool, he took a more ‘bespoke’ route. Having decided that a pre-owned three-axis Bostomatic milling machine offered a stable machine structure, Mr Wylde had this comprehensively rebuilt and fitted with a Heidenhain TNC640 five-axis controller by ACC Systems Ltd. To complete the Bostomatic’s conversion to five-axis work, a Lehmann TF-507510 CNC rotary table was fitted.

Mr Wylde said: “We are constantly searching for ways to improve our capabilities, hence the recent Bostomatic machine tool, Heidenhain control and Lehmann rotary table. These are now in daily use and are helping us to perform exceptionally accurate and highly efficient five-axis machining.

“In addition to the advantages the rotary table has provided to our tool-making activities, it has proven extremely useful when we manufacture our high-precision scientific instruments. For example, we are currently involved in the production of the next generation of satellite-based weather prediction instruments. The precision 3+2-axes capabilities provided by our Lehmann rotary table have been invaluable when undertaking this challenging work. In fact, so successful has our use of a Lehmann rotary table been when used in our Bostomatic machine tool that we are currently in the process of purchasing another Bostomatic, which will also be fitted with a PL Lehmann rotary table.

“It is estimated that 90% of machining procedures carried out by five-axis machining centres are basic five-sided processes. Therefore, the fitting of a CNC rotary table to an existing three-axis VMC represents an excellent alternative way of achieving five-axis capabilities. It also results in a rapid return on investment.”



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