



Technology trade-up

Progressive investment in ever more productive manufacturing technology has been a theme at companies both large and small, as Andrew Allcock reveals

Simon Dawes, workshop manager at 25-employee KBiosystems, says the company's XYZ Compact Turn 52 turning centre, commissioned in May 2008, "has shown itself to be an excellent machine that is ideally suited to the precision machining of smaller components".

The company is a world leader in the design and manufacture of automated plate sealers used in laboratory analysis. Samples for analysis are placed on plate wells and a foil or film sealed on top to prevent spillage and evaporation. The company has always maintained a machining capability but, as demand for its products grew, KBiosystems began to outsource work.

However, with batch sizes seldom exceeding 80-off and delivery of vital components becoming more problematic, Mike Biddle, commercial director, says a decision was taken in 2006 to invest in new machine tools and bring machining work back in-house.

Since then, KBiosystems has invested in several XYZ machine tools – two Mini Mill 560 compact VMCs, a 1010 VMC and a 710 VMC, and a ProTURN SLX manual/CNC lathe joining two XYZ ProtoTRAK manual/CNC mills prior to the installation of the Compact Turn 52. Most of the machining is of aluminium and Delrin acetal resin, with individual machinists responsible for setting up and running two machines and checking each other's first-offs.

"Ease of programming and flexibility are the key to running our double shift system here," says Mr Dawes, "and we have a good track record as regards the reliability of the XYZ machines. I've every confidence that the new Compact Turn 52 will be no exception."

The smallest model in XYZ's range of turning centres with a footprint of just 1,700 by 1,450 mm, the Compact Turn 52, has been designed on the basis of machining a wide range of components

within the smallest possible space. It is capable of turning diameters up to 220 mm to a maximum turned length of 280 mm, and it can do this at spindle speeds up to 5,000 rpm, courtesy of a 15 kW spindle motor.

STRING OF INVESTMENTS

Progressive investment has been the theme at another small company, Hi-Spec Precision Engineering, which was started up by 27-year-old Darren Grainger just three and a half years ago, and which is located on a small industrial estate in the middle of the Leicestershire countryside.

Mr Grainger has recently installed a top-of-the-range Colchester-Harrison Tornado T8MSY mill-turn centre with sub-spindle and Y-axis crossfeed to the 12-station driven tool turret to meet a rising order book for turned parts.

It is the latest in a string of investments, in fact. From manual capstan lathes and milling machines, the

TURNING



KBiosystems' Compact Turn 52 from XYZ Machine Tools is supporting in-house parts manufacture following a decision to move away from sub-contract supply and so avoid attendant extended delivery problems

business has grown rapidly following the installation of a Colchester-Harrison MultiTurn 2000 flat bed combination lathe in December 2005, which was followed in February 2006 by a Colchester-Harrison Tornado T6M driven tool mill-turn centre to provide more automated turning and combine operations. Then, when this machine brought in yet more work, the company took delivery of a larger capacity Tornado T8M in July 2007. This was installed in the company's new unit that doubled the size of the company's shopfloor to 1,800 ft².

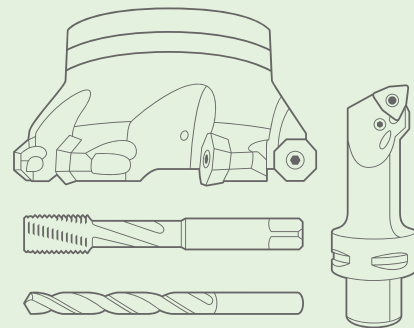
Mr Grainger explains that customers, that stretch from the south coast to Scotland and across to Norfolk, responded with even more orders and wanted larger sizes of components produced by his new capabilities – the TM8 has a 66 m bar capacity. And now, the latest investment has been a TM8SY, like the TM8 but with sub-spindle and Y-axis.

Prior to setting up, Mr Grainger was a CAD designer in an hydraulics company where his father was also workshop manager. Following an illness, his father retired and it was after a family meeting in September 2005 that it was decided to set up a small sub-contract shop with three manual machines.

"I still cannot believe the impact on customers that our first venture into CNC had on the business," he offers.

The managing director was very computer literate but lacked CNC knowledge so he found the Manual Guide i programming on

SINGLE-MINDED BENEFITS
DON'T COME FROM
MULTIPLE SUPPLIERS.





Darren Grainger's move into CNC has been repaid with increasing work volumes which prompted yet further investment, creating a virtuous circle

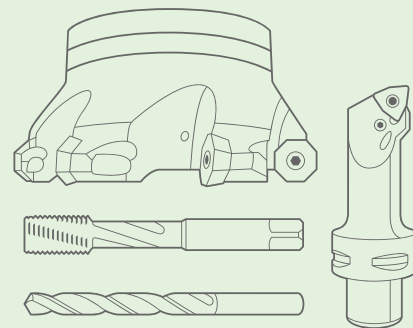
the Colchester-Harrison MultiTurn was ideal for him. The control enabled him to quickly set up a job and then use the CNC to run the batch while he did other things, only having to return to the machine to unload and reload.

The result of this investment was rocketing expansion that is described by him in retrospect as almost unbelievable but enjoyable. "The capability of the machine took significant man-hours out of a job," he said, "but being more competitive and productive means I was hit with loads more work that needed drilling, tapping and milling." And so a discussion with Colchester-Harrison resulted in the decision to go full CNC with driven tools to combine operations where possible.

"It was almost like turning a switch," he said. "Even more orders came in and work that we had taken on previously and on which we knew we were not making money, suddenly became profitable." He described a small coupling for hydraulic power units with a tang and slot with the two features tightly toleranced to each other. He said: "It would be a pain to produce without turn-milling but the Tornado T6M just produces the parts in an automatic cycle without any problem." The TM8 and then TM8SY followed.

Materials passing through the Tornados and MultiTurn, now used for smaller quantity batchwork, include free-cutting steels, aluminium, bronze, brass, 303, 304 and 316 stainless steels, EN 16T, 19T and 24T, in quantities that have risen from five or so to 50, 100 and even up to 3,000. The company also hard turns Rockwell C60

**KNOW-HOW IS
NOTHING WITHOUT
KNOW-WHY.**



steel on the T8M Tornado using CBN inserts without coolant to produce bearing bores for conveyor rollers and pulleys.

With the TM8SY, the company is looking forward to the advantages of the new high rigidity Sauter turret design of the latest machine with HSK 83 tool interface that puts 10 kW of direct drive power behind the cutting tool – almost doubling that of the previous version of the machine. The driven tool speed is also twice as fast at 10,000 rpm for axial and radial approach to the workpiece, with a ± 40 mm of Y travel that is ideal for the general machining service that Mr Grainger's business provides.

What he is really keen to exploit is the 'one-hit' single cycle capability. "The machine will be absolutely ideal for hydraulic type parts that have a high requirement for geometrical relationships between features. This could mean I could be combining up to seven operations into just one," he concludes.

LARGER CAPACITY MACHINING

Progressive investment and one-hit machining of a somewhat larger capacity are also features at a world class motor/pump manufacturer. Rotary Power specialises in the design, development and manufacture of hydraulic motors and pumps and is a wholly-owned subsidiary of the privately-owned British Engines group that was established more than 60 years ago in Newcastle-upon-Tyne and now employs over 800 people. Typical components machined at Rotary Power include cylinder blocks, casings, crankshafts and pistons for hydraulic motors and axial piston, open-circuit pumps.

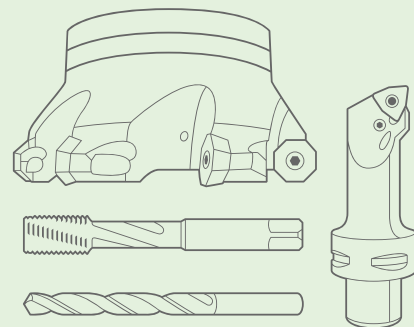
On-going product development is currently matched by a £multi-million equipment investment programme that, according to Ray Johnson, Rotary Power's chief production engineer, is transforming the 250,000 ft² manufacturing area.

He points to the various CNC machine tools supplied in the last three years or so by Yamazaki Mazak UK that are grouped broadly into manufacturing cells, with individual Mazak Integrex multi-tasking machines, for instance, dedicated to 'family of parts' production of specific product ranges. In total there are now six Integrex horizontal machines, one of which is equipped with a gantry load/unload robot, and two Integrex vertical machines, both equipped with e-Towers; a bar-fed Super Quick



Rotary Power is re-equipping its machining facility with Mazak machines

INNOVATION DOESN'T
HAPPEN IF YOU'RE
AFRAID TO CHANGE.





Lifting the bar to maximum production

Looking to improve the productivity of its manufacturing facility, Air Bearings of Poole has introduced a Hydrafeed Rota Rack parts catcher to one of its Mazak 250MS turning centres.

The problem was a bottleneck, as manufacturing manager Gary Waldron explains. "We have one operator running two Mazak 250MS machines and the operator has to manually remove each component from the part

catcher before the next part falls in the bin and hits the previous part. Aesthetics and surface finish are critical to our parts and any marks could lead to re-working or scrap. The aluminium main drill bodies and leaded bronze bearing modules are soft materials, which makes marking easier than on most materials. We have searched the marketplace for over a year and not found a suitable solution until now."

The company solved the in-machine parts catching problem, but a machine conveyor system was incapable of storing any quantity of parts for any period of time and this forced an operator to be present at all times.

"The previous situation meant that an operator had to physically start the cycle for each part despite the capability of the machines to run batches. This is where the bottleneck occurred and the Rota Rack has eliminated this and is already paying dividends," adds Mr Waldron.

Prior to Rota Rack's installation, the machine operator spent his working day moving from one machine to the next continually starting the cycle, with any time in between cycles being spent inspecting parts and setting the machines. "Now the operator has more time available for alternate tasks on the shopfloor. The Rota Rack has made a significant impact on our business and we will now look at implementing the system on another two or three Mazak turning centres in the future," offers Mr Waldron. "This could potentially enable our operator to run more than two machines. Regardless of machine capabilities, we had a bottleneck caused by the human element – this is no longer the case and our turning centre no longer has to take a break with the staff."

Turn mill-turn centre; a Quick Turn Nexus CNC lathe; and a Nano Turn sub-micron controlled turning centre. A stand-alone Mazak FH8800 machining centre located at one end of the shop is used mainly for first stage machining of a broad range of crankshafts, which may be either forged or pre-sawn round bar.

Programs can be compiled at the machine by the operator using Mazak's Mazatrol conversational programming, with the operator also taking responsibility for changing tool set-ups and workholding. The more complex parts are programmed in the production

engineering department using Mazak Camware software, with programs then downloaded via a DNC link to the appropriate machine.

Rotary Power's largest investment to date is the larger of the two second-generation Integrex e-V II series machines. The ultimate in Mazak's 'Done in One' portfolio, these machines are defined as a complete fusion of Information Technology and Manufacturing Technology.

To put it in the words of Ray Johnson, "they are so flexible they can be whatever you want them to be". Equipped with a

37 kW/600 rpm turning (table) spindle capable of machining workpieces up to 1,050 mm diameter, the Integrex e-1060V/8 II series machine, like the smaller e-800V/5 II series machine alongside it, is equipped with a powerful machining (milling) spindle that enables 5-axis machining of multiple faces to be completed in a single set-up. This combination of a 37 kW/10,000 rpm milling spindle and a 0.0001° minimum indexing angle increment can perform complex contour milling and drilling/tapping operations on workpiece faces and diameters. □