

# Changing but constant

**A rebuild or retrofit could be your 'new machine' and be a sound investment, says Steed Webzell**

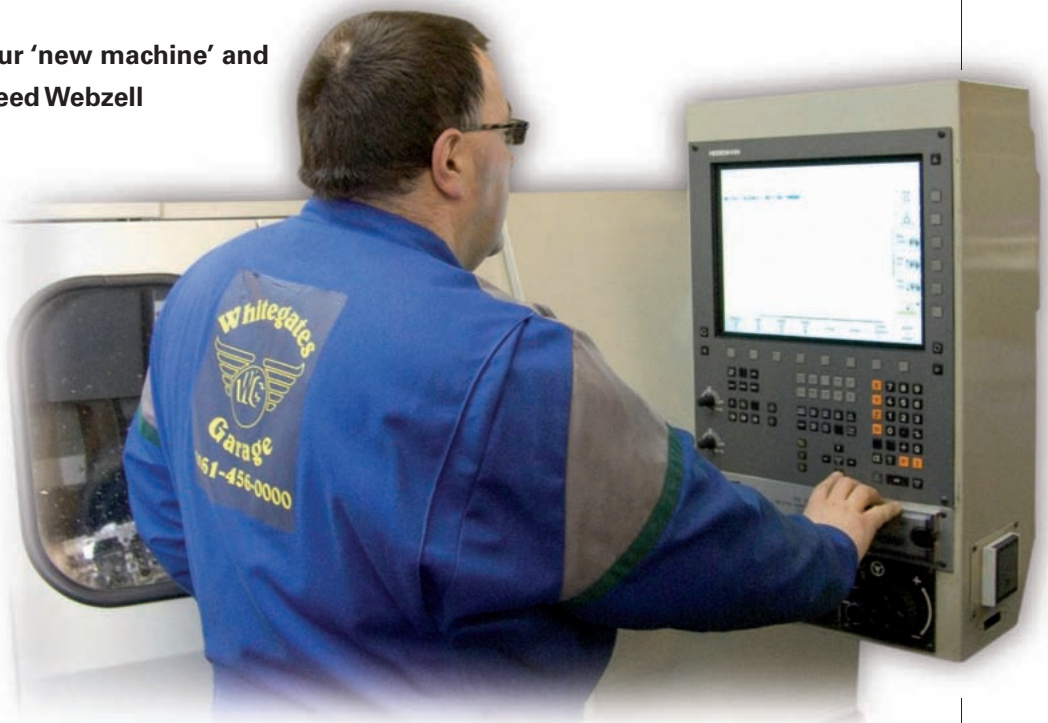
Typically, the mechanics of any machine tool will long outlast its control and drive systems. However, when retrofitted with the latest CNC technologies, the reliability and availability of the machine is improved, as are its diagnostic capabilities.

According to Siemens Automation & Drives, other advantages include: easier operation and programming; faster machining cycles for complex parts; reduced downtime and mean-time-to-repair; long period of guaranteed spare parts supply; reliable and secure data management; and greater data storage.

At Heidenhain GB, applications manager Neil Prescott says that "the UK has always been an active market for retrofitting, more so than mainland Europe, but its nature has changed. While at the beginning of the 1990s people would even retrofit knee mills, by the end of the decade this was no longer viable, and the past few years have seen this market all but die as new machine tool prices have plummeted."

Now, he says, the market is returning, but only for higher value machines. A recent case in point involved the overhaul of three Bridgeport Interact machining centres at Stockport-based CNC Heads, a manufacturer of cylinder heads.

"The real problem lay in the capacity of the machine's CNC control system, which was struggling to cope with the size of our programs," says CNC Heads' Alastair Heywood. "The processing speed [30 milliseconds/block of information] was slowing down the machining process, so the decision was taken to retrofit a new control system to one of



*Heidenhain's TNC 320 control is aimed squarely at the CNC retrofit market*

the machines as an experiment."

The choice entailed use of a Heidenhain TNC 320 control system fitted by Halifax Numerical Controls, an approved Heidenhain TNC retrofitter. After completion, CNC Heads noticed a considerable improvement in machine performance and ease of use. "For instance, the hard drive is large enough to hold complete programs, so we are not having to 'drip feed' them any more," confirms Mr Heywood. "Program data transfer is also much simpler as we can now use a USB memory stick."

Improvement in performance has been equally impressive; with the processing speed up from the original 30 milliseconds to around 6, the cycle times when machining cylinder heads have been reduced dramatically. CNC Heads claims that a batch of 20 cylinder heads can now be produced in the same time it previously took to machine six.

Tormorden-based Weir Minerals Europe needed to increase capacity in its impeller machining cell. Prices and lead times of new CNC vertical turning lathes were deemed prohibitive, and the mechanics on some of the cheaper ones were questionable, so the decision was made to source a used Giddings & Lewis 1,500 mm diameter table VTL and have it rebuilt and retrofitted with a modern CNC control.

Weir contracted Halifax Numerical Controls to rebuild the mechanics of the machine, undertake a complete rewire, retrofit a GE Fanuc 18i controller and drives, and update it to meet health and safety regulations.

Another project retrofitting Fanuc controls to VTLs, along with Newall absolute linear encoders, has helped eliminate component scrap and rework rates through improved accuracy and repeatability. System integrator A-Tec

Systems recently completed a contract to retrofit three tired Morando VLN12 VTLs at an aerospace manufacturer.

"The machines required a complete refurbishment as they were running Allen Bradley CNCs that were at least 25 years old," explains company partner Chris Hatfield. "From a control perspective this meant a new CNC, a new panel and new servo-drives."

The bridge axis on a Morando VTL carries the X and Z axes, and a fundamental flaw in this configuration is that any movement of the bridge by the operator requires the DRO reading to be input manually as an offset into the CNC. This is prone to operator error, particularly over three shifts when communication problems are common.

"The answer was to fit an absolute linear encoder to the bridge," explains Mr Hatfield. "But first, the encoder had to offer good resistance to potential contamination in the form of swarf, oil and coolant; and, second, it had to be easy to mount."

A-Tec deemed the optimum solution was provided in the form of a Newall SHG-AF absolute linear encoder. The design of these encoders allows installation in almost any position, unlike glass-scale linear encoders, which usually need to be installed with the lip seal facing downwards to prevent contamination. A-Tec's preferred CNC for the VTLs was Fanuc. With this in mind, the selection of the SHG-AF was even



*Turret mills continue to be a target for upgrade*

### Maintaining efficiency

When purchasing a new machine tool, ensuring you have the right machine and maintenance package in place is of extreme importance. Many machine tool manufacturers provide product support but via its service division Maintenance Technologies, Cincinnati Machine delivers structured maintenance programmes that reduce unplanned downtime, improve part quality, reduce part costs, prolong machine life and reduce overall maintenance costs. This philosophy sees Maintenance Technologies working on all three phases of the machine life cycle.

The first phase is the machine build, design and installation. The package provides interactive technical support, machine certification, machine monitoring, spare parts packages, technical training and application services. Subsequent machine support offers service parts, a machine repair service, continuous oil monitoring and health checks, on-site maintenance contracts and predictive/preventive maintenance.

Finally, when the Cincinnati machining or turning centre has served the end user for some time, the third element of the programme comes into its own. Not only can the company supply the end user with machine control and drive upgrades but also perform engineering, rebuild, retrofit, re-manufacture repair and exchange services as well as supply pre-owned equipment.

more certain as it has a protocol that is proprietary to Fanuc. The Fanuc CNC makes a request for positional data and the encoder responds with data within a strictly controlled time.

Fanuc is supplying CNC controls and drives as retrofit solutions in the UK across a broad spectrum of industries. "Fanuc's philosophy is that reliability plus innovation in control technology deliver the most efficient and productive machine tools," says Ian Warren, product services manager at Fanuc GE CNC UK.

"By coming direct to us, the customer will get advice about which options and which features will offer the highest productivity and precision for the type of work being machined. How the customer wants to proceed is up to him," continues Mr Warren. "We can project manage the retrofit, or for major rebuilds put him in contact with our partner companies who have received training on the integration of our control and drive systems."

Ageing automatic multi-spindle lathes are also a frequent target for refurbishment programmes by owners keen to extend the life of these rapid cycling machines. Following an in-depth machine reliability survey, Rodmatic Multico of Reading recently initiated on-

site overhaul and refurbishment of its 37 Wickman multi-spindle automatic lathes.

The contract, placed with Wickman specialist Machine Tool Spares, has seen the first two Wickman 1¼ inch x 6 machines completed: savings on cycle time are reckoned to be 330 hours a year per machine. The contract involves the fitting of new spindle bearings, the overhaul of various clutches, the replacement of pins, bushes and gibs, camshaft overhaul, and barfeed mechanism refurbishment.

Rebuilding projects also remain in demand for conventional Bridgeport milling technology. Specialising in providing a dedicated service for this type of machine tool is Braithwaite Rebuild. Proprietor Terry Braithwaite is not surprised that "rebuilds continue unabated", stating that "even 40-year-old Bridgeport turret mill carcasses remain sound and, when re-engineered with, for example, reground column, knee and saddle, and fitted with new leadscrews, as well as being complemented by the latest control technology – predominantly the Acu-Rite MillPwr – the machines are returned as good as new and go on for years to consistently produce accurate components". □