Power play investments

Progressive manufacturers demonstrating a proven track record of investment are finding reward in the UK's burgeoning energy industry. Steed Webzell reports on the latest success stories

Stirling-based Q-Mass' a high level of investment in CNC machine tool technology has enabled the company to become heavily involved in the oil and gas industries.

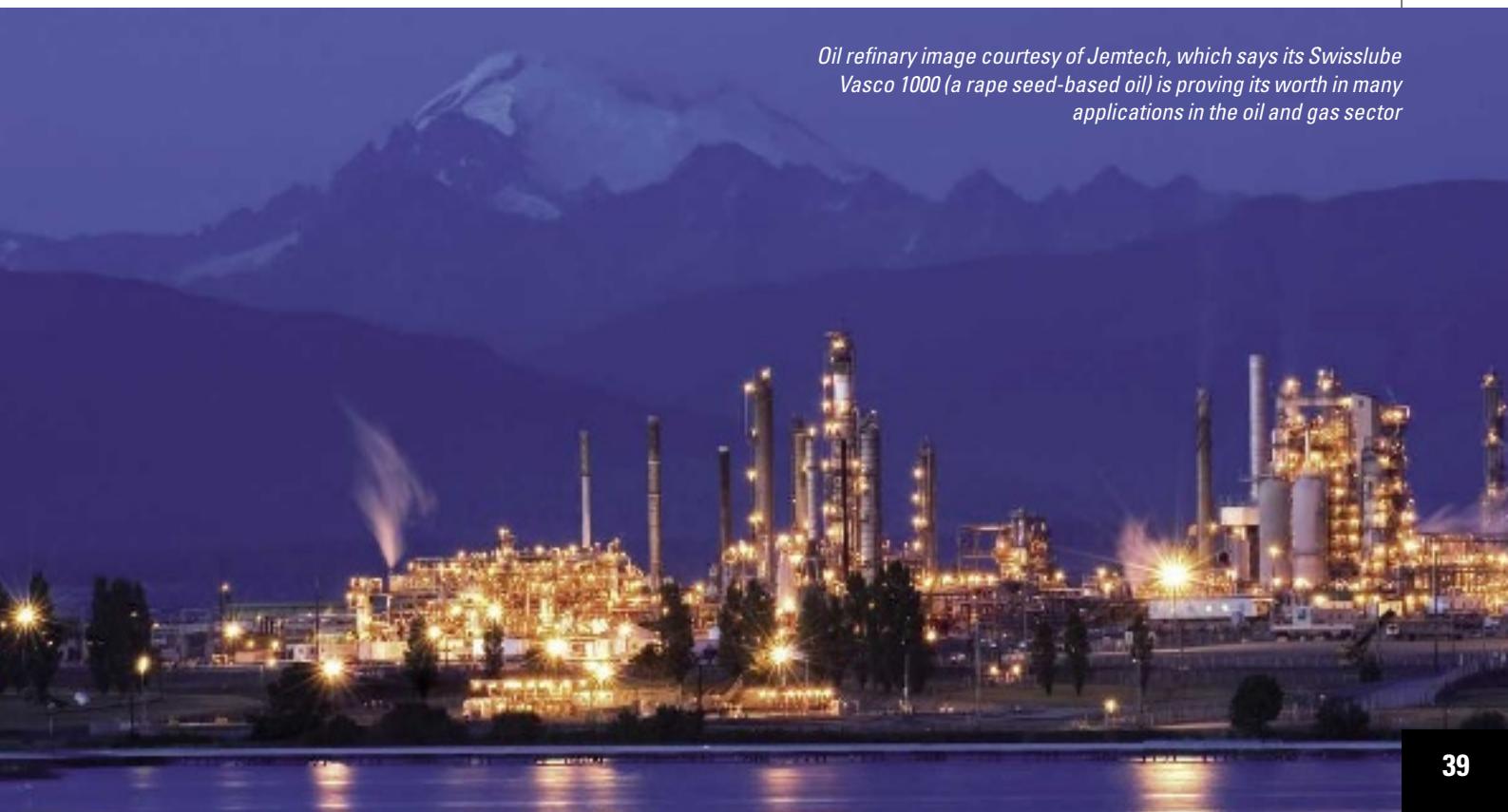
The initial investment made by Q-Mass was for two Yamazaki Mazak Integrex 400 multi-tasking machine tools and a Quickturn 30 turning centre, all supplied through Mazak's sole agent in Scotland, McDowell Engineering. "The Integrex machines have delivered a major advantage in that we are able to machine many components in a single set-up and the speed at which we can turn jobs around is reflected in the prices that we can quote for often very complex work," says John Harvey, Q-Mass' production manager. "We are looking to double our output with further investment in Mazak machines."

This will see three more Mazak machines delivered in the coming months: an additional Integrex 50 multi-tasking machine; a new Slant Turn 50 CNC lathe with 3 m bed; and a new Mazatech V-655/80 column-type vertical machining centre with a 2 m bed. This will bring the Q-Mass investment to over £1 million in the space of 12 months.

Some 50 miles further north-east, Dundee-based precision sub-contractor GA Engineering has become a major player in the oil and gas sector since it was established in 1992. As part of an extensive £1.25 million expansion programme, the company has invested in no less than five Doosan CNC machines from Mills Manufacturing Technology: two Puma 400 lathes with 800 mm chuck capacity; one Puma 700L lathe with 3.2 m bed; and two Mynx 540 vertical machining centres.

"The company has considerable expertise in machining complex components from difficult-to-machine materials such as Inconel, Monel, Duplex steel and exotic alloys," says managing director Gordon Deuchars. " Oil and gas components typically manufactured at GA Engineering include valves, seals, rings, housings, pumps and centrifuge components.

Mills has also recently supplied a Doosan Puma 280 lathe to Airdrie-based George Taylor Engineering, the first of its



Oil refinary image courtesy of Jemtech, which says its Swisslube Vasco 1000 (a rape seed-based oil) is proving its worth in many applications in the oil and gas sector

DKW Engineering has decommissioned over 60 cam autos since 1997, replacing them with seven Star sliding-head machines. The company has retained oil industry work

kind to be installed anywhere in the UK.

Works director Ian Beveridge says: "The oil and gas sector is competitive and global. All of our efforts and resources are focused on reducing lead times, ensuring part quality and making us cost competitive. Access to reliable, high performance machine tools helps improve our productivity and performance as well as increasing our production capacity and flexibility.

"We manufacture components from a range of difficult-to-machine materials that are used in sub-sea applications. These components are complex and have a high precision requirement with ±0.02 mm accuracy and Ra16 micron surface finish being typical."

There's plenty of energy activity in England, too. The oil sector produces 90 per cent of Rotherham-based Cutting & Wear's £4.5 million turnover. This increased by 25 per cent last year, with similar growth predicted this year.

To ensure that Cutting & Wear remains competitive, it has recently invested in a Dean Smith & Grace Series 4000 heavy duty, flat bed CNC lathe equipped with a Heidenhain 4110 MANUALplus control system, which allows the machine to be operated as you would a manual machine, and programmed without CNC terminology.

For simple operations such as turning parallel diameters or facing, the operator can choose to use the machine's hand wheels but for more complex tasks, such as profile turning, grooving and threading, conversational-based control can take over.

The MANUALplus control has proved very effective. "We have found the threading cycles function extremely useful," says programmer/operator Reece Boardman. "In particular, with API threads we often have to re-cut them to ensure a perfect fit and the MANUALplus control allows automatic pick-up of threads, while the chuck is stationary, which simplifies things greatly. Other threading options that we make use of are the ability to vary in-feed rates and pullout angles."

Decommissioning over 60 cam automatics since 1997 and replacing them with seven Star sliding-head mill-turn centres of 12/16, 20 and 32 mm capacity has paid dividends for Portsmouth-based DKW Engineering.

"In 2003, one of our big customers making gas detection equipment for the oil industry relocated its manufacturing operation to China, with much of our work," explains managing director Nick Lacobucci. "However, inferior quality machining and materials meant a lot of the precision mill-turning came back to us, as component reliability is

Tools for the job

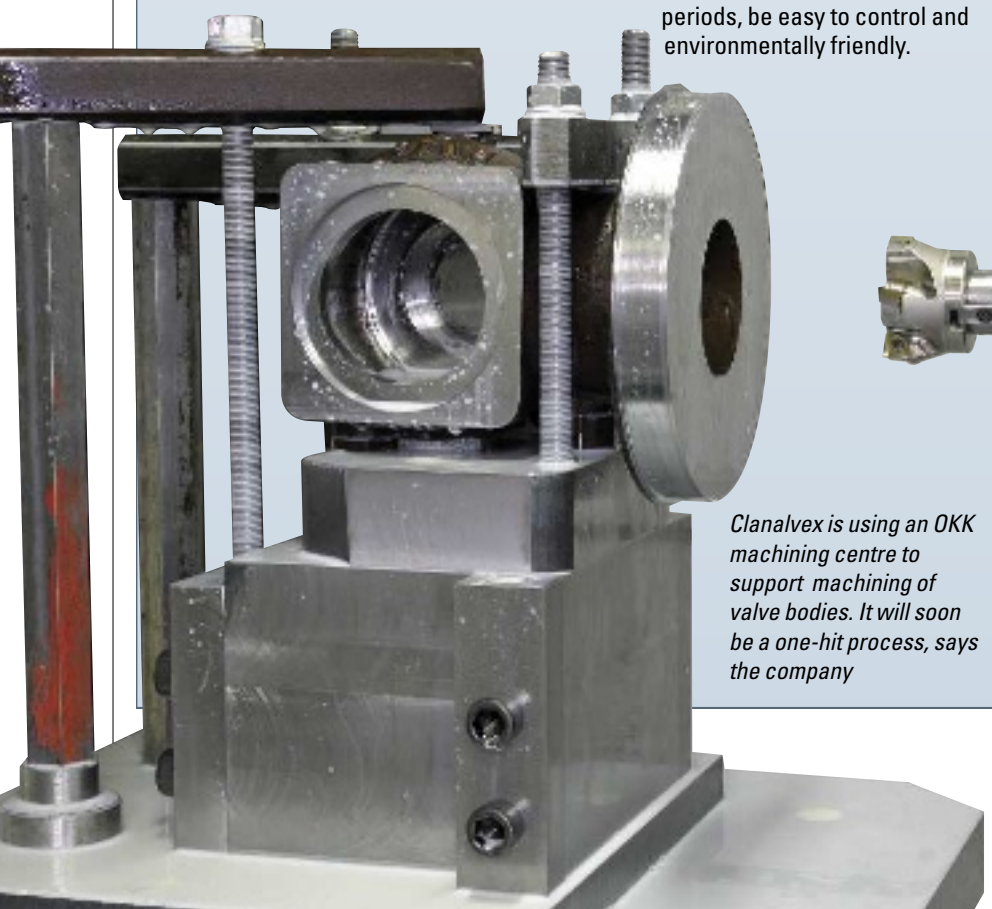
Such is the demand being driven by the energy sector that some machine tool and associated equipment suppliers are developing industry-specific products. These include XYZ Machine Tools, which has released a five-model 'extra large' capacity CNC lathe range featuring a 410 mm spindle bore, making them ideally suited to oil sector work. Weighing in at over 22 tonnes, the 'large bore' XYZ XL 1200's footprint is 13,180 mm (for a 10 m bed length machine) by 2,500 mm.

Cutting fluid specialist Blaser is also getting in on the act. The company's fully refined and renewable rape seed oil cutting fluid, Swisslube Vasco 1000 (available in the UK through agent Jemtech), is proving its worth in many applications in the oil and gas sector. The high lubricity found in Vasco 1000 is a result of its natural polar adhesion characteristics, whereby the fluid is attracted to the material being cut and forms an ultra-thin layer. The result is improved tool life and surface quality without the need to resort to chlorine-based EP additives.

"Where customers are faced with workpieces that require medium to heavy roughing, and more so in materials such as Inconel and titanium (common in the oil and gas sector due to their resistance to corrosion when exposed to salt water), vegetable oil-based cutting fluids are providing a cost-effective solution to a number of problems," says Alan Dalton, Jemtech UK's technical director.

Toshiba Machine, supported in the UK by Leader CNC Technologies, already has machines producing components for wind turbines in Europe, including the TMD large vertical turn-mill centres, the BTF and BP heavy duty horizontal boring machines and the TSS range of moving table vertical lathes.

Toshiba Machine says as wind generators increase in size, the machine tools required to produce the frames, gearboxes, propellers, bearings and universal joints have to be as robust and reliable as the end product. Like the wind turbines, the machines need to be heavy duty, run unmanned in automatic mode for long periods, be easy to control and environmentally friendly.



Clanalvex is using an OKK machining centre to support machining of valve bodies. It will soon be a one-hit process, says the company

paramount in the safety-critical petrochemical industry."

The mill-turn theme is replicated at Peter Brotherhood of Peterborough, where a new £300,000 Gildemeister CTX 620 V4 Linear supplied by DMG produces steam turbine and gas compressor components. The machine is eliminating secondary operations due to its heavy duty y-axis turret crossfeed capability and has also reduced the amount of sub-contract working.

The turbine and compressor parts being turned on the CTX have a tolerance requirement of 0.025 mm. Most of the components, including valve covers, gear shafts and valve cages, are machined out of hard steels demanding a turning platform with high levels of rigidity and significant levels of power.

Dave Head, production manager at Peter Brotherhood says: "With a swing of 800 mm and y-axis crossfeed of +70 mm the CTX negates the need for secondary operations. The driven tool unit on the CTX is also between three and four times more powerful than our existing lathe, so it is easily producing the type of features we had to mill previously."

There is also healthy demand for machining centres to perform prismatic machining operations for the oil and gas sector. For example, a Japanese-built, 4-axis, HM400 twin pallet horizontal machining centre from OKK, delivered by UK agent Whitehouse Machine Tools to sub-contractor Clanalvex Precision Engineering is able to perform nearly all machining operations on valve bodies in one CNC cycle. The only second operation, carried out on a modified centre lathe, is back boring of an internal seat pocket. Clanalvex is working on including even this into the cycle so that valves can

come off fully machined. This is in stark contrast to the previous production route at the Scarborough-based company, which required five set-ups on different machine tools.

At Great Yarmouth, sub-contractor Moughton Engineering Services is using a VM2 machining centre and Hawk 30 CNC mill (and two TM10 CNC lathes) from Hurco to produce parts such as a 250 mm diameter 316 stainless steel pressure release plate for sub-sea applications. Following 45 minutes of OD turning and facing on one of the TM10s, the part is transferred to the VM2 3-axis machining centre for prismatic features to be machined on both sides in a one-hour cycle.

EDM technology also has a place in the oil and gas sector, as demonstrated by the installation of a new Charmilles RoboFil 440 CleanCut wire EDM at Otley-based precision engineering specialist Craftsman Tools

Oil and gas sector components (seals, rings, valves, etc) are manufactured from materials such as stainless and Duplex steels, Inconel and titanium, and exhibit complex forms and profiles such as thin walls and deep ribs, with tolerances of 10 micron or better often required.

"We have often considered (virtually every year it seems) whether we could justify the expenditure required to build up an in-house EDM resource. We made the strategic decision to invest recently and we are delighted with the results we are achieving," says managing director Robert Johnson. □

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Not usually linked with the oil and gas sector, Craftsman Tools had long thought about it and is now happy it took the EDM process on board