

Profit in the pipeline

Oil, gas, petrochemical, nuclear, wind, solar or tidal power generation – the energy sector has never been more topical...or potentially lucrative. Steed Webzell reports



'Oil' has been the word on everybody's lips for more than a year now. Between August 2007 and July 2008 oil prices climbed by a staggering 65 per cent, and while they have cooled slightly since the summer, the effect has been far reaching.

Oil is big business, which is precisely why it continues to command one of the highest annual levels of investment in UK industry. The knock-on effect for the sub-contract community is considerable, with the oil sector accounting for a growing percentage of turnover at company's such as St Albans-based Premier Deep Hole Drilling, where today it represents 25-30 per cent of business.

Premier regularly handles oil sector components such as complex Inconel housing units for down-hole Logging-While-Drilling (LWD) data capture systems (which have to be supplied maintaining ± 3 micron run-out over a 1 m length), oil well condition monitoring tools and stainless steel subsea manifolds that can incorporate anything up to 90 blind, through and intersecting holes.

The company has recently installed a large ejector drilling machine that allows it to machine some of the larger components used in the offshore industry, such as well-head parts up to 4 m long.

It is smart investment on this level that pays dividends for a myriad of other sub-contractors operating within this burgeoning industry. Unsurprisingly, many are based north of the border in Scotland, such as Fife-based Itasco Precision which has recently installed a new Doosan Puma 700LM lathe with a 3.2 m bed from Mills.

Itasco specialises in machining the critical end fittings that create the connections for thermoplastic hoses and/or steel tube 'umbilicals' that are used for tasks such as production, gas lift, gas injection and water injection in subsea oil/gas installations. The low alloy carbon steel end fittings are large, heavy and asymmetric, and exhibit surface finish of Ra 0.4/0.8.

"Before the Puma 700LM was installed we had to transfer parts between lathes and machining centres for both pre-weld machining and finishing operations," says director Jim Mullen. "But now we can complete machining operations in a single set-up, including all flanges, threads and angled bores, thanks to the Puma's driven tool capability."

Mills has also had sales success further north at Aberdeen-based Omega Completion which has recently installed Doosan Puma 400L and 280L lathes to help manufacture well completion and

intervention equipment such as self-opening sand-face valves, clean-out valves, hydrostatic setting tools and roller gauge carriers.

PRISMATIC PURCHASE

And it is not just turning technology that is in high demand, as Ward CNC can testify from its recent sale of a large capacity Hartford Sumo vertical machining centre to Edinburgh-based Nexus Precision Engineering.



Machining critical end fittings for 'umbilicals', Itasco

Coupled with integrated fourth axis and right-angle machining head, as well as 60-tool auto toolchanger, the machine's 3 m bed is for the first time enabling Nexus to machine in a single set-up long (up to 2.5 m) workpieces in a cost-effective way.

The Hartford Sumo was purchased primarily to satisfy the need for the one-hit machining of stainless steel down-hole gauge carriers for Baker Hughes ProductionQuest. Currently 15 per month are being supplied.

"The key to the success of the Hartford Sumo, apart from its extra long bed capacity, is the integrated fourth axis and right-angle head," says Paul Rafferty, project manager. "These features enable all prime machining operations to be performed in a single loading: there's no second operations and therefore no inter-operation handling to extend lead times and overall costs."

Other areas of the UK are also thriving thanks to heavy investment in the energy sector. Milford Haven in Wales, for instance, is one of Europe's largest oil and gas ports, and two further terminals are currently being built for liquified natural gas. It comes as no surprise, then, to learn that petrochemical work accounts for



Bartlett Engineering has slashed one cycle time from 24 hours to just 9, courtesy of Hurco technology

75 per cent of turnover at nearby sub-contractor Bartlett Engineering.

Bartlett machines a lot of high grade stainless steel as well as a mix of other materials including boiler plate. Some of the alloys are difficult to machine; not only the tough, nickel-based materials and stainless steel, but also other ferrous alloys such as EN26W steel hardened to 350 BH. Many of these materials demand high power machining and so this was high on the list of prerequisites when the company recently wanted to acquire a new machining centre. Eventually the decision was made to invest in a Hurco VMX60 with 1,524 by 660 by 610 mm travels and 24-position tool magazine.

One of the first components being made on the new machine is a super-heater element. Made from 220 mm diameter seamless carbon steel pipe, the 2 m long element contains rows of holes that have been machined manually at Bartlett for some years, production time being around 24 hours. Cycle time on the Hurco is now just 9 hours.

With the finish requirements of many oil and gas components superior to those for other industries, any gains in efficiency in this area are usually very rewarding, as Aberdeen-based Weatherford can attest: the company is celebrating having a 10-fold increase in

efficiency and higher production output thanks to the Wheelabrator Group.

Jim Liebnitz, consultant at Weatherford, says: "The cleaning process is an essential part of our operation as it is the only way of evaluating any damage and necessary repairs when completion tools come back to the plant. Our existing process was extremely time consuming: first the tools were soaked for 12 hours in an acid-dip tank, then it took two workers at least three attempts to clean each component with a high pressure wash gun before they could go to the next stage of processing – inspection."

EVALUATION CLEAN-UP

Wheelabrator Group recommended a table wheel blast machine and a front load aqueous degreasing machine. Easy access to the machine allows the parts to be loaded on to the blast chamber table with minimal effort. The table then rotates under the blast stream from two or three blast wheels, allowing maximum exposure and a high production efficiency.

"The solution we provided enables Weatherford to complete a job in 15 minutes that was originally taking them several hours," says Hugh Smillie, Wheelabrator regional manager, Scotland. "The tools are now washed in a



has installed a 3.2 m bed Puma CNC lathe from Mills

degreaser and hot soapy water before being blasted on the table machine. This is a much safer production line, as chemicals have been eliminated and handling has been cut to a minimum. The waste water only needs to be changed once a month – prior to our application Weatherford had to empty the waste every two weeks, so we're also allowing them to be more environmentally responsible with their waste products."

WIND OF CHANGE

Wind power is currently expanding at a global rate of 20 per cent year-on-year and this is set to continue beyond 2012 – at which point the worldwide wind turbine market will be worth a staggering \$300 billion. With wind farms an increasingly common sight on landscapes and shorelines of Europe, opportunities for machine shops in this young energy sector are becoming more frequent.

A case in point is provided by Leader CNC, the UK agent for Toshiba machine tools which has recently installed a Toshiba 1.5 m vertical borer at a British plant machining components for the renewable energy sector. It is the third Toshiba machine on site.

In mainland Europe, the Jutland region of Denmark is a target for manufacturing technology sales as five of



TaeguTec tooling technology has saved 70 hours/month for wind energy component maker Ertech

the world's largest wind turbine manufacturers have plants there, including Vestas, Siemens and GE Power.

Local sub-contractor Ertech Stal produces hubs, base frames, rotor locks and bearing housings for the wind industry and it is here that the support of TaeguTec cutting tools has been invaluable. Ertech machines 30 cast iron hubs each month varying in size between 10 and 56 tonnes. Swarf removal ranges

from 1-10 tonnes per hub as the company has to machine to a depth of between 20 and 40 mm to remove the skin of the cast.

The introduction of TaeguTec face mills has made a considerable impact on facing and interpolation operations. Cutting on the periphery of a large bore, a competitor face mill was making 9 mm deep cuts that took 19 passes to complete. However, using a TaeguTec face mill with 60 inserts, 14 mm deep cuts were taken, completing the process in just 12 passes. With each pass taking 20 minutes, this one tooling change saved Ertech Stal 2 hours and 20 minutes per hub, equating to 70 hours of machining per month.

MINIMAL CLAMPING AREA

TaeguTec has also had success at Jutland-based MillPart, a producer of hydraulic manifolds for the wind industry. Here, a recently introduced TaeguTec ChasePlus feed cutter with TT9080 grade inserts is being used to machine a ductile cast iron component. The job set-up only permits a 2 mm clamping area, but with little stability TaeguTec managed to improve productivity by over 100 per cent by increasing the feedrate from 1,905 to 8,000 mm/min. □

Nuclear powers ahead

With the government seemingly intent on including nuclear power in future energy plans, there is no reason to suggest this established method of power generation will slow in the coming years. On the contrary, many UK machine shops are seeing continued orders from this high profile sector.

Among their number is Coventry-based PowerKut which ordered a Yamazaki Mazak Integrex e-650H II multi-tasking mill-turn centre at the MACH 2008 machine tool exhibition in April. PowerKut has a new contract to machine nuclear components and wished to do as much work as possible in a single set-up.

PowerKut's managing director, Peter Everitt, says: "Buying a machine of this size and capability is important to PowerKut on a number of levels. The 4 m bed length is crucial for a particular contract that we have in the nuclear sector and the overall mill-turn capacity of the machine will enable us to complete work in a single set-up.

"This will allow increased unmanned running, reduced risk to components during transfer of parts and, crucially, improve overall accuracy of components, as they are not being re-positioned for second operations."