

Set Yourself Up for

Success in Oil & Gas



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The outlook for the oil & gas industry appears to be very positive for 2014 and 2015, which is good news since it is one of the world's largest industries. As high accuracy and tight tolerances are required on machined parts, revenues in this industry tend to be invested in new technology to increase production and improve product quality. All markets in manufacturing have been affected by the lack of skilled workers and oil & gas is no different. Products and technology that help less experienced workers increase part accuracy and productivity will help offset this situation.

Higher Accuracy, Tighter Tolerances

Parts machined for the oil & gas industry range from the smallest couplings, valves, pipes and blow-out preventers (BOPs) up to larger parts, including mud pumps and well heads. As drilling goes deeper, parts get heavier and the equipment needs to handle more pressure. In turn this means higher accuracy and tighter tolerances are required on machined parts. Having a high-resolution, high-accuracy CNC and drive system combination provides a distinct advantage. Additionally, reliability to prevent downtime of machine tools is also a key factor as backlogs are currently very high in the industry—



Photos courtesy FANUC America

Unlike in the past, today operators with little or no experience can repair threads thanks to improvements in programming.

anything that pushes out deliveries even further is not good for business.

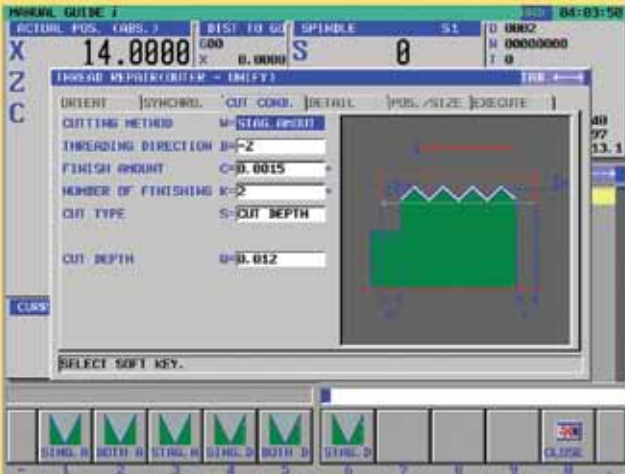
Some oil & gas parts, especially the BOP, over months and years of service have a tendency to wear out as water, rock and mud wear on the surfaces. In order to restore the parts to as-new condition, companies weld new material to the worn areas and then remachine

the parts to the original specifications. High accuracy and tight tolerances and the flexibility to rework parts effectively are essential and selecting a CNC with a high MTBF (mean time between failure) and a low MTTR (mean time to repair) are equally critical.

Certified Education

Reports are that many of the leading companies in the O&G industry have ambitious plans to hire new workers in 2014. As it relates to CNC metalcutting, the issue is finding qualified, trained machine operators in the traditional O&G areas of the country. Training of new inexperienced operators can be costly and some companies are unwilling to take on that expense.

While finding experienced operators can be difficult, companies prefer candidates with experience using the industry's leading CNC system. Those operators can hit the ground running and be productive from day one. Due to industry demand, educators are starting to upgrade their CNC education programs in order to qualify students to be productive right out of the gate for industry leading jobs.



Programming using conversational tools either off-line or directly on a CNC machine is becoming more popular.

Employers are now aggressively recruiting graduates from these educational institutions that have CNC certified education training programs.

Conversational Programming

In the past, the rework of existing parts was often performed on manual machines by highly skilled operators. Simple new parts in low-volume production were also programmed manually by skilled machinists at the CNC. Ease of programming using conversational tools either off-line or directly on a CNC machine is becoming more popular as companies are looking for ways to enhance their productivity and offset the lack of skilled workers. Conversational programming is an ideal way to learn CNC machining as it forces a student to focus on the sequence of operations before they learn G-code.

Conversational programming has evolved over time and is now much more user friendly and yet more powerful. Although conversational programming has been around for 30+ years, advances in computer graphics have made it more attractive to a younger generation of programmers who grew up with video games. For every step in

creating a program, the user receives guidance with graphical prompts and a 3D solid model animation of the machining operation.

Without particular knowledge of G-code programming, using conversational programming such as Fanuc's Manual Guide i makes it possible to interactively generate part programs in just a few steps—allowing the user to go from a drawing to a production part in a very short time. In fact, companies are reporting that they have been able to train operators who have little or no prior experience.

A feature that is very important in the oil & gas industry is thread repair. After a while, threads get beat up and soft. It takes thread repair and a phosphate bath to make them hard again. If the threads are ruined, a part used to be thrown away. Today, companies reclaim pipe, rethreading it over and over, and the producers want to do it reliably and cost effectively.

Companies that used to do the thread cutting setup procedure manually are now having their operators, with little or no previous machining experience, use the thread repair capability within Manual Guide i conversational

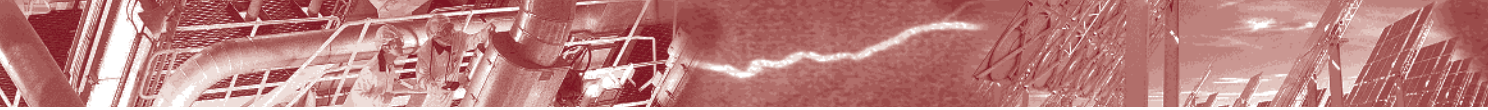
programming. They are guided through the creation of part programs by answering simple questions—all of the relevant information is displayed on one CNC screen. It is quick to set up and it does compensation for the user.

One of the toughest things to do is remachining threads. Manual Guide i simplifies a variety of complicated functions including thread repairs. In many cases, the threads are industry standard. So, all the operator has to do is enter the numbers and then Manual Guide i conversational programming will calculate the cut based on pitch of the thread and how deep it has to be.

Oil & gas companies are increasing their productivity with conversational programming while also upgrading their capabilities by having the programming needed for the new type of connections also used in the oil fields.

Safety First

An increase in OSHA compliance is forcing both large and small companies to look at adding interlocks and safety switches to existing machines. With safety being a huge concern in the industry, leading CNC manufacturers understand the importance of



Many educators are upgrading their CNC education programs so that students are qualified operators by the time they complete their coursework.

safety and have developed features and functions to address this concern. Modern CNC systems can be locked out to limit what the operator can do; this keeps the CNC running and avoids downtime. If the CNC must be powered down, more time is required before machining can be restarted—which slows down productivity.

The implementation of safety on a CNC machine needs to be a simple and straightforward process with a specific function. The most innovative functions, such as FANUC's Dual Check Safety, provides safety for the operator and also protects the machine asset. So

an operator or maintenance person can work on machinery without turning off the power and still be assured of safety. Additionally, disabling the ability to

Products and technology that **help less experienced workers increase part accuracy and productivity** can help close the skills gap.

clear memory, operation history, offset tables and parameters are also very

important when working with inexperienced operators.

Wise Choices

High-accuracy parts, lack of skilled workers, easy-to-use programming and safety are all hot topics in the oil & gas industry today. Wisely choosing an innovative CNC system is critical in order to address all of these issues. In addition to setting yourself up for success with an accurate and reliable CNC, also look past the CNC to the service and support team that backs up that CNC—the level of expertise of your CNC manufacturer can make or break you. ⚡