By Eric Brothers

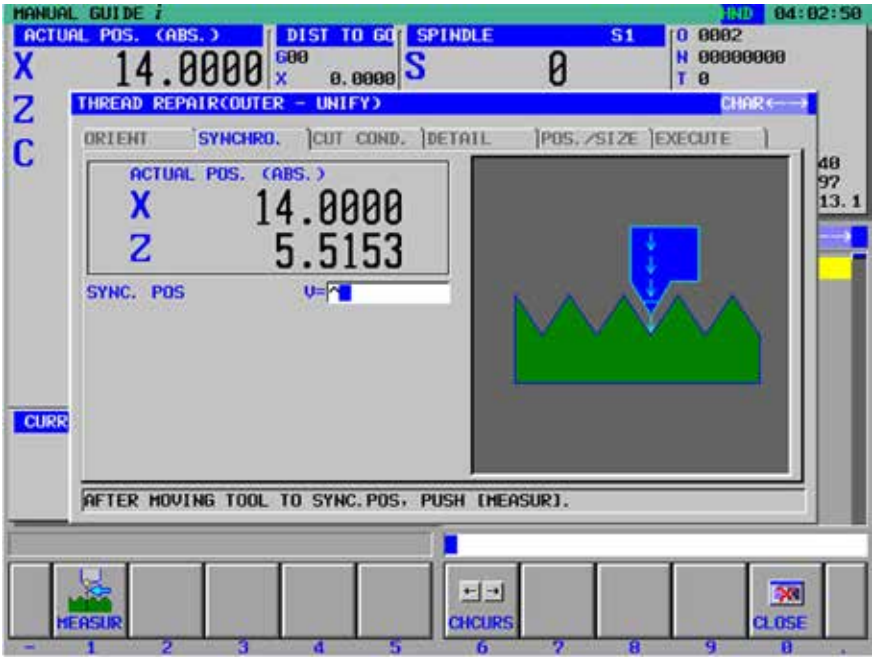
Conversational Programming Finds Work in the Oil Patch

Surbo Tubular Services speeds pipe threading with a user-friendly CNC program and some employee ingenuity.

Surbo Tubular Services in Houma, La., does pipe reconditioning and thread repair for the oil and gas industry. With more than 50 years of experience in the business and thousands of tool joints rebuilt, the company has certifications for API Spec 7-1 Q1 8th edition and has a Grant-Prideco H-series, XT, HT, and GPDS series repair facility. The company's 65 employees routinely rethread drill pipe, drill collars, and subs that are used in harsh environments onshore and offshore.

While that is a remarkable story in its own right, it is the rather unusual method of rethreading the company developed that came to the attention of the CNC controller support manager.

Jody Michaels, FANUC CNC end-user support manager, explains that the usual procedure is to take the tool to the middle of a tapered pipe thread. Normally, the machine operator puts a form gage on the thread to make sure no daylight is visible. But the machinists at Surbo discovered that if you wired two gages together, the combined gage, about 4" long, did not have to be put in the middle of the thread. It was possible to just bring the turning tool over to the end of the form gage and it would pick up the thread perfectly whether it was OD or ID being cut. When told about the procedure, Michaels could not believe something so simple could work. "I said, 'You'll have to show me, because I don't believe it.'" After seeing it first-hand, Michaels is a believer. "It does work."



In the user screen for thread repair with the FANUC Manual Guide *i*, the operator places the tool in the center of the thread and presses the Measure softkey in the lower left corner.

"Catchin' the lead," is what Kevin Lane calls it. Lane is Surbo's CNC supervisor and programmer, and he's been with the company since 1997. He had done the thread cutting setup procedure with some effort manually for more than a decade, but all that changed when the company added three Willis Machinery & Tools Co. CNC lathes equipped with FANUC CNCs and their Manual Guide *i* conversational programming.

The controller's conversational programming employs straightforward screen designs that allow fast, user-friendly operation. Without particular knowledge of G-code programming, it is possible to generate part programs just by answering simple questions. All of the relevant information is displayed on one CNC screen.

Lane likes using the conversational programming. "With older machines, I sit down with a print, a calculator, and a notebook," he says. But with the Manual Guide *i*, he gives it an M19 command, which establishes the tool on the

spindle. "I put my zero in the part. From there, I see where it falls in, and can adjust it either direction," he explains. "It's quick to set up and it compensates for you. The old way I had to compensate myself."

He puts the spindle in the same place every time and adjusts the numbers accordingly. "It works every time," he says.

"Anybody could do it this way," he continues, describing the ease of conversational programming with the Manual Guide *i*. A number of the employees at Surbo came to work from the local newspaper, with no previous machining experience, "and they can run it," Lane explains. And, compared with his first experience with conversational programming some years ago, Lane says the process has gotten easier to use. "I literally write in my thread cycles," he says. The speed the process allows is also welcome, since it's not uncommon to be threading up to 32ft-long drill pipe in three different lines, according to Lane. He adds that the Manual Guide *i* is easier to train employees on and easier for them to use than previous methods.

"One of the toughest things to do is picking up threads," Michaels says. "Usually, a company only had one guy who was good at it, and typically, it was the last thing you do," he continues. If the threads were ruined, the part would have to be thrown away.

Michaels adds, "When I told other people about what technicians at Surbo do, they said, 'Why didn't I think of it? It makes total sense.'" He expresses his admiration for what they've done. "I'm really impressed. Manual Guide *i* is a system you don't have to be an expert programmer to use. If you come up with some idea, it is easy to try it and see if it'll work, and that's what they did."

According to Michaels, the software supports a variety of complicated functions and thread repairs – "a big deal in the oil and gas business where a lot of companies reclaim pipe, where it is rethreaded over and over, and where the producers are trying to save as much money as possible.

"After a while, threads get beat up and soft, so it takes thread repair and a phosphate bath to make them hard again," Michaels says.

In many cases, the threads are industry standard. "Put in the numbers, and then the machine will calculate the cut based on pitch of the thread and how deep it has to be," Michaels says. That has been a problem with manual machines, unless the numbers are to be found on a print, but the Manual Guide *i* has it within the threading cycle. "Press it, and it will calculate."

The guide has a thread repair icon and six tabs that just require the operator to fill in the blanks. Michaels lists the remainder of the procedure: "Then you just bring the tool to the middle of the thread, press 'measure' and it remembers. It syncs the spindle with the Z-axis and then you just back it out. Press 'cycle start' and it picks threads up and makes multiple passes to make the new thread."

Michaels marvels at the sheer size of the pipe that Surbo deals with regularly. Typically, the pipe is 4" to 16" in diameter, and 32ft long. The headstock of the machine will be placed right up against an outside wall, and there will be a hole where they'll bring the pipe through, on rollers set up outside.

"They'll run pipe into the machine, chuck it up, bring the rollers up to support, leaving maybe only 4ft of pipe inside the machine and the thread length sticking out of chuck," Michaels explains. "So maybe there is 26ft of rolling pipe visible outside of the building." It's a sight worth seeing, he says.

Mike Neil is the facility manager at Surbo Tubular Services. He estimates that depending on pipe size, the company repairs 1,200 to 1,800 joints in a month. Neil is optimistic about the added opportunity FANUC's conversational programming gives to the company.

"We're looking for this type of programming to take us to the next level in threading the new type of connections used in the oil fields these days and some of the things we're having to do," Neil explains. "These machines help us to train individuals to cut these connections much easier than the ways we had of doing them in the past."

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>>DID YOU KNOW?

Just a bit of information about FANUC's Conversational Programming: The FANUC MANUAL GUIDE *i* software is based on the ISO code format and has an ergonomic CNC user interface for programming cycles.