

CUTTING TOOL ENGINEERING®

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Turning a 'supermaterial'

Titanium is ultrastrong, but is it kryptonite on the lathe?

PLUS

- Quick-change chucks
- Solid-carbide vs. indexable tools
- Six Sigma quality control
- Profitable problem solving

bur-blank supplier Brazen Innovations Inc., Marlow, N.H., help him provide virtually same-day service.

Dan Stearns, vice president of Brazen Innovations, said, "Peter calls and says I need this today, and we say, 'it's already today!' He then asks 'can you get them out for us when UPS picks up?'"

Brazen can provide, within hours, bur blanks with nearly any brazed head and shank combination, but it doesn't maintain an inventory of finished bur blanks. "If I had to build 5,000 of every conceivable shape and size and shank combination, I'd have probably \$3 million worth of product sitting around," Stearns said. The company keeps just over \$250,000 worth of carbide blanks, bur shanks and brazing discs in stock. "That is one [way] we keep our overhead low," Stearns said.

Brazen's ability to provide made-

to-order brazing is based on its custom CNC brazing machines. Stearns, who has a background in manufacturing and mechanical engineering, designed and built the machines himself. They enable Brazen to quickly combine heads and shanks on an as-needed basis. The machines are fast; Stearns said he is concluding development on a third-generation version of the machine he estimates will be capable of brazing about 400 pieces per hour.

The machines are accurate, routinely producing burs with TIR down to 0.001", according to Stearns. "For one particular customer, on a 6"-long shank, we braze a 2"-long piece of carbide and hold a 0.0005" TIR over the entire length. Our machines are designed to be able to do that without having to work hard at it," he said.

Regarding braze strength, Stearns

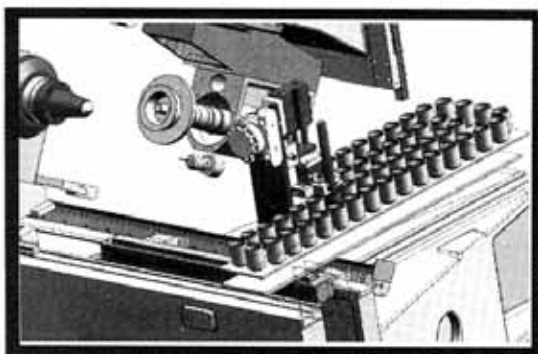
said, "You'll break the shaft off or smash the carbide apart before the brazed joint will get pulled apart."

JIT retrofit

Sometimes the little components in a machining system can cause the biggest headaches. Rotary bushings are one of them.

Rotary bushings are commonly deployed in transfer line tooling applications such as automotive engine block cam and crank boring. They guide boring bars with the frictionless support they need to machine tight-tolerance bores. The transfer line's boring bar moves through a bushing's ID and, with the help of precision bearings, rotates without friction. A stride beyond the more common—and better known—drill bushing, rotary bushings

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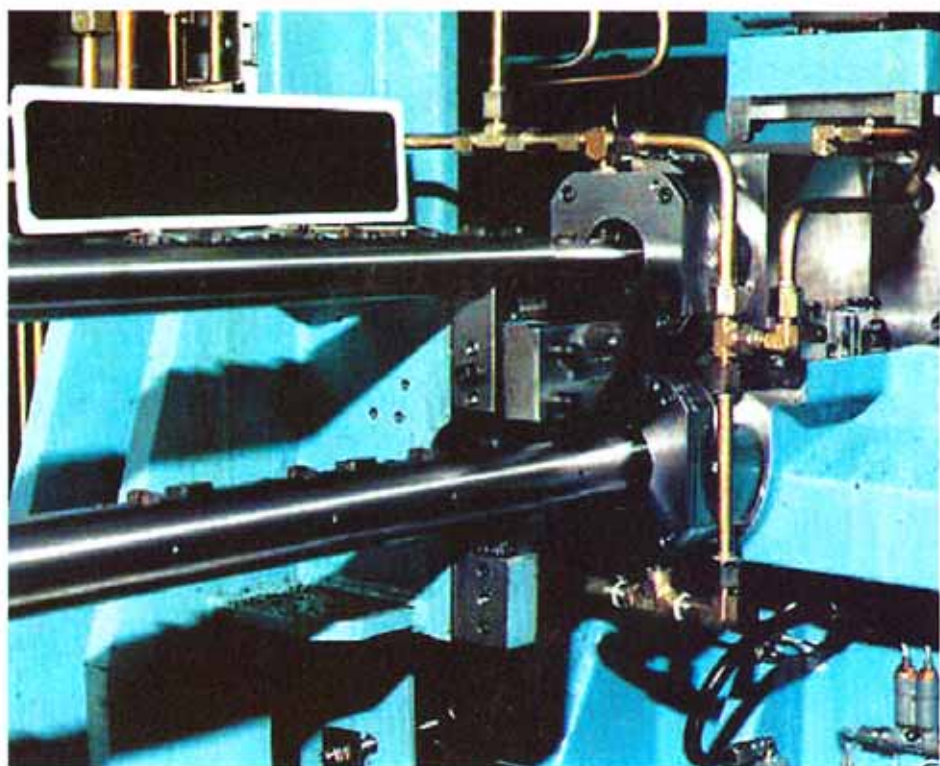
Replace rotary bushings in a timely manner.

SOLUTION

A quick-change cartridge with a self-contained bearing assembly.

not only facilitate accurate cutting, they also minimize heat, wear and chatter.

Although rotary bushings are a small but vital component of high-volume manufacturing, they can also be an Achilles heel. This is attributable to the design limitations of most boring machines, which have individual detail parts that comprise the bearing support and are built into the machine housing.



Rotary bushings guide boring bars with frictionless support.

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The inherent limitation of this design is that when new guide bushings are installed, the entire housing may need to be removed, rebuilt in the toolroom and then realigned back on the machine, which significantly delays production. This can also occur when bearings, seals or components go bad and require repair or replacement. Both cases produce downtime, which can be extremely expensive.

A rotary bushing retrofit to a more easily replaceable part, on the other hand, can help stave off downtime. For example, rotary bushing and toolholder manufacturer Gatco Inc., Plymouth, Mich., developed a quick-change cartridge with a self-contained bearing assembly that is machine-installable in minutes and eliminates the time-consuming and expensive replacement of individual detail parts.

This proved extremely useful to

Galaxy Industries, Canton, Mich., a machine shop that produces a range of parts for major equipment manufacturers such as Caterpillar Inc. and Eaton Corp. Galaxy faced a vexing problem. The machine shop used three bushings to pilot the transfer line's boring bar when boring an engine block, and, last year, all three wore out near the end of a Caterpillar job. Though the company had a spare set of bushings on hand, the cure wound up being worse than the disease.

"When the bushings wore out, we were at the point in the job where we were ready to bore all seven crank journals in the engine block simultaneously," said Dale Funk, Galaxy's plant manager. "We had another set of bushings available but we didn't realize they were the wrong size until we had completely torn down the existing setup to install them. There had been a

change in the crank bar and it turned out that the bushings we had were too small. It really messed us up."

"Armageddon" followed. The operation ground to a halt for 24 hours and the delay cost the company \$150,000—not a penny of it recoverable down the road. That, by the way, did not take into account the \$25,000 Galaxy had already invested in off-size bushings or the time and labor devoted to the fruitless disassembly operation. Fortunately for the company, there would be a happy outcome.

"We contacted Gatco for a retrofit, and they had whole process wrapped up in just 24 hours," Funk said. "That was incredible. Had we approached this thing in a different way we would have been looking at something like 6 weeks to resolve the situation, and God only knows what that would've cost us." △

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