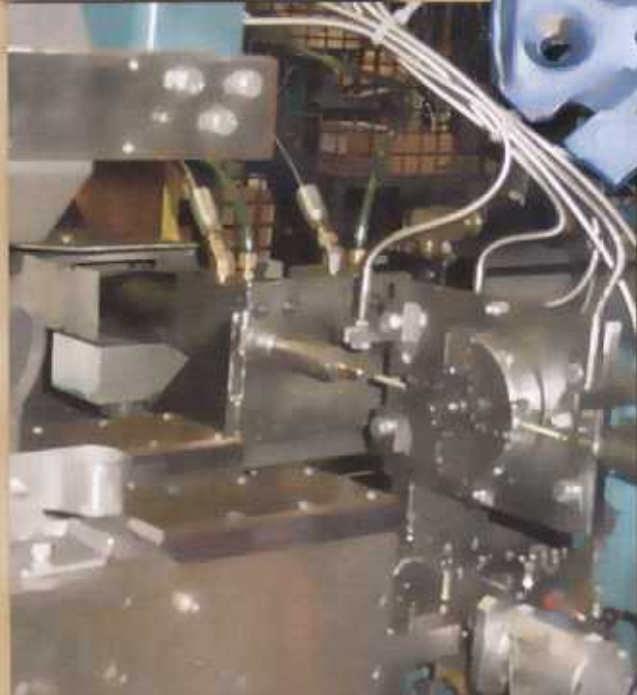


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# Grinding Out Punches Quickly

**Investment in  
CNC punch  
grinding helps  
Stema Punch &  
Die supply  
custom tools  
in JIT fashion.**

BY DAVID BARBER

When Stefan Lorbach began his career as a tool-and-die maker in 1959, he couldn't fathom how the industry would change. In the 1970s, he notes, it might take three to four months to make a die. In 1986, he opened Stema Punch & Die, Cambridge, Ontario, Canada, as a one-man operation supplying tool-and-die shops and metal

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stampings. At first, he quoted three- to four-week lead times. Now, customers demand those jobs within a week.

Today, Stema, with 25 employees, operates roughly 60 machine tools including CNC and manual wire and sinker EDM machines, CNC and manual surface, centerless, cylindrical and punch grinders, CNC turning and vertical machining centers, CMMs and optical comparators. Due to the nature of the business, Stema must forego the luxury of building to inventory, producing every punch in unique diame-

This new CNC punch grinder at Stema Punch and Die works exclusively on hard material such as M2 tool steel. The machine roughs and finishes punch blanks 2 to 6 in. long in diameters from 0.125 to 3 in.

ters, lengths, points, profiles and surface finishes. This results in a chaotic schedule where the only thing approaching routine is the prepping of punch blanks, produced in advance.

### New Punch Grinder Brings Flexibility

To best handle his chaotic production rhythm, Lorbach monitors technology changes that may allow his company to perform more quickly and efficiently, without any sacrifice in quality. This led to his acquisition of a new Studer S32cnc punch grinder from United Grinding Technologies, Inc. (UGT), Miamisburg, OH. With the purchase, Stema became the first S32cnc user in North America.

"We already had two CNC punch grinders," Lorbach says, "and then business progressed to where we needed a third. We looked at the machine, spent two days grinding punches, and bought it."

The new punch grinder adds another degree of flexibility to Stema's production processes, according to Lorbach. The company uses the machine exclusively on hard M2 tool steel, rough-

The control for the new grinder stores process parameters for a number of part runs. This capability, combined with others such as quick-change fixturing, eases setup and job changeover.

ing and finishing punch blanks ranging in diameter from 0.125 to 3 in. and in length from 2 to 6 in.

"In some cases," Lorbach says, "we'll perform secondary operations, but only where we have to electrical-discharge-machine (EDM) additional profiles or threads, or produce keyholes. But 80 to 90 percent of the punches are roughed and finished, ready to go, on the Studer."

Besides flexibility, Lorbach settled on the new punch grinder for its ability to hit and hold close tolerances. Most of his punches require an  $\pm 0.0005$ -in. OD tolerance, but some special punches require an OD tolerance of  $\pm 0.0003$  in.

"We can achieve  $\pm 0.0001$ -in. tolerances on the Studer," Lorbach says, "and it handles 1-in. ground profiles—pretty standard—and 2.5- to 3-in. profiles

for custom punches. That gives us an additional competitive advantage."

Programming on the new punch grinder also adds to flexibility and increased throughput. To simplify job changeover, the machine control stores process parameters for a large number of routine jobs, allowing an operator to call up a part number on the Fanuc 16i touchscreen and let the machine adjust itself. The machine addresses difficult or new parts through built-in routines that adapt to specific part needs, then stores the information for the next time the part runs.

### Batching Not an Option

Such capabilities pay big dividends as Stema, with its custom work, only rarely can run jobs as batches or families.

"The mix is just too high," says Lor-



## Inventory and Premiums are No-Nos

Following his investment in a CNC punch grinder, Stefan Lorbach, president of Stema Punch & Die, continues searching for ways to eliminate or simplify production steps. A producer of custom tooling on a JIT timeline, Stema deals with customers increasingly unwilling to hold inventory, but Stema can ill afford to build to inventory in anticipation of potential orders.

"Two or three years ago a customer might order 12 pieces at a time," says Lorbach. "Now that's down to three or four, and the customer orders three or four times more frequently. That challenges us to find ways to be more flexible, fast and efficient, and drives us to find new ways of doing things."

Those new ways must compensate for the fact that customers no longer will pay premiums on JIT delivery.

"If you think you're going to be compensated for JIT service, think again," Lorbach advises. "Customers expect you to hold the line on price. They look at what you charged them for the last order and expect to pay that amount again, regardless of whether the new lead time is significantly less. Charge a premium on a rush job? That's a nice theory, and it might have worked in the past. But today, what once was a rush job is now normal, and what now is a rush job once was impossible."

"The only way I can hold the line on price," he continues, "is to take costs out of my processes. This is why finding better tools and techniques, eliminating steps and simplifying operations are so important."



Stema must hold tight tolerances on the variety of punches it manufactures. Most of its punches require  $\pm 0.0005$ -in. tolerances on ODs, with some special punches requiring  $\pm 0.0003$ -in. ODs.

ferent requirements. If a customer needs one or two pieces in an emergency, we don't have to interrupt a process to dress a wheel or make a radius, which is where we could lose a lot of time and money."

## Focus on Fixtures for Quick Changeover

Though some part processes at Stema lend themselves to automation—unattended production of punch threads on EDMs, for example—automating the punch-grinding process is a different matter, says Lorbach.

bach. "We may produce two ovals, followed by six round, followed by four square or rectangular punches. And if it's not the mix, then it's the delivery requirements that make running batches next to impossible."

Even higher-volume opportunities, to 100 pieces, are JIT affairs. A 50-piece order, Lorbach says, may include 10 of one type punch, eight of another, four of another—all of differing lengths, diameters and profiles. Again, too customized for batching.

Stema's machine-to-operator ratio ranges from two-to-one to three-to-one or greater, a must to maintain flexibility and contain costs, says Lorbach.

"An employee running two or three machines at once," he says, "affords us the flexibility to work with our unpredictable schedule. An operator uses one machine for roughing, another for finishing and a third for something different—grinding a flat on a part, for example. This way we're not constantly changing over machines to meet dif-

"Because of the short cycle times, to grind punches through the night we'd need to install a robotic loader to handle the blanks," he explains, "then work on only six parts or so at a time, which would take just 35 to 40 min. So rather than automate the punch-grinding process, we make fixtures that allow easy changeover and save time."

Stema also saves time by refining its established processes. Lorbach notes, for example, that some punches coming off the Studer, square or oblong punches in particular, require matching die buttons produced by wire EDM. In these cases, part programming meant entering as many as 86 instructions, a long process.

"We produced the part in 6 min.," he says, "but it took us 12 min. to program the EDM. So we gave some profiles to our software expert and asked him to rethink the process. He created a program with fewer key strokes and instructions, with a significant reduction in time. Now we can program the same operation in 1.5 min." MF