

# CNC Tool Grinding

## In-House or Outsourced?

**A** CNC tool and cutter grinder will improve the quality of parts any shop produces. It does this by helping to ensure that the tools used, whether their geometries are simple or complex, are properly ground and resharpened.

Shops able to perform CNC tool grinding in-house, as opposed to outsourcing it, enjoy additional benefits. For example, tools that are best resharpened on a CNC machine are always available, and the task is completed at a lower cost.

A number of factors determine whether CNC tool grinding should be

done in-house or outsourced. Among them are the variety of tools the company uses and the availability of skilled operators and programmers within the company who can perform the work.

Perhaps the biggest determinant, though, is the volume of tools the shop uses. Many smaller shops simply cannot justify the investment in a CNC grinder, because they resharpen too few tools on a weekly basis. To resharpen a \$50 tool, for example, would not be worth the cost of a \$250,000 to \$500,000 piece of equipment, plus software, personnel and training.

However, if a company uses families

of tools on a production line where hundreds of tools per week are consumed, bringing CNC tool and cutter grinding in-house makes economic sense. It would allow the company to resharpen a wide range of tools at a lower per-unit cost. And, a CNC grinder facilitates new-tool development and the grinding of any specialized tools needed for prototype work.

There are arguments for outsourcing, too, including:

- In-house grinding is an expense, not a profit center.

- Shop space taken up by a tool grinder could be devoted to actual parts-producing machines.

- A large toolroom is needed if the shop consumes a high volume and/or a wide variety of tools.

Some companies take a mix-and-match approach. They regrind their high-volume tools in-house and send out their lower-volume and more complex tools. (As more experienced tool grinders retire, though, shops are having to send out more of their high-volume tools as well.)

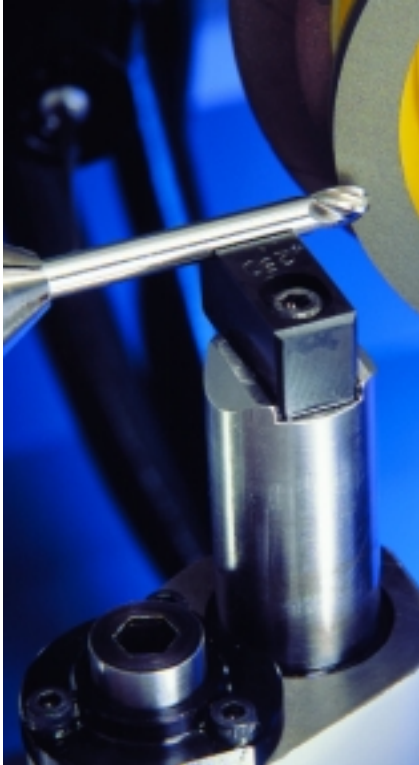
Generally, high-production shops should outsource the resharpening of tools that require a lot of operator input, such as extensive setups and teardowns. Regrind services possess the flexibility, skills and software necessary to produce and resharpen these types of tools.

### Skills and Software

The number of tool and cutter grinder operators is declining. One reason is that experienced operators who learned their craft on manual equipment are re-



All photographs: ANCA Inc.



While there is no substitute for a skilled grinder, modern CNC grinders have helped to fill the skills gap in many tool rooms.

tiring. And because relatively few young people are choosing manufacturing as a career, the old-timers' valuable skills aren't being passed on. This is a big problem for industry.

Increasingly, software is filling the "skills gap" created by the dwindling number of experienced tool grinders. This is especially true at companies that sharpen tools with complex, 3-D geometries that must be ground to extremely tight tolerances.

According to tool-grinding-shop operator Tim Knapke, of Tru-Edge Grinding Inc., St. Henry, Ohio, manual grinding is no longer adequate for most users of cutting tools. "Learning ballnose-endmill sharpening on a manual machine could take 6 months," he said. By using a Windows-based, menu-driven CNC tool and cutter grinder, training time can be tremendously reduced. With software, an operator only has to identify the tool, select the program file and start the machine.

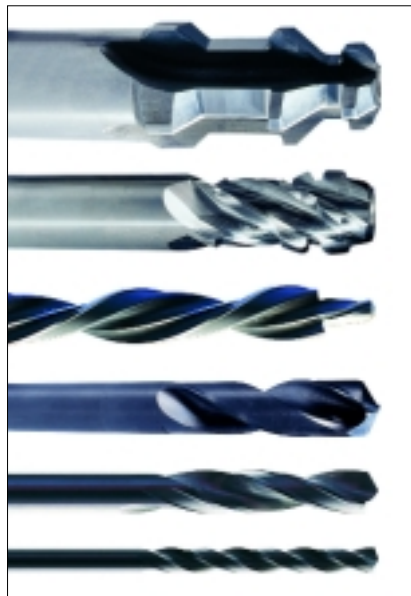
"If an operator can read a micrometer,

he can operate the grinder," said Knapke.

In addition, once a CNC grinder has been programmed to grind a specific style of tool, that information resides in memory. When that tool is resharpened the next time, the machine identifies it and automatically calls up the requisite grinding parameters. This capability dramatically reduces setup times.

It also improves tool-to-tool consistency, which enhances metalcutting productivity. When geometries remain the same from one tool to the next, machining centers and other machines require fewer part-program adjustments. Such consistency is difficult, if not impossible, to achieve with a manual machine.

Whether CNC tool resharpening is outsourced or performed internally, it's critical to set up a regular tool-resharpening schedule. If prior experience with a tool has shown that it needs resharpening after 100 parts, then it should be removed from service after the 90th part. This ensures that the tool isn't pushed beyond a grinder's geometry-restoration capabilities. If a tool is run too long, damaging the geometry beyond repair, it would be nearly impossible to reproduce the geometry without



The complexity of today's tools often drives the decision to purchase a CNC tool and cutter grinder.

a manufacturing program.

## Technological Obsolescence

Some companies purchase the latest CNC tool and cutter grinder because tool geometries have changed so much over the years. Older machines and software, though still serviceable, are incapable of handling today's new, more complex tooling.

Furthermore, new simulation software available with some manufacturers' CNC tool grinders enable the user to move quickly from a CAD drawing to a precisely ground tool without missteps or wasted blanks. This capability dramatically lowers the setup time needed to grind a newly designed tool.

The software, running on the grinder's CNC, also can simulate how a tool would perform in a real-life operation.

Tru-Edge's Knapke said that simulation software allows his company to "take a part print and design and manufacture a tool to complete the customer's part. This is often a special tool that will accomplish multiple cuts in a single pass.

"Customers e-mail a DXF or DWG file describing their production part and tooling challenge. We then reverse-engineer [the tool] from the finished part print," said Knapke.

Obviously, a state-of-the-art CNC tool and cutter grinder offers a lot of advantages compared to a manual machine. And just as obviously, there are advantages—as well as disadvantages—to performing CNC tool grinding in-house.

Only the individual shop can decide whether the work would be best done internally or externally, based on the variety, complexity and volume of tools it consumes.

## About the Author

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