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TO THE POINT

Rush Machinery

In the past, tool resharpening got a bit of a bum rap: It was better, perhaps, than throwing the tools away, but the resharpened tools weren't likely to achieve the same longevity as new ones. Today, resharpened tools can often achieve the same lifespan as new ones, and resharpeners can improve their customers' tool usage in other ways as well.

Presented here is a series of brief articles on elements that can improve the resharpening experience.

PROTECT YOUR EDGES

Shipping mishaps that occur when tools are sent out to be resharpened are common and costly, but easy to prevent.

"A person that has dull tools that he sends out to resharpen needs to protect them," said Dick Hoffman, president of Tri-State Tool Sharpening, Hudson, Iowa. "Just because it's dull doesn't mean you can just throw it in with other tools."

"We see more damage to tools from people just tossing them into a box from 2' away," said Mark Davidson, president of Precision Cutter Grinding Co., Warren, Mich. "Especially carbide ones—they're hard and durable in cutting applications, but very brittle. Two or three in a box rolling against each other can cause quite a bit of damage."

Davidson said tools that are merely dull require relatively little effort to resharpen, and necessitate the removal of relatively little tool material. Tools that are chipped from rough handling, on the other hand, can lose 10 to 15 percent of their total life because so much material needs to be removed to re-create a smooth surface.

A bit of foresight when receiving new tools can go a long way toward protecting dull ones. "There are not many tools that don't come in some kind of container," Davidson said. Tool users should save those containers and use them to protect tools they send out for resharpening.

Options exist if the tool container does get lost, however. Hoffman said Tri-State has extra tubes to ship tools if the original containers are lost.

Davidson said Precision Cutter Grinding dips tools in a protective plastic coating. "Any layering of paper between the tools would help as well," he added.

Those may not be viable options for an end user, however. If not, Hoffman suggested shipping tools in trays with dividers to prevent them from banging against one another.

Pat Yousse, toolcrib attendant for Energy Manufacturing Co. Inc., Monticello, Iowa, said she wraps tools in a bubble wrap-type material for protection when shipping them.

Even treating the tools gently may be enough. "It's a matter of not tossing the tools around," Davidson said.

COOL TOOLS

Computer controls are probably the greatest development in machine tools since... well... the machine tool. The CNC's impact on resharpening is no less significant.

"We have the ability to make tools like new again," said Precision Cutter Grinding's Davidson. "In years past, that probably wasn't the case. Now with CNC, we can."

The effect is difficult to quantify, Davidson said. Each tool, even the ones that are the same brand and geometry, has probably been subjected to different materials, uses and operator skill levels. But, he said, "after we began using CNC equipment, we started getting positive feedback."

Part of the improvement comes from the accuracy of a CNC. But possibly more significant, Davidson said, is that CNC tool and cutter grinders enable the use of coolant. Manual grinders, on the other hand, require the operator to be able to see the tool.

It's possible to grind accurately with a manual machine. However, "you sacrifice finish when you regrind tools dry," Davidson said. "Also, in the case of HSS tools, you risk the integrity of the heat treatment because of the heat generated."

In addition, Davidson said, resharpening cutting tools dry often creates burrs on the tool edge, "and deburring dulls the just-sharpened edge," he said. Using coolant minimizes burr formation, and burrs that do form are smaller and easier to remove. "If it's there at all, the burr usually comes off with the seal peel—it's that light of a burr," he said.

Tri-State's Hoffman said experimenting with newly developed coolants is helping to improve the resharpening process even more. "We've been trying a new soybean oil-based coolant, and it's providing a better finish than other oil products," he said. He added that the new fluid allows faster grinding.

The fluid is made by Environmental Lubricants Manufacturing Inc., Plainfield, Iowa. "Vegetable oils are four times more lubricious than petroleum naturally," said Gene Tripp, ELM's metalworking product manager. "In the past, the products weren't stable enough." Metal fines, water, temperature changes and pressure caused vegetable oils to separate, liquify or plasticize.

ELM's fluid is made from genetically modified soybeans that contain 85 percent high oleic acid. "Increasing the oleic acid content gives the fluid stability," Tripp said.

These innovations allow resharpeners to return a tool to the customer that is like new. "We're doing the same thing to a tool that the manufacturer is when they're making it, often with the same equipment," said Davidson. "There's no excuse for a resharpened tool not acting like a new one."

ENSURING QUALITY

As grinding equipment has evolved, consumers of resharpening services have become more demanding. "If the customer has a problem, the sharpener is the first guy he's going to blame," said Tri-State's Hoffman.

End users' demands are the result of both their own quality concerns and formal requirements, as the widespread ISO 9000 quality-management standard requires documentation of how procedures are carried out.

As a result, tool resharpeners step up to take responsibility for the quality of their service.

Hoffman said his company's grinders each have access to inspection equipment and are responsible for inspecting the tools they resharpen. The company tracks who resharpened each tool, so each operator is accountable for his work if there are problems.

Don Strubler, vice president of operations for Performedge Inc., Fort Mill, S.C., said his company has formal processes, similar to ISO procedures, for resharpening various tools. "That way, we can assure the customer we're giving a repeatable product time and time again," he said.

Performedge

Accurate labeling of resharpened tools eliminates any chance of confusion and helps users meet documentation requirements.

The company inspects the first tool of every job and every 10th piece thereafter. "Usually, the CNCs hold very well," Strubler said. "The programs are basically macros. Relationships in the macros ensure a good point."

Performedge provides either a certificate of performance or a certificate of dimensions; Strubler said the certificate of performance is generally the vital documentation.

He added that customers, some of whom are major automotive manufacturers that have the facilities and equipment to be able to check Performedge's work, don't bother. "They don't inspect [reground] tools. They don't have to," he said.

"We rely on the tool grinder to be right," said Kim Rhoades, manufacturing engineer for Blackhawk Engineering Inc., Cedar Falls, Iowa. "We've talked about doing some inspection, but it would be a real burden."

Energy Manufacturing's Yousse said only a few special tools require inspection, such as a center tool with critical tolerances. "We check its dimensions and width," she said.

Another key to success, however, is the personal touch. "There's an industry standard for standard tools, but the

majority of tools aren't standard," said Environmental Lubricants Manufacturing Inc.'s Tripp, a former tool grinder with John Deere. In those cases, the standard is determined by the end user, and the sharpener needs to work with the customer to comply.

Communication also helps customers be confident about using resharpened tools out of the box. "You better know the guy who is sharpening your tool," said Hoffman. "You want to know that he knows how to put the point on."

Tripp added, "People can't afford [to inspect tools after resharpening]. If you don't trust your sharpening house, you need to get a new sharpening house."

BEYOND RESHARPENING

Tool resharpeners need to be tool experts, which means that they may be able to provide tooling assistance beyond simply bringing back the point.

Performedge offers a tool troubleshooting service. Strubler said one customer asked Performedge for help when the resharpening service it was using returned tools that only provided 25 percent to 50 percent of their original tool life.

Because the resharpened tools didn't last as long as expected, the company's tool supply was running low and it needed 24-hour turnaround. The company was drilling dry using TiAlN-coated drills.

Performedge resharpened a small quantity of drills and returned them uncoated to the customer the next day, so production would not have to stop. (Performedge subcontracts out its recoating work, preventing it from returning the tools in a single day.)

"We told the customer to reduce their speed by about 35 percent," Strubler said. That reduced production, but the customer achieved full tool life with the uncoated drills. It also bought enough time to have the rest of the resharpened tools recoated. Once the customer received the resharpened and recoated drills, it was able to return speed and production to normal and still achieve full tool life.

Another customer, an automotive plant, was using a TiN-coated drill to make wheel hubs. Each hub had about six ½" through-holes. The company was running the machine at its maximum horsepower, and achieving tool life of about 350 to 400 parts.

"We changed the point geometry, changed the coating to TiAlN, and altered the feeds and speeds," Strubler said. The company now is producing the hubs in a shorter cycle time and tool life has tripled.

Tri-State's Hoffman told of a customer that was drilling hard rubber. "It was just chewing up bits," he said.

The company helped the customer by suggesting a drill with a different point style, a radius curve instead of a 118° angle, which improved the cutting tool's durability.

Blackhawk Engineering Inc.'s Rhoades has used Tri-State's troubleshooting service several times. "We had a double-margin drill that we were consistently oversize on," he said. In that case, Tri-State made the results more consistent by making the margins narrower.

In another case, Rhoades said a saw blade used for slotting wasn't yielding acceptable tool life. Tri-State recommended different feeds and speeds, and tool life improved by several hundred percent.

"The biggest thing you've got to work on is establishing good communication," Hoffman said. "It isn't just about the buck. It's the idea that they're your customers and you want them to succeed."

The following companies contributed to this report:

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