

A Well-Oiled Machine

Machine tool and fluid maintenance are keys to extending equipment life.

What's the most important piece of equipment in a metalcutting shop? The machine tool, of course. Without it, there would be no work, no business and no profit.

Another question: What are the most important things a machine does? Cut accurate parts on demand.

Last question: What can owners do to ensure that their machine tools perform as expected? Maintain them and the fluids that are their lifeblood.

The first step is to "do the fundamentals," said Kevin Bevan, president of machine tool distributor GBI Cincinnati Inc. "Like car maintenance—just do the things in the manuals."

Bill Horwarth, president of Cincinnati Lamb Plus, Hebron, Ky., the after-market sales and service group for machine tool builder Cincinnati Lamb LLC, agreed. "Every builder has in its documentation the recommended intervals and schedules for maintenance, usually in a matrix listing machine element, activity and how often to perform it," he said. "However, ordinary drivers do more preventive maintenance on their cars than your average machine tool owner does on his machine."

That, Horwarth feels, is because of the strong maintenance-related marketing done by automakers, their dealers and aftermarket companies—Mr. Goodwrench, Jiffy Lube, Midas and the like. These companies know that there's money to be made in maintenance. During the last 10 years, this approach has become increasingly popular among machine tool builders as well. The reason is simple. "While basic preventive maintenance goes far



Makino's V55 vertical machining center is designed for easy access during routine maintenance.

in extending the life of machines, which is a benefit to shops, basic maintenance reduces warranty costs," Horwarth said. "It's not entirely generosity on the builders' part."

Simply telling machine owners where to find maintenance recommendations in a manual is not enough, though. Horwarth put it in plain terms: "When machine tool builders just sell a machine and say, 'There it is on page 105, follow that matrix,' the shop is not likely to [follow up], and the builders incur more warranty costs in the long run."

Beyond the Manual

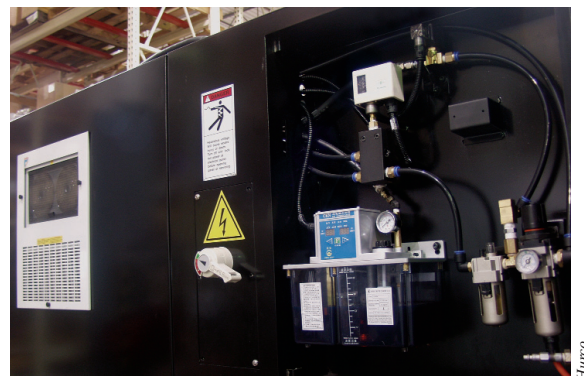
Machine tool builders are making their ma-

chines much more reliable—a response to competitive pressures. This lessens the maintenance workload. But the downside is that some users get lulled into thinking "less" equals "none."

That's why many machine tool builders are discussing maintenance issues up-front during the selling process. Case in point is machine tool builder Hurco Cos. Inc., Indianapolis.

"We strive to bring maintenance to consciousness during selling and, subsequently, during installation," said the company's vice president of customer service, Mike Garlick.

Mason, Ohio, machine tool builder Makino Inc. is doing likewise, said company spokesman Mark Rentschler. "We stress maintenance to our customers, highlighting the training that's



Maintaining filters for air conditioning, heat exchangers and air lubricators is simple, yet is often overlooked.

well-oiled machine

available here at Mason, our state-of-the-art support, and the online and visual troubleshooting that's available on certain models," he said. "Perhaps most importantly, though, we stress our complete life-cycle support, including preventive maintenance programs with periodic audits of key machine components."

Note that Rentschler used the term "preventive maintenance," which can be defined as: "Monitoring the machine's vibration, heat, alignment, wear and debris, and other key factors, with replacement performed as indicated either by the manual or by the results of the monitoring."

Another term in frequent use today is "proactive maintenance," which can be defined as "monitoring and correcting the root causes of failure, such as contamination of fluids." Though maintenance pros often use the two terms interchangeably, proactive typically indicates a somewhat more aggressive approach to maintenance than does preventive.

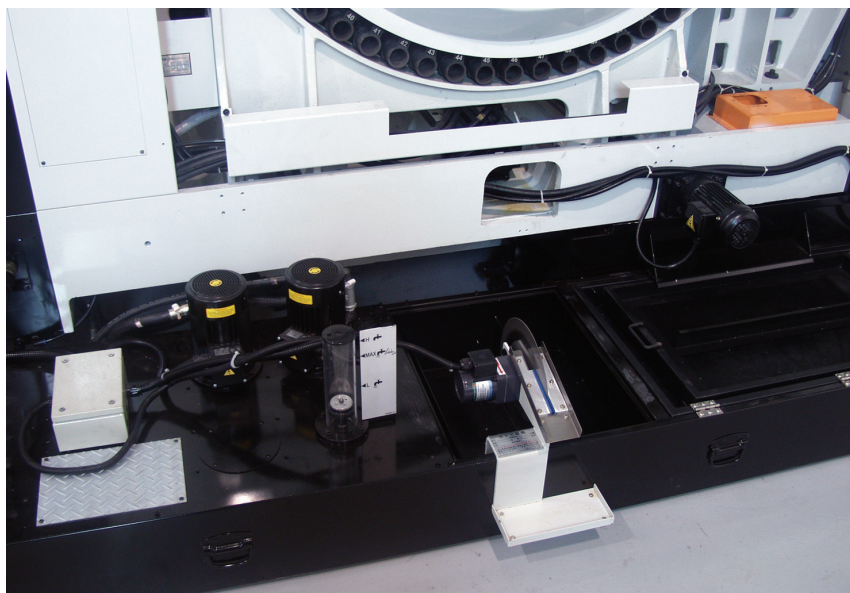
Oil Your Machine

Vichai Srimongkolkul, technical director at OilPure Technologies Inc., Kansas City, Mo., supplier of oil- and fluids-monitoring software, uses the term proactive and is definitely at home with the more aggressive approach.

"A proactive approach to fluid maintenance, or management, extends tool life 15 to 30 percent," he claimed. "If shops would manage fluids, they could save an average of \$15,000 to \$20,000 per month in overall costs. Fluids are paramount for precision and quality control, especially for ISO 9000 shops."

Srimongkolkul emphasized oil maintenance in particular, because he estimates that 80 percent of machine problems are caused by faulty oil. "Oil maintenance is job No. 1," he said.

Maintenance software for oil and lubrication products does the following: offers best practices for machine lubrication; performs scheduling tasks and stores oil specs for each machine in the shop; consolidates the number of oils used to the fewest types; oversees lubrication equipment tracking; incorporates



Maintaining the coolant system filters and pumps on Hurco's HTX500 horizontal machining center increases machine performance and reliability.

Hurco

oil disposal and reclamation procedures; and offers tips on which laboratory to use along with guidance on what actions to take depending on the lab results.

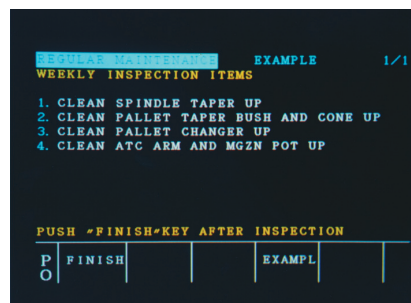
The software also indicates when outside analysis of fluids is needed and what types of analysis should be undertaken, and it can help map a daily maintenance routine within a shop, minimizing backtracking and overall time spent on maintenance chores.

Like any maintenance professional, Srimongkolkul augments software-supplied data with his own set of priorities, born of years of experience.

He said: "If you mistreat oil, like blood, it will quickly deteriorate. Bottom line, you have to control contamination."

Cincinnati Lamb's Horwarth has a similarly aggressive approach to maintenance ... and to the part software can

play. In partnership with Voelker Sensors Inc., Palo Alto, Calif., Cincinnati Lamb Plus offers Oil Sentinel, which is software that allows continuous monitoring of oil in a machine, or for any piece of stationary industrial equipment. "It monitors oxidation—to prevent wear—water contamination, tem-



Easy-to-follow mainscreen controls on the Makino V55 allow for maintenance monitorization and on-line assistance.

Makino

Science 'fictional' maintenance

In addition to oil maintenance software, Cincinnati Lamb Plus offers Freedom software.

"It fits on any machine," said company president Bill Horwarth. "It monitors productivity, reliability and maintainability. It can be sent to a server within the factory [that] collects and reports data for multiple machines. It's like a shop walk-around every moment of the day. In it, you can program auto-

matic notification to maintenance when certain parameters go above set points and you can build tables of maintenance activities and time intervals."

Horwarth claims that today's automatic notification will soon evolve into something even more impressive, maybe even science fictional. "In the next 5 years machines will, in some cases, even fix themselves," he said.

—G. Farnum

perature so that lubricity is not broken down, and, of course, oil level,” Horwarth said. “A patented sensor technology plugs into the existing oil tank. This is an aftermarket solution that can go on any existing oil reservoir. When any of the four parameters gets out of condition, a warning light illuminates and it sends a signal directly to the machine control.”

Oil maintenance software does not preclude the need for periodic lab analysis. However, lab analysis itself is not without its problems, as Srimongkolkul noted. “Sometimes, when shops send oil to labs, they don’t understand what the results mean,” he said. “It’s important to work with someone who can explain the methods, especially spectrochemical analysis, and the meaning of parts per million of lead,

iron, zinc, phosphorous and calcium.”

That someone could be the oil maintenance software supplier, the lab itself, a maintenance consultant, or a machine tool builder or distributor, assuming it offers a sufficiently wide-ranging maintenance contract.

“Customers need to be educated on this—they know about machining, but very little about oil,” Srimongkolkul added.

Keep It Clean

Even if a shop feels it cannot afford oil maintenance software, “that is no excuse for shoddy maintenance,” said Hurco’s Garlick. “Software or not, the main thing is keeping the machine clean.”

He suggests pulling back the way covers to inspect them. If the covers are damaged, then the ballscrews and ball bearings will eventually become damaged too. Also, inspect the wipers, which are designed to keep out small chips and dirt between the slides and the ways, to make sure they are clean. “Unfortunately, those things are pretty grubby jobs, so nobody likes to do them—but they must be done,” he said.

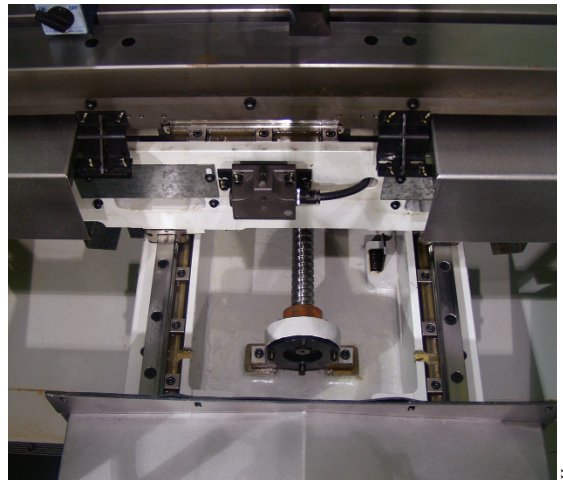
Also, if compressed air is used, check the direction the air hose propels chips. Sometimes, chips are directed to places where they shouldn’t be going. Garlick said using a brush or vacuum to clear chips is best, though it’s much more time-consuming.

Horwarth shares Garlick’s “cleanliness is next to godliness” approach to maintenance. “Housekeeping is absolutely essential,” he said. “Daily

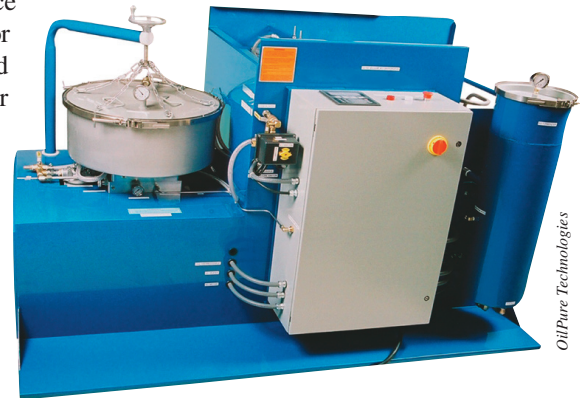
housekeeping routines can include such easy things as checking the hydraulic pallet lift function on a horizontal machining center, doing a little cleaning on the registration plates and wiping the scum off registration cones. If you don’t do that, a month or a year from now, the table will not be square, production quality will be off and people will spend hours puzzling over what’s wrong.” △

About the Author

Gregory Farnum is a Detroit-based journalist and a regular contributor to CTE.



Inspecting under way covers for chip buildup and damaged lubrication lines can significantly reduce the chances of costly machine failures. Way cover wipers should be regularly inspected for damage or wear.



An OilPure system can help maintain purity of cutting oil.

The following companies contributed to this report:

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