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Rightsizing Machine Tools

By George Weimer

Experts weigh in on how to buy smart—for today and tomorrow.

How do you decide which production equipment to buy? How can you feel confident that you are investing in the optimal machine tools for your shop's needs?

In decades past, before CNC and 5-axis and numerous other advanced technologies, purchasing machine tools was relatively simple: You needed a lathe for certain-sized parts and a milling machine for other jobs.

By contrast, a machining center today can produce more parts—of much higher quality—than an entire shop could 30 years ago. Consequently, purchasing production machinery these days is complicated. Guesstimating and intuiting are out; economic and engineering analyses are in. Here

is some advice from the machine tool industry about how to buy the machinery you need. It might be called rightsizing.

“There is a long list of features that any buyer must take into ac-

Don't be timid when discussing new technologies with builders and suppliers.

count to ensure the machine that is purchased meets present needs and foreseeable future needs,” advised Kurt Zierhut, director of electrical engineering, Haas Automation Inc., Oxnard, Calif.

“The best way to do this is to literally list them on paper and check them off, one by one. Another thing that can help is to find a dealer or machine tool builder who has machines on display and can run sample parts on those machines.”

These days, many machine tool builders are turning out “economy” machines. These production pieces of equipment are what one might call no-frills machine tools. They don't have all the bells and whistles, but they offer an advanced technology package with fewer features at, appropriately, less cost. As some experts noted, it may be more economical for some customers to consider adding features to new machines from other vendors besides the OEMs.

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Rightsizing Machine Tools *(continued)*

Spread Sheets and Lists

“Most customers today use some kind of a spreadsheet approach that takes into consideration details like travel,” said Gisbert Ledvon, GF AgieCharmilles’ business development manager. Overall, his advice is “buy a little bigger than you need [because] spreadsheets sometimes miss details.”

When considering new production equipment, Ledvon suggested: “to look at the variety of parts you make or will [make]. Pick the parts that offer the most problems, and then discuss these and your concerns with the OEMs. Have them recommend solutions.” They should show various machinery options, he added.

Much of this is straightforward, added Zierhut. Consider machine size. “Does the part really fit inside of it? Consider spindle power, spindle speed, tool changer speed, number of tools, maxi-

mum cutting feed rate, machine accuracy, cut quality and chip removal. Again, with this complicated list, it may be easiest to actually run a sample set of parts on machines where they are available by the dealer.”

Shops need to take a close look at these machines and an even closer look at the CNC in general. You may find that there are features available today in the CNC that you might want in the future.

“Certainly you will need to look at justifying the machine,” said Ledvon. One major measure of justification for machine tool purchases is productivity improvement, said George Yamane, marketing manager for Mazak Corp., Florence, Ky. “How much will you gain in terms of productivity? That’s the best way to begin an analysis of new machine tool issues. It’s not just price. If you only look at price, then you are not investing for the future.”



The Haas Mini Mill 2, with extended travels of 508mmx405mmx356mm for the X, Y and Z axes, respectively, has a 40-taper spindle capable of spinning up to 6,000 rpm.

Rightsizing Machine Tools *(continued)*

Consider also your expectations in terms of automation in your shop, said Ledvon. "How easy will it be to automate the equipment?" He recalled one case where the introduction of automation meant that the operator's access was compromised. It was, he added, a "disaster."

In addition, a workforce's level of education and sophistication is an important consideration. Look at the equipment's ease of use and evaluate whether your operators are sufficiently sophisticated to handle it.

each element of capability. We need to ask them, "What will you be doing in 5 years, in 10 years?"

Hyatt and others believe that the partnership between builders and users should be based upon long-term mu-

Machine tools today can be as technically sophisticated as advanced medical equipment—or rocket science.

Partnerships in Production

Some machine tool builders suggest a partnership between the builders and their customers. "You need to understand the customer's business model," explained Gregory Hyatt, chief technical officer for the Machining Technology Laboratory at Mori Seiki USA Inc., Rolling Meadows, Ill. "We need to be able to look at their own plans strategically. We need to understand with them

tual trust. The OEMs need to always ask what the customers want to support. They do not want to overcomplicate the machines. "So we need to look at their business plan and take into consideration that there are so many more options now, which means a more critical review is required," Hyatt added. In showing the OEM its business model, a shop allows the OEM to help strategize and consider the fact that "there may not be only one solution" when it comes to



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Driving progress

machine tool evaluation, he said.

While Hyatt noted that “there’s too much variability for a check list,” he does suggest that shops consider two major areas of “future enhancement” for machine tools. The first is software enhancement. Software is continuously evolving, and a shop should make sure its machine tool investments are capable of adapting to these changes.

A second area of enhancement is in workpiece materials. “In aerospace, for example, the materials move from aluminum to more titanium to composites over time,” Hyatt said. “You have to decide, do you want to machine just one or two or all? Nobody wants to buy a machine that’s obsolete in a year or two.”

Another area of high importance in deciding upon new production equipment is the OEM’s local service. “Besides looking at machine tools, look at their service networks and their inventories,” Ledvon added. “Know how they can help in terms of applications support. Know what they charge.”

Further financial investigation of the OEM is important, continued Ledvon.

“Is the OEM a stable company? How many machine tools do they have out there? Talk to other endusers of their equipment.”

If a shop is in the market for specialized machinery, it is dealing with a narrow equipment niche, Ledvon said. “Your vendor needs to be able to provide technology options.” Discuss with them the issue of what you really need to stay competitive.

Shop Around

Sometimes it may be advisable to look at suppliers other than machine tool OEMs for certain kinds of accessories and measuring equipment. Ledvon pointed out that encoder manufacturers can supply excellent equipment for machine tools that might be less expensive than that provided by the OEM.

“Most manufacturers have a long list of options,” said Haas’s Zierhut. “Don’t get sucked into buying things you will never need, but certainly get those things you reasonably know you could use in the several years’ lifetime of a machine.

“Upgrades and options should have

Tips on rightsizing machine tools

UPGRADING A MACHINE tool? Here are some tips from machine tool experts:

First off, study the technology. The builders themselves, via their Web sites, can be a good place to start. Some of the more sophisticated technologies involve computing, software and materials

science. Many machine tool builders offer courses in machining technology. Be sure to include your operators.

Consider partnering with an OEM. This approach is not for everyone, but it can be helpful for some companies to share their business plans and strategies with the machine tool builder.

Ask questions. Don’t be timid when discussing new technologies with builders and options suppliers. You need the optimal—not too little production capability and not too much. Getting just what you need means learning about the functionality and production capabilities of the machine tools you are considering.

Think about your future. What’s ahead for your company 5, 10 years or more down the road? Evaluate how the production equipment you are considering will be adaptable to future automation. How about refitting it in terms of software development?

What about tooling, fixtures, gaging and other accessories? Is it better to shop around to various vendors for certain items? Yes, said some experts. Investigate machine tool enhancements.

Consider the sophistication level of your operators and employees on the shop floor. Much of what is new in the machine tool industry uses highly sophisticated CNCs and requires an equally high level of operator knowledge. Does the machine come with a training package? How much retraining do you want to invest in?

Does the machine tool builder or dealer have a local representative to help you should problems occur? How is their inventory? What do other customers say about them?

—G. Weimer

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TOOLS IDEAS

Rightsizing Machine Tools *(continued)*

prices that are published and realistic,” he continued. “Replacement costs of a machine might rely on the simple fact

that real machine cost—corrected for inflation—has gone down every year for the last 20.”

There are different patterns around the world when it comes to deciding on new equipment, added Mori Seiki's Hyatt. “There are tax code issues. There are different business styles. There are even political issues. In some countries, you're not sure what will happen. Then there's the issue of privately held companies and public companies. Public companies might need to consider a significantly shorter return on investment for the new equipment.”

Machine tools today can be as technically sophisticated as advanced medical equipment—or rocket science. Yet each shop and factory that uses these production machines has a different set of goals and a different style of doing business. All the more reason to invest in educating yourself and your colleagues about the technology. It may take a lot of work and time, but the mistakes that

such effort allows you to avoid make it well worth it.

As a bit of general advice, Mazak's Yamane said, “Some people are merely looking for cheap machines.” What is the proper point of view when it comes to rightsizing? “Affordable? Yes, but not if it means cheap.”

Searching for just the right size machine tools can be tedious, but success in getting that optimal machine is in the details. CTE

contributors

GF AgieCharmilles
(847) 913-5300
www.agiecharmilles.com
IS #340

Haas Automation Inc.
(800) 331-6746
www.haascnc.com
IS# 341

Mazak Corp.
(859) 342-1700
www.mazakusa.com
IS# 342

Mori Seiki USA Inc.
(847) 593-5400
www.moriseikius.com
IS# 343

About the author:

George Weimer, a freelance writer based in Lakewood, Ohio, has an extensive background in the metalworking industry's business press.



Contact him by e-mail at gweimer@jwr.com.

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