



Machining

Thinking About Getting into Live Tooling? Here's What You Need to Know

Kip Hanson | Aug 11, 2020

Live tooling increases a manufacturer's cutting options and enables machinists to perform operations other than turning. Here's what you need to know to maximize your investment.

Traditional, 2-axis CNC lathes are slowly going the way of whitewall tires, only to be replaced by evermore capable mill-turn and multitasking machines.

Because of this trend, live tool attachments (synonymous with driven tool attachments) are becoming increasingly important members of the turning department, responsible for cutting slots, drilling cross holes and milling part features that previously required secondary operations on one of the shop's machining centers.

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Tom Dang
Lyndex-Nikken

Most live tools come from third-party suppliers, however, rather than the machine builder. You might be left wondering: whose should you buy? Which manufacturer uses the best gears, bearings and seals? What brand is most accurate and rigid, able to spin true year after year? And once your new driven toolholders arrive, what maintenance procedures should you follow to avoid dishing out even more hard-earned cash on what is admittedly a significant tooling investment?

How to Maximize Your Live Tool Lathes Investment

Whether VDI or BMT, whatever the brand, rotary toolholders for lathes aren't the least expensive tooling on the turret. Take good care of them and you can expect a decade of productive use. Crash one, or fail to follow best practices, and your toolholder life will be disappointing.

Here are a few tips to achieve maximum utilization:

- You've unwrapped your shiny new live tool, installed it in the turret, and want to get cutting ASAP. That's understandable, but **go easy**. Check with the manufacturer for the correct procedure, but as with any new piece of equipment, it's a good idea to start slow, run it for an hour or two, and gradually increase rpm until the bearings have a chance to settle in. Similarly, run your live tool lathe (or any machine tool, for that matter) through a short aerobics routine each morning before putting it to work.
- Waiting until something breaks before fixing it can be costly. That's just as true for driven toolholders as it is for fishing boats and F-150s. Again, **follow the manufacturer's recommendations**, but all will tell you to do much the same thing: Pull the toolholder out of the turret every so often, check the seals and bearings for wear, clean and lubricate it (and be sure to document when this event occurred). And if you hear a funny noise coming from the turret, or the toolholder feels hot to the touch, shut it down immediately and figure out why before proceeding.
- Always **use the correct tightening procedures** for mounting the toolholder to the turret and the cutting tools to the toolholder.
- Consider sending toolholders out for **routine maintenance** rather than doing so in-house (they're experts, after all).
- And as mentioned before, **take it easy with your feeds and speeds**, depths of cut, and tool stick-out. These aren't machining centers, after all, and a little common sense goes a long way toward maximizing your live tool investment.

Finding Your Best Live Tooling Options

These are all excellent questions, of course, and ones that Scott Leitch can help answer.

The sales and marketing manager at EXSYS Tool Inc., Leitch explains that, even though there are plenty of high-quality live tool options available, shops are limited to those that fit their specific lathe and its turret or turrets—unlike the CAT and BT spindles common to most machining centers these days (although these are evolving to include HSK and other dual-contact designs), machine tool builders have largely gone their own way in turret design.

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Without naming names or offering a preference, Leitch says the majority of live tool lathes are equipped with either VDI or BMT turrets. The first of these acronyms stands for Verein Deutscher Ingenieure, which Google translates as "Association of German Engineers." As you might have guessed, VDI originated in Europe. The toolholder body has a serrated shaft that slides into a hole in the turret's

face or periphery and mates to a toothed, cam-lock drawbar mechanism within. Cutting tool rotation is achieved via a spline gear on the end of the shaft, which engages with a servo motor located inside the turret.

Depending on whom you ask, BMT is short for “base-mounted turret” or “bolt-mounted tooling.” It uses a frustratingly nonstandard pattern of four bolt-holes and keyways to align and secure the driven tool to the turret’s outer faces. As with VDI tooling, BMT is powered by a servo motor within the turret, although the coupling itself varies between a splined interface—common on Sauter brand disc turrets—or the more common tang-style drive.

VDI proponents argue that, because driven toolholders can often be mounted on either turret face, their solution is more flexible and cost-effective. VDI might also be a bit more accurate, especially on lathes with turret misalignment problems, because the toolholders are easily aligned through the use of a dial indicator and some gentle taps with a brass hammer.

Taking It Easy

This adjustability, however, is also VDI’s Achilles’ heel. Because of it, some suggest that VDI is less rigid and requires more setup time. By comparison, BMT’s four keyways mean no adjustment is needed—drop them in, bolt them down, and get machining.

“In my experience, tang-style BMT is gradually replacing VDI as the first choice in driven toolholders, although both styles are capable of doing an excellent job, provided the CNC machinist follows some best practices,” Leitch says.

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Chief among these is the secret behind long-term, hassle-free and productive milling operations on a live tool CNC lathe: Don’t treat it like a machining center. The smaller spindles in these toolholders require that lighter depths of cut be used than with dedicated milling machines. Keep feed rates moderate, and try to engage multiple flutes to reduce harmonics and chatter.

Similarly, tool stick-out should be kept to a minimum. If not, a tool extending three to four times its diameter can overburden the relatively small spindle bearings within the toolholder itself. Worse, a cutting tool hanging out too far in the radial direction might hit the sheet metal when indexing the turret, a fairly catastrophic event.

Plowing Fields with a Camry

Tom Dang, vice president of Lyndex-Nikken Inc., agrees with the need for sound machining practices in live tool applications. And as with EXSYS Tool’s Scott Leitch, he suggests that shops can go a long way toward maximizing their live tool lathes investment by sticking with routine preventive maintenance procedures.

“Because you’re asking them to do more with less, live tool lathes basically cheat the traditional approach to machining,” he says. “It’s a bit like bolting an attachment to the front of a Toyota Camry and using it to plow the fields. You can do it, but if you don’t take good care of the engine and transmission, you’re going to experience unexpected downtime much earlier than you’d like.”

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That means keeping toolholders clean and well-lubricated. Inspect them between teardowns for wear.

Look for live tools able to run either wet or dry, as these eliminate the chance that the programmer forgets to turn on the internal coolant, thereby burning up the seals and bearings. Also, keep track of how many hours of use each live tool has seen. This will avoid the all-too-common problem of pushing a tool past the point of no return, turning what should be routine maintenance into a complete rebuild, or worse.

Maintenance aside, each supplier has its own unique selling features. Dang says most live tools on the market rely on ER-style collet systems but suggests Lyndex-Nikken's SK collets are more rigid and have greater gripping strength, primarily due to their steep, 8-degree taper. And Leitch notes that tool changeover-related downtime is increasingly critical for shops of all sizes, which is why he recommends EXSYS Tool's Preci-Flex modular adapters, which use either a standard ER collet, or Preci-Flex adapter with cone and face contact. The quick-change system supports offline tool presetting, simplifies tool changes for less experienced operators, and is far faster than traditional collet-style holders.

What tips can you share about live tooling? What are your best practices?

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