



Metalworking

A Guide to the Latest Advances in Workholding Tools

Kip Hanson | Jun 18, 2025

The tried-and-true workholding tools that facilities have long relied on to keep parts securely in place continue to bring tremendous value to the production floor.

Serrated edge clamps and step blocks, for instance, are essential components of the ***machinist clamp kits*** found hanging alongside countless toolboxes. Together with the assortment of studs, T-nuts and various threaded fasteners found there, they keep everything from rotary tables to vacuum chucks bolted tightly to the machine table, ready to work.

Similarly, dowel pins help position workpieces in a wide range of fixtures, while support buttons and rest pads provide stable locating surfaces for parts of all shapes and sizes. Spring plungers apply gentle holding force to the same, ball detents serve as stops and alignment aids, and fixture plates—machined with threaded holes in predefined grid patterns—give workholding a precise, repeatable place to call home.

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Eric Nekich
5th Axis Inc.

This is just a sampling of the many workholding components that TE-CO, Carr Lane, Jergens and other MSC Industrial suppliers offer. From fixture keys and clamping wedges to cam levers, knobs and bushings, each plays an important role in the machining process, and all are indispensable to manufacturers in their ongoing quest to grip parts safely, repeatably and, above all, accurately.

Beyond Chucks, Clamps and Collets

Even with the best components, though, it’s necessary to make workholding as efficient as possible. The manufacturing world is changing, and today’s machine shops must adopt fast and flexible workholding solutions that reduce setup time, improve ergonomics and support lights-out machining, all of which is critical in the face of steadily declining lot sizes and an even faster drop in the availability of skilled labor.

These benefits help explain why modular tombstones, zero-point clamping systems and quick-change vises are becoming essential pieces of the workholding landscape, particularly in high-mix, low-volume operations.

That's according to Eric Nekich, vice president of sales for San Diego-based 5th Axis Inc., who has a great deal to say on the subject, especially since the company practices what it preaches. In 2010, recognizing the shortage of workholding designed specifically for *5-axis machining centers*, the owners developed their first product offering, the dovetail fixture, and have been using it and other, more recent workholding solutions on their production floor ever since.

Lighter Vise Options

There's no arguing with a machinist vise. The 6-inch model affixed to the tables of machining centers everywhere can grip parts up to 9 inches across with the standard configuration and nearly 17 inches with the jaws in the outboard position, making them flexible enough to handle most anything made at a typical job shop or tool and die house.

At 70 pounds, they're not much fun to carry, however. They also take up far more real estate than is actually needed to grip the coffee cup-sized and smaller parts that many shops thrive on. Nor are they automation-ready or easily swapped out for a fixture or other workholding device. Simply put, machinist vises might be effective, but they're far from modern.

Nekich is quick to note that 5th Axis has numerous low-profile, compact workholding solutions to address these concerns, starting with the new LiteVise. "We launched the LiteVise at IMTS 2024, and the feedback has been overwhelmingly positive," he says. "Available in three sizes, it's designed specifically for automation and is 50 percent lighter than leading competitors' vises. As with our other vises, it's also compatible with our RockLock zero-point platform."

Standardized Workholding

Nekich explains that all 5th Axis workholding is modular in design, and users can attach vises to either a 52 mm or 96 mm base system, making it easy to standardize across the shop. Companies that don't adopt modular workholding, he says, are really missing out on one of the biggest advantages of modern manufacturing.

"We've seen it firsthand with customers such as Flying S and TurboTech—we've even filmed videos at their facilities. By years three, four and five, these companies and many others have implemented standardized, quick-change workholding across the shop: horizontal and vertical machining centers, assembly stations, and even coordinate measuring machines," Nekich says.

At that point, when machinists are designing the workholding for a new part, the only real question they're asking is whether to use 16 mm or 20 mm pull studs. "That's the level of simplicity and efficiency that modular workholding can bring," Nekich says.

Palletizing Fixture Plates

This push for simplicity and interchangeability represents a significant industry shift, he adds, especially as modular workholding moves into horizontal machining. Where machine shops have long relied on part-specific fixturing attached to a dedicated tombstone and plumbed with fixed hydraulic lines, many are now embracing a more flexible mindset.

"Recently, we've seen many of our horizontal customers purchasing tombstones with integrated RockLock systems, then building fixture plates they can pop on and off quickly," Nekich says.

Just imagine the difference, he adds. Instead of one tombstone dedicated to one specific job, you now have a modular tombstone that can support any number of setups. For instance, an operator can remove a fixture plate carrying a large workpiece, mount three vises in its place, and do so in under a minute.

"People are starting to see the value proposition in rethinking traditional workflows. They're realizing you don't have to settle for time-consuming setups anymore. And that's where I think the big breakthrough has really happened," Nekich says.

"Modular workholding has always had great synergy with 5-axis machining, but it wasn't until maybe five years ago that people started seeing the performance gains in 3- and 4-axis work—many have cut their changeover times by up to 90 percent," Nekich adds. "That's huge, and it explains why you're seeing us and our competitors putting real effort into that space. Whether it's our new LightVise or making the RockLock system more affordable, the goal is to deliver a solid return on investment, no matter the machine."

No More Manual Clamps

Part of this solid return depends on the growing use of pneumatic chucks. Like standard RockLock receivers, these act as the interface between the machine table and the vise or fixture plate. But as Nekich points out, pneumatic RockLock receivers have built-in ejectors that can be made to automatically release and lift the workholding device when the cycle ends. They also emit a burst of compressed air to remove chips and debris from the locating surfaces, a feature unique to 5th Axis.

"Those ejectors offer a number of advantages for both manufacturers and automation providers, and they've been incredibly popular so far," he says. "We have some really exciting developments coming this year, with several companies building fully productized systems around that chuck, integrating it with end effectors, grippers and more."

Learn more: *Tech Essentials: Lathe Chucks*

Automation All Around

Speaking of **automation**, Nekich has this to add: "Our automation hardware has really set us apart. In addition to the pneumatic chucks and our robotic grippers, our rack and shelf kits are a simple, economical way to create quick, functional storage so shops can run lights out with minimal investment."

Nekich says he also loves 5th Axis' transport cleat system. "It's versatile. You can attach them to anything we offer. But more importantly, customers who are already heavily invested in another workholding brand can use the cleats as a way to automate virtually any setup."

He notes that this has been the core message at 5th Axis since the owners shipped their first dovetail clamping fixture so many years ago: Automation should be accessible to everyone, no matter what you're producing. This approach has positioned the company to support a wide range of users, from third-party automation retrofitting specialists to OEM machine tool dealers to small and medium-sized manufacturers.

"The hardware is robust, simplified and flexible, allowing customers to either build their own automation systems or, in the case of dealers, develop productized solutions they can retrofit onto

existing machines or include in a turnkey capital equipment package,” Nekich says.

“That’s what’s been so powerful about our automation hardware—it’s enabling scalability and accessibility at multiple levels of the market,” he says. “I remember back in 2011 when I first got started in this market how modular, compact workholding was a very tough sell. We’ve come a long way since then.”

What workholding tools have made the biggest impact in your shop? Tell us in the comments below.

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