The Kurt PinLock™ Is Ideal For Building A Shop-Wide Modular Workholding System

WORKHOLDING TODAY

New and existing machining centers get a big boost in productivity when they are equipped with Kurt’s new PinLock™ locating and clamping system.
G & Z Industries Reduces Machining Center Cycle Time By Half, Setup Time From 7 Hours To Under An Hour Using Kurt’s New PinLock™ Locating And Clamping System

New and existing machining centers get a big boost in productivity when they are equipped with Kurt’s new PinLock locating and clamping system. (Photo One and Two)

G & Z Industries, a leading precision parts manufacturer for the aerospace industry, recently implemented the PinLock system in a newly acquired Mazak HCN 4000 horizontal machining center.

The first job processed using the system was a cylindrical shaped aerospace housing. Twelve of these components were setup and relief milled with ±0.002 accuracy on the machine’s two PinLock equipped pallets. Previously, only 2 parts were machined per setup. Machine cycle time was reduced by half over the previous method while setup time was reduced from 7 hours to under 1 hour. While significant, more importantly, the improvement laid the foundation for similar workholding improvements throughout the company’s machining operations.

“We wanted to develop a process that would maximize the output potential on that new machine,” reported Gene Kline, director of G & Z operations. “But we also wanted a process that would be easily adaptable to existing machining centers and new ones as they are added. Because we are a longtime user of Kurt workholding products, we brought in David Zaval, our Kurt manufacturers representative, to see what new modular
workholding ideas he had that could improve our productivity with the new Mazak."

"Initially, David helped us target a repeat job for improvement that is run throughout the year. Previously, it was run on a vertical machining center, two parts at a time, with 6 to 8 hours needed for setup plus quality control verification time."

The setup Mr. Zaval recommended on the Mazak HCN 4000 included a new 10” x 10” x 24” Kurt tombstone on each of the machine’s two pallets. The Kurt PinLock system was installed in both tombstones enabling the processing of 12 parts at a time (3 for each fixture plate). This reduced cycle time by half over the previous method. (Photo Three)

The new process improved quality, cycle time, and setup time while it reduced scrap. But the most important aspect of the new process, it paved the way for company-wide productivity improvements, a focus of the company since it began operations over 60 years ago.

**G & Z Began In 1958 Utilizing Innovative Precision Processes**

G & Z is more than a conventional CNC contract manufacturer. With over a half century providing precision parts to the aerospace, electronics, medical and other leading industries, the company has steadily implemented new processes not always available from other machining companies.

One of these is aluminum dip brazing for the aerospace and electronics industries. With the dip brazing process, the filler metal melts and flows into joint areas through a capillary action creating leak-proof joints. Brazed joints are unaltered by typical changes in temperature, minimizing distortion and resisting vibration and shock separation, unlike conventional welded joints. G & Z works with all grades of aluminum alloys using the dip brazing process. It is just one of several G & Z’s value-added processes and technology additions that the company continually adds as was the case with its new Kurt PinLock system.

**PinLock Allows For Creative Use Of Fixture Plates While Making Attaching And Removing Them Fast And Easy – PinLock Is Ideal For Building A Shop-Wide Modular Workholding System**

Kurt’s PinLock allows for creative design of the fixture plates. A window has been cut through the plate adjacent to the mounted PinLock to allow machining from the backside of the fixture plate without having to reposition and re-clamp the part. This saves even more setup time and speeds up the machining process. (Photo Four)

G & Z now has approximately 20 custom aluminum fixture plates dedicated to the system with more being generated as
Mr. Kline planned out the PinLock modular workholding system with help from Kurt over a 6-month period. The carefully designed system significantly increases the company’s productivity and competitiveness, Mr. Kline stated.

their use is expanded. Each of the plates has a machined PinLock mounting hole in the upper left and lower right corner giving it accurate and rigid alignment on the tombstone face. Pointing to the PinLock mounting hole, Mr. Kline said that each fixture plate is identified with a serial number, the company name and logo to show ownership and for coordinated use, particularly when plates are moved in the future to multiple machining centers. (Photo Five)

The PinLock system is ideal for setting up and interchanging multiple pallets for a series of machining centers. This was G & Z’s ultimate goal when it instituted the system, according to Mr. Kline. “We wanted to make the new Mazak maximally productive from the outset and become the foundation for a new modular workholding system that we could adapt to all of our machining centers. We liked PinLock’s helical extraction design over other locating systems. It’s fast and adds to setup accuracy by overcoming binding in side load conditions and enhances the setup for every application when changing parts.”

That’s because the PinLock system uses a pin assembly to engage and create a locking force with line contact, as opposed to other locking systems that use point contact. The PinLock system consists of high precision pins, bushings and liners that provide locating repeatability up to ±0.0005 inch. It’s the ideal system to use with Kurt tombstones, grid plates and vise adaptor plates for a shop-wide, modular workholding setup. That was the long-range goal for Mr. Kline in redesigning G & Z’s machining processes around the PinLock workholding system.

Quality Improvement And Scrap Reduction A Big Plus

While the overall setup time with the PinLock system after the initial setup was just 12 percent of the first setup process, quality control requirements were also much less. First part quality with each initial setup in the PinLock system was consistently within tolerance requirements so no re-work, adjustments of the workholding or extra inspections were needed.

“We were really impressed with the first part precision coming out of the PinLock setup,” reported Mr. Kline. “All of the parts are machined from 6061 aluminum in various size configurations and all are for demanding aerospace applications. Milling of these parts are at top machine speeds up to 18,000 rpm. Some of the required tolerances are as tight as 0.0002”, and we get that easily because the setups with PinLock are very rigid. That ensures first part accuracy and repeatability. With acceptable work on each of the first parts run and everything after that, we’ve seen our scrap rates go down dramatically.”

G & Z’s first PinLock system is dedicated to the new Mazak HCN 4000. With the company operating 2 eight-hour shifts, the system is in constant use.

G & Z’s Future Plans With The PinLock System

“Dave Zaval has been a great source of support to insure we get the latest workholding information we need and the products that make sense for our applications, reported Mr. Kline. “Once our machine operators saw the repeatability and the ease with which the PinLock system has achieved, they began looking at other ways we can use it throughout our machining operations. We’ve already planned on implementing the system into our 5-axis machine and will follow that with several existing horizontal machining centers. Any new multi-pallet machines that we add in the future will definitely include a PinLock system because it makes our setups so much faster while it improves part repeatability.”