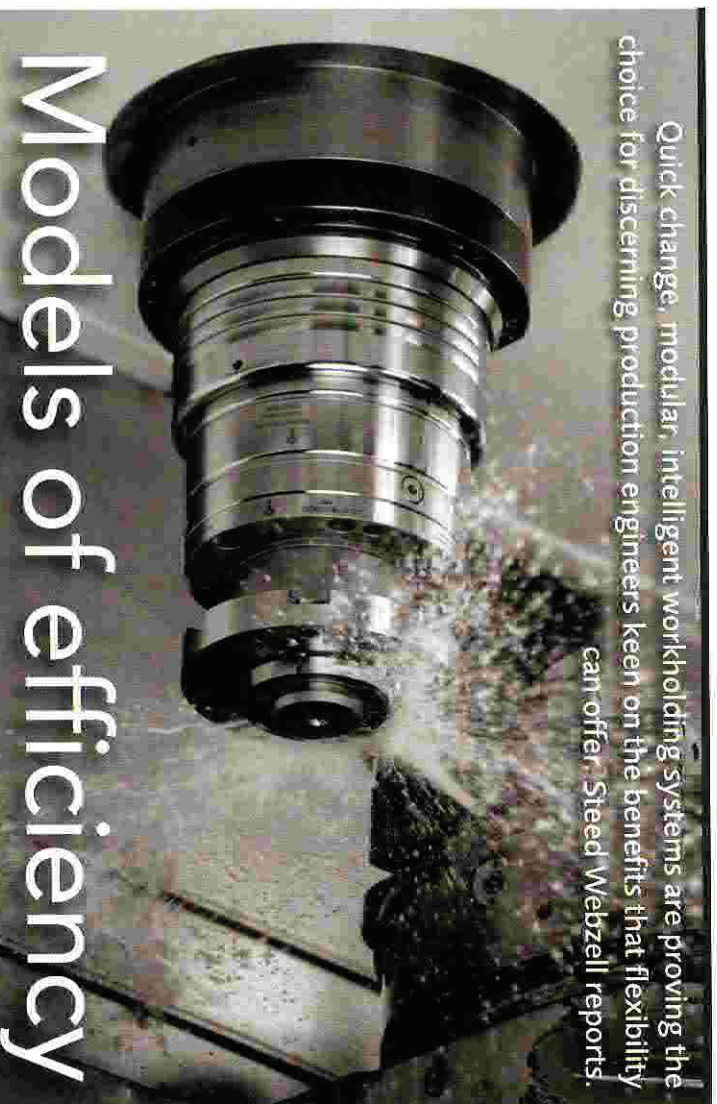


Quick change, modular, intelligent workholding systems are proving the choice for discerning production engineers keen on the benefits that flexibility can offer. Steed Webzell reports.



Models of efficiency

EVERYONE hates downtime. Breakdowns are unplanned, maintenance can be scheduled for quiet periods. But machine set-up time irks, largely because with astute investment and clever application, component changeover time and cost can be attacked, and suppliers of workholding equipment are keen to promote this idea. Gone are the days of setting up a vice using a clock gauge or having to manually centre a set of jaws; modern workholding systems embrace speed and ease of use without sacrificing accuracy.

Take the VB Dock Lock quick-change, zero point workholding/palletising system from Micron Workholding. The claim is for set-up and changeover within 2 minutes - compared to a conventional vice (20 minutes) or fixture (40 minutes). Machines or tables are fitted with the VB Dock Lock base unit, with fixtures mounted with plugs to allow easy engagement and immediate machining. The patented collet-locking system is based upon a series of innovative cylinders that allow any configuration of base plate/set-up stations.

System advantages include set-up changes parallel to machining; the potential to interrupt work at any time without losing 'zero point'; zero point repeat accuracy of less than 5microns; and 5-face processing without unclamping. Available in various sizes to suit different applications, VB Dock Lock variants offer pull-in force per unit up to 30kN and up to 90kN retention force per unit.

Erowa's new self-centring vice from RLM Systems aims to simplify life for machine operators/setters, particularly when milling with high feed rates. In tandem with an integrated pallet, the system can be set up during machining ops, ready for exchange once the machine stops. Rapid change jaws are available to suit every kind of use, and special features ensure ongoing milling ops no matter how many chips accumulate from high feed machining. The unit offers 16kN of clamping power at 60Nm torque on the spindle, while maintaining repeatability of ± 0.01 mm.

Another innovation is the three-in-one jaw system from Kurt Workholding, said to raise the versatility of the company's standard 15cm vices, making it suitable for small

batches and prototype work. Using the simple, bolt-on system, parts can be clamped precisely at 5°, 10°, 15°, 20°, 25°, 30° or 45°. It features a series of pre-set patterns with aligning pins. The jaws hold parts precisely, as with conventional jaw plates, and enable aggressive machining while clamping at different angles. The system also doubles up as a work-stop, with the additional benefit of acting as a parallel. According to Kurt, the jaw system is 'a better and more cost effective option than building a special fixture'.

One UK OEM to replace traditional knee-mill type vices with modern workholding technology is Kocurek Excavators. Customised excavators cost several hundred thousand pounds and civil engineering projects invariably run against short deadlines, so there's pressure to maximise equipment utilisation on site. Machine shop supervisor Ben Woollard says this typically entails machining prismatic parts from 30 to 350mm diameter. 'The ability to maintain consistent manufacturing quality and throughput has to be based on good workholding,' he says. 'Traditional knee mill vices to locate components proved to be less than ideal; to generate the necessary grip to hold parts securely, operators would regularly use a hammer to tighten the vices' crank handles. This not only tended to deflect the units' fixed jaws, leading to machining accuracy and repeatability issues, but the lead-screw would also become stretched, making the units increasingly difficult to use. Even so, components could still occasionally work loose under heavy cuts.

'Our first impressions of the new Chick One-Lok system from 1st MTA were very good. The unit's modular design incorporates a precision ground solid base, which not only enhances its rigidity, but also eliminates swarf traps, reducing the need for cleaning between machine cycles.' One-Lok's rugged construction enables over 4.5 tonnes of gripping force to be generated using only hand pressure on the operating handle. The need to wind a traditional vice handle up to 70 revolutions to fully close its jaws is eliminated by a 'Qwikslide' mechanism which allows the moveable jaw to be easily unlocked and slid forward or backwards to the desired position throughout the

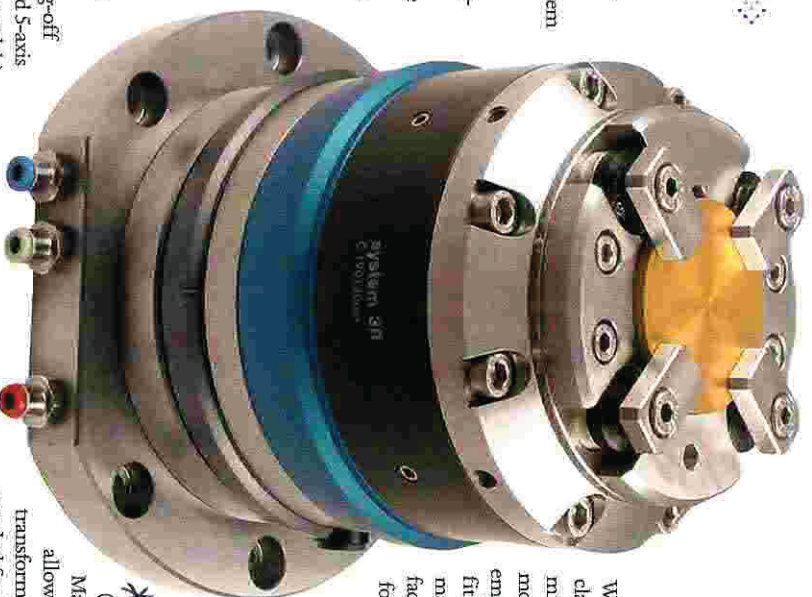
equipment's 430mm grip range, ready for final component clamping. Likewise, the system's 'Boltfast' interchangeable jaw system enables hard or soft jaws to be replaced in under 60 seconds, with a positional repeatability of 0.02mm. 'Since using One-Lok, we've never had a component work loose,' says Woolard. 'This has given us the confidence to push up cutting speeds and feeds on several jobs, and trim cycle times.'

Subcontractors such as Smithstown Light Engineering of Shannon are also benefiting from new workholding technology. 'The need to drive down material costs and eliminate distortion when machining off waste, prompted investment in 5-axis workholding vices from Roemheld. Materials machined include copper tungsten. To both improve material costs by reducing wastage and eliminate distortion during the machining-off process, the company invested in Roemheld 5-axis vices (Hilina MC100Z, MCC60Z and SCS80 models), which offer the ability to grip on just 3mm.

Brian King, managing director and one of the founders of Smithstown, says, 'Before, when we held a big block we would have to machine off 15-20mm and this would cause distortion. Using the Roemheld vices we only need to take off 2mm-3mm so the distortion problems have gone. We have also made significant savings on raw material costs, particularly when machining heat treated materials.'

If 5-axis components cause headaches for production engineers, so do miniature parts. For this reason, System 3R is now offering a solution with its new Twist Lock direct clamping chuck. Developed in conjunction with the Swiss watchmaking industry, it is based on the successful GRS 120 chuck with its repeatable accuracy of 2micron. For precision milling operations especially, automated loading of round and square metal blanks can be quickly and accurately achieved. Pneumatically operated, at the touch of a button the four clamps rise and twist, releasing the workpiece by an ejector function. A new workpiece is then positioned by a robot gripper and the clamps re-engage. No clamps need to be unscrewed, so what could have taken up to 40 seconds now only takes around 4 seconds, says System 3R.

In an era where small batches and high numbers of set-ups dominate UK manufacturing, every second counts.



WNT's ZSG 2 range of multi-function vices can clamp a range of component shapes with minimum changeover time thanks to the modular design and variety of clamping methods employed. For example, the ZSG 2's carrier jaws are fitted with revolving jaw inserts. Users can machine different profiles on each of the four jaw faces, then quickly rotate the jaw, ready to clamp for the next operation. The ZSG 2 can be fitted with a universal adaptor plate. These plates

have ten M12 holes on their surface that allow a range of clamping elements to be located - gripping the most awkward of shapes is simple. Also, the ZSG 2 can be changed from a fixed jaw vice to a centric vice, so either prismatic or round parts can be clamped accurately and quickly.

✱ For turning operations, Hainbuch (available from Leader Chuck) has released its Mando Adapt and Jaw Adapt system, which allows companies to quickly and effectively

transform a standard Hainbuch collet chuck into a mandrel for internal workpiece fixturing or into a large capacity jaw chuck. Compared with conventional separate chuck set-ups for multi-turning tasks, these provide users with a three-in-one lathe workholding system to cover all chucking eventualities at a relatively low cost, as well as vastly reduced changeover times. Designed exclusively for use with the Hainbuch collet chuck, the system is guaranteed within 5micron TIR.

✱ Finally, for vertical lathes, engineers should check out the InoZet clamping system from HWR Spanntechnik (available from Thame Workholding), designed primarily for machining large ring-type workpieces. By converting a standard 3-jaw chuck to a 6-jaw chuck the clamping forces are distributed more evenly around the workpiece. This contributes to reduced distortion of the workpiece and to a significant improvement in machined roundness - for example, out of roundness on a 610mm turned diameter is reduced from 0.2mm to 0.03mm.



Hilina vices address the need to drive down material costs and eliminate distortion when machining off waste.

✱ Chick One-Lok system's modular design incorporates a precision ground solid base.

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