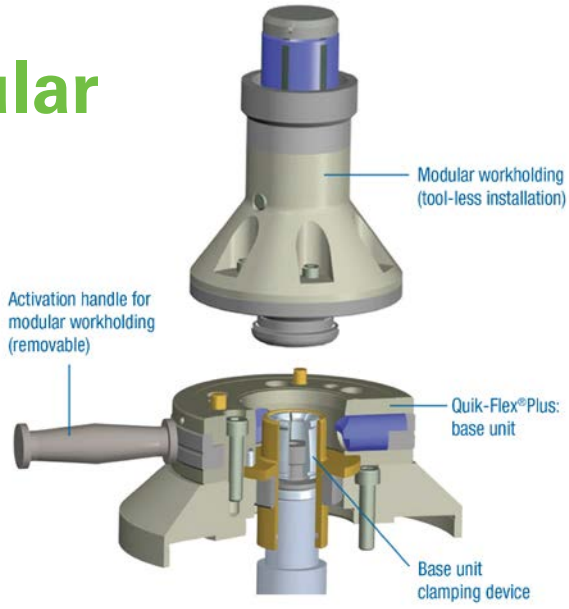
Less Manual, More Modular Workholding for Gears

BY TIM ZENOSKI, DIRECTOR, PRODUCT MANAGEMENT WORKHOLDING, THE GLEASON WORKS



A new generation of modular, quick-change workholding systems requiring fewer tools, less time and minimal operator experience for workpiece changeover has arrived.

In recent years, gear manufacturers have made enormous strides in reducing cycle times with highly productive new machine and cutting tool technologies. At Gleason, taking cost out of every gear production process doesn't end there. We've long believed that workholding is as important as any other manufacturing component. This has never been more true than in today's just-in-time manufacturing environments. In the past, a volume manufacturer might have purchased a machine dedicated to producing just a single part number throughout the life of the machine. Part changeover requirements were infrequent, if not altogether non-existent. But today, many manufacturers are meeting fast-changing customer demand and marketplace conditions with production of much smaller batch sizes — requiring more frequent part changeover. Setting up a machine to run a new part number quickly, easily and with greater repeatability isn't a once- or twice-a-year thing — it's likely happening several times a day.


The operator installs a new Quick-Flex Plus module onto the common workholding interface.

Time is money, and even seconds count. Preparing a traditional workholding assembly for the production of a new part can typically take anywhere from 20 to 30 minutes and require a high level of operator expertise. First, the machine operator must remove the existing tooling from the work spindle — piece by piece, bolt by bolt, all the while leaning awkwardly into the work envelope and making sure not to drop slippery wrenches and fasteners. Then, with installation of the new assembly, the process gets even slower, more tedious and more operator-intensive.

All the components of the new assembly must of course be perfectly clean and properly lubricated. Even minimal dirt or residual swarf can ultimately cause unacceptable runout in the arbor. And improper lubrication can lead to fretting corrosion, and the potential for parts to seize up and/or fail catastrophically.

Most importantly, the operator must be well-versed in the steps needed to ensure that standard workholding accuracies and repeatability are met — typically ±0.005 mm (0.0002") total indicator reading. Arbor body, collet, expander, backing ring — all must be checked and 'trued' as they're assembled, using indicator gauges. Precise torque specifications must also be observed when tightening arbor body bolts and other fasteners. Repeat this process two or three times over the course of the average workday, and the manufacturer can lose an hour or two of precious spindle time, and hundreds, perhaps thousands of dollars in lost productivity each and every week.

Making the change from manual to modular. For those manufacturers unwilling to accept the status quo, there's a completely new technology available that takes most of the time, operator experience, and accuracy variables out of the changeover process. Gleason's modular workholding systems greatly reduce system complexity and, concurrently, most of the time and operator experience required for assembling traditional workholding systems. The best recent example is the new Quik-Flex Plus system for machines producing cylindrical gears that range in size from very small, fine pitch gears to those with diameters as large as 600 mm. Quik-Flex Plus is an improved version of the Gleason Quik-Flex system now in use globally on hundreds of Gleason and non-Gleason machines. With Quik-Flex Plus, even the novice machine operator can change over the workholding for one part type to another in under a minute. Here's how it works:

One of three standard base units (small, medium or large) is mounted to the machine's work spindle during a one-time installation. It's easily 'trued' to zero axial and radial runout and permanently locked in place with torque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mounting bolts, essentially making it part of the spindle. Note that the new base unit has been designed both for compactness and to exceed the stiffness requirements for operations that exert significant machining forces, such as deburring and chamfering. (This is in recognition of the increasingly common practice of integrating these processes into a single machine performing multiple operations.) While the base units are designed for Gleason machine spindle specifications, intermediate plates are available that can match the different bolt patterns found on non-Gleason work spindles. This, along with potentially some minor modifications to accommodate different draw rod heights and/or stroke lengths, enable Quik-Flex Plus to be applied to a very wide range of cylindrical gear production machines.

The operator next installs the only other component required — an expanding collet (typically for gear bore applications) or a contracting collet (for pinion shaft applications), which is a part-specific module. The operator simply lowers it onto the base unit, fitting the module's retention knob over the base unit's gripper fingers and rotating the module just enough so that three internal clamp lugs in the base unit are aligned. Finally, the installation is completed by turning the removable activation handle clockwise, which causes internal clamp lugs in the base to engage with the module's retention knob, pulling the module down and precisely centering it with the taper built into the tooling. The gripper fingers pull down to securely lock the module in place, and the handle (spring-activated to prevent the handle from being inadvertently left in the machine) is removed. A gear or pinion blank (or line gage) is hand loaded, and then chucked/de-chucked to fully seat the module. The entire process can take as little as 30 seconds.

Because of the popularity and widespread use of Quik-Flex Plus' predecessor — Quik-Flex — provisions have been made as well to make it simple and economical for current Quik-Flex users to continue to use their existing modules. A simple adapter base, available in three sizes, can be retrofitted to an existing module, thus enabling the module to fit onto a new Quik-Flex Plus base.

Quick-Flex is a registered trademark of the Gleason Works.

For more information:

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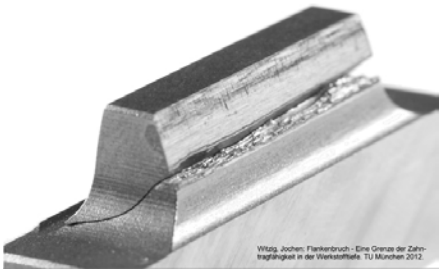
KISSsoft

ADDS FLANK FRACTURE CALCULATION TO LATEST RELEASE

The flank fracture calculation according to ISO/DTR 19042 was recently added to the latest KISSsoft release 03/2015 (module ZZ4). This type of damage manifests itself as crack formation at greater material depths. It can occur on both cylindrical gears and bevel gears. In the majority of cases, flank fracture causes the gear unit to fail completely.

The ISO Committee is currently working on the ISO/DTR 19042 calculation standard for cylindrical gears. This standard includes a method for performing the calculation with simplified load assumptions (Method B) and a local process, which makes it possible to analyze the risk of damage across the entire meshing (Method A). In the new



KISSsoft Release 03/2015, both methods are available to users.

For more information:
KISSsoft AG
Phone: +41 55 254 20 50
www.KISSsoft.AG

Santasalo

LAUNCHES QUATRO+ PLANETARY GEARS

Santasalo recently introduced its new series of planetary gear units to the global industrial market. The new Quatro+ range offers higher torques without the requirement to increase the gear unit size or weight. In addition, an extended bearing life up to 200% higher than the original Quatro series, ensures enhanced availability of the gears and reduced operating costs.

The Quatro+ series offers nominal output torque up to 1,427 kNm, up to 30% increase on the torque of the original Quatro series but with no change to the size and weight of the gear unit. Its design can be highly customized to meet the requirements of applications in many industries.

Santasalo showcased the Quatro+, for the first time, at the 2015 Hannover Fair in Germany in April. Experts on the Santasalo planetary product range were there to represent the product launch and provide experience and knowledge on both the Quatro+ and all other planetary gears offered by the business.

"Upgrading the power rating of Santasalo's original Quatro series has

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allowed us to provide our customers with a new range of drives that fulfill the most demanding high torque application needs," said Pasi Jokela, senior vice president of Santasalo Capital Sales. "With the Quatro + series, we can deliver very cost competitive drive solutions for, not only new machines, but as a replacement of existing Santasalo Quatro drives and competitor gear units. We are excited to launch this advanced technology to the global market for heavy duty planetary gear units."

For more information:
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Kwik Mark

RELEASES PORTABLE HANDHELD DOT PEEN MARKING SYSTEM

The Micro Mark portable dot peen marker from Kwik Mark Inc. features a compact (3" × 5" × 6") head size, and a 1.0" × 2.5" marking field to suit most industrial marking applications.

Additional I/O streamlines "hand-shaking" with other machinery when required, and allows importing data from external files. The Micro Mark features automatic line centering to your part whether it is single or multiple lines, graphics or both with no measuring or operator input required. It is designed for marking around parts such as shafts and pipes.

For more information:
Kwik Mark Marking Systems Inc.
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Heidenhain

INTRODUCES LATEST SOLUTION FOR HEAVY MACHINING

With the advent of Heidenhain's "Dynamic Efficiency" control features, heavy machining solutions that provide new comprehensive process management tools are now readily available through their use in Heihenhain's TNC 640 and iTNC 530 controls.

More specifically, with the concept of Dynamic Efficiency, Heidenhain offers TNC functions that improve efficiency in heavy machining by providing solutions that remove as much material in the shortest amount of time. The goal is to optimize metal removal rates, maximize tool service life and minimize the machine load.

To do this, Dynamic Efficiency comprises these three TNC control functions:

ACC (Active Chatter Control) — this option reduces chatter tendencies and permits greater infeeds; AFC (Adaptive Feed Control) — this option controls the feed rate depending on the machining situation; Trochoidal milling — cycle for the roughing of slots and pockets in a way that eases the load on the tool and the machine.

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Stotz

REPORTS NEW TECHNOLOGIES NOW AVAILABLE TO CONSERVE 40% OR MORE IN DIRECT COSTS

Air gages are typically not in use approximately 90% or more of the time they're in a shop or QC department. Because these gages function through the utilization of clean and dry compressed air in a high controlled flow, this relatively expensive commodity can cost operations unnecessarily when not in use.

It would be impractical and inefficient to turn off the unit when not in use, as doing so would require an extended period of time to restart, balance and stabilize the measurement to achieve the desired accuracies. Since air gaging, by definition, requires the precise measurement of the air flow across the surface of the part being evaluated, this stabilization in the air flow is critical to running an efficient department and maintaining the proper protocol in measuring procedures.

Technology from is now available and allows users to connect the air column to a digital I/O regulator switch in order to turn down the air flow when the unit is not in use. The air flow can be restricted by as much as 90%, but still flows at a consistent and measured level. By doing so, you can guarantee that the measurements taken when the air returns to full flow will be accurate and repeatable. Meanwhile, the energy savings are substantial.

Such technology, to be optimally beneficial to a shop, must have the proper interface between the column and the power supply to function effectively. In one configuration, a proximity switch is positioned in the gage holder and the air flow can be triggered when the gage is removed from the holder.

Another means of arranging this type of controlled but not entirely restricted air flow is to use a pushbutton actuator on the face of the column control panel, or a foot pedal actuation could be possible.

While it is difficult to calculate the exact cost savings to a shop, owing to the various factors of on-time utilization and local energy costs, the fact remains that, in most shops, air is blowing as much as 95% of the time without being used for gaging. If your compressors don't need to run, in order to produce this unused air flow, the savings can be quite substantial. On average, a 40% or better savings in direct energy costs per compressor would not be unreasonable to expect.

For more information:
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