Cutting-Edge Grinders are Great—

BUT HOW'S YOUR WORKHOLDING?

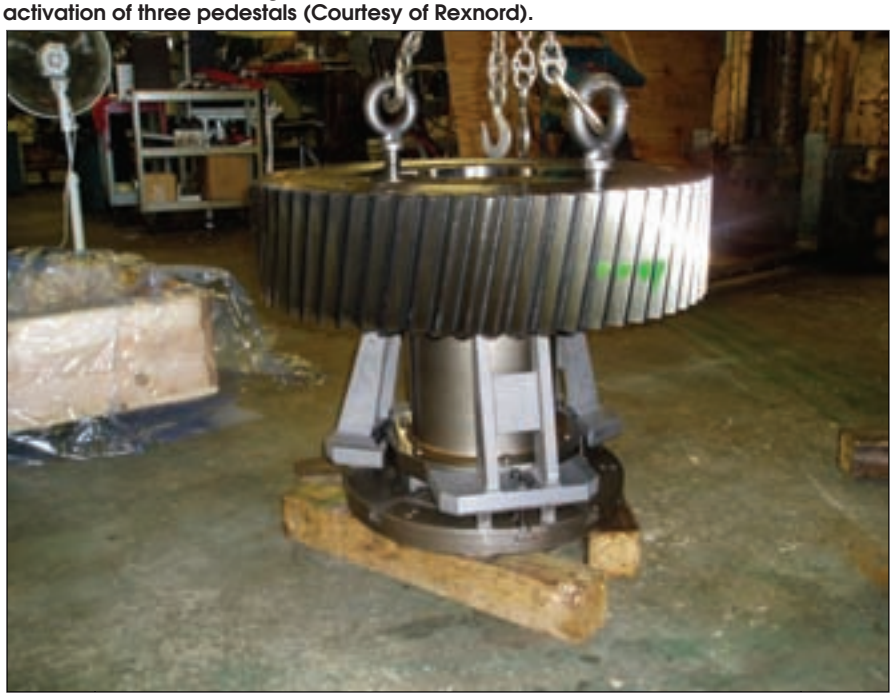
Jack McGuinn, Senior Editor

Ok—you make big gears and you've gone out and purchased, say, a spiffy Höfler Rapid 900 or 1500, or maybe a Gleason 1600. Nice move. But some owners of such machines are finding them to be almost too much of a good thing. The problem, they say, is that while their new machine is state-of-the-art, they are finding that their workholding tooling is so last-century, particularly for large-gear production. It is somewhat like buying a complex machine and not having anyone on the floor capable of running it. Capacity is key today, and the best way to ensure that you are squeezing every dime out of that new machine is to complement it with innovative workholding.

And that is exactly what Milwaukee-based Rexnord did.

"The big thing was that we purchased a Höfler rapid 900 and we realized we bought the latest and greatest technology to grind the part, yet we were putting 1920-vintage tooling on here," says Marty Kuklinski, senior manufacturing engineer, Rexnord geared products division. "What we did in the past when we'd finish grinding the gear teeth geometry, we sat them on a thrust plate or thrust ring. We would have hundreds of these different plates because the OD of the plates would have to be less than the root diameter of the part that we're finishing.

"We approached Drewco and said 'Setup is killing us, because every time we go from one part to another we have to take this plate off, put another plate on; we've got to bolt the plates in place, which is standard throughout the



Top: Drewco's workholding system in action. Bottom: The part is held in place by the activation of three pedestals (Courtesy of Rexnord).

industry."

Drewco, of Franksville, WI, had the answer.

"They asked us if we had an idea for shortening their setup time, so they gave us a family of 30 different gears—bore ranges of 3 to 12 inches—and we came up with a center pedestal setup. Because of the large range we came up with three different series of mandrills or extending collets," says Jeff Moczynski, Drewco engineer/engineering manager. "They initially wanted a big ring that the gear would rest on way out towards the root diameter of the gear. Some of these gears were six feet across and larger—for all these gears you'd have to have a bicycle rack for storing all those plates. I suggested that we use these pedestals that would be precision-ground and move them in and out on the keyways of the table. They weren't real comfortable with it at first, and the other thing they were concerned about was that with the weight of these gears, would our collet be able to center the gear to overcome the weight of it—one gear was 1,700 lbs. But manually, with just a wrench and a flange nut, we were able to turn the gears within a half-thousandth every time."

Moczynski goes on to explain that "The activation of the collet was done by means of a custom-built hydraulic nut. This was done for two reasons—one, it provided direct axial force to expand the collet as opposed to the rotating/axial force a standard nut would provide; two, due to the depth or hub width on some of the larger gears, the activating nut was deep inside the bore, thus not allowing the use of a standard wrench. Operators activate the nut by use of a T-handle allen wrench—no big wrenches or extensions required."

Rexnord was thrilled with the results—and the system's simplicity.

"These uprights (pedestals) are in key slots, and what they did was make little spacer blocks for us that located off of a central pilot," says Kuklinski. "And we just put these blocks in and slide these three uprights in place, and that positions the part like the thrust plate would under the root diameter. So now we're not changing any of these plates. We have these uprights on a fixture and, based on the root diameter, they gave us gage blocks and we just set them in, and we bump up those three uprights, bolt them down and we're ready to go.

"So, we've cut our setup time by 50 percent, if not more."

Drewco has been equally effective with other gear makers as well, Milwaukee Gear among them.

"We were using a lot of traditional manual tooling—solid bushings, clamp plates—and now we use a set of six pedestals with the expanding mandrill from Drewco," says Mike Pascavis, gear supervisor. "You put the part on, clamp it up, and it holds the part very well. It works very well on our Höfler Rapid 1500 and Gleason 1600. If you make a significant investment in a gear grinding machine or hobber, why limit yourself with your table tooling? You can cut down your cycle and setup time by investing in efficient tooling. Our old way was labor-intensive; now we'll do a 50-piece run and guys are taking only 10 to 15 minutes for setup. The savings start adding up."

Drewco's Moczynski explains that both customers were given a setup sheet for each part, so they knew what mandrill was needed with which collet. He also points out a residual benefit in that the work area is much less cluttered, especially in the number of storage racks. And speaking of capacity, the new workholding system is keeping the pedal to the metal on those new machines.

"These new grinders and hobbers—they have much higher capacity. So with our short setup times, in conjunction with better grinding equipment—they (Rexnord) gave us a whole raft of parts and they ran this machine 'out of business,' " says Moczynski. "They actually started using the older hobs and grinders, and we put them out of business as well."

Rexnord's Kuklinski certainly concurs.

"It gives us a lot more flexibility to go from Part A to Part Z because with the old system we had we would load the work up so we're not changing all those thrust plates—we'd try to almost batch the work through," he says. "Now you can run one part at a time regardless of what the next part is. The setup time is so short that we can jump from one size to another and—presto—the setup is changed and we're ready to go."

Prior to taking shipment of the Höfler, Kuklinski explains, the machine builder provided cycle times based on some test parts that Rexnord sent them. And then a light bulb went off.

"Based on (the test cycle times) and based on the machine that we were taking work off of, we saw a percentage increase (in productivity). But then we started looking a bit further when the machine was in transit and we said 'We're going to make it up in the grinding time, but we're still going to lose out in setup.' So we figured at that time that we better take a hard look at our tooling and say—'Wait a minute, we need to take another step here and move into the 21st century.'"

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Modultherm EXPANDS CAPACITY

ALD and ALD-Holcroft Vacuum Technologies introduced a larger size of the ModulTherm vacuum heat treating system. The ModulTherm can now process load sizes of 36" x 36" x 72" with weights up to 7,000 lbs. Previously, the ModulTherm could only accommodate load sizes of 24" x 30" x 40" and 2,200 lbs.

"We've found justification for this size system based heavily in the wind power generation, bearing and construction equipment markets," says Klaus Loeser, vice president of new technologies at ALD-Holcroft Vacuum Technologies. "Too many opportunities have had to settle for atmosphere processing but could truly benefit from the attributes of vacuum. Now that possibility is realized."

The larger version system is available with high-pressure gas quenching, oil quenching, intensive quenching and interfaces to press quenching.

"Our ModulTherm concept has now taken another 'growth step' in maturing as the industry standard for high production vacuum thermal processing. Now more than ever, the versatile nature of the ModulTherm is needed," says Bill Gornicki, vice president of sales and marketing for ALD-Holcroft. "As load sizes and part sizes increase, choices in quenching become an absolute necessity. In conjunction with last year's introduction of five separate quenching options, the ModulTherm is uniquely positioned as the standard for automated large load processing. High volume production of large components can now benefit from the significant value of low pressure carburizing."

For more information:

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Coating Technology

EXTENDS TOOL LIFE WITHOUT OIL

Mitsubishi Heavy Industries, Ltd. has developed a thin-film coating for applying to precision cutting tool surfaces to extend tool life at more than 200 meters per minute without using cutting oil. MHI is featuring the coating on the Super Dry III hob, which was released at the Japan International Machine Tool Fair.

The Super Dry III hob plays off the success of the Super Dry II hob, but it offers an 80–100 percent longer tool life. In order to prolong tool life in high-speed dry cutting applications, MHI focused on improving the anti-oxidation and wear resistance capabilities of the coating at high temperatures. The Super Dry III's oxidation temperature is 1,300 degrees Celsius, which is 100 degrees higher than the Super Dry II. During testing, the Super Dry III demonstrated 40 percent less tool flank wear and 80 percent longer tool life at 250 m/min and double the tool life at 300 m/min.

For more information:
Mitsubishi Heavy Industries America
46992 Liberty Drive
Wixom, MI 48393
Phone: (248) 669-6136
www.mitsubishigearcenter.com

Low-Foaming Cutting Fluid

RESISTS BACTERIAL, FUNGAL GROWTH

The KoolRite 2365 semi-synthetic cutting fluid from JTM Products, Inc. was designed for high-pressure applications that typically have foam control problems. The coolant is made

with mineral oil and extreme pressure additives for use on cast iron, all steels and non-ferrous metals except magnesium.

Performance on aluminum materials has exhibited the most significant performance improvements, and the coolant performs without staining non-ferrous metals while protecting ferrous metals from corrosion. It does not remove paint or damage machines or seals. Using the JTM BioArmor technology, the Koolrite 2365 resists bacterial and fungal growth resulting in long sump life and avoiding unpleasant aromas that often result from such fluids.

For more information:

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Electrically-Heated Quench Tank

CURES PRODUCTS POST HEAT-TREAT

The Number 974 insulated quench tank from the Grieve Corporation is electrically-heated to 200 degrees for heating mineral oil to cure metal products after heat treating. The dimensions of the tank are 22" x 22" x 26" with one-inch insulated walls and an insulated, removable cover that hangs off the front of the tank. The unit is heated by 6.4 kw Incoloy-sheathed tubular immersion heaters, and a 1/3 hp motorized agitator is responsible for fluid motion in the tank.

The Number 974 has digital temperature controllers, manual reset excess

continued

temperature controllers with separate contactors and a fused disconnect switch. The tank has a type 316 stainless steel interior and exterior with a brushed finish. The Grieve quench tank includes a stainless steel workload basket with a removable handle that sits on top of the unit during quenching, and a basket support holds the basket above the quench oil for quick draining.

For more information:
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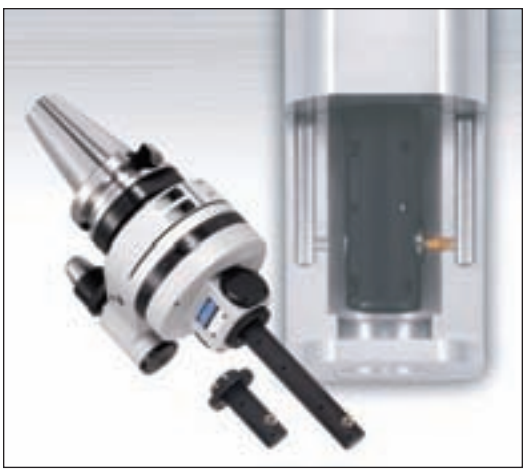
Slender Drive Angle Head

MACHINES BORES MORE FLEXIBLY



BIG Kaiser's Slender Drive Angle Head features a reduced body that is capable of 90-degree cutting operations inside small bores. The latest product in BIG Kaiser's Profit Maker series is offered in CAT40/50 and BT40/50 tapers standard with a dual contact interface. The angle heads change cutter angles without altering the workpiece position.

There are three small diameter and three large diameter output attachments, six total, of varying lengths. The smaller diameter outputs access bores starting at 1.181" in diameter and the larger outputs handle bores up to 1.575". Each output comes with an attachment capable of cutting a tool centerline up to 4.921".

The Slender Drive's maximum speed is 2,000 rpm, and it is designed for drilling and light milling operations.

For more information:
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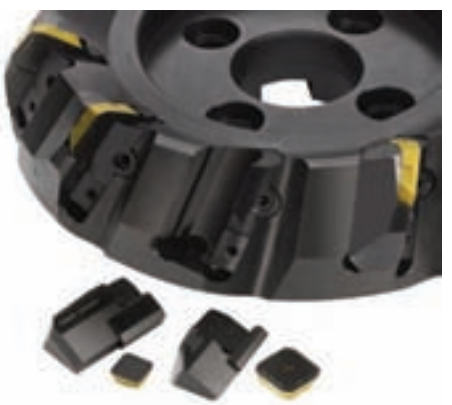
Face Mill

WITHSTANDS HEAVY-DUTY OPERATIONS



The CoroMill 360 from Sandvik Coromant is a 60-degree face mill constructed with through-hardened steel for strength in demanding applications. The cutter inserts are wedge clamped with a quick release for cutting to depths of .709" or 18 mm with high feed per tooth. They are housed in an exchangeable cassette system with precise location to ensure cutter accuracy. The inserts have four edges with wide parallel land and strong edge geometry for high surface finish quality, giving a light-cutting performance.

The CoroMill 360 inserts are available in 19 mm and 28 mm, and both sizes use the same cutter body to minimize tool inventory. They can be easily removed by turning a wedge screw. They come in diameters from 160–500 mm in close and extra close pitch design as well as Arbor and CIS Arbor shank styles.

For more information:
Sandvik Coromant Company
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www.coromant.sandvik.com/us

End-of-Line Crankshaft Gage

INSPECTS ALL CRITICAL TOLERANCES

Adcole Corporation introduced the Model 1300 high-speed crankshaft gage, which allows the horizontal axis to help automatic loading with cycle times under a minute and sub-micron accuracy for three-micron roundness tolerances. The gage provides QS 9000 and Q1 quality verifications and allows statistical production control of journal grinders for diameter, roundness, third harmonic analysis, cylindricity, straightness, stroke and index. The gage provides 100 percent inspection of critical tolerances.

The model 1300 high-speed crankshaft gage is designed to operate two to three shifts a day; it has a granite surface and uses touch-screen control technology and optical linear scales.

For more information:
Adcole Corporation
669 Forest St.
Marlborough, MA 01752-3067
Phone: (508) 485-9100
Fax: (508) 481-6142
www.adcole.com

Cutter Inserts

GENERATE LOW PRESSURE, STRESS

The X700 milling cutter inserts from ATI Stellram are coated with TiAlN by PVD for use in milling stainless steel and titanium alloys while operating at low pressure and stress during machining. As the latest addition to the X-Grade Technology series of inserts, the X700 is suited for high cutting speed and low cutting feed.

The inserts resist thermal cracking and propagation, and they allow metal removal rates three times higher and longer tool life than traditional cutting

tools. The X700 Grade inserts are available in square, round and octagonal styles.

For more information:
ATI Stellram Engineered Products
1 Teledyne Place
Lavergne, TX 37086
Phone: (800) 232-1200
Fax: (800) 223-2219

Mobile Chip Conveyor

ELIMINATES SMALL CHIP CAN USE

Hennig, Inc.'s mobile chip conveyor enables shops with auger chip processing machine tools to use large chip bins or 55 gallon drums instead of small chip cans. The unit helps with higher production auger fed chip loads because it can be rolled around the shop. A variable speed drive provides added efficiency to the standard 110 volt current used. The receiving chip chute can be adjusted and positioned for front, side or rear discharge.

For more information:
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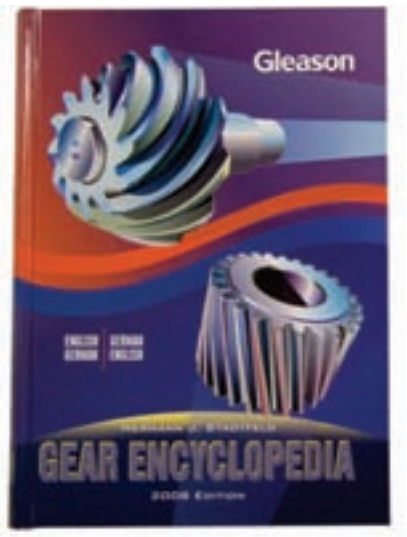
Gleason Publishes

BILINGUAL GEAR ENCYCLOPEDIA

The 462-page *Gleason Gear Encyclopedia* is a comprehensive resource of technical terms applied to the gear engineering and manufacturing industry. Published by Gleason Corporation and written by Dr. Hermann J. Stadtfeld, vice president of research and development, the book is divided in two major sections, English/German and German/English.



Stadtfeld spent five years researching this project with the collaboration of four colleagues.

The encyclopedia includes proper technological terms, formulas, definitions and appropriate translation in both languages. Terms are complemented by corresponding color illustrations, diagrams, formulas and photographs. Two smaller volumes are also available that include conversion tables and factors and a Gleason technical poster gallery.

"The (*Gleason*) *Gear Encyclopedia* is a logical progression of one of my earlier works, the *Gleason Gear Dictionary*," Stadtfeld says. "This time, I wanted to provide the industry with a much more comprehensive and easy-to-use reference book that will be beneficial not only to gear engineers, but to the gear industry as a whole."

Stadtfeld has authored several other gear industry publications, including *Handbook of Bevel Gears* (1993), *Bevel Gear Technology* (1994), the *Gleason Gear Dictionary* (1994) and *Advanced Bevel Gear Technology* (2000).

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