Exhibitors Confidential

Gear Expo Product Preview 2013

Matthew Jaster, Senior Editor

Manufacturing ingenuity will be on-hand in Indianapolis as exhibitors focus on the latest technologies that are changing gear manufacturing. Every two years the gear industry comes together to network with peers, talk shop and learn the latest advancements in gears and gear-related products. Here's a rundown of some of the booths attendees should stop by while roaming the Gear Expo hall (*Ed's Note: For heat treating exhibitors, see additional ASM Heat Treat 2013 coverage on page 70*).

Gleason Corporation

Booth #423

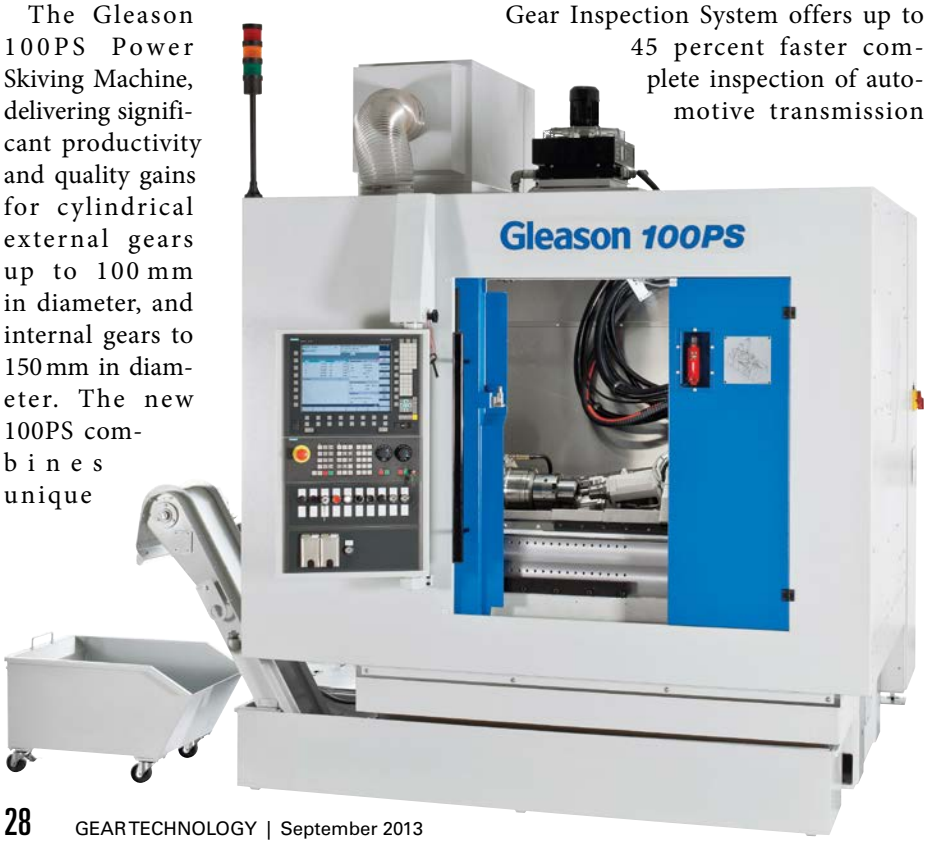
Gleason will introduce a host of advanced new machines, tooling, and global customer support services at Gear Expo 2013, covering a wide array of processes for the complete production and inspection of all types of bevel and cylindrical gears. On display for the first time in North America will be:

The Gleason 100PS Power Skiving Machine, delivering significant productivity and quality gains for cylindrical external gears up to 100 mm in diameter, and internal gears to 150 mm in diameter. The new 100PS combines unique machine, cutting tool and power skiving process expertise to offer users significant performance improvements, particularly in operations where shaping, forming, pressing and broaching are typically used. As compared to shaping, for example, the 100PS can deliver productivity rates as much as eight times higher.

The Gleason Power Skiving process additionally delivers quality levels that are superior to other soft machining processes, with the potential to be used as a 'green' finishing operation.

In addition, the 100PS can be operated both manually and automatically, and easily integrated into production lines with a variety of peripheral equipment, making it an ideal solution for any production volume, any lot size. It's just one of the complete new Gleason PS Power Skiving Series of machines with models available for workpieces as large as 700 mm in diameter.

The Gleason 300GMS Analytical Gear Inspection System offers up to 45 percent faster complete inspection of automotive transmission gears and other smaller gears, gear cutting tools and non-gear parts. The new 300GMS — latest addition to the GMS Series of inspection systems (with models available for gears up to 3,000 mm in diameter) — was developed specifically to meet the needs of automotive transmission gear producers for a faster, more economical solution for complete gear and even non-gear parts inspection. It is the first GMS to feature the new Windows 7-based Gleason *GAMA 3.0* applications software suite which, like its *GAMA 2.0* predecessor, offers users a highly intuitive user interface and simple input screens for programming of workpiece and cutting tool data. Those features, combined with ease of setup, a .NET control system, and movement optimization, reduce the cycle times required for the complete inspection of almost any gear or gear tool by up to 45 percent as compared to Gleason systems running earlier versions of *GAMA*, or competitive products. The 300 GMS also features a new-generation Renishaw 3-D probe head to provide maximum accuracy and flexibility for the complete inspection of all kinds of gears and gear-cutting tools and, in particular, finer pitch gears. The 300GMS is equipped with new ergonomically mounted operator workstations and a Gleason Diagnostic Module — both designed to greatly improve the operator's effectiveness at every stage of the inspection process. The Gleason Diagnostic Module puts a number of powerful tools right at the operator's fingertips, including a 'weather station' to record temperature and humidity, and video telephony, note pad and voice mail messaging capability, enabling the user to capture video, describe a particular programming issue and transmit it over the web to others in the customer's organization or to Gleason for support.



In addition, the 300GMS, like all the systems in the GMS family, offers users the ability to meet a variety of inspection tasks beyond just gear geometry on a single platform, including surface finish and form measurement and even prismatic (CMM) measurement. Visitors will also be introduced to a number of other significant products, technologies and services, including:

Cutting Tools

On display will be advanced new bevel gear cutting tools for cutting and grinding straight, spiral and hypoid bevel gears. For cylindrical gear production, visitors will find a full array of hobs, form relieved milling cutters, shaper cutters, chamfering and deburring tools, shaving cutters, honing tools, coated diamond and CBN grinding wheels, diamond dressing wheels and diamond dressing rolls.

Workholding

Gleason designs and produces a complete series of quick-change, tool-less workholding equipment for bevel gear, cylindrical gear and non-gear production machines. These systems range from the Gleason X-Pandisk systems which automatically align workpieces weighing up to 2,000 kg to reduce changeover time by up to 70 percent, to Quick-Flex and a large variety of quick-change workholding solutions that significantly reduce change-over times for the production of both bevel and cylindrical gears up to 200 mm in diameter. For inspection systems, Gleason offers the high-precision Gleason LeCount expanding mandrels line, renowned for accurate, easy, extremely rapid location of all types of bore parts.

Gleason Global Services

Gleason customers can rely on 250 factory trained service professionals located in over 50 countries throughout the Americas, Europe and Asia, working around the clock to deliver the full range of aftermarket service and support capabilities. Among the most recent of these is the new Gleason Connect 'Remote Service' technology, which enables Gleason service specialists from anywhere in the world to quickly and cost effectively identify, diagnose, repair and monitor products, minimizing costly downtime.

For more information:
Gleason Corporation
Phone: (585) 473-1000
www.gleason.com

Liebherr Gear Technology
Booth #510

The LC 500 universal hobbing machine, providing high machine availability and productivity, as well as flexibility, will be demonstrated at Gear Expo 2013. Market demand for more flexibility was a key factor in the development of the LC 500, which handles workpiece diameters to 500 mm and a maximum module of 12 mm. Liebherr designed the range of LC hobbing machines for universal applications in general mechanical engineering, the commercial vehicle gear industry and construction machinery, as well as their suppliers. Various processing applications can be flexibly performed and optimally configured to satisfy customer requirements, thanks to the one-piece machine bed.

The machine is available in both automatic and manual operation modes — depending on the specific range of requirements. There are a number of specific configuration options beyond

this: from coating and automation as well as drives and cutting heads to additional software modules. "This machine is not off-the-shelf. In addition to flexibility, availability and rigidity during processing characterize the machine concept, even in the event of extremely high cutting parameters. Its flexibility and the broad spectrum of components and batch sizes make it especially appealing to contract manufacturers," said Dr.-Ing. Oliver Winkel, director of application technology, who is responsible for the technological development of gear cutting for Liebherr Verzahntechnik.

Machine Table and Cutting Head

The machines are equipped with fully encapsulated workspaces and spur gears, as well as a highly dynamic, maintenance-free direct drive in the table to deliver premium gear quality. The drive can be a self-cooling spur gear or water-cooled direct drive, based on precision and productivity requirements. Large table bores facilitate the installation of clamping cylinders for workpiece clamping devices.

Different gear ratios for the water-cooled, zero-backlash tool drive mechanism help to achieve the torques required for high performance processing — with rotational speeds up to 3,000 rpm and drive power of up to 27 kW. The tool mount can be made using a hollow shank taper, ISO short taper or collets. An angular gear is available for worm cutting, which is only mounted as an attachment.

Winkel summarizes other features of the machine beyond high productivity and availability: "Taking the LC 500

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GEAREXPO 2013
EXHIBITOR
Booth #823

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as an example, it is easy to distinguish on what this gearing flexibility is based, namely on our ability to produce custom solutions for specific processing tasks. Simply said, customers present us with their components and we build the machines around them."

For more information:
Liebherr Gear Technology, Inc.
Phone: (734) 429-7225
www.liebherr.com

Kapp/Niles

Booth #611

The Kapp Group will be showcasing the Niles ZE 400 machine model, as well as introducing their new product line, R&P Metrology measuring machines. The Niles ZE 400 continues to be one of the most popular compact and economical machines in the gear grinding market due to its versatility to grind internal or external gears, while utilizing both dressable vitrified and non-dressable CBN grinding wheels. It is engineered

for high quality with maximum grinding torque. A stable ductile iron machine bed supports a workpiece of up to 2,650 pounds. The machine comes fully equipped with a tailstock and on-board measuring. It offers advanced productivity features such as rapid pre-grind measurement, which optimizes stock removal and prevents excessive stock removal, for best process safety. Showcased for the first time in North America is Kapp Group's newest product line, R&P Metrology measuring machines. R&P Metrology, a company launched by longtime gear industry professionals Hans Rauth and Christopher Plume, designs and builds gear metrology equipment, concentrating on medium and large parallel axis gears, bevel gears, tools, shafts, bearing rings and 3-D parts. The range starts at approximately 1.0 meter in size. Extended capacity requirements for large applications and customizing are the specialties of R&P Metrology.

Kapp CBN tools for direct grinding, and DIA dressers for grinding and honing are featured as well, and Kapp and Niles application and tool design engineers will be on-site to answer questions about specific applications.

The Kapp Group offers innovative technologies and systems for high precision hard-finishing of gears and profiles. Grinding machines and tools trademarked as Kapp are primarily geared towards the automobile, aerospace, manufacturing and compressor industries. The Niles grinding machines find their applications mainly in the wind energy, rail, drive technology as well as mineral extraction. The Kapp Group encompasses six locations world-wide with about 850 employees. Through continuous research and development, advanced design and manufacturing, as well as superior support, the Kapp Group offers specific solutions for its customers' complex applications.

For more information:
Kapp Technologies
Phone: (303) 447-1130
www.kapp-niles.com

Reishauer

Booth #1041

The inventor of continuous generating gear grinding, Reishauer AG of Wallisellen, Switzerland will be demonstrating the RZ 260. The concept is based on the extremely successful RZ 150 series with several hundred machines installed in plants worldwide. The RZ 260 has not only been increased in size, but also, all relevant components have been adapted to handle higher loads and forces which occur when grinding larger gears. Gears with an outside diameter of 260 mm and modules up to 5 mm can be ground with highest reliability.

An important focus in the design of the machine concept was adaptability to the different production requirements of numerous customers. The machine can be fitted with one or two work spindles. The version with two work spindles is used to minimize the loading times — as introduced with the Reishauer RZ 150. When investment and tooling costs must be minimized or the workpiece handling times are not critical, the RZ 260 with a single work spindle might be a more suitable choice. When grinding gears with space limitations or small lot sizes it might be advantageous to use the changeable profile grinding spindle enabling the use of a small plated or dressable wheel to grind gears with the discontinuous profile method. Both versions of the RZ 260 can be equipped with a fixed or CNC-controlled axis for swiveling the dressing tool. With this option, the flexibility of the dressing

tools can be increased since the same tool can be used for a range of gears as compared to the fixed dresser where the tools are usually workpiece specific.

Like all Reishauer gear grinding machines, the RZ 260 has been developed exclusively for the high demands of the continuous generating gear grinding process, also known as the Reishauer style. All design characteristics that lead to the success of other Reishauer machines have been incorporated in the RZ 260. This includes the Reishauer Generating Module for highest gear quality, Reishauer LNS Low Noise Shifting technology for very low gear noise emissions, Reishauer Twist Control Grinding technology to create defined values for flank twist and the Reishauer HMI for fast change over and set-up times.

For more information:
Reishauer Corporation
Phone: (847) 888-3828
www.reishauer-us.com

Star SU

Booth #901

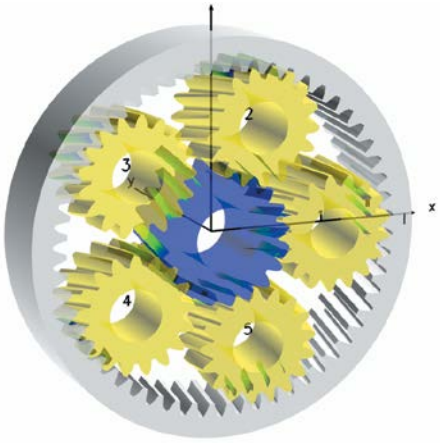
Star SU plans to expand its role as an integration solutions expert for machine tools including workpiece holding, perishable tooling, gaging and automation, according to David Goodfellow, president, Star SU LLC. In Indianapolis, Star SU will fea-

ture the Bourn & Koch 100 H horizontal hobbing machine at Gear Expo.

The Bourn & Koch 100 H can hob splines and geared shafts up to 100 mm in diameter. Mount tools in combinations to cut different gearings on one workpiece or to mill keyways and slots in one tool setup without reclamping. Since the chip conveyor is located directly under the tool spindle, chips are evacuated immediately from the machine to avoid any thermal distortions. In addition, the 100 H can be ordered with automation for machining larger lots. The extended version of the 100 H with a NUM Flexium control can accommodate a workpiece up to 916 mm (36") long and 126 mm (5") in diameter.

The Samputensili G 250 gear grinding machine has been especially developed for very low cycle times and for top-quality and efficient mass production of gears with outside diameters up to 250 mm and shafts with lengths up to 500 mm. The secret behind the machine's efficiency is the dual work spindle concept, which eliminates nonproductive auxiliary times almost completely. By means of the dual work spindles, the loading/unloading process of a workpiece is carried out in masked time, while simultaneously the manufacturing process proceeds on another workpiece. The G 250 can equally use form and worm grinding wheels, both in ceramic and in electroplated CBN. A video presentation of the G 250 will be available at the Star SU booth.

For more information:
Star SU
Phone: (847) 649-1450
www.star-su.com



KISSsoft AG

Booth #717

KISSsoft will be presenting the latest release of the software, Version 03/2013. The latest version of *KISSsoft* incorporates the newest advances in contact analysis for both cylindrical gearing and planetary geared systems.

Additionally, the draft of the new plastic strength analysis standard (VDI 2736) is implemented. Furthermore, a lot of other helpful features for an optimal gear calculation are available now.

Additionally, *KISSsoft* covers a very broad range of applications in one package, even with one user interface. So regardless in which state of the design process the engineer is, he/she can use the same tool. A strong point in *KISSsoft* is the optimizations which are conducted on all levels, for single parameters, for parameter sets, or for complete systems of machine elements. And the program can be customized in many regards. This covers the input (default settings, data base contents), the output (reports), the calculation procedures (customer specific rules that are asserted during the calculations) and of course the installation.

"In addition to these technical points, KISSsoft AG has gained a very good reputation concerning gear knowledge," says Dr. Stefan Beermann, CEO of KISSsoft AG. "This is a very important point for a customer when he/she decides which software package to rely on. We try to measure up to these high expectations by joining the committees for the standards, conducting scientific conferences, conducting general trainings about gear knowledge, providing excellent support and so on."

Beermann continues, "Nothing replaces personal contact, particularly in our industry. Many things are easiest to discuss face to face. Bring your gear design problems to booth 717 and see how KISSsoft can help solve them. Dr. Kissling and I, founders of KISSsoft will be on hand to answer all of your questions."

Software demonstrations will be presented through the day.

For more information:
KISSsoft AG
Phone: +(41) 55 254 20 50
www.kisssoft.ag

Emuge Corp.

Booth #505

Emuge Corp., a manufacturer of precision workholding devices for many industries, offers a comprehensive line of clamping solutions. Emuge's workholding division specializes in providing highly accurate, almost maintenance-free customized solutions for applications from low volume job shops to high volume automotive production environments. "Our workholding group stays close to our customers to learn about their unique challenges and production environments. Doing so helps us develop the best solutions for their applications," said David Jones, precision workholding manager at Emuge Corp.

With its expanding-bush design, Emuge's System SG is used in many machining operations such as hobbing, shaping and shaving for gear production, as well as milling and inspection. The System SG's large surface area contact with the workpiece provides a clamping solution which is very rigid, accurate and repeatable.

The high precision System SP is used not only to clamp workpieces but also to clamp tools. By applying an axial force, the clamping sleeves move in the direction of the force and expand radially. This eliminates the clearance between clamping sleeve and body, and between

clamping sleeve and workpiece. System SP achieves concentricity of < 0.002 mm (corresponding to < 0.0001 inch).

For workpieces that have a short clamping base or for diameters with a very large tolerance, Emuge offers the System SZ. By applying an axial force, a slitted collet is radially expanded by a cone. Simultaneously an axial movement occurs, clamping the workpiece.

When the eccentricity between pitch circle and seating bore is very small, diaphragm clamping System SM is suitable. It allows clamping of the gear wheel at the pitch circle for machining the seating bore. The gear wheel is clamped in both axial and radial directions.

System SH is a solution if there is not enough room for a mechanical clamping system and for clamping long, thin-walled workpieces or a number of similar workpieces. System SH is a closed system which uses hydraulic pressure to clamp the workpieces.

For more information:
Emuge Corp.
Phone: (800) 323-3013
www.emuge.com

Norton Abrasives
Booth #1153

Norton Abrasives, a brand of Saint-Gobain, has developed and launched Norton Vitrium3, the next generation of bonded abrasives products, engineered for maximum performance and cost savings in precision grinding. An entirely new abrasives platform, Norton Vitrium3 features a patent-pending bond technology developed by the Saint-Gobain Abrasives R&D team. This bond features an exclusive chemistry that promotes excellent grain adhesion, resulting in improved product versatility across a wide range of applications. Substantial performance improvements with Norton Vitrium3 are now attainable in all Norton abrasive grains, from proprietary Norton Quantum ceramic alumina to conventional aluminum oxide.

"Whether the goal is to reduce total cost per part, increase throughput, or improve workpiece quality, Norton Vitrium3 is re-shaping the world of precision grinding to meet these needs," said Scott Leonard, director of product management at Norton Abrasives. "This

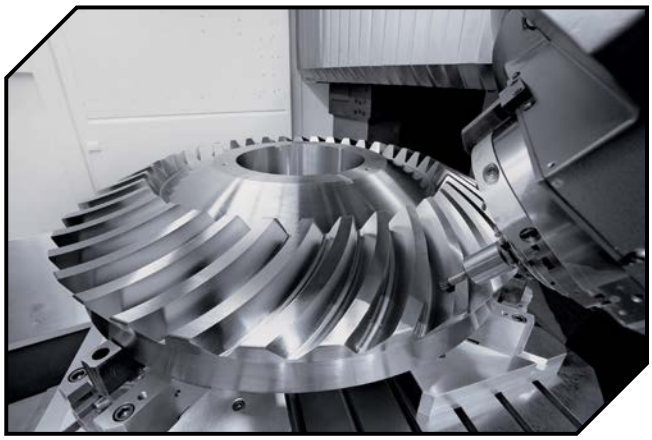
new technology will allow significant increases in production and also introduces the possibility of grinding instead of conventional machining on some operations."

For more information:
Norton (Saint-Gobain)
Phone: (508) 795-2833
www.nortonabrasives.com

DMG/Mori Seiki

Booth #631

DMG/Mori Seiki will demonstrate its full gear machining technology portfolio, with a focus on *gearMILL* software and the InvoMilling process, at Gear Expo. The InvoMilling process will be demonstrated on the NT series multitasking machines and NLX Series (three-axis lathe) machines. The five-axis gear-machining capability will be demonstrated on the DMU series machines and NT machines. In addition to newly developed processes, traditional gear-machining processes such as hobbing, gashing and broaching will be on display on NLX (three-axis lathe) machines. A variety of gears, such as spiral bevels, spur, helical and internal gears, will be machined on these platforms.



"The demonstrations center around the flexibility of the machines to offer the customer a choice of gear machining process based on day-to-day scenarios," says Nitin Chaphalkar, manager of advanced solution development. The demonstrations will emphasize benefits of multitasking machines such as simple change overs between parts, yielding increased throughput in small and medium batch production.

In addition to the demonstrations, Chaphalkar will conduct two presentations at the Solutions Center portion of the event. On Tuesday, Sept. 17 at 10:30 a.m., he will discuss bevel and spiral bevel gear-manufacturing technologies and gear grinding. The presentation will discuss applications for these methods and the software necessary. It will cover gear grinding and methods of surface heat-treating the gear teeth in the multitasking machine. The second presentation on Thursday, Sept. 19 at 10:30 a.m. will focus on universal gear milling machines and new methods for manufacturing gears, including InvoMilling. Chaphalkar will talk about using the multitasking machines for machining gears not only with conventional processes including hobbing, shaping and five-axis machining, but also with new processes such as InvoMilling.

For more information:
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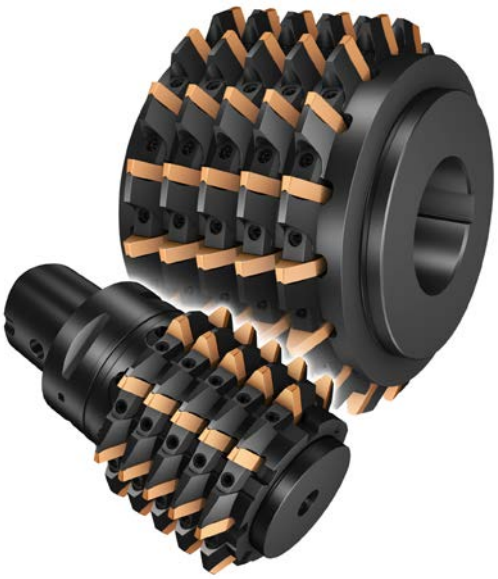
Sandvik Coromant
Booth #335

Sandvik Coromant will focus on the ongoing shift in gear manufacturing technology during Gear Expo. For an operation that has been reasonably consistent for about a century, there have been a lot of exciting technological advancements in recent years. Whether you're running a traditional, dedicated machine for large batches, doing smaller, one-off batches and prototypes on your multitask machine, or anything in between, stop by booth 335 to check out the next generation of gear milling solutions.

One focus area will be CoroMill 176, an innovative indexable insert cutter for productive gear wheel hobbing. CoroMill 176 is a more cost-efficient alternative to regrindable high speed steel (HSS) hobs and is designed for gears in the module range 3 to 10. Its ability to reach higher cutting speeds combined with user-friendly insert changing will reduce cycle times to a fraction versus high speed steel tooling, making it the high productivity gear milling choice for large volume gear facilities.



The new CoroMill 172 full form disc cutter is another area of emphasis. It offers a versatile and timesaving solution for milling of high-quality gear profiles, splines and racks. Thanks to the new indexable carbide insert technology and a powerful iLock interface, the component can be machined in flexible non-dedicated machines, such as multi-task machines and machining centers, as well as in hobbing and gashing machines. This makes the CoroMill 172 a truly flexible choice that has application on a wide array of operations and has shown particular value in the production of splines.

And the InvoMilling (patent pending) process is a unique approach to milling spur and helical gears using indexable insert cutters. InvoMilling opens up new, cost-efficient ways to produce geared components without dedicated hobbing machines. Since complete components can now be machined with just one set-up in a single 5-axis machine, overall production lead-times can be reduced dramatically as waiting for expensive hob cutters is not required. One InvoMilling cutter is capable of producing multiple module or DP sizes. Also, eliminating a hobbing operation dramatically shortens the value stream and overall work in process. And the new generation of indexable carbide insert gear cutters will increase cutting data

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EMAG LLC

Booth #315

With the VL 5, EMAG has created a customized solution that makes a positive impression in handling the heavy stresses exerted on the tools and machine during hard turning. One example is its machine base made of Mineralit, a polymer concrete with a vibration resistance eight times better then cast iron. "A vibration resistant machine leads to an improved surface finish on all workpieces it machines, which also leads to an improvement in tool life," says Peter Loetzner, CEO of EMAG. The vertical design is another feature that ensures an economical process, with the work spindle and the workpiece located above the tool. This offers suitable chip flow conditions, with the material removed being taken out of the machine by a chip conveyor. All guideways are located above and away from the machining, keeping them safe from any chips or dirt. This increases the component accuracy and reduces the maintenance effort.

Another important quality feature of the vertical turning centers from EMAG is their integral automation. They all use a conveyor belt with prisms that hold the raw parts in place. The conveyor belt moves the workpieces directly into the pick-up station, where they are picked up by the work spindle and then machined. Workpiece changeovers are very fast, because the distance traveled between the loading and machining position is only 550 mm. This leads to a massive shortening of the time between machining processes.

The possibilities offered by hard turning on the fully automated, vertical turning machines from EMAG is best shown by the example of a gear production for a sub-supplier to the automotive industry. The VL 5s run by the customer produce a total of eight different gears for a dual-clutch transmission system. Following the hardening process, the workpieces are pre-turned on the machine, to remove the hardened top layer. This is followed by a synchronous ring being welded onto the workpiece away from the VL 5. The workpiece is then returned to the EMAG machine and finish-turned. Before the customer had the VLs, he performed comparable operations on grinders.

"This company started investing in the VL 5 machines for their hard turning process, because the investment costs were so much lower," adds Loetzner. "Hard turning on the VL 5 is in no way inferior to the old grinding process; and the machining times are noticeably shorter," he explains further.

When can hard turning successfully replace the grinding process in the machining of a component surface? "That depends on a number of factors. One important factor is the desired surface texture. We help guide our customers and give them our opinion on the best way to proceed," explains Loetzner, "and when hard turning is possible, it often becomes first choice." Apart from lower investment costs, many users are also impressed by the elimination of the grinding operations. On the VL, the turned part can be finish-machined in a single setup. It is no longer necessary to take it to another machine for finishing. The result: the output level of the whole production increases considerably.

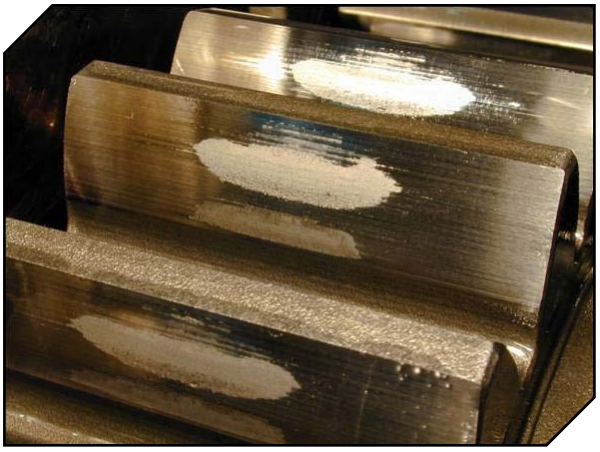
The turning specialists from EMAG have already delivered a total of 3,500 VL machines. The know-how this has provided is something the new user also profits from. "Our design team familiarizes themselves with customer demands. This ensures that the strengths of our machines are targeted on what is required by customers." The types and numbers of components that can be produced on these vertical turning machines are very diverse. Toothed components, such as gears and crown wheels, can be produced with the same efficiency as bearing rings. "The system can be adapted to suit any batch size and is very impressive with its short cycle times and high component quality. If the VL 5 allows you to eliminate a whole process stage, the user will be able to enjoy an unbeatable cost advantage," emphasizes Loetzner.

For more information:
EMAG LLC
Phone: (248) 477-7440
www.emag.com

Dontyne

Booth #1052

Genesis Partners has developed and tested a non-involute tooth form that projects up to a 40 percent improvement in various physical and performance parameters of a gear pair compared to the equivalent involute. A distinct advantage of this new tooth form is that it utilizes the existing gear manufacturing asset base. Under an exclusive agreement Dontyne Systems has programmed the Genesis Partners source code to not only design and rate Convoloid pairs and compare them directly with involute pairs, but also provide the protocols to easily craft these designs to optimize many of the gear parameters influencing successful gearing applications. The confluence of the well-developed specialties of these two firms provides timely, efficient, and comprehensive analysis prior to the machining, testing and inspection of hardware—a breakthrough in the future of gearing power density and cost reduction.



The relative size reduction for Convoloid over optimized involute equivalent for same ratio and face width translate into large benefits in production cost and power density as well as operating life. Dontyne Systems has completed both design and loaded tooth contact analysis modules for the Convoloid gear form. Parameters such as stress, load, efficiency and transmission error can be calculated. These can be used to investigate the performance of a design including the effect of center distance variation and misalignment. The problems associated with this type of conformal gearing are not as acute as an experienced gear designer might intuitively expect. Potential problems such as stress concentrations, micropitting, and vibration can be treated by surface modification, in the same way as an involute gear form often is, to achieve optimum operation. The software enables the user to quickly establish whether the Convoloid solution

is appropriate to provide an advantage over the involute for a given application under specific operating conditions. Further modules to simulate manufacturing and inspection — linking directly to production equipment — are close to completion.

This technology has been aimed initially at the wind turbine industry during its development. As the understanding of the limitations has increased through software analysis, then the confidence in the product applicability has grown such that many industries are ready to investigate the operating characteristics of non-involute designs as never before. This new calculation is exclusive to Dontyne Systems. Genesis Partners will be giving a talk in the Solutions Center on the development and testing of this technology entitled "Convoloid—The Future of Power Density and Cost Reduction," scheduled for 9/17/2013 at 3:00 p.m. The presentation will also include some results from the new analysis software. The potential for this design software or design service can be discussed in more detail at the Dontyne System Booth 1052.

Micro-Erosion: Propagation of Micropitting

The ISO 15144 Method A and B for micropitting have been implemented in Dontyne Systems' *Gear Production Suite* for some time now. The standard is fairly restricted, only giving indication of the risk of micropitting which could be based over a 16 to 70 hour test. It does not state whether micropitting will continue to develop with time or stop (as will be the case sometimes) and further whether this is actually detrimental to the operation of the gear. This may lead some gears to be scrapped and development programs halted pending redesign when it may not be necessary, leading to costly and wasteful delays. Dontyne has been working with Dave Barnett (Gears Made Easy) to implement a calculation which looks at the longer term micro-erosion (model of the propagation of micro pitting) and the influence on operating characteristics under load. The calculation procedure itself has been has been explained in previous AGMA FTM presentations and more recently in a Voices piece (*Gear Technology* November/December 2011). The new method has been experimentally validated and it is believed can contribute to the understanding and development of a more complete model of gear behavior for more efficient design and production. Significantly, it can also look at the implications on life due to surface modification. This new calculation is unique to Dontyne Systems and can be demonstrated at the Gear Expo Booth 1052.

For more information:
Dontyne Systems Limited
Phone: +(44) 191 206 4021
www.dontynesystems.com

Hainbuch

Booth #600

Changing over from O.D. clamping to I.D. clamping without disassembling the base clamping device is done in a matter of two minutes with the Hainbuch modular system. With Mando Adapt, just place the mandrel in the mounted clamping device. It's a great time-savings solution, not to mention that Mando Adapt is extremely rigid and precise.

Mandrel type 213: This mandrel type

is suitable for small clamping diameters and extremely slender mandrel bodies. In comparison with the Mando T211 with draw bolt, the segmented clamping bushing is not released via ejector pins in the mandrel body; rather it is coupled in on the upper end of the draw bolt. Thanks to this trick, the mandrel body can be implemented with even more rigidity. That's why this mandrel type is in such demand, particularly for gear cutting applications where interrupted cuts are on the daily agenda. The vulcanized segmented clamping bushings are supplied as a clamping unit mounted on the draw bolt and thus can be conveniently changed. For greater clamping diameter, you can also change the segmented clamping bushings individually through the use of two-piece draw bolts.

For more information:
Hainbuch America Corp.
Phone: (414) 358-9550
www.hainbuch.com

Mitsubishi Heavy Industries America

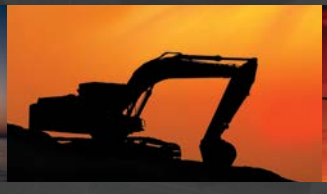
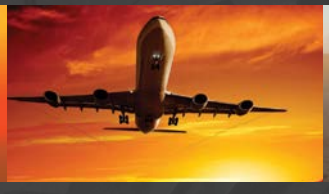
Booth #909

Mitsubishi will proudly be showcasing two machines at Gear Expo 2013. Making its debut in North America, a revamped design of the ever popular Model ST40 advanced programmable lead guide shaper will demonstrate the capability to program internal and external gears with crown or taper through the use of a newly developed NC relieving mechanism. The ST40A machine is also equipped with a quick return stroke function, which greatly shortens machining times for wide face width gears. This machine will be dry cutting one component of a cluster gear.

Additionally at Gear Expo, Mitsubishi will be demonstrating an automated gear cell which includes a palletized conveyor paired with a Model GE15A dry-cut gear hobbing machine. On the GE15A,

Our Gears Work
Around The Clock, Around The World

High Performance, Higher Quality Gears

DELTA GEAR

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www.deltainspect.com
1-734-793-2394

DELTA RESEARCH

Automotive Quality & Speed - Delta Research is a world class provider of CNC 3-Axis, 4-Axis and 5-Axis precision machining, jig grinding, cylindrical grinding and complete assemblies for automotive, aerospace and industrial applications. From complete automotive prototype transmissions or components, to defense, to aerospace machining and assembly, you will be impressed by our capabilities and commitment to quality (Registered to ISO 9001 & AS 9100 quality standards).

www.deltaresearch.com
1-734-261-6400

AGMA

Delta Family Of Companies

GEAR EXPO The Worldwide Gear Industry Event 2018
(Booth 800)

Mitsubishi will demonstrate a timing function which is beneficial for skive hobbing or timing a gear to another feature on the workpiece. Also exhibiting their capabilities in the Mitsubishi booth will be Federal Broach and Machine Company. Mitsubishi and Federal will have industry experts on hand throughout Gear Expo to offer solutions to the many manufacturing challenges that attendees will bring.

For more information:
Mitsubishi Heavy Industries America
Phone: (248) 669-6136
www.mitsubishigearcenter.com

Ingersoll Cutting Tools
Booth #235

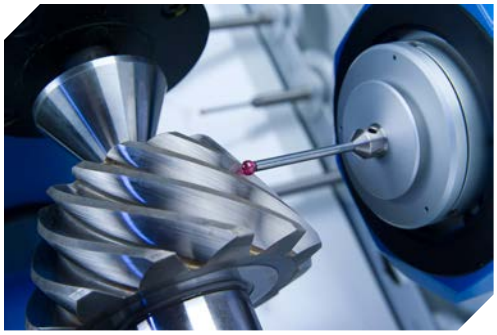
Ingersoll will be exhibiting the latest advancements in its gear machining tools. Whether it's hobbing, gashing, shaping, or CNC machining, be sure to visit booth #235 to see what's new in indexable insert gear machining tools. "We will have our industry experts in the booth, and are eager to discuss your particular gear cutting needs and applications," says Frank Berardi, gear machining product manager. "Our new line of Radial Insert Hobs will be a major focus at the show. The radial hob is designed primarily for smaller module gears. It is available in 1-Start, 2-Start and 3-Starts, and in screw down or wedge style insert mounting.

Additionally, there will also be a live demo in Liebherr's booth (510) featuring the Module 7, Radial Hob on a Liebherr LC500 machine. "We will also have the latest designs in positive and negative geometry gashers for internal and external gears, as well as our indexable insert shapers, which have been extremely successful in roughing applications, reducing cycle times as much as 50 percent in many cases," Berardi adds.

For more information:
Ingersoll Cutting Tools
Phone: (815) 387-6600
info@ingersoll-imc.com
www.ingersoll-imc.com

Klingelnberg AG
Booth #323

With the acquisition of the core business of Höfler Maschinenbau GmbH in 2012, Klingelnberg expanded its product portfolio with the addition of gear manufacturing machines for cylindrical gears, thereby strengthening its position as a single-source system supplier. The company's origins date back to 1863. In 1993, Oerlikon Geartec AG in Zurich was acquired and a new generation of bevel gear cutting machines, the C-Series, was developed. Within this product range, Klingelnberg introduced the dry-cutting process for spiral bevel gears in 1997. The service offering also includes machines for grinding, lapping and testing of bevel gears. The Klingelnberg precision measuring centers (P-Series) are used for dimension, form, and position measurements of gears and axially symmetrical components, such as tools, gears of all types, and gear components measuring several meters in diameter. During Gear Expo, Klingelnberg will be exhibiting the P 40 precision measuring center for the automotive, aviation, precision engineering and industrial construction industries. The P 40 offers a maximum workpiece diameter up to 400 mm, weight up to 300 kg and a vertical measuring range up to 550 mm. Additionally, it offers gear measurements as well as dimension, shape and position of axially symmetrical high-precision components of any kind, roughness measurement on tooth flanks; manifold options for testing of drive components in the automotive industry such as: clutch gears, sprockets, beveloid gears as well as camshafts and crankshafts; maximum precision and repeatability of measuring results; excellent mechanical basic precision and modern compensation strategies and easy operation with a graphical user interface.



For more information:
Klingelnberg America, Inc.
Phone: (734) 470-6278
usa.sales@klingelnberg.com
www.klingelnberg.com

James Engineering
Booth #701

James Engineering is introducing its 2014 line of systems. These systems are a culmination of 30 plus years of experience and refinements. "Our 2014 lineup allows the customers to increase productivity, reduce setup times, increase operator multitasking, increase machine uptime, reduce scrap, and most importantly reduce the cost per part," says Scott Richards, vice president at James Engineering. "We have focused so heavily on these attributes that our company-wide Return on Investment (ROI) is 1.5 years."

LUREN

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Gear Cutting Tools

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Email : Gerald_kuo@luren.com.tw
darian@lurenchicago.com

GEAR EXPO 2018
Booth#1101

Today, James Engineering focuses on flow, setups, and ergonomics. "Our automatic wheel wear compensation, for example, can wear a four inch outside diameter grinding wheel down to one and one half inches without a single setup change. We can wear the wheel from beginning to end with a 10 percent variance in both chamfer angle and size. Many conventional machines can only wear down a half inch radius before they need to make a setup change. These conventional machines may make up to three setup changes to achieve the same minor diameter our systems can. In some cases these conventional machines cannot wear a wheel down that small and simply discard it. Discarding a wheel prematurely is a horrible waste of money and time."

Additionally, James Engineering recently introduced a patented 25,000 rpm, one horse power, hydraulic chamfer motor. "This motor is 80 percent more efficient than the compressed air motors, has a longer life span, and is silent. When these figures are combined it equates to a massive ROI, which in many cases, justifies the purchase of our most expensive systems within six months."

Richards continues, "We offer what is arguably the most comprehensive line of deburring systems on the market. We have expanded our range of systems to encompass manually operated systems, guaranteed setup systems, zero-setup systems, fully automated systems, and high pressure water deburring systems. These systems have the physical ability to deburr gears from fractions of an inch to 400 inches outside diameter and infinite lengths."

James Engineering will be sharing a booth with Sinto Surface Treatment at Gear Expo.

For more information:
James Engineering
Phone: (303) 444-6787
www.james-engineering.com

Hydra-Lock

Booth #640

Hydra-Lock features its patented Conform-A-Chuck and Conform-A-Arbor workholding solutions designed to adapt to an out-of-round OD or ID and securely grip that diameter to enable boring, honing, grinding, or other machining operations without changing the original free state shape of the part. This unique technology provides solutions for the unlimited combinations of machining found in today's gear making applications.

The Conform-A products rely upon a unique plastic material called Hydra-Fibre. This allows the chuck or arbor to easily expand (up to .125" depending upon size) and adjust in order to hold thin-walled and out-of-round components without rounding. The Conform-A products are able to locate on a rough machined surface and establish an average center line. By locating on the entire surface, the chuck is able to support the weak component area and withstand tool pressure. Resulting accuracies of the operation are typically within +.001".

Conform-A-Chucks and Conform-A-Arbors can be developed in any size to meet the application with either a direct pressure or a self-contained hydraulic system. Conform-A-Chucks can be designed to produce either bell-

mouthed, straight or choke condition at the skirt end. Conform-A-Arbors feature retractable stops so that the end face of the part may be machined square and ID chamfered during the same cycle during which the OD is turned.

For more information:
Hydra-Lock
Phone: (800) 634-6973
www.hydralock.com