

LEAD IMTS INNOVATIONS

COMPUTERS AND AUTOMATION

WILLIAM R. STOTT

10

GEAR TECHNOLOGY

Robots, computers and other signs of high technology abounded at IMTS 94, supporting the claim by many that this was one of the best shows ever. Many of the machines on display had so many robotic attachments and computer gizmos that they looked more like they belonged in some science fiction movie than on the floor of a machine shop.

The gear industry made a strong presence in this technological display, with more than 40 machinery and cutting tool manufacturers specializing in gear equipment. In addition, although our booth was considerably less high-tech than some, *Gear Technology* exhibited at IMTS for the first time ever. The staff had a chance to talk to many industry leaders, new subscribers, old fans and other dedicated gear enthusiasts. We also visited the booths of all the major gear equipment vendors to see what was new in the industry.

Most of the gear-industry manufacturers have been hard at work enhancing their machines with added CNC axes, greater flexibility and more user-friendly software. Today's machine is more versatile, with quick changeover times that are ideal for small-batch manufacturing. But they also run faster and with greater accuracy, making them ideal for shops in the automotive and other high-volume industries as well. Today's machines are smaller, faster and more accurate.

A good example of this new breed is a Gleason gear hobber aimed at the high-volume shops serving the automotive, appliance and power hand tool industries. The 125GH CNC 6-axis gear hobber has a rigid, cast iron frame to counteract the cutting forces of high-speed hobbing and produces gear qualities of up to AGMA 13. In addition, a patented hobhead provides low work arbor heights for greater workpiece support. The model on the show floor, equipped with an automatic loader and capable of hob changeover in under a minute, was used to cut transmission speed gears and small gears for power tool applications.

One of the most exciting new technologies on display at the show was Liebherr's revolutionary high-speed dry cutting hobber. Delivering up to 3000 rpm, the LC 82 CNC is capable of using carbide and cermet hobs for cutting speeds up to 2000 sfpm—without lubrication. This means greater accuracy and lower per-piece cost without the additional cost and environmental hazard of cutting oils. In addition, the LC 82 CNC occupies about one-half the floor space of previous models. (See also "Gear Hobbing Without Coolant," page 20.)

Automatic loading systems were also popular this year. For example, Reishauer's RZ 362A gear grinder was tended by a 7-foot, $\frac{3}{4}$ -ton industrial robot, the ASEA Brown Aeneas IRB 3000. The grinder itself uses a creep-feed process, accomplishing in one pass what would otherwise take several passes by moving the workpiece both tangentially and axially with respect to the grinding wheel. Because the work spindle moves after each cycle, the robot must follow the spindle across the machine to load the workpiece in a different position with each pass. The 6-axis robot can be programmed for each part, allowing load and unload times of about eight seconds.

Koepfer introduced its Model 200 CNC gear hobbing machines, which can be equipped with a range of loading devices, from a simple gravity-fed magazine to a robotic gantry loader that allows material flow and communications to be integrated with other manufacturing processes, including washing, measuring, palletizing and transfer to other operations. The automation for each machine can be tailored to the needs of the customer.

Mitsubishi Machine Tools introduced two new machines at the show, the GC20 high-speed gear hobber and the ZG400CNC gear grinder. Both machines can be custom-fitted for flexible manufacturing systems with various automatic tool handling and loading devices. For example, options on the GC20

hobber include an automatic work changer, an automatic tool changer and an automatic jig changer. The ZG400CNC grinder's options include an automatic wheel change device, a workpiece conveyance system, an automatic meshing device and a workpiece measurement device.

Other gear machine manufacturers at the show introduced new machines or current production models with new features. Again, computer controls were highlighted at nearly every booth.

Stoffel Grinding Systems displayed a high precision grinding machine made by Reform Maschinenfabrik of Germany. The Reform ZSM 800 was specifically developed for precision grinding of straight and helical formed gears as well as straight and spiralled fluted broaches. It has eight numerically controlled axes, three of which are on the grinding wheel dressing device, which is capable of continually adjusting for wear on the grinding wheel to maintain the accuracy of the profile generated. Also, because of its quick change-over, this machine is especially well-suited to small batch sizes.

Bourn & Koch introduced its new 500 series CNC gear grinder, which is equipped with threaded CBN-plated wheels. The 500 Series grinders can support 2,000 pounds of fixture and part weight and parts up to 900 mm in length. In addition, the machines come with Bourn & Koch's copyrighted user-friendly software package for programming and operating the CNC controls.

Sunnen Products company introduced its EC-3500 Power Stroked Honing Machine, which uses a two-stage feed pressure feature to reduce cycle times by removing the bulk of the stock at high feed pressure and finishing the part at a lower pressure. The EC-3500 accommodates a wide variety of parts, including keyways, splines and other odd or unusual shapes.

WMW Machinery demonstrated the new Niles profile gear grinder, which has two independent CNC-controlled grinding wheel slides, menu-driven CNC control and integrated software, which allows the measuring of profile, lead, pitch and runout of the workpiece while it is still clamped in the machine.

Kanzaki Kogyukoki demonstrated its new GFB-250/CNC-5 five-axis hard gear finishing machine for superfine finish surfaces on gears. The GFB-250 comes with an optional gaging feature, which activates an automatic dressing

function whenever the gears produced fall outside the specified parameters.

Fellows Corporation demonstrated the latest generation of its 10-4 gear shaper. The machine was equipped with a GE Fanuc control system, providing it with two axes of control. Fellows' Vermont USA Machine Tool Group partner Bryant Grinding Corporation introduced its new Ultraline UL2 high speed grinding machine for grinding bores in gears, bearings, valve lifters and similar components.

American Pfauter exhibited a new hard finishing process for high-volume gear manufacturing. The KAPP VAC 61 CNC uses a Coroning® tool, a hardened steel ring with an internal gear configuration that generates an exact duplicate of the gear profile required on the workpiece when rolling the Coroning® tool. In addition, the machine can use two Coroning® tools, each plated with a different CBN grain size, to divide metal removal into roughing and finishing operations in one work cycle.

In other industry news, American Pfauter announced at IMTS that it would be taking over the North American sales and servicing of the Deckel Maho line of milling and machining centers. Deckel Maho was recently acquired by Gildemeister AG of Bielefeld, Germany. American Pfauter currently is the North American distributor for all Gildemeister turning products.

The Deckel Maho line includes 5-axis universal machining centers that could be used to make hobs, gearbox housings and other ancillary gear industry products. ■

If you would like additional information about any of the companies or products mentioned in this article, please circle the appropriate Reader Service number listed below.

American Pfauter/Deckel Maho	A-40
Bourn & Koch.....	A-41
Fellows Corp.....	A-39
The Gleason Works.....	A-42
Kanzaki Kogyukoki.....	A-43
Koeper.....	A-44
Liebherr.....	A-45
Mitsubishi Machine Tools.....	A-46
Reishauer.....	A-47
Stoffel Grinding Systems.....	A-48
Sunnen Products Company.....	A-49
WMW Machinery.....	A-50

Tell Us What You Think...

If you found this article of interest and/or useful, please circle Reader Service No. A-38.