



Custom Gear & Machine, Inc. expands its manufacturing capabilities

Reishauer grinder with Siemens CNC cuts cycle time on one gear from 40 minutes down to six . . . with improved quality

Roscoe, Illinois can make a claim to be the gear capital of the Midwest. Certainly, on a per capita basis, this small town 90 miles northwest of Chicago has its share of world-class gear companies. One of them, Custom Gear & Machine, Inc., has recently purchased an additional Reishauer gear grinder and, on one job, has seen the cycle time drop from 40 minutes to only six minutes, according to Tim Rose, vice-president of manufacturing, who runs the business with co-owners Dave Patterson and Mike Rasmann.

As Rose explains, "We were looking to expand our gear grinding capability and the Reishauer RZ400 offered us many benefits, including 400mm O.D., 10mm root diameter, up to 999 teeth capability, helix angles to +/- 45° and a z-axis of 300mm, all features we could use on a daily basis. We also liked the easy access four-door configuration and serial interface, plus the machine's auto wheel dresser and add-ons of materials and part handling devices."

Custom Gear & Machine, Inc. was already running an older Reishauer grinder, but was seeking to improve its throughput and overall grinding department performance. The RZ400 has three features that helped them these goals. The machine had more than double the surface speed, going from 1900 rpm to 4000 rpm. It also had a seven-start grinding wheel versus a single-start variety. And, with a coolant pressure increase over the older machines from 30 psi to 300 psi, the flushing and grinding integrity were radically improved.

Custom Gear & Machine, Inc. is a full-service gear manufacturer, producing spur and helical gears to AGMA 8 thru 14 standards and up to 30" diameters typically, plus splined shafts to 54" in length. Its customers include many of the leading builders of agricultural equipment, construction and off-road vehicles, machine tools, printing presses, food processing equipment, overhead cranes, materials handling devices, lift equipment, process equipment

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Operating and programming the Siemens Sinumerik 840D CNC is as easy as touching a button.



Reishauer RZ400 gear grinding machine with Siemens Sinumerik 840D CNC. Machine is show grinding gear teeth.



Custom Gear runs a full CNC machine shop, including large slantbed lathes and various machining centers to produce complementary parts to their gear and spline products.

such as large water pumps and more. Custom Gear & Machine, Inc., founded in 1994, specializes in lot runs from a single piece to 500 and works primarily in steel bar grades, including 4140, 4150 and 8620. The shop also works forgings, as well as cast and ductile iron, brass, bronze and aluminum, per customer requirements. Custom Gear products are often used in gearboxes and transmissions by equipment builders or their primary tier component suppliers.

During the recent Reishauer grinder purchase, Custom Gear & Machine, Inc. was serviced by company VP Dennis Richmond, who heads up the North American sales and service operation in nearby Elgin, Illinois for this Swiss-based machine builder, founded in 1788 in Zurich. Richmond describes the relationship with Custom Gear and Siemens, as well. "Our previous gear grinders at Custom only allowed them a 13" diameter and they were looking to step up to a larger, 16" max diameter, plus they were seeking other features we were able to offer. We use the Siemens numerical controls on our machines for a variety of reasons, especially the architecture's ability to allow our engineers to customize the front ends. This simplifies the addition of new part programs and helps operators more easily navigate the programming and set-up. When the data input is completed for the current screen, for example, the operator is prompted to enter data for the next screen and so on, until the program is completed."

Rose confirmed this point, adding that Custom Gear's machinists are each responsible for the set-up, running and maintenance of their machine. "They take a real pride in making sure the jobs are done right and that the machine is always in great shape." One of the current machinists running the Reishauer RZ400, Daniel Warren, noted that he had not previously run a machine with a Sinumerik CNC from Siemens onboard, but explained, "I got great training from Reishauer and was up to speed very quickly. We were making parts within a few days after the installation and I was completely comfortable with the easy operation of the CNC in less than a month." In describing the automatic wheel dressing sequence, he also noted how the CNC automatically adjusts the settings to compensate for the reduced wheel diameter after dressing, bringing the wheel to the correct point of contact with the subsequent workpieces, every time.

Data such as gear configuration, fixture design and all tool settings are entered into the screens, including pitch, pressure angle, teeth and dressing steps. Once a new part program is completed, the operator at Custom Gear can begin working through the Reishauer-designed man-machine-interface (MMI) set-up screens, which also function in the same manner. Reishauer further allows its customers to add their own HMI screens for features onto the Siemens CNC for data acquisition, training aids and even SPC protocol operations. This service enables the customers to have a common look across the screens on many machines in their shop. This is especially helpful in work cell set-ups, where a single machinist is running multiple machines.

Reishauer also uses other aspects of the Siemens product and service package for added functionality, including Siemens motor and drive packages, in building the control structure on its machines. According to Richmond, this allows a seamless integration between all drives and the numerical control unit (NCU). It also makes a much easier task out of the integration of ancillary machine devices such as chip conveyors, filtration systems, wheel



Typical products made by Custom Gear include helical and spur gears up to 30" diameters and splined shafts up to 54" long, plus a variety of large CNC machined parts to complement their gear work.

dressing stations and especially the critical materials handling and part loading devices frequently built with its machines for customer work cell set-ups. Siemens makes use of the Profibus networking protocol, enabling Reishauer to link various control devices and other machine tools together, thus greatly reducing the field work integration and wiring time during installs. Reishauer uses Profibus to link the onboard Siemens Sinumerik 840D CNC to VFDs, other drives, electronic gearboxes and balancing systems for the grinding wheel on its machines.

Mike Rasmann, vice-president of operations at Custom Gear, concludes, "Our investment in the new Reishauer gear grinder has expanded our capability, allowed us to produce more parts for more existing customers and even opened some new business doors for us. With the added benefit of increased safety on the machine, it was a win-win situation for us, all around." Rose echoed this sentiment, adding, "It's a great machine. When we have any



Touch probe inspection of gear diameters

need for assistance on the machine, including parts and especially application engineering, we know the answer is just a phone call away. Reishauer has been there for us, on many occasions. This is a big reason we've done business with them for 15 years and will continue to do business with them in the future."

Custom Gear also operates a full machine shop with four-axis vertical machining centers, horizontal machining centers, sawing and broaching equipment, plus a full turning machine department, capable of handling 29" diameter and 72" long workpieces. Custom Gear's quality department boasts CNC gear inspection machines and CMM capability. Rose noted with some considerable pride that many of the machinists at Custom Gear have more than 20 years in the business, most of them with his company. "We are a real family here and you cannot put a price on the value that brings to our company and, by extension, to our customers."

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