Razorform Inserts

KEEP VALUE IN ONE SPOT

The ability to cut an entire part on a single machine has long eluded efforts to minimize downtime, but recent technological developments are beginning to catch up. One such advancement is Razorform Tool's indexable inserted broach tool for CNC lathes with locking spindle.

Razorform Tools carbide inserts remain in the machine turret during indexing, resulting in longer tool life while reducing downtime.

The tool provides two cutting edges per insert, so the tool body remains in the machine turret during indexing, allowing operators to skip the 10 to 15 minute-plus step of re-zeroing the tool. John L. Gardner, president of Razorform Tools, describes the process they've trademarked "The Future of Broaching."

"The angle of the pocket and the insert allow the cutting edge to jut up and make the cut, directing the vector of force down into the center of the tool body."

The combination of the tool, the design of the insert, and the insert pocket produce a stable cut with less chatter, so the insert provides longer life. Another advantage of the Razorform tools is the 4140 steel shanks, which "don't allow 'flexing' of the tool holder during the cut," Gardner says. "A solid carbide tool is so hard it is brittle. So brittle, in fact, we've heard of solid carbide tools just breaking in the middle of the cut from the stress."

The TiN-coated, double-sided micro-grain carbide inserts last longer than the typical carbide or high speed steel inserts brazed into the tip of a tool body. Gardner says this is an inferior method because "The high heat of brazing greatly weakens carbide, often times causing it to crumble during cutting, necessitating tool change-out, which means hours of machine downtime."

A third, traditional alternative is the time consuming method of transferring parts to an old style broaching machine, which typically uses

high speed steel inserts that don't last as long as carbide. Razorform inserts provide a nontraditional method of broaching that allows manufacturers to perform more operations on a part on one machine. "The key value is keeping it all in one spot," Gardner says.

Very few competitors exist in this market, according to Gardner, and those that do, while broaching in the same fashion, use small slivers of carbide that do not support the cutting force like the brawny Razorform inserts. Razorform customers, he adds, that have switched from a competitor's version report that their cutting edge is thinner and prone to breaking. In fact, the average Razorform Tools client cuts four to five times more keyways per cutting edge with Razorform tools than with the main competition.

Baldor Electric first tested the technology out in January 2006. "It worked great, and we did a lot of testing there to make sure it was holding up," Gardner says.

Many of Razorform's customers are small job shops, so it's not known which ones of them have tried cutting gears, although, at IMTS 2008, the interest from gear companies was evident. One gear company began ordering Razorform tools after the show and another started testing them and reported positive results. Due to this exposure, multiple companies are now using Razorform tools to cut gears more efficiently and cost effectively using their CNC machines.

Currently the tools are available in nine standard sizes ranging from 0.127 (for a 1/8 inch keyway) to a 0.502 (for a 1/2 inch keyway), but the company hopes to expand this product offering in the future as it grows. Another future plan for development is to offer EDM spline cutting. This is an application that didn't occur to Razorform when the tool was designed, but several customers have reported using them in this application.

"They'll take our product and EDM a spline tooth onto our insert and use that on our tool to cut splines on their CNC lathe," Gardner explains. "However, we don't offer the final product on that. The client has to EDM the cutter themselves.

EDM is definitely the next step for us in the future."

A marketing budget is something else it is planning on in the near future, but for now, keep an eye out

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for Razorform Tools at trade shows such as the Pacific Design and Manufacturing Show, Westec, Eastec, IMTS 2010 and PMTS 2011.

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BMW

SETS SAIL WITH FOREST CITY GEAR AND ARROW GEAR PRODUCTS

The BMW Oracle Racing trimaran employed gears from Forest City Gear and Arrow Gear in the engine and winch system.

Forest City Gear supplied crown gears and splines of special high-strength, lightweight and corrosion-resistant titanium for use in the engine and winch system of the new BMW Oracle Racing trimaran (originally a multi-hulled boat first used by the Polynesians 4,000 years ago). Arrow Gear supplied the bevel gears for the gearboxes.

The winches on a racing yacht are critical items of equipment. Speed, reliability and weight are important factors when determining which winch packages will be installed on a racing yacht.

Made from Ti-6-4, a popular alloy often found in aerospace applications, this material is extremely durable and was determined ideal for this project by the Alpha Engineering Consulting designers, customer of Forest City Gear. The process used to manufacture these gears and their corresponding spline components was hobbing

and shaping, respectively. The crown radius was the point of main concern, owing to the extreme stress and motion present when such gears are in use.

As Jon Williams, a member of BMW Oracle Racing's shore team explained, "During the build-up to the previous America's Cup in Valencia, Spain, we undertook development of our own transmission components for the winch systems on our yachts. After careful study, we had determined this was a critical area for improving our performance on the water." BMW Oracle Racing was looking to reduce mass and increase mechanical efficiency of the gear and spline assembly. A prototype project proved successful and the team undertook a complete redesign of the gearboxes for their USA87 and USA98 yachts. These new gearboxes were manufactured in New Zealand and used by BMW Oracle Racing in the America's Cup.

The current edition of the America's Cup sees different rules than previous Cup programs. Under these rules, all equipment for the yachts must be constructed in the country the team represents. In the case of BMW Oracle Racing, which races under the flag of the Golden Gate Yacht Club of San Francisco, all equipment must be made in the United States.

Williams says, "The construction of our trimaran was a formidable project and it was clear we needed to utilize a group of vendors with specialist skill and expertise. Our project called for a fairly wide selection of gears, splines and driveshaft components, some of which were non-standard sizes. The two vendors we selected to produce these components were Arrow Gear and Forest City Gear."

For Forest City Gear, Jared Lyford and Tom Christenson ran the project. The gearbox casings and other associated parts were manufactured by RB Enterprises of Everett, WA. For Arrow Gear, Joe Arvin ran the project to deliver the bevel gears. Final assembly of the gearboxes and their installation occurred at BMW Oracle Racing's structural R&D facility in Anacortes, WA.

At the conclusion of five weeks of intensive testing on the waters off Seattle and San Diego, the gearboxes were removed for inspection. The gears were only showing the first signs of polishing on flanks.

Williams concludes, "Arrow Gear and Forest City Gear have provided the team with a quality product. We would use them again."

continued

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Arrow Gear Company
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Downers Grove, IL 60515
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Bevel Gear Cutter

SLASHES PRODUCTION TIME

The Phoenix 280C Bevel Gear Cutting Machine from Gleason reduces cycle times by up to 35 percent for bevel gears and pinions up to 280 mm in diameter.

A high-speed automatic loader minimizes workpiece changeover to five seconds for gears and seven seconds for pinions. The machine is appropriate for automotive manufacturers looking to cut workpiece costs on the highest volumes and for job shops that need more flexibility to change parts quickly.

An on-machine inspection device reduces non-productive cycle times. The time needed to remove and inspect parts in a quality lab following a cutter change or when preparing a new part or family of parts is taken out of the equation.

Chamfer/deburr time has also been reduced with an auxiliary chamfering spindle that deburrs a gear in parallel to the one being cut, as opposed to the operation being performed in sequence after cutting.

The 280C operates more reliably in production environments where dry machining is performed. The machine's column is cast from an advanced polymer composite material that provides high thermal stability and damping, which is appropriate for high volume, dry cutting conditions. Hot, dry chips are contained away from the cutting zone.

With guarding that improves access to service areas and new features such as a servo door system with robust rails, the 280C is more reliable in comparison to machines with pneumatic door systems. Other new features include a tool-less hydraulic cutter spindle clamping design to do away with the time and effort needed to change the cutter system. Arbor changeover is faster with quick-change workholding that is removed from the front of the machine instead of from the back without special tools or fasteners.

Software for the 280C is new. Used with either Fanuc 30i or Siemens 840D CNC, the software system provides less experienced operators with the know-how to optimize setup, programming and machine operation. Diagnostics screens help debug problems, and the 280C is network-ready, so Gleason can help with problem-solving in remote diagnostics for installations worldwide.

For more information:
Gleason Corporation
1000 University Avenue
P.O. Box 22970
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Northfield Precision

MODIFIES AIR CHUCK

The Modified Model 425 Air Chuck from Northfield Precision Instrument Corporation loads workpieces sprocket side down. The sprocket face is used for axial location. The locator provides radial force (spring pins) to orient the workpiece

continued

at a 45.648 degree angle. Hardened and ground top jaws grip a 43.3 mm internal diameter toward the top of the workpiece.

For more information:
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DTR

OFFERS HOBS FOR CUTTING WIND TURBINE AND HEAVY INDUSTRIAL GEARS

DTR Corporation recently announced its full line of high-performance, large, coarse-pitch hobs for cutting wind turbine and heavy industrial gears. According to the company's press release, these hobs are precision-made with the latest in coatings and high speed steels (Grade M-2, M-35, ASP2030 or ASP2060, etc.) and ground forms up to AGMA AA quality. Hob sizes range from 5 (5.0 DP) to 32 (0.8 DP) module and OD up to 340 mm (13.0 inches).

DTR manufactures a complete line of hobs including involute, worm, chain sprocket, timing pulley, serration, spline or special tooth shape and shaper cutters for auto, aerospace, wind, mining, construction and other industrial gear cutting applications. The company exports to the United States, Europe, Japan, China, India and other East Asian countries.

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Robotic Shot Peener

CHANGES TOOLS

A robotic shot peening system from Guyson Corp. changes blast heads to automatically perform multiple peening operations without manual adjustments. A single robotic shot peener can perform various metallurgical shot peening processes that would otherwise require two or more automated blast machines.

The tool-changing blast machine features a slotted rack inside the shot peening chamber, so blasting tools are stored by the nozzle manipulator when not in use. The assorted tools required are determined by the range of components being shot peened and the peening process specifications. These may include straight nozzles of different bore sizes, a lance with an angled nozzle for ID peening, a rotary lance tool for small ID peening or a blasting tool that provides a different size of peening shot.

One wall of the 78 by 78-inch peening cabinet has a large opening with a customized protective suit for the articulated six-axis robotic arm. A laminated fabric seals the rubber-lined blast chamber, which is fabricated from a one half-inch thick continuously welded steel plate. This feature isolates the robot from the harsh shot peening environment while accommodating the full range of motion of the robotic nozzle manipulator.

The robotic machine is equipped with a 3,000-pound capacity, 65-inch

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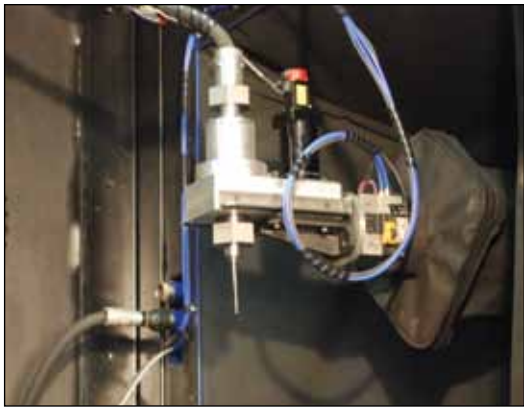
diameter turntable driven by a servomotor and controlled as a seventh axis of robotic motion. The rotary lance peening nozzle also has a servomotor drive, and the nozzle's rotation is programmed through the robot controller as an eighth axis.

In order to comply with strict aerospace shot peening specifications, the nozzle manipulator is capable of repeatedly following the contours of complex-shaped components while constantly and accurately maintaining the correct stand-off distance, nozzle angle and surface speed required for the precisely controlled, cold-working metal treatment process.



Interested customers are invited to submit sample components for free lab testing and application engineering evaluation at Guyson's factory in New York.

For more information:
Guyson Corporation
13 Grande Blvd.
Saratoga Springs, NY 12866
Phone: (518) 587-7894
www.guyson.com

Rex-Cut Abrasive Wheels

OFFERED IN VARYING GRITS

The universal Type 27 unitized abrasive wheels are for grinding, blending and polishing stainless steel, mild steel and aluminum. The Rex-Cut Megabrite T27 Unitized Wheels are all purpose and come in coarse, medium and fine grits for light grinding, blending and polishing applications. They are suited for edge breaking, light deburring, weld surface prepara-

tion, scale removal, rust removal, flash removal, blemish removal and paint preparation.

The wheels are available in 4.5 and five inch diameters with and without hubs. According to the company's press release, they are smooth-running, quiet and provide good operator control and wheel life.

For more information:
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www.rexcut.com

Furnace Temperature Uniformity

BENEFITS FROM IN-DOOR HEATING

The Number 921 electrically-heated, 2,000 degrees Fahrenheit, heavy-duty box furnace from Grieve Corporation is currently in use for various heat treatments at a customer's facility. Workspace dimensions measure 24 inches wide by 48 inches deep and 24 inches high. Nickel chrome wire coils are installed with 34 kw of power, which is supported by vacuum-formed ceramic fiber to provide heat to the workload. An in-door heating element provides more temperature uniformity.

The 921 unit features seven-inch-thick insulated walls with five inches of 2,300 degrees Fahrenheit ceramic fiber and two inches of 1,700 degrees Fahrenheit fiber. The six and a half

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floor insulation has four and a half inches of 2,300 degrees Fahrenheit firebrick and two inches of 1,900 degrees Fahrenheit block insulation. The furnace has a 3/16-inch steel plate reinforced shell and a half an inch steel front plate construction.

A motor-operated vertical lift door is a feature along with a digital programming temperature controller and manual reset excess temperature controller with separate contactors for efficiency and safety.

For more information:
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CoroMill 490

OFFERS 10 MM DEPTH

The Sandvik CoroMill490 is a milling cutter that can shoulder mill, face mill, edge, contour, slice, slot in all materials, and the latest version of it can take up to 10 mm depth of cut.

The 13 mm insert is designed for larger depths of cut and engagements up to 10 mm. The new insert size is

included as part of an expanded program of cutter bodies in diameter range 40 to 250 mm and in grades and geometries for steel and cast iron machining.

For more information:
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25 Bar Furnace

A VIABLE ALTERNATIVE TO OIL QUENCH

Seco/Warwick introduced a 25 Bar Single Chamber Vacuum Furnace as a process alternative to vacuum furnaces using an oil quench. The 25 Bar HPQ provides the same hardness properties as an oil quench, and when it is equipped with optional PreNit and FineCarb advanced LPC vacuum carburizing technology, the furnace can reduce cycle time by up to 50 percent in certain applications.

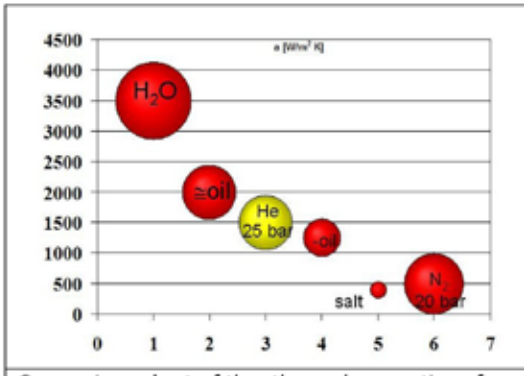
Using helium as a quench medium, the 25 Bar furnace lowers distortion and renders parts washing unnecessary. Loads are both heated and quenched in the same chamber with the single chamber furnace. Many of the problems associated with oil quenching are minimized with the 25 Bar HPQ including the disposal of spent quench fluids, the requirement for a washer to clean parts and post heat treating machining needed to compensate for part distortion in oil.

Helium is used as a process atmosphere to maximize cooling. Recycling

continued

systems are available to recover and reuse the helium, which tends to be higher cost than other process gases; however, there are many choices for supply systems, and helium follows the same installation guidelines as nitrogen.

Seco/Warwick is offering free trials for a limited time at its R&D facility, so companies interested in the process can obtain a full metallurgical report for their samples without any risk. Customers that decide to invest in the new technology will receive extra field support to assure proper installation and efficient operation.



Comparison chart of the thermal properties of a variety of common quench mediums.

For more information:
Seco/Warwick
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Grob Systems has developed a small rotary table for its G-350 five-axis machine, so it is now capable of producing precise, thin, cylindrical workpieces. The machine upgrade targets tool manufacturers that make boring bars with complex insert seats and turbine manufacturers making blades.

The five-axis machine's two rotating axes work for both primary industries; although, blade machining requires a high level of dynamics because of abrupt reversing points at the blade transition from one 3-D surface to another.

The machine is capable of workpieces with a diameter of 250 mm. The table's rigid backbone has 375 mm between the table surface and the tip of the support for clamping both sides. Fixtures corresponding to the workpiece can be designed for the rotary table for radial clamping.

Up to four hydraulic couplings are included on the table for hydraulic clamping and unclamping. A hydraulic flow meter (at 120 bar/1,740 bar) adjusts the stroke necessary to clamp different parts.

"Volumetric accuracies are what make this Grob option so outstanding for thin cylindrical parts," says Bob Ruelle, Grob Systems account director for standard machining centers. "A large table top would be problematic for small, thin and complex workpieces clamped at the ends, which need the entire surface machined.

"Longer tools with a greater projection would be necessary and the risk of collision would be increased," Ruelle says. "For this reason, we developed the small table, put it into testing and discovered its usefulness for more than just machining cutting tools and turbine blades. It can be used to develop parts for optical electronics, medical technology, tool and mold making, essentially to produce electrodes."

continued

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Water-Soluble Coolants

INCREASE SUMP LIFE

The Rustlick PowerCool MaxLife and PowerCool MaxLife CF coolants are water-soluble oils with new additives that formulate to provide maximum biostability and performance for heavy-duty cutting and grinding applications. The technology employed, from ITW Rocol North America, increases sump life, decreases overall fluid use and high performance.

The PowerCool MaxLife coolants are safe for all metals, including ferrous/non-ferrous metals, aluminum, brass, bronze and copper. They can be used for a range of low- to heavy-duty applications including machining, cutting, grinding and milling.

The coolants come in chlorinated and chlorine free versions. The Rustlick PowerCool MaxLife contains chlorinated EP additives, and PowerCool MaxLife CF contains non-chlorinated EP additives and is recommended for use on titanium. Both products are available in five or 55 gallon containers.

For more information:
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www.rocolnorthamerica.com

Mobile Induction Heater

TREATS METAL PARTS

Digimac is a compact, transportable induction heating system from GH Induction Group. It is capable of outputs up to 25 kW and 20 kHz.

The system includes the generator with digital interface for control and a handheld transformer and coil. The MPC control provides power regulation, alarms and cooling water flow data. There is an optional semi-automatic mode with energy control available. Temperature feedback can help control the heating cycle, and pre-programmed heating cycles can be stored in memory. Digimac is used for various industrial applications including heat straightening metal parts, welding cooling pipes, paint and varnish cleaning and sealing.

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