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Abrasive Nylon Brushes Boost Machine Shop Quality and Throughput

Delivering automated deburring and complete surface finishing of workpieces in a single online operation

One of the more noteworthy advancements in tools for in-line machine deburring, edge radiusing, cleaning and other surface finishing applications is the abrasive nylon brush. Now, with new advances in abrasive technology, machining center operators are able to complete surface finishing simultaneously with other machining operations, to speed product completion, improve on quality and save on off-line finishing time and costs.

Abrasive nylon brushes are, for automated applications, densely bristled brushes composed of abrasive and flexible nylon filaments attached to a machine-mountable base. Each filament contains grit particles that provide machining actions such as deburring, cleaning, edge blending, polishing and other surface finishing functions.

Although there are a variety of sizes and shapes available, when configured for CNC or robotic applications, typically thousands of nylon filaments containing the appropriate grit are affixed in clusters to a single base that is mounted (e.g., via drive arbor) to the machining equipment.

Common applications for these tools include: deburring, cleaning and rust removal, preparing surfaces for plating or painting, spot finishing, and polishing. Tools they commonly replace are grinders, polishing heads, chamfering tools, hand deburring and other



NamPower abrasive disc brushes contain a unique combination of both ceramic and silicon carbide abrasive in two fill configurations: Dot Style, for general purpose deburring and surface finishing and Turbine Style for more aggressive deburring.

equipment.

“The abrasive filaments work like ‘flexible files,’ conforming to workpiece contours, wiping and filing across part edges and surfaces to deliver maximum burr removal rates along with an ideal surface finish,” says Eric Sun, Founder of Orange Vise Company, a machine shop and machine tool manufacturer located in Union City, CA.

A quality abrasive nylon brush is very durable and self sharpening, providing excellent performance and wear life. Because of linear filament construction, as these brushes come in contact with work surfaces during machining use, filament grit wears off, exposing new cutting particles. In that manner the brush continues to be sharp. Also, unlike the bristles of metal brushes, the nylon

fibers are not prone to deforming or breaking off.

“A problem with wire brushes is that the bristles tend to shoot out, they don’t really stay put,” Sun explains. “When they bend, they often stay permanently deformed.”

In fact, abrasive nylon fibers offer improved compliancy to the contours of even very complex workpieces, preventing damage while ensuring consistent finishing quality.

Sun notes that using abrasive nylon brushes can also eliminate the need to use other tools in automated applications, such as chamfer tools for deburring, and face mills for surface polishing.

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“This tool is also applicable when tumbling would be required to achieve extensive deburring,” he adds. “While tumbling can certainly produce a nice surface finish, it can also create minor defects on parts because they come into contact with one another. Although it may take an extra minute or two to completely finish workpieces in the machine using the abrasive nylon brush technology, in my experience it is usually worth it in terms of quality and costs.”

Options available

Among a variety of abrasive nylon brush tools available, Sun has adopted the NamPower™ line offered by Brush Research Manufacturing (Los Angeles, CA).

“We have two different patterns of these brushes, one is called the Dot-Type, while the other is called Turbine Type,” he says. “We use the Dot Style for deburring highly contoured workpieces with a lot of peaks and valleys. It is particularly economical for light deburring operations when short cycle times are important.”

Sun adds that the Turbine Style brush has a more aggressive pattern and is used mainly for medium and heavy deburring applications. This style of brush is better suited towards flatter workpieces with fewer contours and can be used to simulate a milled finish without actually removing any material.

Both these styles of abrasive nylon brushes are available in a variety of abrasive types and grit selections to work with materials including a wide range of metals, super alloys, plastics, advanced composites, metal matrix and ceramics. Both brush styles are available in three different diameters and two different trim lengths to suit most applications and can be used to

automate processes on VMC, HMC, CNC and robotic applications, producing a consistent finish from part to part.

Composed of flexible abrasive nylon filaments bonded to a fiber reinforced thermoplastic base, NamPower abrasive disc brushes contain a unique combination of both ceramic and silicon carbide filaments. Although there are other abrasive nylon filament products that utilize silicon carbide or ceramic, it is

the combination of both in one tool that makes this type of abrasive nylon brushes unique. The ceramic abrasive is engages for material removal, but tends to cut a bit coarse. The silicon carbide acts as a buffer to the cutting action. The end result is deburring and surface finishing in a single operation.

These brushes work well with non-ferrous, cast iron, mild steel and ductile iron, stainless and alloy steels, titanium

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and high nickel alloys.

“We weren’t expecting to use brushes so much, but we’re finding more and more uses for them,” says Sun. “We use the same brushes for aluminum, steel, cast iron and stainless steel without having to swap them out very often.”

One such application, and one of its primary purposes, is for edge blending.

According to Eric, Orange Vise utilizes a variety of deburring tools, including a 45-degree chamfer. Although the tool doesn’t typically leave a burr, when it begins to wear – even slightly – it can. Based on this possibility, Orange Vise required an employee to inspect each part and handle any burrs by hand. Now the company automatically deburrs chamfered holes and edges using the NamPower abrasive disc brush in addition to chamfering with a 45-degree

milling cutter. The redundant operation of brushing adds minimal cycle time, improves surface finish, and ensures burr-free parts.

Sun adds that shops using CNC and other automated machining equipment can benefit significantly by adopting this type of abrasive brush technology.

“With this type of equipment working into the evenings and weekends, it’s really desirable to get the finishing operations done straight out of the machine,” he says. “While some shops running three shifts - if they have the personnel and the capacity - they may still prefer to use their machines producing parts – not deburring. But for many operations it’s actually more efficient to let the machine do everything online, so that the part comes out ready to wash and box for delivery to the customer. That can really make a big

difference, because you’re using any unutilized machining hours, plus you’re automatically producing parts with consistently high quality.”

New developments are also on the horizon. Brush Research is set to release several new products featuring diamond and ceramic impregnated filaments. A new series of affordable diamond filament wheel brushes is designed to finish harder materials like ceramic and carbide. Several new end brush designs featuring ceramic filament will be available in smaller diameters to provide the benefits of abrasive nylon finishing and small parts and recesses.

For more information, contact Brush Research Manufacturing, Brush Research Mfg. Co., Inc., 4642 Floral Drive, Los Angeles, CA 90022; Phone: (323) 261-2193; Fax: (323) 268-6587; email: info@brushresearch.com or visit the web site: www.brushresearch.com •

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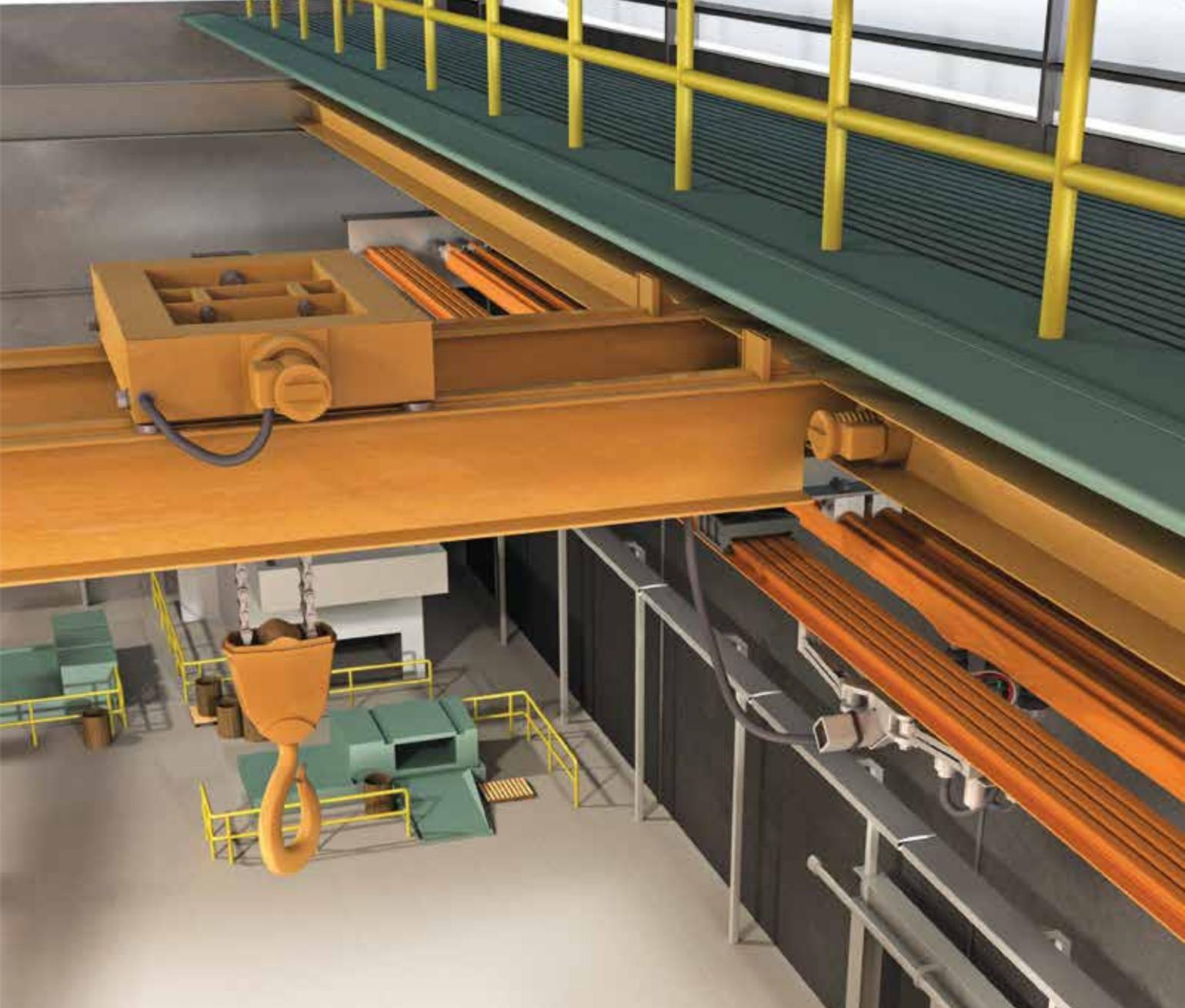


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Atlas Copco launched new version of intelligent compaction system during World of Asphalt



Atlas Copco's new, easy-to-use intelligent compaction system gives contractors real-time material stiffness readings to ensure superior soil and asphalt compaction. This maximizes operator productivity, which results in saving contractors significant time and money. And, its touch screen capability makes the system user friendly and convenient.

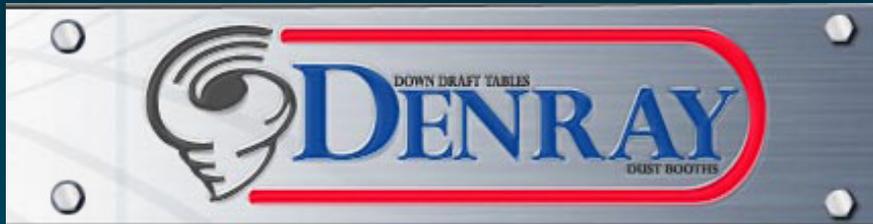
Atlas Copco launched the new version of the intelligent compaction system March 17 -19 at booth 2514 during World of Asphalt in Baltimore.

The intelligent compaction system uses a global navigation satellite system, such as GPS, to track the number of completed passes and a drum-mounted accelerometer to measure the surface's relative material stiffness. The system gives operators immediate materials stiffness results from within the cab to help minimize the number of passes. When using the system on asphalt, it also detects the temperature of asphalt to provide consistent, relative stiffness readings. In addition, Atlas Copco's intelligent compaction system helps contractors detect any loose materials so they can perform additional passes to reach the right compaction. This minimizes the risk of production related quality defects, which are time consuming and costly to remediate.

Contractors can use the intuitive system on a tablet to set project parameters and view compaction data. Once they achieve the optimal level of compaction, the program alerts the operator, so he or she can stop and reduce the risk of over compaction, which can affect the integrity of the material and damage the roller.

The data storage also means contractors have the results readily available to print off or display for Federal Highway Department inspections.

The system is available on Atlas Copco CC2200 through CC6200 asphalt rollers and CA2500 through CA6500 soil rollers. For additional convenience, contractors can get free on-site training from an Atlas Copco representative or dealer. •



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Brokk Introduces New TC120 Tank Cutter Attachment

Brokk Inc. releases the TC120 Tank Cutter attachment. Manufactured by their sister company, Darda, this attachment delivers maximum cutting control and ultimate versatility for continuous steel cutting abilities that are unparalleled in the industry.

The 47-by-17-inch TC120 Tank Cutter can be used with the Brokk 160, 260 and 400 models to deliver extraordinary precision. The TC120 brings flexibility to the jobsite with its hydraulic rotation capabilities and five-inch-wide jaws. It exerts 75 tons of cutting force at 7,250 psi to easily cut through half-inch thick steel plate.

Although this attachment can be used in a variety of applications, such as in salvage yards and balers, it's commonly employed for cutting steel tanks, pipes and vessels.

The most common method of cutting steel, an open-flame torch, poses a fire hazard when cutting into flammable tanks and vessels, and it can raise the risk of exposure to harmful emissions. By using the electric Brokk machine with the TC120 instead, operators reduce the risk of exposure to toxic emissions as well as prevent fires.



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“This revolutionary product defines versatility. It combines power, efficiency and, above all, safety,” said Mike Martin, Brokk Inc.’s vice president of operations. “Safety is vital. When cutting tanks, you never know what you’ll run into. You don’t have to worry about that with the Brokk machine and TC120 combination. Since it’s electric, you reduce the risk that comes with cutting into potentially flammable tanks.”

In addition to heightened safety, the TC120 improves productivity by continuously cutting steel.

“For the first time in the industry, there’s a safe, easy, high-productivity option for cutting steel,” Martin said. “Combining the Brokk machine with the TC120 attachment is like powering a giant scissors – it slices through steel like a scissor to paper.”

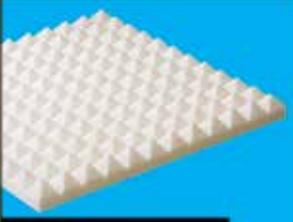
The TC120 attachment also benefits contractors with its extended reach. Brokk machines’ remote capabilities, coupled with arms that extend as far as 27 feet, easily reach places others can’t, improving efficiency while minimizing labor costs. Because it’s attached to a Brokk machine, it reduces the risk of injury to laborers by eliminating the need to climb scaffolds and ladders with torches to get to hard-to-reach spaces.

The TC120 is one of many Brokk attachments that can be quickly interchanged for greater versatility on a job-site. Brokk Inc. supplies a wide range of remote-controlled machinery and attachments, maximizing productivity, improving efficiency and promoting safety. •



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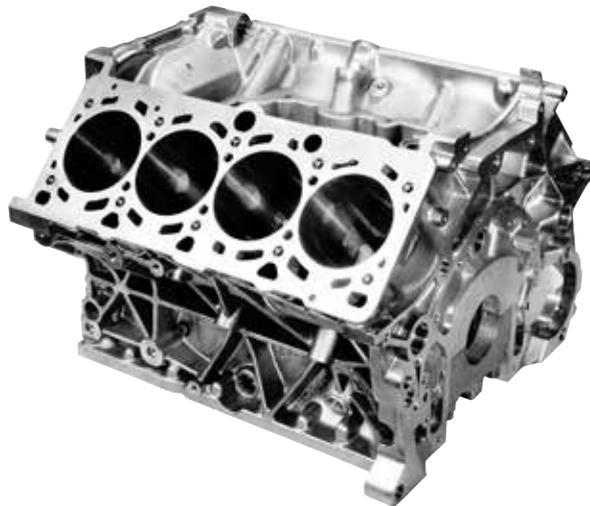
Different Thinking Drives Asymmetric Boring Revolution

Innovation in precision boring increases productivity, reduces costs

Precision boring is a vital process in manufacturing many critical components. The accuracy and finish of a multi-journal crank bore in an engine block relates directly to power and fuel efficiency, and the time it takes relates directly to the engine company's profits. Precision bores in numerous engineered components are essential to critical performance metrics. Such bores must meet critical tolerances; but the downside is that precision boring can be costly and time-consuming, with a small mistake or error resulting in the scrapping of expensive parts. The response from Kennametal is a geometric and asymmetric line boring bar solution being termed a revolution in the process by delighted users.

By definition, boring, as opposed to drilling, is a machining process in which internal diameters are made in true relation to the spindle centerline. This process is most commonly performed with the workpiece held stationary and the cutting tool both rotating and advancing into the workpiece, although boring is also done with the cutting tool and the workpiece being adjustable.

Common applications for boring include the enlarging or finishing of



cored, pierced, or drilled holes and contoured internal surfaces. Related operations sometimes performed simultaneously with boring include turning, facing, chamfering, grooving, and threading.

How It's Done

Envision a small engine block with five in-line journals requiring crank bores. Conventional thinking for a multi-journal finishing assignment, for example, involves a multi-blade guidepad reamer with the following suggested process (here designated as Option 1.0):

- A pilot reamer finishes the first journal
- The multi-blade reamer is fed in and semi- and final-finishes jour-

nals 2 through 5.

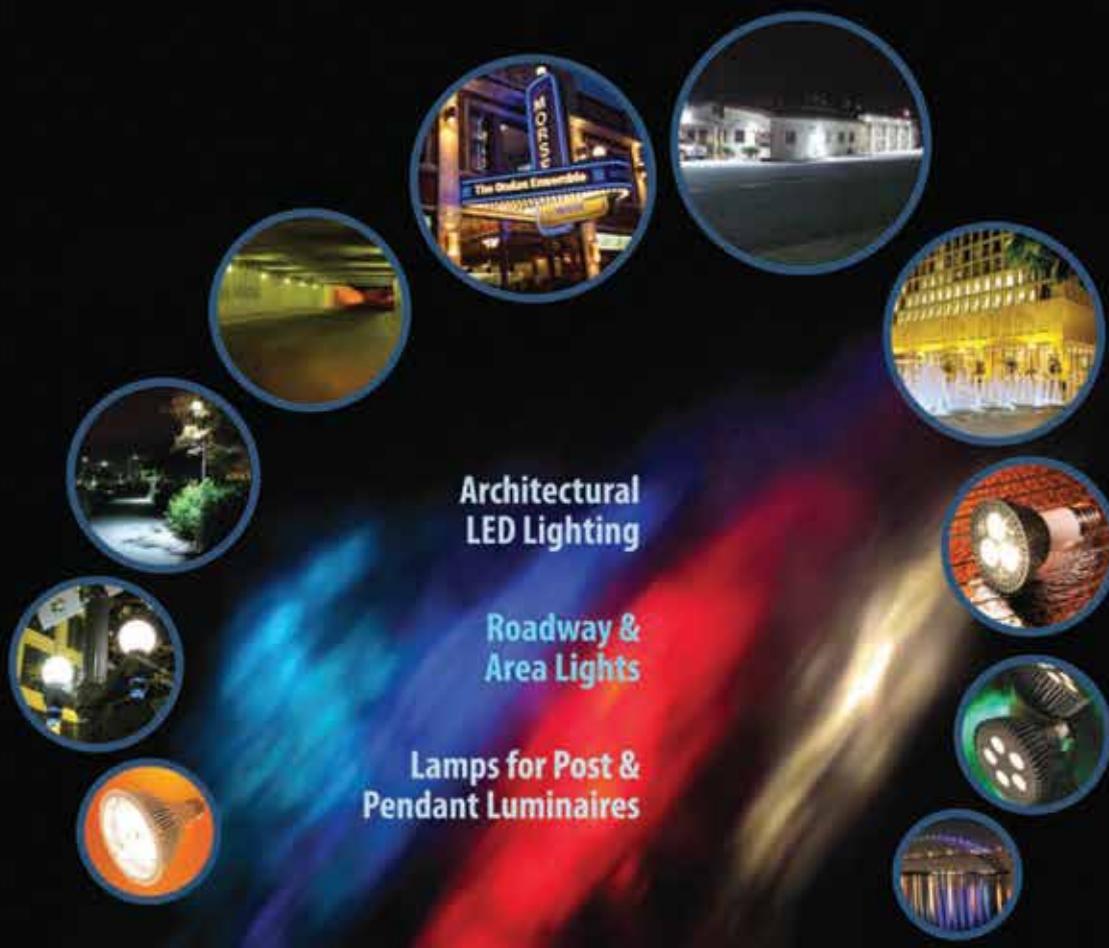
- The reamer is then retracted.

The advantage of such a process is that it lends itself to use on CNC horizontal or multi-axis machining centers and does not require a dedicated boring machine with dedicated fixtures. However, depending on the size of the workpiece, the machine tool must be of sufficient rigidity or quality can fall off dramatically. Also, feed-in and feed-out of the reaming tool over finished bores must be done slowly and precisely or retraction marks and/or damage to the cutting edges will occur.

Another general option for machining this kind of bore is line boring (Option 2.0). The basic issue to be solved at this option is how can the cutting blades and the tool's guide pads pass through unfinished journals with smaller hole diameters?

CNC machine tool builders have responded to this quandary with using conventional line boring bars and "counter-bearing" capabilities on their equipment. The process looks like the following:

- The workpiece area of the machine tool lifts the cylinder block up
- The line boring bar is fed through the component into a bearing at



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- The cylinder block is adjusted down and clamped
- Crank bores are semi- and final-finished
- The cylinder block is lifted up and the boring bar retracted

The process speeds up feed-in and feed-out, and because the tool is supported on both ends; the geometric quality of the finished bore is improved compared to reaming option 1.0. On the downside, lift functions require special fixturing and CNC control, and the required counter-bearing on the fixture makes any additional back-side machining impossible.

Multi-axis machine tools with tilting worktables and/or tilting spindles together with more evolved boring bars contribute to Line Boring Option 2.1 with expandable guide pads, where the process evolves to the following:

- A pilot reamer is fed in and finishes journal 5
- The component (or machine table) gets rotated 180 degrees
- The machining center X-Y axis is adjusted to feed the boring bar in off-center
- The boring bar with guide pads is centered into journal 5
- Guide pads are expanded
- Journals 1 through 4 are semi- and final-finished
- Guide pads are fed back in
- The boring bar is retracted off-center

Option 2.1 uses the multi-axis adjustability of the machine tool. It retains the advantages of Option 1.0 by eliminat-

ing the need for any lift function or counterbearing and Option 2.0 with support on both ends of the tool. The disadvantages are that the complex internal mechanics of this type of boring bar are costly and can be difficult to handle. Insufficient lubrication use can damage sensitive internal mechanics, and if not monitored exactly, the tool can jam or hook in the workpiece and cause damage to the machine, fixture, tool, and part.

An Asymmetric Solution

In collaboration with a major automotive manufacturer's engine block operations, Kennametal engineering staff has advanced the boring function with Option 3.0, asymmetric line boring. This is a geometric leap forward that accentuates the advantages of reaming and line boring while virtually eliminating the disadvantages of both.

As with most advanced solutions, the principle at the foundation is quite basic. Normal guide diameters are of full material or build of 3 or more guide pads, providing no degree of freedom from the bore wall while feeding in and out. The Kennametal solution supports on guide pads in a setup similar to a typical guide pad reamer, but the guide pad, normally located 180° to the cutting edge, was rotated so the resulting design provides freedom to enter and exit the guide part even passing through the raw bores. This geometry allows feeding the bar through raw bores on an eccentric path. The process, then, looks like this:

- A pilot reamer is fed in and finishes journal 5
- The component (or machine table) gets rotated 180 degrees

- The asymmetric boring bar is fed in off-center using the machining center's X-Y axis
- The tool is moved to the center and finishes journals 1 through 4 simultaneously
- The tool is retracted off-center with fast feed out.

Such asymmetric line boring retains all the advantages of previous line boring efforts -- high-quality precision bores, support on both ends of the tool, while no expensive lift functions, obstructive counter bearings or critical mechanisms inside the tool are needed. It also adds the fact that complete feed-in and feed-out moves can be done at increased feed rates on conventional machining centers, adding efficiency to the process.

Naturally, being a Kennametal solution, the indexable inserts offered with this eccentric boring bar solution are also advanced. High-precision RI8 inserts have eight cutting edges with pre-defined back taper, which allows for high feed rates. Diameter can be adjusted to the precision of 1 micron. The high clamping force provided by the conical clamp screw avoids any settling effects.

Both inserts and the asymmetric boring bar are designed so the inserts clamp directly into the boring bar body. This eliminates the need for cartridges and the additional tolerances and space they require.

In short, this asymmetric line-boring solution increases machining robustness, process speeds, and reduces tool maintenance and handling, all while being compatible with CNC machining centers -- a solution any manufacturer in search of process improvements will find anything but boring. •

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Clamping Force Gauge Testit, Clamping Force Measurement Over Machine Control

Hainbuch and Siemens Enter Into Partnership

The Siemens Sinumerik CNC controllers have been getting the maximum productivity out of each machine for over 50 years. Now they have another partner on their side: the Hainbuch Testit software. It is available on a data carrier for installation on Siemens CNC controllers [Sinumerik 840 D sl plus PCU50]. This means that a separate laptop is not needed anymore and manufacturing with »theoretical clamping forces« is also a thing of the past. Thanks to Testit, the operator always knows which clamping forces exist and where, and the actual maintenance status of the clamping device. And given the safety standard DIN EN 1550, it is a »must have«. This means: The Testit clamping force gauge together with the Siemens CNC controller executes a target-actual comparison of the maintenance status of a clamping device. If the limit values are underranged, a warning message is output. Perfect, don't you think?

Trust is good, control is better

Based on his apprenticeship a machine operator or programmer has been taught to work in such a manner that a workpiece does not get destructed, e.g. when programming the manufacturing steps he builds in a lot of safety measures to minimize this risk. However, in reality, effective measurement data regarding the holding forces of a clamping device, and also in regards to the clamping forces of the clamping cylinder itself can only be obtained as vague reference values. A machine operator who knows how dependent the holding forces of a clamping device

derive from its current maintenance status are, or from the centrifugal force losses while turning with jaw chucks, is extremely sceptical of such makeshift calculations and hence builds in a high safety value. Machining of easily deformable components is also extremely critical. Usually only a very small margin of holding force is available. If an item is clamped too strongly, a sensitive component will be excessively deformed. Applying too little clamping force results in an inefficient set-up for rational machining.

Safe results - even with mandrels

However, the globalization of markets requires an optimum of the machining process. Those who face stiff competition can no longer afford to manufacture just by »feeling«. Measurement data is demanded! It not only functions perfectly for outer diameters and during rotation, it also precisely measures the holding force of mandrels for inner diameters.

Key advantages:

- ▶ Clamping force measurement for O.D. and I.D. clamping
- ▶ Can be used rotating [under RPM] and for stationary applications
- ▶ Direct input onto the Siemens CNC controller





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Mr. Beams Introduces New NetBright Motion Sensor Spotlights with Radio Frequency Connectivity

Wireless Environment introduces the new Mr. Beams™ LED Spotlights featuring new NetBright™ technology that uses radio frequency connectivity to link multiple Spotlights on one network.

These bright LED wireless motion sensor NetBright Spotlights offer a great solution for security and safety applications for home or professional use. The Spotlights utilize super-efficient LEDs, which provide a year or more of outdoor lighting on one set of 3 D-cell batteries.

NetBright technology uses radio frequency transceivers to allow the lights to create a private wireless communication network and operate in coordination with other lights in the system.

When one Mr. Beams™ NetBright Spotlight detects motion, it automatically illuminates and sends an “ON” signal to other spotlights in its network, triggering them to illuminate as well. The last unit to detect motion will turn off after 30 seconds of inactivity and send an “OFF”



command to the other units, thus turning all of the lights in a group OFF at the same time.

Each Mr. Beams NetBright Spotlight provides 200 lumens of energy efficient light, with each set of three D-cell batteries providing up to 5000 activations. Each light is equipped with four channels, creating separate networks that, for example, permit spotlights mounted on the rear of a building to operate independently of lights located on the side of the building. Up to 50 spotlights can be connected on each of these 4 channels within one NetBright network, and they can operate at a range of up to 200 feet.

Plus, like all Mr Beams LED Products, the NetBright Spotlights are wireless and do not require an electrician for installation. Mounting is simple and takes less than 5 minutes. Place them anywhere you need bright light: on a house, garage, or barn, or even on a tree or post – no wiring needed. The NetBright Spotlights offer the ideal solution for complete perimeter lighting for large areas around the home or office. The Spotlights are designed with tight water resistant seals and UV resistant material for operation in all weather conditions.

Additional New Mr. Beams Products

Mr. Beams™ energy efficient, wireless LED light fixtures offers indoor and outdoor LED lighting solutions where you need them most. Motion-sensors activate battery-operated lights, equipped with auto-shut off timers and light sensors to provide convenient and affordable hands-free lighting anywhere.

UltraBright Spotlight – Mr. Beams brightest wireless outdoor security spotlight. Mounts to a wide variety of surfaces to provide light where you need it most, including outside a home, office, warehouse, boat dock, etc.

Ceiling Light – Created to light up dark areas at home that do not have standard wired lighting in most cases. Can be mounted in under five minutes to brightly illuminate dark closets, pantries, showers and sheds.

Path/Deck Lighting – Mr. Beams offers a variety of battery operated Path/Deck

Lighting as a great alternative to solar and wired lighting. Both the UltraBright Path Lights and Compact Path Lights are affordable, easy to install, and do not need to rely on sunlight to safely illuminate paths and driveways at night.

Mini Stick Anywhere Night Lights – Offers a convenient lighting solution available for use in areas where an outlet is not accessible. These handy Night Lights can be used to light stairways, hallways, bathrooms, bedrooms, and other areas of the home that need to be safely navigated in low lighting situations.

For more information on the new NetBright system, visit www.mrbeams.com.

About Wireless Environment, LLC

Wireless Environment, LLC, is a successful, fast growing technology company based in Solon, Ohio. The company mission is to design lights that operate fully off-grid or shift between wired and wireless. Since Michael Recker and David Levine founded the company in 2006, they have acquired 13 patents for their technology and launched two successful product lines for both residential and commercial needs. The Mr Beams™ line of motion sensing lights are the number one wireless light on Amazon.com and the ReadyBright™ Power Outage Lights were awarded the 2013 Good House-keeping VIP Award. We offer a number of customizable lighting solutions and licensing opportunities. Sixteen wireless lights have been launched to date and the company will soon launch hybrid light fixtures that – like laptops – are on the grid when needed and off the grid when convenient. For more information visit <http://www.wirelessenv.com>.



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