CUTTING Times

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with better tools from DAPRA

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From the President

We want to make our newsletters as interesting and informative as possible. Your opinions and suggestions are important to us, especially those regarding our product line and the quality of service we provide. Your input is the basis for our output. Please address your comments to me at twatson@dapra.com.

From 1979 through 1985, Harry Gray, the Chairman of United Technologies, spearheaded a Wall Street Journal advertising campaign that generated over five million letters and requests for reprints. The campaign consisted of 75 different full-page ads. Although each ad addressed a different subject, the underlying theme was "How we perform as individuals will determine how we perform as a nation." As a credit to Harry Gray, the content of this unique campaign remains meaningful and timeless. It is with his kind permission that we will feature selections from these ads in *Cutting Times.* The first is as follows:

"Don't Promise What You Can't Deliver."

"I'll have your parts in two weeks." Four weeks later the parts arrive.
"I'll put it in your hand the minute you walk in the door." But all you get when you walk in is a handshake.
"Dinner will be at 6:00." But as you dip your spoon in the soup, the clock strikes 7:45.
"The doctor will see you in five minutes." 35 minutes later, you're greeted cheerfully: "And how are we today?"
Avoid a lot of grief and inconvenience for the people you deal with. Think before you announce how long something will take – and then deliver what you promised. On time.

Sincerely,

Tom Watson

Tom Watson, President

Milling Update:
The Many Benefits of Copy Milling Cutters

Dapra's Toroid Cutters, more generally known as copy mills or button cutters, are a simple variation of the typical end mill in that they utilize circular insert geometry as opposed to traditional parallelogram or square inserts. This difference provides a variety of new benefits to the user, most of which complement today's trend towards high-speed machining (lighter depth of cut and fast feed rates). These benefits include:

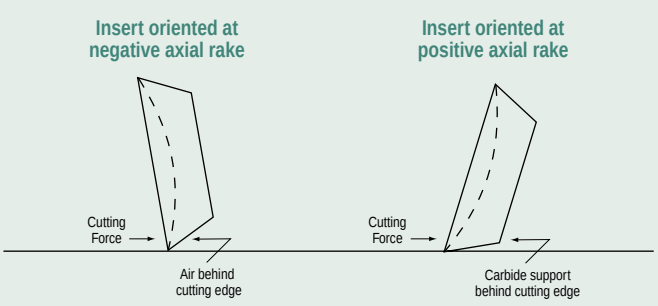
Plunging Capability – Some copy mills possess the ability to plunge directly into the material, similar to a drill. This is especially true with the end mill version, but only where the manufacturer has built in sufficient clearance on the bottom of the cutting tool to allow this movement. It should not be interpreted that the cutter could take the place of a drill; the surface area engaged is much too large to continue much beyond the desired depth of cut. However, having the ability to plunge removes some common machining headaches from many applications.

Enhanced Helical Interpolation/Ramping Capability – Larger-diameter hole-making can be quick and easy with the combined use of a Toroid cutting tool and helical interpolation. Without the presence of a start hole of any kind, the tool simply is positioned at the inside diameter of the hole and begins a helix from there. Interpolating downward in Z-axis with each 360º rotation of the tool within the hole, the tool executes complete material removal from the hole by ramping down towards the final depth. This operation is typically smooth and without the high horsepower consumption often present in large-diameter hole making.

Application information for 1" dia. Toroid Cutter:

Hole: 4" dia.	**200 IPM**
Material: 4140PH	**.035" DOC**
4000 RPM	

Strongest Cutting Edge/Better Cutting Force Distribution – With no corners to break, a round insert provides the strongest cutting edge available in an indexable carbide insert. This comes in handy when operating in a heavy cut or attempting roughing cuts in an unstable environment. When cutting with a long-reach cutting tool, the round inserts are more forgiving of tool deflection/chatter, allowing faster feeds and speeds without significant concern for insert chipping. With the round cutting edge, the cutting forces are spread out more evenly, with a large percentage of the tool pressure directed into the axial direction.



Copy mill cutters utilizing positive axial rake provide not only a smoother cut, but also much better cutting edge support.

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Milling Update:

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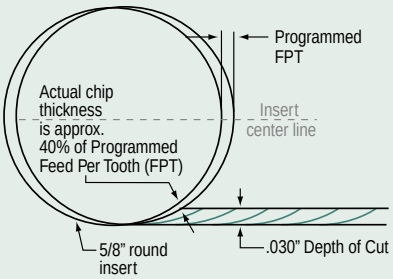
More Usable Edges than Typical Carbide Inserts – Depending on the size of the insert and the depth of cut, a typical round insert will provide between 4 and 8 effective cutting edges/indexes, yielding at least twice the total material removal and minutes in the cut of typical parallelogram or square inserts. This means fewer trips to the tool crib for new inserts (keeping the operator at the machine and the tool in the cut), fewer inserts to stock in inventory (lowering on-hand inventory costs), and a lower cost per cutting edge.

High Metal Removal Capabilities with Lower Horsepower Consumption – Applied correctly, round inserts can yield impressive material removal rates without creating the demand for excessive horsepower. With the strength of a round insert, feeds that would not be possible with 90º cutting tools can now be made, allowing even lighter-duty machines the capability for aggressive roughing.

Roughing Closer to Finish Size – Rather than the large, uneven steps left by the 90º tool, the surface is left with much smaller "scallops," low in height and easier to machine through. This effect is helped by the fact that round inserts are optimally applied at lighter depths of cut, meaning the scalloping effect is kept to a minimum. With these reductions in step size, the remaining stock is much more even, yielding a surface that can be either semifinished aggressively or, in some cases, finished without the semifinish step.

Whatever your milling application, the benefits of copy mill cutting merit consideration. If you want to learn more about these tools, it is recommended that you read the in-depth article on copy milling cutters when you visit **www.dapra.com**. More information on Dapra's Toroid Cutters is also available at this address.



The heavier the depth of cut, the greater the chip thickness and the more horsepower consumed.

DAPRA™ Q & A

Q. What do the Dapra roughing insert grade designations, such as DMP257, mean?

A. Dapra's grade designations are surprisingly easy to interpret. The letters "DM" stand for "Dapra Milling." The "P" is the ISO material's group designation, which includes carbon and alloyed steels and some martensitic stainless steels. This letter may appear as a "K" for cast iron, some high-temperature alloys and many nonferrous applications, including aluminum, or as an "M" for stainless steels.

The numbers "25" represent the ISO classification within the material group for toughness/hardness. A lower number, for example "10," would represent a hard substrate, providing good wear resistance but poor toughness. A higher number, such as "40," would represent a tough, shock-resistant substrate capable of more abusive cuts, but providing shorter edge life or wear resistance.

The final number, in this case "7," represents the coating applied to the substrate, or uncoated insert. Dapra's coating matrix typically adheres to the following pattern:

Grade Designation	Coating
0	CVD TiC/Al_2O_3
1	PVD TiN
3	PVD TiCN
5	Original TiAlN (bronze color)
6	Newer TiAlN (violet)
7	AlTiN (black)
9	TiAlN with slick-coat

Q. How do I pick the best coating for my application?

A. Coating selection can be done fairly easily if a typical rule of thumb is followed. Use TiCN (number 3 – see previous question) for applications at slow-to-medium operating speeds or low-to-medium temperatures. Use AlTiN (number 7) for applications at high operating speeds or temperatures. For applications susceptible to built-up edge, the TiAlN with slick-coat (number 9) is recommended. The use of TiN (number 1) is no longer recommended for most applications.

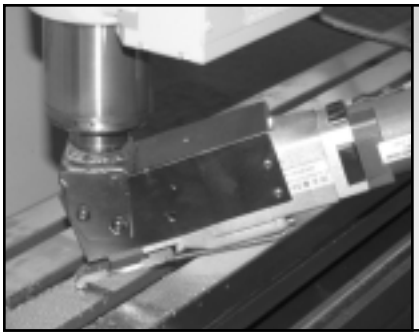
Q. Why does the Feed and Speed chart have such a wide range? For example, in the Ball Nose catalog, the PX grade for plain steel shows surface footage 400-1000 SFM, FPR .002-.012.

A. When the speeds and feeds are developed, we have to take into consideration many different factors. Some include:

- Maximum machine RPM
- Hardness of material
- Depth of cut
- Surface finish requirements
- Tool length
- Machine and fixture rigidity

The list of variables is very long. The ranges in the catalogs are acceptable ranges for that particular product. With good operating conditions (softer materials, shorter tool lengths, etc.), the middle-to-higher end of the ranges can be used. As the operating conditions worsen, the lower end of the ranges should be used. If you are in doubt, Dapra strongly encourages you to contact our field applications personnel for technical support (please see contact list on page 3). This team of experienced machinists runs Dapra cutting tools daily and can provide insightful advice on getting the most from your investment.

Custom Biax Power Scraping Application



One of Dapra's customers, a major machine tool manufacturer in the Northeast, developed an innovative high-production power scraping application utilizing their Biax Power Scraper. Combining their Biax tool with a retired X-, Y- and Z-axis CNC machine, this manufacturer was able to write a program to perform production half-moon scraping and flaking, while still having the scraper available for conventional short-run jobs.

Question? Comment? Suggestion? Here's who to contact:

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Service/Repair	Richard Tatem	x226	rtatem@dapra.com
Warehouse	Bob Felber	x250	bfelber@dapra.com

Just a reminder... We service all of our vises, spindles, BIAX scrapers, air tools and tables in our on-site repair department. Call 1-800-243-3344 for more information.

Dapra Corporation – National Sales Force:

Territory	Manufacturer's Representative	Regional Application Manager	Phone
New England (CT, MA, RI, VT, NH, ME, NY)	F&L Technology 413-564-0733	Mike Bitner	815-509-6395
Atlantic North (NJ, MD, DE, Eastern PA)	———	Mike Bitner	815-509-6395
Mid-Atlantic Southeast (WV, VA, GA, NC, SC, Eastern TN)	Jones Marketing 803-366-2720	Mike Bitner	815-509-6395
Southeast (AL, MS, Western TN)	Jones Marketing 770-921-1711	Mike Bitner	815-509-6395
Florida	———	Mike Bitner	815-509-6395
Ohio (OH, Western PA)	———	Phil Woodworth Jeff Clear	231-578-4509 734-777-0357
Ohio Valley (IN, KY)	JEM Sales 317-848-9843	Jim Olson	815-509-6397
Michigan (Excludes Upper Peninsula)	———	Phil Woodworth Jeff Clear	231-578-4509 734-777-0357
Illinois	———	Jim Olson	815-509-6397
North Plains (WI, MN, ND, SD, MI Upper Peninsula)	———	Jay Swenson	414-788-1854
Central Plains (NE, IA, MO, KS)	Abbott-Warden Assoc. 913-432-8266	Jim Olson	815-509-6397
South Central (TX, OK)	———	Phil Woodworth Jeff Clear	231-578-4509 734-777-0357
Louisiana/Arkansas	———	Mike Bitner	815-509-6395
Mountain (MT, WY, CO, UT, NM, ID)	Precise Tooling 801-375-1721	Mike Bitner	815-509-6395
Pacific Central (CA, AZ, NV)	Innovative Tool Sales 714-780-0730	Phil Woodworth Jeff Clear	231-578-4509 734-777-0357
Pacific Northwest (WA, OR, AK, HI)	Industrial Marketing 360-387-8648	Mike Bitner	815-509-6395

DAPRA™
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66 Granby Street
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Inside...

CUTTING *Times*

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Now Available:

Dapra's Updated Ball Nose and Square Shoulder Catalogs!

Call 1-800-243-3344 now to request your copy of the complete Ball Nose and Square Shoulder catalogs. Each catalog has been expanded to 10 pages, featuring detailed technical information and usage recommendations; complete tool, insert and accessory specifications and ordering information; insert grade selection specifications; troubleshooting suggestions; feed, speed and diameter compensation data; and comprehensive instructions for recommended cutting speeds. Both catalogs also include more detailed information on carbide core and carbide shank tooling options. HBN Series inserts are now detailed in the new Ball Nose catalog.