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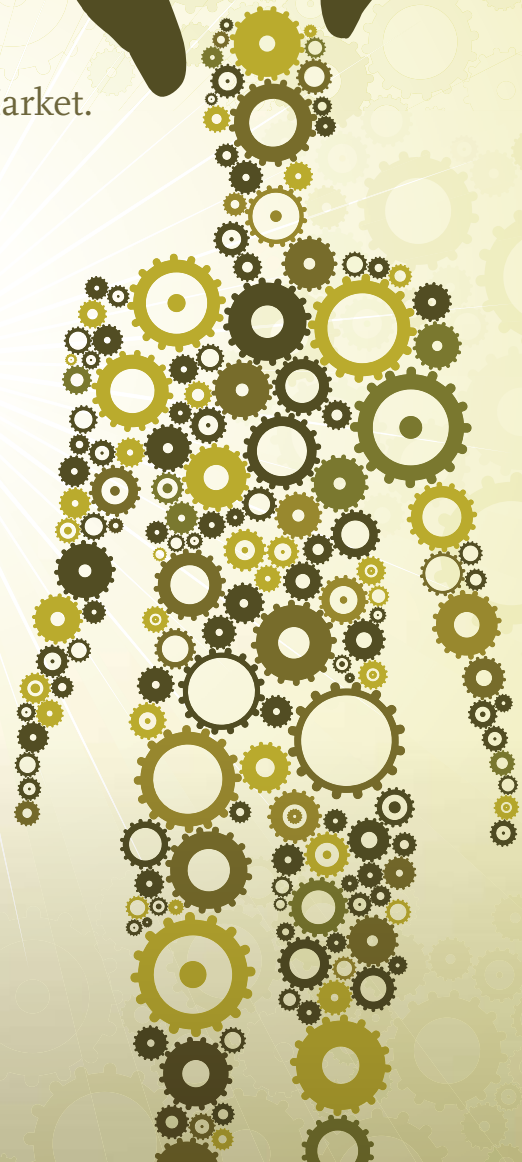
# Today's Machining World

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July/August 2009 volume 5 issue 6

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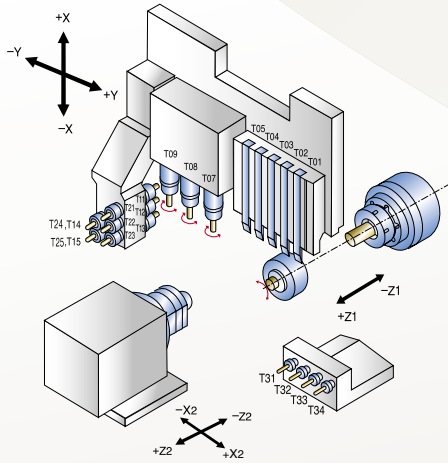
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Today's Machining World



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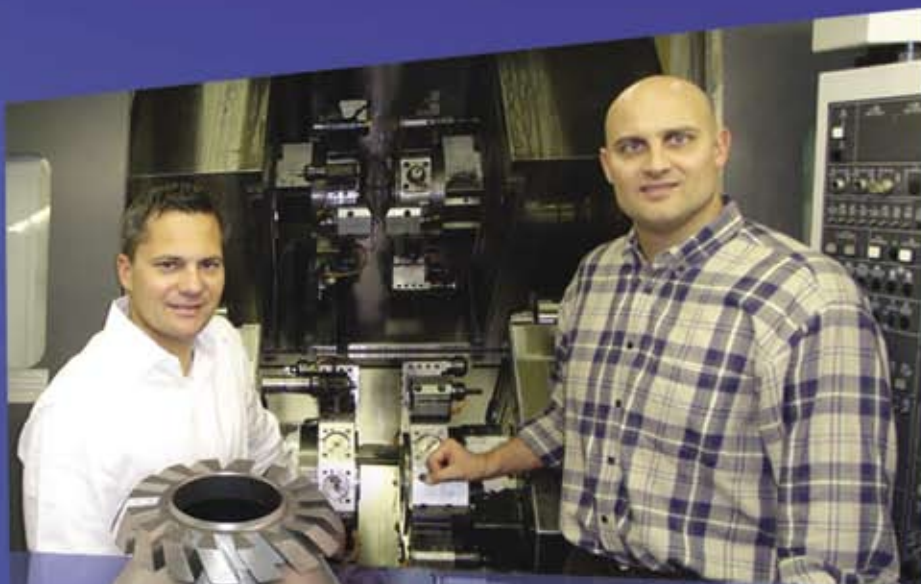


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4235 W. 166th Street  
Oak Forest, IL 60452  
(708) 535-2200

Center Brain  
Lloyd Graff  
(708) 535-2237

Managing Editor  
Emily Halgrimson  
[emily@todaysmachiningworld.com](mailto:emily@todaysmachiningworld.com)

Features Editor  
Noah Graff  
[noah@todaysmachiningworld.com](mailto:noah@todaysmachiningworld.com)

Web Manager  
Noah Graff  
[noah@todaysmachiningworld.com](mailto:noah@todaysmachiningworld.com)

Creative Director  
Robert Bocok / Top Creative Group  
[tmwmagart@gmail.com](mailto:tmwmagart@gmail.com)

Circulation Director  
Sue Ravenscraft - RS Media Services  
[smravenscraft@comcast.net](mailto:smravenscraft@comcast.net)

National and East Coast Sales Manager  
Bill Papp - 845-613-7329  
[bill@todaysmachiningworld.com](mailto:bill@todaysmachiningworld.com)

Sales Manager  
Midwest and Central territories  
Charlie Payne - 717-666-3200  
[adsalespro@comcast.net](mailto:adsalespro@comcast.net)

Sales Manager serving CA  
Craig Zehntner - 626-683-3996  
[wnjla@aol.com](mailto:wnjla@aol.com)

# editor's note

## TMW Coffee Break

I gravitate to the Starbucks Coffee in the Cherry Creek Mall in Homewood, Ill., not because I love the coffee. It's all about the people. It's my equivalent of the Irish pub without the alcohol. This Starbucks is a unique place—I've been to a hundred Starbucks and this is the only one I know where people come to talk. The beautiful thing is that they talk to people they don't know yet. This is a place where friendships are built and the baristas call you by your first name and make your drink before you order it.

It is a place of business too. Commercial conclaves are usually going on all day while solemn students and business types stare at their pixilated screens.

The Cubs, Sox and Bears are staples of conversations, but politics and money are also primary topics. I originally met my friend Stanley Jackson there, who I've been mentoring for two years as he has built his micro medical laundry business.

For Stanley, Starbucks has become a cornerstone of business development strategy. He has stitched together an unpaid network of doctors, suppliers, bankers and consultants by serving as an able listener and conversationalist at the Cherry Creek Starbucks.

This Starbucks has become a wonderful resource for me and my wife, who visits every day for her Frappuccino retreat. We both crave the "third place" away from home, work and screens, which is safe and welcoming for men and women.

The Cherry Creek Starbucks experience is part of the inspiration for what we are doing on the Internet with *Today's Machining World*. With our blogs, email blasts and home page we are trying to make TMW the welcoming coffee shop of the machining world. By putting original "Swarf" in every email blast and expanding our Web reach daily we are rewriting the old model for industrial trade publications' networking.

I have never been more excited about the possibilities of tying the machining community together.

If we do it well, TMW will be a Starbucks experience for all of us.

Lloyd Graff  
Editor/Owner





## Today's Machining World

JULY/AUGUST TALENT POOL

# contributors



**Lloyd Graff** has had a love of writing since getting his first letter to the editor published by the *Chicago Daily News* when he was 12. In high school he wrote short pieces for *Reader's Digest*. He became Sports Editor of the University of Michigan's *Michigan Daily* and weighed a career in journalism before joining the family used machine tool business in 1969. His passion for writing never died as he wrote a "magalog" called the *Graff-Pinkert Times* in the 1990s. In 1999 he decided to build on his knowledge of the machining world and his writing experience by starting *Screw Machine World*, which became *Today's Machining World* in 2005. He considers the development of the magazine to be the culmination of his business and creative careers.



**Noah Graff** has been working at *Today's Machining World* since 2005. He is the features editor, videographer, and "the Web guy" of the magazine. He graduated from the University of Wisconsin majoring in film and history. He currently has a reality show on YouTube called "Jew Complete Me" documenting his search to find the Jewish love of his life. He loves Michael Jackson (his music) and is by far the best salsa dancer on the *TMW* staff. Favorite quote: "Try not. Do or do not, there is no try." *Yoda*.



**Barbara Donohue** has been turning technology into English since 1993. An MIT-educated mechanical engineer with more than a decade of industrial experience, she started her career in journalism as editor of a small-town weekly newspaper. She regularly contributes "How It Works" articles to *TMW* and loves that it gives her an excuse to research different technologies and visit machine shops and factories wherever she goes. When she's not writing, Barbara likes to take her therapy dog, Luke, to visit patients in nursing homes and hospitals.



**Jerry Levine** has been retired since 1998. When not reviewing books for *TMW*, he enjoys his grandchildren, playing golf and tennis, and leading adult education classes at Northwestern University. Mr. Levine had a 35-year career at Amoco Corporation, initially designing and starting up chemical plants around Europe and Asia, then in world-wide crude oil supply during the wild 1970's—through the 1973 Arab Embargo, the 1979 Iranian Revolution and the government price controls. He spent the last half of his career in Washington representing Amoco and the oil industry on energy and environmental issues. Jerry holds chemical engineering degrees from Purdue and Michigan and is a member of the Tau Beta Pi engineering honor society.

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Jack Frost  
FSTechnology  
Alexandria, Virginia

### Swarf Online

Did you know that Lloyd Graff writes Swarf columns every week and sends them out via our extensive Email list? To start receiving these now, send your email address to [emily@todaysmachiningworld.com](mailto:emily@todaysmachiningworld.com) and put "add me to your Email list" in the subject line.

Nice article on Ed LeClair of Curtis Screw. I really enjoyed it! "Life After Automotive." Can you believe what happened yesterday? The largest company in America, GM, goes bankrupt and the stock market goes up 200 points. I never can figure out what's going on! Keep up the great writings you do. I thoroughly enjoy them!

Roger Sustar  
President/Owner, Freedom Corporation  
Mentor, Ohio

### Shop Doc Forum Question and Response

Visit [www.shopdocforum.com](http://www.shopdocforum.com) to post a question, answer questions or read others' posts.

#### Question:

I have some older E16 J Citizens that have many stripped bolt holes in the #1 turret—too many "hammer mechanics" here and over the years. I don't know why everyone wants to tighten bolts like a lug nut to machine .250 and down, but they do. I was going to go the Heli-coil route on these but wondered if anyone had another fix.

-TRR

#### Response:

I never really cared for the Heli-coil type inserts, I have had too many pull out or come out when unscrewing the fastener. I prefer the solid insert type that you can stake in place. They don't come out and are very strong. I've seen them made of standard steel and stainless steel. The problem with these is that they require a lot of real estate, meaning the hole you need to make for them is much larger than for the Heli-coil type. For example, you may have to drill and tap a 3/4"-16 hole for a 1/2"-20 thread. You can check out Keyserts by Alcoa at [www.Allfasteners.com](http://www.Allfasteners.com). MSC sells a number of types, both spring-type and solids.

-Buelldog

*Something on your mind? We'd love to hear it.*

Send your comments to: *TMW Magazine* 4235 W. 166th Street, Oak Forest, IL 60452

Or email us at: [emily@todaysmachiningworld.com](mailto:emily@todaysmachiningworld.com) or [lloyd@todaysmachiningworld.com](mailto:lloyd@todaysmachiningworld.com)

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# The End of an Era

**M**y daughter Sarah does funerals virtually every week as a Rabbi in Palo Alto, California. She has a knack for capturing the essence of the person who just died. She talks to the family, selects stories, brings in her own remembrances and embroiders the eulogy with texture and empathy. I thought about her eulogies before I started to write this piece about the death of *Automatic Machining Magazine* because I hoped to strike a truthful and empathetic tone. *Automatic Machining* started almost 70 years ago under the name *Screw Machine Engineering* in Rochester, N.Y. Don Wood, its founder, had a background in the screw machine industry and saw an opening for a publication that catered to the people who produced precision components.

The magazine found its niche in the heyday of National Acme, New Britain, Brown & Sharpe and Davenport. Used machinery dealers, like Graff Pinkert and Co., coveted space in the back of the publication. It became the primary advertising venue for the business. Everybody read the back of the book and the *Automatic Machining* staff bent over backwards to accommodate a tribe of dealers and tooling guys who knew nothing about print advertising.

Don Wood was a machining guy who filled his pages with the stuff of the industry. People liked it because it was authentic and didn't try to be more than it could be.

Simplicity and Don Wood's personal and heartfelt columns gave *Automatic Machining* its voice. Its niche was small, but Wood and his advertisers defined it clearly enough to fend off larger competitors in the machining realm. Wood was a smart businessperson in his prime, staying under the radar of magazines like *American Machinist* and *Modern Machine Shop* while developing a following in the screw machine crowd with his folksy and sometimes whimsical approach. The competition finally found him around the year 2000, but Don continued to keep a following into his 80s. Don's son, Wayne, worked in the business, but refrained from developing his own visible presence in *Automatic Machining*. The industry changed rapidly to one dominated by European and Japanese builders focusing on CNC equipment. *Automatic Machining* was a CAM operated magazine, a Davenport in a CNC world. When the bottom fell out of the market in recent months the magazine's resources were depleted.

As a longtime advertiser and recent competitor, I mourn the loss of the Don Wood *Automatic Machining* era. I feel a sense of loss for his rugged and durable creation.



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I see business management similar to coaching a sports team. The signing of Ron Artest by the NBA Champion Los Angeles Lakers is an intriguing exercise in team building. The Lakers had a wonderful squad last season but they are taking a chance now to make it better by bringing in the fierce, often banished Artest to stir the drink. With Kobe Bryant, the number one player, or at least 1A (respect Lebron), and the best sidekick around in the mobile seven-footer, Pau Gasol, the Lakers are a favorite to repeat. But smart sports managers know that you cannot stand pat because the competition is always looking for the next rookie or free agent to push ahead of you—This formula of bringing a talented yet nutty genius into the mix sometimes works to make a nice team into a terrific one or a champion into a dynasty. We saw this last year when the L.A. Dodgers took a shot with Manny Ramirez, the goffy left fielder from the Boston Red Sox. Ramirez made a middling collection of under-achieving but talented young players believe in the team, and they surged all the way to the National League championship series.

I would argue that the Dodgers could take a chance on the mercurial Manny because they had the great Joe Torre as manager—a calm, strong man who could keep Ramirez from self destructing. If an organization has a strong core and respected leadership a Manny or an Artest can be a plus. The Lakers have the best coach in the game in Phil Jackson—focused, serene, totally confident in his ability to manage temperamental athletic geniuses like Ron Artest who he calls, “my new Rodman,” referring to the cross-dressing screwball who helped Michael Jordan win NBA titles from 1996-1998.

I have wrestled with the issue of hiring the talented nut versus the reliable but uncharismatic player. I have usually gone for the predictable team player because I realize that I am no Phil Jackson as a team leader. But I understand that the difference-makers in a business may be the iconoclasts who are not men for all seasons. Even though I'm a bit weird in my own way, I do not cope with productive screwballs with equanimity.

Ron Hinks answered our “RFQ” question on how to run an 11" long, 1/4" diameter part made of coiled spring steel. His solution was to run the part on a CNC Escomatic with a hydraulic straightener.

Ron now works at American Micro in Cincinnati, after a stint with Barry Podmore's Esco firm near

## Coming in the September/October issue of *TMW*

**How it Works**  
**Machining Titanium**  
by Barbara Donahue

**Product Focus**  
**Multi-spindle machines**

**Machining Without Electricity:**  
**Investigating the Amish**  
by Emily Aniakou

Boston. He has been in the U.S. for six years since emigrating from England. He is desperate to stay in his adopted country where he feels valued as a skilled professional in the esoteric world of Swiss-type machining.

Ron's participation in our "RFQ" column is part of a movement toward user contribution to publications and Web sites. At *TMW* we are making a broad gage effort to embrace this movement. Our blogs—"Shop Doc Forum" and "Swarfblog"—email blasts and old fashion "Letter to Editor" pages are important segments. I am also beginning to see the value of the social networking sites such as YouTube and Facebook. Our videos are finding an audience on YouTube, and to my amazement I was recently offered a 2007 Makino machining center in Switzerland on my Facebook!

My conclusion is that you and your business need to use every tool available. Having a Web site that offers a rehash of your 10-year-old brochure is nice but adds little value. The action today is in social networking, blogs and the omnibus sites like YouTube and Facebook.

Hire your kids or grandkids, or the barista at Starbucks to get you connected.

**It's a great time to** be in the gun business. The buzz on the Web is that Barack Obama is going to push for a ban on assault rifles, something households need more than a refrigerator.

Evidently Obama's campaign reference to "bitter" small town people clinging to their guns has fueled a tremendous surge in gun and ammo sales. People are buying AR-15s, the civilian version of the M-16 military rifle, like 42" HD televisions. At \$1,000 a pop (sorry) they are pumping out of the gun shops and gun shows. Wal-Mart is struggling to keep ammunition in stock because the NRA is implying a big tax is coming on each ammo box.

The high profile mass murders in Binghamton, N.Y. and Pittsburgh are reinforcing a sense of insecurity, even panic, as right wing commentators foment unease as the economy slides.

But the gun run is a great boon to the Swiss CNC business as manufacturers rush to cash in on the gun bubble. While hunting rifles are currently dead, handguns are the new Rolex's as folks look to show off their fancy shooting hardware.

It is still quite doubtful that Obama is going to risk his political capital in a quixotic joust with the gun lobbies. But

the power of fear at the moment trumps rationality.

With the machining community so riddled at the moment the guns and ammo boomlet is a balm. Medical business is also still humming along. "Guns and medical"—sounds like the lyrics from the old Frank Sinatra tune, "Love and marriage, go together like a horse and carriage."

**Derrick Perkins of** Liberty Research in Gonic, New Hampshire, has a creative approach to customer acquisition. He targets a long running job which he feels he can refine and then virtually own, once he cracks the code.

The Perkins approach is to design and build his own equipment to elegantly and efficiently run the component in play. Perkins and his team of designers and toolmakers essentially invent the machine to make the part. He would rather build a special machine than buy existing technology in many cases, because he is always looking for the "unfair" advantage versus his competition.

He has successfully constructed rotary transfer machines up to 24 stations with an off-the-shelf Hirth coupling and built-from-scratch units.

Derrick is also in the archery products business with a company named American Broadhead. Always the independent entrepreneur, he is attempting to build a name for his brand despite being an outsider to the big box buyers of such hunting equipment.

I think that for entrepreneurs like Derrick Perkins the joy is in doing the next to impossible, whether it is inventing a new machine or building the best arrow.

**Over a dozen years ago** I developed a wonderful business relationship with Ed LeClair who used to be operations manager at Curtis Screw Corporation of Buffalo, one of the largest precision machining companies in the U.S.

Among Ed's many responsibilities at Curtis was buying used machinery, which put he and Graff-Pinkert on opposite sides of the table, but we developed a great rapport even while we were negotiating like pitbulls on the price of Schüttes and Acmes.

It came as a shock when Ed told me he was leaving Curtis in 2007 to buy a printing shop franchise in Raleigh, North Carolina, which he planned to run with his wife Carol.

I knew Ed had long had the dream of going into business for himself because he had queried me periodically about what job shops were on the market. But Ed and Carol were entrenched in Buffalo and I doubted he would put it all on the nose to buy a screw shop in Detroit or L.A. But one day he and his wife, a long time teacher, found themselves rattling around in their big house, their youngest child now off at college, looking for one more big challenge before

retirement. It was the right moment. The print shop opportunity popped out of the weeds and they grabbed it. Mild Raleigh winters sounded good and the thought of absorbing the pressure of running an automotive supplier had lost some of its appeal. It was difficult for Ed to leave his good friend and colleague Paul Hjonacki, the general manager of Curtis Screw, and the tremendous team of professionals he and Paul had shepherded in Buffalo, but as it turned out his timing was impeccable.

The auto market tanked, the stock market imploded and Ed managed to escape from both calamities with his move to Raleigh, where he found the relative stability of job shop printing and a community heavy in colleges and drug companies.

He and Carol have now been working together for more than 500 days, an experiment he wondered would work, but Ed says they still love each other.

Ed is a thorough and charismatic operations guy and he brought the rigor of automotive land to the Alpha-graphics franchise he bought. Business is prospering. He called me to ask if I knew of a good sales person in North

# swarf

Carolina he could hire. He told me he stays in touch with Paul Hjonacki at Curtis, but he is happy to have fled the misery of the car industry.

Ed LeClair is living proof that there is life after automotive. He says he's just a lucky guy. He bought Ford stock in February and it has tripled. Lucky, maybe, but smart enough to live out his dream before life runs away.

**In the used machinery** business we constantly make bets on the current and future values of the iron we bid on. When business is going well we will figure a deal to make a small profit because the downside appears modest. The goal is to get a lot of deals because more will be winners than losers and if we bet wrong the



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In a miserable falling market like we've suffered through for more than two years the calculation is different. We look at a lot of deals and buy a tiny fraction. The premium is on the perception of safety and the hope of a big profit and quick turnover.

The irony is that this working thesis is probably the opposite of much of our clientele. From what I hear from our machine customers they are willing to bid jobs cheap to re-inflate their plants.

Both strategies are logical in the recession we are enduring. But what if both strategies are flawed? I always like to pose the hypothetical contrary position to keep me focused and cognizant that my current course may be dead wrong, or at least partially flawed.

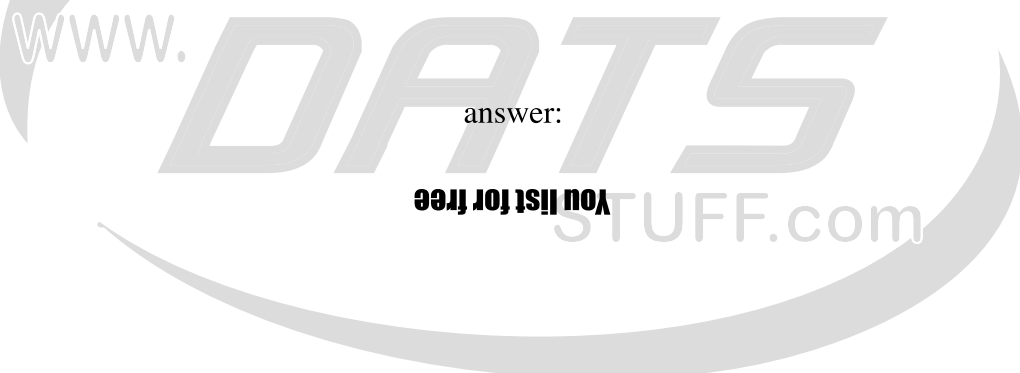
What if instead, Graff-Pinkert bet big that we have hit bottom already and the market will improve as the year moves on. It would then behoove us to buy more aggressively, settle for smaller profits and ride the market up.

What if machining companies aimed for wider spreads in their quoting, figuring that fewer jobs with bigger margins was a better way to live because the opportunities with a culled supply chain and rising car market will soon be upon us.

I am not making suggestions or predictions now, just challenging my own and perhaps your forward perceptions. Guessing right on whether we are at an inflection point in the machining market will make a big difference in whether 2009 continues to stink or could be the beginning of sweeter times.



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BY JERRY LEVINE

## *The Secret War with Iran*

Ronen Bergman, an investigative reporter and TV anchor in Israel, has spent over 10 years researching and reporting on Iran. He illuminates his vast knowledge of the country in his recent book, *The Secret War with Iran*.

For the last 30 years Iran has been the world's leading sponsor of global terrorism. Bergman argues that if the country develops the ability to build nuclear weapons it would likely further empower Muslim terrorist groups, lead to an arms race in the Middle East, and increase its ability to threaten Israel.

Bergman reports that Iran's Lebanon proxy, the Shiite terrorist group Hezbollah, operates as a state within a state. Although Iran is ruled by a Shiite theocracy, Iran and Hezbollah assisted various Sunni Muslim terrorist groups, such as Al-Qaeda, in developing their organizations. In addition, Iran is the main weapons supplier to Hamas in Palestine and has trained and supplied Iraqi roadside bombers.

When Supreme Leader, Ayatollah Khomeini, came to power after Iran's revolution in 1979, he maintained a strict policy against developing weapons of mass destruction. However, after suffering horrendous losses from Saddam Hussein's use of poison gas in the Iran/Iraq war, he changed his mind. In 1983 Iran began developing offensive chemical weapons, yet Khomeini still did not support the development of nuclear weapons. Today Iran has a sizable stockpile of chemical weapons, which it mainly produced using raw materials from China.

After Khomeini's death, his successor Ayatollah Ali Khamenei, secretly restarted the country's nuclear development program, which had been initiated prior to the revolution. The Russians sold the Iranians nuclear technology, uranium-mining technology and sophisticated anti-aircraft missiles to protect Bushehr, Iran's chief seaport, and other strategic targets. North Korea supplied long-range missile technology. China supplied fast missile boats equipped with long-range anti-ship missiles to further protect Bushehr from naval attack. Together Russia and China have blocked attempts by the international community to build a coalition against Iran.

However, there was also some double-crossing. Russia never truly intended to supply Iran with nuclear weapons or

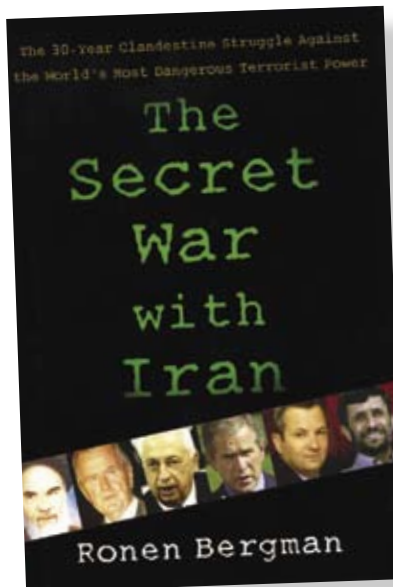
the equipment to make them. They just intended to string Iran along to make money. Iran eventually figured this out and in 2003 partnered with the infamous A.Q. Khan, the father of Pakistan's atomic bomb, who sold Iran high-speed centrifuges, other crucial equipment and technical know-how.

Israel is considered by many as a significant factor in delaying Iran's uranium enrichment. People suspect it was responsible for numerous "coincidences" such as the disappearance of an Iranian nuclear scientist, the crash of two planes carrying cargo to the nuclear development project, an Iranian opposition group publishing details of the project which eventually led to renewed IAEA inspections, an accident which killed several people and shut down a joint Iranian-Syrian Scud missile production facility, destruction of Syria's nuclear reactor being built with North Korean assistance, and a car bombing of Hezbollah's military leader, Imad Mughniyah in Damascus in February of 2008.

These were all significant accomplishments, but did they do anything more than slow down the inevitable? Bergman says, probably not. This leaves a quandary as to what to do. Bergman says it would be difficult to take out the Iranian nuclear facilities, and that even if the operation was successful, the country would likely respond with mea-

sures such as closing the oil shipping checkpoint, the Straits of Hormuz, launching missile attacks on all Persian Gulf oil shipping facilities, committing terrorist attacks worldwide and causing oil prices to surge astronomically.

Whatever Iran's response and the international community's counter-response, the outcome is not very optimistic.



Comments? You can email Jerry Levine at [jerroldlevine@yahoo.com](mailto:jerroldlevine@yahoo.com).



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## ◀ Abanaki Corporation

A new accessory to Abanaki's Grease Grabber® oil skimmer, MatBuster™ churns the water surface and breaks up matted grease so the oil skimmer can operate more effectively. MatBuster has a zero maintenance design, consisting of stainless steel blades that mount to the tail pulley of the Grease Grabber. No separate motor or other moving parts are required.

For more information, please contact Abanaki Corporation at 440-543-7400 or visit [www.abanaki.com](http://www.abanaki.com).

## ▼ Doosan Infracore

Doosan's new, pre-drilled bed castings reduce the lead-time for gantry-equipped turning centers. The castings for 11 models of our Lynx and Puma turning centers are engineered at the factory to accommodate gantry load-unload systems. This enables us to install the systems at our domestic headquarters while retaining the precision and rigidity previously achieved only with factory installation.

For more information, please contact Doosan Infracore at 847-437-1010 or visit [www.usa.doosaninfracore.co.kr/](http://www.usa.doosaninfracore.co.kr/).



## ► BIG Kaiser Precision Tooling Inc.

BIG Kaiser Precision Tooling Inc. introduces expanded offerings to the Phoenix drill series, the newest dimension to the Sphinx product line. The Phoenix has expanded from 6xD to now include 3xD and 12xD sizes. The drills are available in diameters from 0.1 mm - Ø12.7 mm, in 0.1 mm increments, with coolant through from Ø2.5 mm and a Helica coating. Special dimensions are available upon request.

For more information, please contact BIG Kaiser at 847-228-7660 or visit [www.bigkaiser.com](http://www.bigkaiser.com).



# fresh stuff

## ▼ Genevieve Swiss Industries, Inc.

Genevieve Swiss Industries, Inc., national distributor and marketer of PCM Willen S.A. of Switzerland tooling products, now offers the new PCM high-speed speeder heads (15,000 max. rpm) for Tsugami SS20 and SS32. The PCM models work as a direct replacement, and depending on the station they are installed into, they can function in cross work or end/face work positions. In addition, they can be installed on either the main or subspindle with no retrofitting required.

For more information, please contact Genevieve Swiss at 413-562-4300 or visit [www.genswiss.com/tsugamiss20.htm](http://www.genswiss.com/tsugamiss20.htm).



## ▲ Ganesh

The Ganesh 5X-250 VMC weighs over two tons and features heavily ribbed box-way construction to dampen cutting vibration. It works with the robust Tsudakoma rotary CNC trunnion table to provide superior surface finish and improved tool life. With pre-tensioned double-anchored ballscrews and 40-block look-ahead in the FANUC control the 5X-250 is designed to generate precise programmed feature definition.

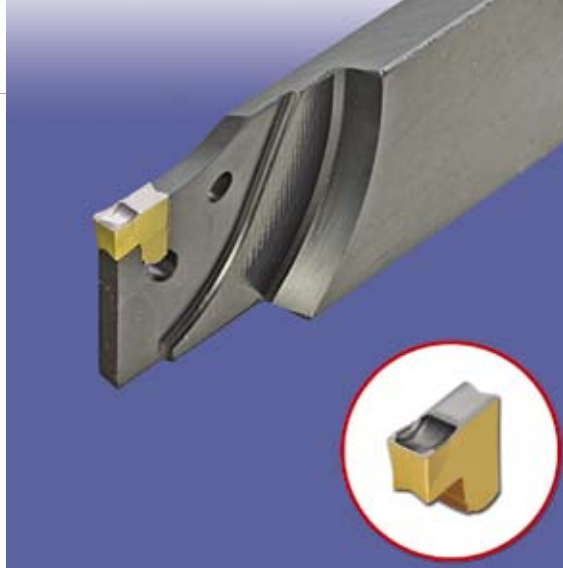
For more information, please contact Ganesh at 888-542-6374 or visit [www.ganeshmachinery.com](http://www.ganeshmachinery.com).

## ► Haas Automation

Haas Automation, Inc., has increased the performance of its core rotary products to boost customers' productivity and yield a faster return on investment. The performance gains come in the form of increased speeds, higher acceleration or deceleration rates and reduced brake dwell time. The Haas rotary products offering these higher performance levels are the HA5C, HRT160, HRT210 and HRT310, as well as their respective SP models and the HRTA5 and HRTA6.

For more information, please contact Haas at 800-331-6746 or visit [www.HaasCNC.com](http://www.HaasCNC.com).





## ▲ Iscar Cutting Tools

Iscar has developed a new family of reinforced TANG-GRIP blades for the popular TRAUB (TNL and TNK models) and INDEX (MS18C model) turn/mill machines. These blades, due to their reinforced construction, can be used in long overhang. Only the part of the blade required for penetration (cutting depth) has a reduced width. The rest are thick, which provides improved rigidity and stiffness.

For more information, please contact Iscar Metals at 817-258-3200 or visit [www.iscar.com](http://www.iscar.com).

## ▼ Mazak

Mazak's versatile VTC-200G vertical machining center is once again available for part production of long or heavy workpieces. The vertical machining center is equipped with a long, fixed working table (154.3" x 20.1") that accommodates up to 4,600 lbs., and can be partitioned to allow for machining on one side while an additional setup takes place on the other. This enables operation similar to that of a pallet changer but with additional flexibility.

For more information, please contact Mazak at 859-342-1700 or visit [www.mazakusa.com](http://www.mazakusa.com).



## ▲ Hanwha Machinery

Hanwha Machinery America introduces one of its newest CNC Swiss turning centers, the all new XD12H. This high speed CNC Swiss turning lathe is designed for universal and precise machining. It has a large bed for easy tooling and high rigidity. A built-in motor on the main spindle allows for high precision and speed. The XD12H has a spacious tooling area that allows for comfortable operation and tooling.

For more information, please contact Hanwha Machinery at 414-421-2300 or visit [www.hanwhamachinery.com](http://www.hanwhamachinery.com).



# fresh stuff

## ► Phillips Engineering Technologies

The OLYMPIA Model V40F/60 vertical turning center from Phillips Engineering Technologies features a 42" diameter table with a maximum swing of 60", a working height of 40", an 80 HP continuous duty motor and a 12-tool automatic tool changer with a rotary carousel that is driven by a hydraulic motor and positively located by a taper pin for each location. This VTC is especially suited for hard turning and flexible manufacturing operations that encompass aerospace, automotive, power generation, medical device and other large, round, part turning applications.

For more information, please contact Phillips Engineering Technologies at 905-660-5055 or visit [www.phillipset.com](http://www.phillipset.com).



## ◀ Sandvik Coromant

Sandvik Coromant's CoroThread 266 is a new family of rigid, high-precision threading tools that provide increased productivity and stability. Offering superb value to the oil, gas and mechanical engineering industries, the new tool is available in 0.5" and 0.625" insert sizes. The CoroThread 266 achieves high levels of stability through the innovative iLock insert locking system.

For more information, please contact Sandvik Coromant Company at 201-794-5223 or visit [www.coromant.sandvik.com/us](http://www.coromant.sandvik.com/us).

## ► Toyoda Machinery

Toyoda Machinery is excited to announce the addition of two new high-speed linear way machines to its vertical machining line. Toyoda's FV850S and FV1050S high speed vertical machining centers rely upon an extremely rigid Meehanite cast iron base. This solid base offers higher density and uniform soundness over traditional cast iron, giving the casting greater tensile strength and maximum vibration-dampening capabilities. Rapid traverse rates reach 1890 ipm in the X- and Y-axes and 1417 ipm in the Z.

For more information, please contact Toyoda Machinery at 847-253-0340 or visit [www.toyoda.com](http://www.toyoda.com).



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1" 6-spindle, 1960-1992 (9)  
1" 8-spindle, 1980  
32mm 8 spindle, 1997  
1-3/8" 6-spindle, 1967-1979 (3)  
1-3/4" 6-spindle, 1965, 1993 (10)  
1-3/4" 8-spindle, 1970  
2-1/4" 6-spindle, 1962, 1973-79 (3)  
3-1/4" 6-spindle, 1973,  
6-5/8" 6-spindle, 1979  
5-5/8" 6-spindle, 1978,

## ACME

7/16" RA6, 1970  
1-1/4" RB8, 1981  
1-5/8" RBN8, 1979, thdg., pickoff  
1-5/8" RB8 thdg., pickup '68-72 (5)  
2" RB6, 1979  
2" RB8, like NEW 1978, '66  
3-1/2" RB6, heavy recess, '66  
2-5/8" RB8, 1990, 1979

## CNC INDEX

G200, 1997, Index  
G300, 1997, Index  
ABC 60mm Index '96  
MS25, 1990 Index (3)

## SCHUTTE

SF51, 1985

AF32, DNT, 1998 (2)  
SF26, 1979  
SF51 PC

## CNC SWISS

Star SR-20, 1998  
Citizen L-25 1998

## BROWN & SHARPE

00-R/S 1/2" B&S  
#2 1-1/4" 1974 B&S  
#2 1-5/8" 1975 B&S

## DAVENPORT

3/4" thdg., pickoff, longbed (4)  
3/4" 2000, Tamer  
3/4" thdg., pickup, 1977-66 (8)  
Noise Tamers

## HYDROMATS

Pro 20, 1999  
HW 25-12, 1994  
HB45-12, 1996  
HB45-16, 1989 - '97  
HS16, 2001  
CNC 36/100 HSK tool spindles w/2-axis  
CNC flange and valves w/ 6-axis CNC,  
new in 2006.  
VE 20/80 QC unit  
26/80 QC unit  
40/80 unit

## RISMAT

8 Station 2001

## EUBAMA

S-20, S-12

## ESCOMATICS

D9 (2), 1995  
D6SR (2)  
D-2, D-4, D6SR

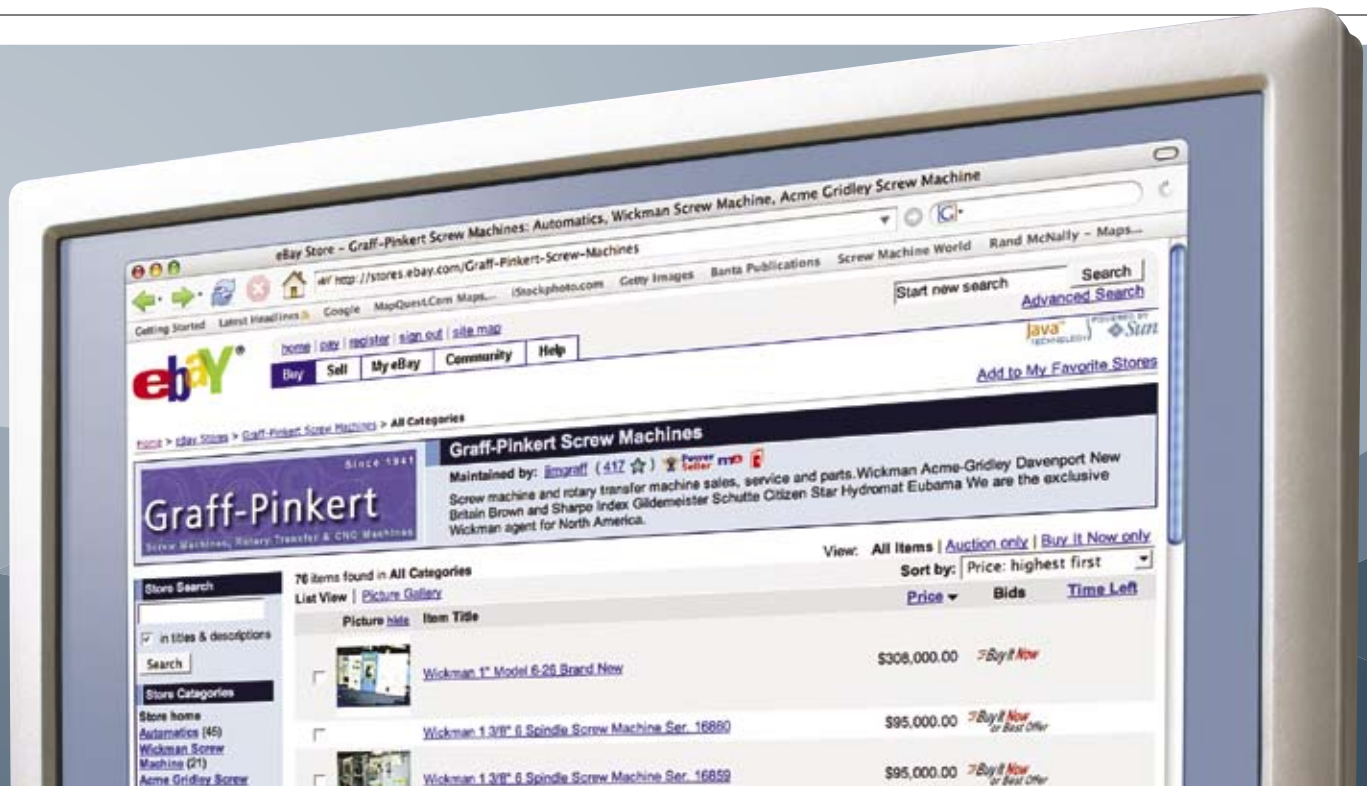
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WICKMAN AND INDEX

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LLOYD GRAFF INTERVIEWS TOM MEDVEC

# Looking for Franchise Players:

## A Headhunter's View of the Machinist Job Market

TOM MEDVEC HAS BEEN A RECRUITER, HEADHUNTER AND PLACEMENT MAN IN THE PRECISION MACHINING WORLD FOR OVER 20 YEARS. HE HAS WORKED IN THE INDUSTRY HIMSELF AND HAS SEEN THE BEST AND WORST OF TIMES.

Tom Medvec

LG: Have you ever seen a hiring climate like this?

TM: Never. I hear things from the employers' perspective and they're very reluctant to make hiring decisions and are extremely selective.

LG: In an economy like this, would you say that the job candidates available are better, worse or about the same as in "normal times"?

TM: I would say that the candidate base is below average. Every once in a while you see organizations that will be forced to lay off what I refer to as a franchise player. Companies working through this type of economy typically lay off their second string.

LG: In bad times, are the franchise players more cautious about leaving what they know?

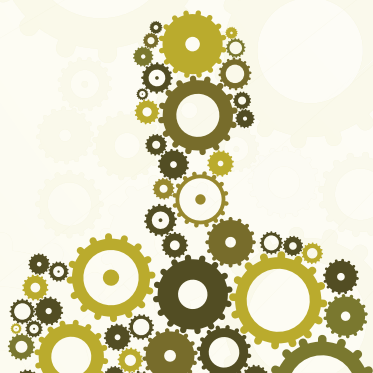
TM: The biggest problem right now is finding the absolute stellar candidates. Most of them are pretty hunkered down. Folks might want to take a job out of state, but because of the nature of the housing market it's very difficult for these

individuals to make career moves. [No one] wants to be last in the organization in this type of economy, so individuals are looking at [work] from a different perspective: "I'm glad to have a job. I'm glad I'm not laid off. It's not the perfect job, but I'm going to stay here and not take the risk of being last in and first to get laid off."

LG: So what if somebody comes to you aggressively looking for a job, what do you tell them?

TM: The advice we give depends on the type of position they're looking for. There are certain jobs that just don't exist anymore. For instance, in the last several months there have been very limited supervisory and non value-added positions. Meaning a lot of the companies hiring want what I call "doers"—people making components and operating the machines. Companies are adding machinists or engineers by necessity. They don't want the extra overhead of bringing on some of the non value-added operations managers. I think the thought process is that there are individuals in the company [already] that can step in and guide and direct some of the machinists without raising the headcount.

“ I think right now a hiring decision is based on who brings the most value, who can come in running and be proficient and quick. ”





LG: What do you see as far as organized labor is concerned? Do you think that union activism is going to become more or less of an issue going forward?

TM: I can tell you that it comes up more when discussing jobs with machining candidates. I have found that even up in Michigan there are a lot of individuals who are very reluctant to work in a union shop. I think the thought process is that these folks have lost their jobs or been laid off and feel the union really hasn't done a whole lot [to help them].

LG: Is it harder to place someone who's been in a union than somebody who hasn't been?

TM: Absolutely. Especially when they're coming out of some of the unions like the UAW that serve the automotive industry. I think these individuals enter the workforce with

an automatic stereotype. I think many of the union employees—good, bad or indifferent—have entered the workforce and gotten quite a reality check. I recruited some individuals out of Michigan who were employed in the UAW, working for Delphi running screw machines for \$27.50 an hour, which is well above average for an Acme setup operator, even in some of the better companies. What we saw is that many of those UAW employees ran the same parts for a number of years. If a machine went down, they called maintenance. If there was a tooling issue, they called engineering. Consequently, I think many of those union employees never really developed the skills they needed to compete in today's workforce. Out in the non-union shops, their value really drops because many of the non-union employees, especially the ones that work for contract shops, know the equipment intimately. They think through how they're going to tool and process and are creative in problem solving. It's not unusual for an individual in a non-union shop to repair

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“ I find that a lot of individuals who have gone through government, state and local training never actually go into the field because many of the skilled trades that they’re being trained in or retrained in are not the hot markets.”



his or her own machine. They have mastered their trade. It was very difficult for a lot of the union employees to [learn] how to do that because in many cases, by union rules, they weren't allowed to touch the machine on a repair issue.

LG: What markets are working?

TM: I think there is a lot of new technology that's being developed and we're seeing new markets open up. Where we've lost some of the automotive, hydraulics or fluid power, we've seen some new markets open up in aerospace, power generation and metals. There have been a lot of medical startups in the last few years. Many of these companies are doing quite well through this recession, and there's a handful that have done some regular hirings. One of the positives is that I'm seeing some fantastic benefits out there—some of these medical OEMs offer an above-average benefit package.

LG: What would you tell someone who calls you and says, “my company just closed. I was a foreman and I'm looking to stay in the industry. I've got 50 years experience in the field and I'm willing to move.”

TM: I think I would tell that individual that that's probably one of the better moves that they could make right now. What I'm seeing is that jobs are very spread out. I think most industries have been affected by this recession, so a candidate has to be open and go where the work is.

LG: What does a bad resumé look like?

TM: Sometimes certain attributes and job functions that are commonly looked for are not on the resumé, or sometimes they're very vague. Sometimes they have a lot more experience than they demonstrate and sometimes they actually highlight too much experience.

LG: I talk to people in the machining industry and they say, "Hire for attitude and then train," yet you are implying that's a bunch of baloney, that people hire for skills and worry about attitude later.

TM: I think right now a hiring decision is based on who brings the most value, who can come in running and be proficient and quick. I find in most interview situations, people have a different demeanor, the attitude doesn't come through as strong. But overall, when you're talking about the skilled trades like machinists they're basically hired on: Do they know the machine, and can they come in running? There isn't much in the way of training going on in manufacturing right now. As a matter of fact, the searches that I'm working on at this point have been extremely pinpointed.

LG: Are people hiring for creativity, ingenuity and innovation, or are they hiring for basic skill sets?

TM: I would say they're hiring that basic skill set. I think the majority of companies out there are in survival mode.

LG: When automotive bounces back, where are the workers going to come from?

TM: That's a good question. I think many of them are not going to find employment until this turns around. The market in Michigan is so incredibly bad that many of these UAW workers are probably going to be sitting unemployed six months from now.

LG: Are the workers going to come back, or will they say, "I've had enough automotive, forget about it. I'm going to Wyoming. I'm going to get into heating and air conditioning. I'm going to install solar panels. I don't want anything to do with automotive."

TM: Ultimately, I think they're going to come right back to automotive. I think the biggest reason is there are not enough opportunities out there in electricity, HVAC, plumbing or other professional trades.

LG: Do you think that in three years you will be placing people more in solar, wind and natural gas extraction than automotive?

TM: That could certainly become a market we serve.

I don't think the individuals who are working in automotive areas like Detroit and Cleveland are going to be able to transition into some of these other industries [easily]. Most employers are reluctant to bring those individuals on because of lack of experience in their industries. Exceptions are companies that may pay a professional engineer who's designed bearings for the automotive industry and can design bearings for the power generation industry. The automotive industry will lose those types of individuals. But very few of the machinists, supervisors and maintenance folks are going to have that opportunity. Retraining is not going to pay enough. I see that quite frequently with a lot of the training that the state and federal government provides. For instance with the NAFTA, if you lose your job because your company is going down to Mexico or overseas, you're eligible for government training. Unfortunately, a lot of government training does not lead to a respectable income so people can support their families. An individual might go through government retraining and not find a position at all, or only find a daytime \$10 or \$11 an hour position. I find that a lot of individuals who have gone through government, state and local training never actually go into the field because many of the skilled trades that they're being trained in or retrained in are not the hot markets. I think that there are a lot of companies in our industry that would love to see a number of people retrained on Swiss Turn CNCs because that's a hot market. But there's no training where people can come in and learn to run a Star, Citizen, Tsugami or one of the other sliding headstock brands.

LG: Thank you so much, Tom.



*Today's Machining World's "Shop Doc" column taps into our vast contact base of machining experts to help you find solutions to your problems. We invite our readers to contribute suggestions and comments on the Shop Doc's advice. If you consider yourself a Shop Doc or know a potential Shop Doc, please let us know. You can also check out the TMW online forum at [www.shopdocforum.com](http://www.shopdocforum.com).*

Dear Shop Doc,

I'm drilling a .5 inch hole, with a  $\pm .001$ " tolerance on a CNC lathe. Most of the holes are in spec, but sometimes I get one that is oversize. Then I get 10 in a row that are good. Any idea what's going on?

Off Track

Dear Off Track,

There are many factors that can affect drilled-hole size consistency. Some examples include, but are certainly not limited to: tip geometry, feeds and speeds, spindle vibration (especially if using a bar feeder), tool-length, tool holding method, chip evacuation and built-up edge.

Your intermittent drilling problem sounds similar to a recent one I encountered that was caused by tool misalignment.

I was drilling a 14 mm diameter hole, with a  $\pm 12.5$   $\mu\text{m}$  tolerance on a CNC lathe in a partially-machined, chrome-moly forging, and I was getting an over-sized hole every 5 to 15 parts, sometimes by as much as 30  $\mu\text{m}$ . As I was watching the drill cut the hole, I noticed the chips didn't always flow out of the flutes very well. When the drill pulled out of the hole, the chips would sometimes be packed into the flutes. After initially making some changes to the feed rate, I added a single peck to the program to see if it would clear the chips out of the flutes. Then it became interesting.

After the drill backed up, as it was returning to the bottom of the hole, one flute was cutting and it was making a medium chip. When the drill got to the bottom of the bore and started cutting again, both flutes made similar chips. I was curious why the drill was cutting that much on one flute during the peck, so I ran the same part a second time without re-chucking.

The drill repeated the occurrence, with somewhat lighter chips coming off the same flute as before. I ran the part a third time, and the same flute

made lighter chips. I took the part out and it was way over-sized (200  $\mu\text{m}$  out of spec). I then ran a new forging; this one was in spec.

If the drill makes a significant cut on one flute only, when it goes back into the hole, there must be a misalignment issue between the tool and the spindle/part. At this point the drill is cutting on one flute only, which I would consider to be single-point cutting as if it were a boring bar.

So if the tool is far enough out of alignment that it cuts a hole 200  $\mu\text{m}$  over-sized, how can it cut a  $\pm 12.5$   $\mu\text{m}$  hole in spec in the first place? The answer lies in the forces that are acting on the drill point as it cuts. As the drill engages the part, forces act on each side of the drill point, pushing the drill center towards the center of the spindle rotation. This basically means that the drill point is moving in the X/Y directions as it centers itself (the Z-axis runs along the drill centerline). The total movement of the tip may be the sum of multiple deflections: the tool, tool holder, turret, etc. After the hole is cut, there are no longer any forces acting on the end of the drill to center it, so the drill just reverts back to its misalignment and acts as a boring bar.

The lesson to be learned from this is that even if the drill is making 10 good parts in a row, that doesn't guarantee the tool is in good alignment with the part or spindle. So if you have variations in the size of drilled holes, you need to check the tool alignment.

*Mark Bos is a manufacturing process engineer with Robert Bosch Fuel Systems in Kentwood, Mich.*

Have a technical issue you'd like addressed? Please email [noah@todaysmachiningworld.com](mailto:noah@todaysmachiningworld.com). We'll help solve your problem, then publish both the problem and solution in the next issue of the magazine.

# shop doc

Dear Shop Doc,

I would like to run a part that has a .5 inch hexagon-shaped blind hole using my rotary broaching tool.

However, the hole is two times the depth that the rotary broach catalog recommends. Is there anything I can try to get this to work?

## Deep Trouble

Dear Deep Trouble,

Your first option would be to consider one or more undercuts in the hole. This allows the chips to break as the broach advances and reduces pressure. An undercut at the bottom of the hole should also be considered if it is important to remove the chips after broaching with a drill or flat end mill. If no undercuts are possible, a back-taper can be machined into the pre-drilled diameter to reduce chip size as depth increases.

Second, putting the machine into a peck mode or peck cycle will reduce the constant pressure on the machine. Try broaching .250 inches deep and back off .050 inches. Use this method until you reach the desired depth. Tweaking overall speed and feed rates can also be successful.

Pre-drill is one of the most important keys to successful broaching. Pre-drill size should be greater than the smallest size of the form. Your standard .5 inch broach is likely .505 inches across the flats, and the pre-drill size should be .523 inches. The most effective way to reduce thrust is to increase this pre-drill diameter to the maximum that can be allowed. If a significant oversize pre-drill is not permissible, you can order the broach with vent holes to allow hydraulic pressure to escape.

The practical depth for this broaching application is one and a half times the size of the form. Since your form is a .5 inch, and you want to broach twice the recommended depth, you need about 1.5 inches of cutting clearance. You can easily order a special broach with this length of cutting clearance. Your adjustable rotary broach holder will accept longer broaches. However, because it is longer than the standard broach, you will need to center the holder using the new broach.

The thrust required for rotary broaching increases with the hardness of the material being machined. For example, broaching a .5 inch hex in stainless steel would be difficult even at normal depths. The problem with broaching to greater depths is the increase in the required thrust which can break the broach or stall the machine. If you can look at your project with the goal of reducing chip size and pressure, you have a good chance of broaching beyond recommended depths.

Peter Bagwell  
Slater Tools Inc.

*Peter Bagwell is an engineer at Slater Tools Inc., which specializes in rotary broaching tools. He is also a frequent contributor to [www.shopdocforum.com](http://www.shopdocforum.com). For more information visit [www.slatertools.com](http://www.slatertools.com).*



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Protest of the 2009 Iranian presidential election results. Tehran, June 16, 2009.



**Bret Stephens** is a foreign affairs columnist and member of the Editorial Board at the *Wall Street Journal*. He was also editor in chief at the *Jerusalem Post* from 2002 to 2004. He is considered an authority on Middle Eastern affairs, most recently focusing on the precarious situation in Iran.

**How close is Iran to being a nuclear-ready state?**

**BS:** I think there is universal agreement that Iran is very close to being a nuclear-ready state, if not a nuclear weapon state. The estimates range as to when they will have all the elements in place needed to build an atomic device—possibly within the next year or two. Whether they put those elements together is another question.

**What would be some of the repercussions of Iran having nuclear weapons?**

**BS:** The Iranian threat is not [aimed] only at Israel, but also the United States. It would likely lead to an arms race in the Middle East, which can hardly be an advantage to us given how strategically important the Middle East and the Persian Gulf regions are to us. It would give considerable aid to some of Iran's more dangerous allies, including Al Qaeda. There are numerous credible reports that Iran has given refuge to senior Al Qaeda leaders despite the Sunni/Shiite sectarian differences.

**What should America do to deal with the threat?**

**BS:** I think the Obama Administration, if it intends to pursue diplomacy, must do so in a way that gives time limits. Iran cannot be allowed to use negotiations to play for more time. If the deadline expires, the United States needs to move very swiftly to implement punitive sanctions that will persuade the Iranian leadership that its long-term interests are better assured by not having a bomb or nuclear capacity than by having one. The most effective way of doing that in my view is through a gasoline embargo that would cut off Iran's access to refined gasoline products.

**How would that work?**

**BS:** People forget that because Iran has inadequate refining capabilities it depends on roughly half of its domestic gasoline consumption from foreign sources. To cut those sources

off might persuade the Iranians of the risk they're taking in pursuing their current course. The Iranian régime changed power in a popular revolution, and it could be swept out of power in the same way. But if the Obama administration doesn't apply sanctions like that, if negotiations go nowhere or if Iran looks likely to acquire nuclear weapons capability, then I think a military strike, for all its obvious and predictable drawbacks, is a preferable outcome to an Iran that is a nuclear weapons state.

**Would a régime change potentially make the country a less dangerous nuclear threat?**

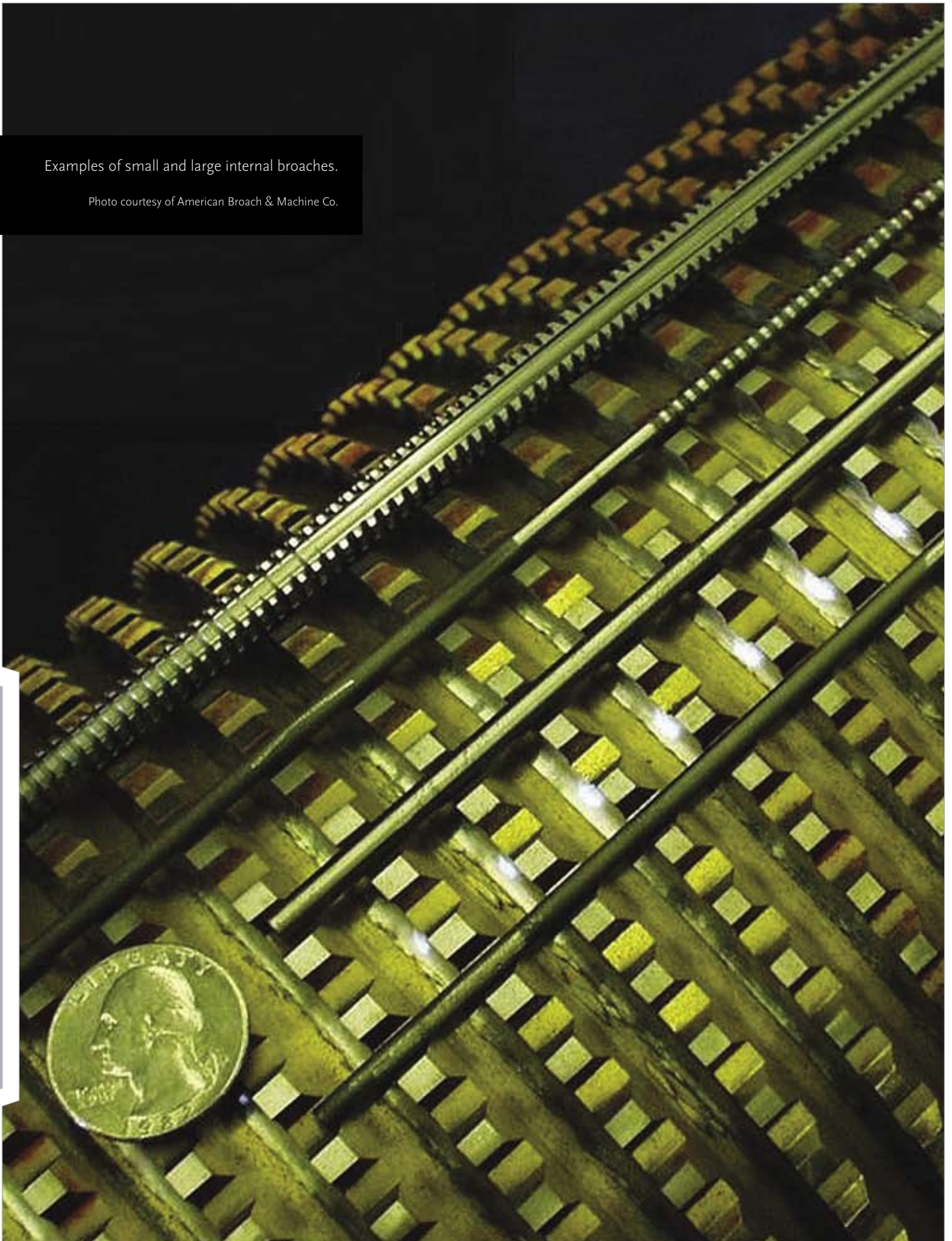
**BS:** Iran was for many years a de facto ally of both the U.S., Israel and the West. It is inherently antagonistic to many of the other Arab régimes that pose a multitude of threats to U.S. interests. Régime change—ideally begun from within—is the ideal outcome. It means that even if Iran continues to pursue its nuclear program, it won't necessarily build nuclear weapons, much less threaten its neighbors by supporting radical régimes like Syria and North Korea or terrorist groups like Hezbollah and Hamas.

**What can the Iranian people and the international community do to bring about a régime change?**

**BS:** It will require a combination of continued active—if not open—opposition to the régime by the demonstrators, stronger leadership on the part of Mir Hossein Mousavi—or whoever picks up the banner of dissent—consistent moral support from the West on both the political left and right, and a policy by the U.S. and our allies of not rewarding Ahmadinejad's theft of the election by giving him international legitimacy. Now is the ideal time to impose the gasoline embargo, for which there is legislation in both houses of Congress. The Iranian régime needs to learn it can't behave this way without paying a price.

Examples of small and large internal broaches.

Photo courtesy of American Broach & Machine Co.



## how it works

BY BARBARA DONAHUE

# Broaching

Making accurate and complex cuts easy

and economical for high-volume parts

A broach is a cutting tool with many rows of teeth, each slightly larger than its predecessor. They are designed to produce simple or complex forms quickly, usually in one pass, with repeatable and reliable accuracy. As the broach moves past the workpiece (or the workpiece past the broach), each tooth takes a shallow cut along the whole length of the part, carrying the chip to the end of the part, said Dave West, general manager at V-W Broaching Service, Inc., Chicago, Ill., which provides broaching and broach sharpening services and manufactures broaching tools. In many cases, a single pass of the broach completes the machining of the surface. For some workpieces, multiple passes with multiple broaches may be required, depending on the geometry of the part and the amount of stock to be removed.

A typical broach consists of many rows of teeth that do roughing, then a few rows of teeth for semi-finishing and another few rows that finish-machine the surface. The tool design is based on the shape being cut, the properties of the workpiece material and related factors. You can broach internal or external surfaces to almost any shape imaginable, from simple flats and slots to gears to turbine blade hubs for aircraft engines.

Broaching can be quite simple in geometry—cutting a keyway in a gear or other component, for example—or quite complex. Broaching is often used to cut precise diameters or to produce non-round holes in shapes such as a hex, square, or “double D.” You can also use broaching

to cut splines, gear teeth and other shapes. West spoke about a surface-broaching job at V-W Broaching that cut 50-plus different dimensions in one pass. “All the dimensions are built into the tool,” he said.

A very simple manual broaching job, such as cutting a keyway in a single part, requires only a broach, an arbor press and the appropriate fixturing. Production broaching requires specialized machines and is best for a very large number of parts.

Broaching can reduce the cost of machining certain features to pennies per part. In addition, broaching can sometimes perform cuts that would be impossible to make any other way. In use for more than 100 years, broaching is still widely recognized as the best process for many applications.

Broaching machines come in different configurations; horizontal or vertical, and are designed for internal, external, spiral or surface broaching. In a typical internal broaching machine the part is fixtured and the broach is pulled through it. For broaching outside diameters, typically the broaches are fixtured in the machine and the part is pushed past them. Spiral broaching is often done on a horizontal machine that drives the broach to spiral through an inside diameter and create helical grooves, such as those in a rifle barrel.

broaching



# how it works



**Above:** Example of a chip resulting from a broaching operation.  
Photo courtesy of American Broach & Machine Co.

## Applications

Many materials can be broached. “Almost anything you can cut by machining,” said West, including ferrous and nonferrous metals and even some plastics. V-W Broaching runs dozens of broaching machines, producing parts large and small, for just about any use or industry you can think of—hand tools, appliances, automotive, farm implements, turbines, plumbing, military and many others.

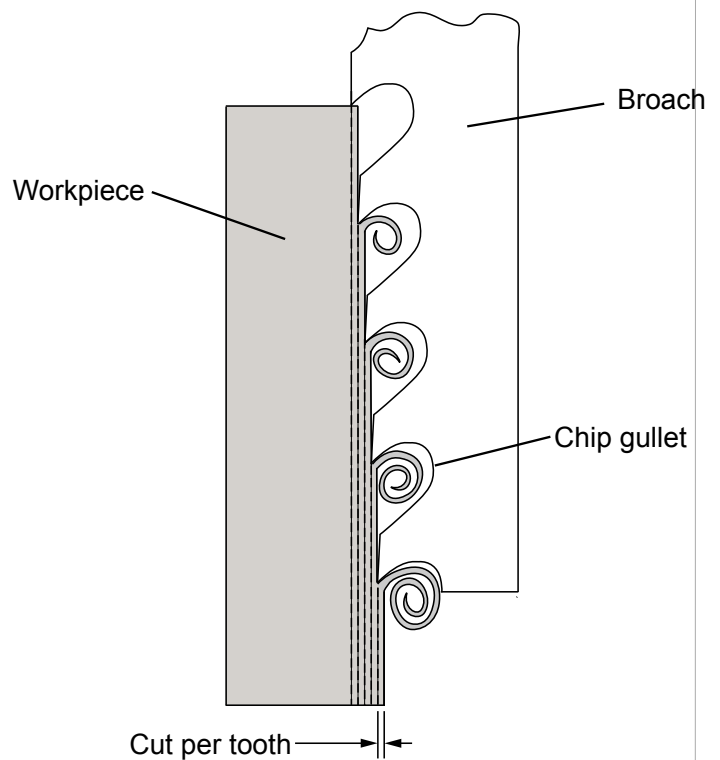
Broaching works best in materials with hardness in the range of 26 to 28 Rockwell C, said Ken Nemec, president of American Broach & Machine Co., Ypsilanti, Mich., manufacturer of broaching machines, broaches and CNC sharpening machines. It is commonly done in the range of 10 to 32 Rockwell C. Chip formation is critical in making good broaching cuts, however, and soft materials “are like bubblegum,” Nemec said, but in the ideal range of 26 to 28 Rockwell C, you get clean chips and good tool life. The tool designer needs to take the workpiece material properties into account and needs to run the tool at the appropriate cutting speed to achieve the best results for a given part.

For precision parts that need to be heat treated, such as gears, a part can be broached to near net shape before heat treating. Then a finish broaching operation is performed, removing just a small amount of the hardened material, Nemec said. In this case, the very expensive, specialized machines can cut material as hard as 58 to 60 Rockwell C.

## Broach it yourself

The machines and the broaches tend to be quite expensive, but if quantities justify the investment you could bring this capability into your shop. “Most people have sticker shock when they get into broaching,” said Nemec. “It is pretty expensive, especially if you want to get into high production.” You may have a high-volume part on which it costs 20 cents to machine a particular surface that is suitable for broaching. “We can show you how to do it in a lot less time, but you have to invest in capital equipment,” he said. In addition to high-volume machines, American Broach & Machine also offers lower-cost broaching machines suitable for shops that want to broach smaller quantities of parts.

If you have a high-volume part or family of parts that look as if they may lend themselves to broaching, the machine manufacturer would start from the print. “First we design a broach for you, then design a machine for the broach,” said Nemec. “We have about 10 different types of broaching machines. We stretch them bigger,



**Above:** How broaching works.

Illustration courtesy of Barbara Donohue.

and use more or less pressure,” depending on the specific application. Since each machine is different, it is designed and built to order. Delivery can be 26 weeks or longer, he said. Options such as automated parts handling or pressure-monitoring can add capability. “Buying a broaching machine is like buying a car,” Nemec said. There’s a base price and then you add on the options. In his experience, some customers want relatively bare-bones machines. But adding options can save money in the long run—and sometimes, in the not-so-long run.

### TLC for tools

An increase in force during a cut indicates that the broach needs sharpening. American Broach & Machine offers a pressure monitoring option that allows you to track the condition of the broach. This capability will add about \$16,000 or \$17,000 to the cost of the machine, Nemec said, but it can quickly pay for itself. Considering that a broaching tool may cost \$2,000, you can easily scrap enough tools in one year to pay for the monitor, he said.

To make good use of the machines you’ll need to understand a few basics of broaching and how to keep your process in order. The machine manufacturer should provide training—just two or three hours with your staff “can save a lot of time, trouble and money,” said Nemec.

Care of broaches, both on and off the machine, is critical to keeping a broaching process profitable. You can run a new \$2,000 broach until it fails, get maybe 8,000 parts and then throw it away. Or, you could run 3,000 parts and



**Above:** An example of a broached part.

Photo courtesy of American Broach & Machine Co.

then sharpen the tool, as many as 20 times, said Nemec. This makes your cost come way down—8,000 parts versus 60,000 parts with the same tool. If sharpening costs \$80, this works out to a tooling cost of 25 cents per part versus 6 cents per part.

Off the machine a user must take pains not to damage the cutting edges. Don’t leave broaches lying around on the bench, Nemec said. Store them in wood, plastic or cardboard containers or sleeves, which allow the teeth to dig in but won’t damage them.

Timely and correct sharpening extends tool life and helps keep tooling costs down. You can send tools out to a shop that specializes in sharpening broaches. However, by the time you have three or four broaching machines, you would save a lot of money by sharpening them yourself on a CNC sharpening machine instead, said Nemec. “The guy who is putting that broach in a box could sharpen it.”

**Right:** American Broach & Machine VTU 15-36 vertical broaching machine.

**Below:** American Broach & Machine H35-100 horizontal broaching machine.

Photo courtesy of American Broach & Machine Co.



## Rotary Broaching

### Rotary broaching

Rotary broaching is a completely different process. It can cut the same forms as conventional broaching, but you can use it on your screw machine or lathe. A special rotary broaching tool holder mounts on the machine turret, and rotary broaching becomes just another step in your process. This eliminates the need for secondary operations to form square holes, hex holes, splines or gear teeth, or almost any other internal or external shape you want. Rotary broaching easily works in blind holes, which is not possible with conventional broaching.

A rotary broaching tool has cutting edges the shape of the hole or form you want. It mounts in a toolholder that holds the tool at a 1-degree axial tilt in relation to the center line of the workpiece. Bearings in the toolholder allow the tool to rotate freely. The workpiece is turning, and when the tool comes in contact, it rotates right along with the workpiece. Because of the 1-degree axial tilt, the tool appears to wobble as it rotates. Because of this, rotary broaching is sometimes called “wobble broaching.” It is also known as “Swiss broaching.”

### Rotary broaching in action

Before the rotary broaching operation, the workpiece needs to be drilled or turned to the correct diameter for use with the rotary broaching tool. This minimizes the amount of material that the tool will cut. Then, the area where the tool will contact the workpiece is countersunk or chamfered, to allow smooth engagement of the tool. If the chamfer or countersink is not acceptable in the final part, you can design your process to remove it afterward. Then the part is ready for broaching. The following describes internal rotary broaching; external is similar.

As the prepared workpiece is turning,



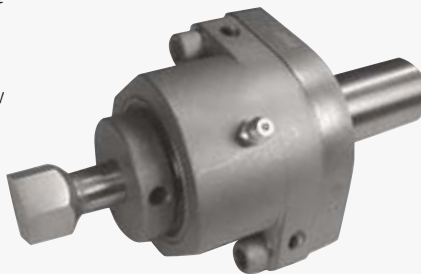
**Above:** Internal and external rotary broaching tools, with sample parts.

Photo courtesy of Somma Tool Company, Inc.

the rotary broaching tool/toolholder advances toward it. Because of the 1-degree axial tilt, only one corner of the tool engages the workpiece at first. When the tool makes contact, the workpiece drives the tool to rotate in unison with it. During rotation, first one corner of the tool contacts the workpiece, then the next, and so on, around and around.

As the tool advances into the workpiece, each corner, in turn, cuts into the metal. This way, bit by bit, the tool cuts a shape that matches the shape of the tool.

How large a form you can rotary broach depends on the material. In aluminum, you



**Above:** Rotary broaching toolholder and broach.

Photo courtesy of Somma Tool Company, Inc.

can usually rotary broach up to 2", in steel to 1". You can rotary broach harder materials, but in smaller sizes. For example, you could broach a quarter-inch hole in Inconel, said Peter Bagwell, engineer at Slater Tools Inc., Clinton Township, Mich.

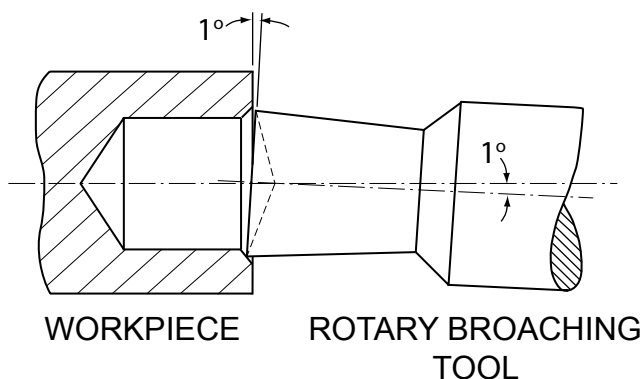
### Toolholders and setup

The technology was developed decades ago, but rotary broaching companies continue to improve tool holders and tools to increase tool life and make the technique easier to use. Because of the precision alignment and offset required, rotary broaching tool holders traditionally required many adjustments and painstaking setup, which could take considerable time, depending on the employee's experience. A standard rotary broach setup might include six set screws, two bolts with nuts and a sliding plane between the toolholder body and the machine adapter.

Rotary broaching engineers have developed innovations to streamline setup procedures. A specially designed tapered-centering-pin gage can allow you to set up a fully adjustable tool holder in a minimum of time, said Dick Noti, sales engineer at Somma Tool Company, Inc., Waterbury, Conn. Some toolholders require only an X-axis adjustment, and, in recent years, no-adjustment rotary broaching toolholders for Swiss-type machines have become available.

If you are sending out parts for broaching, or have a job that might take advantage of rotary broaching, contact a rotary broaching tool manufacturer. An application engineer can look at the part and advise you. If you're not sure you want to make the investment, many suppliers will let you try out a toolholder and broaches on your own machine, without obligation.





**Above:** How rotary broaching works.

Illustration provided by Barbara Donahoe & Somma Tool Company, Inc.

Cutting fluids also influence the tool life and part finish, of course. Generally, you should use a good water-soluble oil, Nemec said. In more challenging applications a heavy cutting oil may be needed. Many cutting fluid suppliers offer specially formulated coolants for broaching applications. Your machine manufacturer and tool supplier can recommend appropriate coolants.

With brass parts you'll want to use a water-soluble oil that won't discolor the material. You'll also need a water-soluble fluid with certain thin-walled parts. "Especially for internal [broaching] with thin wall sections, sometimes coolant can make a difference in what your final tolerance is," said West. "If you broach a round hole [with] a thin wall, it gets hotter than blazes and expands." In this case, a water-soluble oil will help dissipate the heat.

Whether you broach high-volume parts yourself or send them out for broaching, you can take advantage of the capabilities of this time-honored process: precision, low per-part cost and the ability to cut complex forms with accuracy and repeatability not found with many machining processes.



## Contributors to this article:

American Broach & Machine Co.: [www.americanbroach.com](http://www.americanbroach.com)

Slater Tools Inc.: [www.slatertools.com](http://www.slatertools.com)

Somma Tool Company, Inc.: [www.sommatool.com](http://www.sommatool.com)

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# A Walk in the Park:

## Understanding Today's Economy by Understanding Your Neighbors' Businesses

BY LLOYD GRAFF

I have driven into the Oak Forest Industrial Park at least 5,000 times since Graff-Pinkert & Co., my family-owned used machine tool business, moved there in 1984. I used to run through the park for exercise, now I walk. Since I've been working in this place I've paid hundreds of thousands of dollars in property taxes and seen my father and his partner, Aaron Pinkert, die. Yet if you asked me who owned the businesses to my immediate north, east and west (south is 167th street), I couldn't tell you.

But I figured there was a story on the lightly traveled streets of this modest industrial park in the southern suburbs of Chicago. So I knocked on doors and tried to meet my neighbors. This is what I found.

**Generally business is lousy in my neighborhood—but not for everybody.**

### U.S. GLU-LAM Structural Wood Products

The company to the west, U.S. GLU-LAM Structural Wood Products, occupies the biggest land site and is stuck in the worst industry. They sell engineered wood, which is a laminated reconstituted wood product primarily used in residential building. In 2006, my street, 166th, was crowded with truck traffic moving in and out of their 10-acre yard. Today they are selling a half truck load on a good day. Beverley Gilmore, a charming 60-year-old woman, owns and runs the business with her son Max. She has been in this field for 30 years and has built a nationally prominent business. Now she is on the ropes.

With virtually no new homes going up in the Chicago-land area she has hardly any sales. She is considering selling her valuable downtown Chicago condominium, and I understand the Oak Forest property is for sale. She has laid off most of her staff, just trying to hold on while the housing market readjusts.





Beverley Gilmore, owner of U.S. Glu-Lam Structural Wood Products, sitting in her company's barren 10-acre yard.

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## Roy's Paving and Sealcoating Company

Directly across the street from Graff-Pinkert is Roy's Paving and Sealcoating Company. This is a Mexican-owned entrepreneurial business that does street paving and parking lot construction work. They have paved our parking lot twice and done a nice job, which makes them one of the few companies in the park Graff-Pinkert has exchanged money with. Roy's is definitely a family operation. When I visited there were little kids running around and a Pak n' Play crib in the office. I sometimes wonder if Roy's is in the Lexus business because there are usually several Lexus SUVs parked in the company driveway. Spanish is the language of choice at Roy's, and they have been successful at navigating the minority set-asides to build their business. In Chicago, like in many places, road building is politically connected, and Roy's seems to be making the system work for them.

The parking lot business is weak, but they are hopeful that the Federal stimulus money will kick in this summer. There are 33 miles of Chicago street scheduled to

be paved as the city waits for the big Obama honey pot for funding. Roy's is in a holding pattern but confident that they will soon be busy.

## In-Print Graphics

In-Print Graphics is a contract-printing firm immediately east of us. Rob Klauber and his father Bob owned Metro Litho, which was the first printer of *Screw Machine World*, the predecessor of *Today's Machining World*. They sold out four years ago to a fly by night outfit which soon failed. In-Print Graphics picked up the pieces and the solid 20,000 square foot printing plant, and Rob now works for the family-owned company. I used to play softball with Rob, and he is the only person in the park who regularly visits us looking for business. He says volume fell off precipitously last year, but the last four months have been successively better. They recently hosted an open house which brought in the famous Chicago Blackhawk winger, Bobby Hull, who signed autographs for several hours. In-Print's parking lot is always overflowing with cars, and Rob seems

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happier than I've seen him in the last few years, even though he says he got killed in the stock market.

### Frito-Lay and Emerson Electric

The Oak Forest Industrial Park is not all family businesses. Frito-Lay has a warehousing and distribution facility one block away. I visited them and found friendly corporate apparatchiks who would tell me absolutely nothing about their business. I was told that all communication with the press must go through "public relations." They were pleasantly uninformative, which was better than Emerson Electric, which has a small valve service business located about a football field away from us. At Emerson they were indifferent to my inquiries to the point of rudeness. I tried several times to call the plant manager who would not see me. He also refused to return my calls. Must be terribly busy.

### Wendy's Restaurant

On the other hand, the Wendy's day manager, whose franchise is at the entrance to the park, was responsive as we talked to him on his break from filling orders behind the counter. He said their business was stable despite the competition of a McDonald's across the street in a new shopping center. Wendy's has great street visibility while

McDonald's is submerged in a deep parking lot. Wendy's is now serving until 1:00 a.m. and seems to have a thriving drive-through following. You can get a decent high-fat lunch for under five bucks there.

### Concept Motorsports

Next to Wendy's in an incubator building is Concept Motorsports, a new business which specializes in fancy custom wheels for cars and small trucks. It is owned by Timothy Triplett, who seems to have a predominantly African American clientele. He says his business, which also has a Web presence, is doing okay. He uses a parked garish-orange decorated pickup as signage on his lawn and appeals to a drive-by trade. After talking to him a couple times he reached out to Graff-Pinkert looking for some machining expertise, which we could not provide.

### Real Estate Market

Triplett's building is owned by N-S Builders run by Nat Sclafani. Nat has 14 rental spaces in the park and four are vacant, with another tenant, Orkin Pest Control, moving out after 18 years. He says he is dropping his rental rates if necessary, but there's not much action on his units.

A building directly east of Graff-Pinkert is vacant, as is a 12,000 foot structure across the street. Jeffrey Locascio



Timothy Triplett, owner of Concept Motorsports, with son Kyle.



is the agent for both properties. He claims to have bites on both factories, but the two have been vacant for a year. Both buildings are owned by people in housing-related operations who are still in business but have relocated into cheaper space.

## Anderson Fittings

The one company in the Oak Forest Industrial Park which has been a long-time customer of Graff-Pinkert is Anderson Fittings, which has had several parents and is now controlled by Warren Buffet's Berkshire Hathaway. They have scores of multi-spindle screw machines running brass fittings for big hardware chains and other large users of turned brass. We've dealt with them for 30 years—since before old man Anderson sold the business to Cerro Copper. Their business is soft now and staff is down, but the company has deep pockets behind it and they are quoting heavily. If they land a few of the big deals they are working on, the parking lot will be filled and they will be buying their first Hydromat rotary transfer machines.

## South Suburban College

In the whole industrial park only one operation is truly thriving—South Suburban College. Enrollment is up 13 percent over last year at the former 60,000 square foot warehouse that is now a satellite campus. At this facility they teach courses primarily in criminal justice and court reporting. Pat Rush, head of public relations for the community college said demand is still strong in both fields. Accredited court reporters are making starting salaries north of \$65,000 just out of school. Evidently the deposition business is hot.

What I found in my walks through the park is that anything directly related to new residential construction is a disaster, but for businesses where government is involved like paving and education, life is good. For folks with a diversified clientele like In-Print Graphics, Wendy's and Frito-Lay, there is some stability. Manufacturing has a pulse but that's about all. New businesses are still starting up despite the odds against them. Family operations hang in there when a big company might have long ago given up. If Oak Forest Industrial Park is a case study, one third of the companies are on life support, one third are limping along and one third are feeling good about themselves.



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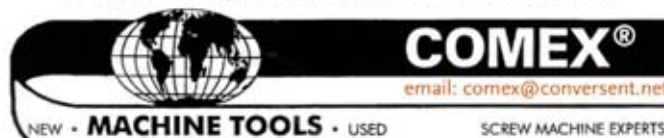
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# product focus



P



M



K



N



In the precision parts world a cutting tool is used to remove metal from the workpiece by means of shear deformation. In order to last, cutting tools must be made of a material harder than the material which must be cut and be able to withstand the heat generated in the metal cutting process. They also must have a specific geometry designed so that the cutting edge can contact the workpiece without the rest of the tool dragging on its surface.

## Iscar Cutting Tools

ISCAR's new SUMOCHAM drill family is an advanced evolution of the CHAM-DRILL and CHAMDRILLJET drill families. The drill features twisted coolant nozzles with indexable drilling heads which are available in different head configurations for various material groups. SUMOCHAM drills can be used either on milling centers or lathe machines.

For more information, please contact Iscar Cutting Tools at 817-258-3200 or visit [www.iscar.com](http://www.iscar.com).

### ► Lyndex-Nikken

Lyndex-Nikken introduces a new complete series of live tools for Nakamura Tome available in stock. Designed to enhance the performance of a CNC lathe, Lyndex-Nikken offers a wide variety of live tools. These highly precise and rigid tools effectively improve milling, drilling and tapping capabilities in turning operations. Lyndex-Nikken stocks a range of standardized live tools for CNC turning centers from Nakamura Tome, Okuma, Mazak, Mori Seiki, Sauter and all other major builders.

For more information, please contact Lyndex-Nikken at 800-543-6237 or visit [www.lyndexnikken.com](http://www.lyndexnikken.com).



### ◀ Sandvik Coromant

Sandvik Coromant recently added two new products to its family of high pressure coolant solutions. The modular Serration Lock (SL) 40 and 70 heads for turning allow Sandvik Coromant to provide more than 300 tooling options for the most difficult to access areas.

The high-pressure coolant system harnesses the high pressure pump's capability and channels a high precision jet through small diameter precision nozzles. The resulting increase in focus and velocity of the coolant jet produces a hydraulic wedge reducing the contact between the rake face of the insert and the chip. The result is improved process security and productivity.

For more information, please contact Sandvik Coromant at 201-794-5223 or visit [www.coromant.sandvik.com/us](http://www.coromant.sandvik.com/us).

### ► Knuth Machine Tools USA

Knuth Machine Tools USA introduces the KHT, a value priced line of strong and rigid hydraulic swing-beam shears for workshop applications. Combining heavy duty construction with simple manual controls, the KHT-A swing-beam shears provide for fast setup times while ensuring high quality, consistent output over a wide range of material thicknesses from 1/8" to 1/2" capacity and maximum cutting length of 157".

For more information, please contact Knuth Machine Tools at 847-415-3333 or visit [www.knuth-usa.com](http://www.knuth-usa.com).





# product focus



## ▲ Somma Tool Company

Somma Tool Company has been manufacturing cut-off blades in their Connecticut plant for over 50 years and has ample inventory on hand. Standard styles offered include T-type, Johnson/Hollow Ground, and Acme "B" type. Blades are stocked in M2 High Speed Steel for general usage and Cobalt and T15PM for excellent wear resistance and red hardness. The T-type blades are also available in solid carbide for longer wear, less galling and better finish at high speeds. Micro-grain Carbide Tipped Double End T-type blades and Single End Hollow Ground blades are also available from stock.

For more information, please contact Somma Tool Company at 203-753-2114 or visit [www.sommatool.com](http://www.sommatool.com).

## ▲ Ceratizit

The new, coated CBN solution from CERATIZIT will mainly be applied for fine or medium milling operations with cutting speeds up to 1,000 meters per minute, depending on the application. The tooling solution therefore requires stable machining conditions and is applied without cooling lubricant. Tool life compared to uncoated CBN is increased between 30 percent and 40 percent.

For more information, please contact Ceratizit at 800-245-6880 or visit [www.ceratizit.com](http://www.ceratizit.com).

## ▼ Valenite LLC

Valenite LLC introduces its new turning grade, VP9605 with Micro-Form™ technology, specifically designed for difficult-to-machine materials and the aerospace industry in semi-finishing to finishing applications. The VP9605 works well in demanding environments such as corrosive applications, continuous duty cycles and elevated temperatures and pressures. In addition to aerospace, VP9605 is ideal for the automotive, die and mold, oil/gas, power generation, off highway, medical and marine industries.

For more information, please contact Valenite LLC at 248-733-6980 or visit [www.valenite.com](http://www.valenite.com).





### ▲ Sumitomo Electric Carbide, Inc.

Sumitomo Electric Carbide, Inc. recently unveiled its new WDX Indexable Drill Series for large diameter hole drilling. The WDX not only accurately drills holes, but can also perform operations such as turning and boring. The drill's nickel-plated steel body reduces inventory costs by accepting the same insert geometry for both the outer and inner cutting edges, allowing the use of all four of the insert's cutting edges.

For more information, please contact Sumitomo Electric Carbide Inc. at 800-950-5202 or visit [www.sumicarbide.com](http://www.sumicarbide.com).

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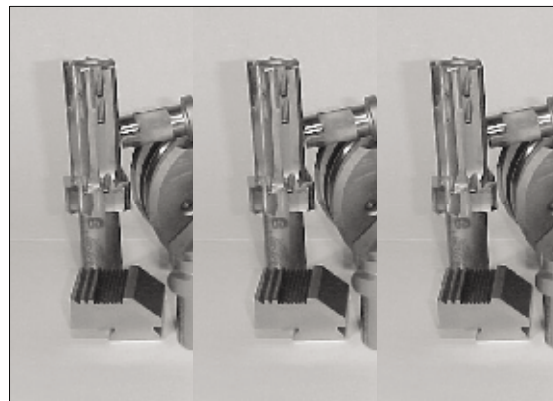
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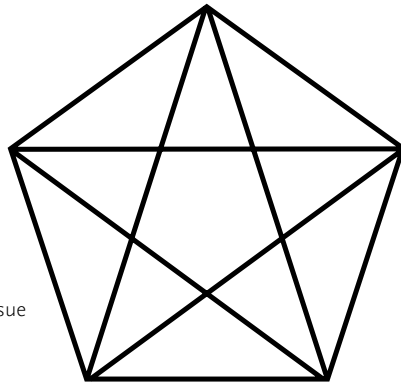
	4			2		1		
				9		3		
1		8						
	6		9			4	3	
		1	6		8	2		
	9	4			5		1	
						6		2
		5		1				
		7		8			4	

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# Sudoku

## Triangle Puzzle



There are 35 triangles.

Puzzle found in the April 2009 issue

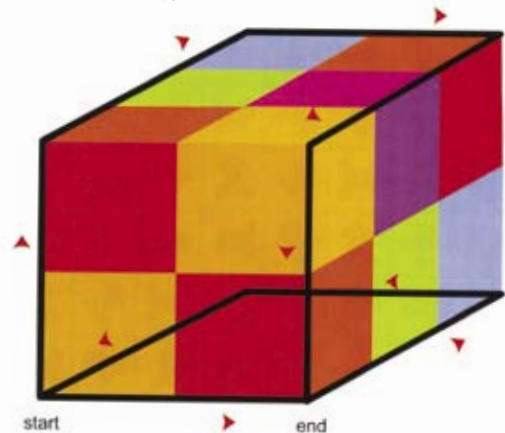
### Who's Triangulating?

**Steve Richards** of Yamazen Inc.; **Miles Free** Precision Machined Products Association; **Teresa Saenz** of Monroe Machine Inc. in Farmers Branch, TX; **Francene Stockdale** of Kelley Manufacturing in Pocahontas, IA; **Terry Acosta** of Weatherford International in Woodward, OK; **Thomas Saur** of Methods Machine Tools in Sudbury, MA; **Rick Stein** of Key Products Inc. in Milwaukee, WI; **Genevieve York** of Manda Machine Co., Inc. in Dallas, TX; **Janet Querido** of G. H. Berlin Lubricants in East Hartford, CT; **Frank Camillieri** of Stone Machine Co. in Chester, NH; **Zac McDaniel** of A-1 Machine Works Inc. in Bristow, OK; **Chet Gagat** of MFG Composite Systems Company in Ashtabula, Ohio; **Richard M. Hanus** of Lockrey Manufacturing in Toledo, OH; **Roger Stillman** of Metric & Multistandard Components Corp. in Hawthorne, NY; **Jeff Kovalenko** of Key Machine Tool Inc. in Elkhart, IN; **Jeffrey Goodman** of Eaton Steel Bar Company; **Larry Campbell** of Afab Precision Machining in Lake Forest, CA.

## Worm Trip

The worm can crawl 22 centimeters.

Puzzle found in the May/June 2009 issue



### Who's Creeping Around?

**Mark Schramm** of Lockrey Manufacturing in Toledo, Ohio; **Jimmy Hunt** of Global Shop Solutions in Houston, TX; **Uli Kuster** of Blaser Swisslube in Goshen, NY; **Steve Richards** of Yamazen Inc. in Milwaukee, WI; **Jeff Riley** of Rawco Precision Mfg. in Califon, NJ; **George Stringe** of Highland Service Co. in Frederick, CO; **Chet Gagat** of MFG Composite Systems Company in Ashtabula, Ohio.



# postings



Noteable and newsworthy information and events for upcoming months.

Gear Manufacturing  
Conference  
at  
Gear Expo

Sept  
15-16

Indianapolis IN

[www.sme.org](http://www.sme.org)

Lean to  
Green  
Manufacturing

Austin  
TEXAS

Sept  
28th to the 30th

[www.sme.org](http://www.sme.org)

Aerospace  
Measurement,  
Inspection &  
Analysis  
Conference

Baltimore MD

Sept. 29th  
to Oct. 1st

[www.sme.org](http://www.sme.org)

Green  
Manufacturing  
Expo

Sept 22nd  
thru 24th

Rosemont, IL

[www.greenmfgexpo.com](http://www.greenmfgexpo.com)

Design &  
Manufacturing  
Midwest

Rosemont  
Illinois

September  
22nd to 24th

[www.DM-midwest.com](http://www.DM-midwest.com)

AMMO:  
American  
Manufacturing  
Exposition

Aug 17th  
to the 19th

Las Vegas, NV

[www.ammexpo09.com](http://www.ammexpo09.com)

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premiered

Sept, 7th 1979

Aug. 29, 1949:

Soviet Union  
explodes its first  
test nuclear weapon  
on the Kazakhstan  
steppe.

[www.wired.com](http://www.wired.com)

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NFL season.

Tennessee at  
Pittsburgh.

Sept 10, 2009

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began publishing  
Sept. 18th 1851



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## A New Direction

I'm so tired of reading and hearing about the "Asians stealing our jobs" and "people being replaced by automation." Face it. It's happened. It's going to continue to happen and we have to roll with it and discover where we can add value and get paid for it.

I have read and reread several times a talk given recently by Daniel Pink at a Wharton Business School symposium. I suggest you read the entire article. Pink argues that outsourcing is only going to become more widespread as services move to talented, low-cost providers. I know TMW's talented Web designer, who is 24, is now subbing his more routine work to a young woman in Manila while he focuses on design and client acquisition. Pink notes that even if 85 percent of India's one billion people get left behind there will still be 150 million college-educated Indians entering the global workforce—more than the population of Japan.

"The idea that there is usually one right answer to a problem is the hobgoblin of little minds."

Pink argues that a generation ago students were given a formula to follow. "Get good grades, go to college, and use that education to find a good job." People with good math skills became engineers, good language skills became lawyers etc. He says those skills still matter, but less so today. He argues that it's not only important what we learn but how we learn. The left side of the brain specializes in linear, logical, analytical thinking. The right brain takes on big picture, non-verbal tasks. The right brain specializes in processing things all at once instead of in sequence or interpreting facial expressions—it synthesizes rather than analyzes. It used to be the most important, and well paid abilities were characteristic of the left hemisphere. It was the "logical, linear, sequential, analytical spreadsheet, SAT, zero-in-on-the-right-answer

abilities area." While still important today, the premium is on "artistry, empathy, inventiveness and big picture thinking." Bingo.

I agree with Pink. The future of our children and grandchildren will depend significantly on right brain education. To continue to emphasize the same old approach of problem solving rather than problem identification will produce a generation of kids and adults with dismal futures as their jobs are taken by people with scripts, improved software programs and more sophisticated automation.

Pink talks about doctors going to art classes to improve their diagnostic skills by assessing facial expressions in sculptures, and improving their listening and communication skills to make better diagnoses and explain them to patients with conscious kindness.

The idea that there is usually one right answer to a problem is the hobgoblin of little minds, or at least left-brain minds.

In the machining and manufacturing worlds the rigid problem solving approach may still work in the short run, but the big winners will be the flexible creators of value, not the skillful painters who flawlessly stay within the lines.

To read the article please visit: <http://knowledge.wharton.upenn.edu/article.cfm?articleid=2255>

Lloyd Graff



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