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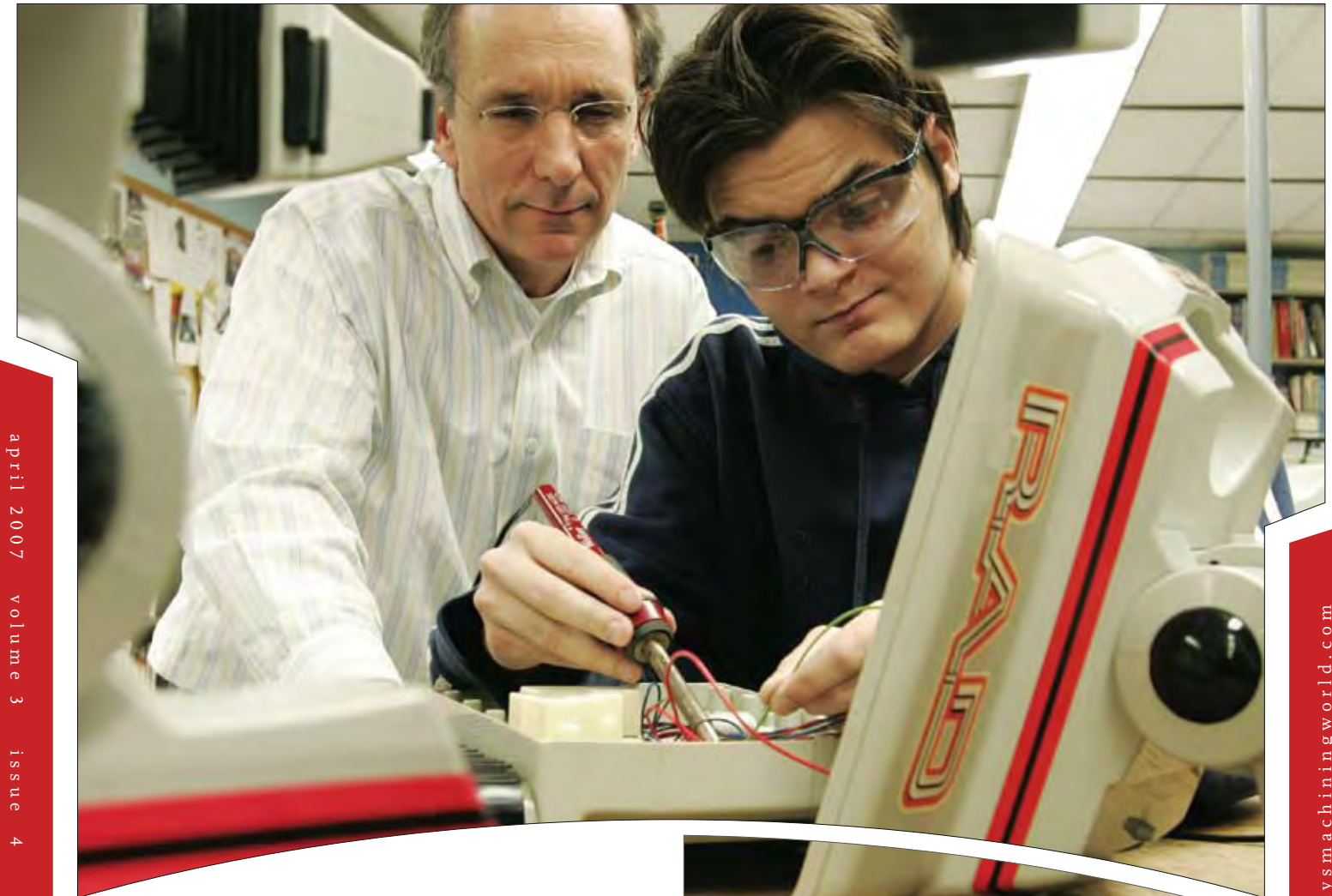
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april 2007 volume 3 issue 4

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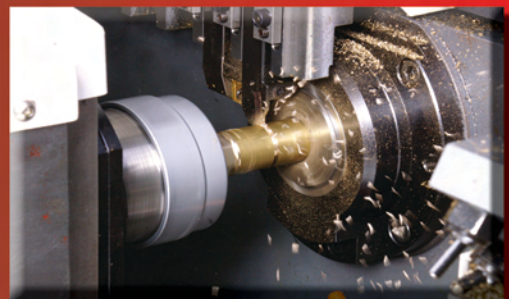
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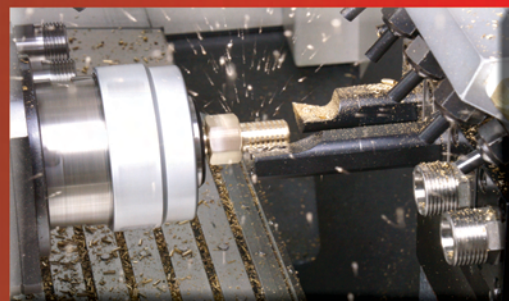


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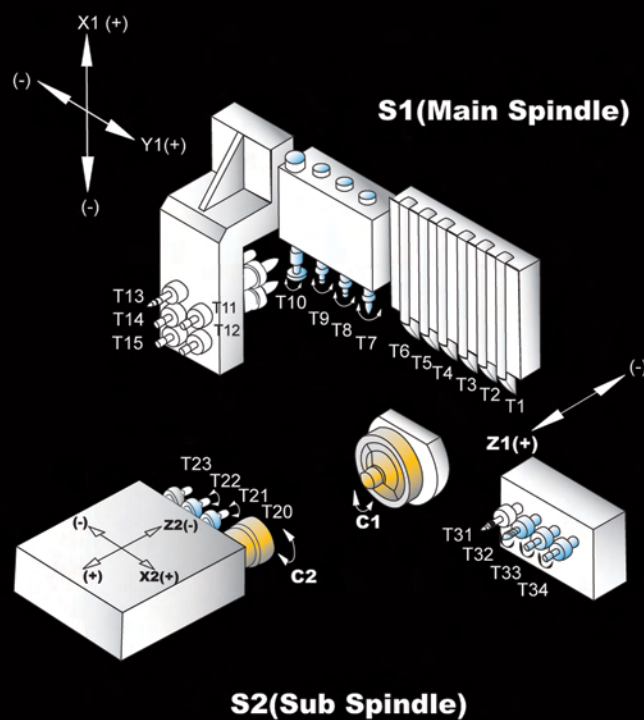


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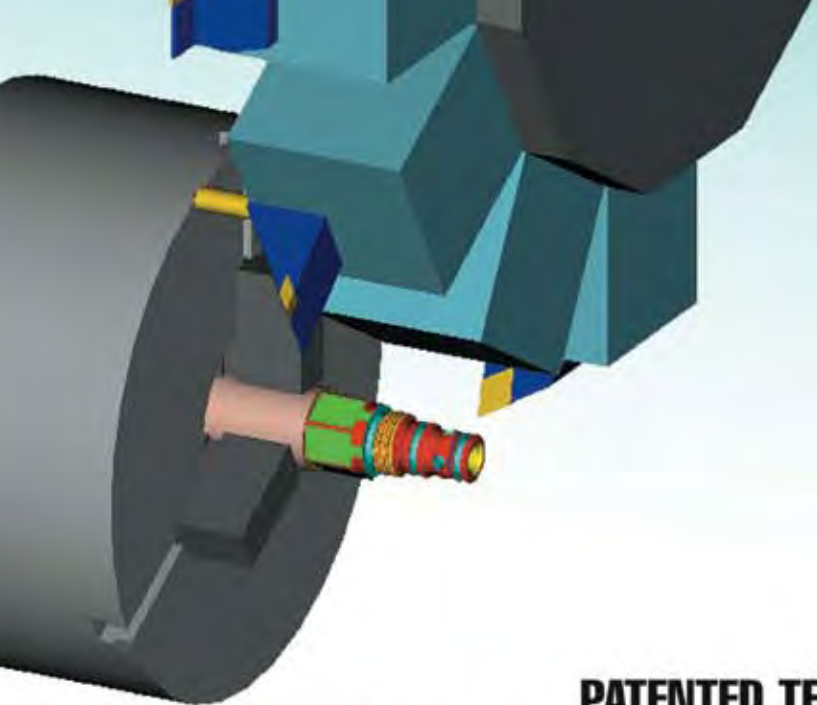
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Hot Water  
Lloyd Graff  
(708) 535-2200

Publisher  
Dan Pels  
(312) 342-6557

Managing Editor  
Jill Sevelow  
jill@todaysmachiningworld.com

Features Editor  
Noah Graff  
noah@todaysmachiningworld.com

Web Forum Editor  
Noah Graff & John Iwanski  
noah@todaysmachiningworld.com

Creative Director  
Terry Ntovas  
terry@todaysmachiningworld.com

Circulation Director  
Judy Palmer  
judy@todaysmachiningworld.com

Sales Manager - East Coast  
Bill Papp - 845-613-7329

Sales Manager - Midwest  
Dianne Lach - 708-460-6383

Contributing Writers  
Barbara Donohue, Paul Eisenstein, Lloyd Graff,  
Noah Graff, Garth Stephanson, Robert Strauss.

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# editor's note

## Kernel of Truth

Orville Redenbacher is coming back to life to sell popcorn for ConAgra. The sound engineers are computer graphics folks who are making new television ads using the computer-generated voice of Orville in an animated visual format. Sounds a bit eerie to me, but Redenbacher's grandson is cool with it.

It prompts the question of the value of a personalized brand for a product. The *Today's Machining World* brand, as well as the Graff-Pinkert name, are closely identified with me and the Graff family. The financial logic of this marketing choice is to instill confidence and a sense of connectedness to the audience by humanizing the owners of these businesses. My belief is that I gain credibility for the magazine by identifying my biases and revealing my personality to the readers. I think this choice has enabled us to build a brand that feels authentic and real. I feel that you actually care about this magazine like no other business-to-business publication.

But I realize this style has a downside. Some potential advertisers find the pictures of me in the Graff-Pinkert ad and the "Afterthought" column to be an unethical effort to manipulate the audience to buy our machinery. Other people see me as a dilettante on a long ego trip. Is there a kernel of truth in either of those positions?

From a financial viewpoint, the personalized brand is an impediment to selling either business. Could Oprah sell her magazine if she retired? What is Martha Stewart's magazine worth when she's in jail?

Hard questions. Maybe Orville's video clone will give us an answer.

Lloyd Graff  
Editor/Owner



**Garth Stephenson** is a chartered accountant and former CEO and co-owner of Stegg Limited in Ontario, Canada. Garth is now offering counseling and coaching services for owners interested in selling their business. Fees are donated to Camp Trillium, a camp for kids with terminal cancer. Garth enjoys ocean scuba diving, hunting pheasant, tennis, and family time in cottage-land.



**Lloyd Graff** has an M.A. in journalism from the University of Michigan. Lloyd splits his time between buying and selling machinery, writing Swarf and swarfblog and playing Fantasy Baseball on Yahoo. He is married to Risa, a world champion in Tae Kwan Doe. He has three children and a granddaughter who are all above average. One of his life goals is to make 65 consecutive free throws on his 65th birthday.



**Jill Sevelow** has incorporated a few of her passions into her last three professions; teacher, department store buyer and managing editor of *Today's Machining World*, a role she's relishing. Jill is an avid gardener and dedicated mah jong player, volunteers her time & creative energy for exceptional organizations, and adores her friends and family. Her greatest source of pride has been raising daughters Jade and Tess, her two most favorite people on the planet.



**Noah Graff** has been working at *Today's Machining World* since 2005. He graduated from the University of Wisconsin Madison, majoring in film and history. He is the features editor for *Today's Machining World*, as well as the videographer for *TMW* and Graff-Pinkert & Co., producing training videos on screw machine maintenance and video stories for the *TMW* website. Noah enjoys investing, filmmaking and improvisational comedy. He is also a master of the sacred art of live band karaoke.



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## Letter from Japan

I'm writing after being fortunate enough to be invited by Mitsui-Seiki to see their Tokyo plant first-hand, as well as visit their customer Aikoku Alpha in Nagoya.

I found the Mitsui Seiki plant and its commitment to precision, a vision – figuratively and literally. The newest plant has been built according to Japan's strict environmental regulations and Mitsui's dedication to ultra-precision (around 12 microns true positioning capabilities) in their vertical and horizontal machining centers. The plant was built on a 1200 mm thick concrete "bed" in order to thwart environmental shifts, and maintains a 68 degree temperature throughout (at a cost of over \$75,000 a month!), with air circulating 24 times an hour for constant thermal stability. To complete their quest for the ultimate in accuracy, machines are virtually handmade. I witnessed "hand-scraping," where an employee's dedication to hand-scraping a perfect "fit" for achieving structural robustness (of up to 250 hours per machine) was an artistic dance as well as an exact science.

I asked about the employment climate in the manufacturing sector in Japan, and was told since the depression of the 1990s,

hiring has been very slow in manufacturing, though the industry is very strong. There is an age gap between 50 year-old experienced workers and the newer under 30 year-old workers. Their solution is to hire Chinese, Korean and Taiwanese in addition to their country's engineering talent. The current immigration laws are slowly opening up to allow that to happen. They look for a personality type willing to learn their technology and an interest to stay motivated throughout his career, then develop their talent. I was intrigued and moved by the intense personal focus by the employees and their tasks at hand, both at Mitsui-Seiki and Aikoku Alpha.

My letter would not be complete without mentioning the impeccable hosting by Scott Walker, president of Mitsui-Seiki U.S.A. (who speaks Japanese fluently, plays a mean guitar and understood my desire to soak in everything, including sushi for breakfast) and Lynn Gorman, president of Gorman Communications and my perfect partner-in-crime for donning kimonos at dinner, 6:00 a.m. fish markets and addiction to Japanese salt baths. I highly recommend Japan – and a Mitsui-Seiki tour!

Jill Sevelow

## The Exodus

I read the "Future of Michigan" (February 2007): I remember the young ladies from Flint marrying out-of-state General Motors Institute students to get away from their blue collar life. I remember my exodus as a General Motors employee with a Masters of Science degree after being told they did not want that level of education working in the shops. I remember the exodus in Detroit of transient white and blue collar workers that continually stripped the city of a stable culture. I remember the exodus of employment opportunities for young people as the Big Three continued to lose their grasp of market share. Finally, on a business trip to the Detroit downtown, I saw the final sign of exodus – in a feeble attempt to put some color into otherwise drab surroundings, flowers planted the day before had been ripped from their beds and were dying in the street. Michigan needs a Lee Iacocca.

Dennis Myers  
Laguna Beach, CA

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# Big Fish in Machining

Elliot St. James is a bright, young guy with a clear business plan. He wants to dominate the turned parts business in British Columbia.

His company, Columbia Tool, based in Surrey, British Columbia, makes tapping tools for the drywall trade. It's one of those profitable little niche businesses – he says he has six competitors – but highly dependent on the winds of the construction business. Elliot runs five Citizens and a Mazak to make the 70 turned parts in his tapping tools. But the big opportunity he sees is becoming the big fish in machining in an area where machining skills are withering away.



The Vancouver area is thriving, but the manufacturing talents of the Baby Boomers are wasting away. Weisser Lock used to have a big factory in B.C. but its production has gone to the invisible offshore world. There are still hundreds of entrepreneurial businesses in medical, aerospace, electronics and esoteric fields like drywall taping that need precise metal parts, and they prefer to buy from somebody they can talk to in their office on a regular basis.

Elliot St. James is using his taping tool product line as a base to get into the jobbing business in the province. He is buying up job shops to get their customers. He sees

cam-operated machines as interesting relics of the Bronze Age of manufacturing. He wants to service the local clients with state of the art CNC turning machines, better attuned to the smaller lot sizes they demand. He also believes that operators for cam machines are generally eyeing retirement. His plan is to replace older machinists with eager young people who love CNC.

Elliot St. James' approach is delightfully Darwinian – survival of the fittest in a changing climate. If he executes the plan he'll be the big fish in the not-so-little B.C. pond.

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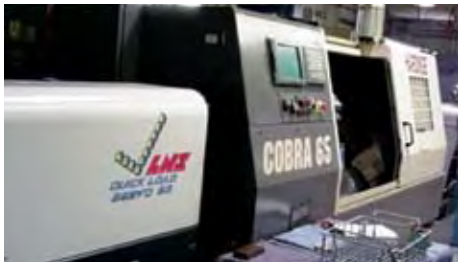
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## The shifts in automotive and other high production portions

of the manufacturing economy continue to rock our world.

The big M & S auction by Hilco at the end of March was part of the unwinding of the domestic auto supply business.

M & S was a highly successful automotive subcontractor. I would call them Tier II – under \$100 million in sales, but not much. They were highly profitable in the 1990s and invested heavily in CNC lathes, CNC multi-spindles and rotary transfer equipment. They also bought top of the line inspection and metrology equipment – lots of it.

But the last several years were unkind to the owners of the business. The families that controlled the company fought over the money that had poured in during the fat years. Lawsuits amongst the key shareholders sopped the energy of the owners. The fun seeped out of the business and ultimately, so did the money.

A key client, for which the owners of M & S had gambled on \$7 million of Hydromats and other ancillary equipment, wanted out of an eight-year contract after four years because Ford was disappointed with the truck component's design. The primary contract was cut back to service component levels, leaving the Hydromats way overcapacity.

Disgruntlement turned into despair and fear at the company. The lenders, who bet on the Ford contract, were worried about the viability of M & S. The banks pushed the owners to find a buyer for the company before they were forced into bankruptcy.

The macabre dance of workout firms, consultants, appraisers, and liquidators began in earnest. Employees knew what was going on and started looking for the exits. Layoffs accelerated. Internal dissension mixed with endless meetings was causing a combustible, poisonous atmosphere in the office.

Ultimately, Robert Levy of Hilco made a financial guarantee to the owners of M & S and the creditors for the company's assets, gambling that the proceeds would at least equal his number, and the 12.5 percent buyer's premium would make the deal profitable for him and his partners.

Recently, Tom Zupan sold his big machining firm, Whirlaway Manufacturing, in Ashland, Ohio. There is plenty of private money looking for automotive suppliers expecting a turnaround soon. Despite Chinese outsourcing, there is still money to be made in the field.

Perhaps M & S could have survived if the will was there, but when the fun is gone, shareholders are in court and Ford is gasping, the impetus to lay it on the line to survive goes away.



# swarf

## Ernest Gallo died recently at 97.

He and his brother Julio founded and built the wine business that carries their name and is still owned and run by the family.

The Gallo brothers started the business in 1933 after the murder-suicide of their parents, poor immigrant grape farmers in the San Joaquin Valley of California. With a borrowed \$5,900 at the depth of the Depression, they began one of the great American companies.

To the Gallo Brothers wine was a business. Success was measured in cases sold, not prizes at tasting festivals. To them a good Chianti was red and made money. In the Remembrance column of the March 10, 2007 *Wall Street Journal*, the obit writer recounted an exchange between Michael Mondavi, son the famous California vintner Robert Mondavi and Ernest Gallo:

"Do you know what I do?" Michael Mondavi recalls asking Gallo when they first met. "Yes, you run the largest winery in the country," replied Mondavi, then in his mid-twenties. "No," Ernest corrected him, "I go out and visit customers in stores."

Both men understood what they, and their companies were all about. The Mondavi family built their brand around impeccable taste in wine. The Gallos built their empire on Thunderbird by the truckload. Mondavi and Thunderbird are both American icons.

One of the keys to success in any business is understanding what you are good at and going after it with a passion. Ernest and Julio Gallo, giants of American business, always stayed true to their core strength, and the members of the company and the clients never had to guess about it – make a drinkable wine and sell the heck out of it.





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Thanks to the kind people who responded to my "Afterthought" column on the "anti-anti clutter movement" (January, 2007).

## I think the world is full of

creative, productive people like Jim S. from Southern Indiana, who makes a living running his 12 CNC machining centers while his desk festers with open catalogues and coffee-stained prints. Jim just bought a new Romi lathe with a 6-1/2 inch hole for 140 grand cash, but he cannot see the bottom of his desk. He describes the entrance to his eight foot by 12 foot office as a "path," but he has a proprietary product for the plastics industry which is highly successful.

Mark Crotts of Winston-Salem, North Carolina called to say the "Afterthought" column described him to a "T." He has a highly regarded machine tool dealership selling Toyota and Mitutoyo, among other lines. He has been honored by his peers at the Society of Manufacturing Engineers, but his papers still bedevil him.

One of the joys of doing *Today's Machining World* each month is reaching out and feeling connected to the people of the precision machining world. Our universe is full of neat people. Some of the most cluttered are the neatest of all.

## The downtown train station in

Chicago has recently been remodeled. Two coffee shops, one a Starbucks, the other an independent, have opened directly across from one another. The coffee is comparable at both, but the independent serves better pastries and a much larger assortment of food. The prices are similar. Starbucks has a few tables and chairs and the independent has no sitting area.

Every time I go in the new station I notice that Starbucks is filled with a waiting line and the independent is virtually empty. Why?

Starbucks has a fabulous brand. This certainly is helpful in pulling customers in the door, especially travelers who seldom go in this commuter station. But most of the folks at the downtown Metra station are daily or frequent commuters who I would think would try both shops to find the one they like best. That's what I did. And I ended up buying a coffee at Starbucks even though I hate the pastries there and I was hungry for a sweet before my ride.

What pulled me to Starbucks was the vibe, the energy,

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# swarf

the positive feel coming out of the Starbucks. The baristas at Starbucks were young and smiling. They greeted each customer warmly and asked them how they were doing. At the independent café there was one older Chinese man who struggled with English behind the counter. He looked a little lost, like he would rather be out of sight not talking to customers about the muffins.

In retail the vibe is so critical. It's what you feel before you even enter the store. It is the great Starbucks advantage over its competitors. It's why customers come back day after day for the positive experience.

I think we underestimate the power of the vibe in industrial businesses. Every company sells something. If the energy is stale and negative, it affects the employees and turns away applicants. Even if the money is good, people don't want to stay at a negative place, and customers eventually feel it too.

I think that over time we get comfortable with our setting and don't even notice the negative vibes because they are what we are used to. Businesses need independent vibe

testers to tell the managers about their aura. And then they need to find the inner strength to rid the place of the infecting downers.

## What do you do when what you've

**been doing isn't working? That is what I've been confronting with my vision after six eye surgeries, which my surgeon terms a success, yet the quality of my vision continues to erode.**

**I recently tried new contact lenses and then tinted graduated glasses, but these approaches exacerbated my light sensitivity, glare, and double vision problems. I tried blocking the vision in my surgically-repaired right eye with a vision blocking contact, but that messed up my depth perception and put a huge burden on my "good eye" where I've already suffered a retinal tear.**

**Things finally got bad enough for me to push through my fear and inertia and try a more unconventional approach. An old friend from grade school, Lee Erman, who has gone from being a Ph.D. researcher in computer science to a massage therapist for hospice patients, recommended that I go to**



Art by "Starman"

Meir Schneider, who has a program called “Yoga for the Eyes.” I filed Schnider’s name away in my mental Rolodex, though I did purchase his video and managed to get through 15 minutes of it before giving up.

I find instructional videos generally useless in changing my behavior. Schneider’s was interesting, but it had way more information than I could absorb.

My friend Lee lives in the Bay area, and in one of life’s coincidences, is a congregant at my daughter Sarah’s (she’s a rabbi) synagogue. Every time I visited her I would connect with him and we’d often end up talking about Meir Schnieder’s program.

A few months ago I got a call from Lauren, a secretary in Schneider’s office, telling me about a six-day workshop he was doing at his office in San Francisco. The timing was perfect. My vision was bothering me, I was scheduled to be in California the week before, and I could stay with my daughter in Palo Alto. The stars aligned and I said “yes” on the call.

I took four days of the workshop and two one-on-one sessions with Meir. His approach, which emphasizes relaxation exercises, a daily eye regimen of staring into the distance and receiving sunshine and vision training is a radical paradigm shift from the ideas of surgeons and ophthalmologists. But I’ve learned as a tennis player and businessman that you need to shift if you are playing a losing game.

It is early to make a definitive call, but I am encouraged. I have made more progress in three weeks than I made in three years with my sight and comfort. I feel less fatigued and happier at the end of the day. It’s another reminder of the inspiring words of Winston Churchill to the British people at the worst point of World War II: Never, never, never give up.

## Reading Jerry Levine’s book review

about the phenomenal Pete Maravich made me think about Steve Nash, point guard of the Phoenix Suns, who is on his way to his third straight Most Valuable Player award in the NBA.

Nash is averaging over 19 points with 11 assists per game for the season. When he plays, the Suns are one of the two best teams in the league. When he sits with an injury they are weaker than .500. Without Steve Nash orchestrating, Amare Stoudemire, the Phoenix center, is a nice young big. With him, he’s an All-Star. Nash doesn’t just make his teammates a little better. He makes them a quantum leap better. Steve Nash on the floor is worth at least twenty

games to Phoenix over a season.

Nash is no Maravich. Maravich was a basketball genius, a totally unique player who dominated every team he was on. If Maravich was on the floor, all eyes were on him, because he was about dazzling. Maravich was an artist on the court making incredible passes and amazing shots. And his teams generally lost. When he was on the floor the game was all about him. It was fun for a spectator, but it was not fun for the guys playing with him. At times Pete would show up his own teammate by making an incredible “through the legs, behind the back” pass that surprised him. When Maravich was on a team, he was the team.

Steve Nash is in the Magic Johnson, Bob Cousy mold. They were magnificent players within their team. Their teams won championships and they were thrilled to be a part of it.

Steve Nash is by far the greatest basketball player ever to come out of Canada – by way of South Africa, where he was born. His father was a minor league soccer player and his mother was a world-class netball player. His folks moved to Vancouver, British Columbia when he was two because they did not want him to grow up under Apartheid in South Africa. He played a lot of soccer as a kid, which helped him develop his remarkable peripheral vision on the court.

He excelled in basketball as a kid and led his team to the B.C. high school championship. To be a wonderful basketball player in B.C. is like being the best hockey player in Mexico.

No college scouted him from the United States, but Dave Davey, the coach of Santa Clara University, heard about Nash from an acquaintance. They guy knew basketball, so Davey flew up to Vancouver on a hunch. He could not believe how good the kid was – who nobody had ever heard of, in the era when scouts were checking out 5th graders with tall genes. Nash took Davey’s offer of a scholarship – the only one he received in the U.S., and ultimately became a college star.

He was a middle of first round draft pick in the NBA, starred with Phoenix, then Dallas, and now with Phoenix again after Mark Cuban refused to outbid the Suns for his services in 2004.

Steve Nash is one of the few players in the NBA I would pay to see, and I love basketball. As great as he is, Nash is never showy or flamboyant. He is the consummate team player. In every successful business you have a person like Nash who finds his glory in the success of the group. A Pete Maravich was a joy to watch, a human highlight film. Steve Nash is even more fun to watch, and his teams win.





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BY JERRY LEVINE

## Pistol Pete

NBA Hall of Famer “Pistol Pete” Maravich brought urban playground basketball to the NBA. He wasn’t the first to dribble behind his back or make a through-the-legs pass, but his circus shots and hotdog passes were considered outrageous for his era. He was a quirky player, symbolic of the 1960s, with his black, floppy, low top Chuck Taylor sneakers; often unwashed, gray socks; and flowing, unruly mane. Some basketball purists felt he was more show than substance, but his crowd pleasing antics drew unparalleled attendance.

After staying silent for two decades, Maravich’s widow Jackie agreed to speak to authors Wayne Federman and Marshall Terrill. The result is the definitive biography *Maravich*. The authors interviewed more than 300 players, coaches, journalists, fans and detractors. The epigram to the first chapter is from sportswriter, Ralph Wiley, who described Maravich, saying, “He was unstoppable. It’s as if they melted down all 12 Harlem Globetrotters, and filled up this skinny 6’-6” white frame with everything they had.” Pat Riley said, “Pete was the original. He was the best ball handler I ever saw. Ever.”

But Maravich was a tortured genius. In today’s world he might be considered to be on the autism spectrum for his obsessive-compulsive behavior and savant basketball ability.

Maravich was literally born with a basketball in his crib. His father Press Maravich, a former professional basketball player himself, pushed his son extremely hard, turning basketball into an obsession for Pete. By the time Pete was eight, his practice routine lasted eight hours a day. He brought his basketball to the movies and annoyed the rest of the audience by dribbling it in the aisle throughout the show.

The obsessive-compulsive behavior remained throughout Maravich’s entire life. At home he was constantly washing,

vacuuming and meticulously raking leaves. He was obsessed with UFOs, practiced a vegetarian diet, Hinduism, and meditation, and believed in reincarnation. He was paranoid and depressed, and had thoughts of suicide, but eventually he found salvation as a born again

Christian, only to die of heart failure at age 40.

Maravich set the career college scoring record of 44.2 points per game, which he accomplished before the introduction of the 3-point shot. Statisticians estimate that had the 3-point shot existed, he likely would have averaged 52 points per game. Yet even with his remarkable stats, Maravich’s greatest legacy was his gift for making thrilling offensive plays – wowing audiences with seemingly impossible shots, no-look passes and killer crossovers.

Some say that Maravich was more interested in being an artist on the court than winning because he never won a championship and rarely played on winning teams. Yet Maravich would often say, “I worry about winning. Statistics are for losers.”

Regardless of his true motivations on the court, Maravich’s unique flair, showmanship and passion for the game has directly or indirectly inspired the way millions of people play basketball today, even though probably 99 percent of them have never seen nor heard of “Pistol Pete.”



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







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## Heads-Up

New Rotary Broach heads, available from Genevieve Swiss Industries, Inc., feature no center indicating for CNC Swiss-type machines and gang style lathes. The compact size of the 2160 Rotary Broach heads fits into the tightest tooling areas without losing adjacent ID stations. The head diameter of 1.1" and length of 2.42" permits use in space limited sub-spindle applications. The extended shank allows for easy modification to suit specific machine and application requirements.

The Model 2160 is ideal for many medical and dental implant manufacturing (bone screws) applications as well as aerospace rated fasteners that utilize hex shapes to drive them. The 2160 is stocked in shank sizes of 16, 20, 22 and 25mm as well as  $\frac{5}{8}$ ",  $\frac{3}{4}$ " and 1" diameters.

For more information, please contact Genevieve Swiss at 413-562-4800, or visit the company website at [www.rotarybroaching.net/nonadjust.htm](http://www.rotarybroaching.net/nonadjust.htm).



## Insertion Order

Sandvik Coromant is broadening its variety of milling inserts with CB7025, a strong grade optimized for interrupted cuts in case hardened steel. The key to CB7025's performance lies in the fine grain CBN, which controls wear and mechanically interlocks insert corners. Sandvik Coromant's CB7025 is available in a wide range of positive inserts and comes in two patented, radius wiper geometries. The grade's -WH geometry provides high surface quality with reduced cutting forces, while its -WG geometry offers the best preparation for finishing cuts while running at high feed rates.

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





# fresh stuff



## Beam Me Up

Pinpoint Laser Systems has introduced new 2 dimensional Microgage for precision measuring, machine alignment, calibration and more.

This product combines a compact laser transmitter with a receiver and digital display. This new Microgage will operate over a distance of 100 feet with a bright red beam. Several simple accessories allow for alignment of straightness, runout, parallelism, squareness, roll & web alignment, shaft & bore alignment, flatness measuring and much more. All components are machined of solid aluminum with a hard anodized coating. A serial and USB interface connects to a laptop or PC and links to spreadsheets.

For additional information, please contact Pinpoint Laser Systems at 800-757-5383 or email [clord@pinlaser.com](mailto:clord@pinlaser.com).



## Stop It

Preferred Technologies Inc., of Stanford, Ky. has designed and patented a stop to fit into a standard CNC lathe turret or bushing. The stop will absorb all turret impact created by the pressure of the bar feeder advancing the stock. Internal adjustment allows the stop to perform over a wide range of bar sizes. When properly adjusted this stop will accurately locate the stock and prevent damage to the lathe turret and the bar feeder.

For more information, please contact Preferred Technologies, Inc. at 606-365-9430 or email [preftech@bellsouth.net](mailto:preftech@bellsouth.net).

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## Along Came a Spider

The new SDP Spider Mill (above) from Sumitomo is designed for high productivity face milling of gray and ductile cast irons. The SDP is a 90 degree double negative milling cutter with positive cutting insert geometry. Each insert consists of eight cutting edges. A unique positive chipbreaker insert provides less cutting force, more productivity and a longer tool life.

The SDP is available with an ACK100 CVD coated grade for high-speed milling applications and a ACK200 CVD coated grade for general purpose milling. Both grades are available for use in 3", 4", 5" and 6" cutter bodies.

For more information, contact Sumitomo Electric Carbide Inc. at 800- 880-0619 or visit the Sumitomo website at [www.sumicarbide.com](http://www.sumicarbide.com)





# fresh stuff

## Wex Appeal

Sumitomo's new WEX indexable insert endmills and shoulder milling cutters (below) are designed for the smooth cutting of a variety of materials. The wave-shaped cutting edges of the WEX generate lower cutting forces, even during deep slotting or milling using low rigidity machines. Consisting of heat- and wear-resistant Nano technology coated grades, WEX cutter bodies feature a highly durable surface treatment and an improved method of insert clamping into the pocket. CVD and PVD insert grades are available to offer extended tool life in steel and cast iron applications. The WEX comes in Super ZX coated ACP100, ACP200, ACP300 for steels and ACK100, ACK200 and ACK300 for cast irons.

For more information, contact Sumitomo Electric Carbide, Inc., 800-880-0619 or visit the Sumitomo website at [www.sumitocarbide.com](http://www.sumitocarbide.com).



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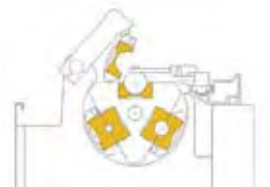


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## Four Casting

Kitako has introduced the HS4200i four-spindle CNC lathe with ultra high-speed automated gantry loader. Available from SB Machine Tools, the Kitako HS4200i CNC Lathe boasts x-axis gantry loading feed rates of 6,700 ipm, along with carrier indexing time of 1.5 seconds, 0.3 second turret indexing per station.

Operating much like a pallet changer on a machining center, parts are transitioned in and out of the machining zone in as little as 0.8 seconds each. The HS4200i's four spindles are mounted in a horizontal, square pattern in a large carrier drum. The drum's positioning accuracy is ensured by a large diameter, precision-toothed, curvic coupling. Spindles are generally partnered as pairs so as the carrier is indexed 180 degrees; two spindles rotate to the machining area as two spindles move out for loading and unloading. The two spindles in the machining zone, along with the respective slides and turrets, work simultaneously as well as independently.

For more information, contact SB Machine Tools at 847-882-9600 or visit the company website at [www.sbmachinetools.com](http://www.sbmachinetools.com).

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## High Speed Drive

IBAG North America has introduced the new 25mm HSC (High Speed Cutting) motor spindles designed for use with Swiss-type automatic lathes. These spindles fit in the linear toolholders and operate at speeds up to 60,000 rpm (optional to: 80,000 rpm) for machining applications involving micro milling and drilling tools as well as engraving and fine milling. IBAG offers a ready-to-install kit that includes the supply unit, all electrical and pneumatic lines and the the new 25mm HSC spindle to permit precision radial drilling, milling and tapping, expanding overall turning center capability.

For more information, please contact IBAG North America at 203-407-0397 or visit the company website at [www.ibagnorthamerica.com](http://www.ibagnorthamerica.com).

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## Robo-Crop

A new configuration of the Fanuc RoboDrill, the RoboDrill T-21EL DDR 700 V size vertical machining center from Methods Machine Tools is available with a choice of 10,000 or 24,000 rpm spindles and employs a direct-drive indexing system to achieve positioning and cutting speeds in the 4th axis. The 4th axis indexer has a built-in synchronous servomotor with an  $\alpha$ iCZ sensor. Its gear-free, zero-backlash linear motors are capable of unclamping, rotating 180°, and reclamping in approximately 0.4 seconds at a table-rotation speed of 150 rpm. Indexing precision is  $\pm 0.0055$  degrees ( $\pm 20$  seconds). The 140-mm unit has a maximum torque of 192 ft-lbs and a maximum loading capacity of 220 pounds. A large 40-mm through-hole allows for pneumatic or hydraulic fixture actuation. The 3-taper RoboDrill offers feedrates to 2362 ipm, rapid traverses to 2125 ipm, accelerations to 1.5 G or more, and 0.9-second tool changes (tool-to-tool.)

For more information please contact Methods Machine Tools, Inc. at 978-443-5388, visit Methods Machine Tools at PMTS in booth #762 or visit the company website at [www.methodsmachine.com](http://www.methodsmachine.com).

## Count Fuji

Fuji's new FS4-3500 compact automated turning center with 4 position turret is changing parts with a loading/unloading time of less than 5 seconds. This machine allows loading and unloading of the workpiece during spindle rotation. The FS4-3500 incorporates a 30 degree bed design. The saddle and cross slides are coated with TURCITE type material to reduce stick slip.

The FS4-3500 is especially suitable for bearing applications, as well as transmission parts requiring short cycle times. The FS4-Series can be applied to most applications that require both OD and ID turning. The machine can be connected with a part flip station for complete OP-10 / OP-20 turning. Maximum part diameter is 6.0".

For more information, please contact FUJI Machine America at 847-436-2744 or visit the company website at [www.fujimachine.com](http://www.fujimachine.com).



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# The Minuteman Revolution

Photos: Rick Friedman Photography BY ROBERT STRAUSS



how-to high





Carl Segerstrom was wielding a mighty vacuum hose, cleaning up shards of shaved metal all around the lathe he had just used to make a model project for his machinery class. While Carl had become pretty proficient at shaping his model, it was clear that vacuuming was not previously on his list of skills.

“Carl, this is part of the whole thing. Here, here, here, here,” said his teacher, pointing to places all around the lathe where those shards dropped. “You don’t run a successful shop if it is all a mess.”

Carl is one of the 703 students at Minuteman School of Applied Arts & Sciences, only a few hundred yards from where the Shot Heard Round the World – the first spark from a gun that started the American Revolution – took place. Minuteman, the regional technical high school, too, is a leader in a revolution, this one being how to make technical secondary education relevant to today’s business world. And while Minuteman does not necessarily teach cleaning up lathes, its curriculum does cover everything from academics to technology, working with both hands and minds. And, yes, to know that vacuuming can be a customer-incentive activity is integral to preparing hands-on type folks for the workplace of the 21st Century.

“You think about what technical high schools meant 30 years ago and the general thought is that they were a dumping ground for all the school district’s problems,” said Thomas F. Markham III, Minuteman’s assistant superintendent-director, the head man of the school while a search is on for a new superintendent. “This is Minuteman. We operate on a different standard.”

### Educational Philosophy

Minuteman offers 22 different technical concentrations, from the traditional, like automotive, health care, and carpentry, to the modern, like biotechnology, environmental technology and telecommunications. There is no stinting on academics either, since the Common-

wealth of Massachusetts requires high school graduates everywhere to take four years of math, science, English, and social studies, as well as develop proficiencies in physical education and foreign language.

The philosophy at Minuteman, though, is that there are academic learners, and then there are hands-on learners, and that too often, the hands-on types are looked upon as less valuable or slower, when they are merely looking at things through a different set of eyes or, more accurately, accessing information from a different cortex.

“In a vocational school, about 85 percent of students are right-brained, and, thus, are more hands-on,” said Sebastian Paquette, an English teacher at Minuteman for more than 20 years, and also the high school’s Learning-Styles Specialist, the fellow who makes sure teachers and students learn each other’s ways of gaining and imparting knowledge. “A right-brained kid would sit through a 48-minute lecture and just not retain enough. He needs to do projects, to see what things are, to touch them, to maybe take in a little bit at a time. He is equally as smart, but he has to learn differently, but at an academic high school, he often gets lost.”

### The Guru and the Vision

The guru for Paquette and Markham and virtually everyone who has ever come through Minuteman was Dr. Ronald Fitzgerald, who set up Minuteman in the 1970s and retired in 2004.

“He was a visionary in using scientific and brain-specialization techniques and methods to education,” said Markham. “His mission was to connect the eyes and

ears to the brain and hands, as opposed to just sitting in a classroom and listening to a teacher talk. That is fine for, say, 40 percent of kids, but up to 60 percent are best served by applying, rather than reading, a lesson.”

This may sound esoteric, but in practice the theory has worked for Minuteman. The sophistication of its offerings, counseling and individual attention to students is more reminiscent of an elite private school than a public technical high school.

In fact, Minuteman is a sending high school from 16 towns just west of Boston, perhaps the most academically oriented city in the country, which makes the school’s technical innovativeness all the more special. One of those towns, Weston, has the highest median family income in the state – more than \$153,000 a year – and five of the other 15 – Concord, Sudbury, Wayland, Winchester, Lincoln – are in the top 12 in the state. Also feeding Minuteman is Arlington, a large working-class town near the city, and some rural areas to the west.

“It is a diverse area, but primarily a wealthy one, which has its own set of challenges for schools like ours,” said Markham.

Fortunately, Minuteman also has partisans like Kemon Taschioglou, one of Minuteman’s 16 Access Committee members comprised of one from each town. The son of Turkish immigrants, Taschioglou worked his way through the Massachusetts Institute of Technology and Harvard Business School and then did well enough in the tech business to retire early and devote his time to education.

“I live in Lincoln, one of the wealthiest towns in the country, but I saw this technical high school and wondered what I could do to help it succeed,” he said. “Sure, we all want to see our kids go to Ivy League schools, but we should also want them to know how to do things with their hands. There should be no dichotomy in those who run a good plumbing business or who know biotech research skills or who become lawyers. We all benefit from a society that enhances everyone’s best skills. Technical high schools of the best sort, like Minuteman, complement the academic track and are the ones that are going to keep all businesses in this country viable.”

## Business Boost

Merrissa Shock wheels around on her teller’s stool and smiles at the next customer in line at the convenient Cambridge Savings Bank branch. It is her week for the

noon shift and she doesn’t mind eschewing lunch for that time.

The difference is that Merrissa is a sophomore in high school, a bit younger than the usual Cambridge Savings Bank teller. The convenient branch is inside Minuteman School of Applied Arts & Sciences, in what Minuteman folks call “The Mall,” which also has a bakery, a crafts shop, a beauty salon, a flower shop and The Fife and Drum, a small restaurant – all run by Minuteman students and their supervisors.

“It is a good experience, since there are real customers who come here,” said Merrissa, who lives in Arlington, the town that provides about a quarter of the Minuteman students. “I find out how to put it all together, how to see what a future job would be like. And it’s fun, not just some regular class.”

“The best technical high schools are the ones that are going to keep all businesses in this country viable.”

Besides the stores on The Mall, Minuteman students have other retail outlets. There is a child-care center for kids from two to five years old, an auto body shop, an auto mechanic shop, a printing business, welding services, a catering operation, and even an HVAC shop, all staffed by Minuteman students.

“People set up appointments and come in to get their brakes done or some body work or whatever,” said assistant superintendent Markham. “We get senior citizen buses in to get hair done or go to the bakery or the restaurant.

“That is why we teach calculus and business and English composition,” he said. “These students are learning how to run businesses, do business plans, write letters they would need to do to run, or even work in, businesses.”

## Cooperative Effort

As with many technical high schools, Minuteman has co-operative work-study programs with area employers, but it is only a small part of the curriculum.

“It is only during senior year and only for some

students,” said Paquette. “Basically, we like to have our students get the academics they need in high school, and we have a lot of shops and practical things here. It is important to keep good relations with the business community so they learn about the real working environment, though. So for those who really want it, we have the work-study program.”

Three years ago, four Minuteman students worked on the 25th anniversary building project for the PBS show, “This Old House,” for instance. Though generally, the students find that staying on campus is the most valuable experience.



## The Minuteman Effect

Zack Simmons is on his way to Minuteman. He was a good student in middle school in Bolton, but said, “I really hadn’t found my way.” Many students in Bolton, where the average family income is more than \$108,000, go to the public high school there intending on going to Ivy League or Ivy-like colleges. Simmons decided on Minuteman as an alternative.

“I’ve gotten a whole different experience here. I guarantee I couldn’t have learned about robotics otherwise,” said Simmons, who has won district championships in Skills USA competitions, similar to science fairs and spelling bees, but for hands-on students. Those elite colleges are now recruiting him, among them Rensselaer Polytechnic Institute, one of the top engineering schools in the country. Simmons intends to become a mechanical engineer or industrial designer. “I know, hands-on, how this kind of business works. Who knows whether I could have learned that in a regular academic setting?”

Certainly even the most sophisticated academic high school would not have a whole floor designated for robotics and large machinery. They would probably not have a faculty member with the title “Department Chair: Robotics Technology/Pre-Engineering” as does George Taliadouros.

“Machining may be a dying art, so much of it is going to China,” said Taliadouros, walking among CNC machines, various robotic machines, and even simple lathes. “But everyone here is expected to learn how to use the machines, if only to see how their business might work if they run one. The sophisticated machines work on the principles of the simple ones.”



He shows off small bolts and screws made by the students, but is often more enthusiastic about their academic prowess.

“We teach them principles of engineering, statistical analyses, the material sciences of aluminum, brass and steel,” he said. “But it is not, ‘Here is a book. Read it.’ These are different kinds of learners. It is a whole different philosophy.”

## Hands-On Emphasis

Paquette, the learning styles coordinator, said that teaching at Minuteman is no easy task. Teachers have to buy into the left-brain/right-brain split idea and cater to students who learn at different rates and in different ways. For some, the traditional lecture-discussion-test route will work, for others, it will have to take creativity.

Paquette walks over to one of his many boards around the English computer lab showing some of those different ways of teaching. This one shows how to write an



eight-paragraph essay.

"You take an academic kid, a left-brain person, and he or she will do this sort of thing from first to eighth paragraph. They will be better or worse, but they will do the essay in the traditional way," said Paquette. Then he shows off what looks like a snake with boxes and circles attached. "A right-brained student will have to see each paragraph separately, maybe do one to three today, then go back and do the next few a little later. He will have to be encouraged to connect them to the main idea.

"They will both come out in the same place, but the hands-on kid will have to have a hands-on solution," said Paquette. "That's how we do things at Minuteman, but it takes a lot of effort. I have teachers come through here from other schools and they get excited, but it takes an administration willing to take time with this and get everyone on board. It takes money and commitment. So it just won't happen everywhere."

## Technical Issues

Markham admits problems even in his Mecca of tech. There are still an overwhelming number of special education students at Minuteman – 51 percent of students compared to 16 percent in the average Massachusetts district. Minuteman still has to do a lot of marketing to middle-school parents and students to convince them a technical school can be as good as the average hometown one. Minuteman does not have "technical" in its official name, Minuteman School of Applied Arts & Sciences. Markham shows off a 10-minute DVD aimed at potential parents and students, an extensive website for the school, a glossy-backed promotional kit. That DVD has videos of automotive classes and the cheerleading squad, but it also has several shots and comments by Kelsey Byers, a recent Minuteman graduate who got perfect SAT scores, got into Harvard, and then rejected it and went on to MIT.

"The average parent of an eighth-grader is in his or her 40s or early 50s. That means they went to school in the 1970s and 1980s, and think of the reputation of technical high schools then. We're preparing kids for real careers now and we have to be constantly in all kinds of markets," he said.

The school has constant job fairs and speakers from companies in the community. The biotech people come to look for lab people at Minuteman and the high-tech corridor around Boston has a constant need for robotics

operators and engineers, computer techs, telecommunications experts of all sorts and electronics folks. The emphasis Minuteman puts on coordinating academics with practical technical education wears well in sophisticated Boston-area businesses.

## Success Story

Nearly 100 percent of Minuteman students pass the state exams for a Massachusetts high school diploma the first time they take them. Markham said that he doesn't remember anyone not passing the exams on retesting.

Further, more than 70 percent of Minuteman graduates continue on to some type of college, which belies the stereotype of technical high schools being terminal.

"This is our real success, to show people that just because you want to work with your hands, you aren't also working with your brain," said Markham.

"Minuteman kids are learning to apply what they learn, which is part of being an experiential learner," said Markham. "Industries today have a set of standards that isn't as minimal as it used to be, whether you are a biotechnician or a carpenter or a school administrator. We're not just teaching a McDonalds cashier here, and that is what is exciting."

## Biological Marvel

Kelsey Byers appears prominently in the Minuteman promotional DVD. She graduated in the Biotechnology Academy concentration at the school in 2003 and got a perfect 1600 on her Scholastic Aptitude Test. She went to the Massachusetts Institute of Technology, where she will graduate in June with a bachelor's in biology and a minor in music. She said her grounding at Minuteman was a big plus when in competition with the other students at one of the world's great research universities.

"Doing research at Minuteman allowed me to get a job in high school working on the Human Genome Project, which gave me experience that was invaluable in conducting independent research here at MIT," said Byers. "It also made it much easier to start research before my sophomore year. In general, students need to take the first biology lab class before professors are comfortable having them in a lab, but my research and lab experience from Minuteman meant that I was able to start research before taking that class."



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# Selling the Family Business

## The Turmoil of Letting Go

On March 21, 2004, we sold our family business. I was 58 years old. When I got the first check for several million dollars, I didn't know if I should jump for joy and drink champagne or bang my forehead and cry in my beer. I wanted to celebrate because my father, who had started the business in 1956, would have been so proud that his little company had grown so big. On the other hand, I had just sold the family jewel, so I wanted to cry. I'd made a lot of money, yet I felt as if I had done something wrong.

BY GARTH STEPHANSON





Stegg Limited of Belleville, Ontario, is a contract manufacturer of precision-machined components for the automotive, medical, electronics and munitions industries. It had been part of our family for 49 years. Between 1972 and 2004, it grew more than 100 times in sales and had consistently maintained its position in the top 10 percent of our industry in North America, reaching \$15 million in sales in 2001. We had experienced the enormous boom in the electronics industry in the late 1990s and shivered during the high-tech bubble burst of 2001, but we were always debt-free and profitable. The 60 core team members had been at the company for many years.

Three years ago my brother Garry and I, who were equal partners, were both getting tired. Garry was 65 and had been at the business for more than 40 years. I constantly – and aggressively – encouraged him to sell his shares to me and retire, but Garry refused; he was comfortable with his lifestyle and income stream. The issue set the tone for continuing sibling unrest. To achieve resolution, I could have used the shotgun clause in the buy-sell agreement, but I was not prepared to trade

my life savings or incur major long-term debt. For the next several years, we remained in a state of unresolved conflict. Although profit margins remained robust, sales were decreasing because of my lack of focus to promote new contracts. The company could not remain in that state, and I was frozen in indecision. There were also no prospects for family succession; my two university student daughters had not displayed any interest in entering the family business, and Garry was childless.

In 2002, our third largest customer was sold, and its 42-year-old CEO, Bob Stokes, accepted a golden parachute. He had an impressive academic background as an engineer and had rocketed to excellence in his previous manufacturing career. Bob was now anxious for a new adventure.

### Early Morning Walks

In March 2003, I invited him for a friendly early-morning walk. It turned out to be the first of many hour-long meetings that included exercise. Originally, I thought he would coach me on our long-term contracts with his previous employer, but he had a different agenda.

Bob used our meetings to learn about our company – and I learned he wanted to acquire it. He had experience; he had bought and sold several companies while serving as president at his previous employer. After several months of cultivating a thorough understanding of our successes and family dynamics, he began to inquire about our succession plans and suggested a sale.

My original reaction was that I was too young to sell. Our company was well established, tightly managed and profitable. We had an excellent team and a solid customer base. On the other hand, I was in denial about our unresolved family conflict and its destructive effects. Other challenges included the enormous pressure for price reductions from the North American automotive industry, the long-term effect of aggressive pricing from global suppliers including China, and our failure to continually upgrade equipment during the past several years. I knew that eventually we would sell and had been researching the issue over the past three years. For me, it was a question of timing.

### The Offer

Eventually, I disclosed the financials. Bob was pleasantly surprised and even more anxious to proceed. He presented a letter of intent, conditional on exclusivity as a prospective buyer. Though he hadn't considered taking on partners, he ultimately teamed up with a sales manager and a CPA who had worked for him at his previous employer. They were silent partners until the sale closed.

Bob's offer was reasonable, and we accepted it in October 2004. Then the real negotiations began. This deal would be a win/win, and I recognized such opportunities were rare. I had personal experience with four precision machining competitor companies that had gone bankrupt because they failed to identify the right time for sale.

The perfect choices to represent us as the sellers were an independent, sophisticated experienced business valuator, negotiator and CPA, and a meticulous, ethical and seasoned lawyer who had done dozens of these deals. Researching, identifying and retaining these two professionals proved to be extremely important. As sole practitioners, each grew to understand our file intimately, and, as the process moved closer to closing, they each devoted the required time, including evenings and weekends. In addition, our chief financial officer did a masterful job in responding quickly and accurately to their data requests. Together, our group formed an excellent team.

As time progressed, Bob incurred increasingly larger administrative fees from the financing group. If the deal didn't close, that money would be lost. In addition, the letter of intent stipulated a "break fee" of several hundred thousand dollars, applicable to the buyer or vendor, so by this time we were all truly committed. Garry and I were coached to distance ourselves from negotiations. It was one of the wisest moves we made. The advisor felt that the offer was excellent and advised us to accept it. We respected and trusted his opinion, and to this day, we have no regrets. It's like going for a heart bypass operation: When you are on the operating table, you don't get to tell the doctor how to handle the scalpel. The best approach is to do research on the surgeon before the operation.

**"When you are on the operating table, you don't get to tell the doctor how to handle the scalpel."**

Shortly after finalizing the letter of intent, Garry and I met with our senior managers and informed them of our intentions and current status. They were absolutely stunned. Since my brother was seven years my senior, they had anticipated that eventually I would purchase his shares and he would retire. We requested their confidentiality and support in the transaction and, thankfully, received unanimous affirmation. During the following weeks of due diligence, daily activities continued as normal.

### Closing the Deal

On Friday, March 19, 2004, Bob, Garry and I, together with our wives, met at noon at Bob's lawyer's office in Toronto to sign the papers for the sale closing. With all the related documentation, final negotiating and corrections, we were there until midnight. The formal closing date was Sunday, March 21, 2004, and the funds were transferred in trust until the following business day Monday, March 22.

That Monday, Garry and I met with all members of the staff to announce that the company had been sold. We introduced the three new owners and assured

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everyone that the transaction was friendly and we wholeheartedly supported the new shareholders. Bob's opening comments were enthusiastic and positive. He communicated a message of stability, expressing his group's intent to retain all existing staff and grow. During the hours that followed, many employees expressed surprise but gracious acceptance, agreeing to assist the new owners in days ahead. One of our long-tenured production supervisors stopped me in the plant and gave me a full-body hug.

"This must be incredibly difficult for you, Garth," she said. "It is," I replied, suppressing a tear as I thanked her.

Although I had been professionally coached, my emotional reaction was completely unpredictable. I really did have the wrong idea of what was important. I thought that the issues were obtaining the highest possible sale price, ensuring that funds would be paid after the closing and securing a long-term management contract. But the real question was "How would I feel after the sale?"

## The Aftermath

What a strange feeling for me to return to the office that Monday morning after the marathon Friday midnight closing, knowing that Bob was the new president, the controlling shareholder and the Grand Pooh-Bah! It was like having surgery to remove several internal organs. It didn't take long before he took charge of communications and quotations with our major customers – that had been my job!

Bob did not consult with me on his decisions or company operations. He sent a very strong message. Our adviser reminded me that it was normal for the seller of a business to remain less than six months and that I should not take it personally. He was right.

At first, the experience left me filled with tremendous emotional turmoil. On the one hand, I knew that this had been the right time to sell. We had a perfect buyer, who had the enthusiasm and drive to make the business succeed. He would provide continued employment for the loyal team members who had devoted their entire careers to this family organization. And the sale would guarantee financial freedom for our retirement. For almost 50 years, it had provided our family with the excitement, joy, stimulation and satisfaction of building the organization, but Garry and I did not have the vision, energy or desire to take this

great company to the next level.

Ownership could not and would not pass to our next generation. Fortunately, our respective families were supportive. They were relieved that the source of sibling disagreements was eliminated. In the end, we all admitted that the sale had been the right thing to do, and the timing was impeccable. On the other hand, we were giving up ownership and control of the legacy that Dad had started 49 years earlier, and I felt a profound sense of emptiness. For years, the business had consumed me, and now I had been put out to pasture.

Although my morning walks with Bob stopped, our connection remained congenial. Within 12 months, four of the oldest and most senior of the original team left the company or retired. Bob began to encircle himself with a new hand-picked group imported from his previous companies. The transition happened slowly, and the new team had the opportunity to assume control before the older senior management left. Although the company's sales dipped for several months following the transaction, they have rebounded and grown since then. Bob's CPA partner stayed with him for only seven months and then returned to Toronto. His sales manager partner is still with Stegg.

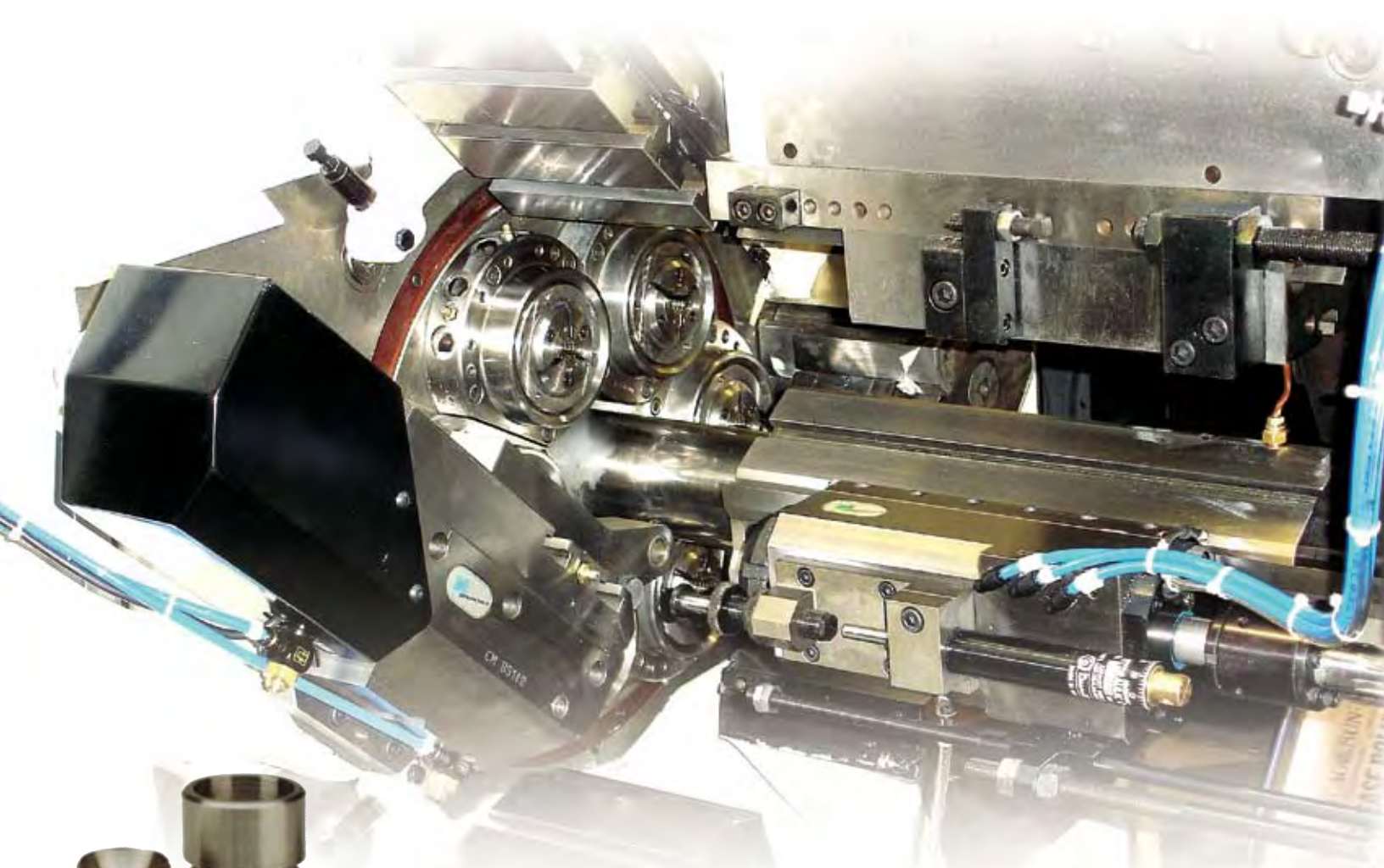
On Aug. 10, 2005, I had lunch with Bob and received the last payment for shares and the management termination contract. That was a very important day for me, and a pleasant, friendly experience.

As the months passed, I realized that the emotional trauma of the wind-down was far less than I had expected. I lost interest in production meetings, delivery schedules, budgeting, variance analysis and all the other drivers that once excited me. My separation from the company filtered in slowly. I don't miss the adrenalin of the business or the office. But one thing is for certain: The stakes don't get any higher. Owning the business was the thrill of a lifetime, and I wouldn't have missed it for the world. Two years ago, I would have emphatically denied my ability to let go. Today, on those rare occasions when I enjoy libations, they bubble in a shallow glass. Yes, it's champagne!

*Garth Stephanson is a former second-generation owner of Stegg Limited in Belleville, Ontario, Canada. John Parikhal, a New York-based writer, consultant and speaker, assisted in the preparation of this article.*



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A continuing column in which we ask smart people to discuss their views on topics related to the future of manufacturing

BY NOAH GRAFF

next

## If skilled technicians were offered double their current pay, would enough people choose those professions to satisfy U.S. industry?

*For the past few years, many companies have complained that they cannot hire enough skilled workers to satisfy their production needs.*

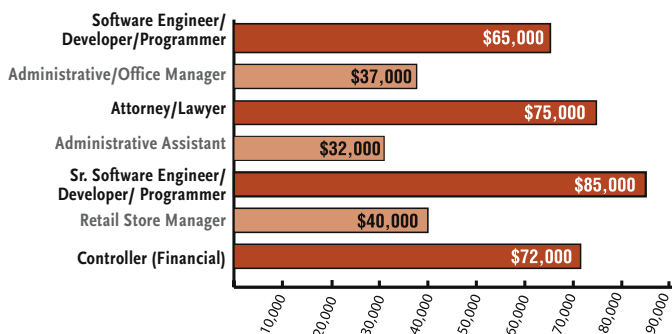
A significant increase in compensation would make a huge difference in recruiting new talent to the field. But there are two caveats. First, the increase would have to be substantial – enough to bring wages in line with white-collar technical jobs such as computer programmers. Second, in order to retain these new entrants to the field over time, manufacturers may have to change their HR practices. Pay can get people through the door, but keeping employees depends on their relationship with their boss, the nature of the work they are doing, opportunities to grow and develop, and what they think about their company.

Barry MacLean  
Senior Compensation Advisor  
PayScale Inc.

Many employers who are having difficulty finding adequately skilled workers are already increasing pay rates, but what is happening is they are simply hiring away workers from each other. The long-term issue is that the skilled labor pool in the U.S. is shrinking because of lower birth rates and an aging population.

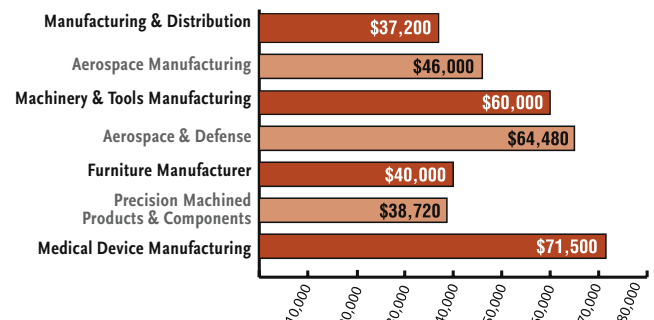
We must focus on re-skilling and retraining our workforce so we can bridge the gap between unfilled jobs and unemployed individuals. Government, employers and individuals all must play a part in confronting the talent crunch. Government needs to invest in education and vocational training and work to improve public-private initiatives. Employer involvement can include enhancing their links with schools, making

Median Salary by Non-Manufacturing Jobs in the U.S.A



Source: [www.payscale.com](http://www.payscale.com)

Median Salary by Industry: CNC Operator and Programmer in the U.S.A.





workplaces cleaner and more attractive, tapping into unemployed and underemployed sources, redesigning jobs and promoting inclusiveness. Individuals need to recognize the importance of keeping their skills up-to-date throughout their careers.

Melanie Holmes  
Manpower Inc.

We already pay high salaries – an average of \$66,000 a year. While jumbo salaries might entice some, our greatest barrier is the negative, outdated image of manufacturing. It is viewed by students, parents and educators as dark, dirty and in decline. The jobs today that are highly skilled in a technology driven environment are unknown to those entering the job market. That dull, dim perception cannot be overcome by just big salaries. Our job is to show them the reality, as we do in our “Dream it. Do It” campaign.

Phyllis Eisen  
National Association of Manufacturers

## the facts:

Based on data provided by 450+ manufacturers, non-exempt **hourly employees in manufacturing averaged salary increases of 3.4 percent in 2006 (compared to 3.7 percent across all industries)**. Salary increase plans for 2007 in **manufacturing are targeted at 3.5 percent**, whereas the average for **all other industries is 3.8 percent**. (Stats are for non-union members)

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81 percent of respondents to the Institute/NAM 2005 Skills Gap survey said they could not find qualified workers to fill open positions.

National Association of Manufacturers

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## Mike Rowe

hosts the Discovery Channel's hit program *Dirty Jobs*.  
He's leaped into a multitude of blue-collar occupations including some off-the-beaten-path jobs: Shark Suit Tester, Copper Foundry worker, and Road Kill Removal Specialist. No matter how disgusting, dangerous or strenuous the job, Rowe continues to approach it with enthusiasm.

**NG:** What jobs did you aspire to do when you were a kid?

**MR:** I honestly had no aspirations, at least none that I can recall. I mainly remember feeling panicked by the idea of doing any one particular thing for the rest of my life.

**NG:** What is the "dirtiest" job you've ever had to do?

**MR:** Removing a broken lift pump from a wastewater treatment facility has to be near the top of the list. Someone must enter the shaft from the bottom, swim through tons of human waste, climb to the top of the pump, and tie off a cable. Unforgettably bad.

**NG:** What's the strangest job you've done – on or off the show?

**MR:** I worked the midnight shift at the QVC Cable Shopping Network for three years. I also sang in the opera for a few years. A great place to meet girls while dressed like a Viking.

**NG:** In what job have you felt most endangered for your life?

**MR:** Shark suit tester, lumberjack, coal miner, alligator farmer, golf ball recycler – in no particular order.

**NG:** What's the most physically difficult job you've had to do?

**MR:** In terms of physical abuse, it's hard to separate the agonies of railroad work from hot-tar roofing, or indoor deconstruction from blacksmithing. Anything that involves swinging a sledgehammer for 12 hours in a row is going to leave an impression.

**NG:** What is something that you would absolutely refuse to do?

**MR:** Direct.

**NG:** How do the people you are working with feel about their jobs?

**MR:** The people I meet, by and large, appear happier, more balanced, and better adjusted than most of my friends with white-collar jobs. They genuinely seem to love what they do. Most of them seem to be in on some sort of joke that your typical professional doesn't get.

**NG:** What's the most important thing you've learned from all of the jobs you've had?

**MR:** One of my favorite lessons is the importance of having visual cues in our daily work lives, and the forgotten benefits of working on a job that allows you the satisfaction of having actually done something. Bricklaying, road-kill removal, whatever. Seeing a finished product or the fruits of your labor is something a lot of the white-collar workforce no longer experiences, and it's important.

**NG:** If forced to choose one job from the show as your lifelong occupation, which would you choose?

**MR:** I think I'd like to run the machines at a scrap metal yard. The magnet, the claw, the shredder; they are all very satisfying. Farming taro in Hawaii was also gratifying. I wouldn't eat the poi, but farming the taro is good fun.

**NG:** How do you stay so upbeat and positive?

**MR:** I get to leave at the end of the day.

**NG:** If you could work alongside anybody living or dead for one day, who would that be?

**MR:** That's a tough one. I'd like to navigate a riverboat with Mark Twain, or maybe drive some spikes with John Henry. I'd like to see if he really died with a hammer in his hand. Mostly, I believe I'd like to split some logs with my grandfather.



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1-3/4" 6-spindle, 1965, 1993 (10)  
1-3/4" 8-spindle, 1970  
2-1/4" 6-spindle, 1973-79 (3)  
3-1/4" 6-spindle, 1982  
5-5/8" 6-spindle, 1979  
6-5/8" 6-spindle, 1979

## ACMES

3/4" RA8, 1973  
1-1/4" RA6, 1975  
1-1/4" RB8, 1975  
1-5/8" RBN8, 1994-2000 (3)  
1-5/8" RB8, 1980, rebuilt 1996. pickoff  
2" RB6, 1979, Direct Drive Rebuild (2)  
2" RB6 collet chucker, 1980  
2-5/8" RB6-1977

## GILDEMEISTER & SCHÜTTE

SE25 Schütte 1970

## SWISS-CNC SLIDING HEADSTOCK

Citizen L20, Type VII, 1996-98 (2)  
Citizen L25, Type VII, 1998

## NEW BRITAIN

Model 52, 1-1/4" 6sp., 1979 (3) pickoff  
Model 62 2-1/4" 6sp., 1975  
Model 62 2-1/4" 1960, \$5750

## INDEX

MS 36E, 1993  
MS 25 6-spindle, 1990  
GB 30 1990 (2)  
GFG 450, 1987 (4)

## DAVENPORT

3/4" thdg., pickoff, 1985-1965 (10)  
3/4" chucker, 1985 (4) Tamer  
3/4" with Tamer & Logan clutches

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Barrett 1100 chip spinner 1986

## HYDROMATS

HW25-12 1986 (3)  
HB45-12 1997-1995  
HB45-16 1996HS-16 2000

## MISCELLANEOUS

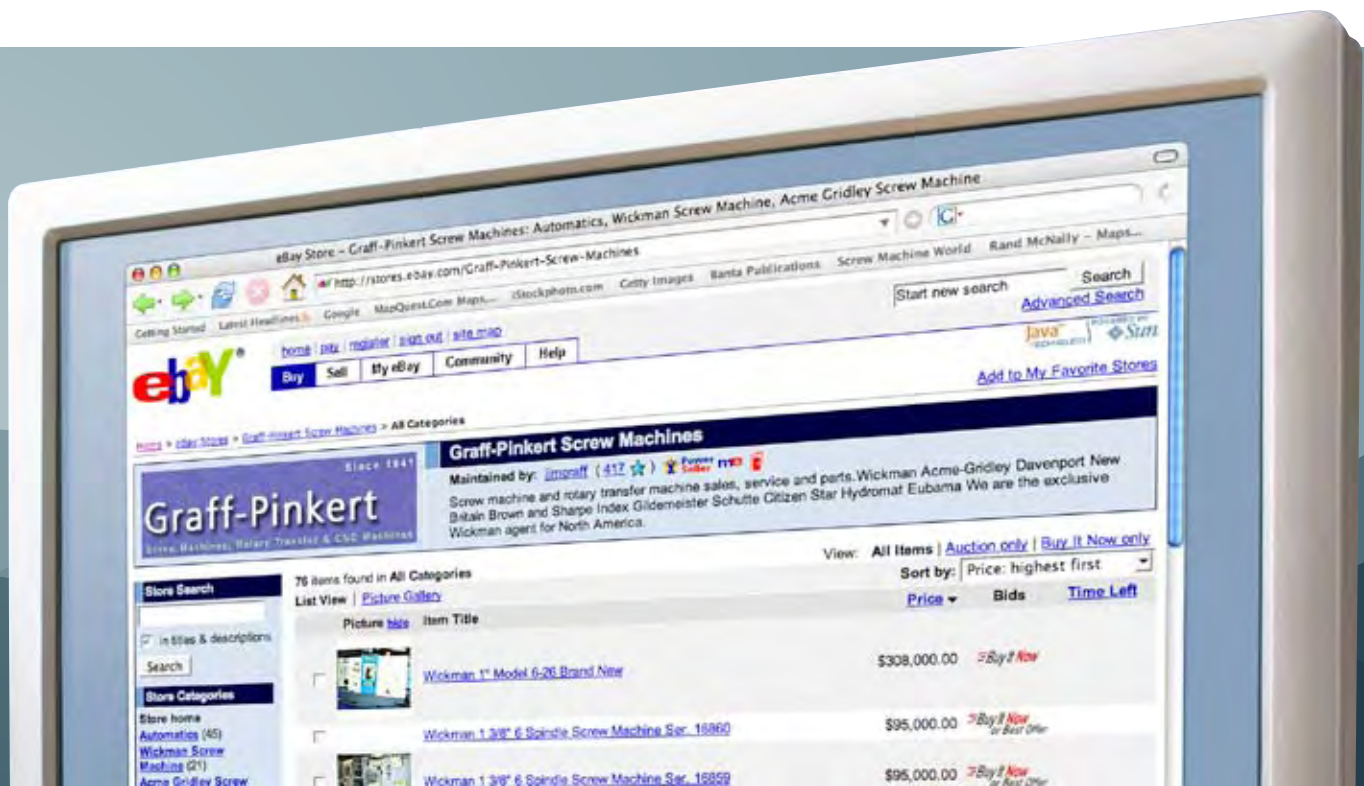
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BY BARBARA DONOHUE

## how it works



Putting the finishing touches on your parts

# Burrs and deburring

If you cut metal, you are going to have burrs. They will vary from little feathery bits that look as if they would blow away in a light breeze to sturdy protrusions of the part material.

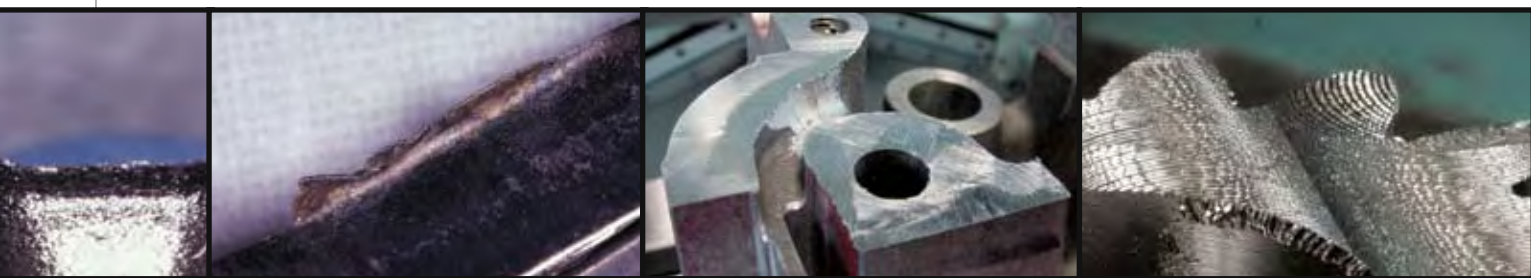
All photos above courtesy of Weiler Corporation.



The traditional methods of burr removal – by hand, tumbling, vibratory deburring and abrasive blasting – take care of these unwelcome bits of metal most of the time. However, for problem burrs, you may want to investigate other technologies.

According to LaRoux Gillespie, a consultant in Kansas City, Mo., and the author of the *Deburring & Edge Finishing Handbook*, there are at least 119 different deburring processes, 80 of which are in industrial use somewhere in the world today.

Here are some old and new techniques that you may find useful. Most companies that offer deburring products and services will be happy to work with you to develop deburring procedures tailored specifically to the burrs on your parts.



### Hole deburring

Several brands of hole-deburring tools are available. Most have a spring-loaded cutter that mounts in an arbor. The cutter has a taper at the bottom end which deburrs and can chamfer the front side of a hole as it enters. The center part of the cutter is smooth, with edge, so it passes through the hole without damaging the bore. As the tool backs out of the hole, the edged taper at the top of the cutter blade deburrs the back side of the hole.

Deburring tools from E-Z Burr Tool Company, Plymouth, Mich., feature replaceable cutters and can be customized to perform the specific deburring/chamfering tasks you need. Standard sizes run up to two inches, and larger custom tools are available. A drill can be incorporated into the design, as well as a separate cutter for chamfering or countersinking. E-Z Burr also offers a line of Micro deburring tools for holes as small as 1 mm in diameter.



PHOTOS ABOVE: a,b,c. Hole deburring tool deburrs front and back of the hole. d. Micro deburring tool from E-Z Burr Photo courtesy of E-Z Burr Tool Company.

# how it works



Brush-deburring a crankshaft.  
Photo courtesy of Weiler Corporation.

## Brush deburring

Specialized brushes can perform burr removal, especially on-machine, where the brush can be included as one of the tools in the tool changer. Weiler Corporation, Cresco, Pa., provides a wide range of engineered brush products, including nylon abrasive filament disc brushes, designed for deburring flat-surfaced parts with multiple surface holes, slots or cavities.

When using brushes, “If you’re looking at automating a deburring application, you typically have three options,” said John Sockman, director of engineered solutions at Weiler Corporation, Cresco Pa. If you want to use a robot for deburring (see “Robotic deburring,” below) you can either take the part to the brush or take the brush to the part. In a horizontal or vertical machining center with live tooling, he said, you can put the brush into the tool changer. Or you can have dedicated equipment to deburr a part or family of parts.

“In a machine deburring solution,” said Sockman, you have to ask, “what is the geometry of the part, what is the burr geometry and what is the work material? Can we get filaments on the burr? If the part masks the burr we can’t do it.”

Sockman pointed out a particular advantage of deburring parts at the machine: “Single-point accountability for the quality of the part. It is relatively common in high volume [production] for the operator to be responsible for the parts, not the burrs, neglecting that there’s a deburring issue downstream [caused by] running too fast or waiting too long between tool changes.”

## High force centrifugal deburring (Harperizing)

Harper centrifugal barrel high-energy finishing machines, also known as “Harperizers,” have been around for about 50 years, said David Krupp, president, Chas. G. Allen Co, Inc., Barre, Mass., manufacturer of the machine.

In a centrifugal barrel machine, several cylindrical containers are mounted to a rotating base, which may be vertical or horizontal, depending on the machine. The base rotates in one direction and the barrels rotate in the opposite direction. This generates high forces so that the centrifugal barrel machine can deburr and finish parts in a fraction of the time required in a conventional vibratory or barrel finishing machine. In spite of the high forces produced, the action of the finishing media on the parts is gentle enough for critical small medical parts like “little stents and tiny biopsy pincers,” said Krupp, as well as larger parts.

## Centrifugal disc finishers

Another type of high-force finishing system is the centrifugal disc finisher. This type of unit provides a container in which you place your parts and finishing media. A disc at the bottom of the chamber rotates rapidly, causing the contents to rotate and move outward toward the wall of the container, up and back down again.

Left photo: Centrifugal disc finisher makes the parts and media circulate to the sides of the container, up, down and back. Photo courtesy of Nova Finishing, Inc.



Harper Mini centrifugal barrel finishing machine  
Photo courtesy of Chas. G. Allen Co, Inc





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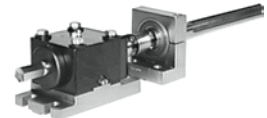
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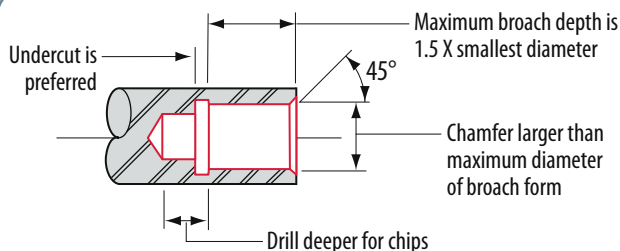
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Magnetic deburring in action. Photo courtesy of Earth-Chain USA



Parts before and after deburring by electrochemical machining.

Photo courtesy of Extrude Hone Corporation.



The CoolPulse electrochemical machining system.

Photo courtesy of Extrude Hone Corporation.

The forces produced are nearly as high as those in a centrifugal barrel finisher, said Tony Kenton, president of Nova Finishing, Inc., Huntingdon Valley, Pa., manufacturer of small centrifugal disc finishing units. Finishing time in a centrifugal disc finisher is a small fraction of that required by more common deburring methods. The Nova website gives an example: "For every 100 minutes a standard barrel tumbler operates at 1g ( gravity/ pressure ) a vibratory system will produce the same results in 10 minutes at 8g's and a centrifugal disc equals 1 minute at 24g's." Here, "g" indicates the acceleration due to gravity, used as a measurement of relative force produced.

Centrifugal disc finishing lends itself to many small-part applications in industries such as automotive and medical devices. Extremely small parts may not work, however, as there is a gap between the disc and the container. "On a disc finisher the determining factor is the gap between the disk and the wall. The standard dimension is 0.020", and you can get [units with] 0.005," Kenton said.

### Magnetic deburring

Magnetic deburring offers another alternative to traditional methods. "What we do is we excite tiny magnetic pins in a magnetic field," said Greg Webb, vice president of sales, Earth-Chain USA, Indianapolis, Ind., manufacturer of the sPINner deburring system. "This creates a deburring action on small precision parts," including their inside diameters, without damaging the surfaces or removing stock.

You place your parts and the stainless steel pin media in the deburring container, add the deburring solution and turn the unit on. As the magnets beneath the container rotate, the pins

circulate and jump about, striking the parts inside and out. The deburring solution is a soap and water mixture, which helps to suspend the pins during the process. Parts made of magnetic materials may need to be fixtured within the deburring chamber. Average cycle times are 10 to 20 minutes, Webb said.

Applications include "anything coming off a Swiss-type [screw machine]," Webb said, typically parts 2" in size or smaller. The sPINner units are available in different sizes, including one that is mounted on casters and can be brought to the machine as needed.

### Electrochemical machining

Electrochemical processes may be thought of as "reverse plating," where material is removed from the part rather than added to it, explained Jim Koroskenyi, electrochemical machining business unit manager at Extrude Hone Corporation, Irwin, Pa.

Electrochemical machining (ECM, not to be confused with EDM – electrical discharge machining, a spark erosion process) may be used for deburring. Koroskenyi described the process: You use a tool the shape of the edge you are deburring. The tool and the part are immersed in an electrolyte solution with a gap of 20 to 30 thousandths between the tool and the edge being deburred. The tool is made negative, the part positive, and current flows. The part material nearest the electrode dissociates, causing the metal to migrate out into the electrolyte. There it forms an insoluble compound, which precipitates out of the solution. The tool is not affected by the ECM process.

ECM deburring usually takes only 10 to 30 seconds, maybe a little longer if the edge needs to be broken. Multiple parts can be fixtured in an ECM system to be deburred at the same time. Deburring is done quickly and inexpensively at room temperature and does not consume the tool. However, for conventional ECM, deburring, you do need that customized tool for each part.

In addition to the large ECM systems used in a shop's deburring area, small ECM systems can be used on the bench next to a screw machine for on-the-spot deburring.

### A new type of ECM

Extrude Hone has developed a new ECM technology, CoolPulse, which overcomes some of the limitations of conventional ECM. In the CoolPulse system, parts are suspended between two metal plates immersed in a proprietary electrolyte – you don't need a part-specific tool. The electrolyte solution is optimized for edge effects, so that the CoolPulse process "finds" the sharp edges that need to be deburred or radiused. It can also reach inside holes up to about half the hole diameter.

# how it works

The process takes perhaps one to three minutes, said Koroskenyi. While it deburrs, the CoolPulse also polishes the part's surfaces. This new technology is ideal for small precision medical-industry parts, Koroskenyi said, such as the miniature tools used in laparoscopic surgery.

## Abrasive flow machining

Probably the most ingenious deburring technology available today is abrasive flow machining (AFM) from Extrude Hone. Invented in the 1960s for the aircraft industry, AFM uses abrasive grains embedded in a polymer material. The process can finish complex surfaces, removing burrs and leaving a very smooth surface, even in areas that are completely inaccessible to conventional deburring and finishing methods. "We take a puttylike substance filled with abrasive [and flow it] back and forth," said Tom Kohut, vice president, abrasive flow machining division at Extrude Hone. "It acts like a grinding wheel," but conforms to any surface shape. "You can achieve surface-finish improvements of 90 percent," said Kohut. "Starting with 100 [Ra] you can easily take it down to 10. . . We have generated surface finishes under one micro-inch."

AFM finds application in a very wide range of industries, anywhere superior surface finish is required, and especially among parts that are difficult or impossible to deburr and finish by more conventional means. In the diesel industry, for example, Kohut said, AFM is used to treat fuel system components. It's not uncommon for pressures within a diesel engine fuel system to exceed 30,000 psi, he said, and any sharp edges or burrs on holes act as stress raisers and can cause failure.

Ultra-pure applications in the pharmaceutical and semiconductor industries make use of AFM to finish tubing, valves and other components to smooth surfaces so they can't harbor even microscopic amounts of contaminants. AFM also imparts ultra-pure surfaces to implantable medical devices such as heart valves and knee joints. In a lot of these applications, even a 10 Ra finish from machining leaves too much opportunity for contaminants to stay on the surface. Other applications include automotive manifolds and heads, and rotating parts in aerospace applications. "In one particular [helicopter turbine] engine," Kohut said, "we do 21 different components." The smallest holes processed with AFM were 40 microns in diameter, he said, and the largest part was "in excess of 10 feet in diameter, with 320,000 holes under 1/4" [diameter]."

Extrude Hone sells AFM and other deburring/finishing equipment and also provides contract finishing services at plants located in different areas of the country.

## Thermal energy method

The thermal energy method (TEM) is another problem-solving technology available from Extrude Hone. TEM uses the energy from ignition of a fuel/oxygen mixture to "burn" off burrs anywhere on the part, even in small, deep holes or passages. It also removes stray chips from the part.

The parts are placed in the TEM chamber, which is then tightly sealed. The chamber is filled with a mixture of oxygen and a fuel gas such as natural gas or hydrogen. "The gas goes into all the nooks and crannies of the part. When it is ignited, burrs or chips are oxidized," said Koroskenyi. The part absorbs any remaining heat energy. The amount of fuel/oxygen is determined based on the burrs to be removed, and other factors, to provide enough heat to take off the burrs, but not to harm the part.

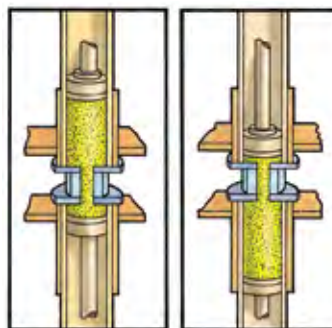
"Many parts can be put into the chamber at the same time. Very often, small screw machine parts can be bulk-deburred in a basket," said Koroskenyi. Fixturing is required only for parts that need protection from nicks or scratches, such as those with an O.D. thread, or finish-turned surfaces.

Where does the burr material go? "You've converted the burr into an oxide, which resettles on the part," explained Koroskenyi. The oxide is removed from the part during subsequent heat treating or plating, or you can use a simple cleaning process. "Basically [TEM] converts the burr into something you can wash off the part," said Koroskenyi.

## Robotic Deburring

For some applications, using a robot to deburr a part may make sense for complex edges that retain burrs, parts that will be in high volume production for a long time, and where close tolerances are not required.

You have to profile every edge that has a burr if you are using a robot, author Gillespie pointed out. He recommended using flexible tooling, and providing for the tool to back off when it encounters a surface it doesn't expect.



This diagram shows how the abrasive media is pushed back and forth through a part in bi-directional abrasive flow machining.

Photo courtesy of Extrude Hone Corporation.

# how it works



Small parts deburred with thermal energy method.

Photo courtesy of Extrude Hone Corporation.



Flexdebur Model RC-660, a robotic deburring tool from ATI Industrial Automation.

Photo courtesy of ATI Industrial Automation

## Turbo-abrasive machining

Turbo-abrasive machining (TAM), an innovation of Turbo-Finish Corporation, Barre, Mass., gives a fine, isotropic surface finish to complex rotating parts for the aerospace and other industries. Available through Chas. G. Allen Co, Inc., Barre, Mass., TAM machines rotate a part in an aerated bed of abrasive. For most parts, all surfaces can be deburred and finished without special fixturing or hand work. Non-rotating parts can also be finished with TAM if they can be appropriately fixtured in the machine.

## Controlling your burrs

Burrs that are small and consistent in size help all these deburring technologies to do their job. Even better are the burrs that aren't there and don't need to be removed. Consider the following concepts and suggestions from Gillespie and his *Deburring & Edge Finishing Handbook*.

- While there may sometimes be a burr created where the tool enters a part, there will always be a burr where the tool exits the part, if the part is made of a ductile material.
- Sharp tools and appropriate feed rates can help minimize the size of burrs.
- Plan the machining steps to minimize burrs. Burrs generated in one cut may be removed by a subsequent operation.
- You may be able to machine a part to create the burr where it is easy to remove, or does not interfere with fit or function (in which case it may not need to be removed).
- When turning, you can use a form tool to minimize the number of burrs.

The size, condition and location of burrs affect whether your chosen deburring technique will work. "You have to understand that if the burr is larger, it is harder to remove," said Sockman. To help quantify the range of burrs, his company, Weiler Corporation, has a classification system for burrs, rating them from one to five, depending on how large the burr is and how it is attached.

Since burrs are a fact of life in the machining business, Gillespie recommended having a written standard, so you and your customers all know what you mean by "burr free." This needs to include the inspection procedure, so you're not saying

"burr free to the naked eye," while your customer is thinking, "burr-free at 40x magnification."

Though many deburring technologies may seem to work wonders, they won't perfectly remove just any burr. New users of an automatic or mass deburring system are often disappointed, until they learn what it can and cannot do, said Koroskenyi of Extrude Hone, echoing the comments of others in the deburring business.

"When the machine arrives, they think they can cut faster and use the tools longer, because they have a 'magic deburring machine,'" said Koroskenyi. "This is one of the most important things for a customer to realize: there's no magic out there." Deburring systems "have limitations. For customers to automate deburring, it means they have to pay attention to the machining side, make the burrs as small as possible, and uniform – stay in a relatively narrow range."

No, they're not magic. But when integrated as part of your machining process, these deburring technologies can help improve product quality, customer satisfaction and your bottom line.

## for more information:

### Web sites:

Abrasive flow machining, thermal energy method, machining: [www.extrudehone.com](http://www.extrudehone.com)

Brush deburring: [www.weilerabrasives.com](http://www.weilerabrasives.com)

Centrifugal disk deburring: [www.novafinishing.com](http://www.novafinishing.com)

Gillespie, LaRoux, consultant, author:  
[www.DeburringTechnology.com](http://www.DeburringTechnology.com)

Harperizer systems: [www.harperizer.net](http://www.harperizer.net)

Hole deburring: [www.ezburr.com](http://www.ezburr.com)

Magnetic deburring and video:  
[www.earth-chainusa.com/deburring-equipment.htm](http://www.earth-chainusa.com/deburring-equipment.htm),  
[www.earth-chainusa.com/spinner-movie.htm](http://www.earth-chainusa.com/spinner-movie.htm)

Turbo-Finish systems: [www.turbofinish.com](http://www.turbofinish.com)

### Books by LaRoux Gillespie:

*Deburring & Edge Finishing Handbook*, 1999, Society of Manufacturing Engineers.

*Mass Finishing Handbook*, 2006, Industrial Press



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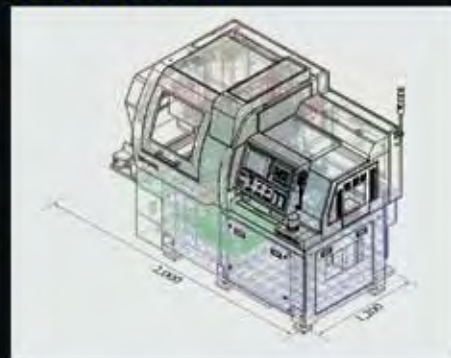
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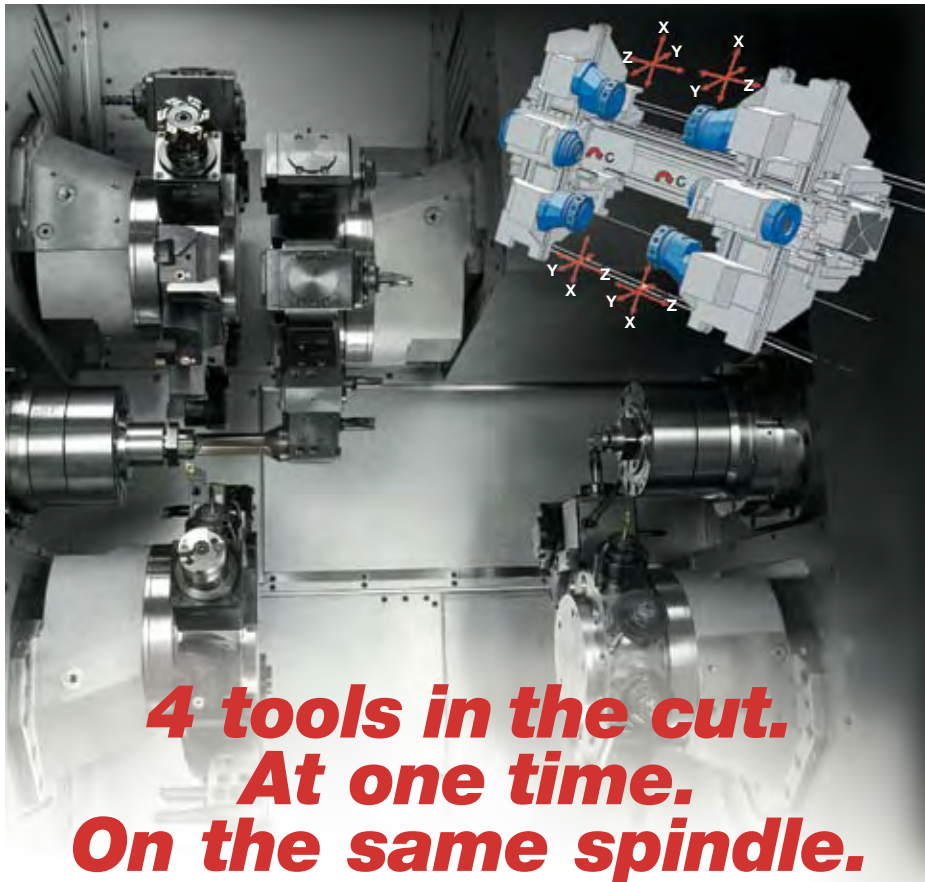
## CHAMPION SCREW MACHINE – Booth #705

Champion Screw Machine Engineering, Inc. of Wixom, Michigan, unveiled the 'Lectronic' electric stock depletion unit at PMTS 2005. Attendees at this year's show will see a new and improved version. The engineering staff at Champion has made some design changes resulting in an increase of component life and a more robust stock stop. The length of engagement of the head and plunger has been increased. All new units have a longer one piece proximity switch cable, which eliminates connection problems. A revolving head for larger machines comes standard.

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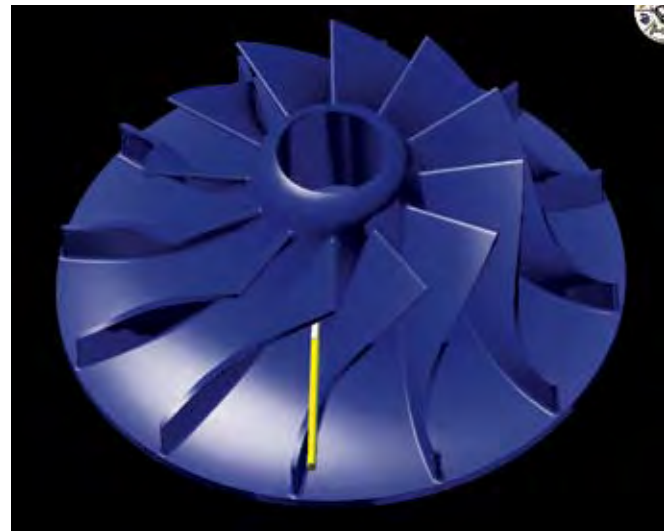
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## GIBBS & ASSOCIATES – Booth #822

Gibbs and Associates, developer of GibbsCAM, software for programming CNC machine tools will be introducing the GibbsCAM Machine Simulation option. This capability, which complements GibbsCAM Cut Part Rendering process simulation functionality, allows for entire machine tool motion of a CNC program to be validated in an accurate simulation.

Gibbs and Associates has formed key partnerships with a number of machine tool vendors which are focusing on multi-tasking as part of their strategic market position, such as Index, Matsuura, Mazak, Mori Seiki and Nakamura Tome. The updated version of GibbsCAM Machine Simulation being demonstrated adds support for turning, mill/turn and multi-task machine tools to the previous version which supported milling machine tools. Machine tool models can be built and setup like the real machine tool, then the CNC program is simulated to validate it prior to running the CNC program on the actual machine tool.

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# product focus



## HARDINGE – Booth #600

The Super-Precision QUEST GT27 S gang tool turning center will be unveiled. The QUEST GT27 S includes a precision sub spindle, Hardinge's world-renowned collet-ready spindle, and patented interchangeable tool top plate. The machine can be used as a stand-alone unit in a high production environment with a bar feed, or a fully automated system with the robot option. The QUEST GT27 S features a special-accuracy 5C collet main spindle, providing .000015" part roundness capability.

The standard 2-axis programmable sub-spindle supports typical machining operations such as facing, chamfering, grooving, threading, drilling, spot drilling, tapping and boring. It features a Fanuc 3-hp (2.2-kW) drive system with speeds from 0 to 8,000 rpm – clockwise and counter-clockwise. Included is an air-actuated collet closer that utilizes S25-HS Dead-length® hardened & ground collets.

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# product focus



## MARUBENI CITIZEN – Booth #536

MARUBENI CITIZEN-CINCOM is excited to introduce their newest CINCOM, the K16 Type VII NGB. PMTS attendees will be the first to see this new version, which features a non-guide bushing design.

MCC will also display state of the art CINCOM L720 Type VIII with the ALL axis simultaneous Cincom System M7 control; M320 Type V with user-friendly editing function incorporating multi-line/multi-axes; programming with superimposed/synchronized control A20 Type VI and R07 Type VI with a top spindle speed of 12,000 rpm with Rotary Guide Bushing.

All of the MCC lathes will be exhibited with dedicated CINCOM barfeeds. Cool Blaster high pressure systems, thread whirling, 1.5mm gun drilling, and Flexible Guide Bushing systems will also be displayed.

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# Product focus

## INDEX – Booth #401

The new INDEX Traub TNX65/42 turn-mill centers are designed to machine complex parts from bar diameters to 65mm (2.60 in.) and a length of up to 300mm (11.8 in.) at costs that are globally competitive. The modular design machine includes identical 37.5/32.2 HP (28kW/24kW) main- and counterspindles and may be equipped with two, three or four turrets, each capable of holding 10 live or fixed tools, and each of which can travel in X and Z direction 175mm (6.9 in.) and 650mm (25.6 in.), and optionally +/- 40mm (1.57 in.) in the Y direction.

Up to 80 tools can be accommodated using double tool holders, reducing setup times even further for complex parts processes. For the first time Traub offers unsurpassed simultaneous use of four tool carriers—four tools in cut—plus main and counterspindle in combination with powerful tool drives (7.4 HP/5.52 kW, 6,000 RPM) permits productive, diverse machining processes in a single setup.

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## MAXIM INTERNATIONAL – Booth #622

The Nomura YB 25 series (above) is a machine with a sub-spindle that comes standard with 5 OD tools, 4 front drilling tools, 3 back drilling tools, 2 back turning tools, 6 live cross drill/mill tools, and 2 back live drill/mill tools. Both the main spindle and back spindle come standard with a .001 degree C-Axis. A variety of options are available which include a front and back eccentric drill unit, and various combinations of turning and drill/mill units.

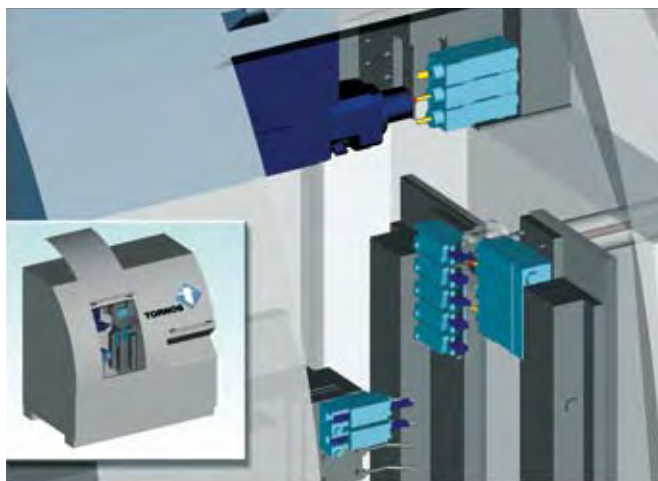
Phone: 800-496-2946 [www.maximint.com](http://www.maximint.com)

## MIKRON – Booth 137

MIKRON Machining Technology has developed the Rotary Transfer Multifactor machine, available with 8, 10, 12 or 15 stations; the number of stations is defined with the amount of machining operations. The maximum work piece size is 4" x 4" x 4". The machine can be tooled with CNC units. All Multifactor models can be automatically fed with blanks or pre-machined parts. Multifactor transfer machines can be inter-connected or coupled with other machines.

Mikron will also present the Multistar CX-24 rotary transfer machine with new 3-axis CNC machining units, as well as the CrazyDrill small drill (below). Mikron has expanded their range of small drills and stocks small diameters, starting from .0295" (0.75mm) and with internal cooling! The available standard lengths are 6xD, 10xD and 15xD; and in incremental diameters of .002" (0.05mm).

Phone: 203-261-3100 [www.mikron.com](http://www.mikron.com)



## PARTMAKER – Booth #544

PartMaker Inc. will display its latest release, Version 8 of its PartMaker® CAD/CAM software for CNC Mills, Lathes, WireEDM, Turn-Mill Centers and Swiss-type lathes. PartMaker Version 8 features a wide range of improvements including the introduction of the PartMaker Full Machine Simulation module, which allows the user to view a photo realistic 3D model of the machine for which they are programming a part.

This new simulation module will provide improved error checking and collision detection to PartMaker users by allowing them to perform an even more robust machining simulation than currently offered in PartMaker. The machine model being simulated incorporates machine specific tool holders and attachments to assure that any possible collisions that could occur on the machine will be detected off-line on the user's PC.

Phone: 215-643-5077 [www.partmaker.com](http://www.partmaker.com)

# product focus

## REM SALES – Booth #200

Rem Sales, LLC has announced the North American Introduction of the NEW Tsgami BR20 sliding headstock lathe. Boasting true simultaneous operation of the main and sub spindles, the BR20 features 10,000 RPM main and sub-spindles and a 5,000 RPM tool spindle. Speed is more than spindle rpm; the ability to maximize functional cutting time is critical. Tsgami's unique opposed gang slide design typifies this by allowing for the shortest possible chip-to-chip time. The BR20 features a Fanuc 31i-A 3-path control, A.C. drives, six controlled axes, and 8 5/8 inches of stroke.

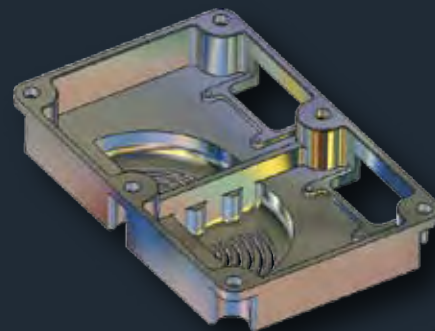
Phone: [www.remsales.com](http://www.remsales.com).

## ROYAL PRODUCTS – Booth #662

Royal Products has introduced the Royal Roto-Shield™, which consists of an oversized steel coolant slinger machined into the center's rotating point, combined with a long-life, spring-loaded neoprene seal that is resistant to abrasion, high temperatures, and virtually all metalworking fluids. The Royal Roto-Shield™ produces a dramatic increase in bearing life by deflecting coolant, protecting bearings against harmful chips, fines, and dust, minimizing seal wear, and maintaining grease consistency. All Royal live center models equipped with Royal Roto-Shield™ technology are rated for high-pressure coolant applications up to 2,000 psi and have a guaranteed runout accuracy of +/- 0.000050" TIR.

Phone: 800-645-4174 [www.royalprod.com](http://www.royalprod.com)

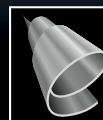
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## SNK AMERICA – Booth #349

SNK's Prodigy GT-27 gang tool lathe features a C-Axis spindle as standard, a polymer base and precision components for small parts turning. The Prodigy GT-27's spindle speeds reach up to 6,000 rpm. The Prodigy GT-27 lathe uses three axes of motion that can be commanded in absolute or incremental modes. The Prodigy's C-Axis spindle allows for indexing and positioning as well as more advanced functions.

Precision and versatility is achieved through the incorporation of non-heat generating collet closers, the absence of a turret and full C-Axis indexing positioning. The Prodigy GT-27 can index in .01 degree increments. As a result, live tooling can be used for side drilling and milling operations. The Prodigy GT-27 can also perform rigid tapping. Maximum production bar work is up to 1 1/16" diameter.

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# product focus



## UGITECH USA – Booth #714

UGITECH USA is the North American subsidiary of UGITECH, which is a Stainless & Nickel Alloy Long Products business unit of SCHMOLZ + BICKENBACH AG. Expansion of their global manufacturing base in 2007 includes a state of the art stainless bar processing facility in the greater Chicago area due to be completed by midyear.

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# shop doc

WITH NOAH GRAFF

*Today's Machining World's "Shop Doc" column taps into our vast contact base of machining experts to help you find solutions to your technical 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.*

**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.**

We are a Davenport shop having a problem doing a 1/4 -20 thread in 303 stainless steel. No matter what we try we are getting torn threads. Someone suggested changing the slip clutches to disc clutches. Before we spend the money, is there another solution?

**By a Thread**

## Dear Thread,

Disc clutches are a good style, but slip clutches can do this job. I will go through some troubleshooting methods for slip clutches.

Make sure your spindle speed gears are not rubbing on the threading gears, because they are running different rpm. That will cause the machine to labor and affect threading.

Check the shifting cam for the clutches to see if it has moved. The 3/8" square head collar screws are too long when they're brand new and can bottom out inside the hole. You might think the cam is tight, but it's not. Grind off two threads and put the screws back in.

Now inspect the clutches themselves. Take the clutches apart and inspect the parts for cracks, loose carbide blocks, undersize bearings and deep pit marks from the bearings. Pit marks are the reason we do not leave the clutches hooked up and shifting while they are not in use. Without centrifugal force to hold the bearings to the outside and pit evenly, gravity will obviously hold the bearings at the bottom, causing pitting on one side of the clutches.

Clutch cones can still be garbage if the keys are intact. If clutch cones are not gripping, you can cut

them in half. You can now buy them in two pieces. Brand new clutch cones are 1.010" or 1.011" in length. Measure the length of the used cones (minimum length is 0.995"). If the cones are shorter than this they are garbage. Cones with bronze keys are definitely stronger but are never needed on the high side. As it is, the low side does all the work of cutting and forming the threads. The high side is just chasing itself out of a threaded hole. An easy way to tell if your clutches are slipping is to just put your hand on the clutch. It should feel warm, but if it feels hot it means it is slipping instead of driving.

A trick I use to check the timing of the shift is to put a tommy bar in the hole on the low side of the clutches, and a tommy bar in the hole of the cam lever on the threading spindle. As the machine is running empty watch the two tommy bars. The bar in the clutches should shift just before the bar on the cam lever starts to drop back. Set the depth for 4 or 5 threads to see how much pullout you have – it just needs a little pullout. This is called the "cushion." I hope this solves your problem.

**Jim Gross  
Davenport Doctor  
Niagara Falls, Ontario Canada**

# New!

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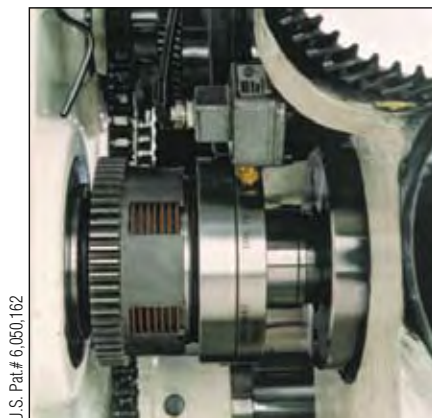


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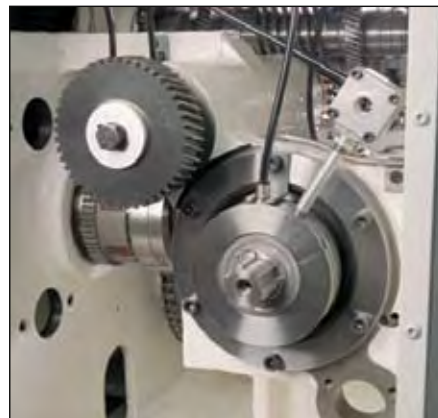


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## No Silver Bullet

At America's first auto show in New York just over 100 years ago, potential buyers were offered an array of options: battery cars, steam cars, even cars running on gasoline. It took the discovery of cheap and plentiful supplies of petroleum before the internal combustion engine came to dominate the market.

A century later, the search is on all over again, thanks to global warming and the politics of petroleum. Dozens of alternatives were on display at the latest Bibendum Challenge, a more-or-less annual traveling road show, sponsored by Michelin, designed to highlight fuels and powertrains that could reduce both CO<sub>2</sub> emissions and our petroleum dependence.

The latest Challenge, in Paris, included an array of fuel cell vehicles. This technology promises to be the clean alternative the world is seeking. Combine hydrogen and oxygen in a fuel cell stack and you get current to power an electric motor. Think of the technology as a refillable battery that produces nothing but water vapor as its by-product. No wonder automakers around the world are racing to put fuel cells into production.

Indeed, during his most recent state of the union address, President Bush spotlighted hydrogen as a way "to make our air significantly cleaner, and our country much less dependent on foreign sources of energy."

Unfortunately, there are several problems. While hydrogen is abundant, it is not found in its free form, so it must be produced, usually by electrolyzing water or cracking common hydrocarbon fuels, such as coal or natural gas. That's energy intensive and can actually increase pollution if you don't use green sources, such as wind, solar or geothermal energy. Meanwhile, shipping and storing the lightweight gas is difficult, and experts estimate it would cost at least \$10 billion to upgrade the existing service station infrastructure alone.

So, if the hydrogen economy remains a decade or more out, are there other alternatives? There is no "silver bullet," cautions Michelin CEO Michel Rollier. "On the contrary, there's a vast array of solutions."

The Toyota Prius is one possible answer. This popular hybrid-electric vehicle, or HEV, primarily relies on a conventional, internal combustion engine, but its batteries recapture energy normally lost during braking or coasting, reusing that power during launch and hard acceleration.

General Motors, meanwhile, hopes to bring its prototype Chevrolet Volt, a plug-in hybrid, to market. Unveiled at this year's Detroit Auto Show, PHEV technology one ups Prius by plugging into the electric grid to give a car, like Volt, enough range to handle the typical commute on battery power alone.

"We believe very deeply in the principle of energy diversity," declares GM's car czar, Bob Lutz. The automaker is also a proponent of ethanol, which it contends could supplant a sizable share of our imported oil. Then there's bio-diesel, an alternative to that high-mileage fuel. You can produce it from used French fry oil – or soy beans, if you're gearing up for high volume.

In fact, no single alternative, whether hydrogen, hybrid, diesel or battery car, is likely to replace the gasoline-fueled internal combustion engine anytime soon. If anything, the next decade or so will likely see us rely on a vast array of powertrain options, much as we did at the turn of the last century.





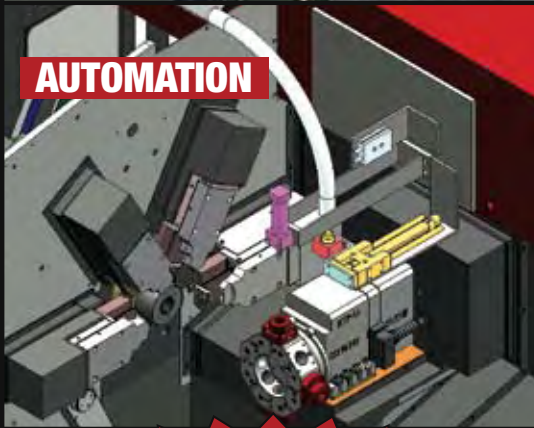
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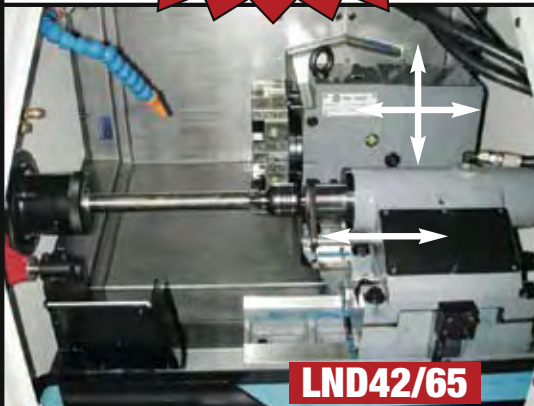


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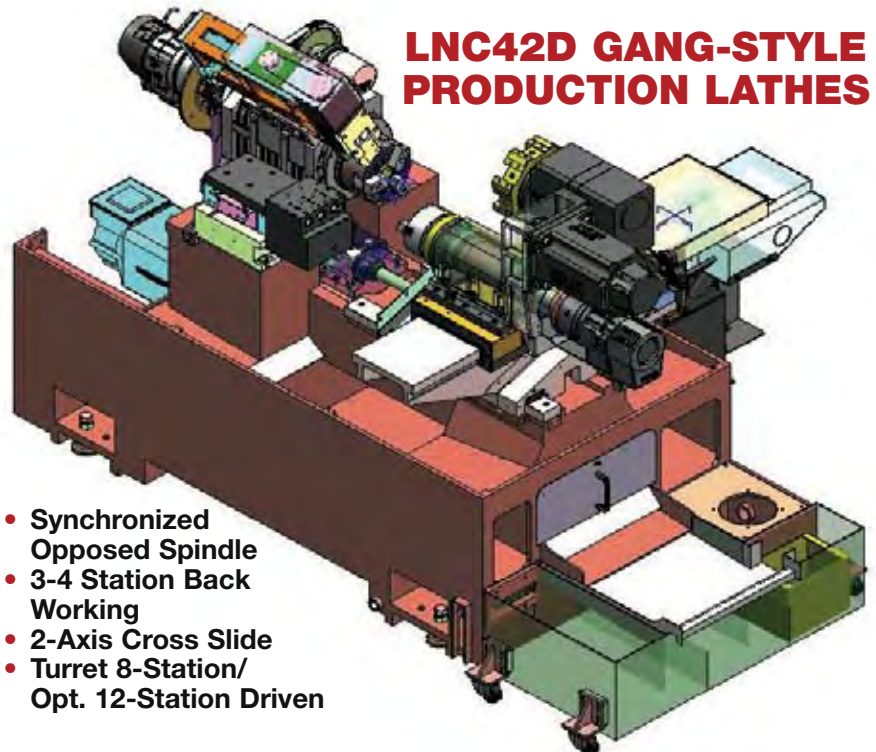


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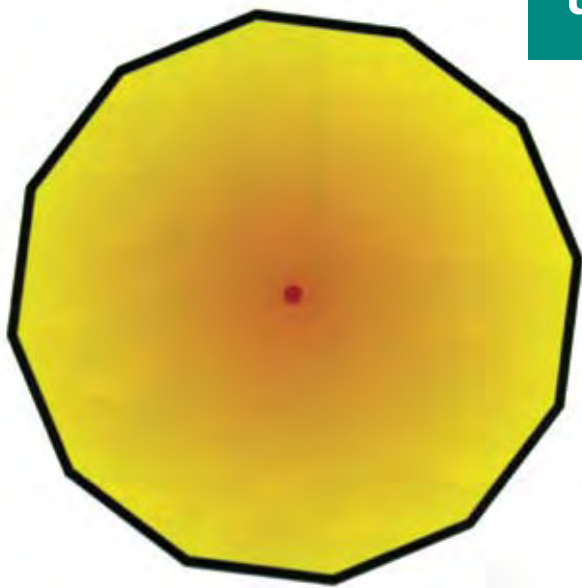
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# Shadow Garden

think tank



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All twelve walls of a dodecagonal garden are illuminated by a single lamp, which is positioned in the garden's center. Can you redesign the garden so that even though a lamp is placed at its center, each of the twelve walls is partly or entirely in shadow? The walls must be straight, but they don't have to be the same length.

## Circle Divisions

A circle can be divided into any number of regions of equal area using a compass and a ruler. Simply divide the diameter into the number of equal divisions required and from those points draw semicircles, as shows. Ancient Chinese mathematicians knew of this method; the yin-yang is an example.



Who went around in circles with me?

**Roger Stillman** of Metric and Multistandard in Hawthorne, NY; **Jeff Kovalenko** of Key Machine Tool in Elkhart, IN; **Jim Gnesa** of El Camino Machine & Welding in Salinas, CA; **Steve Richards** of Yamazen, Inc. in Schaumburg, IL; **Kenneth F. Harkin** of American Laubscher Corporation in Farmingdale, NY; **Mark Drouin** of T & A Screw Machine in Terryville, CT; **Gary Sewell and Lynne Weixel** of GS Design and Machine in Tallahassee, AL; **Janet Querido** of G.H. Berlin Oil Company in East Hartford, CT; **Uli Kuster** of Blaser Swisslube in Rohnert Park, CA; **Ron May** of Hunter Engineering Company in Bridgeton, MO; and **Jerry Morgan** of K & Precision Products Co. in Dexter, MI.



# postings



Noteable and newsworthy  
information and events for  
the month of April.

## EASTEC

2007

Exposition

W. Springfield,  
MA

May 22-24

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

Meeting

of the

Society of

Tribologists  
and Lubrication

Engineers

May 6-10

Philadelphia, PA

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

## 3D SCANNING:

Reverse Engineering,  
Inspection & Analysis

Detroit, MI

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

May 1st  
&  
May 2nd

## Metallurgy Certificate Program

Nashville, TN

May 8-10  
2007

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

## Certified Manufacturing Technologist Review Program

Springfield, MA

May 22nd thru  
May 24th

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

## Montreal Plant Maintenance & Design Engineering Show

Montreal,  
QC CANADA

May 15-17

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

## Online Auction

CNC & Manual  
Fabricating & Toolroom,  
Inspection &  
Facility Support  
Equipment

May 16-17

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

Birthday  
Clint Eastwood

May 31,  
1930

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Mother's  
Day

May 8th

May 1st 1978


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#### Process Engineer

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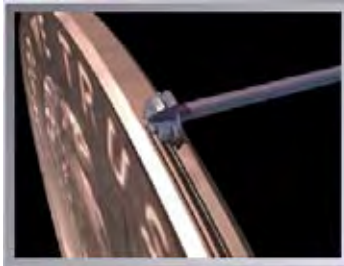


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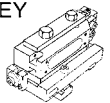


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# afterthought

## The Multiple of One

The full page color ad in the February 2007 *Dwell* magazine immediately grabbed me.

It showed a sketch of a swan-necked faucet with a sliding handle to turn it on and off and regulate the temperature of the water. Elegant design, but it was the copy that really caught my eye. The ad asked me to design my own faucet and shower. This was the perfect illustration of the manufacturing process merging the multiple and the singular approach.

The product is the brainchild of Symmons Industries of Braintree, Massachusetts, a 70-year-old family business famous for its hotel room shower heads.

Symmons is a niche player in the bathroom fixture universe. In the U.S., Delta, Moen and Kohler dominate, but Grohe of Germany and Toto of Japan vie for pieces of the

“I am fascinated by modifying the mass into the unique and using manufacturing as a sales strategy.”

market, and the Chinese generics aim for the lower end. How does a Symmons set itself apart from the crowd, particularly Kohler, which is huge and privately owned with loads of marketing money to project a luxury image?

I spoke at length to Jeffrey Reilly, vice-president of marketing at Symmons, because I am fascinated by this snowballing trend toward modifying the mass into the unique and using the manufacturing process as a sales strategy.

What Symmons is doing quite adroitly is enlisting the designers of hotels and condominiums into the plumbing manufacturing process. They have a collection of interesting fittings to start the conversation, but they really want the designer to build a unique look for every big project. The invitation to designers made in print ads, at shows, and in one-on-one presentations asks them to put their imprint on the bathroom brass. They will take the designer's ideas and produce a prototype within a few days using their CAD/CAM equipment and material layering machinery to turn the idea into tangible pieces of wood and metal to be studied, felt,

and then tweaked. The valves and fittings behind the walls are usually standard high quality Symmons products, but for the designer of a Four Seasons hotel or Jackson Hole condo the faucet is clay to be shaped.

Reilly says this approach of moving out of the catalog into the imagination has been the wedge to make significant inroads into the high-end market, especially one of a kind destination hotels.

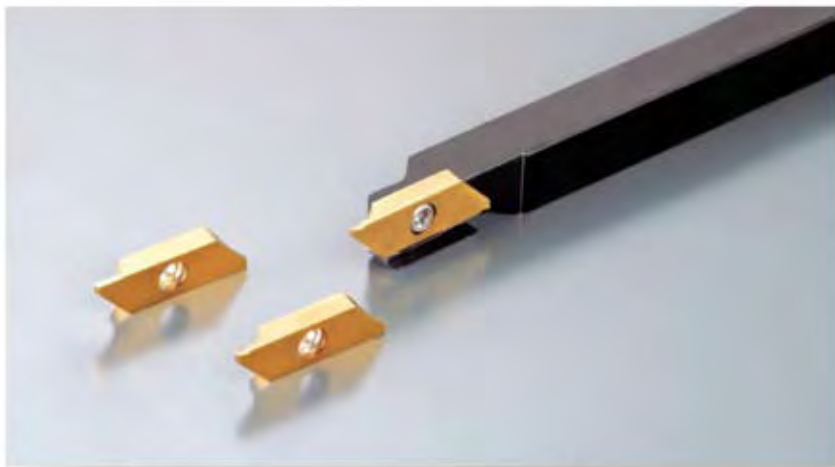
Because Symmons produces its products in the U.S. they can be in production on a unique hotel product in four months, which Reilly says is fast enough to accommodate one of these large projects like the Mohegan Casino in Uncasville, Connecticut, a 1200-room high-end hotel which they got when another supplier failed in the clutch.

Symmons is showing how a forward-thinking smaller company can compete with multi-billion dollar firms on the elite jobs by changing the way the game is played. The Symmons approach reminds me of the open software movement and the rise of YouTube as a challenge to traditional TV and movies. By enlisting the designer community in the process, rather than simply offering a portfolio of previously used options, Symmons is appealing to the creativity of its buyers. By using the new manufacturing tools proliferating today to convert the mass into the individual at a competitive price, the company is drafting onto the most dynamic force in the product game today.

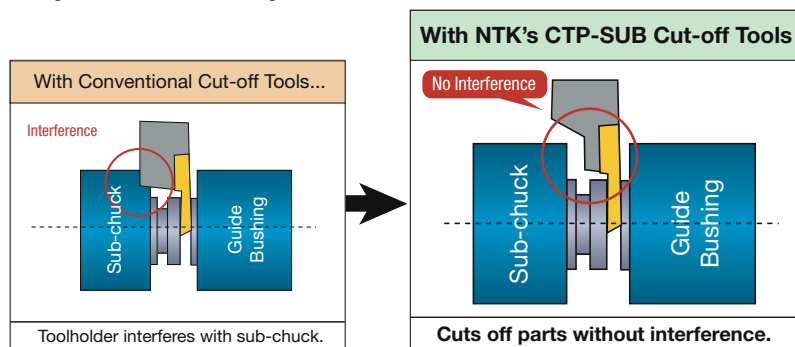
Combining the universal and unique is the future of manufacturing in this country, whether the product is spinal implants or the back massaging shower heads of Symmons.

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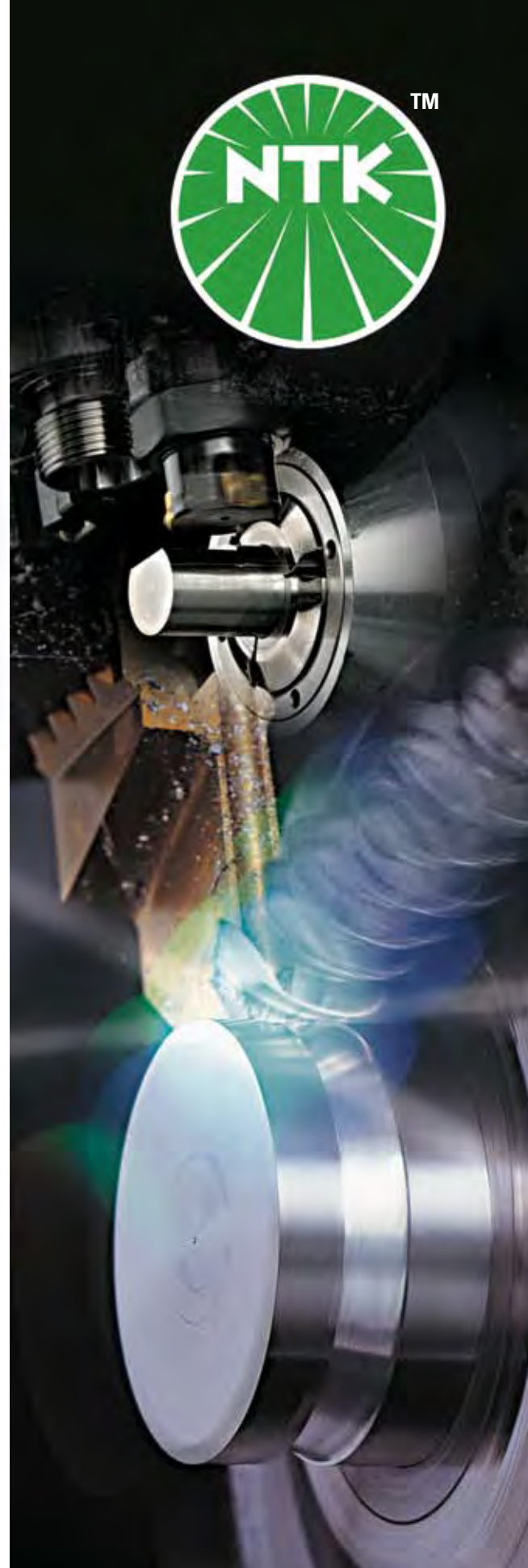


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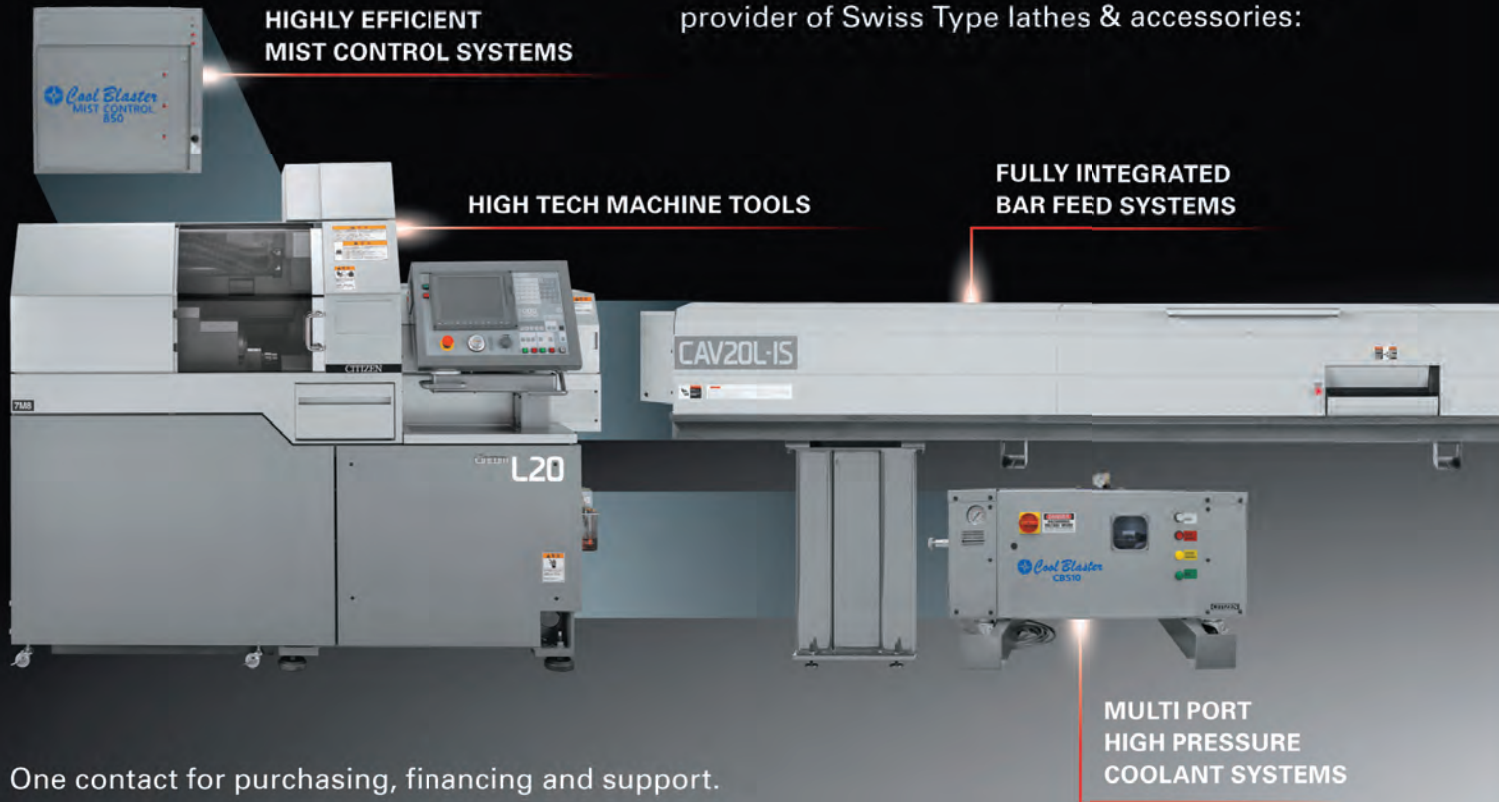
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