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Today's Machining World

THE MAGAZINE FOR THE PRECISION PARTS INDUSTRY

april 2008 volume 4 issue 04

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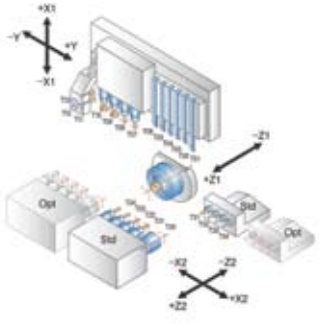
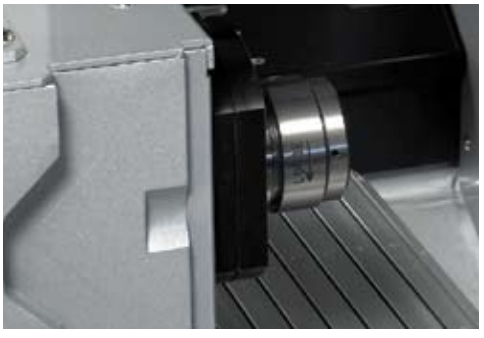


SA20D Tool Layout

Back End Tool Station



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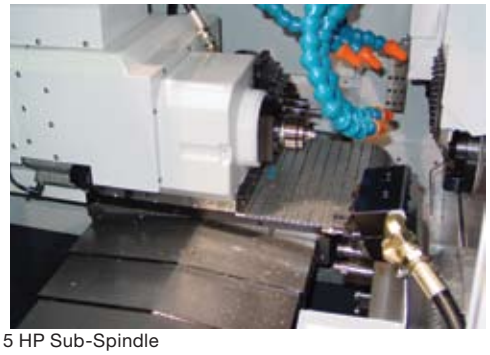
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in this issue

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BPA WORLDWIDE

editor's note

Spring Eternal

I live for April. The new beginning of baseball season, Passover and Easter signaling freedom and rebirth, the blessed fade of winter into spring, the NCAA Basketball tournament, tulips defying the cold.

I live my life pushing back against the eclipse of pessimism. April is a sunrise. It is one more chance to get outside and feel the warmth of possibility replace the chill of fear.

For you charmed readers in California and Costa Rica, this seasonal ode probably sounds like the labored prose of an ESPN intro, but for me, a winter-worn Chicagoan, April really does mean hope. After several years of mild, even sunny winters, this past marathon bear of a winter has left me begging for April's thaw.

No, T.S. Eliot, April is not the cruelest month, even though the economic news has gone from lousy to just awful and everybody is droning about sub prime and $4 gasoline. I am sick of it. Give me my April.

Politics has been a diversion with Barack Obama preaching hope against Hillary Clinton's 3 a.m. nightmares. At the moment hope is winning by a thread. And it's April.

Perhaps I invoke the baseball metaphor too often in my writing, but I believe that baseball still is the unifying language of America. My beloved Chicago Cubs, the perennial doormats, are really quite good this year. They are favorites to win their division. The team has solid pitching and a manager who believes in the players.

It's April. By God, it's April.

Live in hope, Lloyd. Live in hope.

Lloyd Graff
Editor/Owner

Today's Machining World

April's talent pool.

contributors

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.

Sara Bongiorni is a Louisiana writer and former business reporter whose essays and articles have appeared in the *Boston Globe*, the *Los Angeles Times*, the *Christian Science Monitor* and the *Shanghai Daily News*. She is author of *"A Year Without 'Made in China': One Family's True Life Adventure in the Global Economy,"* a memoir that tells what happened when her family decided to shun Chinese-made goods. In her free time, Sara enjoys reading, hiking and spending time with husband Kevin, and their three children: Wes, age 7, the big leg on his soccer team; Sofie, 4, a world-class hugger; and Audrey, 1, who walks like a robot and is working on saying the word "banana."

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

Barbara Donohue received her mechanical engineering degree from MIT. She worked in design, heat transfer and manufacturing for several years before changing careers to become a journalist. Now she writes about technology and business from her home office in Acton, Massachusetts. When not writing, she sings in a choir, volunteers as a literacy tutor, and is weekend "foster mom" to a yellow Lab puppy named Tikva that is training to become a wheelchair assistance dog.

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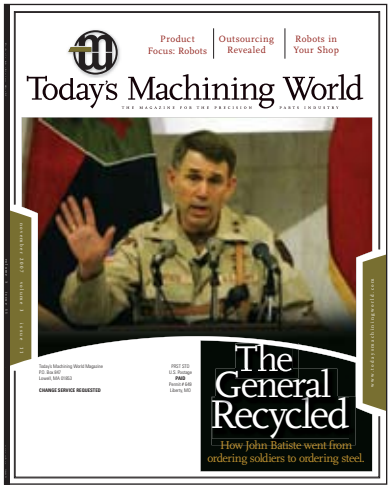

Heart and Soul

I saw the response from Gary Sperry (Feb., 2008) regarding General Batiste's comments in your November 2007 issue. I thought it was quite refreshing to hear from someone [Batiste] on the front lines who knows what is actually going on. I figured you would get some flak about what he said. So what!

Mr. Sperry reveals himself in a few of his remarks. As a typical "Kool Aid drinking" Bush follower he "didn't want to know what a retired army officer's agenda is or was." Hell, no. Why should he cloud up his already made up mind with facts? That's how we got into this mess to begin with.

If you ask me, the person who "doesn't have his heart and soul in his job" is Mr. Bush, not General Batiste. Had there been more General Batiste's speaking out 35 years ago, perhaps Mr. Sperry would not have had to waste his time for 36 months in another unnecessary and undeclared war.

As I have a business to run and don't wish to get into a contest, I shall refrain from signing my name. The above statements speak for themselves. I also don't need another reason for Dick Cheney to go through my emails.

Anonymous

View of the Game

Guess there's a first for everything...I've never slowed down to write a letter to the editor of anything over the past 25 years in the machining industry. I'm a consultant and business broker up here in Wisconsin that focuses exclusively in the metal working industry.

I got to know about you folks from a very impressive guy I met who owns a machining house who could actually talk with me about multiples of EBITDA and depreciation recapture without his eyes glazing over.

Most machining house owners (who I respect immensely) are incredible technocrats (Ala Gary Sperry types, page 11 Feb 08) who can sit and talk about how to effectively machine 4140 or how to deal with stingy chips off 1018; however, to talk high level global perspectives or the profound influences personal ethos has upon industry is lost in their concrete sequential paradigms.

I'm very appreciative and impressed with the technocrats that drive the creation of wealth in our nation; however, to soar above the rattling bar feeders once a month is a profound and truly inspirational pleasure.

Thank you for being you, and please don't gravitate into the trenches down here in the lowlands where we fight for survival each day. Your view of the game from your skybox brings hope and encouragement for those of us who love machining and have a passion to see it survive and thrive over the year to come.

So you're asking me why I say you owe me two pages...I hate baseball...or maybe I've never learned the fine art of watching life in slow motion.

Since I have surprisingly found the patience to sit down and pound out a letter, maybe I'm turning a corner in my life where I may find joy in watching grass grow.

Thank you for bringing some warm summer breezes for us to briefly soar upon each month!

Craig Helgerson
Industrial Specialists Group
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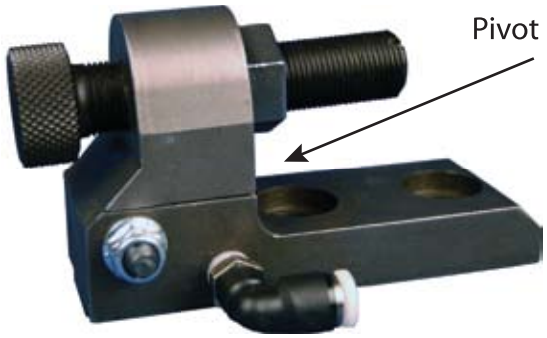

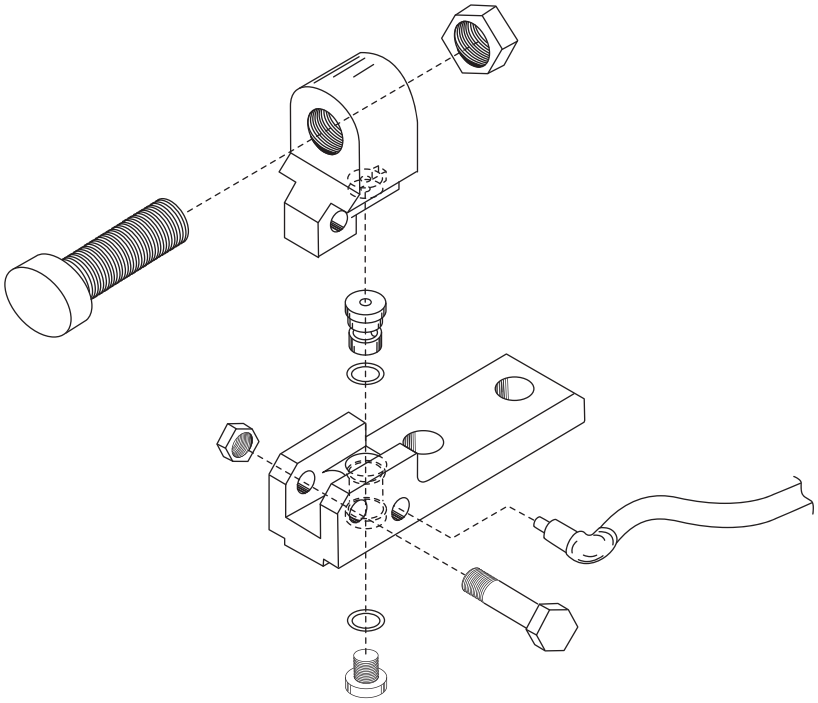

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Economic World View

By Lloyd Graff

As I write this it is early March and the economic news in the aggregate looks bleak. Housing and automotive are on respirators and the economy is losing jobs except in Government. The stats are going to show that the United States is in a recession for the first two quarters of 2008.

On the other hand, at the Management Update of the Precision Machined Products Association in New Orleans, the mood was surprisingly positive among the folks I talked to. Perhaps the people who go to such conclaves are a self-selecting group of high achievers and improvement junkies, but in 2003 they were really glum and today they are smiling. One message that I got quite loudly is that China is no longer a big negative to PMPAers.

In fact, work is coming back from China because of suspect quality and higher costs in the land of the Great Wall. The low hanging fruit has already migrated to Asian manufacturers. With the Heparin blowup, Mattel's lead paint headache, and the stretched supply chain for questionable quality, China contracts are looking breakable.

Meanwhile the export express, particularly to Europe, is gaining momentum. In fact, there is a pesky container shortage today if you want to ship a tractor or a lathe to Europe, because after the containers unload in Rotterdam or La Havre, there is nothing to bring back to Montreal or Savannah. If you are shipping from the U.S. today, you have to beg for a container.

So with the weak dollar today, we are seeing the positives of world trade. The automotive transplants are now serious about sourcing product here. This means a lot of work for PMPAers and job shops around the country.

In talking to Chad Arthur of Arthur Machinery (see interview) I heard the same bullish report in the face of the shrill pessimism of the financial media. The financial stimulus package rushed through Congress figures to help by autumn. The real estate market will eventually find some equilibrium, although we probably will only know it happened in retrospect.

If your machining business is holding while the Chicken Littles are in full throat, stick in your earplugs and stock up the machines.

(Swarf continued on next page)

Some straws in the wind tell us the

power of the dollar's dramatic drop in value. The German audio equipment manufacturer Sennheiser is moving more manufacturing to the United States because Americans are their biggest customers, China cannot reliably make product to their standard and Germany is too expensive to be competitive.

Chinese manufacturers, especially smaller firms, are finding it difficult to make a profit by making goods in China. It is harder to recruit unskilled workers from the hinterlands as agriculture in China becomes more highly valued. Skilled workers are also hard to find and their wages are being bid up. To combat shrinking margins they are moving operations to a welcoming Vietnam, which has a huge number of young post-war baby boomers.

Caterpillar showed an unexpected surge in orders and profits in its recent quarter despite the dismal residential real estate market. This illustrates how a multi-national manufacturing firm reporting in U.S. dollars can keep earnings and work flowing to the most profitable areas in turbulent times.

Foreign buyers see a window of opportunity to buy strategic American assets on the cheap. A Russian firm, Evraz, recently bought IPSCO Steel, a maker of tubular steel goods with plants in Canada and the U.S. The Rouge steel works in Detroit, started by Henry Ford, is Russian owned. I imagine foreign buyers are looking at an array of metals firms including Alcoa and Carpenter Steel. I wonder if the Federal Government or Congress would step in if either were in jeopardy of being bought by a friend of Vladimir Putin.

Speaking of Putin, the Europeans must be feeling rather vulnerable today because so much of their natural gas now comes from Russian fields. The Russkys have almost accomplished what they failed to do under Communism; dominate the rich but soft Europeans economically by controlling the energy supply. Putin has shown his willingness to cut off suppliers by playing hardball with Georgia and Ukraine.

Natural gas is now a relative bargain with the world price the equivalent of 60 percent of the spot oil price. There is still a lot of natural gas in North America, especially in Alaska, but Exxon, BP and other producers have blocked a pipeline through Alberta in order to keep energy prices high.

This finally makes liquid natural gas imported from the Middle East a viable alternative. For a long time the Saudis and the Emirates burned their natural bi-product of oil because there was no viable way to use it in the Middle East. Today petrochemical plants, and now aluminum plants, are using some of the gas, but now more will be used for LNG.

More congrats to the Chinese for surpassing the United States as the #1 emitter of carbon dioxide in the world's air. For the fans of global warming – professors, owners of lakefront property in Duluth, and Al Gore for President supporters – point your finger at Beijing. It has been a tough month for the Chinese with Yao Ming messing up his knee, the Tibetan rebellion, and now the CO_2 championship belt.

One more jab at the Chinese government. The absolutely horrendous genocide in Sudan has long been abetted by the Chinese contract to buy the oil produced in this renegade country. Pressure by humanitarian groups to shun the oil or use economic leverage on Sudan has been ignored by China. See you at the Olympics.

Zeke Vanderhoek is an

education revolutionary. He is the 31-year-old visionary and creator of a charter school for 5th through 8th graders in the Washington Heights neighborhood in Brooklyn.

Vanderhoek, who made a pile of money in the test preparation business after graduating from Yale, proposed to the New York City Public School system to start a charter school, which pays its teachers $125,000 plus bonuses if schoolwide performance benchmarks are met. This amount is double the average salary for New York City middle school teachers.

Vanderhoek's belief is that teachers make the difference in a school so it makes sense to recruit the best and pay them well. Vanderhoek will take a $90,000 salary.

To make the school fit into the Public School budget structure, Vanderhoek is hiring only two social workers and plans on a class size of 30, several students larger than the norm. Teachers will work a longer day than their counterparts and assume the task of attendance coordinators and discipline deans.

The student body will be comprised by 120 students, mostly of Hispanic background, with plans to go to 480 students. The school will start with seven teachers and no assistant principals. In place of a palate of electives, only music and Latin will be offered.

According to a New York Times article of March 7, 2008, Vanderhoek, who had taught for three years in Washington Heights in the Teach for America program, came up with his ideas after starting a test preparation company called Manhattan GMAT in 2000.

He paid his tutors $100 per hour plus bonuses, several times what the competition paid. It worked. Customers paid a premium for tutors perceived to be the best available.

Vanderhoek has a backlog of applicants and has developed a rigorous vetting procedure including three live teaching auditions. Among those who have already applied are a Ph.D. in Latin with 40 years of experience and a teacher who has taught science at some of the top private schools in the country.

As one might expect, the head of the New York principals group called the idea of paying the principals less than the teachers "the craziest thing I've ever heard." The head of the teacher's union, Randi Weingarten, fretted that the non-union teachers would be hampered by a lack of power in dealing with the principal. "What happens the first time a teacher says something like 'I don't agree with you?' she said.

I find the New York City school experiment particularly exciting because it tests what variables can make a school work well.

The parallel question for a business is for the leader to identify the key people in an organization and pay to find the best available rather than trying to find people who fit into an old existing pay schedule.

I am anxiously waiting the results of the Vanderhoek experiment.

Managing Editor Jill Sevelow

attended a "Made in America" Town Hall Meeting hosted by John Ratzenberger at the Museum of Science and Industry in Chicago. Hundreds of the very pro-union crowd, many wearing "stars and stripes" clothing, packed the auditorium. The event was sponsored by the Alliance for American Manufacturing.

Jill said John was in his element, lamenting about his manufacturing-laden childhood and the sad state of his home town, and our youth's inability to "tinker." John has helped establish the "Nuts, Bolts and Thingamajigs" Foundation, a non-profit organization offering camps for children wanting to make tinkering fun again, to combat what he sees as a steep decline in an interest in manufacturing.

Ratzenberger, U.S. Senator Dick Durbin, United Steelworker Vice-President Tom Conway, and Scott Paul, Executive Director of the Alliance for American Manufacturing, each took turns decrying China's blatant currency manipulation and unchecked ease at cheating on trade laws. The AAM reiterated that they are "non-partisan but totally political," and said they cannot turn the U.S. around without turning policies around. Globalism is inevitable, Senator Durbin said, but we are not competing effectively without a fair trade system benefiting U.S. manufacturers. According to Durbin, with subsidies for companies to move overseas, American companies are at a complete disadvantage.

Jill said there was a fair degree of Wal-Mart bashing and a reminder to the people sitting in the room to raise the consciousness of the American consumer and what those "low, low" prices really mean.

Kudos to Scott Eigmy of

of American Turned Products of Erie, Penn. He has a website which gives a potential customer a sense of what his firm does. He has four short video clips in which a picture of the sophistication of ATP's processes comes alive.

I think that what Scott has done is within the reach of virtually any machining company. Web developers are easily found, video equipment is inexpensive for do-it-yourselfers, or it's easy to hire a local to produce the videos. Searchers are not looking for Oscar-worthy, they just want information and a feel for what makes companies a worthwhile possibility to do business with.

A recent video about industrial auctions which my brother Jim and I did under Noah Graff's direction has been seen by more than a thousand people. This is the greatest cheap marketing opportunity since eBay and Google.

DMG Chicago will host their

Technology Center America Open House April 15-18, 2008. DMG has recently moved into a new building with more than 11,500 square foot showroom in Itasca, Ill. They've lined up guest speakers for the aerospace, medical, high-speed cutting, and production machining industries, and will show live demonstrations on a number of their high -tech milling and turning machines, including the U.S. premier of their CTX beta 800, DMU 40 monoBlock as well as the Ecoline lathes and vertical machining centers. If you'd like to attend, you can register at www.dmgamerica.com.

I visited Okuma in Charlotte,

North Carolina recently, and for the first time I really understood its big investment in Partners in THINC.

Okuma has built a splendid new building to display some of their sophisticated machines, but also to offer a smorgasbord of suppliers to outfit a CNC machine to the special needs of a client.

The genius of this approach is that the partners, who are tenants, talk to one another as colleagues looking for the best solution for the Okuma clients. A cynic would ask

swarf

how Sandvik, Iscar and Kennametal can occupy the same building in Charlotte and be collegial, but according to Jeff Estes, who runs the operation, there is a lot more sharing than you might expect.

The way the building is set up makes it extremely easy to collaborate. It takes the onus for the solution off of the distributor or even the builder, and allows the group knowledge to help the customer who also brings unique input.

The approach helps the Partners in THINC to learn from their colleagues. Mindy Mikami, who guided me through the building, says that her boss Larry Schwartz, head of Okuma in the U.S., recently challenged the enrollees in the project to use the collegial approach more aggressively. They are paying for the privilege of being members of an elite group of vendors, so it is strongly in their interest to bring people to Charlotte who work well with others and can bring back useful information to the home folks.

I think Okuma is on to something very important and it should get even more worthwhile as the partners learn how to play well with each other.

Jeff and Brad Ohlemacher of

Elyria Manufacturing recounted a strategy for keeping employees on track. They say it has helped them significantly in reaching their production and quality goals.

The method is "the huddle." They found it in the playbook of *Mastering the Rockefeller Habits* by Vern Harnish.

Each morning at 7:30 Brad, Jeff and a small cadre of key people meet in the huddle. The huddlers must each present a piece of positive news to set the proper upbeat mood and tone. They must be brief; just a few seconds are allowed for each person.

The huddle is held standing up like a football huddle. The day's goals are set and each huddler informs the group where they are in relation to the goals and whether they have a special problem to deal with. The huddle is supposed to last just six to eight minutes. If a longer discussion about an issue is needed, a later meeting can be set.

The huddle is a disciplined effort to get the day going in a positive, focused way, and the Ohlemacher brothers are really high on how it works for their firm. See the video of the interview on todaysmachiningworld.com.

swarf

The Barack Obama presidential

run comes at a time when America's racial relationships are shifting, but perhaps too slowly for Obama to win the nomination or the November election.

The statistics show that Obama is getting only 25 percent of white votes in states like Ohio, California, New York, and potentially Pennsylvania, which could be the pivotal state in the long primary fight. This indicates that the racial divide continues to trump other issues for a lot of folks in the Democratic Party because Obama and Hillary Clinton are close on almost every policy point. The Obama run is fascinating to me because it taps into my own racial consciousness.

I grew up on the Southside of Chicago. We lived in a lovely four-square block enclave across the street from the sixth hole of the public Jackson Park Golf Course. I used to play the hole a few times every night during the summer and play baseball in an open area between the sixth and 13th holes. Occasionally, marauding black kids would threaten me and my friends and take the quarters in our pockets and our golf balls.

My grade school was about one-third black, one-third Jewish, and one-third assorted white. The public high school I would have attended was Hyde Park, which was over 90 percent black. For my parents, this was unacceptable, so they enrolled me at the University of Chicago Laboratory School, which required getting a ride in the morning and taking a public bus in the afternoon. U-High was an elite school with a lot of U of C faculty kids. It was one-third Jewish and 20 percent black. The clear message that I grew up with within my family and in the community was that black people were to be feared and shunned. But at school, I played sports with black guys and socialized tentatively with black girls. I had a clear feeling that having black friends would be frowned upon at home and dating a black girl would be looked at with total amazement and complete disfavor.

As I look back, I grew up with a Southside Chicagoan's baked-in fear of black people. I admired the civil rights movement of Martin Luther King from a distance, while enjoying the benefits of being a well-off white person in America.

In the late 1970s with two young kids, my wife Risa and I bought into the American dream and moved into a house in Olympia Fields, Ill., an upscale suburb south of the city. It was a fateful decision from a racial standpoint, because a decade later the area became a mecca for black people looking for a suburban lifestyle.

As our children, now three of them, reached high school, the local public school, Rich Central, became predominantly African-American. Risa and I and our children were faced with a decision similar to what my parents faced with me and my siblings. Do you want your kids to be a minority in a heavily-black school? We considered the private school options, moving, or sending the kids to Rich Central and took a chance on the public high school. Each year the number of white students dropped. Test scores steadily receded. Teachers, some white, some black, became disheartened with the less academically-oriented student body. Our children became disenchanted being part of the shrinking white minority as time went by. But we stayed in Olympia Fields. Property values skyrocketed in almost every area of suburban Chicago, but not where we lived.

Most of our neighbors sold their homes to black people. The school behind our house now has almost all black faces. And we're still there.

Risa and I have adult African-American friends which we do see socially. Our house has no mortgage and we still enjoy it, even if it's a worth a pittance compared to a comparable one in a suburb that is predominantly white. Jesse Jackson Jr. is our Congressman.

And now we have Obama – half African, half white, but seen by America as a black man. I feel like I've lived my conscious racial life as part of the endemic racism of America, which conflicts with my desire for a human relationship with my neighbors in Chicago.

As I've gotten older, I still have the gut fear of angry, disaffected, alienated black men walking down the street. But I really want better. And I want my country to do better. Race has bedeviled me for as long as I can remember. Obama is no savior, and I do not like a lot of his politics, but I am sick of the racial divide. I am sick of my divide. I hope he wins. I hope I win.

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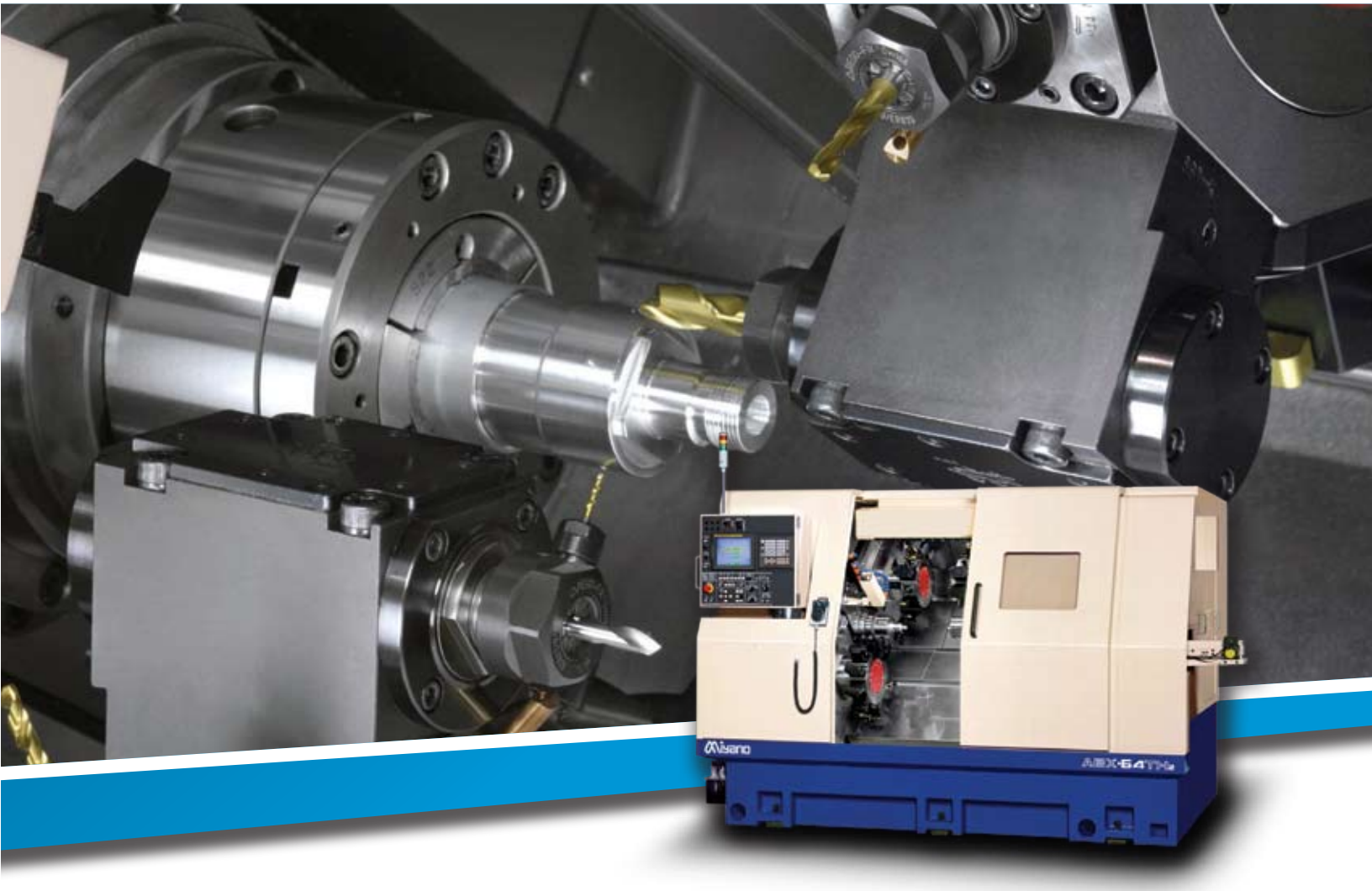

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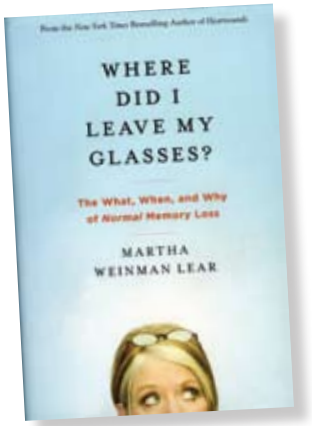
By Jerry Levine

Where Did I Leave My Glasses?

This year the first of the 78 million baby boomers reached 62 and became eligible for two milestones: The right to collect Social Security and the right to endlessly ask, "Where did I leave my glasses?"

Where the baby boomers are chronologically drives the nation's political and cultural agenda. It's like watching a python swallow a pig and seeing the bulge move through the snake's body. When the boomers were young and wild and crazy, the country was wild and crazy. When they were middle aged, had kids, a house and a mortgage in the suburbs, the country became more serious and conservative. Now the boomers are retiring, and U.S. priorities will again follow.



Our human brain (like the rest of our body) begins losing some of its ability after our twenties. The hippocampus is important for inputting and filing memories, and the frontal lobe for retrieving. We may have done a good job in the past with data input and storage, but the frontal lobe is now booting up slower. We're like the Web. There's a lot of information in there – we just need a faster search engine.

We need strategies to compensate, and in her book *Where Did I Leave My Glasses?: The What, When, and Why of Normal Memory Loss,* Ms. Martha Weinman Lear goes through a series of strategies.

The key to healthy memory function at any age is attention – pay attention. Focus on what you are absorbing. If necessary, take time and repeat and review.

Memory experts tout four imperatives: healthy diets, a good night's rest, avoiding stress, and regular exercise, both mental and physical – all common sense suggestions. Interestingly, neither mental nor physical exercise alone is sufficient. We need both a sound mind and a sound body to keep all our neurons firing up to speed.

We laugh at our normal memory lapses – walking into a room and not remembering why, dialing the phone and forgetting who we just called, etc. But what unnerves us the most is the specter of Alzheimer's. There are times when the lapses aren't normal, and Ms. Lear goes through a long series of "what's normal" and "what's worrisome." It's a good guide if you have concerns for a loved one or for oneself.

As far as nutrition, America is a country addicted to diets, health foods, and supplements. There is much conflicting information. After interviewing many mental health experts, Ms. Lear concludes the jury is still out on almost everything. However, diets associated with lower risk of vascular disease are also associated with lower risk of dementia.

There are a few interesting studies the author mentions. Caloric Restriction (CR) is known to slow aging. One has to eat so little that the body goes into survival mode and slows the metabolism dramatically. CR switches on a longevity gene, which changes body chemistry. For most of us the diet is too severe to sustain, but some pharmaceutical companies are funding research on a pill that would mimic the effect of caloric restriction. Not only could this increase longevity, but may also protect against memory loss.

For wine lovers, tests with mice have shown positive results for a chemical called resveratol, found in red wine. You have to drink gallons a day to match the mice, so it's not practical, but resveratol pills may soon become commercially available.

Finally, Ms. Lear looks to the future as baby boomers demand to be kept sharper longer. We have cosmetic surgery for the face body parts, but why not brains? The anti-aging industry is now in its infancy. In the near-to-distant future, many new products can be envisioned. There may be brain exercise computer programs tailored to individual needs; smart pills to improve your memory and other cognitive functions; genetic interventions which have shown success in laboratory animals; and finally whole brain implants – computer chips that could give us the entire web for information and Google to search it almost instantaneously.

I can fanaticize a whole "Brave New World" with all its potential positive and negative aspects – an ideal one where I wouldn't have to keep searching for my damn glasses.

Comments? You can email Jerry Levine at jerroldlevine@yahoo.com.

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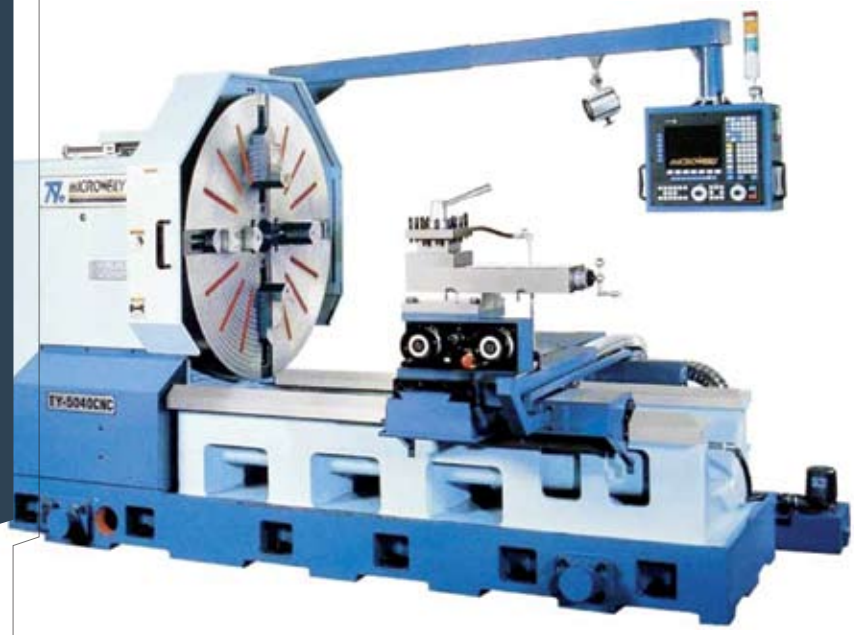
Stocking Heads

Rem Sales, North American importer of Tsugami machine tools, announces the availability of the "BH20SY," which features a sliding headstock with gang tools, a 12-station turret with stationary or rotating tools, plus a back spindle. All three "paths" can work on parts simultaneously, reducing cycle times, and offer the capability to completely machine complex parts up to 20mm diameter in a single setup.

Adding to the BH20's productivity, spindle speeds up to 12,000 min-1 are possible on both the main and back spindles. Further, the BH20 can operate with or without a guide bushing so the most suitable operation for the workpiece length may be chosen. The spindle without a guide bushing doesn't require ground bars, enabling high speed and high precision when machining cold drawn bars.

For more information, contact Rem Sales at 860-687-3400 or visit www.remsales.com.



Oil Country

Ganesh Machinery has introduced a line of manual and CNC oil country engine lathes. The manual lathes are available in 22", 26", 30", 38" and 44" swings. These heavy-duty lathes are available up to 200" between centers and up to a 6" spindle bore. They are built with rugged meehanite casting, up to 20 HP spindle motors and true-geared head to provide the most torque on the low speed ranges. Rapid traverse is standard on all our large engine lathes. The Ganesh CNC plus oil country lathes are available in 24", 30", 44" and 52" swing. The 52" machine is built specially for oil pipes. It has 10" spindle bore, 52" swing, powerful A-2-15 spindle nose and a 25 HP spindle motor.

For more information, please contact Ganesh Machinery at 888-542-6374 or visit www.ganeshmachinery.com.

fresh stuff

Making Its Debut (right)

DMG GILDEMEISTER has introduced the universal CTX 310 ECO and CTX 510 ECO lathes and the DMC 635 V ECO and DMC 1035 V ECO vertical centers, with a market price of less than 50,000 euros. The CTX 310 ECO universal lathe offers sophisticated turning operations for bar machining in a diameter range of up to 200 mm and chucking components of 51 mm respectively thanks to its spindle drive whose continuously adjustable rotational speeds of up to 5,000 rpm provide a power of 11 kW and its torque of 112 Nm. At the same time the direct measuring systems on the spindles in combination with the high-end CNCs from either Fanuc or Siemens ensure maximum positioning accuracy. It offers a VDI 30 turret with 12 tool stations of which 6 can be equipped optionally for power-driven tools and a C-axis. All axes are equipped with digital drives that allow feed rates of 24 m/min in the X-axis or rather 30 m/min in the Z-travel.

The DMC 635 V ECO with its work area of 635 x 510 x 460 mm and the larger DMC 1035 V ECO (1,035 x 560 x 510 mm) both offer a number of high-tech features in the entry class of vertical milling. Productive highlights include the 8,000 rpm milling spindle with an 82-Nm torque, the 20-pocket tool magazine with double gripper for shorter changeover times of only 1.6 seconds and the dynamic axis drives for feeds of up 25 m/min.

For more information, please contact DMG Gildemeister at (630) 227-3900 or visit www.gildemeister.com.

All Systems Cool (below)

The new CoroTurn® HP from Sandvik Coromant is a high-pressure coolant system that partners with Coromant Capto® to harness the high pressure capability of up to 1100 PSI in turning centers, vertical turning lathes and multi-task machines. Via the turret or spindle, Coromant Capto coupling channels a high pressure coolant jet through small nozzles mounted close to the insert cutting edge. The resulting increase in velocity of the coolant jet produces a hydraulic wedge that lifts the chip from the material. CoroTurn HP's improved chip control also provides security for unmanned production in turning centers with high volume, automatic component changing, and multi-task machines where chips gathering around the tool prevent automatic tool changing.

For more information contact Sandvik Coromant at 201-794-5223 or visit www.coromant.sandvik.com/us.

Clean Patrol (right)

Farr Air Pollution Control (APC) has introduced a new "FDC Controller" that provides pulse cleaning control for all types of cartridge and baghouse dust collection systems. Using factory-programmed or customer-selected settings, the unit monitors pressure differential across the filters to ensure pulse cleaning, reducing compressed air energy usage and extending filter life. A pulse cleaning switch on the front of the box allows the user to turn pulsing off, to pulse based on pre-determined settings, or to clean "on demand" when the high pressure setting is reached and a dirty filter alarm sounds. The control board inside the unit includes 10 solenoid outputs to interface with the dust collection system, plus an additional 10 outputs on a lower expander board. Power requirements are 110/220 V, 50/60 Hz, 1-phase.

For further information contact Farr APC at 800-479-6801 or visit www.farrapc.com/fdc/.

Broach the Subject (left)

TPS International, Inc., Sussex, WI, has introduced an addition to their line of Poliangolar adjustment free, rotary broaching attachments. The new driven attachment offer sadaptation to CNC lathes that utilize a driven tool turret. The system is available in all common VDI sizes with drive gears that fit all CNC lathes. The broaching tools used in the attachment are available in inch and metric for both internal and external shapes such as squares, hexes, stars, torx, serrations and any number of special geometries.

For more information, contact TPS International at 800-423-4031 or e-mail info@tpsintl.com.

fresh stuff

CERT-ify

FANUC Robotics America, Inc. introduced the Certified Education Robot Training (CERT) program, a new certification available to qualified high schools, community colleges and universities. The program certifies instructors at educational institutions to train their students to program FANUC robots.

To accompany the CERT program, an eligible school can purchase a new innovative educational tooling package that includes an industrial robot, integrated vision system, programmable logic controller, and ROBOGUIDE simulation software.

Contact FANUC Robotics at CERT1@fanucrobotics.com to request more information, or by calling 248-377-7000.

fresh stuff

In the BAG

IBAG North America has announced the addition of new 20 and 22mm diameter high speed milling & drilling spindles for Swiss turning applications. Utilizing synchronous, DC motor technology, the spindles operate up to 100,000 rpm with 260 watts continuous power and high torque. Ideal for machining applications involving micro-milling, drilling tools, engraving and fine milling, these spindles feature less then 2 microns run-out. IBAG offers a ready-to-install kit that includes the spindle and drive, all electrical and pneumatic lines, and optional spindle mounting blocks. The 20 and 22 mm spindles complement the existing line of 25 mm diameter spindles from IBAG, offering high-speed, precision milling and drilling capabilities for smaller Swiss turning equipment.

For more information, please contact IBAG at 203-407-0397 or visit www.ibagnorthamerica.com.

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ChipMunked

Kurt Manufacturing has introduced a new, front-loading 125 metric ton Chipmunk metal compactor briquettor. Model 1200FL delivers up to 8:1 compaction ratio and reclaims cutting fluids. It has an output capacity of up to 1,200 lbs/hr of aluminum chips (depending on chip geometry) and compacts both ferrous and non-ferrous chips into dense 3½ x 1¼ inch briquettes.

The Chipmunk's front-load design utilizes a hydraulically driven infeed auger which separates most unwanted solids from chips prior to the compacting cycle. The system is designed with a mechanical kinetic energy drive. The Chipmunk produces up to 50,000 PSI compaction force transforming metalworking chips into dense, dry pucks.

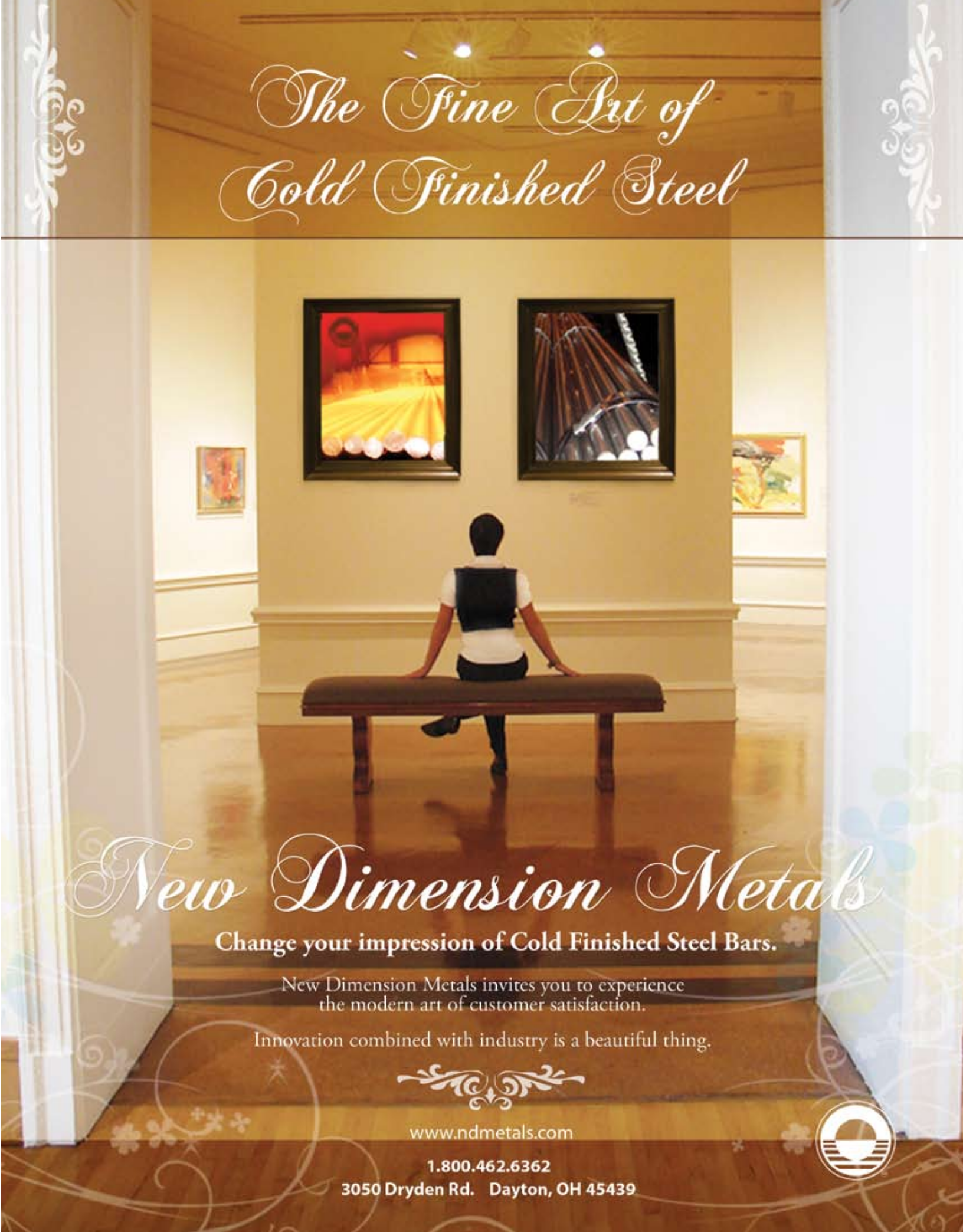
For more information, please contact Kurt Manufacturing toll free at 877-226-7823, or download the brochure at www.kurtchip.com.

Office Worker

The new OM series Office Mills from Haas Automation, Inc., are ultra-compact machines small enough to fit through a 36" doorway. The OM machines fit into most freight elevators, and with the optional caster kit, they can be rolled from one location to another. The machines run on single-phase power (240 VAC). The OM-1 features a work envelope of 8" x 8" x 8" (xyz), while the OM-2 has a work envelope of 12" x 10" x 12. Both machines feature a 20" x 10" T-slot table, and come equipped with a 50,000-rpm brushless micro-motor spindle that accepts tools up to ¼" shank size. For higher-production work and added flexibility, the OM-1A and OM-2A are available, which feature a Haas-designed and -built ISO 20-taper spindle (30,000 rpm) and 20-pocket automatic tool changer.

Maximum cutting feeds for all OM models are 500 ipm, with rapids up to 757 ipm for reduced cycle times. For "office" shops needing turning capabilities, Haas offers the OL-1 Office Lathe. It features a 5-hp (peak) spindle that spins to 6,000 rpm. The 5C threaded spindle accepts a number of optional chucks, and is equipped with a pneumatic collet closer. The machine's high-speed cross slide has travels of 12" x 8" (xz), and accepts a variety of gang-style tooling.

For more information, please contact Haas at 805-278-1800 or visit www.haascnc.com.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The GM Renaissance Center in the heart of downtown Detroit includes General Motors' global headquarters.

Detroit photos courtesy of the Downtown Detroit Partnership.

Shrink to Fit?

Can cities simultaneously downsize and expand?

By Sara Bongiorni

A hurricane hits the city, tearing at the roots of its economy and driving out half the population. Left behind are thousands of decaying buildings, a downward spiral of crime, chaotic public schools and brewing racial tensions that sometimes bubble to the surface. Fully 25 percent of the city's 139 square miles is empty or abandoned.

New Orleans after Hurricane Katrina?

No, Detroit, Michigan, where years of upheaval in the automotive industry have left a scarred landscape that bears striking similarities to post-Katrina New Orleans.

Both Detroit and New Orleans have shrunk to less than half their peak populations through decades of flight to nearby suburbs and, more recently, out-of-state migration. Both struggle with crime. In both places, glittering casinos clash with intractable poverty in some of the poorest urban areas of the country. Both are looking for a second chance – Detroit with billions of dollars of new investment that is driving a downtown revival, New Orleans with massive infusions of storm-recovery money.

Detroit and New Orleans share something else. They almost certainly will be forever smaller than they once were, leaving them with what amounts to too much city and too few people to fill them up – even if current renewal efforts bring new prosperity.

Detroit's population peaked at two million in the mid '50s. It now has about 918,000 residents and has continued to lose residents from 2000 to 2006. New Orleans topped out at about 600,000 in the late 60s. It had a little over 450,000 residents on August 29, 2005, when Hurricane Katrina overwhelmed its levees and left massive death and destruction in its wake.

No American city has ever made up such big population losses. Jersey City, NJ, a much-admired example of successful revival, has gained 20,000 new residents and transformed itself into a hip up-and-comer with the nickname "Wall Street West." But Jersey City had 299,017 people in 1950, compared with 242,842 in 2006. If history is a guide, Detroit, New Orleans and other hollowed-out cities across the country will be forever smaller.

The likelihood of a smaller future raises questions about the nature of cities. Can a smaller city be a stronger one? How do you gracefully downsize a city? The short answer is unsettling: We don't know. But at least part of the answer may lay in Youngstown, Ohio, a rusted-out steel town embracing a radical solution to decade of population loss. It is actively, deliberately shrinking its footprint and turning tracts of land back to nature.

The D gets rolling

Time and again, Detroit city leaders have signaled that a rebirth is just around the corner. In 1977, the towers of

Campus Martius Park in downtown Detroit.

the hopefully named Renaissance Center altered the skyline and gave Michigan its tallest building, at 73 stories. On the ground, the cluster of skyscrapers did little beyond drawing workers from older office buildings, adding to a grim sense of creeping decline.

Lately, however, Detroit is starting to see a payoff, as projects that were years or decades-in-the-planning begin to bear fruit in the form of thousands of new jobs, billions of dollars in private investment and even a trickle of residents buying up artsy downtown lofts. After decades of tough news, Detroit has reason to celebrate – and hope.

The city's momentum includes the $250 million RiverWalk, a meandering stretch of plazas and fountains that eventually will reach 5.5 miles along the Detroit River. Nearby, Campus Martius Park, an urban oasis surrounded by office buildings and eateries, bustles with office workers eating lunch and playing bocce ball on the grass in the warmer months. There is skating in winter and films and concerts in summer.

A key function of Campus Martius is luring more firms downtown, and it is doing that. Compuware completed its new building on the park and put 3,500 workers there in 2002. Online mortgage company Quicken Loans will bring another 4,000 workers downtown when it moves its headquarters from suburban Livonia in the next three years. Cadillac Centre, a $150-million complex of high-rise condominiums, restaurants, stores and a six-screen movie theater, will open in 2009.

On the waterfront, Detroit's port is planning a new terminal building and dock to give a place for Great Lakes cruise ships to stop – as they do now in Windsor, Ontario – on the Detroit side of the river. At least five residential and mixed-use developments on the river are planned. And Michigan is beginning the final phase of Tricentennial Park, its first urban state park, on the riverfront. Elsewhere in downtown, two new luxury hotel-casinos opened in late 2007; a third will open this year.

The revival includes the resurrection of long-neglected symbols of the city's heyday of urban muscle, such as the $180 million renovation of the Book Cadillac Hotel, a landmark that sat empty for two decades.

"I'm seeing things I never thought I'd see," says David Carroll, vice president for Quicken Loans.

A long view

Downtown Detroit's new momentum was long in the making. Planning for Campus Martius dates back to 1996, says consultant Larry Marantette of Taktix Solutions LLC. Marantette is the former head of Greater Downtown Partnership Inc. and played a key role in bringing the project to life.

"Momentum comes from a lot of work over a long time," Marantette says. "This is about making a plan and sticking to it."

Several projects reflect unprecedented collaboration between the public, private sector and charitable sectors (there are 17 Fortune 500 companies and several major charitable foundations in the region). RiverWalk involved scores of players, including General Motors (which added ground-level amenities to RenCen, including an Asian marketplace), the city of Detroit (it gave the conservancy that operates RiverWalk a 90-year free lease on the land) and the Troy-based Kresge Foundation, which put up $50 million – its largest grant for a single project.

"Things are rolling," Mayor Kwame M. Kilpatrick told the *New York Times* in an interview last December.

The question is not whether Detroit has momentum – it does. But the city's problems are staggering, and include worst-in-the-nation unemployment and the highest rate of home foreclosure in 2007, according to RealtyTrac. The question is whether downtown's change in fortunes will stretch much beyond downtown, where many of the city's streets are as mean, and empty, as ever.

Robin Boyle, a professor of urban planning at Wayne

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Baton Rouge & New Orleans: Sibling rivalry

New Orleans and Baton Rouge have never been friends, but until Hurricane Katrina they were never rivals, either.

"New Orleans basically ignored Baton Rouge because it didn't see it as a threat," says Wayne Parent, a professor of political science at Louisiana State University. "For the first time, there's a sense of competition."

Louisiana's capital city has never had the panache or the population of New Orleans. Katrina's havoc on Louisiana's landscape has upended the balance of power. In the first few days after Katrina, 250,000 evacuees from New Orleans flooded into Baton Rouge, doubling the city's size overnight.

Baton Rouge has gained an estimated 35,192 residents since 2005, meaning most evacuees returned to New Orleans or moved on to points unknown. New Orleans is still a much bigger region. The city has around 300,000 residents, compared to about 450,000 before the storm, but estimates are murky and vary broadly.

The stakes are high for both cities because population totals from the coming 2010 U.S. Census will dictate representation in the state Legislature.

Adding to the uncertainty is a tug-of-war over 100,000 former New Orleans residents living in a 70- to 80-mile radius of New Orleans. In many cases, their tie to New Orleans may be as little as a post office box, says Elliott Stonecipher, a political analyst in Shreveport. Nobody can say where this group will settle long term, or even where they are now, he says.

"But both Baton Rouge and New Orleans want to claim them, which is typical," says StoneCipher.

And if ever there was a potent symbol of a shift in power, it was the January swearing-in of Louisiana's fresh-faced Gov. Bobby Jindal, who moved his young family from suburban New Orleans to the Governor's mansion in Baton Rouge, his childhood home. Among his first moves was to tap the head of the Baton Rouge chamber of commerce for Louisiana's top economic development job.

"Perception is reality in politics, and the perception is that Baton Rouge is the state's new power center," says LSU's Parent.

State University, cautions that renewal of downtown doesn't translate into a revival of the city itself.

"We're talking about one square mile of a city that is 139 square miles," Boyle says.

Much of the challenge has to do with sheer scale. In much of Detroit, a single house may be the only occupied structure in a block of boarded-up properties that are magnets for drug activity. But the city is on the hook for the cost of roads and services that serve this vast, semi-abandoned urban wasteland. It has no way to unload it.

"We've got every street, every meter of sewer pipe, every sidewalk for a city of two million, but we've got half that [population]," Boyle says. The city would be best served if it could "turn whole areas back to nature," he says.

Yet the city doesn't have the money for mass buy-outs

> "In the end, a smaller New Orleans may be a smarter, healthier city."

of blighted homes and can't force unwilling homeowners to relocate. Politically, there is little appetite for proclaiming an intention to grow smaller.

"The language we use is 'redevelop, renew, revitalize,'" Boyle says. "We know that companies can get smaller and be profitable. But we don't have a sense of talking about that in a city. No one thinks we're going to grow back to two million, but there is no road map for downsizing either."

A clean slate

Detroit has no clear path to shake off the crushing weight of too much city. New Orleans has that chance – and huge sums of money to make it happen.

The federal government has promised to fix the city and build taller, stronger levees to protect it against another monster hurricane, a menace that becomes more likely as the earth warms and seas rise, climate experts say.

The city's billion-dollar recovery plan includes 17 zones targeted for revitalization, including the hard-hit Lower Ninth Ward. Diversifying the low-wage, low-skill tourism economy to include new sectors like biomedicine will be essential to remaking the city into a healthy, thriving place. The city's fate may be further shaped by the inward rush of bright, energetic outsiders keen to take part in rebuilding everything from education to the medical system.

"We've got the best and the brightest coming here now," says William Borah, a land-use attorney, preservationist and president of Smart Growth Louisiana. "But we've got to learn how to do things differently – and I mean everything."

The city is doing some things differently since the storm, chief among them revamping its notorious public school system, now dominated by charter schools. Federal prosecutors are pursuing crooked politicians with zeal. One former City Council member is in jail. The fabric of New Orleans culture, including a laissez-fair attitude toward corruption, is changing, observers say.

"It's not 'in' to be a thief anymore," says Richard Cahn of Dixie Mill, which sells machine tools near the New Orleans Superdome.

Other developments are less encouraging. The crime rate is worse than ever. There is an acute shortage of affordable housing, along with doctors, nurses and workers for rebuilding. Building and insurance costs are soaring. Banks are skittish about lending in a city whose future is so uncertain, slowing critical private investment. The city is still sinking. The rate of repopulation slowed late last year.

"Most of the people who have not come back yet are not coming back," says George Penick, director of RAND Gulf States Policy Institute in Jackson, Miss.

In the end, a smaller New Orleans might not be a bad thing. "It may end up as 300,000, but it may be a smarter, healthier city," says Jeff Hebert, an urban planner with Concordia, which has played a central role in the city's planning process over the past two years.

The problem is that city officials have not recognized a smaller New Orleans as a possibility, although that has huge implications for how, and where, to spend rebuilding money, says Janet Howard, president of the nonprofit watchdog group the Bureau of Government Research. Not even the city's recovery plan includes estimates of the future populations, she says.

"They dance around it," Howard says. "But it's a fundamental, commonsense issue that needs to be addressed."

Borah, the preservationist, says the city's master plan lacks the force of law, a worrisome shortcoming in a city with a history of backroom dealings and what he calls "planning by surprise."

"You wake up and 'Surprise!' you find out what's

Ann Arbor & Detroit: Playing nice

Big, gritty Detroit can seem a world away from leafy college town Ann Arbor. You might even expect Ann Arbor to distance itself from Detroit, which is still the nation's biggest poor city, its downtown revival notwithstanding. Ann Arbor seems to be doing nicely on its own. Recent coups include a 1,000-job Google advertising operation and a Toyota technology center opening this year.

But the cities speak with a unified voice when it comes to pushing Southeast Michigan as a place to do business.

Over a year ago, a dozen economic development agencies from across Southeast Michigan joined together as the Economic Development Coalition of Southeast Michigan. Their goal? To bring home as much state and federal money as they could to support business development in the region, including Michigan's push to become a leader in the development of alternative energy sources and other sectors that play on its deep well of engineering talent.

The group reaped the benefit of working collaboratively when it made its first trip to Washington, D.C., last year and came home with $3 million in federal earmarks to support budding start-ups across the region, especially young technology firms looking to accelerate their growth.

Setting aside rivalries wasn't necessarily easy to do, says Anne Masterson, director of communications for Detroit Renaissance, which focuses on downtown Detroit.

"We didn't all come together to sing Kumbaya," Masterson says. "But the timing was right, and given the challenges in the automotive industry, it just made sense."

Ann Arbor and other players in the region seem to recognize that their prospects are tied to Detroit in other ways, too. In California's Silicon Valley, it's easier to recruit executives to lead high-risk start-ups because they know they will have other options if the venture goes bust – as many start-ups do, says Elizabeth Parkinson of Ann Arbor Spark, the economic development agency for Washtenaw County. A prospective recruit to Ann Arbor, population 114,00, will be more likely to take a job there if he or she knows that nearby Detroit offers a place to jump if that job doesn't work out, she says.

"The perception of Detroit impacts a person's ability to choose a job in Ann Arbor," Parkinson says. "The world has linked us."

New Orleans' French Quarter, one of the few spots of normalcy in a city where rebuilding and decay co-exist. Photo by Sara Bongiorni.

planned for the city," he says.

Nor has anyone made tough calls about where to rebuild. There is no ban on construction in areas that have flooded repeatedly and probably can't ever be protected adequately, Howard says. That means New Orleans neighborhoods can rise from the ruins in the same gap-toothed pattern of urban sprawl that is so costly and dangerous to cities like Detroit, and was a major problem in New Orleans before the storm. Soon after the storm, a commission put together by Mayor Ray Nagin recommended the city shrink its footprint for these reasons. The idea was shouted down and hasn't come up since.

"They have punted again and again on the hard decisions," Howard says. Not everybody is so worried about formal rebuilding plans. Eric Hill, a former NFL middle linebacker for the Arizona Cardinals, owns a Nissan dealership in New Orleans East. Just blocks from Hill's dealership lies the hulking and empty campus of Methodist Hospital. It's unclear if the area can ever be made safe from flooding and Hill's insurance company insisted he build his new showroom four feet above the ground. Still, Hill figures it's a matter of time before the city comes back. "You roll the dice a little, but I feel it's going to happen," he says.

Cahn says that better city leadership will matter more than formal rebuilding plans. The reference to Mayor Nagin – widely viewed as incompetent – is a common theme among locals frustrated by the slow pace of recovery. Nagin's term is up in two years. Term limits prevent him from running again. "There is energy here," Cahn says. "I think it will get done." Nagin's office did not respond to repeated telephone and email requests to discuss the city's population or other matters relating to the recovery.

A better, smaller city

In Youngstown, Ohio, officials are looking to a better future in a smaller one. The city's population nosedived after its steel mills closed in the 70s and 80s. Thirty thousand jobs were lost over just five years, according to Mayor Jay Williams. The population peaked at 170,000 in the '50s. These days, it has about 83,000 residents, many of them poor.

The plummeting population has inspired a strategy that departs from the conventional wisdom of cities. Over the past couple of years, Youngstown has demolished about 1,000 abandoned homes and commercial buildings as part of a deliberate strategy of what Williams calls "right sizing" the city. Over time, tracts of land will be cleared and some streets closed, allowing Youngstown to reduce the cost of maintaining blighted blocks that attract crime and, often, arsonists. Williams says taking down another 1,000 or so buildings would make a big difference to combating blight and crime.

Williams' initial goal is to stabilize the city's population by curbing the cycle of blight and crime that drive so many out of town. "I don't envision a big up tick," he says. "Maybe we'll get to 90,000." He say he has discussed the possibility of federal funding with the area's congressman, Rep. Tim Ryan (D-Ohio), but so far the city has paid for the demolitions on its own, to the price tag of $2.5 million.

Fresh starts are hard to come by, and Youngstown's path is being closely watched by declining cities left with too much land and the blight that comes with it. Williams admits the idea is a hard sell to many who feel smaller is somehow inferior.

"It's about recognizing where we are now instead of looking in the rearview mirror at what we used to be," he says. For New Orleans, in particular, there is an ironic lesson in Youngstown. For unless it starts to make hard decisions about its future, it may recreate a city that is much like the one that Youngstown is spending millions of dollars to dismantle.

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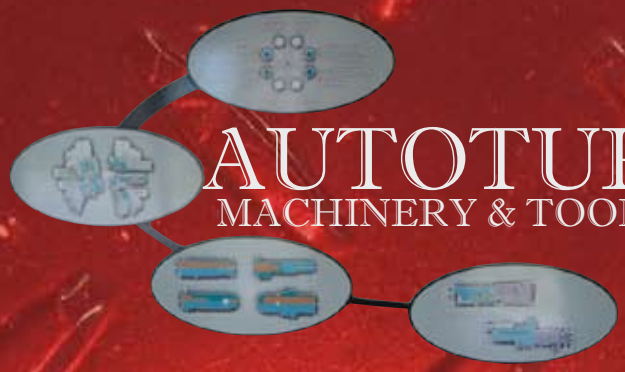

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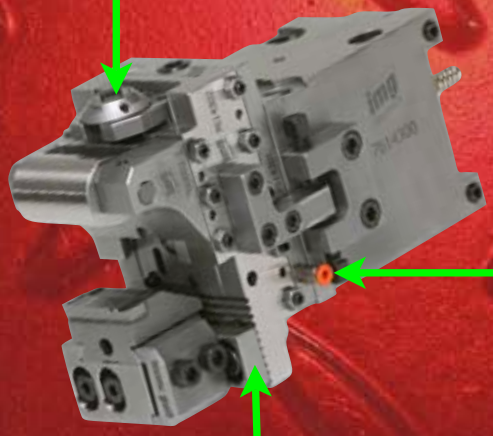

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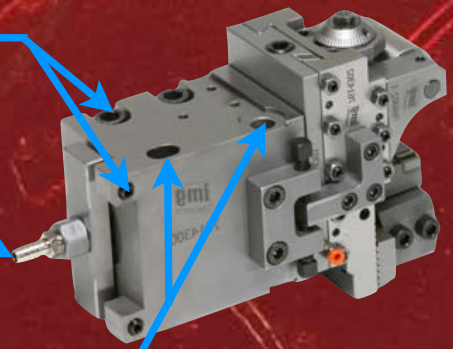

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Chad Arthur, left, and his father and mentor, Bob.

Photos courtesy of Arthur Machnery

Machine Tools on Steroids

Chad Arthur, 41, joined his father Bob at Arthur Machinery, a machine tool distribution firm outside of Chicago, after playing four years of college hockey. He bought the company a decade later and "put it on steroids."

LG: Chad, tell me about your first connection to the machine tool business?

CA: My dad would go on road trips and come back with metal shavings in the bottom of his leather shoes. I used to pick them out for him.

When I first got involved in our business, I had some basic training as an engineer. My Dad would buy used radial drills – three-foot, five-foot radial drills – and say, "Okay, rebuild it." I made every mistake known to man like completely disassembling them, then forgetting how to put them back together.

LG: That's how you learn.

CA: My first sale was an Ooya radial drill, RE 1300 that I had rebuilt. Technical Steel was the name of the company. The guy flew in, he wanted me to operate it; there's nothing to operating a radial drill, and I did it. He gave me a check and walked out. My dad said, "Did you a get a purchase order?" I go, "What's a purchase order?"

LG: Chad, you sell many lines, including Haas, Doosan, Star and Hydromat in Illinois and Indiana. Tell me about your youngest client.

CA: I met Michael Getz at the age of 15; he came in to one of our Haas Demo Days, and the only individual with him was his mom and no one really wanted to help him – they thought he was a student. But he had already prepared himself by having machine printouts from the Haas website.

LG: Was he local?

CA: Yes, he lives in Addison. He said, "I'd like to buy this mini mill." They usually average around $35,000. The salesman who had initially reluctantly handled him came back saying, "This kid knows more about manufacturing than some of my customers." He had picked this machine with a tool changer and everything that he wanted. His mom said, "We can afford this much." We asked, "How would you like to pay for it?" She said, "Oh, I've got my checkbook," pulls it out, writes the check. We had the machine in stock. "Would you mind if you shipped the machine on Saturday?" Michael asked. The salesman was an engineer, and said, "Sure, I'll do it for you. Why Saturday?" The kid goes, "Duh, I go to school." His business has evolved now to 11 machines. One of his recent purchases was a Doosan MX machine, 9 to 11 axis.

NG: How old is he now?

By Lloyd & Noah Graff

CA: He's 19. He's got five employees. Because he couldn't sign any documents, his dad had to sign everything, and on his sixth machine, his father came and said, "The family funds are tapped, so would you mind if we financed it?" I said, "Sure." So we accommodated them, and the payment was $2,400 a month. His dad said to Michael, "Are you going to make money?" He goes, "Dad, duh, I make $8,000 a week off this machine." He's a remarkable individual, great kid, likes to work hard. I took him to speak at Elk Grove High School. He's kind of a shy individual but I asked him, "Would you do this for me?" He said, "Well, as long as you talk." He was like a duck to water. As soon he started talking, he was a natural. It was cool to see him field some of the questions that were coming from these kids because he could relate to them. One of the students asked, "How much money do you make?" He said, "I don't know. I don't do it for the money. I'm sure I'm making money. My parents make sure I'm making money, but I like making parts." He started out making BMX parts. He's evolved into making stuff for Joe Gibbs Racing. He makes a lot of aerospace parts. Through our assistance, he's been able to be successful, so it's a reciprocating relationship.

LG: Is the family in the business?

CA: Parents are not involved in the business. The father's an accountant for ServiceMaster and his mother's a school teacher.

LG: You've used the term, "being Arthurized," about your salesmen. How would you define it?

CA: Not many people want to do the door-to-door hard work basics. I want my salesmen to make 20 face-to-face calls a day. It hasn't changed since Machine Tool Sales 101. Many times a salesman will have some quick luck and live off of that. You can't. You're only as good as what you sold today, and you're only as good as the seeds of what you plant today. It's a win/win if the guy works hard in the organization. The organization, since my Dad started it, and I put it on steroids, supports the salesmen out in the field. I'm a big advocate of less paperwork. Everything's done electronically to minimize it. Yes there's some paperwork that gets involved in it, but I try to minimize it. As for being a salesman on the street, I know the problems they come across. They just want to move the rock. What does it take to move the rock? We want to make sure that everything is done to bring in the top producers.

LG: Do your sales people have proprietary arrangements with accounts?

CA: No, we're different than my competitors. We don't have territories. As long as the salesman is calling a customer and continually calls on a customer, it is his. But if he sells a machine and then neglects them, that account could be taken away. My role and responsibility is making sure that Arthur Machinery is stable, making sure our customers are taken care of and supported. We have sales meetings once a month and they're configured on past, present and future. We talk about statistics in the past, what's going on today and what future goals are.

"You're only as good as what you sold today and the seeds you planted."

LG: Are you into contests with your sales people?

CA: Salesmen, they have their own kind of perpetual competition. Everyone wants to be number one. With contests, builders do offer them. But for salesmen their thresholds are different. Some guy wants to make mid six figures, some guy just wants to get close to six figures. Each one has his own love bug, and it's our job as managers and entrepreneurs to find out: How can we get them to the next level, and how can we make it easier for them? That's what I enjoy. I enjoy taking somebody to the next level. I thought $50 million was a lot. $100 million, what's that? Could this go to $150? Easily, but making sure that we don't ever overextend ourselves is my responsibility and bringing in people who want to run that size of an entity is what I like.

LG: You've really developed a very robust multi-textured system it appears for selling machine tools.

CA: In 1998 we had 98 employees. It was almost exactly a third sales, a third service, and a third support. Support doesn't make you money, no disrespect to that, but it's the nature of our beast, namely distribution. So what we did was put in systems and controls to bring the efficiencies up. We increased the people but we put those

resources towards revenue generators which are parts, service and sales.

LG: You've tightened up your support.
CA: In 1998 we did $50 million with 98 employees. Now we do in excess of $100 million with 105 people. The increase in people has only been in the recent years. We were doing $75 million with 65 employees at one time.

LG: Those are boxcar numbers. You're talking about a million dollars per employee in sales.
CA: That's the magic number.

LG: Do you have benchmarks with your competitors as far as where they stand in reaching that million dollar per employee number?
CA: Well, I've heard through colleagues of mine that that seems to be the magic number. Bottom line is: Are we making money? The system works for us.

LG: Do you see much price cutting out there today?
CA: Certainly. There was a statistic I pulled up about three/four years ago. Over a 10-year time span, how many different vertical machining center brands do you think were sold in the State of Illinois?

LG: 20.
CA: Try over 100.

LG: Are you losing any deals now that would've been made last year because financial institutions are less liberal now?
CA: I don't think so. People don't necessarily buy equipment because of financing. But if they need a piece of equipment, they're going to buy it. They have multiple sources. They can go to their own banking institution or us. I refer to ourselves as offering alternative funding sources or keeping your bank honest. Yes, I'd like a client to finance with me, but I want the transaction to be as simple and basic and painless as possible because it is a major purchase and it's not like we're buying paper towels. This is a product that they buy; they make money with it. So if the transaction is easy, he's more apt to come back and buy another one because our bottom line is to get him to make a decision, and then to make that installation and training process as quick as possible.

In a little room off the main offices sits the wine & sausage room.....

LG: Tell me more about the wine & sausage room.
CA: This is our little homegrown stuff we make. My Sicilian father-in-law was one of my mentors. We make our own wine. It is made from the grapes of Elk Grove. We also make and stuff our own sausage.

LG: How'd you get into sausage?
CA: My in-laws make it; our family makes it. It's my uncle and my mother-in-law, and I keep the traditions going. My three daughters came and helped.

LG: You make the sausage here?
CA: Actually we had it mixed at another relative of ours, Greco's Foods. We also offer the Nuts and Bolts Wines Foundation Wine in which John Ratzenberger has a stake. This bottle of wine sold for $35 of which $20 of it goes to the Foundation. People are more apt to buy a case in which $240 goes towards the Foundation.

LG: Can you legally sell it?
CA: We do it through the Wine Styles organizations, yes. I don't do anything illegal here.

LG: I love the wine & sausage room.
CA: Customers just love when we open up the doors. It's all hands on. Actually my mother-in-law brought back a wine tank from Italy and she paid like $1,200/$1,500 and I go, "Heck, I could reverse engineer this. I reverse engineered it, gave it to a customer of mine to make, and I made eight wine tanks. I gave two to a customer and they gave me a sausage machine in exchange, a little bartering, and I donated others to some local Italian organizations. It's disgustingly easy. All we do is take the juice – this juice is from Italy – you pour it in there. You seal it and you get wine in about three months out of this tank. I actually screwed up, typical engineer. It's supposed to be out of 20-gauge. I made it 80-gauge. You can have the sun beating on this thing and it wouldn't affect it.

LG: Do you eat the sausage you make?
CA: It's good. I had it today. I've got both mild and hot.

LG: You had the sausage for breakfast?
CA: Just a snack. It's just like the wine, you've got to taste it.

The sooner he cuts chips, the sooner he makes money, the sooner he buys another one.

As you know, no one starts and buys one of these. They make babies, and it's our job to educate them about what is available – bar work, chuck, robotic, Swiss, high volume. There's a variety of options. But once you get outside of your niches, you're expanding yourself too much. I'm constantly cognizant of not spreading ourselves too thin.

LG: Customers don't buy machines unless they have the work for them. Let's say they have the work, but their balance sheet doesn't look so hot, can they get the money today? Is it tougher to get money today than it was six months ago? You're in the trenches every day.

CA: I don't think it's tougher. It depends on how the deal wants to be structured. About 10 percent of our financing is rental. It's usually short-term. A customer gets a job from a big Fortune 500, can't get a commitment for more than three years so he rents from me for six months. Certainly, that's a win/win. But most people won't want to do those types of deals. Those transactions are very complicated. You have to document them properly.

LG: You've got your internal backup with your used machinery operation, and if it ends up as a repo, it is not the end of the world. You have Plan B.

CA: Yes, we do a lot of those deals.

LG: Right, because you're thinking: What's my downside? They pay six months, we get it back, how much will we have to discount it? That goes into the equation.

CA: Our finance person spent 20 years in the banking industry. I'm a big advocate of surrounding myself with people who are smarter than me.

LG: Where are you weak now or less strong than you want to be? As you look at how you've deployed your forces, do you see yourself as having a slightly exposed flank?

CA: I'd say our weakness is that we can't possibly cover every customer that exists in Illinois, northern Indiana, western Michigan and Florida without establishing relationships, so more salesmen is probably something that I'd like. I don't want a salesman just for the sake of sales. They've got to be "Arthurized," got to understand short-term and long-term. We grow together. Our compensation structure allows a salesman to make as much as he'd like; there's no cap. As long as the house is taken care of, he's taken care of, we all live. That's what it's all about.

"Our salesmen have got to be 'Arthurized,' got to understand short-term and long-term."

Nuts & Bolts & Tinkering

LG: You're involved with NIMS heavily, Nuts and Bolts & Thingamajigs Foundation, John Ratzenberger, all of these things to develop awareness of manufacturing, of machining options for kids. Do you think that boulder is beginning to move?

CA: There are statistics that a lot of kids are dropping out of high school, or that they go to college and when they get out, don't have a trade to get a job. Someone needs to be aware on how to be a tradesperson at some capacity to fulfill their goals or responsibilities as a family person. That's why we're going to be a certified "on the job" trainer for NIMS here. So it's a boulder that's moving. There's this misconception that you have to go to college and be an attorney or a doctor to be successful. I don't think that necessarily is true. Not to take anything away from advanced education or the betterment of being one of those professions, but there's no harm in being a plumber.

The nice thing about the Nuts and Bolts Foundation is it hits all causes. One is the preservation of manufacturing, but it's also getting kids and individuals to just tinker. Kids don't have to go into manufacturing per se, but we enable them to work with their hands. A lot could be accomplished if there was just a basic awareness of having kids play and be inventors. Without these kids tinkering, we're not going to have anyone inventing. That's one of the basics foundations America is all about.

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With Noah Graff

shop doc

Today's Machining World's "Shop Doc" column taps into our vast contact base of machining experts to help you find solutions to your problems. We invite our readers to contribute suggestions and comments on the Shop Doc's advice. If you consider yourself a Shop Doc or know a potential Shop Doc, please let us know.

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

Dear Shop Doc,

I have a job in which I need to drill and tap one end of a part and cut off at the other end to a sharp point at a 60 degree included angle. I don't have a sub-spindle lathe and it would sure be nice to drop off the part complete. I've tried a variety of cutoff tools, but no matter what I try, the part breaks off with a large cutoff burr. Is there a tool that can cut off to a sharp point?

Cut to the Chase

Dear Cut,

There is no off-the-shelf answer to your problem that I know of, but there is a simple solution that works quite well: It's called a "pivot cutoff." You'll need to grind your own tool from a brazed carbide stick tool or an insert type grooving tool.

The idea is that you will grind the leading edge of the cutoff tool at an angle that is perpendicular to the point on the work. For strength and clearance, you will grind the trailing edge of the tool so that it will clear the point being generated by two degrees.

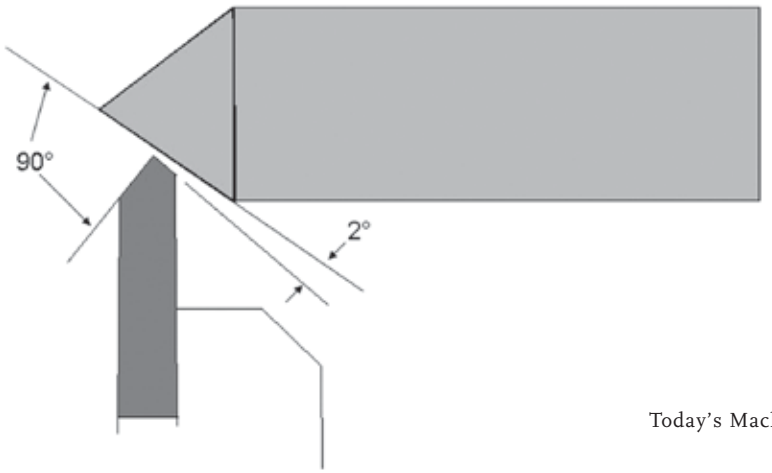
Picture the tool grinder with the blank groove tool's cutting edge oriented parallel to the grinding wheel. You will need to rotate the tool clockwise 60 degrees to grind the leading edge of the tool. The trailing edge will be ground by rotating the tool counterclockwise by 32 degrees. This will give the tool tip an included angle of 88 degrees, resulting in a strong edge.

Programming the tool is a simple matter of turning the angle in one pass. Usually there is no benefit to any roughing. The weight, length and diameter of the work will dictate the speed and feed rate you will use with this tool. The longer and heavier the work, the slower the spindle speed will need to be. Sometimes it helps cycle time to break the tool path into two segments; run the first segment at a higher speed and feed rate. Then, drop the rpm and feed lighter as the tool approaches spindle centerline.

Dan Murphy
Regional Sales Mgr.
Tsugami/Rem Sales

How to cut off to a sharp point:

By grinding the leading edge of the tool perpendicular to the point, the cutting forces are directed into the bar and away from the work piece, allowing you to cut off to a sharp point.



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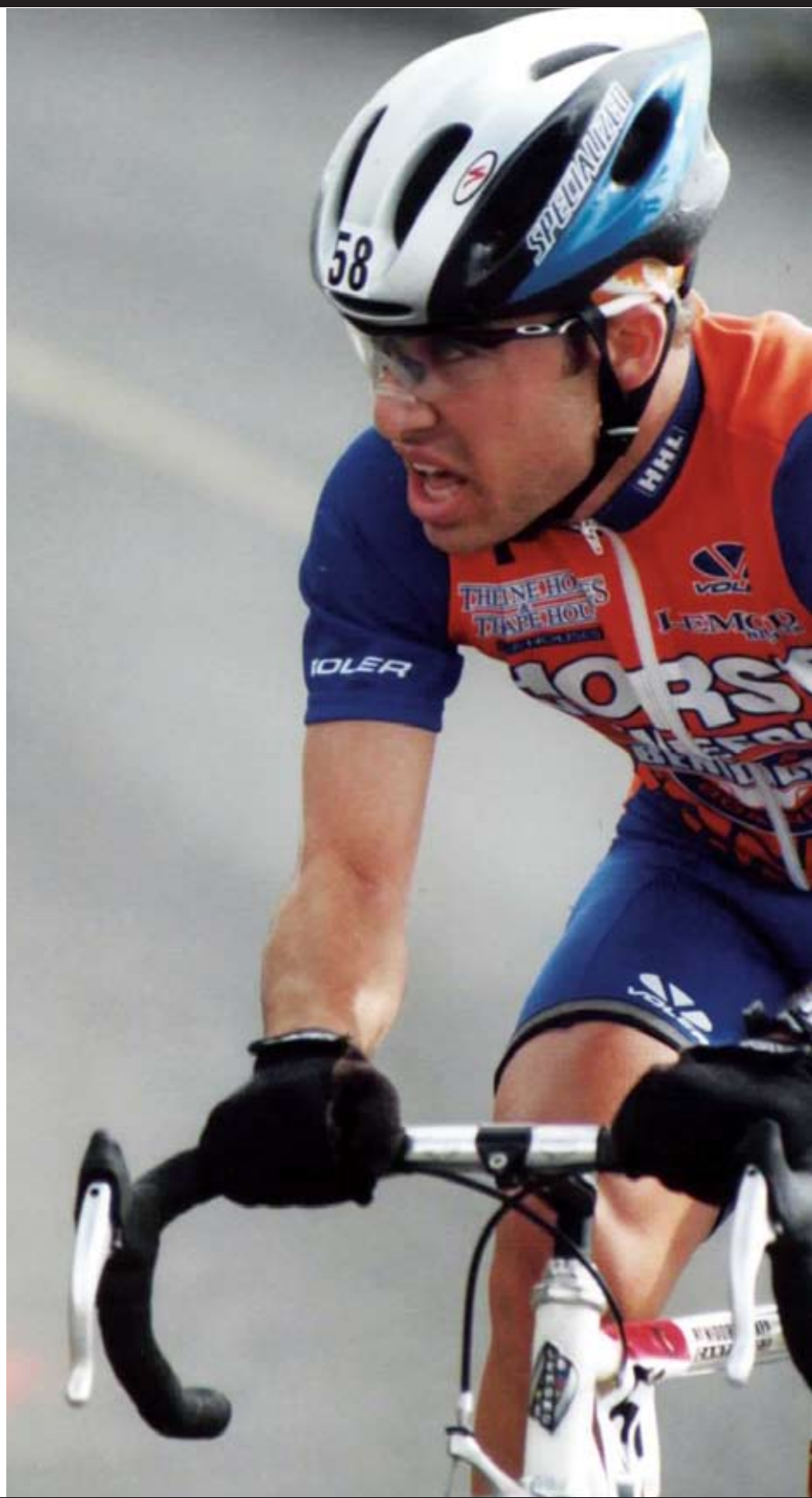

Today's Machining World?

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

next

BY NOAH GRAFF

Will Dubai become the financial center of the world in 10 years?

Incentives for companies such as a zero tax rate on profits, and permitting 100 percent foreign ownership within a stable, well-regulated financial system have made Dubai the fastest growing financial market in the Middle East.

I doubt whether Dubai will become the financial center of the world in this timeframe, although it has a better chance of becoming the financial center of the Middle East. The constraints on Dubai's development include its heavy dependence on imported skills and labor, the reluctance of the authorities to accord political rights to the expatriate population, chronic inflationary problems and the aspiration of other regional centers to play a similar financial role. Dubai's fate is also linked to a number of external variables, such as the oil price, the situation in Iran and the ability of Saudi Arabia to build up its own financial services industry.

David Butter
Middle East regional director
Economist Intelligence Unit

No, Dubai is unlikely to be the center of the financial world. However, there is a slight chance that it could be. With its Sarbanes-Oxley Act (Sarbox), the U.S. government has made it very unattractive for a company whose shares are traded publicly to exist in the United States. Sarbox has made Initial Purchase Offerings (IPOs) much more expensive and has shifted some of this business from the United States to London and other overseas markets. Some public companies in the United States have even gone private to avoid the heavy hand of Sarbox regulation. Imagine that wild and woolly politicians in the United Kingdom come up with the same poisonous schemes there. Then one could imagine international companies shifting their listings out of the U.S. and the U.K. and into other places. Maybe Dubai. Still a long shot.

David R. Henderson
Economist
Hoover Institution

the facts:

Dubai refers to one of the seven emirates that constitute the United Arab Emirates (UAE) in the eastern Arabian Peninsula, or that emirate's main city, **sometimes called "Dubai city"** to distinguish it from the emirate.

With its **man-made islands** shaped like palm fronds and a ski slope in the desert Dubai draws around six million visitors a year, more than any other Arab tourist destination except Egypt. It plans to **increase per capita GDP to $44,000 in 2015,** higher than that of the United States today, and up from $31,000 in 2005. www.arabianbusiness.com

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Some 150 of the Fortune 500 companies (including all of the top 10) have **established a presence in Dubai,** and the UAE's 23 free zones are now host to numerous multinational and regional companies – **including over 5,000 companies from over 100 different countries** located in Dubai's Jebel Ali Free Zone. Price Waterhouse Coopers

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Firms operating in the Dubai International Financial Centre (DIFC) are **eligible for benefits such as a zero tax rate** on profits, 100 percent foreign ownership, no restrictions on foreign exchange or repatriation of capital, operational support and business continuity facilities.

The DIFC focuses on several sectors of financial activity: **Banking Services (Investment Banking, Corporate Banking & Private Banking); Capital Markets (Equity, Debt Instruments, Derivatives and Commodity Trading); Asset Management and Fund Registration; Insurance and Re-insurance; Islamic Finance & Professional Service Providers.** www.difc.ae

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The Dubai International Financial Exchange (DIFX) currently lists shares, Sukuk, conventional bonds and structured products. **"Sukuk" is the Arabic name for a financial certificate** but can be seen as an **Islamic equivalent of a bond**. Standard fixed income, **interest bearing bonds are not permissible in Islam,** but Sukuk securities comply with the Islamic law and its investment principles. http://islamicbanking.worldmuslimmedia.com

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From 2005 – 2006 Dubai's population increased from **1.130 million to 1.422 million**. Out of that population **75.5 percent were male**. This is attributed to the city's reliance on a foreign laborers who comprise around **80 percent** of UAE's residents. www.uaeinteract.com

one on one

one on one

Interviewed by Noah Graff

Shop Foreman **David Plitt** has worked in the University of Chicago's central machine shop for 20 years. The shop produces parts used by U of C students and professors to build precision instruments for scientific experiments. The shop also produces parts for NASA and the scientists at Fermi Labs and Argon Labs.

NG: What did you do before you came to the U of C?
DP: I was tool and die maker.

NG: Tell me about the equipment the shop uses.
DP: We have three 3-axis CNC mills, three 2-axis CNC mills and one CNC lathe. We also have a conventional mill and all kinds of special lathes.

NG: Are your jobs usually low volume?
DP: Yeah, everything here is usually just one of kind. What we call production around here is 20 parts. That's the most we make, unless we're starting to work on an instrument for NASA or something like that. Then [we may be] talking a couple hundred parts. But they're just small, little parts and all the components have to be handmade or machined conventionally on our CNC equipment.

NG: Do you or other people in the shop have engineering degrees?
DP: No sir. It's just called street smarts – experience.

NG: What is your relationship like with students and professors?
DP: Very good I believe. They'll come right down to the shop all the time – students, professors, scientists, doctors, you name it. When we make stuff for the hospital, they come to me first. I look at their sketches. Sometimes I improve on it in some respect.

NG: There is also a student machine shop at the University. Can you explain what they do there?
DP: It's like Machine Shop 101. It's something that you might've taken in high school. The man that runs that shop use to work here.

NG: So there are some U of C students that are interested in machining?
DP: Oh, sure there is. And the professors want them to get their hands dirty too. You can't blame them. That's very good experience, but they can't work at this shop because it's a union shop.

NG: How has the work here changed over the years?
DP: The clients are still the same, but the instrumentation that we build now is really downsized. Without the proper grants these scientists have a very hard time doing the work themselves, so everything is incorporated with several universities. You may have five or six universities making components for balloon flights. Some electronics are made at Penn State, University of Maryland, or someplace else, then a component here. Then it all gets assembled and nothing fits.

NG: Can you name a couple of projects off the top of your head that you're really proud of?
DP: All the work we've done for NASA everybody's really proud of. It's something that everybody's seen, or that can help the world.

NG: What's one of the most difficult projects you've had?
DP: I can't answer that. It's fun. You don't know what you're going to be working on the next day. You could be working on stuff that monkeys use for testing, contraptions of different sorts for mice and rats – for a sleeping lab where they get them really tired. We make turntables for them and they're chasing their own tails. A lot of things we've built here I don't even want to bring up – things that some people would be very disturbed about. A lot of projects are hard; I realize that. But they're just a new adventure for us.

NG: Thanks, David.

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By Barbara Donohue

Torque converter stator wheel, sand cast in aluminum and then machined. *(Photo courtesy of Olson Aluminum Castings.)*

Machining cast aluminum parts

A little knowledge and know-how make these complex parts come out looking fine.

For thousands of years, humans have made decorative and useful objects by melting metal and pouring it into molds. Now, industrial casting processes are available to produce a variety of complex parts economically in different metals.

Sometimes cast parts can be used in the form they leave the mold. Often, they need to be machined to provide sealing surfaces or threaded holes. In the machine shop, cast parts can present challenges. To machine them, it helps to know about the casting process and the physical characteristics of castings, so you can adapt your machining practices accordingly.

In any casting process, molten metal fills a cavity the shape of the part you want. When the metal solidifies, it has taken on the shape of the cavity. The various casting processes create the cavity in different ways and use different methods to introduce the metal into the mold.

As an introduction to casting and machining cast parts, this "How It Works" covers aspects of aluminum castings, including four common casting methods, and information about machining cast aluminum parts. Many of the principles and processes apply to other metals, as well.

This automated pouring ladle is used to fill green sand molds with molten iron. *(Photo courtesy of American Foundry Society)*

Sand casting

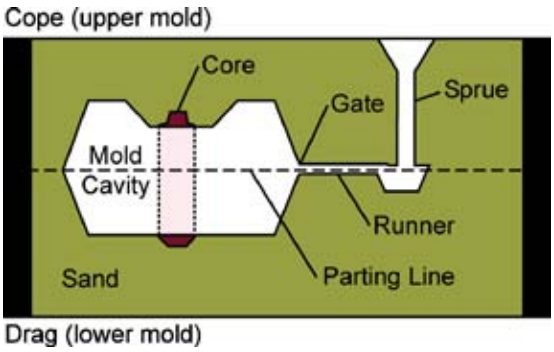
In sand casting, special casting sand is compacted around a three-dimensional pattern, which forms the part cavity and the channels through which the metal will flow. The pattern is removed and the cavity remains. The mold is made in two halves, called the cope (top half) and the drag (bottom half). Where they come together is called the parting line. On the cast part, you can usually see where the parting line is.

If the casting needs to have hollow sections or holes, one or more sand cores are set in place, usually in the drag, fitted into grooves left by the pattern. The cope and drag are married together and the metal is poured. It cools, sand is removed from the outside of the part, and the cores are broken up and removed. The surface of the part picks up the texture of the mold, which may be fine or coarse, depending on the sand used. Cost is relatively low, and, depending on the part, sand casting may be used for any production quantity.

Die casting

Die casting is done in a reusable steel mold, or die. It is the fastest of these casting processes. Molten metal is forced at high pressure into the mold. The mold is cooled by air or water until the part is solid and can be removed. Cycle times of a minute or less are common. Die casting is suitable for quantities that are high enough to make the cost of tooling worthwhile. It can produce thin wall sections and yields parts with a good surface finish. Porosity can be an issue.

Sand cores are used in a variety of metalcasting processes to produce hollows in the metal. *(Photo courtesy of American Foundry Society)*



A typical sand casting mold. *(Illustration by Barbara Donohue)*

Permanent and semi-permanent mold casting

Permanent mold casting also uses a steel mold, but the metal enters the cavity by gravity, or at low pressure and/or under vacuum. The cycle time is slower than for die castings, often three to five minutes. Moveable metal cores can provide holes or internal passageways. "Semi-permanent mold" casting uses sand cores to provide holes and hollows in the parts. Parts have a good surface finish, and often have better mechanical properties than die cast parts.

Investment casting

Investment casting, known as the lost-wax process, uses patterns that duplicate the final part, made from wax or a similar meltable material. Patterns are attached to a gating system made of wax, then the whole assembly is coated with a ceramic slurry (fine particles suspended in a liquid) in several layers and dried to create a shell. The wax is then melted out of the shell. Metal is poured in. After it solidifies, the mold is broken and removed. Investment casting can produce net-shape or near-net-shape parts with excellent surface finish.

As with any manufacturing process, there are tradeoffs – production quantities, part size and complexity – in selecting which casting process to use, said Alfred Spada, director of marketing, public relations and communications at American Foundry Society, Schaumberg, Il.

Not the same as bar

Castings bring a degree of difficulty to the machining process. If you are accustomed to machining nice, clean, precise bar or other dimensioned stock, castings may surprise you.

"The main difference is, if you start out with bar stock, you know what you're getting – tolerances of maybe a couple of thousandths of an inch," said Lanning Brandel, president of AMT, Inc., Sharon Springs, N.Y., a producer of ferrous and non-ferrous precision investment castings. Even on investment castings, which tend to hold tight tolerances, they are likely to be in the neighborhood of a few thousandths per inch.

On a six-inch aluminum sand casting, the foundry will likely be able to hold tolerances of +/– 0.010" to 0.020", and there may be a mismatch across the parting line, where the two halves of the mold come together, of up to 0.020".

Two-part molds will produce a visible parting line on the casting. Often, the part is designed so this parting line is on a surface that will be machined. If it will not be machined, and the parting line is intrusive, it will be removed with a belt sander.

Metal may leak out between the mold halves, producing flash on a part. For die casting processes, an automated trim press may be used for cleanup. Sometimes this may cut into the part, or sometimes fold over the flash rather than remove it.

Location, location, location

An as-cast part will not have a nice, flat surface to seat on the machining center table, or a close-to-perfect diameter to hold on to. You have to figure out how to hold the piece, and you will have to gage off of locating surfaces incorporated into the design. These are surfaces or features built into the casting, left as-cast, and indicated as target or datum locations on the drawing. You will use them for initial setup in the machining center.

Locators should be on the same half of a two-part mold, usually the drag. "The worst is taking your machining locators across the parting line," said Tom Prucha, vice president of technical services at the American Foundry Society. That way, any cope/drag mismatch would add to the other tolerances.

Once you mount the part in the machining center, you can also use a touch probe to pick up selected features and to give the correct offsets to the machine control.

"In general, you would like to start by locating at a surface that won't be machined," Brandel said. Pick up three locating points and make sure the print indicates where they are and notes that they should be left as-cast and not be damaged, ground or machined.

Hold on

Workholding for castings can also pose a challenge. Without the right fixtures, a part can easily be misaligned. However, you don't want your fixturing so tight that it requires the locators to be pristine, said Prucha. With cast parts you need to take the tolerances into account, and can't depend on the features being perfectly flat or perfectly smooth.

"I can't emphasize enough having quality-built fixtures" to hold castings during machining, said Mike Stahl, sales manager, Olson Aluminum Castings, Rockford, Il, manufacturer of high-end commercial and industrial grade sand castings. "It's well worth the few dollars up front to have dedicated fixtures."

Machined surfaces

Creating a quality machined surface on a cast part isn't just between you and the metal. It's a team effort that includes you, and the foundry, and your customer.

The areas you finish machine need to have enough metal for you to remove all of the cast surface, allowing for the tolerances of the casting. The foundry needs to make the part selectively oversized to provide enough material so you can machine over the whole area. This additional material is called the "finish allowance" or the "machine stock." If there isn't enough machine stock, after you've run the cutter over the surface, some as-cast surface may remain, and you will have to scrap the part.

Porosity inside heavier sections of die cast parts can be an issue, so you won't want to cut into them too deeply.

Fortunately, die casting holds tight tolerances, in the range of a couple of thousandths, so with a properly designed casting, you don't need to remove much material, and can stay clear of the porosity.

Other types of castings may also have porosity problems, so when you cut into the piece, pits show in the surface. You can work with the foundry to remedy the situation, or, if necessary, you can convince your customer to find another foundry that can produce better-quality castings.

Hard to tell

If you look at the Aluminum Association specs for 356 aluminum, a common sand-casting alloy, said Stahl, you'll see a wide range in the Brinell hardness spec. Particularly with aluminum, the hardness affects machining qualities. Maybe last month's lot of aluminum castings worked fine, but you now are having trouble machining this month's shipment. The aluminum tears and smears and won't make clean chips. Check the hardness, he suggested. You will probably find it is softer than last month's shipment. A casting supplier that carefully controls the alloy formulation and does its own heat treating will be able to provide you with parts that will machine the same from one lot to the next.

In the middle

"There seems to be a lot of 'matrix buying' out there," said Stahl. The customer will source a low-cost casting supplier and a low-cost machining supplier, and put them together. The machine shop then may have a problem.

"You don't know what will come in. Where are the datums? Where is the parting line?" said Prucha. "Usually none of that information is conveyed." Porosity and inconsistent hardness may degrade the finish of the machined areas.

As a result, your customer may blame your shop for problems that originate in the casting. You may be able to work with the foundry to improve the situation. If not, you may need to push back on your customer to source better castings.

Start at the very beginning

When you are going to machine a casting, it's a good idea to begin communicating with both your customer and the foundry as early as possible. Try to get as much information as you can up front, said Stahl. "Even an hour talking about [the part] will save time down the road."

"The most important things are the surface finish [of the] castings, and the tolerances," said Brandel. "And [you] need to look at the parts and see how much of the part can be used as-cast and how much needs to be machined."

The design of the casting is critical for providing good flow and fill characteristics for the foundry, and providing you with useful locating features and sufficient machine stock. If there's not enough machine stock designed in, you'll be scrapping parts after you've invested machining time into them.

Clear communication with your customer and the foundry will help provide you with the good castings you need to start with. "You can't machine quality into a casting," said Stahl.

Melting aluminum ingots in a crucible. *(Photo courtesy of Olson Aluminum Castings.)*

Ready to cut

The foundry should have thoroughly inspected the castings before shipping them. However, you would be wise to do your own inspections, too, before putting castings into your machining center. You may want to check the hardness, especially for aluminum parts. Make sure the locating features are intact. They should not have been ground, knocked off, dinged, dented, or otherwise damaged.

Look at the cast surface. The overall roughness should be uniform. Note any rougher patches or protrusions.

If the part is from a metal mold process, look for indentations from the ejector pins used to push the part out of the mold, and see if there are any areas that were scraped during removal from the mold.

Working with castings is definitely different from cutting bar stock. To save yourself headaches and keep your customers happy, work with the foundry to get good castings to start with, and keep in mind the special requirements for machining cast parts.

product focus

The following are companies who have given information on machine controls.

Each month, *Today's Machining World* works to help you understand how the precision parts marketplace works, what's available in the industry, and how you can use available resources, as well as knowledge, to run a more efficient and effective shop. In every issue, we'll feature a product category and focus on equipment key to remaining competitive in our marketplace.

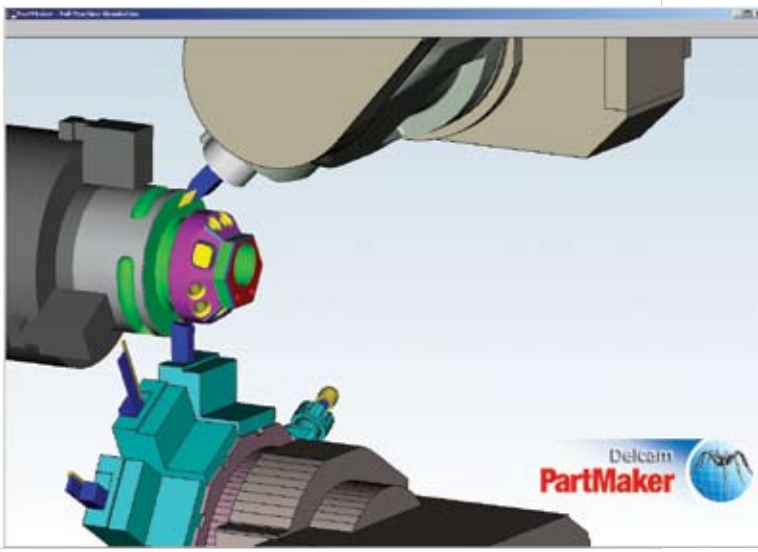
Brett Hopkins of Delcam says machine controls continue to advance in their ability to maintain high accuracies while maintaining higher feedrates than was previously possible. Hanan Fishman of PartMaker states, "The biggest trend has been the move to PC based controls, away from the proprietary hard controls seen in the 80s and 90s. PC-based controls typically are much easier to use and provide better ergonomic features than their predecessors. They also improve communications capability on the shop floor by allowing machine controls to be networked with other computers in programming with CAM systems to better harness the capabilities of today's CNC machine tools."

PartMaker, Inc.

PartMaker Inc. is now shipping Version 8.5 of its PartMaker® CAD/CAM software for CNC Mills, Lathes, WireEDM, Turn-Mill Centers and Swiss-type lathes. PartMaker Version 8.5 offers PartMaker users the ability to create horizontal, vertical, linear, circular and angular dimensions in every face window separately by picking geometric entities. "Flexible" dimension combines horizontal, vertical and linear dimensions in the shop. This move has also coincided with a trend toward off-line one icon. Free-floating notes and notes with leaders are also supported. Dimensions and notes can be edited and special symbols inserted. Multi-line text is supported for dimensions and notes.

PartMaker Version 8.5 also features a number of enhancements including the ability to link CAD to CAM to automatically update programmed features when a geometry change is made. Tool path profiles can also now be modified once they have been created. Additionally, recently used files can automatically be accessed from with-in the software.

For more information please contact PartMaker Inc. 215-643-5077 or visit www.partmaker.com.



Milltronics

Milltronics Mfg. Company has been designing and building CNC controls in the U.S since 1993. What began as a simple control designed to educate students on emerging microprocessor technology evolved into a sophisticated, technologically advanced control for high speed and high tolerance applications. Its multi-functionality makes it a desirable control for toolrooms as well as high production, multi-axes application environments.

In April, Milltronics will introduce a new operator's panel that will begin the transition away from the Centurion CNC name. It will be called the 7000 Series CNC. A new CNC version, the 8000 Series CNC, will be introduced at IMTS in September 2008. This new 8000 Series CNC will combine the features of the past Centurion controls with the technology of the 21st century, with many new enhanced features.

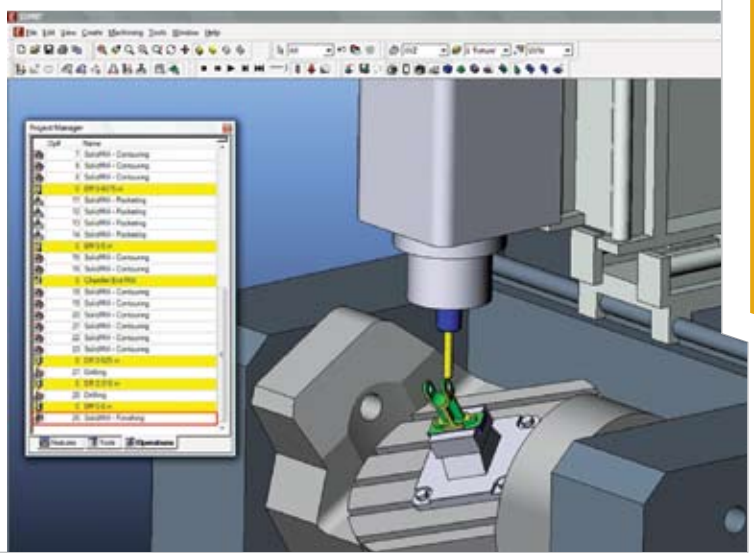
For more information, please contact Milltronics at 952-442-1410 or visit www.milltronics.net.

ESPRIT Technology

ESPRIT® is a computer-aided manufacturing (CAM) system for a full range of machine tool applications. ESPRIT delivers full-spectrum programming for 2–5 axis milling, 2–22 axis turning, 2–5 axis wire EDM, multitasking mill-turn machining, and B-axis machine tools. ESPRIT's capabilities include machining any part geometry (solid, surface, or wireframe), universal post processing to format G-code for virtually any machine tool, and solid simulation and verification with dry runs rendered in dynamic solids for optimal part quality and consistency. ESPRIT is 100% pure Windows®, and provides a comfortable and familiar user interface for maximum productivity.

ESPRIT's multitasking component provides capabilities for driving mill-turn machines, multi-axis lathes, and Swiss-style machine tools. ESPRIT provides synchronization of simultaneous cutting cycles using any combination of turrets and spindles for milling or turning, factory-certified post processors for all the leading multitasking machine tools, and dynamic solid simulations for dry run verification of the machining processes.

For more information, please contact DP Technology Corp. at 805-388-6000 or visit www.dptechnology.com.



Delcam (above)

Delcam supplies complete automated CADCAM solutions for the design, manufacture and inspection of complex-shaped products. Delcam offers its software either as a complete solution including customization to meet specific requirements with templates, macros and visual basic programming or as a series of best-in-class, stand-alone products. Newly acquired products for machining FeatureCAM and PartMaker have completed the range of CAM products that Delcam can now offer.

FeatureCAM automates machining and minimizes programming times for parts on mills, lathes and wire EDM. FeatureCAM has Feature-Based Technology that streamlines programming. With it you can simply draw or import a part, identify part components as features (holes, pockets, surface milling, etc.), click simulation and you're done! FeatureTURN includes a thread wizard that allows you to identify industry-standard thread types, (such as I-8-UNC), and then automatically creates the thread to those specifications. New improvements to FeatureTURN/MILL include more pattern creation, with new options for radial patterns, improved Z-face rotation for machines with limited Y movement, improved milling with a 3D curve at any index angle and additional posts from major manufacturers, including Hardinge Quest single and multi-turret, Mazak Integrex IV e-series, DMG CTX, Mori Seiki NT series and Nakamura.

For more information, please contact Delcam in the U.S. at 801-575-6021 or visit www.delcam.com.

product focus

AMT Machine Systems, Ltd. (below)

AMT Machine Systems, Ltd., has announced the CyberNet™ CNC control system. CyberMotor™ intelligent servomotors network to a color touch-panel HMI, creating a true, distributed, parallel numeric control system. Because each intelligent servomotor provides additional computing power, a CyberNet™ CNC can control up to 128 axes simultaneously. The ServoCam® UltraTurn™ XL is the first production use of the CyberNet™ control system. Benefits include reduced cabling and connectors, a smaller control enclosure, extensive diagnostic capabilities, and simplified programming.

CyberNet™ controls include a CAM package for easy programming of simultaneous cutting operations, with no complicated program codes required. A graphical timeline interface provides programming control and visual confirmation of overlapped axes, ensuring that no interference occurs.

For more information please contact AMT Machine Systems Ltd. at 614-451-3366 or visit www.amtmachinesystems.com.

Okuma America (right)

Okuma America Corporation presents THINC®, The Intelligent Numerical Control – a single processor, PC based system. THINC® is a fluid platform. All functions including motion control and Microsoft Windows® applications run from a single processor of a PC motherboard. This board can be easily and inexpensively swapped to allow THINC® controlled machines to grow with new technology after installation.

THINC® brings true plug and play of industrial peripherals to the factory floor. The OSP-control boasts 40 GB of memory and uses standard USB and Ethernet ports and PC based software developed by either Okuma, the end user or a third party. As a result, devices such as bar feeders, robots, gauging systems, adaptive control software, ERP, etc., can be integrated into a system with nonproprietary tools. Available for all new Okuma lathes and machining centers, select Okuma models can also be retrofitted with the THINC-OSP control to give new life to old iron.

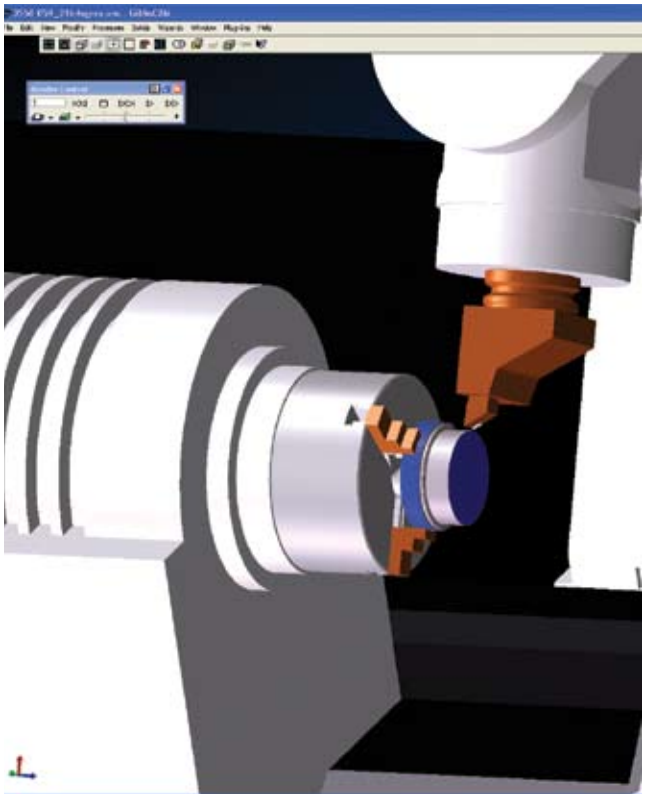
For more information please visit www.okuma.com or www.partnersinthinc.com.

product focus

GibbsCAM (below)

GibbsCAM® brings supporting machining strategies for 2- thru 5-axis milling, 2- thru 4-axis turning, mill-turning, multi-task machining, and 2- thru 4-axis wire-EDM. Full associativity between geometry, process and toolpath allows incremental updates to be easily accommodated. Comprehensive support for a wide variety of CAD formats ensures that data can be read in cleanly and machined from just about any source. Working with a number of strategic partners, such as Mazak, Mori Seiki, Doosan, and Tornos, ensures that GibbsCAM MTM is able to support the extensive operating capabilities of their very complex multi-task or swiss-style machine tools. The Sync Manager, GibbsCAM's graphical user interface for multi-process synchronization, provides you with a simple and flexible work environment, while the system takes care of all the underlying process details.

For more information, please contact GibbsCam at 800-654-9399 or visit www.gibsscam.com.



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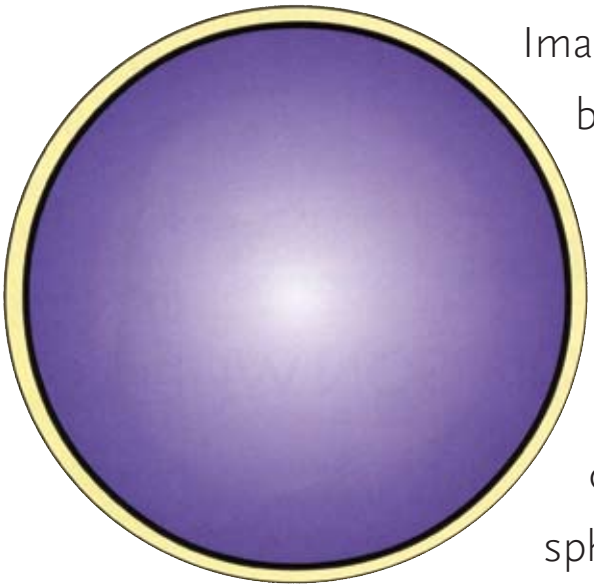
Cutting A Sphere



Imagine that this sphere has been divided with four straight cuts, all of which go right through the sphere. Can you determine the maximum number of pieces into which the sphere has been divided?

Combination Lock

The number of non-repeating three letter combinations are 26 x 25 x 24, or 15,600. That means his chances are .0064 percent.

Who got the winning combination?

Brian Thinnes of Matte Precision Tooling in Anoka, MN; **Jonathan Schroeder** of Pacific Bearing Co. in Roscoe, IL; **Doug Bourque** of Electric Boat Corp. in Groton, CT; **Randy David** of Lanford Manufacturing in Lawrence, MA; **Chris Morgan** of K & M Precision Products in Dexter, MI; **Jerry Levine** of Chicago, IL; **Pete Clark** of Plastic Engineering in Tempe, AZ; **Greg Tetrick** of Cass Screw Machine Products in Minneapolis, MN; **Steve Emmert** of Emmert Welding & Manufacturing in Independence, MO; **Rich Omdahl** of WARD Performance in Zimmerman, MN; **Sheldon Wheaton** of Garmin International in Olathe, KS; **Birten Todd** of Blackhawk Manufacturing in Bozeman, MT; **Daniel Stern** of Everite in Philadelphia, PA: **Jim Riddell** of Baker College in Flint, MI ; **Kim Gardner** of Comco Inc. in Burbank, CA; **Rocco Sarro** MAHLE, Inc. Engineering in Trumbull, CT; **Jimmy Hunt** of Global Shop Solutions in The Woodlands, TX; **Ron May** of Hunter Engineering Company in Bridgeton, MO; **Ron Dore** of Haas CNC in Oxnard, CA; **Larry Miller** of Miller Equipment and Manufacturing Inc. in Clarkfield MN; Gary Sewell & **Lynne Weixel** of GS Design in Tallassee, AL; and **Jim Brown** of Apogee Machining Services, Inc. in Salem, MA.

postings

Noteable and newsworthy information and events for the month of May

Montreal Manufacturing Technology Show

Montreal, QC CAN

May 12 ~ 14

www.sme.org

EASTEC 2008

West Springfield, MA

May 20th ~ 22nd

www.sme.org

3D SCANNING: Reverse Engineering, Inspection and Analysis

Lake Buena Vista, FL USA

ww.sme.org

May 20th thru May 22nd

A Passion for Manufacturing

Detroit, MI

May 31 thru June 3

www.sme.org

RAPID 2008 Conference & Exposition

Lake Buena Vista, FL

Design, prototyping, tooling, direct manufacturing

May 20 ~ 22

www.sme.org

AmCon: A Contract Manufacturing Expo

Huntsville, AL

May 14 ~ 15

www.amcon-shows.com

First professional baseball league,

the National Association, first season

May 4, 1871

MLB Opening Day

March 30th

Birthday: Karl Marx

May 15, 1818

Charles Lindbergh flies across the Atlantic

May 21, 1927

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DAVENPORT DEPT. MANAGER
up to $95K – Rochester NY Suburb – must have solid leadership, planning, hands on, cutting tools, attachments, gearing, cam selection, estimating, problem solving, growing division, relo assist, many long term employees

SUPERVISOR
up to $65K – Cleveland OH Suburb – lrg. OEM, Acme, Davenport, cnc turning, leadership, continuous improvements, planning, scheduling, problem solving, project management, lrg. OEM w/ good benefits and room for career advance.

SWISS CNC MANAGER
up to $90K – N. Boston MA Suburb – knowledge of swiss cnc programming, cycletimes, tooling, planning, training, leadership, hands on and ability to solve machining issues, major medical OEM, relo., great benefits, 20% annual co. growth

MACHINING MANAGER
up to $70K – Greater Raleigh NC Area – solid management exp., planning, leadership, training, high volume, screw machine, cnc, rotary transfer, secondaries, top notch benefits, bonuses, corporate relo pkg.

SCREW MACHINE SUPERVISOR
up to $65K – Detroit MI Suburb – must know screw machines, Acme, or Davenport, problem solving, planning, scheduling, leadership, great benefits, lrg. multi plant corporation

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PRODUCTION MANAGER
up to $65K – Knoxville TN Suburb – planning, scheduling, leadership, training, troubleshooting, knowledge of production milling and turning, growing co., southern living, no state taxes, great cost of living

CNC MILL MACHINIST
up to $22/hr – Knoxville TN Suburb – set up, program, off sets, edit, 4 axis machining centers, Fanuc, Mori Seiki, castings, relo. assist, good benefits

CNC MILL MACHINIST
up to $24/hr – W. Boston MA Suburb – lrg. growing medical implant mfger, set up, operate, edit, touch off tools, off sets, 3-4 axis milling, outstanding benefits, modern shop

MANUFACTURING ENGINEER
up to $70K – Houston TX Suburb – OEM, fluid controls, high volume turning, CAD/CAM software, multi spindle / multi axis cnc's, conventional and swiss type turning, 20% + annual co. growth, fantastic benefits, co. re-investing in new tech. up to 11 axis

MANUFACTURING ENGINEER
up to $70K – Knoxville TN Suburb – cnc machining centers, process, fixture, tool, program 3-4 axis VMC w/ Fanuc controls, castings, product launches, great oppty., relo. assist., low cost of living

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SWISS CNC ENGINEER
up to $90K – Boston MA Suburb – tool, process, program, medical OEM, growing division, great benefits, relo. assist, will consider exp.

SWISS CNC ENGINEERING TECH
up to $70K – Hartford CT Suburb – process, program and prove out new components, Star, Citizen, Tsugami, great oppty to get off shop floor

SWISS CNC ENGINEER
up to $80K – South Florida, East Coast major OEM, state of art technology, Star or Citizen, tool, process, development, relo assist pkg.

SWISS CNC PROGRAMMER / TECH
up to $58K + OT – St. Louis MO Suburb – program, process, debug, no production, Tornos Deco swiss lathe exp.

SWISS CNC MACHINIST
up to $24/hr – Houston TX Suburb – program, process, set up, problem solving

SWISS CNC MACHINIST
up to $20/hr – Atlanta, GA Suburb – set up and operate Citizen lathes, some conventional lathes, programming is pref., relo assist.

CITIZEN SWISS LATHE OPERATORS
up to $25/hr – Boston Suburb major medical OEM, great retirement, 1st and 2nd shifts

SWISS CNC ENGINEER
up to $70K – Cincinnati, OH Suburb great benefits, another solid OEM with great benefits, must know swiss programming, process development, tool selection

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SW NY (6 mnth contract) $30/hr – temp housing, great for retired engineer or laid off looking for cash, Acme, Davenport, tool, layout, problem solve, cad design

MANUFACTURING ENGINEER
up to $70K Cleveland OH suburb – layout, tool, process, cad design, Acme, Davenport, cnc lathe is a huge plus, fluid controls, OEM

SCREW MACHINE ENGINEER
up to $68K St. Louis, MO suburb – modern shop, exp. with modern servo driven screw mach, Tornos Deco, Euroturn, Schutte, Index and/or Gildemeister, tool, process, layout, program, relo. assist.

PROCESS ENGINEER
up to $78K - Kalamazoo, MI area – automotive, foreign implant customers, growing, cnc turning, broaching, grinding, screw machine, transfer machine, solid tooling, layout, process, problem solve, new product launches

MANUFACTURING ENGINEER
up to $80K - Chicago Area Suburb – screw machine, cnc turning, lrg high tech facility, tool design, layout, multi spindle screw machine exp, candidates need strong prod turning

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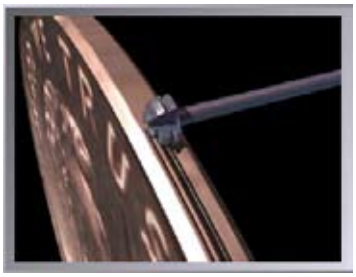

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afterthought

Transformation

My old business guru Dan Sullivan used to tell me that you rarely get the thing you go looking for, but in the course of the search you find something even more valuable.

This was brought home to me for the umpteenth time at the recent Precision Machined Products Association Management Update in New Orleans. There were several top flight circuit speakers on economics, energy, and business building and they were uniformly excellent, but the guy who made the most impact on me was a speaker I walked out on, Eugene Thomas, because he was a mediocre lecturer. But Gene is not a professional speaker – he's a professional physical trainer.

He ran two brutal, boot camp-style workouts at 6:30 in the morning at the conference. On the first day I found a convenient excuse not to go – I needed the sleep – but really I didn't go because I was scared I couldn't do it and would be embarrassed.

"I did not go to the business meeting for the workout, but the workout was the transforming event."

My cardio workouts have suffered in recent years. I've gotten flabby, stiff, and scared about being a 60-ish slug, so the aggressive workout hit my retreat into a shell button. But with a hope and a prayer and a loose-fitting sweatsuit I fretfully headed for Gene Thomas's 6:30 a.m. workout on the second day of the conference.

And I did hate it while he was pushing me and 60 others through a medley of aerobic renditions. Running in place with hands over head, pushups, bridge poses, crunches, leg lifts, hurdler stretches and assorted dry waterboarding made for a delightfully sweaty hour. But I did survive and I realized that I was not quite the sloth that I thought I had become and I was capable of rejuvenating my doughy body.

For this I am grateful – extremely grateful. With Gene Thomas's cackling cajoling I've passed through a painful rib cage condition caused by a lifetime of bad posture and five years of strained squinting caused by bad eyes. I certainly did not go to the business meeting for the workout, but the workout was the transforming event.

I recite a prayer every morning that resonates for me. I would like to share it.

I asked God for strength, that I might achieve
I was made weak, that I might learn to humbly obey...

I asked for health, that I might do greater things.
I was given infirmity, that I might do better things...

I asked for riches, that I might be happy
I was given poverty, that I might be wise...

I asked for power, that I might have the praise of others.
I was given weakness, that I might feel the need of God...

I asked for all things, that I might enjoy life
I was given life, that I might enjoy all things...

I got nothing that I asked for,
But everything I had hoped for...

Almost despite myself, my unspoken prayers were answered.
I am, among all people, most richly blessed!

Thank you, Gene, for amplifying its meaning to me on the carpet of a Bourbon Street New Orleans hotel.

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Back spindle speed	8,000 rpm	8,000 rpm
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