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Today's Machining World

THE MAGAZINE FOR THE PRECISION PARTS INDUSTRY

june 2008 volume 4 issue 06

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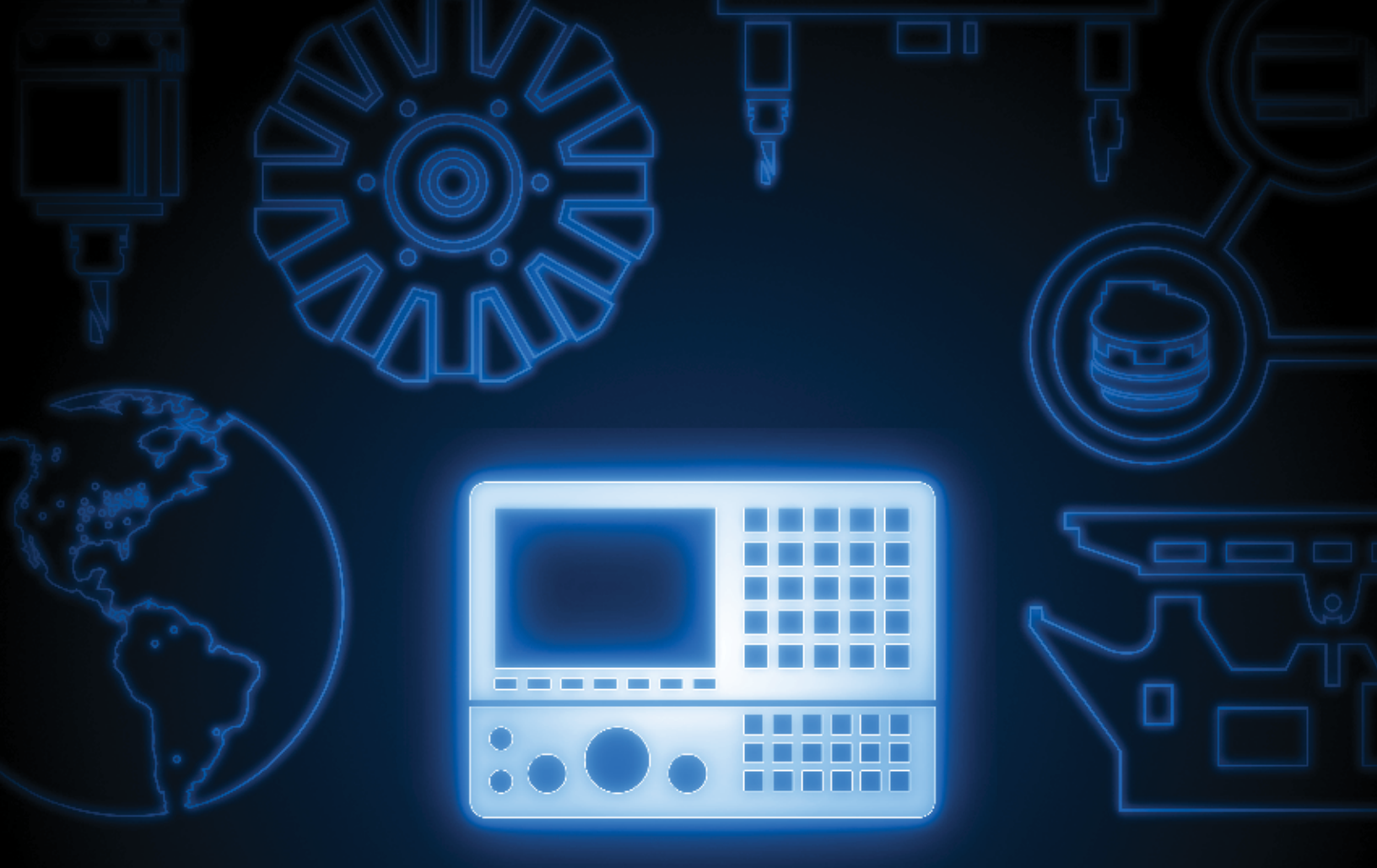

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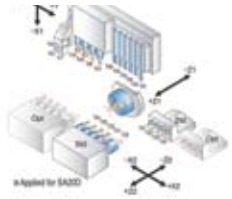

SA20D Tool Layout

Oil Cooled Built-in Motors

Before you buy your next CNC Swiss you owe it to your customers - and to your business - to compare the newest generation of Nexturn CNC Swiss-Type Lathes to the competition. A powerful 10 HP Main Spindle Motor and a 5 HP Sub-Spindle Motor are standard on the SA26D & SA32D Models. This includes a 1½ HP Mill/Drill Unit on the gang with a cross spindle speed of 8,000 RPM's. Equipped with 20 tools, 8 of them live. Amazing!

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in this issue

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Features

Cover photo by Casey Gibson

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BPA WORLDWIDE

editor's note

Brewing Ideas

As we traipse through our lives, most people I know continually retrace their steps. Old patterns calcify. Life gets boring. Inertia rules. Same old, same old.

I recently read Malcolm Gladwell's excellent piece on the creative process of Nathan Myhrvold's company Invention Ventures in the *New Yorker*. Myhrvold was the head of research for Microsoft when they were actually coming up with productive ideas. He left in 1999 with hundreds of millions of dollars – about the time Mister Softie really went stale. His new company brews ideas which hatch into patents which other firms use to make things.

He gathers creative thinkers with vastly different backgrounds and waits for the sparks to fly.

The working thesis of the company is that there is a myriad of wonderful ideas that require face-to-face interactive probing to come together.

Gladwell, who wrote *The Tipping Point,* recounts a session where a physicist and a surgeon collided in an invention session. The big question they tackled was intercepting metastasizing cancer cells before they actually started to form a cancerous tumor in the body. It turns out that the cells can be detected long before they start doing damage.

The physicist, who is highly adept at measuring things, asked the surgeon if there might be a way to filter the blood of the bad cancer cells in the body and remove them before they latch on to the organ which they could destroy. The potential success of such a process might be measured by frequent testing of the blood.

The Ph.D. staff of Invention Ventures checked the literature and patents and found that a company in Rochester, New York was working on similar filtering technology. A joint venture may ensue.

Creativity is a process with a plan. I think most people and companies are capable of developing fresh ideas, but few devote much energy or thought to making things happen.

Creative ideas in business to business publishing is an oxymoron. But not in a *Today's Machining World*. Keep joining us for a fun ride of playing with ideas.

Lloyd Graff
Editor/Owner

Today's Machining World

June's talent pool.

contributors

Scott Livingston is President and CEO of Horst Engineering, a sixty-two year old East Hartford, Connecticut manufacturer. He is a graduate of Boston College and completed the Harvard Business School OPM program. He is an active member of the Young Presidents' Organization and chairs the YPO Family Business Network. When not battling business cycles, he makes time to run, bike, kayak, and hike, often with his favorite training partners, wife Debbie, and son Shepard. He is a passionate environmentalist and his favorite work days are those when he commutes by bicycle.

Noah Graff has been working at *Today's Machining World* since 2005. He holds the titles of features editor, videographer, and "the web guy" of the magazine. Noah graduated from the University of Wisconsin majoring in film and history. When he was 19 he took a 50 hour Greyhound bus ride from Chicago to San Francisco to make a documentary about the outrageous, fascinating people he met on the bus. He currently has a reality show on YouTube called "Jew Complete Me" documenting his search to find the Jewish love of his life.

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.

Lloyd Graff has had a lifelong love affair with magazine writing since discovering *Sport* magazine at age eight. During high school he would camp out at the University of Chicago library, endlessly reading periodicals. His writing heroes are Tom Wolfe, Jim Murray, and RIng Lardner. Besides writing, Lloyd's primary currect advocation is watching sports on television. He recently set a personal best of 27-1/2 hours during one recent two-day weekend.

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Today's Machining World

When We Had Chad

I just finished another enjoyable read of the April issue of *Today's Machining World*, including your profile of Chad Arthur. You did a great job of capturing the essential issues of running a successful machine tool distribution business and how Chad has taken the company started by his father to the next level. I especially enjoyed the side-bar credit for Chad's work with NIMS and working to develop greater awareness of the career opportunities for young people in manufacturing. It's fundamental to the future of machining to develop the next generation workforce that has passion about making things.

Bob Skodzinsky
North American HTEC Program
Haas Automation, Inc.
Oxnard, CA

Unplugging

Lloyd Graff certainly has every right to his opinions, and a right to express those opinions in the magazine he owns. My opinion, however, is that I no longer wish to be a subscriber. Mr. Graff's suggestion that Barack Obama could possibly unite the country is absurd beyond belief. Please suggest to Mr. Graff that he read the attachment to this email (Brigitte Gabriel's speech delivered at the Intelligence Summit in Washington D.C.) if he believes "uniting" with Muslim radicals is a good thing for America. Obama, by his association and friendship with those who openly voice contempt for the nation of Israel is not someone I want in the White House.

Therefore, please remove my name from your subscriber list. Thank You!

Tom Grimes
MoldWorks, LLC
Cumming, IA

Wars and All

Thank you for publishing my letter ("Heart and Soul," Forum, April 2007). I am sure I am taking it on the chin from a lot of readers. Unfortunately, they will never even know about this Pentagon manipulation because the "fair and balanced" network certainly will never mention it.

The *New York Times* recently ran an article by David Barstow about the manipulation the Pentagon used in regard to military "analysts" on news networks, especially FOX "News." The American people were being fed what Donald Rumsfeld wanted them to hear under the guise of former military people who were "experts" in the field of war matters. In other words, the fix was in from day one. This was in place long before September 11th.

In his defense, not surprisingly, General Batiste was one of the generals mentioned on page 9 of this article who criticized Mr. Rumsfeld's handling of the war.

I have a manufacturing operation that does military work, but I would rather go belly up than be an accomplice to getting work just for the sake of keeping the military-industrial complex running along at the expense of getting our young (and not so young) men and women killed for no good reason. Funny thing is – I was busiest during the 90s when we were not at war.

Again, I remain,
Anonymous

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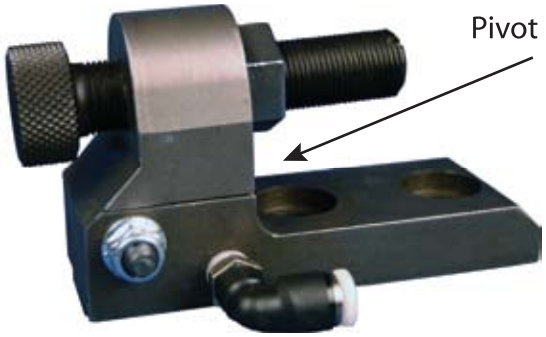

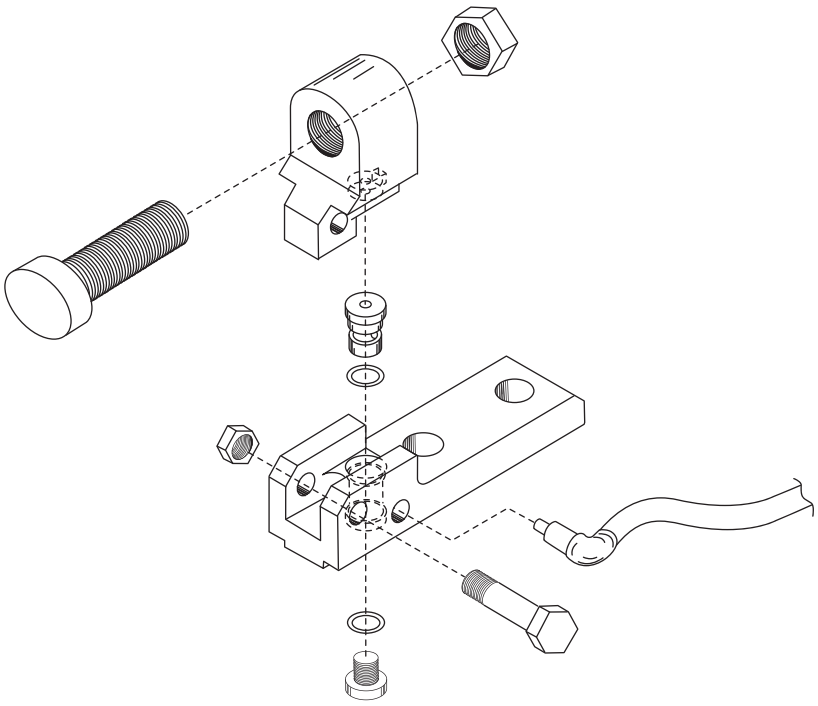

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By Lloyd Graff

Trumpet Call

As the stimulus tax rebate checks come back to us from the IRS in May, the economic chatter that I hear on T.V. and the financial media is devoid of talk about the most important part of the Federal Government's tax bounty.

The accelerated depreciation of capital equipment and the doubling of the expensing allowance from $125,000 to $250,000 is potentially a huge spur to American business – small and large.

The timing of IMTS in September is perfect for companies to take advantage of the one-time only opportunity to receive a very large gift from the Feds.

I have been shocked at how slow the machine tool builders and tractor makers and truck purveyors have been to publicize the opportunity.

Ford has Mike Rowe (Dirty Jobs) doing their spots for the F-150 truck which is their meal ticket, yet I have yet to hear them tout the tax credit to small business. Same with Chrysler, which is trying to peddle their wares with a hokey gimmick of $2.99 gasoline.

I have yet to see an ad in *TMW* talking up the tax incentive and I saw nothing at WESTEC trumpeting the business bonanza.

At the recent MDNA Convention I attended in San Francisco it was never mentioned, and a recent conversation with a sales manager of a major machine tool builder revealed a complete ignorance of the legislation.

This tax present offered to American business is good only through 2008. Use it or lose it. A small business could buy two new or used CNC lathes or mills for $250,000 in '08 and wipe out the income tax on $250,000 of profit. This is like getting a $75,000 discount on the machines.

The accelerated depreciation provision allows double the usual write-off for the first year. The amount you can write-off is unlimited for new equipment so it would behoove a company that was contemplating a $1 million expansion to do it in 2008 because the cash flow advantage will be quite significant.

The opportunity to push this government largesse during IMTS is tremendous. Frankly, I think it is probably more important to most buyers than the product refinements being promoted.

It is about time that the builders and all of the complimentary players at IMTS started pulling out the trumpets for the really great business discount of 2008.

(Swarf continued on next page)

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As we head towards IMTS, I see the

convergence of the precision turning industry in three primary approaches today – CNC Swiss lathe, multi-spindle screw machine, and rotary transfer machine. A fourth approach – saw and turn in a CNC chucker also is becoming viable with robots and automation.

On many jobs, several of the approaches could give similar cost pictures. We recently had a client at Graff-Pinkert who was weighing a CNC Swiss versus a Hydromat. Naturally the cycle time on the Swiss was much slower, but the opportunity to run the machine around the clock with minimal tending made the sliding head stock competitive. They also liked the comfort level of having a versatile piece of equipment available to sell time on if they lost the contract. The argument for the Hydromat was that they could run the job out in two months and then look for other jobs to put on the machine, hopefully without massive retooling expense.

The multi-spindles face the hurdle of the shortage of set-up expertise vis-à-vis the CNC Swiss and the trend toward shorter-run jobs. I recently discussed this issue with a client with primarily automotive clients. He has traditionally run product on multi-spindles, some bought new but mostly older refurbished machines. The demands for quality from automotive get more stringent every year and now he is weighing buying a high-speed cold saw to slug the barstock and then robotically load pieces into two spindle CNC chuckers. He thinks that the reliability of the new CNC equipment will trump the shorter cycle times of the fussier multi-spindles and the reliance on scarce set-up and repair talent.

The argument that the builders of sophisticated multi-spindles make today is that the new machines are much more versatile than yesterday's cam-driven machines. They argue that well-trained people can change part families in a few hours, thus making the machine competitive on 2,000 to 5,000 piece runs. Hydromat also argues that their Epic machines are now flexible enough to compete with multi-spindles on 20,000 to 50,000 piece runs. They also push the rotary transfer approach as a big cost saver on near net shape material.

Sophisticated multis with full CNC, reflecting the weak dollar versus the euro, are considerably more than $1 million per copy. This is a huge hurdle for a potential buyer which in today's world is usually a job shop with sales under $40 million per year. What we are seeing is the fear factor rearing its head as companies evaluate the machining options.

The multi or Hydromat may be the optimal choice on the basis of raw efficiency, but the capital expenditure may push the buyer to a machine with a lower sticker price like a CNC lathe or sliding headstock which seems less daunting.

Also, today, the well managed shops have a lot of possibilities for work as the U.S. becomes a low cost producer in the global market. A few years ago automotive was the gold standard for machining opportunities. Today many firms look askance at car company business because the auto companies are hopelessly bureaucratic and cutthroat.

Many firms opt to make golf putters or medical parts, not that they are free of heartache, but the people they deal with are more reasonable.

A few years ago Citizen sold against Star, and Mazak sold against DMG. Today it may be Star against Hydromat and Citizen or Index vying for an order against Okuma or Euroturn.

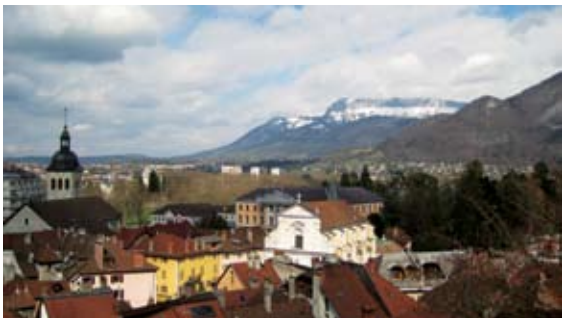
Convergence is going to make IMTS even more fun than usual.

Noah Graff spent the first week

of April in France's Haute-Savoie region, just across the border from Geneva Switzerland at a press junket held by the Arve-Industries Haute-Savoie Mont-Blanc Competitiveness Pole (Arve-Industries for short). This is his account.

While famous for its ski resorts and mountain lakes, France's Haute-Savoie region also happens to be a hot bed of screw machine companies; small to medium, privately owned firms whose origins date back to the clock making industry of the Middle Ages. Arve-Industries, named for its location in the Arve Valley, is what's known in France as a "cluster." It is an organization formed in 2006, of 183 companies in the region working together on joint R&D projects, to better compete in a relentless world economy. Lionel Baud President of Baud Industries, and Vice President of the Arve-Industries cluster, told me that before the cluster was formed, the small family businesses of the Arve spent little time or resources on R&D and rarely collaborated with one another. The cluster's members believe their newly formed unity has the potential to bring the region's companies unprecedented success.

I was the lone American journalist on the trip and the only one in his 20s, and I don't think the French execs giving us the tours were accustomed to my frank, often sensitive questions. I asked them how French manufacturers could keep up with the rest of the world while tied down by their country's mandated 35 hour workweek and laws prohibiting the firing of workers. I asked whether they were hiring a lot of workers from Turkey and North Africa to deal with the shortage of skilled labor. I asked why these companies wouldn't just send all of their operations overseas, or at least 40 minutes across the border into Switzerland where many of these regulatory hurdles would be lifted. When I pushed the question about the difficulty firing workers as companies become leaner and automated one exec from Bosch, the one multi-national company we visited, answered frustrated, "Well, what do you want me to say?" But overall, most people I talked to, although a bit taken aback by my bluntness, really impressed me with their intelligent, honest responses.



The truth is, some companies in the Arve Valley do have plants in Switzerland containing some French employees who commute across the border daily. Switzerland has much lower corporate taxes than EU member states, it's easier to find workers there, and its workweek is more flexible than that of France. Baud Industries concentrates its watch and medical device manufacturing there, yet Lionel Baud told me he still insists on keeping the most technical, complicated jobs in-house because the cluster is available for assistance and France is where he has the best communication with workers, which creates loyal employees and low turnover.

To deal with the 35 hour workweek, executives said that lights-out manufacturing, automation, and overtime helps keep up productivity. They also said that just because French workers put in less hours does not necessarily mean they can't match productivity of workers with longer hours if they have superior focus.

As far as my query about firing workers – after a little badgering, the Bosch executive told me to downsize, the company sets up a type of early retirement plan for workers they want to lay-off that meshes with government regulations.

My questions about the employment of workers from the Middle-East and North Africa received the most diverse responses. One company said that 60 percent of its workers come from North Africa and that there are good training schools there producing a lot of quality skilled labor. He added however, that third generation North African immigrants born in France are often not interested in manufacturing jobs, similar to their native French counterparts. One company told me their workforce included 20 percent Turks or North Africans, but as more jobs are requiring advanced skills that number is declining. Another executive said he employs virtually nobody from those regions, but some of his best employees come from Eastern Europe.

Although the companies I visited had diverse business philosophies and strategies, throughout the week I felt a common spirit from my hosts; one of pride, creativity, and a passion to grow while still preserving their roots.

Managing Editor Jill Sevelow

attended the Delcam American Technical Summit, hosted by Methods Machine Tools in Sudbury, Mass., in mid-April. Jill was most impressed by the portfolio of Delcam products. Operations Director Clive Martell said their goal was "to build a series of 'best in class' when orchestrating their software CAM acquisitions. Aside from well-known turn/mill and Swiss-type lathe CAM software Partmaker (which Delcam acquired in July of 2006), Delcam includes DentCAD and DentMILL, a dental CAD system for dental machining, PowerMill for 5-axis machining, FeatureCAM, ArtCAM (which Delcam's Rob Walker likened to "bringing craftsmen into the digital age), and now Crispin-CADCAM software for the shoe industry. In the age of increasingly individualized customization of product, Delcam's software has evolved with market demand, generating sales of almost $60 million in 2007. Power point presentations laid the groundwork for each product, but customer testimonials drove the "message of excellence" home. Each attributed its growth and acceleration in its respective fields to the collaborative and innovative Delcam product used.

For many years I have been a

staunch advocate of gridlock in Washington politics. The visceral animosity on the national scene began when the Republicans ganged up on the Democratic House Leader Jim Wright, forcing him out of Congress. The Democrats finally got even by banishing Tom DeLay. The legislative process is a Pork Barrel provider presently and not a vehicle to tackle the serious issues of the day.

This might be starting to change. Assuming the presidential race is between John McCain and Barack Obama, a pair of mavericks in their parties who won their nominations as long shot outsiders, we might see each one reaching out to the other party for cabinet members and even vice presidential possibilities.

Some young people are reaching out to both parties to actually address issues that people care about. George Bush wasted eight years in addressing the health insurance problem that affects almost everybody in the United States. The insurance companies and Federal bureaucracy have made such a mess out of health care that we may be near some kind of national compromise if the partisans are

swarf

circumvented by the people. With some baby boomers retiring soon and a new president, this would be the time.

Another huge Bush failure is immigration policy. He abdicated to the Lou Dobbsians and now the country is losing its transfusion of people energy. Hopefully McCain, who has a grasp of immigration issues from his Arizona experience, or Obama, who is sort of an immigrant himself, will pull us away from the know-nothing cheerleaders in both parties.

On Iraq it may be easier for McCain to extricate a lot of American troops from combat than Barack Hussein Obama, who may have to show the country, the Joint Chiefs and Bin Laden that he is a tough hombre.

I am strangely optimistic about this election and totally undecided about who I'll vote for. These are two good men to choose from and I haven't felt that way for a few decades.

On May 8, the state of Israel had

its 60th birthday as an independent country. The country has never been as strong economically as it is now with 20 years of spectacular growth behind it.

Americans can learn a lot from the Israeli experience.

The core strength of the Israeli economy derives from the creativity of a highly educated population. In technical fields, Israel excels. Silicon Valley is filled with Israelis who live in the U.S. and then go back to live in Israel's Silicon Valley near Tel Aviv.

Israel thinks globally. A myriad of trade deals with other countries have thwarted the Arab economic boycott. After military service almost every secular young Israeli leaves the country for at least a year of travel. This gives the population a worldliness virtually unmatched elsewhere.

Israeli business has abundant access to money through a thriving venture capital network. A host of Israeli tech companies and medical firms have gone public on the Nasdaq stock exchange. Most children in Israel speak at least two languages, Hebrew and English, which is a necessity for global commerce.

The Israeli economy has continued to thrive despite terrorism, six wars, political isolation, and a tiny population with

swarf

a large segment of parochial Orthodox Jews, many of whom barely work in the modern economy. In many respects, it is an economy functioning with one hand tied behind its back.

The United States can learn from Israel that terrorism can be contained with intelligent determination. We can also learn that immigrants, even poorly educated ones, can bring prosperity if properly acculturated and educated.

Israel has shown that a tiny country, surrounded by fanatical enemies, can thrive if its people have ingenuity, positive energy, intellectual capability, access to capital, a global outlook, and the determination to thrive – no matter what the obstacles.

Noah and I visited Vienna,

Austria recently on a business trip to central Europe. Our first order of business was to find the original Julius Meinl coffee shop, which is my favorite in Chicago.

Our first challenge was to locate the place. Vienna has a big central shopping area, the "zentrum," with a vast array of shops and restaurants adjacent to the city's historic buildings. We took the "underground" to the zentrum and asked people for directions to Meinl. Nobody was helpful until we found, of all things, Starbucks. I walked into the old reliable and asked the young barista behind the counter where Meinl could be found. He answered instantly and offered detailed directions in excellent English. He then added that Julius Meinl had recently opened a store in Chicago.

After several missteps, we found Meinl at about 6:00 in the evening on Sunday. The only part of the store which was serving customers was the outdoor seating area. The blond fraulein who came to take our order spoke no English. She was quite pretty but she carried a near scowl on her face. I tried to order a latte, but she only understood cappuccino, so that's what we ordered.

The coffee came promptly and it was beautifully presented with a heart artfully drawn in the foam. The size of the cup was about one third smaller than the comparable American one and the price was double in American dollars. To the best of my tasting ability, the Viennese and American coffees tasted the same – excellent. But the attitude and the price were decidedly better at Julius Meinl in Chicago.

Jonathan Goodwin dropped out

of seventh grade to help pay the bills and follow his passion for cars and engines. Today the automotive world bows to his genius and wonders if this car nut might actually win the 10 million dollar X PRIZE for producing a low emission, competitively priced, 100 mile per gallon car.

His partner in this venture is Neil Young, rock legend, who contributed his 1960, Lincoln Continental "boat" as Goodwin's test car.

Goodwin works out of a garage where he specializes in converting Hummers into fuel sipping diesels while boosting their power. He also likes to run his thug cars on fried chicken grease contributed by the local KFC outlet.

The fact that the prestigious X PRIZE contest committee has allowed Goodwin and Young to apply to join the elite, well financed, automotive companies from around the world gives him credibility.

Goodwin is negotiating with DHL to convert 800 vehicles to super efficient systems which cut fuel costs by 50 percent.

It appears that his approach is unique because he does not want to build a new vehicle and engine. His devious plan is to make inexpensive conversion packages for existing vehicles turning them into biodiesel burning plug-in hybrids.

Proving his point on Neil Young's 40 foot "boat" may not win the X PRIZE, but that's what they said about the crazy bike mechanics Wilbur and Orville Wright in 1903.

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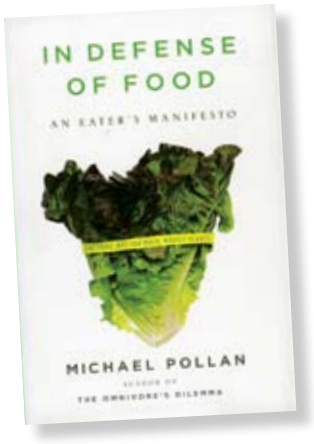
By Jerry Levine

In Defense of Food

It's a sad commentary that anyone needs to write a book entitled, I*n Defense of Food*, but in our diet-obsessed society it's a best seller, named "one of the 10 best books of the year" by the *New York Times*. Americans consume tons of the latest low fat, low carb, omega 3 and protein enriched foods, yet have substantially higher rates of obesity, diabetes, heart disease and cancer than other folks around the world eating any number of traditional diets. And, our life expectancy is lower.



Where is the disconnect? Who's to blame? What should we eat? Michael Pollan's thoroughly researched and readable treatise gives us simple (and complex) answers.

Pollan defines food in the first section of the book. It is not the advertised, highly enriched processed items on the grocery shelves, but the unpackaged stuff in the produce section. Pollan's rule? "Don't eat anything your grandmother wouldn't recognize."

Pollan takes on the "Nutritional-Industrial Complex" – comprised of error-prone scientists pushing for new research grants, eager food marketers searching for new customer hooks, and easily gulled journalists looking for a scoop. Over the past few decades they have created a politically correct conventional wisdom Pollan calls "Nutritionalism." What matters most in nutritionalism is not the real food but each chemical nutrient, and because nutrients are invisible and generally incomprehensible you need an expert to tell you what to eat.

Pollan believes food is also about social pleasure, community, family and friends, and our relationship with the natural world. The French enjoy foods filled with saturated fat, yet have substantially lower rates of heart disease and live longer. They eat slower, eat less, avoid seconds, and eat at the table with family. All of this contributes to better health.

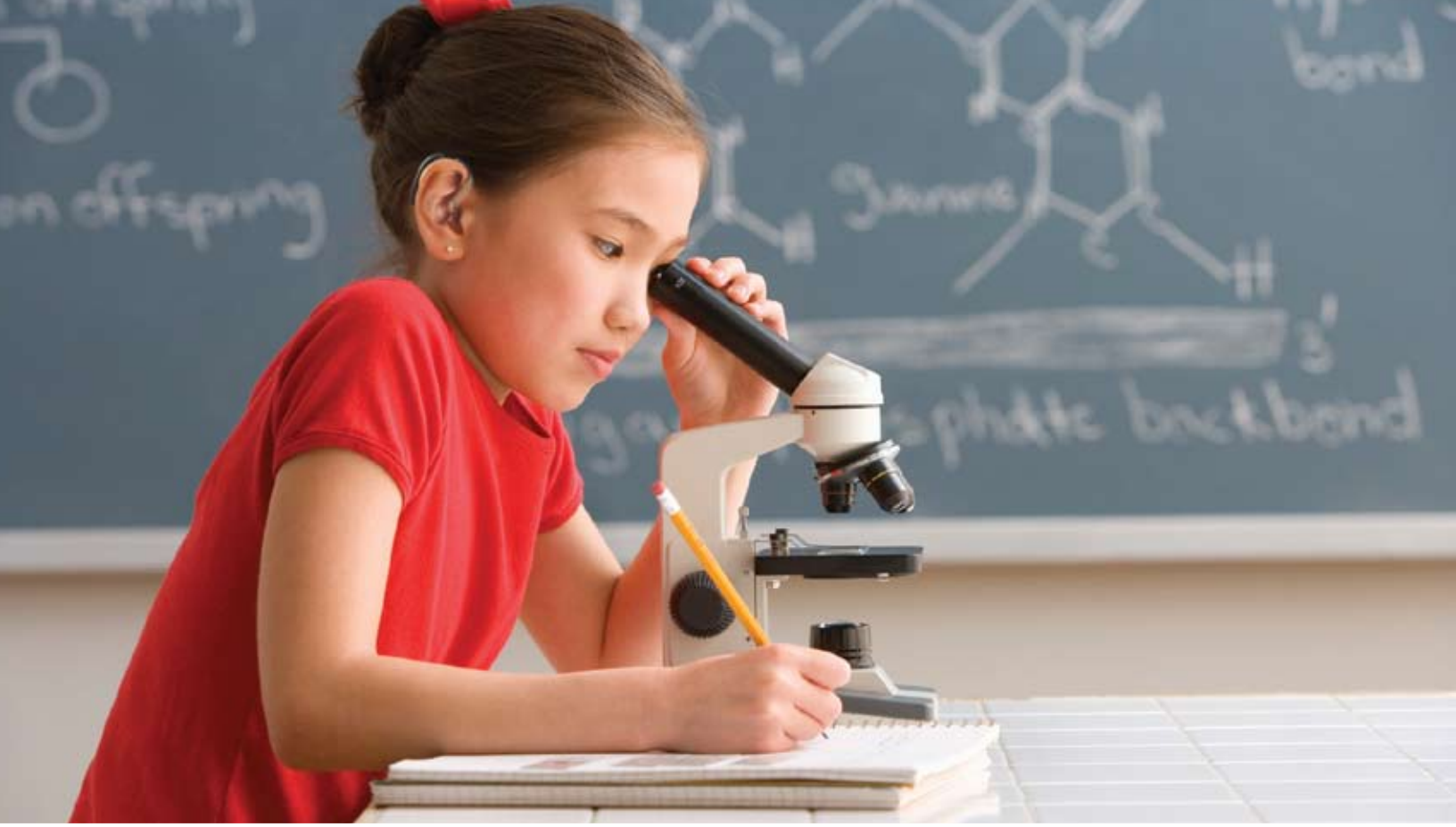
The first big shibboleth Pollan takes on is dietary fat. The recently published, federally funded Women's Heath Initiative failed to find a link between a low-fat diet and heart disease. Additionally, Harvard's School of Public Health reviewed other research and failed to find any significant correlation between polyunsaturated fats or dietary cholesterol and heart disease. A diet high in fiber may have no impact on colorectal cancer or heart disease, and two studies on Omega 3 reached opposite conclusions. The National Academy of Science said, "Omega 3 has no effect," while Harvard reported it would reduce risk of heart attacks by one-third.

Meanwhile, Americans are getting fatter and suffering from obesity related diseases. Why? Pollan postulates that when we adopted low fat diets, we replaced fats with carbohydrates and trans-fats. The concept that foods could be processed (removing nutrients) and reconstituted with selected vitamins and minerals gained acceptance. But Pollan explains a carrot has a panoply of nutrients that interact with other nutrients in various foods we eat, and this complex interaction is beyond science's ability to analyze.

After pointing out what's wrong with the Western diet, Pollan sets down rules on how to eat. Stay away from processed foods with hyped nutritional claims. Shop the peripheries of the supermarket – the produce, dairy, meat and fish sections. Shop farmers' markets where the food is fresher and varies by season. Eat plants; in countries where people eat more than 1 lb. of fruits and vegetables a day, the cancer rate is about 1/2 of ours. Eating meat is fine, but it should be a supplement to the meal. Eat slower; it takes about 20 minutes for our stomachs to signal our brain that we are full. Also, eating less will slow cell division and increase longevity.

Most importantly, eat meals at a table with friends and family. Food should evoke a pleasurable experience. Cook and plant a garden. This will help increase control over your food. Food is not a mix of unpronounceable chemical compounds. It's a beautiful blend of colors, textures, flavors and aromas that are to be enjoyed with others. Good health will follow.

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



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NEXT Up

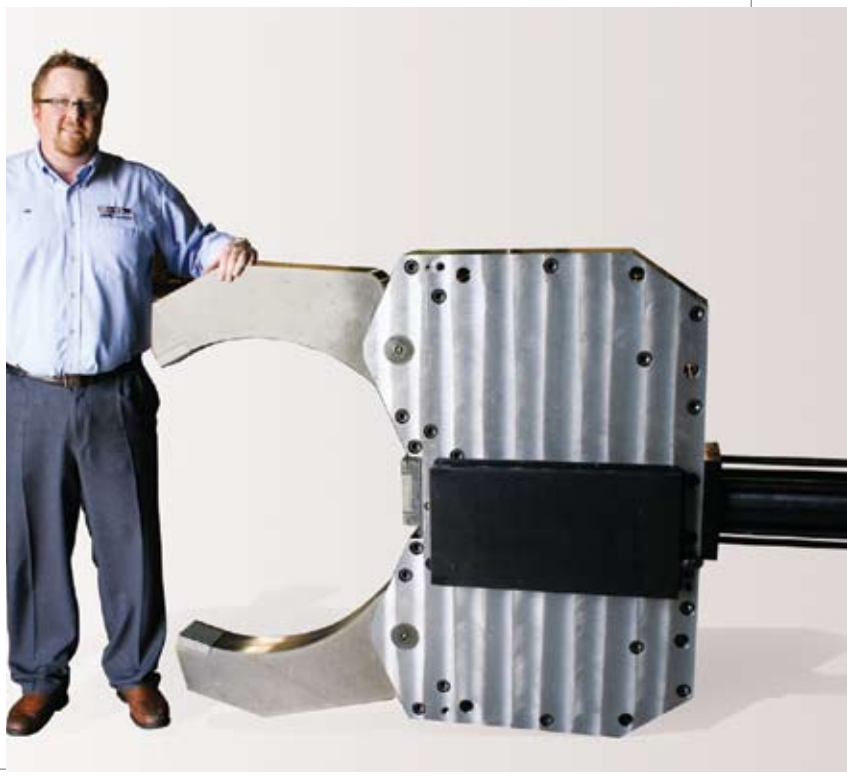
Nikon Instruments Inc., has introduced the iNEXIV VMA-2520 Video Measuring System. The iNEXIV is designed to measure 3D workpieces, is touch probe ready, integrates the latest imaging processing software and incorporates a new 10x optical zoom system and Laser Auto Focus option. The iNEXIV is specifically designed for measuring 3D workpieces. The iNEXIV has integrated the latest image processing software, so three-dimensional objects can be easily documented and viewed in their relative 3D form with precise proportionality when created with the extended depth of field software in which all Z axis data stays in focus. The software also generates accurate 2D stitched panoramic images captured with CNC XY stage precision, making super wide FOV (field of view) observation possible. A newly designed 10X optical zoom system has an ultra low distortion of less than 0.1 percent, and features an Apochromatic Objective Lens with a High Numerical Aperture NA (0.11).

Product-related inquiries may be directed to Nikon Instruments at 800-52-NIKON.

Steady Ready

LMC Workholding has introduced the extra large Atling self-centering hydraulic steady rests. The new steady rest holds up to 38 in. diameter workpieces. This Atling steady rest features a minimum clamp size of 340 mm (13.4 in.) and a maximum clamp size of 965 mm (38 in.). Features include a glass scale for sizing feedback and a linear encoder to measure part diameters to within +/- 5 microns. The part requiring this large steady rest is a graphite shaft that weighs over 10,000 lbs. Atling self-centering steady rests maintain the integrity of shaft or bar workpieces that tend to bend or deflect under unstable cutting loads. Designed to fit virtually any CNC or conventional lathe, the steady rests deliver a large gripping force in a compact housing and fit even where space conditions are extremely limited.

For more information, please contact LMC Workholding at 574-735-0225 or visit www.logan-mmk.com.



fresh stuff

Spin Me Round

Kine-Spine/Barrett Division of the Kinefac Group has introduced the 601 Versafuge, which is applicable for chip wringing, fluid cleaning, part cleaning and washing and drying. This new centrifuge provides a cleaning force of up to 350 Gs, a chip or parts cleaning capacity of 130 lbs. and a fluid reclamation basket capacity of 5 gallons. The new Versafuge has touch screen cycle control, a new safety lid latch and optional hoist and bucket dump units. Its small footprint allows it to be placed near the production operation it supports and its simplified part handling allows production equipment operators to load and unload the Versafuge without significantly diverting them from their primary task.

For more information, please contact Kine-Spin/Barrett Division at 508-755-4306 or visit www.barrettinc.com.

Laser Made

Mitsui Seiki has launched "VLD-300" a small, vertical, Nd:YAG laser drilling machine for 12-in. cube parts (300 mm x 300 mm x 300 mm in X, Y, Z axes). The VLD-300 offers positioning accuracy and repeatability in X, Y, Z-axes of 0.00004" (0.001 mm). A axis positioning accuracy is ±6 arc seconds; repeatability ±3 arc seconds. C-axis accuracy is ±4arc seconds; repeatability ±2 arc seconds. X, Y, Z-axes cutting feed rate is 0.004 ~ 787" (0.1 ~ 20,000 mm) X, Y, Z-axes acceleration rate is 1.5g. The VLD-300 is designed to also work with CO2, diode pump, and fiber lasers for aerospace and electronics, medical, and automotive parts. Inconel, Waspalloy, Hastalloy, and nickel-based titanium alloys are typical materials used.

The VLD-300 has a cast iron bed and linear motor drives. A dust collection system keeps cutting debris from contaminating the work zone and equipment. The Nd:YAG system offers a focal length of 200 mm or 300 mm with a height sensor for scanning and work offset probing.

For more information, contact Mitsui Seiki at 201-337-1300 or visit www.mitsuiseiki.com.

Baby Got Broached

Schlitter Tool has introduced a rotary broaching attachment for the Swiss screw machine industry. Dubbed the "Baby Swiss," this holder features an ultra-small profile, quick-set fixturing, and industry-leading performance. Quick-set design eliminates an otherwise lengthy setup. This holder is available with both metric and inch-sized shanks and is ideal for broaching forms less than 3/8" (10mm) in diameter on Swiss, Davenport and small CNC's. Shops can create high quality hexes, splines and other regular shapes, in nearly any metal, on nearly any machine.

For more information, please contact Schlitter Tool at 800-521-1743 or visit www.schlittertool.com.

fresh stuff

Rush Off

Rush Machinery, Inc. has introduced a new production-rated Carbide Rod Cut-Off machine for the carbide tool and carbide rod manufacturing industries. The "Auto-Cut," a CNC Carbide Rod Cut-Off machine has easy to use CNC controls with a touch screen operator interface. Parameters can be quickly set for rod diameter and length. The machine automatically loads and cuts rods from a large capacity magazine. Capacity of the "Auto-Cut" is .055" (1.4mm) to 1-9/16" (40mm) diameter rod, up to 16" long, and comes standard with a flood coolant system.

For more information, please contact Rush Machinery at 800-929-3070 or visit www.rushmachinery.com.

fresh stuff

Pick & Place

Toellner Systems, Inc. today announced a breakthrough in pick and place technology for running Op. 10 to Op. 20 between two CNC lathes. Toellner's design enhances the transfer of Op. 10 machined parts from one servo driven, parts loading/unloading system to a second, running Op. 20 in a fast, constant and smooth automated process.

After Op. 10 has finished machining, the part automatically transfers between the two cells via a Toellner conveyor system. The pick and place gripper arm assembly on cell two gathers the part, turns it around 180°, and then places the part in the nest assembly, ready for Op. 20 machining, before moving on to Op. 30 using the same technology.

For additional information please contact Toellner at 715-424-4530 or visit www.toellner.com.

Finish Line (above)

A spindle-finishing machine engineered for highest precision and performance in deburring small gears and machined parts is now available from ALMCO, Inc. Requiring just 15 square feet of floor space, the Model S2-30 finishes up to 480 pieces per hour. Parts measuring up to 2-1/2 x 3 inches are loaded on one or both of the machine's spindles, either manually or with robotics if desired, and unloaded after a typical 15-second deburring cycle.

Complex parts are mounted on the S2-30's air-actuated collets or I.D. expanding collets at the ends of the rotating spindles. The spindles then pivot into the rotating tub, placing the workpieces in a stream of abrasive slurry moving at speeds up to 2,000 feet per minute. Centrifugal force spins the slurry into a form-fitting "grinding wheel" while slow rotation of the part in the mass assures uniform deburring and finishing of all surfaces. The spindle heads automatically return to the up position at the end of the pre-set time cycle.

For more information, please contact ALMCO at 800-521-2740 or visit www.almcoinc.com.

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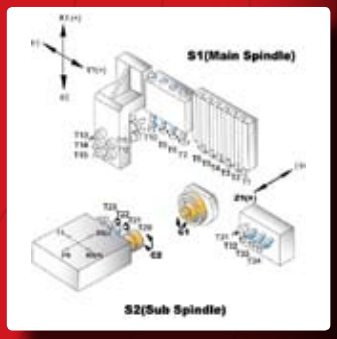

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You Can Broach This

Slater Tools Inc. is expanding its product line of Swiss Type Adjustment Free Rotary Broaching Tool Holders. Slater's latest rotary broaching video, broadcast on YouTube, demonstrates the new 0700 series Swiss Type Broach Holder, which has a .500 inch tool bore. The Swiss Type Rotary Broaching Tool Holder is shown creating a hexagon shaped hole in a metal bar on a lathe. The 0700 series tool holders use standard .500 inch shank, 1.75" overall length rotary broaches for polygon forms, most are available from stock. The Swiss Type Adjustment Free Rotary Broaching Tool Holder is used primarily on swiss type CNC machines and gang style lathes.

For more information, please contact Slater Tools at 586-465-5000 or visit www.slatertools.com.

Big Bore

The Hardinge Group has introduced the American designed and built SR 200 BB (Big Bore) high-performance multi-tasking turning center. This heavy-duty turning center features a Hardinge Sure-Grip lever type 250mm (10-inch) 3-jaw chuck as standard equipment. The SR 200 BB can be configured with many multi-tasking functions including live-tooling, Y-axis, C-axis and sub-spindle.

The Hardinge SR 200 BB turning center is a true "chuck and bar" machine that will cut the toughest materials and handle deep interrupted cuts. The machine features vibration damping accomplished through the use of linear roller guides mounted to a Harcrete®-reinforced cast iron base.

Key attributes of the Hardinge SR-Series machines include a Hardinge/GE Fanuc i-Series SR control unit with high-speed milling capability and multi-axis functionality; Fanuc Manual Guide i conversational programming system; Hard Turning and Hard Milling capability; Harcrete-reinforced cast iron base for superior damping, improved tool life "hard turning" capability up to 67 Rc; Exclusive Eppinger top plate option designed for high accuracy, zero clearance tool location, repeatability and robust live tooling system; and, a vast array of exclusive Hardinge workholding systems.

For more information, please contact Hardinge Inc. at 800-843-8801 or visit www.hardinge.com.

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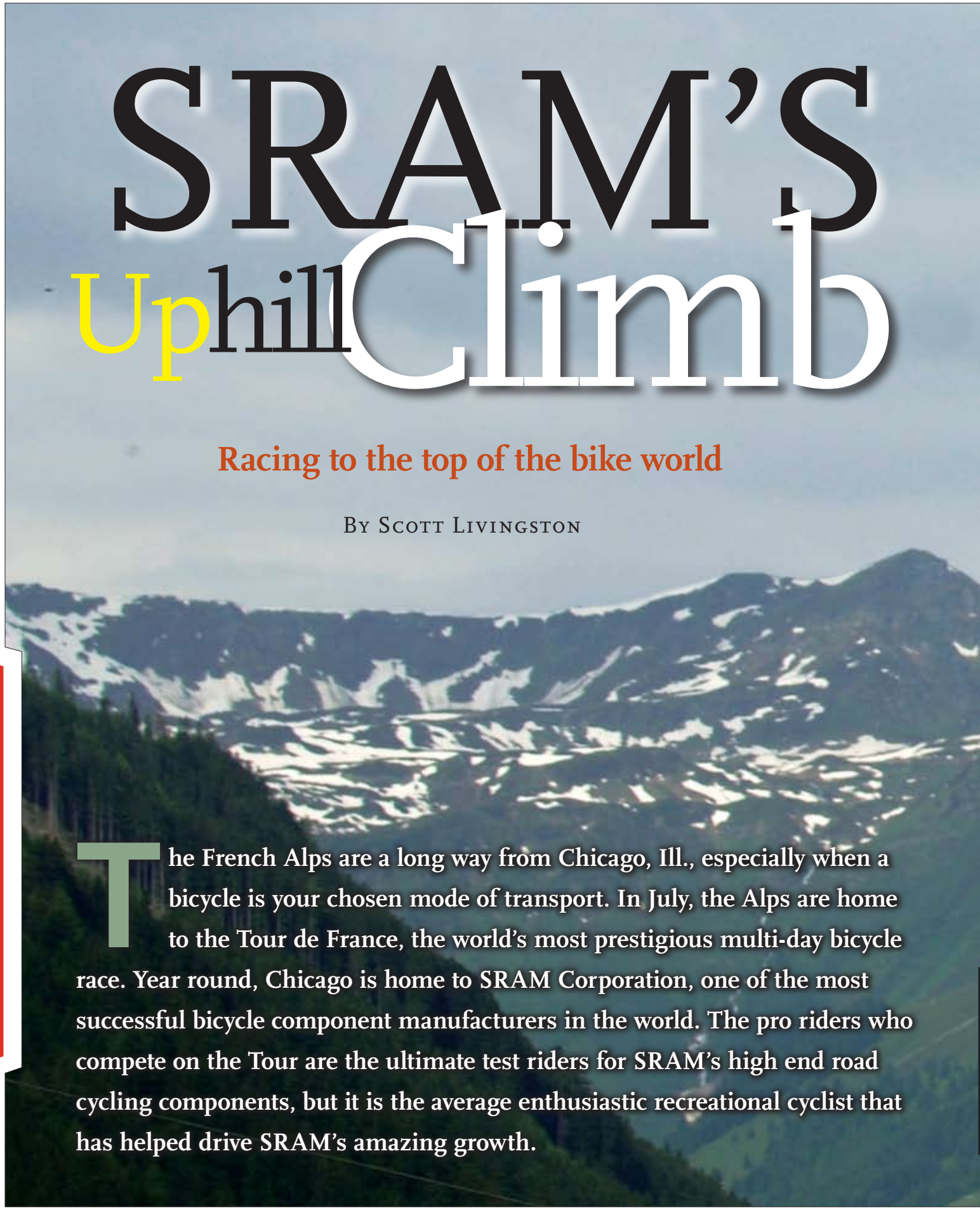
All Photography courtesy of SRAM Corp.

SRAM's Uphill Climb

Racing to the top of the bike world

By Scott Livingston



The French Alps are a long way from Chicago, Ill., especially when a bicycle is your chosen mode of transport. In July, the Alps are home to the Tour de France, the world's most prestigious multi-day bicycle race. Year round, Chicago is home to SRAM Corporation, one of the most successful bicycle component manufacturers in the world. The pro riders who compete on the Tour are the ultimate test riders for SRAM's high end road cycling components, but it is the average enthusiastic recreational cyclist that has helped drive SRAM's amazing growth.

sram bike parts

U.S.-based SRAM Corporation stands tall in the global bicycle marketplace.

Above: German professional freerider Joscha Forstreuter; Far left: SRAM's race support; Left: Four-Cross race Jill Kinter of the United States.

Red is SRAM's top of the line component group-set for road bikes.

SRAM has progressed tremendously from its launch in 1987 to its present day status as one of the big three bicycle component manufacturers. The company has grown through both traditional internal product development and acquisition, establishing itself as a major player in the mountain bike, road bike, and comfort bike markets. The February 29 issue of *BusinessWeek Chicago* reported that privately held SRAM grew 15-20 percent in each of the last five years and had 2007 fiscal year revenues of $318 million. Publicly owned Shimano, Inc. of Japan, the market share leader, had bicycle segment revenues in 2007 of more than $1.5 billion and total revenues of more than $2 billion. Shimano's other industry leading business is fishing products, including reels, rods, and jigging.

Whether the products are bicycle parts or fishing gear, Shimano is a formidable competitor and SRAM has had to climb to gain its share in a challenging market. The third major player in bicycle components is Campagnolo S.r.l., an Italian based company. While SRAM and Shimano build parts for all segments of the market, Campagnolo focuses on the enthusiast road bike segment. Shimano is well known for its history of technical innovation, and Campagnolo, though also known for some technical innovation, is more known for their European style and design. Seemingly, SRAM has been able to meld the two together. Their strong position in the mountain bike segment has fueled its leap to the high end road bike segment. Campagnolo used to have a lock on supplying the top European based pro teams, but first Shimano, and now SRAM have made inroads by supplying parts to top teams at the high visibility professional level.

Lennard Zinn is a bicycle frame builder, technical writer for *Velo News*, and author of numerous books on bicycles and bicycle maintenance. He has been follow-

ing SRAM since its founding and says that their growth is very impressive. “If it weren’t for SRAM, the whole industry would have ceded the mountain bike business to Shimano and the road bike business to Shimano and Campagnolo,” said Zinn. He is amazed at the amount of capital that SRAM has pumped into its acquisitions and noted that the inorganic growth has not slowed down its internal product development. Zinn fully expects SRAM to continue its growth.

Pedaling for Growth

How did SRAM move from scrappy upstart to a major player in a market that has changed dramatically in the past 20 years? During the entire history of the bicycle, U.S.-based companies have made big contributions. As the mass market for bicycles commoditized, U.S. companies lost their grip and domestic manufacturing migrated to the niche bicycle frame building business and small segments of the market where innovation was still thriving. U.S. manufacturers have led in the development of new materials and technologies like suspension and lightweight composite wheels, but until SRAM’s growth kicked in, there wasn’t a dominant U.S. player focused on large scale component manufacturing. Many of the large U.S.-based companies producing complete bicycles, such as Specialized, Trek, Cannondale, Schwinn, and GT have shifted from in-house manufacturing to a design, market, outsource model of brand development. Some still operate U.S. factories, but there has been a fair amount of consolidation and most of the sourcing is done offshore, primarily in Taiwan and more recently in China.

> “U.S. manufacturers have led in the development of new technologies.”

SRAM started out as many companies do, with a single product idea in the mind of an entrepreneur. Stan Day, Jr. founded SRAM with his brother and three friends. The name SRAM is derived from the first and middle initials of some of the founders. Day’s first design was the GripShift, a handlebar mounted derailleur shifter. The technology for that shifter is still present in their current line of twist shifters. SRAM has grown to be one of the largest component companies that still has internal manufacturing, most of which is offshore. Their line of components and collection of brands is one of the most comprehensive in the industry. Their main brands are: SRAM (drive-train, shifting, and brake components), RockShox (suspension products), Avid (cantilever and disc brakes), Truvativ (cranksets, bearings, seatposts, stems, bars, pedals), Zipp (composite wheels, cranksets, bars, and stems), and Pitstop (bicycle tools and maintenance products).

The Bicycle Shop Owner’s Perspective

Dave Barrow, owner of Tolland Bicycle in Tolland, Conn., is a self professed, “campy guy,” but that hasn’t stopped him from stocking both mountain and road bikes with SRAM’s products. Though he personally rides Campagnolo parts, he is a dealer for Taiwan-based Giant Bicycles where some models are sold complete with SRAM parts. When asked if SRAM, once the upstart,

Photos left to right: **A.** A lightweight cogset is precision machined. **B.** The Red crankset has molded carbon fiber crankarms and aluminum chainrings. **C.** An aluminum seatpost is made from high strength alloy. **D.** Machined and welded, this aluminum stem connects the handlebars to the forks.

Photos: **A.** The SID air spring suspension fork is a mountain bike standard bearer. **B.** A rear shock is matched with front shocks on full suspension mountain bikes.

is now a viable competitor to Shimano and Campagnolo, Barrow said, "Yes, without a doubt." He noted that SRAM made really good mountain bike components for years and they are now making their impact with innovative parts for road bikes. He doesn't think that his average customer knows or cares that SRAM is a U.S. based company. His customers want the best value for their dollar. SRAM's top component group-sets are "lighter than anyone on the market," said Barrow.

Weight Weenies

In bicycle-speak, a "weight weenie" is a rider who measures the difference between bicycle components in grams. Even casual riders, who could lose a few grams or pounds themselves, are infatuated with the drive to ride the lightest possible bicycle available. High-end complete bicycles can routinely cost $5,000 or more, and recently, there have been examples of custom bikes with top components going for double that price. As with any luxury good, the sky is the limit when it comes to customization and cost. Between the frame, the wheels, and the component group-set, the cost per gram of weight savings can be hundreds of dollars. SRAM has developed components that maintain their performance and durability while shaving weight. For the pro riders in the Alps, this may mean the difference between winning and losing, but it won't make a huge difference for that ride to the coffee shop or that commute to work. Still, the trickle-down technology from the automotive and aerospace industries, and lighter and more user friendly components, can benefit the average rider when the bicycle is easier to pedal and control.

Jack Greetis is SRAM's Chicago office Engineering Manager and has been with the company for 10 years. He has witnessed the company's growth and has a good pulse on SRAM's global operations. "SRAM's strategy is to be in locations near our customers," said Greetis. Many of those customers, the marketers of complete bicycles, have migrated to Taiwan and China. According to Greetis, the high-end bike parts are about "weight and whiz bang stuff. Cycling is fashion." Hence, the annual product development cycle pumps out new parts every year. SRAM's successor to Force, their inaugural road group-set, is called "Red." SRAM supplied lightweight chains and cassettes to top European pro teams in the past, but only recently began outfitting ProTour teams like Astana, Saunier Duval-Scott, and Agritubel with their full group-sets.

Right: Rear derailleur

Right: Twister shifter

Global Manufacturing

SRAM has thousands of manufacturing employees spread amongst six main factories. Two are located in Taiwan; two are located in China (Shanghai and Guangzhou), one in Germany, and one in Portugal. Over the years, acquisitions have gained small operations in Indiana and Colorado, but Greetis said it has been 10

years since SRAM operated a major metalworking facility in the United States. Labor cost was a big factor in the subsequent moves. He said there was an experiment in Chihuahua, Mexico, but that lasted only two years before the focus was turned to Asia, namely Taiwan, which has been a global center for the bicycle industry for more than 25 years.

SRAM's approach is to perform research and development at engineering centers in Illinois and Germany before establishing production manufacturing at the global plant site that best fits the product. Greetis said both R&D locations are blessed with "strong knowledge bases." When pressed for an explanation why products are still produced in higher cost countries, he went on to say that the "technically challenging products, such as internal gear hubs," are made in Germany, and a specialized factory for bicycle chains is in Portugal.

Like many U.S. based companies, SRAM has focused on design, marketing, and assembly. "We look to experts who are doing what they do best – our expertise is in assembly and we have been adding resources each year," said Greetis. SRAM still has substantial in house manufacturing capabilities, including turning, milling, centerless grinding, carbon fiber molding, plastic injection molding, and die casting. It also outsources some of these processes to gain added capacity, and rely on suppliers for other processes like forging and stamping. SRAM prefers to work with suppliers who are located close to its factories. Greetis said that in Taiwan, there is a cottage industry for bicycles with lots of small family run firms supplying the larger companies.

Dave Barrow, owner of Tolland Bicycle, confirmed that bicycles and components have become a lot more expensive in recent years. Rising commodity costs, shipping

Right: Hydraulic disc brakes

Right: Hollow pin chain and cassette

They have worked with outside experts to implement lean enterprise processes, and some best practices are shared between their facilities, but for the most part, the operations are independent of each other. "In the bicycle industry, innovation is driven by the patent landscape," said Greetis. He said that a lot of time is spent on reviewing previous designs and that much of the lean focus has been on the design process. He leads a group of nine engineers and lean product development has allowed them to launch new designs more quickly. SRAM has posted information about its own patents on their website for others to see.

costs, and manufacturing costs are contributing factors. A recent trip to SRAM's Taiwan and China plants proved to Greetis that costs are rising in Asia. Greetis said, "The euro has gone crazy. China's currency valuation and labor inflation have neutralized some of China's advantage. Four years ago, everyone (in the bicycle industry) was moving away from Taiwan," but that recently, "Taiwan is back to the top and their infrastructure is outpacing the Chinese with the exception of the large lots." SRAM is always looking at their product portfolio to find the missing links. Greetis wasn't at liberty to discuss what developments SRAM was working on, but he said it is a goal

Left: The S7 internal gear hub integrates braking and shifting.

for them to supply all tiers of the bicycle market.

The Market

Seven Cycles is another U.S.-based bike company, though their focus is on custom road and mountain bike frames. It is a small organization compared to SRAM, but Seven Cycles has made a name for itself in the industry. Seven manufactures all of its products in their Massachusetts facility. Jennifer Miller, Seven's Marketing Director, said that the company is "neutral" when it comes to parts manufacturers. Seven features their mountain bike frames with both Shimano and SRAM parts, and road bike frames with Campagnolo, Shimano, and recently, SRAM component group-sets. Since Seven doesn't sell complete bikes, it is up to the customer to work with a bike shop on the parts selection. Two of Seven's sponsored mountain bike professionals, Mary McConneloug and Mike Broderick, are candidates for the 2008 U.S. Olympic Team, and both ride bikes built with SRAM parts, including RockShox suspension forks. Miller noted that SRAM has had a strong presence in the mountain bike segment for many years, but that its has made a recent push to capitalize on the faster growing road bike segment.

Switching Sides

Richard Sachs, a Chester, Conn., custom road and cyclo-cross bicycle frame builder has made the switch to SRAM products. For more than 30 years, Sachs was loyal to the Italian company Campagnolo, but made the significant decision to move to SRAM both personally and professionally. "I'm riding my new bike and loving it," Sachs said. "Last fall, SRAM had a major league presence at the U.S. Grand Prix of Cyclo-cross." Sachs networked with some of SRAM's marketing folks, and ultimately switched. Sachs said, "It looks right on the bike." For years, Sachs favored the look of Campagnolo parts on his bicycles. Trained in England, his work has a European flare that could be considered old school. His frames are hand built from steel tubes, and meticulously brazed together.

Thirty percent of his frames are sold complete with the components and they all used to be specified with Campagnolo's products. However, many of the patient customers, who are next in line on his six-year waiting list, are following his lead and going with SRAM. When pressed to explain his choice in parts, Sachs said, "Shimano is ugly and androgynous; SRAM is organic and beautiful." His output is only four or five frames a month, so his volume isn't going to dictate the direction that the market swings, but his 35 years in the industry have made a difference and people do respect his opinions. Sachs is less concerned where SRAM's parts are made. "Only three things matter; the stuff works, it is beautiful, and I can get it," said Sachs.

So Jack Greetis, the SRAM employee who studied aeronautical engineering at the University of Illinois and was a competitive amateur cyclist in the 1980s, has seen things come full circle. He has worked at SRAM and been part of the fast-paced growth. From the sounds of it, the pace of innovative product development and acquisitions indicate that SRAM will continue to make their mark on and profit from the global bicycle industry.

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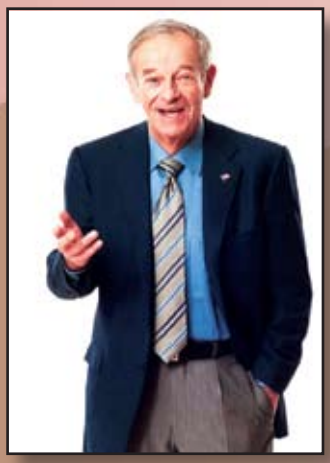

An interview with Herb Cohen

By Noah Graff

For more than three decades, Herb Cohen has been a practicing negotiator, intimately enmeshed in some of the world's headline dramas, from hostile takeovers to hostage negotiations. His clients have included business executives, entrepreneurs, and sports agents plus large corporations and governmental agencies. He is the author of *New York Times* Bestseller *You Can Negotiate Anything.*

NG: How did you get into the negotiation business?
HC: People think you must have the genes for negotiation. Both my parents were immigrants to the United States. They were happy to be here and didn't negotiate for anything. If they sustained a loss, they didn't report it to the insurance company because they were afraid the insurance company would either raise their rates or cancel them. And as a kid, I didn't really negotiate. But during law school I got a job as a claims adjustor. My job was negotiating with people in New York City from different socio-economic levels. One day you're in Bedford-Stiverson and the next day Park Avenue. [Other employees] were settling three cases a month. I settled 12 cases a month in half the time while going to law school full-time. They asked, "What are you doing, and could you teach other people?" I began teaching a three-week course in negotiation for attorneys for Allstate Insurance Company.

NG: Where have you been working lately?
HC: I was in South Korea, Hong Kong and the People's Public of China, and more recently in London and Prague. I gave lectures in Beijing and Shanghai about negotiations to try to change some of their attitudes and outlook about how conflict should be resolved.

NG: I was reading that a lot of cultures have different customs for negotiating. Is it more difficult for you to negotiate with people in other countries?
HC: No, for some reason, I do well. It surprises everybody, especially my wife. I do very well in strange places. People somehow relate to me because I always see myself as an outsider. If you're Jewish, you're always an outsider, no matter how accepting the culture is. You see yourself as a little different, and it is a tremendous advantage because you tend to see what more accustomed eyes miss, and that kind of sensitivity puts you a little bit ahead of everyone else. My major strategy in negotiations is to make the other side feel they're superior to me. I work very hard to have them relate to me on human terms.

NG: What are the biggest mistakes people make when they enter a negotiation?
HC: Fall in love with the people, but don't fall in love with any deal. Don't fall in love with things that are material or involve money. The biggest mistake people make is they get too emotionally involved. You want to be a little bit more detached. Another mistake is coming across as having too much authority and make quick and precipitous decisions. If your reader owns a company, he or she can say "yes" or "no." That's a mistake. They should say, "I'm the owner of the company, but I've got to check this out with my board," even if they have no board of directors. Or, "Let me check this out with my banker. In fact, let me speak to my wife." This means you are not forced to make quick decisions, and causes you to emanate tremendous power.

NG: If I had to hire a new salesman and was trying to figure out who'd be the best negotiator, what qualities would I look for?
HC: I would look for someone who's at ease with people; someone people would trust; who is an amicable individual, and a high achiever; who has good expectations of life. I'd also look for someone who isn't confined to what the "norm" is and who is optimistic about the future, who looks for new ways to do things, and has a track record of achievement, even a modest one.

NG: On your tapes you mentioned how important it is for you to be the caller. Would you elaborate on that?

HC: Many negotiations are more competitive than they should be. When you're the caller, you tend to be prepared. You've got the file with you. You have an outline, you know what questions to ask. You're in a quiet place and can concentrate. The person being called didn't know you'd call. They don't have the file. They're not prepared. When dealing with a competitive situation, you should say, "Hey, let me call you back." As simple as that. If people are egomaniacs, they don't want to do that; they will rely on their memory, but your memory won't work – it will fail.

NG: You also talk about the art of making the deal.

HC: There are four key ingredients to making the deal. To start with, you want to use some form of legitimacy, like car dealers do. They'll show the sticker price, which you know is legit because it's literally stuck to the car. The sticker price is $39,346.11. The car salesman shows the actual factory invoice price of the car, a printed document which gives it a high form of legitimacy. You've got to invest time and energy; you must use some form of legitimacy; you must look at how concessions are made. With the car dealer, the first concession is $2,000. Then they drop the price $2,000, then drop it $1,000 more, then $400 more, then $100 more. Then they go see the dealer or sales manager in the backroom then says, "He could knock off another $33." When you list the pattern of concessions, you say, "Gee, I'm really at the end now." They've gotten you involved in the process, and people support that which they helped create, which would cause you to close the deal.

NG: How do you negotiate with a family member?

HC: Let's say you're dealing with children. Kids are little people in a big person's world. They are people without formal authority and power, yet they seem to get a lot of what they want. How do they do it? Kids aim high. They know if you expect more, you get more. Sometimes they make unrealistic requests of their parents, but it raises the expectation level of parents. That's a good thing. Kids understand that decision making process within a family, which means if they ask the mother for something, and the mother rejects them, they go to the father. The father rejects them. The parents are united against them, so what do they do? They form coalitions or alliances with the grandparents. Kids understand that the word "no" is an opening bargaining position. Most of us, when we hear "no," we think: Oh, it's over. Kids understand "no" means "no" at this particular moment in time with these facts. Change the facts, change the time, it's altogether different. Kids persist; they persevere; they wear you down. They are tenacious. And they are very good negotiators.

NG: How do you negotiate with irrational people?

HC: The truth is crazy people are the most difficult people to negotiate with. But the way to negotiate with irrational people is behave the way they behave. If they say something that doesn't make sense, you say something that don't make sense. In other words, all behavior makes sense from the standpoint of the actor. Crazy people don't think they're crazy. Irrational people think they are behaving normally/correctly, but it's based upon their whacked out experience. So you've got to try to understand the experience of the other side. I remember in dealing with Iran and Saddam Hussein, I tried to give advice to our government to understand why this person was behaving the way he was. His behavior made sense. He didn't fear the United States; he feared Iran. When the government said, "He's got weapons of mass destruction," I said, "I don't know whether he has weapons of mass destruction, but he wants Iranians to think he has." He killed millions of their people during the Iran/Iraq War when they invaded them, and I couldn't get people to really understand it.

NG: That's what happened with this war.

HC: As Americans, we tend to ascribe our values and our beliefs to the people we're dealing with, which is a mistake. We assumed that they would do what we would do in a situation, which doesn't make sense. Look at the situation in Iraq: It took us awhile to realize there are Sunnis and Shia, and they hate each other. We have yet to realize Iran has tremendous leverage with Shia in Iraq. You've got to understand; Iranians are Persians and the Shia and Iraqis are Arabs. There's a big gap between those two and they're not going to be friends. Here's how we look at things. There's a movie Broadway show, Oklahoma by Rogers and Hammerstein, and the songs show that the farmers and the cowboys are friends. The farmers milk their cows and the cowboys herd their cattle. We see the world in those simple terms. We look

at the Israeli situation and see it in very simplistic terms. Even the Israelis sometimes are more simplistic than they should be in terms of negotiations.

NG: Do you see an end in sight for the Israel/Palestinian conflict?

HC: Sure. 60-65 percent of the Israelis want to make concessions for peace, which means that they would accept the proposal put forth by Ehud Barak which would involve a division of Jerusalem. What Israel should do, in my opinion, is try to make some concessions that will work for them, and not just make concessions. You must make the other side negotiate for any concession that you give them. When you make the concession they feel they earned it, and they give something in return.

NG: Do you think the Palestinians really want peace or just all of Israel?

HC: They've already spent so much time talking about the whole thing and gotten nothing. Most realistic Palestinians will take something less than the whole thing, which means they will accept Israel's 1967 borders, maybe a little bit more. They want their own state with some way of each part communicating with the other. There must be a way for Palestinians to get from the Gaza Strip to the West Bank without passing through Israeli checkpoints and a way for people to fly in and out. They won't be happy, but probably 65 percent would take a state like that.

NG: But Hamas doesn't see things the same.

HC: Hard-line Hamas people will fight to the bitter end. The leadership of Hamas is not sacrificing their lives, they're sacrificing the lives of young Palestinian kids who don't even know what the hell they're doing. You want to try to isolate that group and have them be seen by all Palestinians as a radical group; that if they follow Hamas, it's going to be another 50/60 years before they're going to get anything. They're not getting anything. The standard of living of the people in Gaza and the West Bank is pathetic compared even to the rest of the Arab world.

NG: But do they only understand power, and not the "you scratch my back, I'll scratch yours" mentality?

HC: You're right. They don't respect reciprocity. When I was a little boy my mother said to me, "Herbert, if you'll be nice to people, they'll be nice to you." This is how American kids are raised. That's reciprocity. Arabs respect power. If you show them you're going to be tough, you're going to be strong, and this is the way things are, you could really make progress with these people. I wouldn't trust them one iota, but I would make concessions to them, bargain hard in return for something else. Right now, I think the Israeli government, which is strong, should be negotiating with the Abbas government on the West Bank. Not Hamas. Israelis should make the Abbas government look good.

NG: Tell me about some of your most difficult negotiations. How have you dealt with terrorists and hostages?

HC: The first thing you must recognize is what the terrorists want; what are their needs. Very often they want to publicize their grievances. That's why terrorists' acts occur in a place with the most media exposure. I wrote a memo to President Reagan, in maybe '85, telling him the next attack would most likely be in New York City, London, then the Olympics. Why? Because that's where there's the most media coverage. If a terrorist act occurs in Lagos, Nigeria, there's no media to cover it. It's worthless.

NG: What if you're in a plane hijacking situation?

HC: You try to recognize the situation. You as one individual will have very little power. In today's world, you must try to take back the plane while it's in the air. Flying within the U.S, you've usually got people on the plane who have worked for the government. They will know what to do. If that's not the case, try to get the flight attendants to do something. If they don't do it, it's up to you. We live in a very dangerous world. I'm big on not allowing yourself to be batted about. I believe in taking control of your world as best you can. You have to understand, I am a product of Jews in the Second World War. We were virtually extinguished. I believe you always have options; you always have power. It is better die on your feet than on your knees. [That leads] to a point where a lot of people who know me think I'm a little crazy.

NG: Thanks Herb.

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,

We're an extrusion equipment manufacturer shipping extrusion barrels reaching 10-12 feet in length. For rust prevention we have been applying cosmolines and oils using a long, makeshift broom caked with oil. The process takes a lot of manpower, workers and customers often complain about the smell of the oil, customers have to use mineral spirits to the remove the oil from the metal, and sometimes the parts still rust. Some of our equipment can be valued at as much as $100,000 per piece. Is there a better way to prevent rust?

Oily in Memphis, TN

Dear Oily,

We brought your question to David Yancho – vice president of Armor Protective Packaging, a manufacturer of corrosion inhibiting & rust removal products, to discuss some different options.

Oils and cosmoline are tried and true products that certainly do the job in terms of rust prevention, but I've heard some accounts of the messy and labor-intensive nature of the applications. They've also been known to be a contaminant for dust and other particles that gravitate to them.

Water-based rust preventative (RP) liquids are the closest alternative to what you're using now. They provide similar benefits to oils, but can be easier to apply and remove because they're water-based. That means they're safer for the worker as well as the environment. They still can be messy, have an odor, may be difficult to remove, and possess disposal challenges. Also, RP liquids flow to high and low spots in the metal, resulting in less than full surface coverage.

Another product to prevent rust is desiccant. Desiccants are designed to adsorb moisture from an enclosed environment. They're good because they're clean, easy to use and remove from the package after use, which eliminates the need for removing liquids off of the part. However, desiccants don't do much to affect the surface of the metal. They focus on the moisture in the air. They lack the ability to prevent contaminant, salt or other causes of corrosion. Once they adsorb their allotted amount they no longer help prevent moisture from entering the area.

Another rust prevention product that's been available since the late 1940s is vapor/volatile corrosion inhibitors (VCI) packaging. VCI prevents rust from forming on metals without using greases or oils, and it will eliminate your odor problem. VCI is a class of chemical compounds which emit a safe rust-inhibiting vapor into an enclosed airspace to prevent corrosion on a metal product. VCIs are typically impregnated or coated into packaging materials such as paper, film, fiberboard, foam or other emitting substances so that the part can remain clean and dry. The packaging becomes the carrier for the VCI chemical to the metal part. Good VCI packaging can be used for shipping, long-term storage or export applications. If you only compare the cost of VCI packaging with oil on a per unit basis, it would appear that VCI is more expensive than other methods. However, you must account for the packaging that is incorporated into the VCI and the overall cost associated with applying oil and removing it. We've helped many customers with strikingly similar situations to yours – shipping everything from small parts to extruding heads to large engines.

David Yancho-Vice President
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Over 50 Years of Satisfying Customers

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

Protests of China's human rights policies preceding the Beijing Olympics have put the games' corporate sponsors under international scrutiny.

"Will the political fallout preceding and during the Olympics affect the flow of business into China?"

No, China will proudly host a highly successful Olympic Games and then continue to remain as the world's hottest spot for foreign investments for years to come. China is not only the world's largest manufacturing powerhouse but also has the 1.4 billion population largest consumer base in the world, which is highly attractive to global investors. Sensational media is always short lived. Stories do not stay fresh forever. China has always been poor at its own PR, but Wall Street investors and multi-national corporations care little over the long run as businesses naturally pursue maximizing profitability in a capitalist society. Political differences, which I believe will be minimal, will have no effect on business flow into China.

Benjamin Wey
President
New York Global Group, Inc.

Despite all the recent uproar about China's involvement in Darfur, its crackdown in Tibet, and its poor human rights record, there is a real limit on what the U.S. government can do in terms of restricting trade with China. The agreement for China to enter the World Trade Organization limits the ability of using political levers to influence economic and trade relations. Also, lack of support from American businesses to link trade ties with China to political issues makes it difficult to use political tactics to influence China's domestic or international behavior.

Professor Bruce J. Dickson
George Washington University

Beijing 2008 Olympic main stadium under construction.

I don't think political issues will significantly affect the flow of business into China in the short or mid term, even with the Olympics this summer. The world economy depends too heavily on China and vice versa. But because of its increasingly central role in the world economy, China must get used to increased scrutiny of its actions at home and abroad. China's economic rise has been unmatched in history. Not only did that economic growth bring luxury cars and ultra modern skyscrapers to China's cities, it lifted hundreds of millions of people out of poverty as well. The pace of political and legal reform, however, has been slower, but the pressure to pick up that pace will increase now that China is taking center stage globally.

Thomas Clouse
American Journalist
China Resident

the facts:

May 1, Chinese citizens organized a **protest of the French retailer Carrefour** in response to attacks on the Olympic torch relay in France. There were only a handful of protestors at a Carrefour in **Beijing**, while protestors also chanted slogans at Carrefour stores in **Changsha** in central China, **Fuzhou** in the southeast, **Chongqing** in the southwest and **Shenyang** in the northeast, the Government's Xunhua News Agency reported. www.wtop.com

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Olympic broadcasters and corporate sponsors account for **87 percent** of Olympic revenue. www.nytimes.com

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In February Steven Spielberg withdrew as an artistic adviser to the 2008 Summer Olympics in Beijing, after almost a year of trying unsuccessfully to prod President Hu Jintao of China to do more to **try to end Sudan's attacks in the Darfur region.**

Deirdre Latour, a spokeswoman from **General Electric,** the Olympic sponsor with the highest revenue last year, said in an e-mail, **"The violence and brutality committed against the people in the Darfur region is appalling,"** She added, **"It is not GE's role to use the games to influence government policy."** http://news.moneycentral.msn.com


KEEP

one on one

Interviewed by Noah Graff

Ice sculptor **Roland Hernandez** is CEO and founder of Carving Ice, an ice sculpting company that provides pieces for events including weddings, parties, and corporate gatherings. Eight years ago he began using CNC routers to compliment his traditional sculpting methods.

NG: How did you get into the ice sculpting business?
RH: Right out of high school I managed to get into an apprenticeship program under a master chef at the Century Plaza Hotel in L.A. The chefs there are required there to teach you as much as they can, and I saw a gentlemen cutting ice and said, "I think I can do that." As means to support my way through [college], I started [doing ice sculpture] as a business on the side. Six months into college I was so busy I decided just to do that.

NG: How do you use the ArtCAM software? How does today's ice sculpting process work compared to what it used to be?
RH: We take our blocks of ice and we put them onto our deck. We'll freeze them down to the deck so we don't have to actually use any type of clamping system. Then, once the design is created in ArtCAM, you see what vectors and spindle feed rate and actual bits that you're going to be using. You input it into ArtCAM and then upload the file and press start. The machine does the rest. Imagine a CNC that cuts wood or plastic or aluminum. It's just put in the freezer.

NG: Does the sculpture you do by hand look as good as the one from the machine?
RH: Sometimes you can't tell which is which. The amazing thing is that hands-down the CNC will beat me on any kind of logo work or anything that looks mechanical – anything that has straight edges. What it comes down to are three-dimensional pieces. The machine can't really replace me too much when I've got to cut a lion and I use taps, certain muscle texture and movement within a reasonable amount of time.

NG: Do you have any favorite projects you've done?
RH: Usually my favorite projects are when I'm able to take pieces off the machine and incorporate it into designs that I'll do. Two days ago, we did a 12-foot long sail ship that was actually an ice bar for one of the liquor companies. The machine routed out most of the ship for me. The front helm had the sea mariner, the women with the bust on the front of the ship. A silhouette of the image was cut onto the block of ice for me off the machine. Then I finished it, sculpting it by hand.

NG: What project was really difficult for you?
RH: The daughter of one of our big clients was getting married. She told me, "Roland, I don't want to make this complicated. All I'm looking for is an oak tree that I can actually get my drinks out of." So what wound up happening is again we did a 50/50 combo. I told everybody, "Okay, let's just build it, get the blocks set up and then let me have at it with the chainsaw." The elements that needed detail with the leaves and branches we did on the CNC machine. We made a 12-foot wide sculpture, but the tree was almost 8-feet tall and about 9-feet wide. In the end, the bar looked great.

NG: What is the price range for ice sculptures?
RH: They'll range from as little as $85 for a piece that's in a box, to a nice big bar or ice lounge for anywhere from $5,000 to $10,000.

NG: How do you keep the stuff from melting?
RH: You would think here in California we would use freezer trucks, but we actually just use mover padded blankets and dry ice.

NG: How do you keep warm when you're in the freezer?
RH: It looks like we're going skiing all year long.

NG: Thanks Roland.

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1-3/4" 8-spindle, 1970
2-1/4" 6-spindle, 1962, 1973-79 (3)
3-1/4" 6-spindle, 1982
5-5/8" 6-spindle, 1979
6-5/8" 6-spindle, 1979

ACMES
1-1/4" RA6, 1973 (2), thdg., pickoff
1-1/4" RB8, 1981
1-5/8" RBN8, thdg, 1979
1-5/8" RB8 thdg., pickup '68-72 (5)
2" RB6, 1979
2" RB6 collet chucker, 1980
2-5/8" RB8, 1973, like NEW
2-5/8" RB6

INDEX
B60, 1967
B42, 1974

SCHUTTE
SF 26, DNT, 1989

ESCOMATICS
D6R (3), 1975
D6SR (2)

NEW BRITAIN
Model 52, 1987, thdg., pickoff
Model 62 2-1/4" 6sp., 1975, heavy thdg.
Model 62, Collet Chucker, 1979

DAVENPORT
3/4" thdg., pickoff, longbed (4)
3/4" 1981 (4)
3/4" thdg., pickup, 1977-66 (8)

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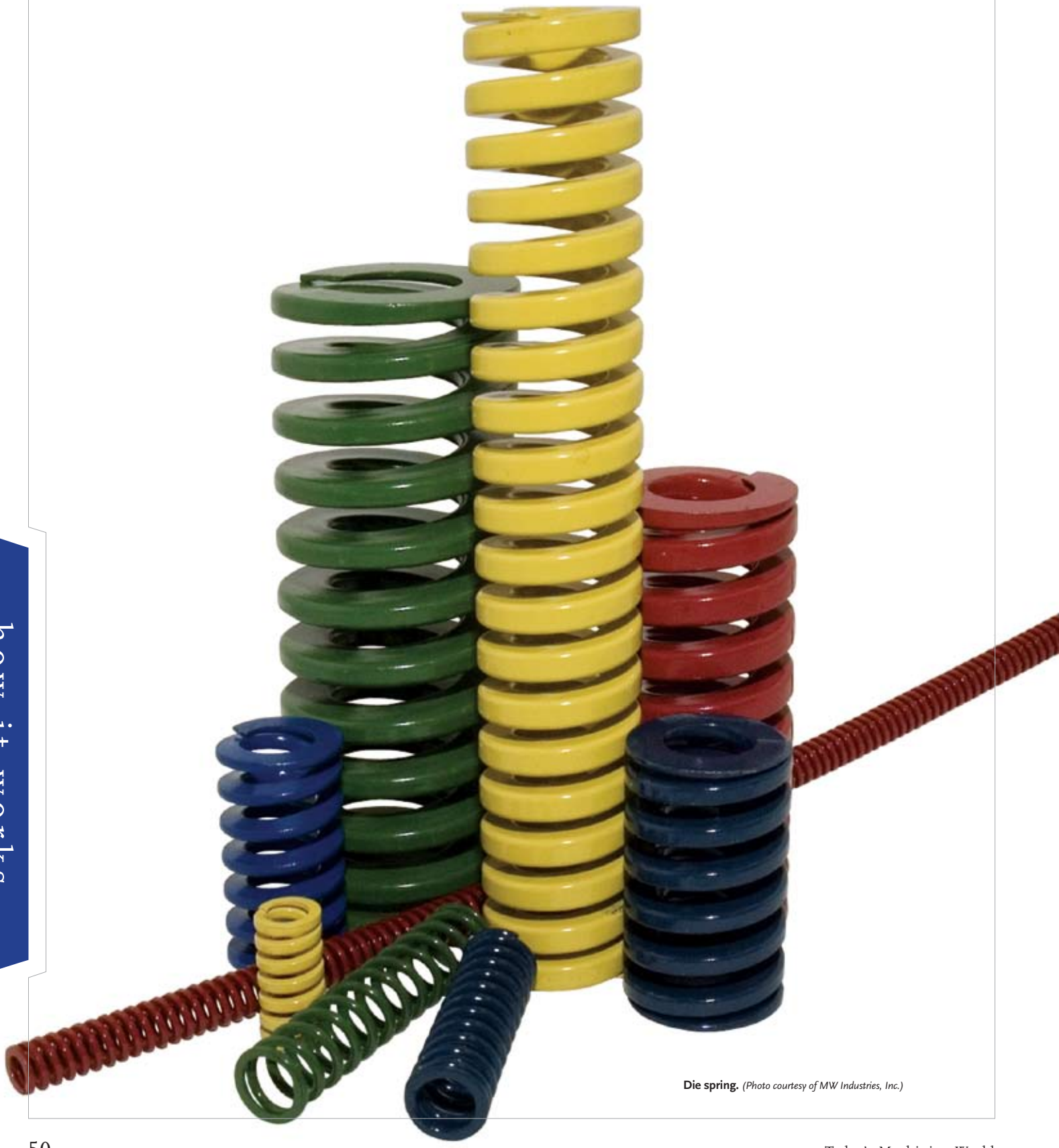
By Barbara Donohue

how it works



Die spring. *(Photo courtesy of MW Industries, Inc.)*

Spring forward

Compression springs.
(Photo courtesy of MW Industries, Inc.)

Coil springs, flat springs and wireforms perform varied functions in many types of mechanical assemblies

Springs are "flexible members that store energy," according to the Handbook of Spring Design published by the Spring Manufacturers Institute, Oak Brook, Ill. Other definitions of springs highlight their ability to return to their original shape after being compressed, extended or otherwise distorted; one definition describes this quality by saying a spring is a device that has "memory."

Whatever the size, shape or material of a spring, its useful characteristics are its capacity for storing energy and its ability to provide force by purely mechanical means in a limited space. Springs can take on potentially damaging mechanical energy, act as fasteners, or provide power to do useful work.

Familiar coil springs, made from wire or bar, work in compression or extension, or in the case of torsion springs, in rotation. Wire can also be shaped into "wireforms," which often function as clips or torsion bars. Flat springs are made from strip stock bent into shape. Spring materials range from high-carbon steels to copper alloys to titanium to high-temperature alloys, depending on the application.

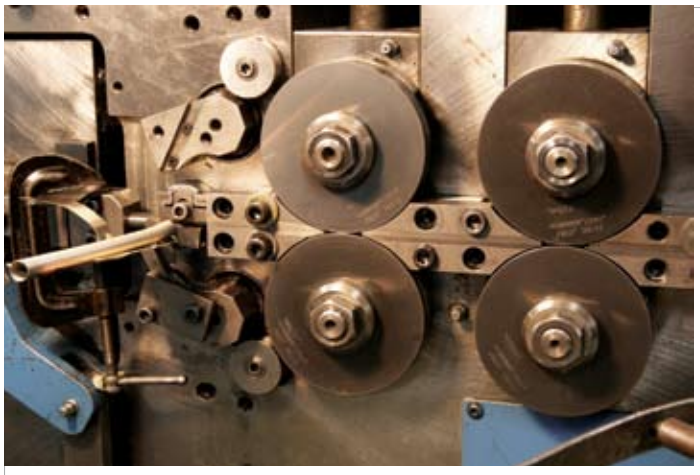
Here are several kinds of springs you may encounter. Other types and materials are available.

Coil springs

Push, pull or rotate. The most familiar springs are those made from coiling wire or bar into a helical shape.

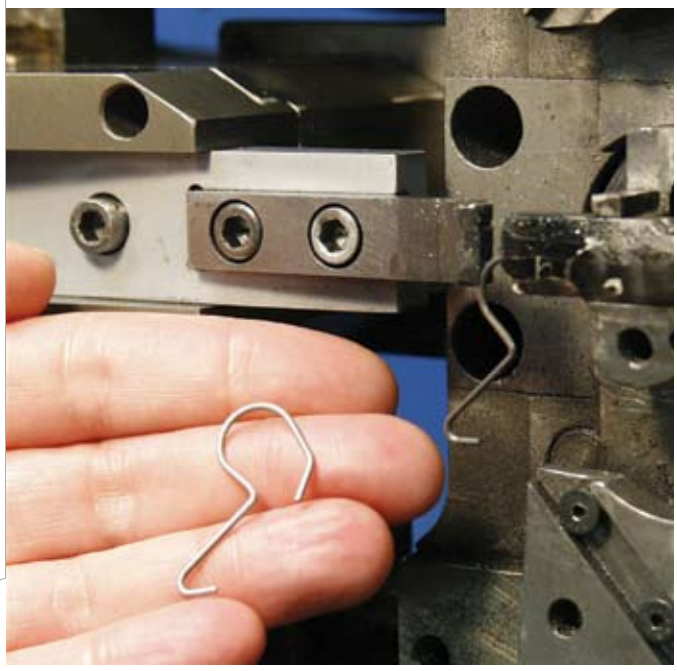
Compression springs are wound with spaces between adjacent turns, so the coils can move closer together with increasing compressive force.

One application of compression springs is deployment of ram air turbines in aircraft. This turbine generates electricity when the plane loses power; the pilot presses a button and the turbine pops out from the belly of the plane, said John King,



Extension spring being wound on a CNC spring maker at Spring Manufacturing Corp. *(Photo by Jean Butler.)*

A CNC spring maker at Spring Manufacturing Corp. *(Photo by Jean Butler.)*



A wire clip made on the CNC spring maker shown. There is also a clip in process on the machine (Note: the machine was stopped when this photo was taken. *(Photo by Jean Butler.)*

how it works

manager of engineering and sales at Atlantic Spring Division, MW Industries, Ringoes, N.J. The springs that do this are made from titanium bar one inch in diameter; the springs are about one foot high and eight inches in diameter, he said.

For another aircraft application, Spring Manufacturing Corporation, Tewksbury, Mass., makes tiny compression springs wound from 0.010-inch Inconel wire. Hundreds of these small springs maintain a seal inside jet engines, said company president Roger Desmarais.

Compression springs specially designed for use in die sets are available off the shelf. The springs are designed to fit in a hole and over a shaft, and are usually color coded to indicate strength. They are usually made of rectangular wire, which maximizes the amount of material in a given space, reducing the stresses in the spring, said Mike Kime, manager of product engineering/quality assurance at Matthew-Warren Spring Division, MW Industries, Inc. Logansport, Ind.

Extension springs are designed to be pulled on, and generally are wound with no space between the coils. They may be wound with or without an "initial tension," which requires the pull on them to be above a certain level before the spring will extend. You can find extension springs in such applications as overhead garage doors, spring scales, and screen-door springs.

Torsion springs store rotational energy and provide torque. A torsion spring is usually wound with a small space between turns to prevent the friction that could occur if the coils touch each other.

Familiar applications include mouse traps, spring-type clothespins and the clips on clipboards. Torsion springs can do heavy lifting, too. On the Trident submarine the hatch covers are five feet in diameter and two feet thick, King said. Yet one sailor can open the hatch unassisted. The springs? Beryllium copper torsion springs made from one-and-an-eighth-inch-square stock.

How they're made

Coil springs may be wound from most any diameter wire, but commonly spring manufacturers will work with wire in a range of, say, a few thousandths to within a fraction of an inch. After winding, most coil springs are treated to relieve the residual stresses from winding. For example, stainless steel might be heated to 500 degrees F for an hour, said Desmarais.

Larger wire is hot-wound. Kime said his company winds up to two-inch-diameter wire, and anything over five-eighths is hot wound.

Some of the largest springs ever made, King said, were the compression springs used in construction of the North

American Aerospace Defense Command (NORAD) installation at Cheyenne Mountain in Colorado, which opened in 1966. To help protect the facility from a nearby nuclear blast, it is supported on springs wound from four-inch diameter bar, four or five feet high and over two feet in diameter, King said. At the time the facility was built, there was no equipment available to wind springs that large, King said, so special machinery had to be developed to make the springs.

Belleville washers and other spring washers
(Photo courtesy of MW Industries, Inc.)

Flat springs

Any part made from thin stock and used to provide energy storage or force can be considered a flat spring. Often they are stamped or made on four-slide machines (see "For more information" sidebar) to make complex shapes for such applications as clips and electrical contacts.

Spring washers make up a special class of flat springs. Spring washers are installed around a bolt, rod or shaft. They can provide force to create a preload or prevent threaded fasteners from loosening, for example. These include familiar split-ring washers, wave washers and slotted-washer designs, as well as Belleville washers.

Belleville washers, look a lot like plain washers, but they have a cone shape, so they deflect slightly as a load is applied. They provide a great deal of energy storage or force in a very compact package. They are used where very high load and very low deflection are required, such as providing high bearing preloads on large truck or agricultural transmissions, or in clutch applications, said Kime. When stacked up in various orientations, Belleville washers can economically provide even higher loads in relatively small spaces.

Often manufactured from high-carbon steel, most Belleville washers are made in stamping presses. Very large ones need to be machined, Kime said, such as the Belleville washer eighteen inches in diameter, with an eight-inch ID.

Winding up

Power springs, also known as clock springs, are an effective use of space, providing a lot of torque in a small area, King said. Now that most clocks don't have springs, these are perhaps most familiar as the key-wound power for wind-up toys. They have a spiral shaped flat spring retained inside a housing. These springs are sometimes used in specialized applications such as farm equipment and large valves, King said.

Constant-force springs

With most springs, the force goes up as the deflection increases. But consider your retractable steel tape measure. You pull it out of its housing, and it pulls itself back in. It may be 25 feet long, but it's about as easy to pull out the twenty-fifth foot as it was the first. This is an example of a constant-force spring, said King.

All kinds of retraction and counterbalance applications use constant-force springs. For example, a constant-force spring retracts the fabric tape barriers that keep you in line at the bank. Today's double-hung windows use constant-force springs to counterbalance the sashes, instead of the old system of weights, ropes and pulleys.

How are constant force springs made? King said the process was invented in the 1930s, and is similar to curling the ribbon on a gift package. High-strength stainless steel strip is run over a sharp edge, and it curls up into a cylinder.

Other springs

Wire shaped to a functional form can serve as a clip. Familiar wire forms are hairpin or horseshoe clips, paint can hooks, and paper clips.

Often thought of as fasteners, snap rings or retaining rings, are actually springs. They are commonplace in mechanical applications such as vehicle transmissions. However, they also turn up in some surprising places – implantable medical devices, for example. Spring Manufacturing Corporation makes a slender titanium ring about an inch and a half in diameter that retains a plastic insert in a hip joint replacement.

The force be with you

Most types of springs provide a force that increases with increased deflection. You have to exert more force as you push or pull the spring farther. In their working range, basic

compression and extension coil springs have a consistent, or linear, relationship between force and deflection. Pull or push it twice as far, and you have to exert twice as much force. With variable coil spacing or spring diameter, compression and extension springs can be designed with more complex force/deflection characteristics.

You measure the behavior of torsion springs as a force/angular deflection relationship, and flat springs each have their own complex force/deflection relationship. Constant-force springs, as mentioned above, provide a consistent force over very long deflection.

Design

The spring is often the last part of the design a customer will look at, said Desmarais. The designer wants a certain load in a certain space, and sometimes this load is more than can be accommodated in the desired space.

The design of a simple spring includes the material, wire diameter, spring diameter, number of coils, pitch between coils, treatment of the ends, as well as the desired working load, space available, temperature, type of loading, etc. Your spring manufacturer can check the spring design to make sure the spring will operate in a stress range well below the material's ultimate tensile strength, and can withstand the operating conditions.

Visit to a specialty spring manufacturer

On the shop floor at Spring Manufacturing Corporation in Tewksbury, Mass., you can carry on a conversation in a normal tone of voice. Here, metal parts are being fabricated, but there is no raucous sound of metal being cut, or thunder of stamping presses smashing metal into shape. A few spring-making machines quietly form wire into coils or clips, and long lines of benchtop pneumatic presses stand ready to bend metal, step by step, turning strip into flat springs, or wire into wireforms.

Company president Roger Desmarais started the business in 1979, and now, with about a dozen staff, produces custom springs for many applications in this 12,000-square-foot facility. Major markets for the company's products include medical devices, aerospace, and semiconductor manufacturing.

His company specializes in custom springs, Desmarais said, but this doesn't necessarily mean they have to be exotic or difficult to make.

"All springs are different and designed to work in a [particular] application," Desmarais said. "The key is to never design a catalog spring into a product without having a specialty spring manufacturer look at it. Catalog springs can get expensive," he said, as there usually isn't very good pricing on high quantities.

Desmarais told about one medical device company that had, over time, bought 50,000 small springs with ground ends from a catalog before they called him when their catalog supplier was out of stock. He quoted the spring, but also looked at the application and noticed it didn't really need the expensive secondary grinding process. So, besides receiving volume pricing, the customer could do without the ground ends. "We saved them a lot of money," Desmarais said.

Different kinds of springs turn up just about everywhere. "There's hardly anything manufactured that doesn't have a spring in it," said Kime. If you have need of springs for a project or assembly job, especially in volume, or to unique specifications, talk to a specialty spring manufacturer early in your design process.

For more information

Contributors to this article:

MW Industries, Inc. Logansport, Ind., 574-722-8242, **"http://www.mw-ind.com" www.mw-ind.com**

Spring Manufacturers Institute, Oak Brook, Ill., 630-495-8588 **"http://www.smihq.org" www.smihq.org**

Spring Manufacturing Corporation, Tewksbury, Mass., 978-658-7396, **"http://www.springmancorp.com" www.springmancorp.com**

Other resources

Glossary of spring terminology: http://www.patrickmfg.com/glossary2.htm, www.patrickmfg.com/glossary2.htm

Handbook of Spring Design: http://www.smihq.org/public/publications/handbook.html, http://www.smihq.org/public/publications/handbook.html

How a four-slide machine works: http://www.fourslide.com/fourslide-reference.htm, http://www.fourslide.com/fourslide-reference.htm

Machined springs: http://www.taylordevices.com, www.taylordevices.com

North American Aerospace Defense Command (NORAD), Cheyenne Mountain, Colo.: http://www.norad.mil/about/CMPOC.html, www.norad.mil/about/CMPOC.html

Technical Q & A: http://www.centuryspring.com/pdfs/techfaqs.pdf, www.centuryspring.com/pdfs/techfaqs.pdf

Titanium springs: http://www.rentoncoilspring.com/performance/why_titanium/, www.rentoncoilspring.com/performance/why_titanium/

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The following are companies who have given information on Inspection and Metrology.

product focus

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.

Stephen L. Bond, Sales Manager for Methods EDM, a division of Methods Machine Tools says, "Today's sophisticated wire EDM machines can run unattended for extended periods, dramatically reducing the cost of producing finely detailed parts with exceptional surface finishes, even from hardened materials. [EDM] machines require no expensive electrodes; are capable of producing extremely sharp blade edges and very small inside-corner radii for tightly mating parts; and offer the lowest operating cost per hour of any type of machining."

FANUC

FANUC has completely redesigned their new iD Series wire EDM machines. Machines feature a beefier, thermally insulated cast Meehanite base that is 40 percent more rigid than previous models. Table travels were increased with no load overhang during table movement. Heavy-duty 1.26" (32 mm) ball screws for the X and Y axes are double-anchored and encapsulated to prevent contamination. Ball screws for the U and V axes are Ø 0.79" (20 mm). The iD Series' 310iS-WA control features a Windows® operating system, 15.1" LCD touch screen, split-screen graphics with increased drawing speed, interactive parts/maintenance assistance, and file transfer via USB memory stick or Ethernet.

The FANUC AWF has been entirely redesigned, including a new Air Jet wire transport system in the upper annealing pipe. The twin-servo wire-tensioning system reduces tension variations. Machines use standard brass wire. Precision 0.010" (0.25 mm) guides are standard, but machines accommodate guides for 0.004"–0.012" (0.1–0.3 mm) wire.

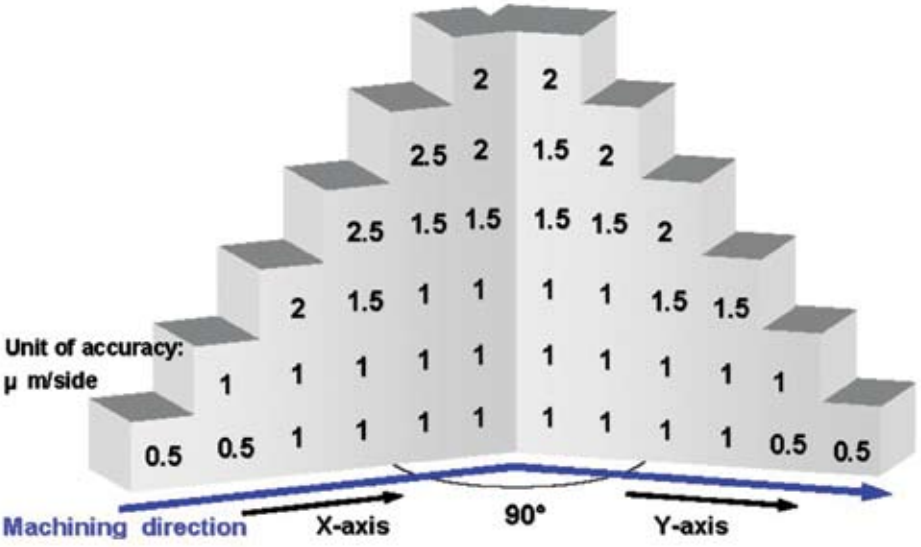
For more information, please contact Methods Machine Tools at 978-443-5388 or visit www.methodsmachine.com.

Agie Charmilles

GF AgieCharmilles has announced the debut of the CUT 20, which handles wire diameters from .15 to .30 mm with ease. GF AgieCharmilles constructed the CUT 20 with a T-shaped base frame that permits the loading of large, heavy workpieces. They have added a glass scale on the X- and Y-axes. The CUT 20 also features the HMI (human-machine interface), which is built on the Windows XP platform to enable integration into a data network via LAN.

Adding to the design of control is the Swiss-made IPG-V generator. The generator makes fast removal rates possible, even with brass wire. Additionally, the inclusion of GF AgieCharmilles' new "Speed" technology package allows the CUT 20 to achieve surface finishes between Ra .60 µm and Ra .35 µm while minimizing operating costs.

For more information, please contact Agie Charmilles at 800-CTC-1EDM or visit www.gfac.com/us.



Makino

Makino is proud to offer its latest Wire EDM technology development, SurfaceWIZARD™, which the company states virtually eliminates witness lines. Historically, when stepped parts have been Wire EDMed the process would leave a "witness" line at the transition from one step thickness to the next. SurfaceWIZARD virtually eliminates these lines and has been shown to maintain part straightness within 5 microns in one pass and within 2.5 microns in two pass machining. SurfaceWIZARD technology has been developed for tool steels up to 4 inches thick, and will support 0.008" and 0.010" diameter wires with one and two pass conditions.

For more information, please visit Makino's website at www.EDMmatters.com and read tips and ideas from Makino EDM.

Global EDM Supplies

Gamma Phase Coated EDM Wires feature an outer layer of high Zinc diffusion annealed gamma phase brass (Cu35Zn65). These proprietary wires are manufactured exclusively for Global EDM Supplies under US Patent # 5,945,010. The proprietary Gamma Phase Coating has a combination of Zinc rich coating composition and discontinuous surface structure. The benefit of a Zinc rich coating is its "flushability," to vaporize without leaving debris that must be flushed away by the water. The discontinuous surface structure allows for improved cooling of the wire along with improved debris evacuation from the cut. The combination of these two properties result in cutting speeds that are typically up to 20 percent faster than other coated wires and 50 percent faster than brass wires. Gamma wires are available in three series: Gamma Brass®: Replaces brass wires and legacy Zinc coated wires; Gamma X®: Replaces legacy X type wires for Charmilles machines and aerospace applications; Gamma D®: Replaces legacy D type wires for Agie machines and high performance applications.

For more information, please contact Global EDM Supplies at 800-290-7573 or visit www.gedms.com.

product focus

EDM Network

EDM Network and CHMER EDM offer their newest wire EDM for EDMing dovetail form and shave tools, the A322S. This 6-axis wire EDM features many standard features like the "world's fastest AWT" that can rethread on location, under water, through the kerf in less than 10 seconds. In addition, the dual AC/DC power supply allows for EDMing PCD and PCBN inserts as well as carbide for form tools in addition to M42 and other tool steels. The A322S, as well as all of the other larger wire EDMs from CHMER, can also be equipped with a built-in or add-on B-axis in the submerged worktank for indexing workpieces such as fluted reamers and specialty cutters automatically from the CHMER CNC controller.

For more information, please contact EDM Network, Inc. at 630-466-5588 or visit www.edmnetwork.com.

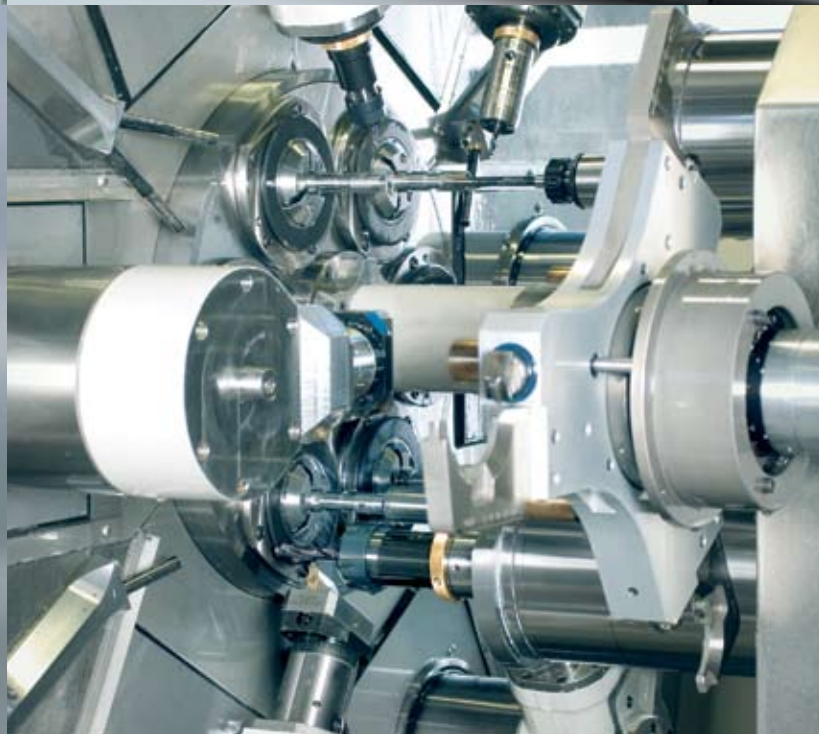
product focus

Sodick

Sodick's new Hybrid Wire EDM combines the fast cutting speed of a waterjet machine with the cutting accuracy of a wire EDM. Sodick incorporated their own Intelligent Qvic control technology that controlled both the waterjet and the EDM process. A 3D CAD file can be imported into the Hybrid's control and automatically converted to NC code for both the waterjet and the EDM process. The operator then selects the workpiece material, thickness, and wire diameter from a pull down menu and the cutting data is automatically entered into the program. Sodick's own linear motor drives are also used on the X,Y,U,V axis drives.

The Hybrid Wire EDM can be operated in three different modes. As a waterjet only machine, it can cut non-conductive materials. It can be used as a wire EDM only or the combination of the two technologies. Since the same set up can be used for both processes, there is no need to re-fixture the workpiece. The Hybrid Wire EDM has an axis travel of 22" x 14" x 10" and a maximum workpiece size of 30" x 15" x 10". Its maximum workpiece weight is 2,200 lbs. The waterjet process can cut up to an 8° angle while the wire EDM process can cut a 30° angle. Standard items include high speed annealing AWT, jumbo wire spooler and wire chopper.

For more information, please contact Sodick at 888-639-2325 or visit www.hybridedm.com.



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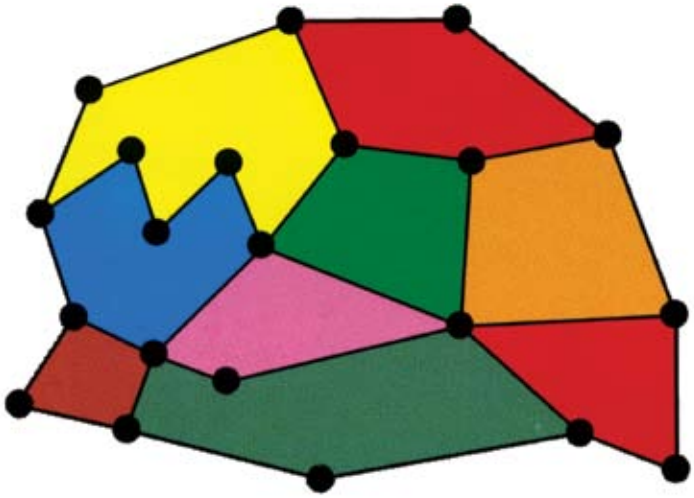
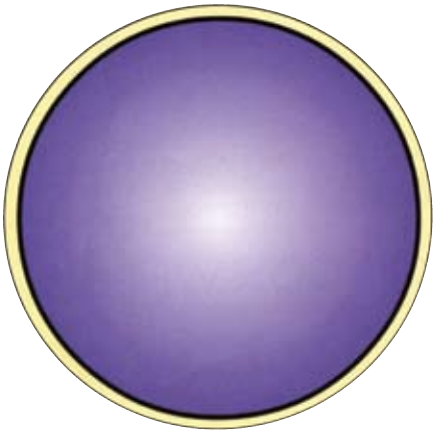


Examine the complex polygonal map illustrated above. Then count the number of points represented by the black dots. From that number, subtract the number of sides, and add to that result the number of regions. What is the number? Will it be the same for every polygon, regardless of its size, shape and complexity?

Cutting a Sphere

Imagine that the four cuts have created a tetrahedron in the interior of the sphere. Based on that tetrahedron, the sphere has been divided into the following regions: four at the vertices, six at the edges, four at the faces of the tetrahedron, and the tetrahedron itself. The total is fifteen regions.



Who cut it?

Richard Knapp of P.S.S. Company in Girard, PA; **Greg Tetrick** of Cass Screw Machine Products in Minneapolis, MN; and **David Visnic** Touchstone Research Laboratory, Ltd. Millennium Center Triadelphia, WV .

postings

Noteable and newsworthy information and events for the month of July

Introduction Machinery Vibrations

Vibration Institue

Willowbrook, Il

July 29- August 1, 2008

www..vibinst.org

Oil Analysis

(Training)

Salt Lake City, UT

July 8th - 10th

www.noria.com/training/oal/

Lean Plant Reliability Advantage

(Seminar)

Chicago, Il

ww.noria.com/training/eprm/

July 22nd thru July 23rd

IMTS 2008

Chicago, Illinois

September 8 thru September 13

www.imts.com

Machinery Lubrication

(Traning)

Pittsburgh, PA

July 29 - 31

www.noria.com/training/MachineLube/

EASTPO

Shanghai International Machine Tool Fair

July 9-12, 2008

http://en.eastpo.net

Fingerprint

first used for identification

July 17, 1858

www.http://onin.com/fp/fphistory.html

July 20, 1969

Neil A. Armstrong is the first man on the moon

www.science.howstuff-works.com

Metrology

Systems Conference

July 21-25

Concord, NC

Birthday

Julius Caesar

July 12 or 13, 100, 101, or 102 BC.

www.roman-empire.net

calendar

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president *of*
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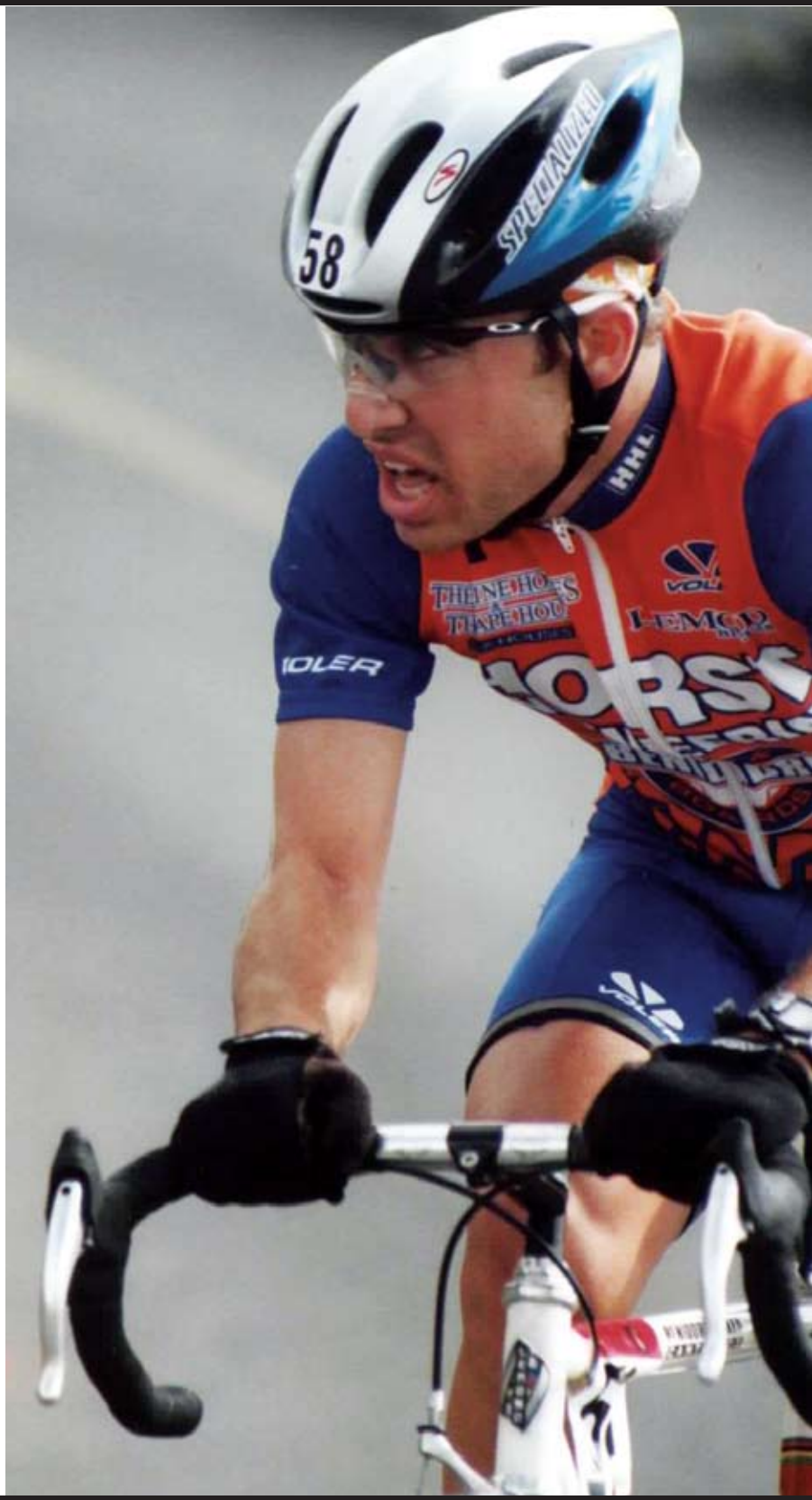

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up to $70K –Hartford CT – must know swiss programming, large medical OEM, great benefits list, leadership, planning, R&D

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ENGINEERING MANAGER
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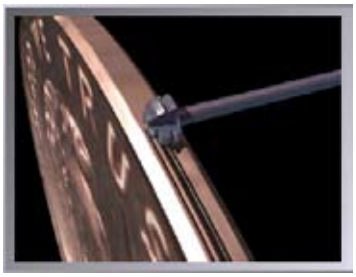

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For Sale

Machine Tool Magnate

It was a balmy April night. The pizza was worthy of Napoli – crisp, bubby thin crust, nice mozzarella and gorgonzola cheese with fresh mushrooms and tomatoes. The Cokes were cold with real sugar, not the fructose imposter. After pizza we picked up groceries at the new supermarket, then bopped over to the local video rental shop. We chose *Rocky Balboa* and *The Bourne Supremacy* and headed backed to the apartment for a night of TV.

Saturday night in Zlin, Czech Republic, with the Managing Director of the 1,600 person ZPS Machine Tool Company. Saturday night, kicking back with my son Noah and Mickey Tajariol, who had lived and worked with us in Chicago seven years earlier.

Noah and I had arrived in Zlin the day before to see the new CNC multi-spindle, which ZPS is positioning to compete with Index and Schutte for the million dollar a copy market for machining sophisticated high volume components. But we also came to reconnect with Mickey, his parents Andrea and Karen, and brother Lorenzo. It was business – of course it was business. Would we have schlepped 13 hours across seven time zones nibbling square airline food if it wasn't business? But this was also personal because Mickey is a special person to Noah and me – not quite family – but almost.

"To me this visit was to understand how the Tajariol universe and the Graff universe are realigning."

To me this visit was to understand how our worlds – the Tajariol universe and the Graff universe – are realigning in the international machine tool trade. They wanted my input on the American market's tone in the time of the hot euro, and I wanted to feel out the potential for a newly-honed relationship with the Tajariols, who also own Wickman.

But it was also a chance for Andrea to show me the culmination of his long romance with the multi-spindle screw machine, an eight-spindle mastodon of a machine – full CNC. And for Noah and I it was the opportunity to eat Karen Tajariol's risotto for dinner on Friday night.

Business, family, food – rebooting a relationship that required the refreshment of real physical contact. As I get older I sometimes trick myself into thinking that the phone or email can substitute for the conversation that takes place at the car door between sips of a Pilsner. The words may be similar, but it takes a lot of talking to get to an insight or a feeling. The limitations of phone and computer usually leave people short of the real human connection that changes everything.

So Noah and I journeyed to Czech. He and brothers Mickey and Lorenzo stayed up 'til 3:00 in the morning – laughing, comparing notes about women, being big kids before they resumed adult roles the next day.

Mickey is putting a fortune into rebuilding a huge old house – indoor swimming pool and all the accoutrements worthy of a Managing Director of a big, successful business. There will be a prominent space in the living room for his billiard and foosball tables in a spot where he could fit four CNC sliding heads with magazine barloaders.

Mickey frets that it is hard to tell if the Czech girls in his life want him or the "life." His Hollywood house, which will be finished by late summer – even though he has no idea how he will furnish it – will be a great place for parties and one day, for kids. But in Mickey's real world of 2008 it's mostly for him and the dog.

Noah and I left Zlin Sunday morning after eating the breakfast we fixed together in Mickey's Ikea-style flat. Mickey said the highlight of his day would probably be romping with his dog Caddy. His personal assistant Hana had arranged for a driver to Vienna and reserved a hotel room for us there.

On Monday Mickey resumed his life as the machine tool magnate of Czech.

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Front Tool	5
Back Tool(Driven)	4(2)
Off-Center(Driven)	2(2)
Cross Tool(Driven)	4(4)
Power	Main 5.5/7.5kW Sub 2.2/5.5kW
Weight	4,050kg
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