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March 2009 volume 5 issue 3

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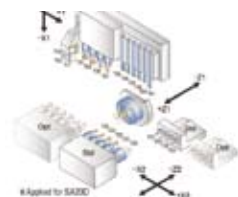


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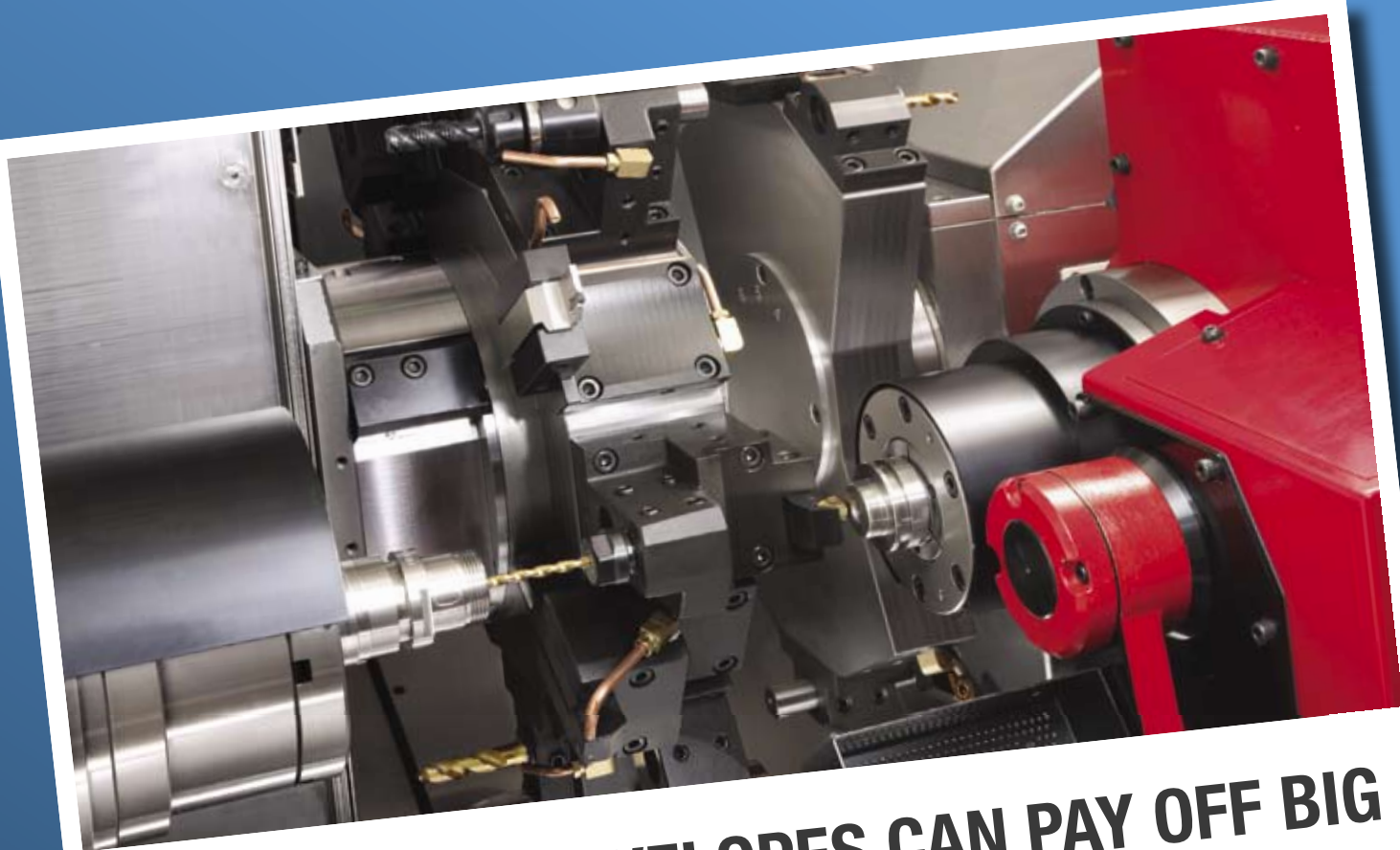
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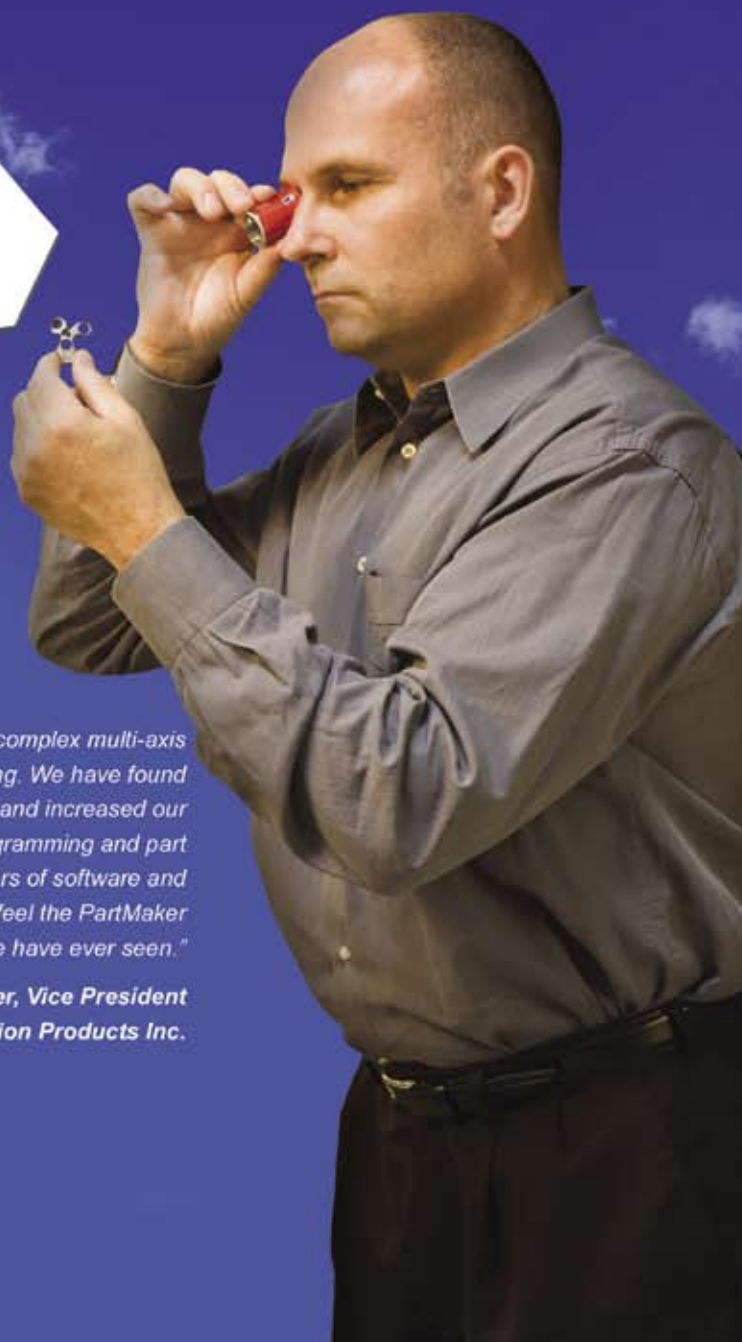
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# editor's note

## Keep On Drilling

I used to jog regularly with a fellow named Gordon McKeague. He was a big guy like me, so as we lumbered through the neighborhood on our six-mile treks we had a chance to talk quite a bit.

Gordon was a bigwig at Amoco, the oil giant based in Chicago which was ultimately absorbed by BP, then called British Petroleum. He had lived all over the world and earlier in his career he was involved in oil exploration for the company.

One summer night he recounted the story of Amoco's biggest oil find—the fabulous Prudhoe Bay discovery in Alaska. Gordon had been part of the exploration team at Amoco so he knew what he was talking about.

The geologists and drillers believed there was oil in the underground rock formations near Prudhoe and they convinced management to sink 72 exploratory wells. They amassed the tubular steel and drilling equipment and started punching their holes in the tundra of southern Alaska. The first week they hit nothing. For months they sank their steel and rock bits around Prudhoe and struck zilch. They drilled their 72 wells and came up empty.

But after their fruitless work was supposed to be done they found they had enough pipe for two more holes. So what the heck—rather than leave the stuff for the scrap dealers they decided to expend their tubing. Number 73 was dry, but on the last exploratory well they hit the black gold they believed in their gut was waiting to be lifted from Alaska.

Gordon's story has stayed with me long past our runs together. When business has been tough and I thought the next customer would never appear, I often recalled his Alaska story, which he swore was absolutely true.

But even if they struck oil on number 73 instead of 74—so what. It is the authentic story that keeps us going in this life.

Let's keep drilling until the last tube and bit are used up.

Lloyd Graff  
Editor/Owner



**Paul A. Eisenstein** is a veteran automotive journalist based in the Motor City—that is, if you can ever find him there. His coverage of the products and people, business and trends keeps him on the road much of the year. Mr. Eisenstein publishes a news/blog, [TheDetroitBureau.com](http://TheDetroitBureau.com). He has won numerous awards for his writing; serves as a board member with the Automotive Press Association and is a juror for the prestigious North American Car and Truck of the Year awards.



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



**Lloyd Graff** is the founder and owner of *Today's Machining World*. He also co-owns Graff Pinkert and Company—a machinery trading firm—with his brother, Jim. He has been around metalworking equipment since he was a child, when his father, Leonard, would bring him to the screw machine plant he owned. *Today's Machining World* developed out of his love of writing and his fascination with buying and selling used machinery. In his spare time he watches TV and worries a lot.



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



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### Keeping on

I have been reading your magazine for a couple of years now, having had it recommended to me by Dennis Hoff of Hoff-Hilk Autioneers. I enjoy it very much, and in fact, it's the only trade magazine that I don't just skim. I hope you can keep it going—I'm sure it must be tough. I've been involved in manufacturing since 1966 when I started as a screw machine operator at Honeywell. I stuck with screw machining in various capacities, including a stint with National Acme as a sales engineer until the early 1980s when I started this business to make form tools for screw machines using wire EDM. That business is all but gone now and we have transitioned to precision job shop machining, now employing about 20 people. I feel as if we have been under constant stress since around 2000, but, like a lot of other industries the good shops survive and the weak ones fall by the wayside. I hope Lloyd's health continues to improve and you can keep the magazine going. There is nothing else like it!

**Mark Eriksson**

Form Tools Incorporated  
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### Tough love

Emily Halgrimson is perfect in her position as managing editor. "Turning Hardship into Hope" is a factual article written by a compassionate person. The text and photos truly have a person-to-person feel, which is hardly ever found in any other trade magazine. One of the most important points made is that learning a skill can lead to a college education. A large percentage of industry leaders started their career with that approach, though most parents and educators are not aware of this fact. Also, many college students do not end up with six credit hours during the first 16 weeks of attending college. It seems to me that the MTA has created a tough-love program that provides the industry with skilled and adaptable employees with great character. I am truly impressed by the fact that the students end up with a forklift operator certificate and OSHA certificate in addition to machining, CNC set-up and operating. I hope that Eddie Welch will look into getting NIMS accreditation for the MTA program, which will

then give the students a truly portable skills certificate. The advisory board mentioned provides the input to keep this program in tune to the needs of prospective employers. Our industry leaders too often do not realize that getting involved in the local high schools with a machine shop or a nearby trade school is beneficial to the students and industry alike.

**Paul Huber**

President, COMEX®  
Bridgeport, CT

*The TMW Swarfblog, found at [www.swarfblog.com](http://www.swarfblog.com), recently posted a blog on GM's decision to suspend work on the \$370 million factory being built to assemble the new Volt. The following questions were posed: Are you disappointed that GM stopped construction of the Volt's engine plant? Should the company give up on the project, or has it already?*

### Out of touch

The Volt is actually a redux of its former protégé—another version of an electric car that they released and then reneged on (see the documentary, *Who Killed the Electric Car?*). It was one of the few things I was looking forward to seeing on the horizon of American manufacturing. It has a cool design too, but the cost will probably be way out of line with the average consumer's buying capability. That's where GM falls on the job. They are so out of touch with the rest of us.

**Elizabeth Barr**

The Machinist's Wife blog

### It's possible

Let's all hope they can make the Volt and capitalize on their innovations in the media—like Toyota has done with Prius. It will be costly. And like Prius, you most likely will not get your money back with the current price of fuel. But it can be used as a "flag" for the company, like what Ford did with the GT. (Got the young guys to buy Mustangs and such). If fuel hits \$4.00 a gallon, it should be a real hit.

**Marty Fielder**

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

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

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

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# Changing With the Times

**B**ack in the Bronze Age of magazines *The Reader's Digest* was king. The editors condensed interesting pieces from other publications and solicited their readers to submit small 100 word stories that they ran at the bottom of many pages. It was a fabulously successful formula and propelled the magazine to success comparable to *I Love Lucy* on TV.

My writing career began by submitting short pieces to *Reader's Digest*. I actually got a few published—the beginning of my career as a professional writer. I received \$25 for pieces they ran. It was a little like Woody Allen's professional start in which he wrote jokes for popular comedians and picked up five bucks for each one that ended up in a routine.

The grandchild of *Reader's Digest* is the online forum and blog. Writers can be heard on a million topics. Questions can be answered by a myriad of experts or at least self-proclaimed experts.

I have been trying to build a community with *Today's Machining World* since I began the magazine. We had a forum at the beginning but it got spammed to death by porno raiders who flocked to a magazine named *Screw Machine World*.

We started the [www.swarfblog.com](http://www.swarfblog.com) rendition a year ago, but it has not caught fire like I had hoped, maybe because it had similar content to this magazine.

My son, Noah Graff, built the ShopDoc column in *TMW* into a successful component over the last four years, and we felt that ShopDoc could be a natural forum for the online world.

In February we launched the ShopDoc Forum online with an email promotion. We are offering a chance to win a gorgeous Gerstner oak toolbox to people who post by April 15, 2009. So far the response has been sensational.

We have learned that with online products, just like popcorn, fitness clubs or SUVs, you have to advertise and promote—not just once, but continually. Success does not just happen.

The ShopDoc Forum is going to be huge. Join the fun. Win the toolbox. Change with the times. *Reader's Digest* is virtually an artifact today. If a business does not align itself with the Web, it is missing the opportunity of the decade.



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## Doctors' Opinions of the Financial Bailout Package

The Allergists voted to scratch it, and the Dermatologists advised not to make any rash moves. The Gastroenterologists had sort of a gut feeling about it, but the Neurologists thought the administration had a lot of nerve, and the Obstetricians felt they were all laboring under a misconception. The Ophthalmologists considered the idea shortsighted. The Pathologists yelled, "Over my dead body!" while the Pediatricians said, "Oh, Grow up!" The Psychiatrists thought the whole idea was madness, the Radiologists could see right through it, and the Surgeons decided to wash their hands of the whole thing. The Internists thought it was a bitter pill to swallow, and the Plastic Surgeons said, "This puts a whole new face on the matter." The Podiatrists thought it was a step forward, but the Urologists felt the scheme wouldn't hold water. The Anesthesiologists thought the whole idea was a gas, and the Cardiologists didn't have the heart to say no. In the end, the Proctologists left the decision up to the asses in Washington.

*-Submitted by Susan Minerbi*

**A thought about the** housing bust and the gasping U.S. economy. We could jumpstart the country with a simple act: Expand legal immigration.

The best and brightest of the world still want to come here. Immigrants have built this country since the days of Plymouth Rock and Jamestown. Immigrants built the Intercontinental Railroad, mined the coal, manned Silicon Valley and brought us sushi and tacos.

When Canada was huffing and puffing to get some growth in the 1990s they pushed through immigration enhancement legislation aimed particularly at Chinese who were scared about the imminent change in Hong Kong from British rule to Beijing's hegemony. Chinese immigration to Canada, particularly Vancouver, sparked a real estate boom and economic revival.

The Canadians demanded that immigrants bring money with them. It took a sizeable stake to get into the country. We could try something like that today in the U.S. We could also expand visas for educated people to come here to work and study. Due to post-September 11th anxieties, heightened by a paranoid Bush Administration and the loudmouth Lou Dobbsians, we frittered away our luster as the place to go for the world's smartest and most ambitious people.

If we tried the immigration gambit we could quickly accelerate our moribund economy.

**Serena Williams**, winner of 10 Grand Slam Tennis Championships and once again number one in the world of women's tennis, just does not know how to play the game correctly. As much as she annoys me with her approach, I have to appreciate her as a competitor.

I've played a lot of tennis—nice serve, no backhand—and I truly love the game. That's why Serena and her sister Venus irritate me so much. They don't play the game right. Technically they stink. In tennis, footwork is crucial to success—except for the Williams sisters. They do not move their feet well, and they look lazy on the court. They don't seem to go on the court with a well thought out plan, and they lack full-time coaches. They don't know what they are doing—but they win.

Serena and Venus grew up in Compton, Cal. near Watts, playing on cement courts with their Dad, Richard, a charismatic nut who believed he could make the sisters into Wimbledon Champions and keep them sane human beings at the same time. He somehow convinced Reebok that Venus was worth betting on at 9 years old, and little Serena soon joined the party. Perhaps because they did not learn the game at the Nick Bollettieri tennis factory in Bradenton, Fla., where most of today's pro players have prepped, the Williams sisters developed a style and attitude different from the crowd.

They do not play a million tournaments a year. They play doubles together in the Grand Slam events rather than husband their strength for singles. They play their own game and do not move their feet properly to win points. They just win matches and championships—they crush opponents.

Billie Jean King was one of the greatest women's players of all time. I once heard her interviewed when she discussed her view of what it takes to become a champion. She said that you need one superior stroke—forehand, serve, whatever. Your other strokes need to be okay, but to win you must have a go-to weapon and that was what you really needed to practice. The Williams sisters have followed her advice. They have developed contrarian tennis, focusing on their strengths—serving and power forehand—while not worrying so much about their supposed deficiencies like footwork and body mass.

The lesson is obvious. Develop one, great strength and build on it. You go girls.

**I am sick and** tired of the barrage of negativity I read, see on television and hear in the street.

Does the economy stink? Yes, but not for everybody. Most people are working. Thousands of jobs are available—just check the Websites. And new businesses are popping up like April tulips.

swarf

I recently checked out a new book about why starting a business during a recession is a sound idea. I am intimately familiar with one start-up. My friend Stanley is building his micro laundry for healthcare institutions behind his retail coin Laundromat.

The beauty of starting a new venture today is that almost every overhead expense is way down in price versus a year or two ago.

My buddy Stanley, after a long odyssey of bank shopping, has a solid line of credit with a major Chicago bank and is buying the equipment to outfit his micro institutional laundry. The six-month delay in securing financing turned out to be a blessing because he was able to study the best and worst practices of two of the biggest healthcare laundries in Chicago first hand. He has one significant hospital account that believed in him and his business concept. They have stuck with him even though his physical laundry has taken longer to take shape than he expected. Stanley has stood by his commitment to them by farming the work out to two sources. He often picks up the laundry himself in a Ryder truck and gets to

study a multi-million dollar operation as an insider. He has developed relationships with the top managers and salespeople as well as the operating folks and fellow truck drivers. He figured out the best equipment to buy and first rate maintenance people who would moonlight. He also found how they cut corners and fudged on the sanitation compliance standards. This experience confirmed to him that he could compete very nicely against them with a tiny footprint laundry that executed its plan faithfully and picked its spots. Big laundries have big built-in costs that economies of scale cannot fully overcome.

To complete his laundry, Stanley needs a dryer-folder, which costs \$35,000 new. Under my tutelage he has probed the secondary market for a good used model. The dryer-folder he needs is the Wickman of laundry



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equipment—reliable, sturdy, old technology. Good used is 90 percent of new for efficiency and 25 percent of the price. Fortunately for Stanley, the market for used laundry machinery is totally fragmented and devoid of good trade publications or Web sites to search for equipment. But he combed 1,000 Google pages and found two used machines that fit his needs. He also found an expert in Chicago to refurbish and maintain the machine he ultimately buys. The laundry machine pro will work by the hour at a rate far lower than the factory service guys get.

Stanley also needs a boiler, water purification machinery, and skilled labor to install them. He will find the boiler used and the services at a fraction of what he would have paid a year ago. He is preparing an RFQ and expects 20 bids from qualified people.

Stanley can be shrewd about costs but ultimately success will come by securing clients. This is where the recession also works for him.

He is hungry and willing and able to offer value for money that established competitors cannot or will not.

Stanley is also single, lives at home and has a working Laundromat to cover his expenses and pay him a salary. He has the time to solicit new customers when his micro laundry is up and running and illustrating the viability of the idea.

When I see Stanley hit the street running to build his independent business I get inspired. *Today's Machining World* is no start-up. But today the opportunities on the Web and with video make it feel like a new business.

If we all looked at our businesses—and lives as start-ups, we would be more successful and have a lot more fun.



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BY JERRY LEVINE

## THE TRILLION DOLLAR MELTDOWN

Years ago I considered myself an expert in credit markets and corporate finance. But having been retired now for over 10 years, I am technically obsolete. When I read Charles Morris' *Trillion Dollar Meltdown* I finally began to understand collateralized debt, astronomical leverage at banks and their hedge fund clients and the ever-cryptic credit default swaps. I also began to understand the huge financial mess we are in.

Although Morris finished writing his book over a year ago and it was published in March, 2008, it took some time for people to realize that he had accurately predicted a major recession in 2008, along with the stock market collapse and credit market seizure. He also predicted that housing prices would fall 10 percent to 30 percent and consumer spending would drop precipitously. His predictions read like they were written yesterday.

How did we get into such a fix? Morris begins with the long period of Keynesian liberal government-centric policy which led to the great inflation of the 1970s. As a cure for this Nixon took us off the gold standard and introduced a failed policy of wage and price controls. Carter followed with an almost Soviet-style system of controls on parts of the economy that were connected to gasoline lines, stagflation and his "national malaise." Both men made a bad situation worse.

The early 1990s saw the birth of structured finance, the formalization and expansion of financial derivatives (options) markets and the mathematical modeling and computerization of trading. Excessive risk throughout the system along with the more deregulated environment worked to create the credit bubble that is imploding all around us today.

Financial problems began with collateralized mortgage obligations (CMOs), originally on behalf of Freddie Mac. Brokers and banks sold their mortgages to Freddie, who bundled them (from AAA rated to "toxic waste") and sold off various levels called "tranches." Eventually, all kinds of bad debt, not just sub-prime mortgages, became packaged with good debt as collateralized debt obligations (CDOs), and were sold, often on margin, to hedge funds. Toxic CDOs and CMOs each represent about \$400 billion of the trillion dollar problem.

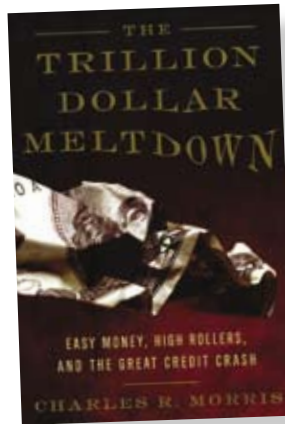
Then two other things happened. First, in the early 2000s the Fed lowered interest rates to less than the rate of inflation, so the short-term interest rate was negative (essentially free money) and credit insurance became available. Credit insurance was initially purchased from insurance companies like AIG, but this could be reinsured through the derivatives market with "credit default swaps." Lending became costless and riskless. Freddie would buy whatever bad deal any mortgage

broker made. Any rational lender would keep lending until there was no one else to lend to. But there was no substance to back the insurance which backed the bad loans. Eventually, all this highly leveraged, bad debt was teetering in "Yertle the Turtle" land. Then someone sneezed.

The good news is that Charles Morris knows not only the causes, but some cures. He lists what must be done to regain balance. The first priority is to restore effective oversight of the financial industry and restore confidence in American markets. The program should start with the banks. Loans to highly leveraged parties should carry penalty capital charges. Bank-like capital requirements should apply to all lenders. Loan originators should retain first losses.

Accountants shouldn't recognize credit insurance from thinly capitalized entities. Credit derivatives should trade in exchange markets, not over the counter, or in inflated sales between banks. Finally, Congress should restore Glass-Steagall separation between commercial and investment banks.


The financial meltdown was caused by the coddling of the financial industry, fertilized with free money and no-risk lending. It was propped up with tax advantages and insured with fresh funds from the Fed every time it faltered. Hopefully, the current collapse can be righted quickly enough that the entire economy will not drop into a very deep recession.



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







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## Hardy and flexible ▼

Hardinge's new FlexC™ Collet Systems are flexible, sealed collet heads that interchange quickly and are available with spindle mounts for all brands of CNC lathes. Pull-back thru-hole, pull-back stationary stop and push-to-close dead-length® styles are available for main and sub-spindle CNC lathe applications. Purchase one spindle mount and interchange collet heads from job to job. Hardinge FlexC collet heads are fully interchangeable with other models. The changeover concept uses a manual wrench to compress the collet for removal or replacement in seconds. A typical FlexC collet head has a gripping range of .020"



(.5 mm) to allow variation in bar stock without having to change the collet. There is no collet shank, therefore, the collet segments remain parallel to the stock even when there are variations in the stock size. Parallel clamping minimizes stock "push back" and requires less draw bar force to achieve the same gripping capability as conventional collets.

For more information, please contact Hardinge at 800-843-8801 or visit [www.hardinge.com](http://www.hardinge.com).

## Hot and new ►

Haas Automation's new EC-630 is a large-capacity, high-production horizontal machining center with a 40" x 33" x 35" work envelope, 50-taper geared-head spindle, dual pallet changer with 630 mm pallets, 50-pocket side mount tool changer and a built-in 1 degree pallet indexer (a full 4th axis is available). The EC-630's geared head couples the motor directly to the spindle through a Haas-built gearbox. The two-speed gearbox provides 450 ft/lb. of torque for heavy material removal, and speeds to 6,000 rpm for finish cuts. Each of the machine's 630 mm pallets handles a 2,645 lb load, and the servo-driven pallet-changer swaps pallets quickly. A separate, protected load station allows the operator to safely load and unload parts or change fixtures on one pallet, while parts are being machined on the other — keeping spindle run-time at a maximum. The machine's enclosure accommodates parts up to 39.4" in both diameter and height.

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



## Holding it down ▼

Advanced Machine & Engineering Co. (AME) introduces several new workholding-clamping products from Jakob Antriebstechnik. The series MC power clamping nut offers simple manual operation, high clamping forces through force magnification, and high operating safety as a result of a self-locking feature. The series ZSF/ZDF hydro mechanical spring clamping system provides mechanical clamping with a hydraulic release. It boasts high operation safety because the clamping force generated is independent from the oil pressure and from pressure loss as a result of leakage. Series SC power clamping screws use a wedge clamping system as a force amplifier. This results in high clamping forces ranging from 40 kn to 120 kn and low tightening torques.

For more information, please contact AME at 815-316-5277 or visit [www.ame.com](http://www.ame.com).





# fresh stuff

## Explosive control ▼

Nook Industries, a linear motion control systems and components manufacturer has recently introduced its ELZex Modular Linear Actuator series which meets ATEX 95 explosion area testing certification for caustic environments. The heavy-duty rod-less design is belt-driven and features the industry's only anti-static HTD (high torque drive) belt on the market. The ELZex presents a unique solution for extreme manufacturing environments. The design features stainless steel guide rods (modified from standard) that work in conjunction with adjustable track rollers to maintain consistent contact with the stainless steel guide rods which prevent potentially explosive electric arcing discharge.

For more information, please contact Nook Industries at 800-321-7800 or visit [www.nookindustries.com](http://www.nookindustries.com).



## Tough guides ►

NSK's PU/PE series of linear guides are fabricated from martensitic stainless steel. They feature high corrosion resistance and are suitable for miniature applications in the medical, semiconductor and automation industries. NSK equipped the PU/PE series with newly designed resin ball recirculation components that offer smoother motion, reduced noise output and dust generation. The improved design also provides excellent dust proofing, lower particle generation and features a safety design that prevents steel balls from dropping out of the ball slide. Interchangeable rails and ball slides are stocked for quick delivery, and high accuracy preloaded assemblies are also available upon request.

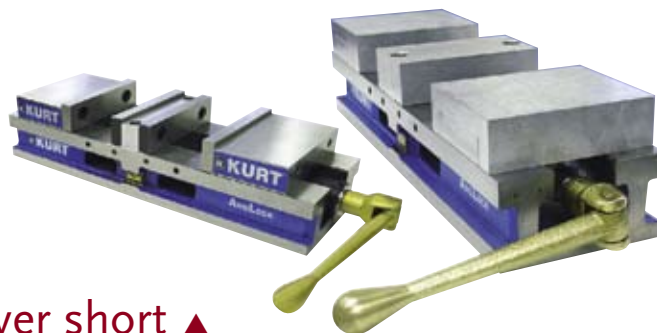
For more information, please contact NSK Precision America at 317-738-5089 or visit [www.nskprecision.com](http://www.nskprecision.com).



## Never short ▲

Kurt introduces its new high-density long (HDL) vises with two clamping stations. Available in 4" and 6" capacities and in manual and hydraulic models, they increase machining center output using existing machining centers. Designed on an 80,000 PSI ductile iron body with precision machined steel components, these new HDL vises are extremely rigid delivering up to 6,316 lbs. of clamping force at 70 lbs. of torque. Both size vises provide strength, rigidity and long-term accuracy while absorbing machining vibration. Both feature two clamping stations with a full 3" or 4" opening in each station using Kurt's standard hard jaw system. The HDL manual model vises easily convert to hydraulic operation using a conversion kit.

For more information, please contact Kurt Manufacturing Company at 877-226-7823 or visit [www.kurtworkholding.com](http://www.kurtworkholding.com).





## How to ... ▲

PartMaker Inc., a division of Delcam, is releasing a comprehensive set of instructional videos for using the new features in the recently released PartMaker Version 9. They are available for download at [www.partmaker.com](http://www.partmaker.com). The major highlight of PartMaker Version 9 is a new look user interface featuring easy-to-use, user-configurable toolbars. Existing icons have been recast to make them easier to understand. The new tool bars, populated by attractive and easy-to-understand icons, make the software faster and more productive for both new and existing users. The revamped user interface has been carefully planned out so that existing PartMaker users will be able to use PartMaker Version 9 without any additional learning curve.

For more information, please contact PartMaker Inc. at 215-643-5077 or visit [www.partmaker.com](http://www.partmaker.com).



## Traking along ▲

The TRAK TRL 1630SX lathe, featuring the ProtoTRAK SLX CNC, is the smallest toolroom lathe in the TRAK line. The 1630SX may be operated manually or CNC with the optional TRAKing feature. The bedways are hardened and ground and sliding surfaces are Turcite coated. The 1630SX comes with electronic handwheels and a jogstick and a spindle speed range from 150 rpm to 2500 rpm.

For more information, please contact Southwestern Industries, Inc. at 866-876-0601 or visit [www.southwesternindustries.com](http://www.southwesternindustries.com).

## Better and new ►

Rush Machinery introduces the new FC-250EX and FC-700EX Automatic Diamond and CBN Wheel Truing and Dressing Machines designed for truing and dressing of flats, angles, and radii on diamond and CBN single wheels and multiple wheel packs. They feature PLC-controlled, automatic dressing cycles with servo-driven dressing wheel in-feed, power swing and oscillation. The heavy-duty, one-piece, cast iron base provides extra rigidity and minimizes vibration. Standard features include ExVision, a computer-driven vision system with a software program specifically designed for the FC-250EX and FC-700EX and their various applications, an automatic power zoom and a 2-axis DRO for measurement.

For more information, please contact Rush Machinery, Inc. at 800-929-3070 or visit [www.rushmachinery.com](http://www.rushmachinery.com).





# fresh stuff



## Technically speaking ▲

Technifor introduces the TF420 which has a light source operating at 1.06 mm (diode) placed remotely in the control unit and a reduced number of optical components. The marking head takes up a volume of 10 cu. dm, and the light beam travels to the marking head along an optical fiber. The remote control unit can be fitted in a 19" rack and it features an integrated buffer memory. The use of a fibre laser increases the diode service life to 100,000 hours. The TF420 marking head and its control unit have also been designed with the lowest number of optical elements (no Q-switch, no crystal, no RF driver) to reduce maintenance and avoid drift in the settings of the optical components. Also, an electronic safety system featuring a reflectivity alarm stops the laser if the reflection level from the part is too high, and prevents laser damage in the event of incorrect parameterization.

For more information, please contact Technifor at 704 525 5230 or visit [www.technifor.com](http://www.technifor.com).

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# A SUPREME DEBACLE:

## THE LONG DECLINE OF THE DETROIT THREE

BY PAUL EISENSTEIN

**Is the United Auto Workers Union primarily to blame for Detroit's steady demise?**

By the time the CEOs of General Motors, Ford and Chrysler were forced to go calling on Washington, hats in hand, late last year, it seemed like virtually everything that could go wrong had gone wrong. It was, lamented GM CEO Rick Wagoner, "the perfect storm." There was the steady assault of the imports, of course, but then came rising commodity prices and record fuel costs, which sent motorists scampering away from the big pickups and SUVs that served as Detroit's last bastion of profitability. By the time the credit crunch and recession hit, just as Wagoner and his counterparts were making their collective plea to Congress, it began to look like the domestic auto industry wouldn't last out the year.

It didn't help to have the Big Three executives make the major faux pas of arriving in D.C. on three corporate jets.

Nor was the cause helped by the results of the recent election, which had only further politicized Washington. A group of Southern lawmakers, known among their brethren as the "Senators from Toyota," rejected a proposed bailout, leaving open the possibility that two of the Big Three, GM and Chrysler, might not make it to the New Year.

**Would it matter if the Detroit Three went away?**

That was a critical question for lawmakers and an equally skeptical public. Yet even Toyota itself began to weigh in as 2008 began drawing to a close. The Japanese giant—suffering an increasingly serious downturn of its own—recognized that without its American rivals, a number of key suppliers would likely fail, bringing virtually the entire North American auto industry to a standstill. The Center for Automotive Research in Ann Arbor, Michigan, also weighed in with a new study suggesting as many as 3 million American jobs were at risk, a number that threatened to push recession into Depression, in the words of one researcher, if the domestics faded away.



**But with the Congressional wing of the GOP unwilling to move, it was left to the outgoing Bush Administration to work up a deal of its own in its final weeks.**

The package, which delivered more than \$13 billion in loans to GM and Chrysler—Ford had belatedly decided to forego federal aid—came in the days before the holidays began, but it was no Christmas present.

**In return for the initial tranché of cash, Chrysler and GM were forced to accept a mandate far more restrictive than what Congress had implemented in the earlier TARP bank bailout.**

It made it quite clear that there was skepticism, at best, about Detroit's long-term odds for survival. So likely, viability was precisely what the White House would require, demanding that the domestic makers slash costs, realign debt, rethink their product portfolios and deliver plans that adequately laid out terms to repay taxpayers for their largesse.

**Ironically, had the economy held up, the situation in Detroit might have been significantly different going into the New Year.**

In the fall of 2007, the UAW agreed to make a series of concessions, including the creation of a two-tier wage structure. Add a new approach to health care coverage and various steps to improve productivity, and the savings were expected to add up into the billions. Even before the three-year phase-in of the new agreement, factory floor efficiency was rapidly on the rise. "Chrysler has already matched the productivity of Toyota," explained Ron Harbour, whose Harbour Report serves as an industry benchmark. Ford and GM were rapidly catching up, as well. But that's no longer good enough.

"All stakeholders will have to make sacrifices," according to GM's President and COO Fritz Henderson. The jobs banks have closed, and going into mid-winter, the UAW has reluctantly negotiated further cuts. In recent years, Detroit's makers have rapidly slashed their production base, hoping to bring production in line with demand. The bailout is speeding up planned closures and will likely lead to still more. The corporate jets, symbols of profligate waste, are being sold off. But the impact on senior and mid-management is more than

just symbolic. Wage and benefit cuts are being made, and thousands more white-collar jobs at every level, are being eliminated.

## **"TODAY MANY STOCK ANALYSTS VIEW THE COMMON STOCK OF GM AND FORD TO BE VIRTUALLY WORTHLESS."**

**Investors are clearly feeling the pinch, as well.**

As recently as 2007, GM shares pushed past \$50. Today, they're hovering in the \$3 range. Chrysler is now a closely-held subsidiary with Cerberus owning 80.1 percent and the rest being held by Daimler AG. Cerberus Capital Management has agreed to forego any profits from the sale of the automaker. It has reached a tentative agreement with Fiat sPa to form a global alliance that would yield a 35 percent stake to the Italian automaker for no cash investment. Meanwhile, talks continue on plans to write down some of the two makers' massive debt. A conversion to equity would further dilute shareholder value. Today many stock analysts view the common stock of GM and Ford to be virtually worthless.

**Dealers could be among the hardest hit.**

In the industry's early days, there was an advantage to having as many dealers as possible. But today, it's morphed into a serious liability. Part of the problem is that with sales and market share down, existing dealers simply can't move enough metal to support their operations. And hungry dealers cut deals, often bidding against retailers selling the same franchise's products just a few doors away. GM wants its dealers to compete against Ford and Toyota and Mercedes-Benz, not against other GM stores. So, laments COO Henderson, when the market is down by a third, you need to make some drastic cuts in your retail headcount; the U.S. giant aims to trim its dealer body from 6,901, in 2007, to just 4,700 by 2012.

That effort could be expedited by GM's decision to consolidate its eight North American brands—Hummer and Saab will be sold or shuttered and Saturn may face a similar fate, while Pontiac will be reduced to a niche line-up and share showrooms with the new Buick/GMC alliance. Ford and Chrysler, meanwhile are targeting similar retail cutbacks.

**Ultimately, however, the remaking of Detroit will depend upon product.**

Analyst Dan Gorrell says, “Ford is probably in the best shape of the Big Three,” one reason the automaker has opted out—so far—from the federal bailout. Ford has a procession of new products coming to market, from the 2009 Flex “people mover,” to the Fiesta subcompact and next-generation Focus. Significantly, the latter two products were developed by Ford of Europe and only slightly modified for the American market. This move to globalizing product development—the norm for the Japanese and Europeans—should shave off billions in costs.

## “EVEN THE STRONGEST AUTOMAKERS ARE STRUGGLING.”

**GM's global product development program is already yielding big savings and some significant results, including the latest-generation Chevrolet Malibu, which took North American Car of the Year honors, in 2008.**

Virtually all GM products, save for its bigger truck models, will be “globalized” by decade's end, promises Vice Chairman and product chief Bob Lutz.

**The challenge is more severe for Chrysler.**

Exiting its unhappy marriage to Germany's Daimler AG, barely 10 percent of Chrysler's sales were being rung up outside North America, which is why many analysts view it as the domestic maker least likely to survive. “They need to either merge or go away,” contends Senator Bob Corker, the Tennessee Republican who led efforts to block the auto bailout.

**“We're not seeking a sale or merger,” insists Chrysler CEO Bob Nardelli, but the Fiat deal—which will be finalized only if the Obama Administration approves Chrysler's viability plan—suggests there are some alternatives.**

The two makers will work together to expand their presence in key emerging markets, like Russia and China, deriving significant improvements in their economies of scale by sharing components and even product platforms. Meanwhile, Chrysler has set up more limited ventures with Volkswagen and Nissan. The U.S. maker is producing a version of its minivan for VW, boosting its factory utilization, and will do the same thing when it starts churning out a new, full-size pickup for the Japanese maker. In turn, Nissan is providing a new small car for Chrysler's expanding Latin American retail network, and plans to build the small, fuel-efficient Dodge Hornet for sale in the States.

**With all the changes underway, can GM and Chrysler deliver acceptable viability plans?**

And will Ford be able to survive without an injection of federal assistance? Perhaps nothing will determine that more than the federal economic stimulus plan. At January's annualized sales rate of barely 10 million—down from a peak of more than 17 million early this decade—even the strongest automakers are struggling. As a result of the decline in the American car market Toyota will post its first global loss since World War II. It has been forced to slash production at its American transplant assembly lines—even delaying the launch of the newest plant indefinitely—and will make “voluntary” cuts of at least 1,000 jobs.

**What is a sustainable figure?**

Hoping to win over the Obama Administration and the new Democratic-led Congress, Chrysler's viability plan suggests that things won't get better soon. It projects the U.S. market will slip by as much as 2 million units, this year, to a total volume of just 11.1 million, and could hold at that dismal level “for a couple years, and maybe as much as four years, before going up to 13 million,” warned Chrysler Vice Chairman Jim Press. And, if anything, added Press, a worst-case scenario could see sales slip as low as 10 million. Though he in-

sisted Chrysler could struggle through, few see that as possible. "I don't see that happening," warned Ford's marketing chief, Jim Farley, and most analysts believe that the scenario Press paints would lead to a serious shakeout.

## **"SALES OF BIG PICKUPS ARE ONE OF THE FEW BRIGHT SPOTS IN THE INDUSTRY, RIGHT NOW."**

**But even with a stronger economic recovery, there are serious uncertainties, warns consultant Joe Phillippi, of AutoTrends Consulting.**

And some of the challenges could be caused by the very terms of the federal bailout, which require the domestic makers to shift emphasis from gas-hungry trucks to fuel-sipping small cars and hybrids. The plunge in fuel prices has only encouraged American buyers to return to their ways. Sales of big pickups, like the newly redesigned Ford F-150, are one of the few bright spots in the industry, right now. Fuel efficiency has fallen off the consumer's radar. Consider that Prius sales, which topped 20,000 in April, barely hit 6,000 in December. Ironically, if Detroit is pushed to give up big trucks by a federal car czar, and fuel prices remain in the \$1.50 to \$2.00 range, Phillippi and other analysts believe it would be the Japanese who could benefit, with products like the full-size Toyota Tundra truck picking up share.

**Longer-term, however, most experts believe petroleum prices will rise once again.**

In a rare show of solidarity, GM and Toyota are both forecasting numbers in the range of up to \$150 a barrel. But Lutz insists that without a viable energy plan, it

will be difficult to impossible for any maker to lay out a viable product strategy. That's why, he says, "I actually look forward to having a federal car czar, because we've never had a point person in the administration to have a decent conversation with. There's been no one with the concerns of the car companies at heart. If the czar diligently reports back (to Washington), this may lead to a sounder energy and transportation policy in the future."

**What would a sound policy include?**

GM's Lutz and Toyota's Don Esmond are all but demanding new fuel taxes, perhaps a floating figure that would keep gas prices at a minimum level needed to encourage consumers to "go green." Tax incentives of various sorts would also be useful, say industry leaders, to spur sales of hybrids, electrics, diesels, compressed natural gas and other high-mileage models.

**It only makes sense, industry observers echo, that if Washington wants Detroit's makers to lay out solid strategies for the future, that lawmakers craft a viable plan of their own.**

But while that may make it easier to predict the future, there are plenty of tripwires laying in wait for the Big Three today. The federal bailout has bought GM and Chrysler some time, but they're going to face some difficult challenges proving they really can reverse decades of decline.

**Of course, the alternative is to simply accept the argument that the domestic carmakers have outlived their usefulness.**

It's a case some are willing to make, but in the increasingly frail economy, others are backing off. Detroit was the arsenal of democracy during World War II, and despite the skeptics, many still see the Big Three, their suppliers and dealers as one of the critical elements in the fight to restore the economy. GM, Ford and Chrysler will now get one last chance to prove they can reverse decades of decline, and show the world that they are now tough competitors.



# THE SAD PAST

Few labor organizations have been more aggressive—and successful—at implementing a progressive agenda than the United Auto Workers Union.

Over the years, it's pushed goals like factory floor integration, health care and the 40-hour week. But for decades, one of the UAW's most far-reaching aspirations remained out of reach, getting Detroit's Big Three to stop thinking about their hourly workers as nothing more than expendable line items, to be tossed off the job in the industry's inevitable downturns.

Then came the boom years of the mid-1980s, and the emergence of robotics and other labor-saving system. Suddenly, it was a trade-off Motown was willing to make.

In exchange for permission to add productivity-enhancing technology, the Big Three agreed to place workers impacted by such efficiency measures into a program guaranteeing them 85 percent of their pay and benefits. Unless the company could find an appropriate alternative job, those workers might be idled in a Job Bank until retirement.

The timing couldn't have been worse, and the grand experiment quickly turned into costly reality as the Big Three's share of the U.S. market began to rapidly erode.

As each domestic factory closed, there became fewer and fewer opportunities to find work for those in the Jobs Bank, which had become little more than a corporate welfare system—and yet another reason why the domestic auto industry has been steadily losing its competitive edge.

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1-3/4" 6-spindle, 1965, 1993 (10)  
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2-1/4" 6-spindle, 1962, 1973-79 (3)  
6-5/8" 6-spindle, 1979

## ACME

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

## CNC INDEX

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

## SCHUTTE

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

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Noise Tamers

## HYDROMATS

Pro 20, 1999  
HW 25-12, 1994  
HB45-12, 1996  
HB45-16, 2002  
HS16, 2001  
CNC 36/100 HSK tool spindles w/2-axis  
CNC flange and valves w/ 6-axis CNC,  
new in 2006.  
VE 20/80 QC unit  
26/80 QC unit

## ESCOMATICS

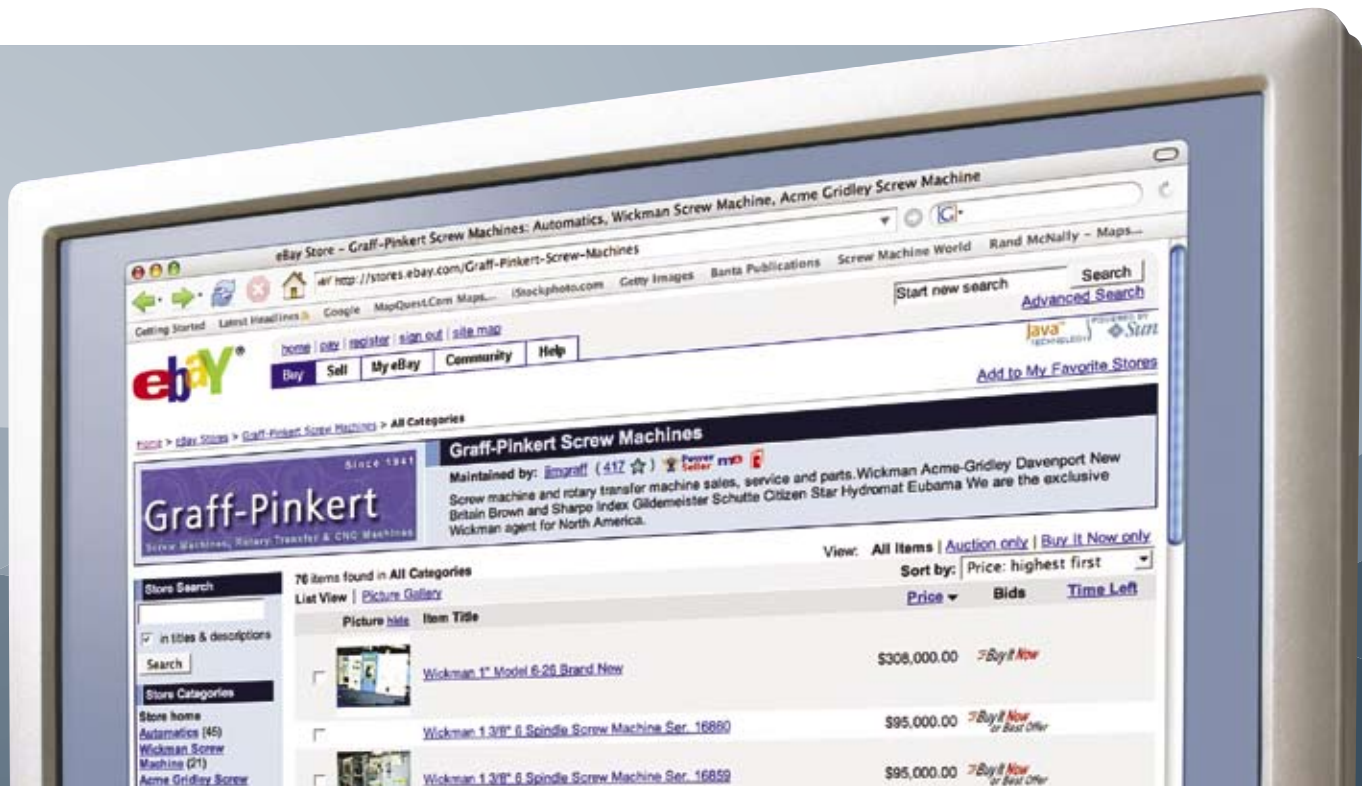
D9 (2), 1995  
D6SR (2)  
D-2, D-4, D6SR

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Scott Livingston, president and CEO of  
Horst Engineering in East Hartford, Conn.

# Growing by Association

Lloyd Graff Interviews Scott Livingston

In 1995, at the age of 22, Scott Livingston began as a manager at Horst Engineering, which was started by his grandfather. Since then he has helped build it into a successful job shop, acquired new companies and expanded into the medical sector. Horst Engineering now has average sales of \$10 million and hit \$13 million in 2008.

**Have you been at Horst your entire business career?**

SL: Yes, I graduated high school in 1990, spent five years in college between various schools and ended up finishing in 1995. I started at Horst full-time the Monday after I graduated.

**Did you work at the plant as a kid?**

SL: My first timecard was in 1988, and I did all the usual stuff. I drove the truck, did a lot of packaging, shipping and receiving and worked a little bit in the shop.

**What attracted you to the business?**

SL: I went to Boston University for Economics and Journalism on an Army ROTC scholarship and had been slotted for Airborne School. At a full day physical I came out with a notice saying I failed because of my eyesight. It was really disappointing after completing a year in the program and having a scholarship. I stopped school and had an important conversation with my father just days before I was supposed to go back for my junior year. I said school wasn't right for me and I needed a change of course. We agreed I wouldn't go back but he said, "Well, you're not just going to come home and sit around. You're going to have to get a job." That's how I started working in the Turning Department at Horst. Everyday I punched the clock—45/50 hours a week of pure manufacturing. I got a taste for what it was like. I worked for

a lead person out there, having nothing to do with my family. It was at that point I decided I wanted to go into the business.

**What was it like when you first started working alongside your father and uncle?**

SL: It was 1995 and I had received my diploma, so my father and uncle weren't going to put me back on a lathe. We were in the midst of acquiring the assets of a small shop that was also in the thread rolling service business. We tripled our service business for centerless grinding and thread rolling over the course of that summer. My father and uncle decided to put me in charge of that small operation within the company.

**Was thread rolling a specialty that you had as a part of a larger job shop?**

SL: Exactly. We had been doing it since the early 1970s. We actually incorporated a second company.

**Was this a convenient area for you to assume some leadership?**

SL: I did purchasing, engineering, a little bit of HR, sales and packed the parts. I did it all, but for a tiny part of the business. I worked with a small team of folks and got a real taste for what it was like to be in general management.

In Malcolm Gladwell's new book, *The Outliers*, he presents a theory that it takes 10,000 hours of practice to develop confidence and expertise in a field. Does this have some validity in your career?

SL: I have a friend whose wife has a PhD in physiology. He and I always joke that those types of people couldn't survive in our environment with all the change, and we couldn't focus on one thing like they do. The people that spend all day in a lab doing one specific thing, yeah, they're geniuses. But when you're in business, especially in a job shop in manufacturing, it's nonstop.

You've been in the business for 13 years. When did you decide you wanted to expand it?

SL: On day one. I think about when I was running that lathe out in the shop in 1992 and things were hard economically. We were an aircraft company and my father was quoting work just to keep the spindles turning. He brought in a microwave-part job called an Impact. I keep one of those parts here in my Gerstner toolbox, just to remind me that I never want to have to scrape the bottom of the barrel like that again. That was a tough job. There was no money and you had to meet a certain rate. But I was observing everything and saw that despite the downturn, we could do something different.

Do you consider yourself a grownup?

SL: Yeah, I've been here 15 years. But in machine shop years, I've probably aged 45 years. The stuff I've dealt with, the number of decisions I've been able to make, the opportunities I've had, have been tremendous. I was thrust into it, grabbed it, and did it. That's how it's shaken out and it's worked.

How do you acquire new customers?

SL: Historically we only did inside sales and grew through our reputation in the industry and by contacts through our existing customers. There wasn't a strong sales focus before. We have changed that now, and have acquired customers through direct marketing, more diligent networking and acquisition.

What do you mean by direct marketing?

SL: We've put concerted effort into developing our image as a full service supplier, primarily through our Web presence. We've used some keywords in Google and AdWords, and have coupled that with some PR.

Tell me how your online advertising on Google, etc. has helped grow your business.

SL: We've just started experimenting with that. We've developed long-term relationships with major aerospace OEM customers. To make those types of relationships work we've developed families of parts and multi-year agreements, so we're not looking to quote every job that comes across the fax—we want to go deeper with customers. We've gone online mainly to build our image. What doesn't work is being in a machine shop category with 3,000 other shops, whether you did it in the old days with Thomas Register or you do it now with Google. When we were developing business in the medical sector, we gained a foothold by making an acquisition.

Tell me about your approach to acquisitions. Isn't it a bit unorthodox for a relatively small company to grow by acquisition?

SL: There are a lot of challenges in trying to grow that way. You need to know if your people have the skills you need to acquire, negotiate and integrate another business.

Tell me about your recent acquisition. What did you buy?

SL: In the most recent one we acquired the goodwill, customer relationships and knowledge base of Crystal Precision, LLC, but not the physical assets. The former owners ended up liquidating the physical assets through auction; we used their relationships and knowledge to help us diversify.

Isn't it fairly unusual for companies to buy the goodwill of job shops?

SL: It's an opportunity. How else can you easily break into a new market and find new customers? Sometimes you need an insider. There are a lot of ways you can break in, but it's never easy in our business.

How did you find out about the availability of your recent acquisition?

SL: Through The Young Presidents' Organization and contacts I have in my network.

Was the expertise you acquired just in medical?

SL: No, it was in aerospace, industrial and medical.



**Is it really that hard to find new clients out in your neck of the woods?**

SL: Yes, it is. Connecticut is a very high-class state in a very high-class region and the customers are looking for lower-cost solutions. It's also very difficult to convince customers that you're a reliable source around here.

**Another part of your expansion has been to develop a plant in Mexico.**

SL: There are multiple reasons for our investment in Mexico, which is a near shore expansion. At the time we initiated it we needed more space if we were going to keep the existing equipment and move to a multi-axis platform.

**Has Mexico been harder, easier or about what you expected?**

SL: It's been harder.

**You also have a medical business you launched independently, which is adjacent to your plant in East Hartford, Conn.**

SL: We renovated a building adjacent to our main plant instead of moving to a larger facility. It was a safer choice. We dedicated space there for the service business and moved out of the main plant.

**What are the different skills you need in order to do medical work versus aerospace work?**

SL: There's a culture difference. Aerospace requires closer tolerances, much more diverse materials, much more variety and a lot of specifications and paperwork. Everything is very well defined and is an approved process. Medical has a much quicker prototype and production process with more emphasis on visual features and fewer raw material choices. The two don't

mix very well. We make a lot of aircraft products that are 40 years old or more. If you prove you can make a product and you develop the right relationships, you'll make that product time and time again.

**I know you love to exercise. How has that impacted your life?**

SL: I needed to put all the energy that I had put into ROTC into something else, so I started cycling a lot. I stopped running and raced bicycles competi-

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tively in my remaining college years. I raced in Europe a little bit until I met my wife at an ultra marathon event. I was there to mountain bike the 50 miles and she was there to run them. Meeting her got me back into running, now we do all kinds of stuff. The company has

been supporting a cycling team since 1997. We've gone from being 20-year-old kids racing on the weekends to family men who race in the master's category. I think adventure sports have given me tremendous strength and endurance, and I use that every day in the business.



Scott Livingston has a passion for endurance sports—especially bike racing. He comes by it almost genetically. His paternal grandfather left Germany just before the Nazi's opening salvo against the Jews on Kristallnacht on November 9-10, 1938. Before that he had trained and worked in a German bicycle factory. Horst Manufacturing sponsors a local bike racing team and Scott often rides his bicycle to work. The biking has also morphed into an abiding interest in the environmental movement as Scott works continually to reduce his and the company's carbon footprint.



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

BY NOAH GRAFF

next

## “In five years, will more Americans be enrolled in higher education online than attending traditional college campuses?”

*Skyrocketing tuition*

*rates for traditional*

*universities and frantic work*

*schedules, coupled with*

*improved Internet access*

*has significantly increased*

*enrollment in higher*

*education courses online.*

However much parents moan about the increasing cost of higher education, which tops \$50,000 a year at some private colleges, the traditional educational model is unlikely to disappear any time soon. That's because—according to The Chronicle of Higher Education—98 percent of the current freshmen in four-year colleges are under the age of 20. These freshmen seek not only the kind of education you get from a traditional campus, but also the camaraderie of a group of like-minded peers. They also go to college as a way to position themselves for better jobs after graduation, and perceive the college “brand” as important to their future success. Online education will definitely increase as audio and video quality increases and colleges look to cut costs. But we won't be seeing a wholesale shift in students matriculating at institutions that offer predominantly online courses.

Sheila J. Curran  
Career Strategy Consultant  
Curran Career Consulting

No, in five years time traditional campuses will still be the dominant experience for the majority of students. Age is the key variable. For so-called “adult students,” those age 25 and over, online higher education will account for 50 percent or more of enrollment by 2014, about double our current estimate. The vast majority of younger students will continue to value the traditional campus for all the experiential benefits it offers. To win over a large proportion of younger students, online higher education will have to offer demonstrably lower tuition, a more engaging student experience and more compelling evidence on outcomes.

Richard Garrett  
Program Director and Senior Research Analyst  
Eduventures, Inc.

## the facts:

Approximately 3.94 million students (including students at traditional college campuses) were taking at least one online course during the fall 2007 term; a 12 percent increase over the number reported the previous year.

Online enrollments show a 12.9 percent growth rate, far exceeding the 1.2 percent growth of the overall higher education student population.

Over 20 percent of all U.S. higher education students were taking at least one online course in the fall of 2007.

It is a safe bet that in five years at least 50 percent of all students in higher education will be taking at least one online course. I think a projection of 15 percent to 20 percent for students earning a degree entirely online, is possible. The percentage will be much higher for non-credit, corporate sponsored education and training, where almost all further learning will be offered electronically. As a society dependent upon the investment and return on human capital, distance education is an essential strategic resource. For both venues, access, convenience and cost are key factors. Moreover, comparative research has demonstrated that online education can be superior to traditional education—especially with respect to improved writing and retention.

**Paul Jay Edelson, Ph.D.**  
Dean, School of Professional Development  
Stony Brook University

## the facts:

The College Board estimates that the average cost of tuition and fees at public four-year colleges in 2008 was \$6,585 for in-state students and \$17,452 for out-of-state students per year. In contrast, private four-year institutions averaged \$25,143 in tuition and fees per year.

The Chronicle of Higher Education, 2008-2009

University of Phoenix, the largest private university in North America, offers online classes for over 80 degrees including:

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Sheila Curran, founder of Curran Career Consulting in Providence, R.I.



**Sheila Curran** is the founder of Curran Career Consulting, a firm advising institutions of higher education, employers, families and individuals. She describes herself as a “career enhancer”—essentially a cross between a counselor, career strategist and coach, who can help people reach their careers goals more quickly and easily.

*When helping today's graduates find jobs, are your expectations lower because of our present, difficult economy?*

SC: I would certainly encourage people to go after their dream job, but in this economy you have to be willing to compromise. You can't guarantee that dream job will even be available, and that if you even apply for it you're going to get it. The advice I'd give in this economy is a little different than I would have given even a year ago. That is, try and find the best possible match for your skills and abilities, but recognize that there is value in any work you do, and that you can build skills and experience while doing a job, even if you believe it is below you.

*What are some things you would advise people to think about when searching for the job they desire?*

SC: There are two pieces of advice I always give to recent graduates. One is to think like an employer. If you find a job that looks interesting to you, you need to analyze it very carefully to see how your background and experience relates to the qualifications for the position. In this market it's all about the employer, not you. The second piece of advice I give is to “find your hook.” You've got to find what makes you special and stand out from all the other people who might be applying for that same job. Sometimes it's because you have a particular qualification. For example, you might want to work for Honda. Having fluency in Japanese could be a hook you could employ.

*Do you also help people figure out what they want to do?*

SC: I don't do testing because I'm not involved in the counseling side of things. But I do strongly suggest that my clients to do a SWOT analysis on themselves. It's an analysis of your

strengths and weaknesses, job opportunities that may fit and what threats are on your application. I find it an interesting way for people to think critically about what they have to offer, and also where their interests and values lie.

*What is the “2 a.m. in Japan” test?*

SC: One of the things the employer is looking for is “Are you going to be a good fit in this particular environment?” What they will do sometimes is a mental “2 a.m. in Japan” test. What that basically means is if I were in Japan at 2 a.m., having had an airplane canceled, and I'm sitting in there with you, would I want to be with you? Would you be an interesting person to talk to? Would you be able to talk in a non-threatening and very informal way with the person [next to] you?

*Do you feel like the majority of young people are going into jobs that fit them well?*

SC: When we did a survey of five-year-out graduates we found that the most common reason graduates left their first job was because it was a bad fit. They may look at how much money the job pays or where its located, but whether or not it's a good match for who they are, what they want to do and the right environment—that's something that students don't pay attention to.

*If you could be a machine what would you be?*

SC: I would be a machine that could play multiple instruments at once. I think in this new economy, in this new world, we have to be able to do a lot of things at the same time, and we have to be able to make music. We also have to be able to orchestrate the whole thing together.

Thanks, Sheila.

Four Nitinol medical devices.

(Photo courtesy of Burpee Materials Technology, LLC.)

# Developing a Good Memory: Nitinol Shape Memory Alloy

It's expensive and hard to machine, but Nitinol is perfect for applications that require one or more of its special qualities: superelasticity, shape memory, biocompatibility and fatigue resistance.

A very special class of materials can “remember” their shape. After deformation you can just heat them and they return to their original form. A number of different shape memory materials have been developed, but one in particular has become a standby in many applications.

Nitinol. The name comes from the metals it's made of and the lab where this remarkable family of alloys was discovered. NiTi-NOL; Nickel, Titanium and Naval Ordnance Laboratory.

**Right:** Nitinol parts.

(Photo courtesy of Johnson Matthey, Inc.)





## Discovery

In 1958, William J. Buehler, a researcher at the Naval Ordnance Laboratory in White Oak, Md., started looking for a metallic alloy for missile nose cones that could withstand the high temperatures of re-entry into the atmosphere. Buehler wrote in "NITINOL Re-Examination," an article about the alloy's history. He selected 12 likely alloys. One day he discovered that one of the alloys, a combination of nickel and titanium, rang like a bell when struck if it was warmed above room temperature, but at room temperature it sounded dull, like lead. This attracted some attention in the lab.

Later, Buehler prepared for a lab management meeting by bending a thin strip of the material into an accordion shape, intending to flex it repeatedly to demonstrate the material's fatigue resistance, he wrote. However, during the meeting the associate director of the lab took out his lighter and applied heat to the strip. "The [bent] strip immediately extended with considerable force," Buehler recounted. This astounded people at the meeting and revealed that Nitinol had strong shape memory.

This amazing material also exhibited at higher temperatures a quality called superelasticity. It could tolerate considerable bending without taking a permanent set.

Nitinol's unique properties of shape memory and superelasticity result from a phase transformation within its crystal structure that happens with temperature change. At lower temperatures the structure is martensite, a weaker form, and at higher temperatures, austenite, which is stronger. In addition, martensite can also occur at higher temperatures where the material is stressed. The mechanical properties of Nitinol actually change with stress, and with relatively small changes in temperature.

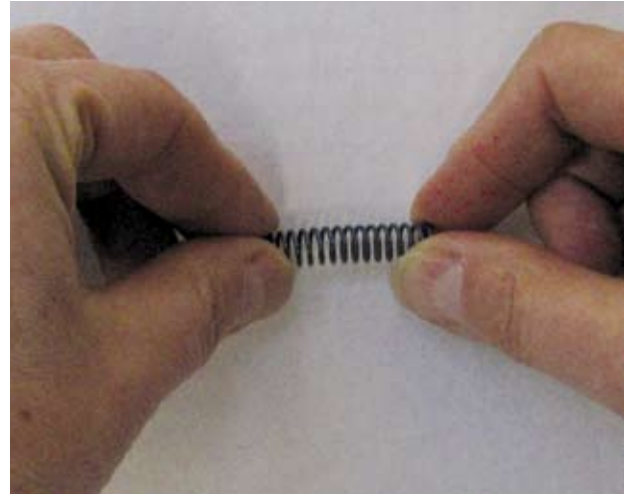
## Shape memory

To demonstrate shape memory behavior you can deform a Nitinol item at a low temperature, really bending it out of shape. Then heat it and watch it return to its original shape, as if by magic. Nitinol in its martensitic (low temperature) state is easily bent or twisted into a new shape. Then, as it is heated it passes through a narrow range of temperatures where it changes to an austenitic structure and reverts to its previous shape.

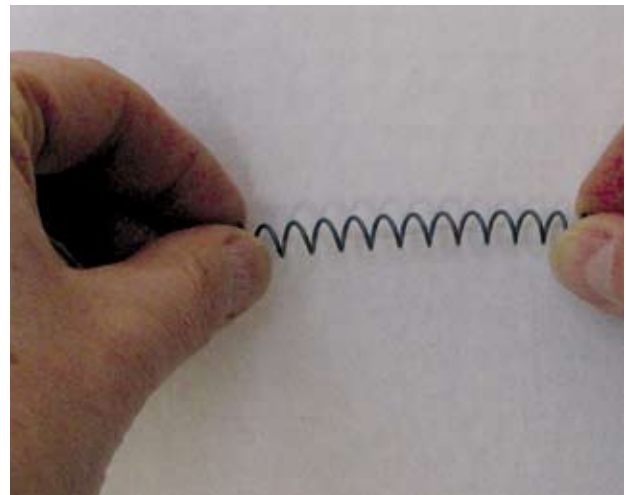
The temperature above which the material remembers its high-temperature form is called the transformation temperature.

"The useful range of the material is typically between 0 degrees and 100 degrees Celsius [32 F and 212 F], a very narrow range when you think of metals," said Joseph Kain, product manager, Johnson Matthey, Inc., West Chester, Pa., a supplier of Nitinol and other metals and parts to the medical device industry. The transformation temperature

# how it works



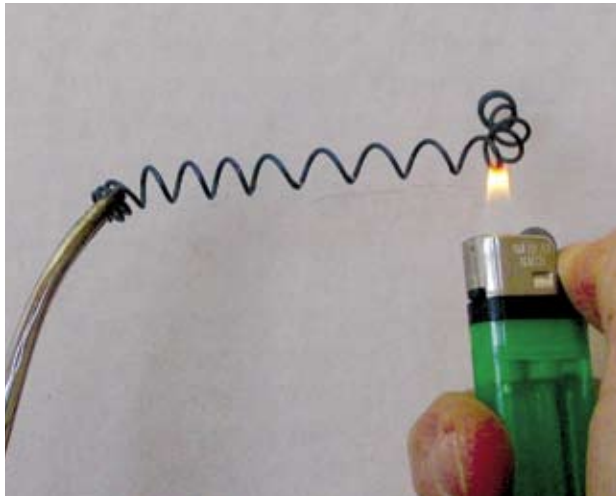
**Above:** 1. Take a nitinol spring at a temperature below its transition temperature.



**Above:** 2. Stretch it way out of shape.

can be controlled by small changes in the alloy's composition and how it is heat treated. The temperature to start or finish the transformation can be controlled within a degree or two, if needed.

To use the shape memory property once the part is fabricated, it needs to be shape set. "Setting the shape is very simple," said Kain. "Create a form and hold [the part] in that shape. Constrain it—it has to be under load. Then you heat treat it at 500 degrees Celsius and water quench or fast-cool it." Then, if the piece is later pulled, pushed or bent out of shape below its transformation temperature,



Above: 3. Heat it above 212 F.



Above: 4. Like magic it returns to its original shape.

when heated past its transformation temperature, it will return to its remembered shape.

### Superelasticity

Above its transformation temperature, Nitinol displays superelastic behavior. This is due to martensite forming in areas that are stressed, even though the temperature is above where martensite normally occurs. Then, when the stress is removed this martensite returns to the undeformed austenitic state. This makes a Nitinol part very

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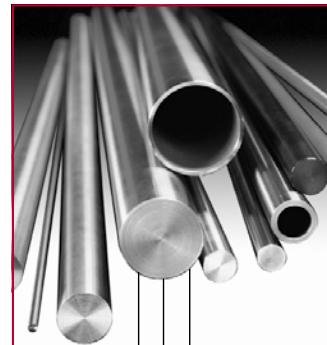
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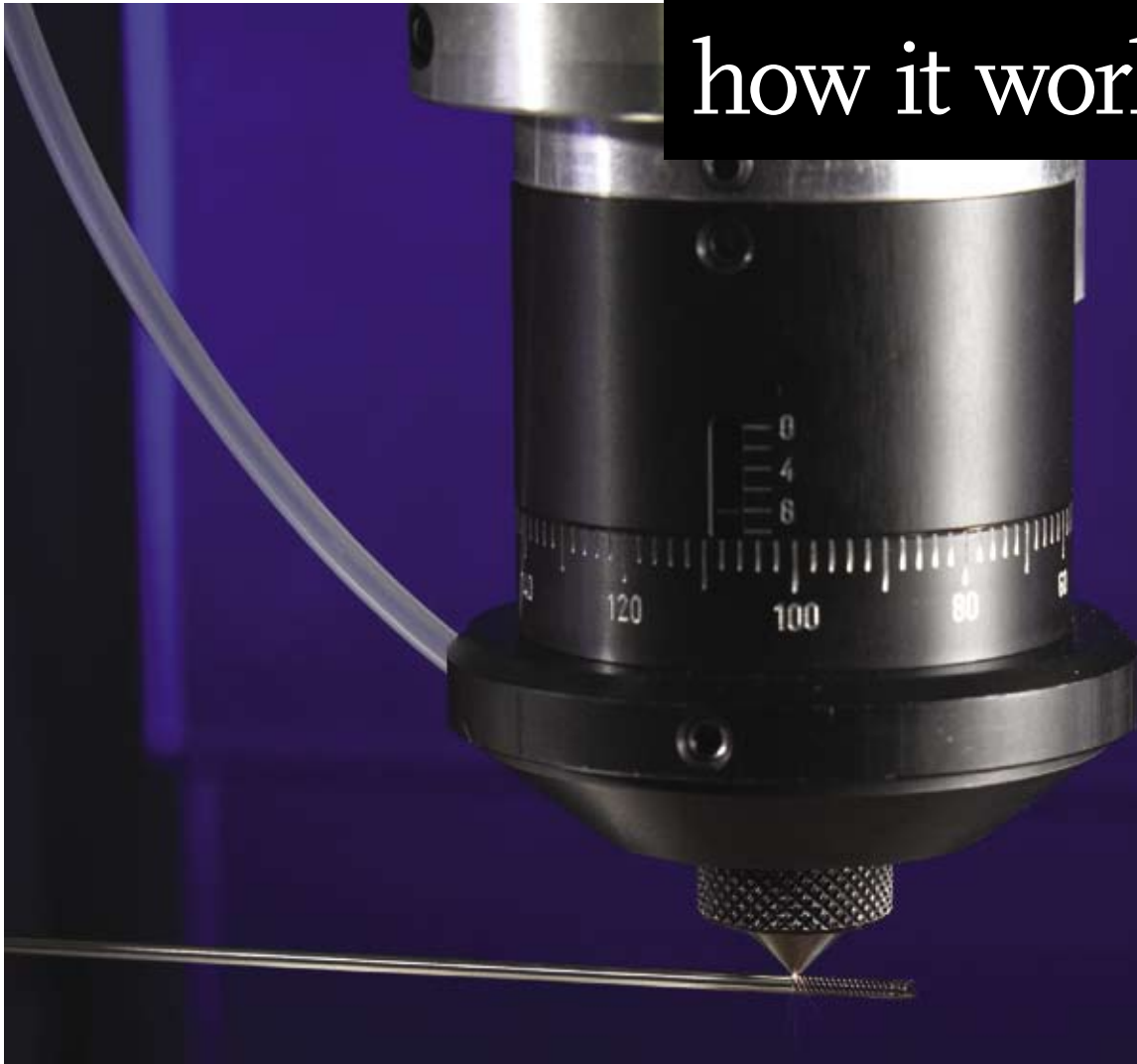
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# how it works



**Above:** Laser cutting a Nitinol tube.

(Photo courtesy of Norman Noble, Inc.)

springy in feel and able to return to its original form even after huge deformation.

Though Nitinol is known as a shape memory alloy, many of its applications make use of its superelasticity. Where most metals can tolerate only a small fraction of a percent of strain without permanent deformation, above its transformation temperature Nitinol routinely can take up to an eight percent strain and afterward return to its original shape. Nitinol is also known for its fatigue strength.

## Making parts

Laser cutting and EDM (electrical discharge machining) are usually the processes of choice with Nitinol. This metal can be conventionally machined, but it's not easy to deal with.

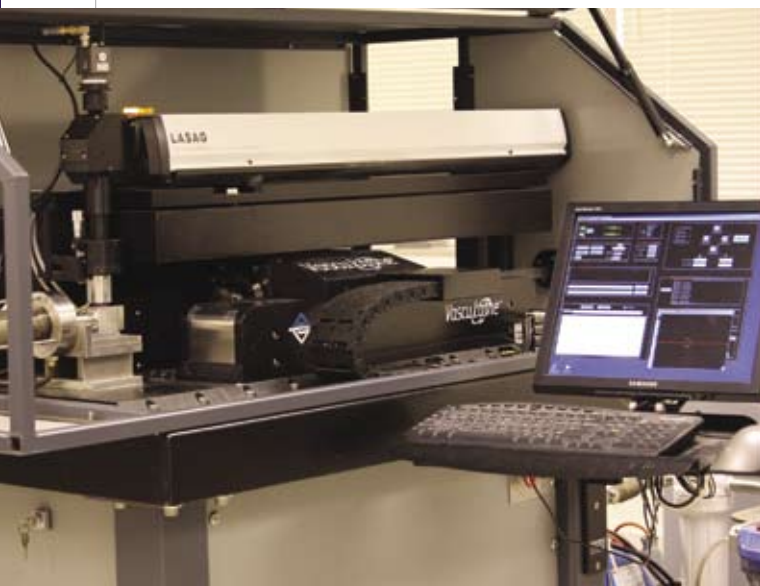
"This is the alloy from hell. It eats tools," said Frank Sczerzenie, chief technical officer, SAES Smart Materials, New Hartford, N.Y. "But we machine it every day of the

week. It's a relatively difficult material to cut because it is superelastic. To cut, you have to go through the stress-induced martensite, and that creates heat and tool wear." Normally, depth of cut is deeper and feeds are slower to allow heat dissipation, he said.

Nitinol is a very challenging material to machine, and it requires the use of unique manufacturing and finishing technologies, said Brian Hrouda, director of sales and marketing, Norman Noble Inc., Highland Heights, Ohio, a contract manufacturer for medical devices. Though his company EDMs or laser cuts many different types of Nitinol devices and implants, it has also developed processes for Swiss turning small Nitinol components for implantable medical devices.

"From a conventional machining standpoint, grinding is a normal way to work with Nitinol," said Kain. Since the material is so heat sensitive, you need to keep it at a constant low temperature, preferably below 100 degrees Celsius (212 F), he said.





**Above:** Laser-cutting equipment.

(Photo courtesy of Burpee Materials Technology, LLC.)

The medical devices used to keep blood vessels open, called stents, and similar devices are often fabricated by laser cutting Nitinol tube. The process starts with a tube of very precise diameter, roundness and wall thickness, said Janet Burpee, CEO, Burpee Materials Technology, L.L.C., Eatontown, N.J., a contract manufacturer to the medical device industry. A laser cuts a complex pattern from one end of the stent to the other. Cutting might take five minutes for a 3 mm x 18 mm (0.12" x 0.71") stent, she said. Or, depending on the size and complexity of the part, from 30 seconds to 45 minutes.

Surface finish is critical on Nitinol parts used for their superelasticity and fatigue strength, said Hrouda. Any surface irregularities or micro cracks can cause fatigue failure. Processes such as electropolishing take care of this, and also can remove any heat-affected material from the part after laser cutting or EDM.

Nitinol is available in sheet, foil, tube, bar, wire and other forms. It is price prohibitive for most applications, said Kain. For example a piece of sheet stock that might cost a dollar in steel might be \$400 in Nitinol. Wire is the lowest cost form. Nitinol is difficult to process, difficult to shape and form and difficult to join to anything else, he said. What typically happens is if every other option doesn't work, they use Nitinol.

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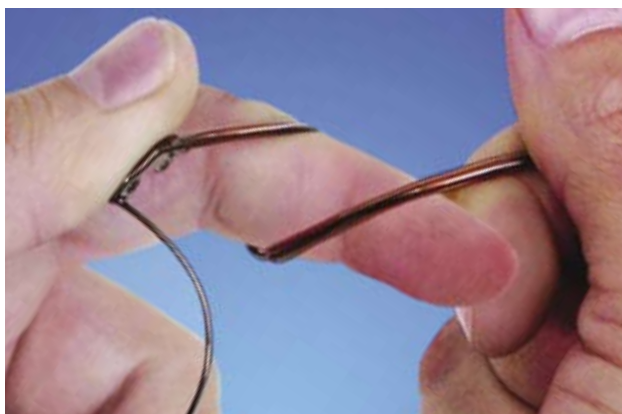


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**Above:** Flexon eyeglass frames made from Nitinol exhibit superelastic behavior. After extreme bending they return to their original shape.

(Photo courtesy of Marchon Eyewear, Inc.)

## Applications

Though many Nitinol applications are invisible to the general public, some are quite familiar. Eyeglass frames made from Nitinol can be bent severely out of shape, but then return perfectly to normal. Also, some years ago, when cell phones had pull-out antennas, many of the antennas were made from Nitinol, allowing them to flex without breaking or permanently bending.

Another superelastic application, where you or your children may have experienced Nitinol, is in arch wires used for orthodontistry. The orthodontist takes a Nitinol wire and bends it, attaching it to the teeth. Because the wire is superelastic, it tries to return to its straight condition, and continually exerts a force on the teeth. This allows less frequent visits to the orthodontist to have braces tightened.

A number of lesser-known applications use Nitinol's shape memory capability. A well-known computer manufacturer used a Nitinol device to eject PCMCIA cards. Also, Nitinol is used in couplings that join the ends of hydraulic tubing in aircraft. In a less serious application, Nitinol enables spoons from the magic shop to bend when placed in hot water.

The superelastic quality of Nitinol, along with its biocompatibility, makes it ideal for making many types of medical devices that are implanted in the body. An application familiar to many of us is the stent, a device that supports blood vessels and keeps them open. Nitinol's superelasticity allows a medical device, such as a stent or a heart valve, to be compressed into a shape that fits inside a catheter. The catheter is positioned at the correct location in the body, the device is released, and it returns to its original shape.

This same superelasticity makes Nitinol the only material suitable for stents used in the carotid artery in the neck, or blood vessels in the legs, said Hrouda. In these vulnerable locations, a blow to the area of a stent will cause it to deflect, but a Nitinol stent will return to its intended shape. Stents made of other materials would be subject to crushing or

# how it works

permanent bending by such an impact.

Surgical instruments and components made from Nitinol fill many needs, especially in minimally invasive or arthroscopic surgery. These may take advantage of the superelasticity and fatigue resistance of Nitinol. A tool that has a bend in it can be straightened and introduced through a cannula, a rigid tube. When it emerges from the cannula, the tool returns to its original shape. The surgeon performs the procedure, and then the tool is retracted back into the cannula where it straightens out again for easy removal.

## The shape of things to come

Its modulus of elasticity varies with temperature, stress and strain. It's expensive. It's difficult to machine. But, Nitinol has a unique combination of shape memory, superelasticity, fatigue resistance and biocompatibility. And for some applications nothing else will do.

"Go try everything else," said Kain. "When you get to the point where nothing else works, you can afford to use Nitinol."



## For more information:

The Alloy That Remembers, Time Magazine, Friday, Sep. 13, 1968:  
[www.time.com/time/magazine/article/0,9171,838687,00.html](http://www.time.com/time/magazine/article/0,9171,838687,00.html)

Nitinol Facts:  
[www.nitinol.com/pdf\\_files/nitinol\\_facts.pdf](http://www.nitinol.com/pdf_files/nitinol_facts.pdf)

Nitinol Frequently Asked Questions:  
[www.memry.com](http://www.memry.com), click on "Nitinol FAQ"

Machining Nitinol:  
[www.shape-memory-alloys.com/machining\\_nitinol.html](http://www.shape-memory-alloys.com/machining_nitinol.html)

Heat Treating and Shape Setting:  
[www.shape-memory-alloys.com/heat\\_treating\\_shapesetting.html](http://www.shape-memory-alloys.com/heat_treating_shapesetting.html)

"NITINOL Re-Examination" by Nitinol researcher William J. Buehler:  
[www.wolaa.org/files/Nitinol\\_Ora\\_History.pdf](http://www.wolaa.org/files/Nitinol_Ora_History.pdf)

## Contributors to this article:

Burpee Materials Technology, L.L.C.: [www.burpeetech.com](http://www.burpeetech.com)  
Johnson Matthey, Inc.: [www.jmmedical.com](http://www.jmmedical.com)  
Norman Noble Inc.: [www.nnoble.com](http://www.nnoble.com)  
SAES Smart Materials: [www.shape-memory-alloys.com](http://www.shape-memory-alloys.com)

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# shop doc

WITH NOAH GRAFF

Dear Shop Doc,

Whenever we finish a long running job on our CNC Swiss, we find that our headstock collet cap is stuck tight on the spindle. It takes a considerable amount of time and effort to remove it. Is there any way to prevent this in the future?

Dear Sticking tight,

Whenever you change over the machine it's a good idea to put a small amount of anti-seize grease on the threads of your headstock collet cap as well as your guide bushing adjusting nut. Anti-seize grease will help prevent the threads

from sticking. It's also a good idea to put a small dab on the screw threads of your turning holders—it helps speed up insert changes and helps prevent stripping out the hex and Torx heads.

Sticking tight

Dear Shop Doc,

We are running a shaft on our CNC Swiss that has an eccentric diameter on one end. We tried picking off the shaft and milling the eccentric with an end mill but could not get the required surface finish. The tolerance is too tight for a hollow mill. Is there a better end mill or method we can use?

Dear Picking wrong,

Assuming that your Swiss has a two-axis sub-spindle, you can buy an eccentric collet and pick the part off while holding it eccentrically. What you need to do is mill the part off while it is chucked in the eccentric collet.

First, orient your sub-spindle using the C-axis or indexing function. Next move the X2 axis (sub-spindle cross axis) off by the distance of the eccentric feature. Bring the sub-spindle up over the workpiece, leaving the collet open. On the main spindle side do a partial cutoff operation using a normal cutoff tool. Cut down to around a 1/8" diameter, or as small a diameter as the part

will allow before it starts to whip. Stop and lock the spindle using the C-axis or spindle index function. Close the sub-spindle collet then tool change to a small end mill and mill through the small remaining 1/8" diameter to part the work from the bar.

Now that the work is held in the eccentric collet you can start the sub-spindle and rough and finish-turn the eccentric feature using normal turning tools.

Picking wrong

Dan Murphy

Tsugami REM Sales

*Dan Murphy is a regional sales manager for Rem Sales LLC., a U.S. Tsugami distributor. He can be reached at [dmurphy@remsales.com](mailto:dmurphy@remsales.com).*

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

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

shop doc

THE FOLLOWING ARE COMPANIES WHO HAVE  
GIVEN INFORMATION ON WESTEC 2009

# product focus

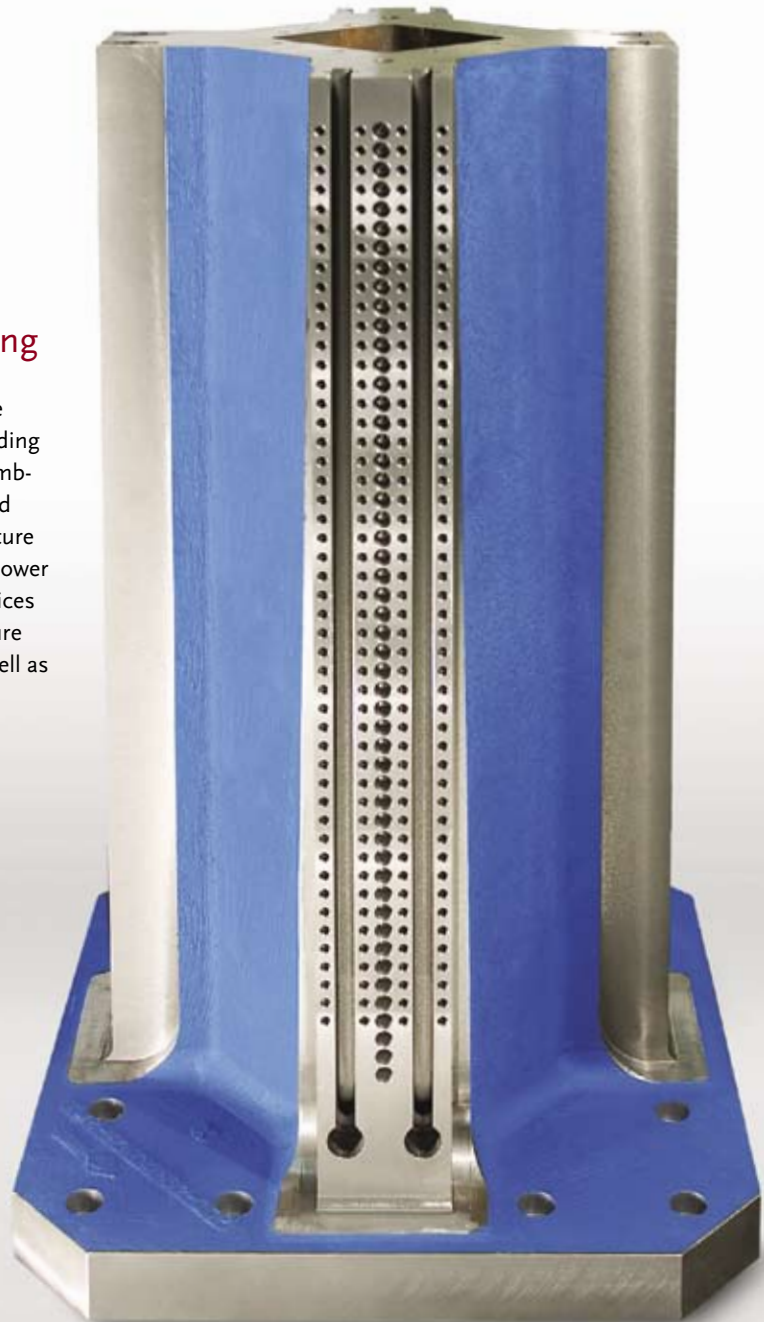
**W**ESTEC has been the west coast's new product and technology showcase since 1964. This year's show, held in Los Angeles, Calif., will be March 30 – April 2, and will feature more than 600 exhibitors. More information on Westec can be found at [www.westeconline.com](http://www.westeconline.com). Featured below are companies who will be exhibiting at Westec.

## Advanced Machine & Engineering

Booth #4443

Advanced Machine & Engineering will feature the following: Fixturing/Workholding products, including Amflex/S.A.F.E. modular workholding, Amrok tombstones and grid plates, dedicated tombstones and Triag modular clamps and jigs. They will also feature Spindle Interface products, including Ott-Jakob power drawbars, Schuessler HSK tool holders, and services including spindle shaft repair. They will also feature Hennig's Machine Tool Protection products as well as their chip conveyors and chip filtration system.

For more information, please visit Advanced Machine & Engineering Co., at Westec Booth #4443.



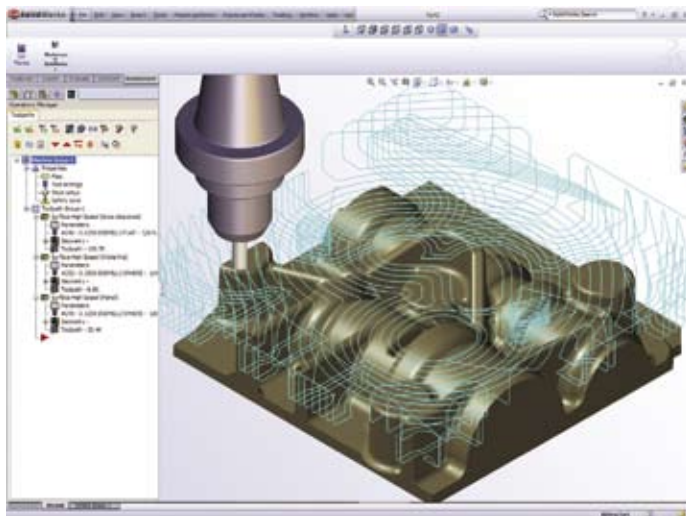


### ▼ CNC Software, Inc.

WESTEC Booth #3258

CNC Software, Inc., will feature the newest product in the Mastercam CAD/CAM software suite — Mastercam for SolidWorks, as well as Mastercam X3. Mastercam for SolidWorks includes a suite of cutting strategies, including Feature Based Machining (FBM) and 3D High Speed Machining toolpaths. High speed machining promotes longer tool life, faster machining time, and precision cutting by creating smooth cuts that eliminate dangerous sharp moves. Mastercam for SolidWorks also delivers a powerful set of automated cleanup toolpaths, letting you get parts off the machine faster with little or no handwork.

For more information, please visit CNC Software, Inc. at Westec Booth #3258.



### ▲ BIG Kaiser Precision Tooling Inc.

WESTEC Booth #2632

BIG Kaiser Precision Tooling Inc. will showcase a number of new and exciting products including the new EWB-UP (Ultra Precision) Finish Boring Head and a new series of Kaiser boring tools with fine adjusting resolution of .001 mm steps of diameter corrections (.00005" on dia. for inch graduated heads). The EWB UP series' six boring heads allow users to bore a range of 20-100 mm (.787"-3.94"). The flexibility of the Kaiser KA connection permits a wide range of spindle interface options. All bore ranges and tool lengths are identical to the existing Kaiser EWN program. The integrated counterweight can be adjusted to any bore diameter by a separate scale to permit high-speed operation.

For more information, please visit BIG Kaiser Precision Tooling at Westec Booth #2632.

### ► Hardinge Corp.

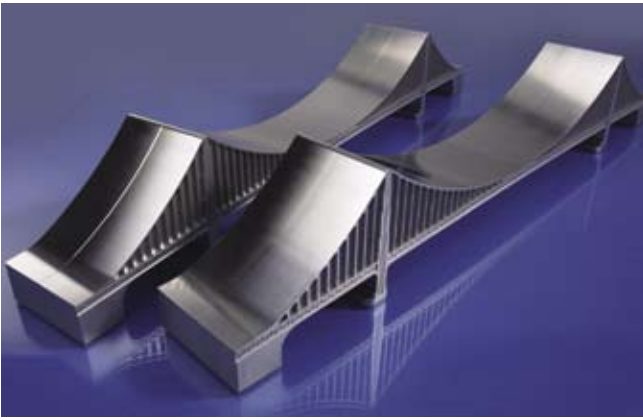
WESTEC booth #2700

Hardinge introduces the new GD210LP low-profile rotary table, which has a 210 mm slotted face plate that is precision ground on a Kellenberger® grinding machine and features rapid table rotation of up to 40 rpm. The faceplate can be removed to mount a manual jaw chuck directly to the A2-5 spindle for ease of gripping round parts. The rotary table can be operated as a standalone unit (horizontal or vertical) with a servo control, or as a true 4th axis directly connected to the machine. The low-profile footprint takes up minimal space on the table allowing vises or other fixtures to remain in place for other jobs and reducing setup and teardown time.

For more information, please visit Hardinge Corp. at Westec booth #2700.



# product focus

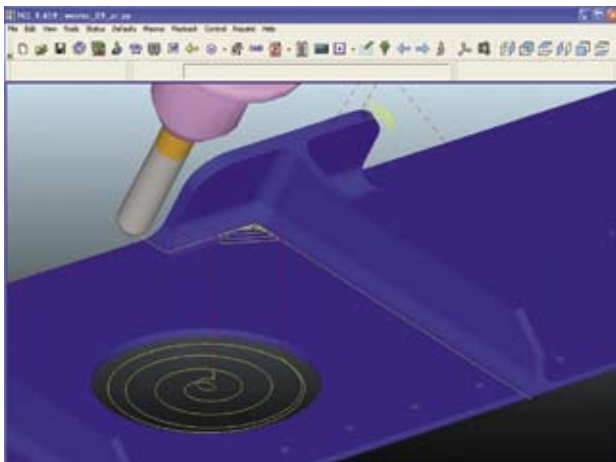


## ▲ HEIDENHAIN

WESTEC Booth #2612

HEIDENHAIN will display a variety of linear and rotary encoders, controls and touch probes. The newest touch probes include the TS 444 battery-free probe, with its built-in air turbine generator and capacitor using the same burst of air that cleans the part. The TS 740 high accuracy probe, boasting a  $\leq 1 \mu\text{m}$  accuracy with repeatability of  $\leq 0.25 \mu\text{m}$ , is coupled with the use of an innovative low force analysis triggering method.

For more information, please visit HEIDENHAIN at Westec Booth #2612.



## ▲ Numerical Control Computer Sciences

WESTEC Booth #3282

NCCS, the developer of NCL multi-axis machining software, used in the aerospace, automotive and turbo-machinery industries will showcase the latest version of their flagship product NCL V9.7 as well as other state-of-the-art manufacturing solutions including PostWorks, an advanced multi-axis universal postprocessor and NCL/Machine Simulator which provides high performance, realistic, simultaneous material removal and CNC machine tool simulation. NCL V9.7 includes dozens of enhancements that speed the creation of highly efficient multi-axis tool paths. Auto-roughing enhancements in addition to contoured and rectangular billets, and forging can now be used as a stock model, significantly reducing both programming and machine time when roughing parts made from forgings.

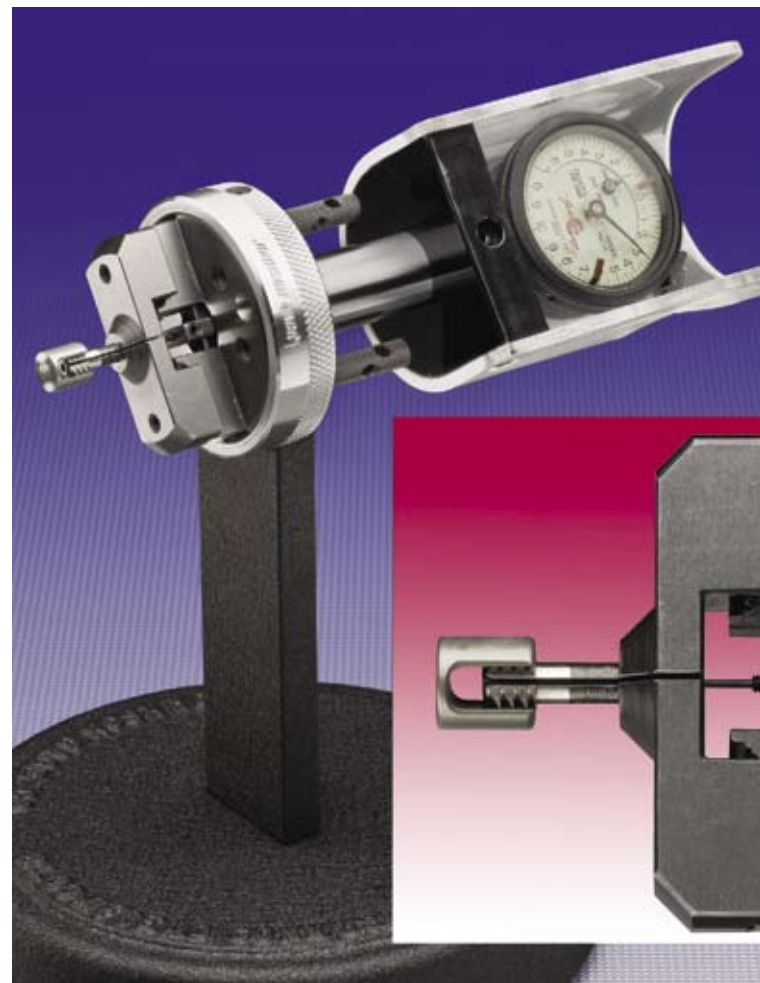
For more information, please visit NCCS at Westec Booth #3282.

## ▼ Johnson Gage

WESTEC Booth # 2758

Johnson Gage will display a new Thread Inspection System for the verification and in-process control of reverse-angle buttress threads commonly used in anti-splashing medical devices such as orthopedic implants. The new system is based on advances in grinding and manufacturing technologies and is similar in design to current Johnson Gage products utilized for medical applications such as bone screws and dental implants. The new system is suitable for both inspection and manufacturing environments. Common applications include design validation, dimensional inspection and conformance, initial manufacturing and tool verification, and in-process determination of capability degradation.

For more information, please visit Johnson Gage at Westec Booth #2758.







### ▲ Precision Cutting Tools/ Günther Wirth

WESTEC Booth #3632

Precision Cutting Tools/ Günther Wirth (PCT/GW) will introduce a new line of High Performance Drills at Westec. Their new North American plant is initially geared towards the production of High Performance drills, but plans are in place to fabricate Deep-hole Drills, Step drills as well as its popular line of Four-in-one drills. PCT is a producer of misc. hard metal tools which include drills, end mills, milling cutters, reamers, core drills and special tools.

For more information, please visit Precision Cutting Tools/ Günther Wirth at Westec Booth #3632.



### ▲ Siemens Energy and Automation, Inc.

WESTEC Booth #3837

Siemens Energy and Automation, Inc. will introduce new solutions and services for machine tool manufacturers and end-users and will exhibit its newest innovations in CNC, motor and drive technology as well as a new and innovative solution for CNC training. New versions of the popular ShopMill and ShopTurn software packages feature easy, step-by-step, on-screen programming. They will also introduce the new SINUMERIK 802D, an operator panel-based control system that combines the numerical control (NC), the programmable logic controller (PLC) and the human machine interface (HMI) in a single unit. It has the capability of five-axis machining (two of which may be spindles) and is the ideal solution for the low and medium-range milling and turning machine markets.

For more information, please visit Siemens Energy and Automation, Inc. at Westec booth #3837.

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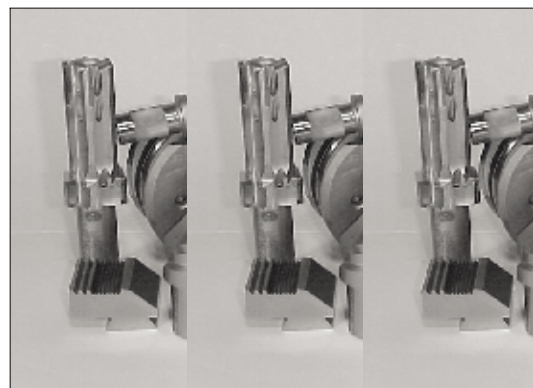
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# product focus



## ◀ Sunnen Products Company

WESTEC Booth #2916

Sunnen's new SV-1000 Series vertical CNC honing machine is based on an innovative modular design, engineered to scale up from a single-spindle machine to a fully automated multi-spindle unit for ultra-precise bore sizing and finishing. Designed for part diameters of 3 mm - 65 mm (0.120"-2.56"), SV-1000 series machines can size bores to accuracies of 0.25  $\mu$ m (0.00001"). The new machine is ideal for diesel fuel injectors, gears, small engine cylinders/connecting rods, hydraulic/pneumatic components and medical devices in medium to high volumes. The basic single-spindle SV-1000 module is designed from the ground up for future automation with removable side enclosure panels to facilitate flow-through part processing. It is available with a fixed tooling plate or servo rotary table with 12-position rotary air union for fixture control.

For more information, please visit Sunnen Products Company at Westec Booth #2916.



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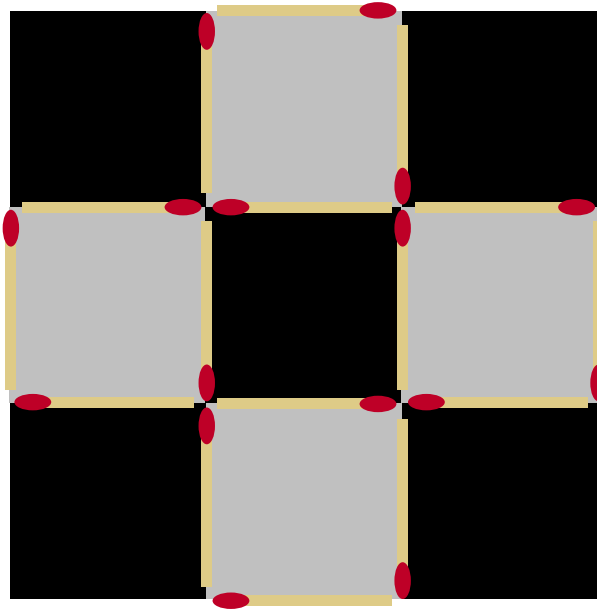
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# think tank

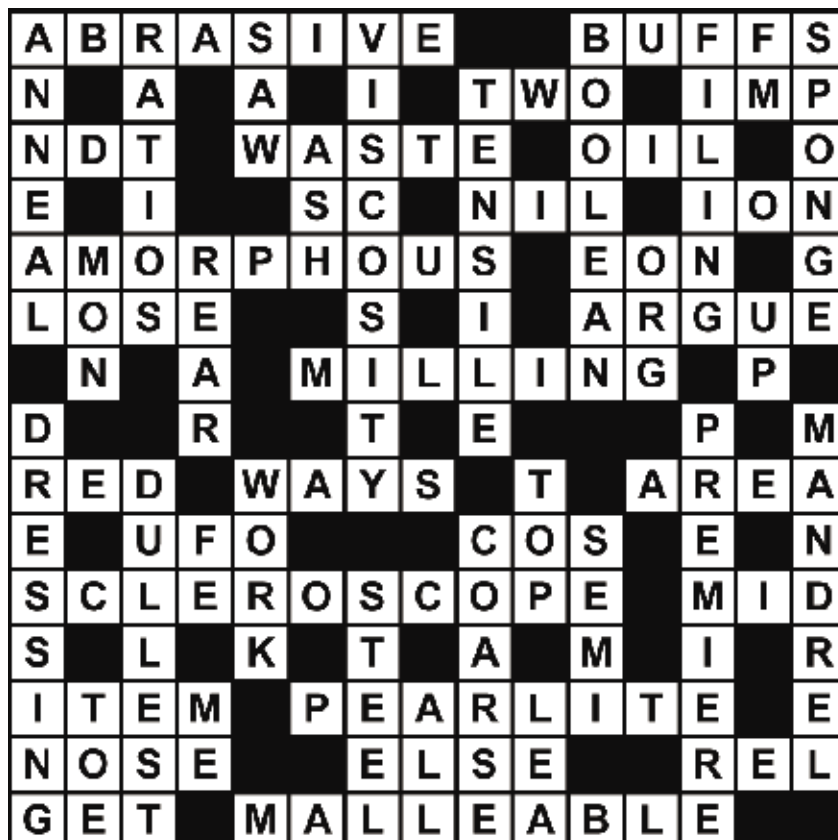


## The Match Cross

There are five identical squares in this cross, formed with 16 matchsticks.

Move three matchsticks to get six identical squares. The matchstick's overlapping, breaking or "loose ends" are not allowed.

## Who's an expert at their industry?



Only one of you!

Congratulations to  
**Jeff Kovalenko** of Key  
Machine Tool, Inc.  
in Elkhart, IN!

Puzzle found in the January 2009 issue



# postings



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Manufacturing  
and Tooling  
for Composites

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April 29<sup>th</sup>  
thru May 1<sup>st</sup>

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

## PMTS

Columbus,  
Ohio

April 28<sup>th</sup> thru 30<sup>th</sup>

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

Geometric  
Dimensioning and  
Tolerancing (GD&T)  
Introduction

Mazak Corp  
Florence, KY

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

APRIL  
2<sup>nd</sup>  
& 3<sup>rd</sup>

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March  
30<sup>th</sup>  
thru  
April 2<sup>nd</sup>

MicroManufacturing  
Conference  
& Exhibits

Minneapolis,  
MN

April 1 - 2

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

NanoManufacturing

Conference  
& Exhibits

Minneapolis,  
MN

April 1 - 2

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

Baseball  
Opening Day

Sunday, April 5

(Dodgers vs. Giants,  
Braves vs. Phillies)

Birthday  
Sir Alec Guinness

(Star Wars,  
Lawrence of Arabia)

April 2, 1914

April 14, 1939

John Steinbeck's

"The Grapes of Wrath"  
published

Concurrent  
Engineering

Detroit, MI

April 28 - 29

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

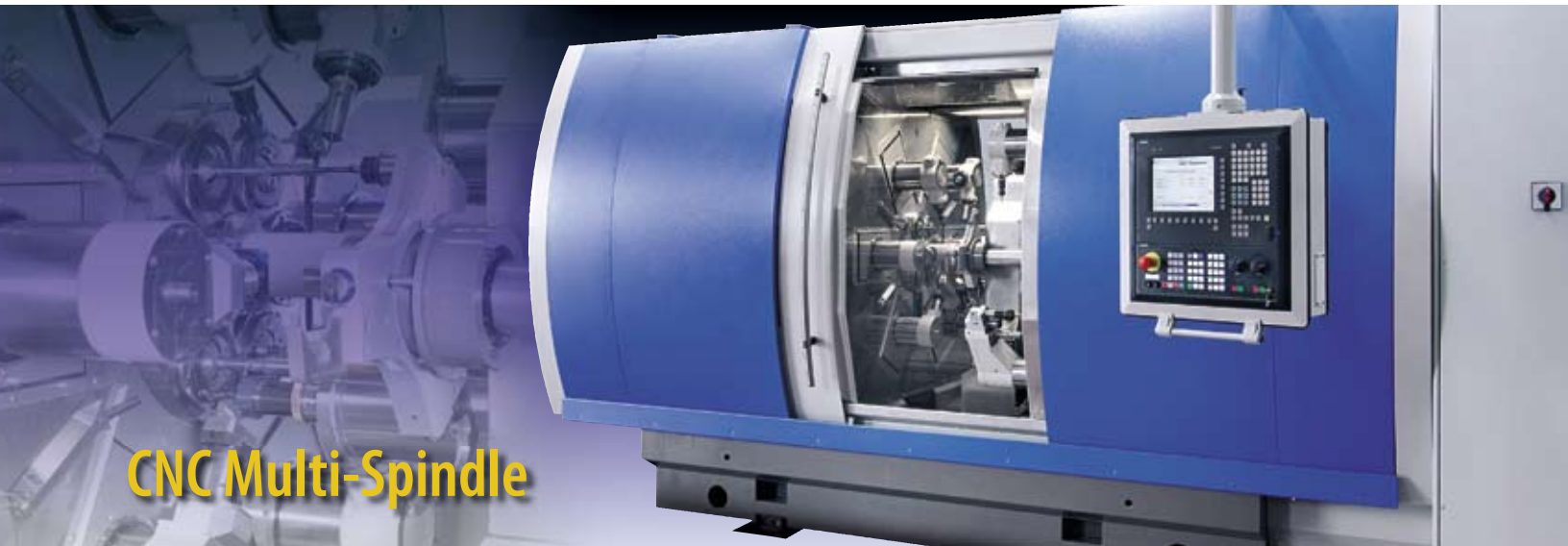


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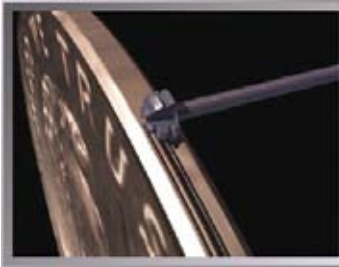
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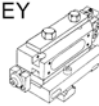
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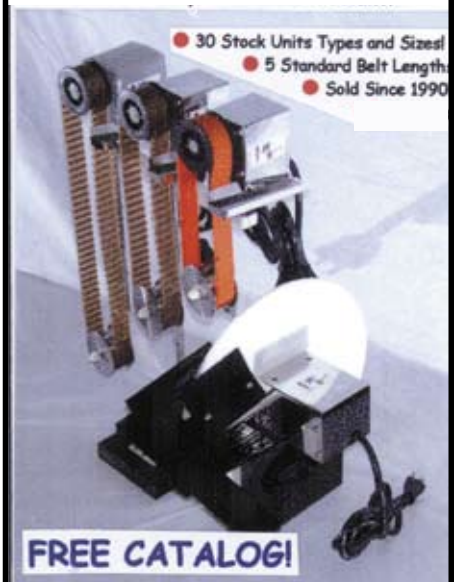


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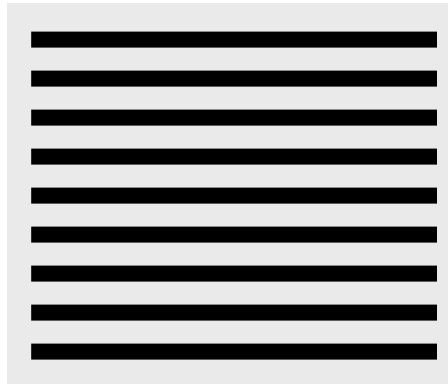
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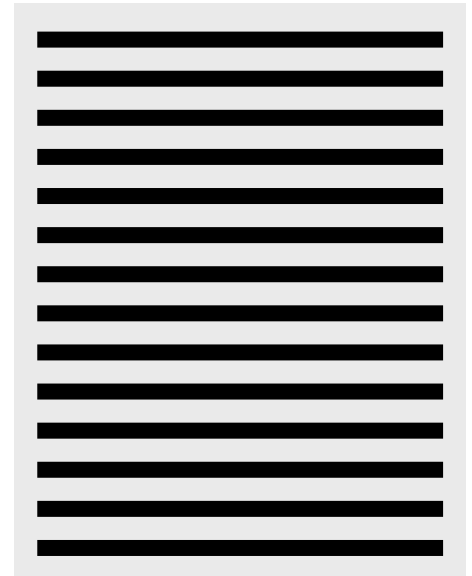
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## What We Can Learn

I recently had the opportunity to talk to an insider who has been intimately familiar with the success of McDonald's over the last five years, as they have gone from lumbering giant to innovative master of fast food. They continue to post amazing numbers despite the worldwide economic retreat.

He says their success has come from many sources—worldwide expansion, smart supervision of franchises and company stores—but especially from shrewd acquisitions aimed at picking up knowledge quickly without the painstaking bureaucratic handwringing that would have plagued them if they relied on developing everything from within.

“[McDonald's] success has come from shrewd acquisitions aimed at picking up knowledge quickly.”

He said McDonald's bought the floundering Boston Market chain because they wanted their knowledge of the chicken business. Boston Market had excellent contacts in the world of chicken which McDonald's, despite all their heft, lacked. Boston Market, formerly Boston Chicken, was where McDonald's learned the special intricacies of chicken preparation and chicken procurement, which made a big difference in developing the Chicken Selects® Premium Breast Strips and other chicken products that have made the McDonald's menu a powerful player against KFC. McDonald's had expected beef consumption to wane because of health concerns about cholesterol and fat. Chicken was their big alternative. Even though burgers have held up fairly well, chicken has thrived at McDonald's.

McDonald's was looking to expand their breakfast business to take on Dunkin' Donuts. They also had an interest in Mexican food after seeing the rise of Taco Bell. They picked up a tiny Denver chain of restaurants called Chipotle Mexican Grill, to study Mexican food, but especially to develop a mastery of wraps. McDonald's ultimately spun off Chipotle Grill, but not until they used its knowledge to come up with the fabulously successful Breakfast Burrito.

Breakfast is huge for McDonald's now. They studied Dunkin' Donuts but did not attack them directly. Inadvertently, they delivered a body blow to Starbucks with the

improvement of their coffee and breakfast fare. McDonald's had attempted to buy Starbucks in the early 1990s, but Howard Schultz, the builder of the coffee chain, had no interest in selling. McDonald's has now partnered with Green Mountain Coffee Roasters to bring a premium coffee product to market, which is whacking Starbucks, as they are vulnerable to the economic slowdown with no viable hot breakfast menu.

My source says that even though McDonald's has highly sophisticated, in-house executive chefs they are very slow to get products to market. The acquisitions have provided leapfrog knowledge which they have absorbed quickly.

What can smallish metalworking companies learn from a McDonald's acquisition odyssey?

In hard times a lot of firms are going out of business. In an interview in this month's magazine Scott Livingston of Horst Engineering talked of his recent acquisition of the goodwill of a tiny player in the Swiss screw machine medical products arena. He was making a determined push into this sector and was looking for an entrée to customers, which would save him time in developing a clientele. For a meager investment he bought leapfrog knowledge into medical. He did not need the equipment or the people, he just wanted an introduction to the clients.

I think acquisition is a neglected area in the job shop world. Product lines and customer knowledge, as well as access to skilled employees, can produce a lot of value. One might even find the secret to the next Breakfast Burrito blockbuster in the carnage of floundering competition.

Lloyd Graff



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