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December 2008 volume 4 issue 12

Today's Machining World Magazine  
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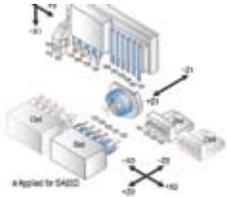
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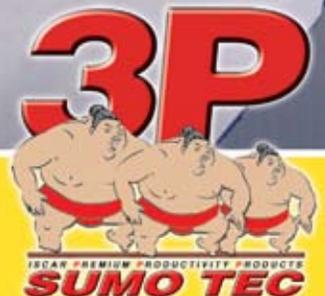
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# editor's note

## True gratitude

**T**hanksgiving is by far my favorite secular holiday. It's a day that revolves around gratitude, connection and food. These themes resonate loudly for me this year after living through a heart attack and bypass surgery, economic dislocation and a big change in diet.

I have never been more in touch with these three big themes of Thanksgiving.

While I was on my back for 12 days with a breathing tube stuck down my throat I was sustained by the almost constant visits by family and friends in the Intensive Care Unit. My biggest regret was that I couldn't be out in the waiting room feeling the vibe of connection and solidarity between the visitors, some of whom schlepped thousands of miles to be there.

I was so grateful to be able to connect with family and friends even if I could not talk. I could listen and write notes and feel even if I was unable to utter a word. Before I went to surgery my family sang me my favorite songs for 45 minutes which connected us all in a way that still brings tears to my eyes.

As I was recovering in the ICU with the breathing tube, I could not eat. I longed for foods that I loved — especially fresh peaches. I dreamed about fruit that was forbidden to me and lay bound to the bed with half a dozen tubes providing artificial sustenance. In desperation to satisfy my lust for taste my wife, Risa, put Listerine strips in my mouth just to give me some hint of flavor. We also tried an experiment putting fruit oils on my tongue, which ended up gagging me. As sick as I was I still had an appetite in my head.

This year I await the flavors of Thanksgiving — the pumpkin, cranberry and turkey, with extra zest and gratitude, and I will cherish the connection with family and friends with a greater sense of the fragility of life.

As I was on my back in the ICU I wrote articles for *Today's Machining World* in my mind. Noah told me about IMTS and I asked him questions on my notepad. For me *TMW* is more than a business. It's about my connection to the people in our community who read and respond, like the 800 folks who answered our survey. This Thanksgiving I am grateful to be alive and never more thankful to be able to connect with you.

Lloyd Graff  
Editor/Owner

editor's note



**Lloyd Graff** has worked at Graff-Pinkert and Co, a machine tool trading firm, for 47 years, starting at 17 as a telephone prospector. He started *Screw Machine World* in 1999 which morphed into *Today's Machining World* in 2005. His writing career began at age 12 with a letter to the editor published by the *Chicago Daily News*. At that point he considered good writing to be the correct use of big words like “evanescence.” His favorite sport is table tennis. If he could only have one food on a desert island it would be a Crisco pie crust.



**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 this 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.



**Emily Halgrimson**, Managing Editor of *Today's Machining World* has an eclectic background which includes a degree from the Eastman School of Music in French horn performance, a year of service at a Bangladeshi orphanage, training at a Zen Center, and most recently — a stint in the Peace Corps in Benin, West Africa. Although she used to consider herself in-the-know with new technological developments, her time out of the country has left a gaping hole in her modern technical lingo, which is most obvious when conversing with her peers. She is starting to empathize with her grandparents, who cannot for the life of them figure out why teenagers want to wear pants that are falling off their bottoms.



**Noah Graff** has been working at *Today's Machining World* since 2005. He holds the titles of features editor, videographer, and “the web guy.” He graduated from the University of Wisconsin, majoring in film and history. Currently he has a reality show on YouTube called “Jew Complete Me” documenting his search to find the Jewish love of his life. Noah is also a budding salsaero, makes amazing brownies and believes few things can match the exquisiteness of the perfect corn dog. Lately he has been pondering a trip to Vietnam.

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transforming  
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Thanks for putting the November 2008 brainteaser in the new *Today's Machining World*... Unfortunately, a few of the guys in the shop think the ball is going to get to the bottom of the slope on different planes the quickest. I think

it's the circular and a few think it's straight and so on. Could you please send us the answer because it's a good argument right now.



**Eric Hennessey**  
Slater Hill Tool  
Dayville, CT

*Answer to come in the January 2008 issue!*

A TMW *Swarfblog* entry on Oct. 22, asked the following questions about installing cameras in job shops: Does your shop use cameras to monitor employees? Has it had an impact on productivity? How would you feel as an employee if your boss installed cameras to monitor your work? Below is one response.

I know of at least one mold manufacturing company that installed video cameras, not to monitor employees but to monitor the work. The employees can log in to view their machines' progress at will. Initial employee fears of employee monitoring quickly gave way to seeing the benefit of greater unattended productivity. It is my understanding that in one case, a fire may have been avoided when an employee spotted his EDM arcing when he checked in on his job before bed. A quick visit to the shop avoided bigger problems. Over the more than two years that these have been in use, I believe that all the staff have embraced the benefit.

**Todd Schuett**  
Creative Evolution CNC  
Schaumburg, IL

*To read or respond to additional blogs visit [www.swarfblog.com](http://www.swarfblog.com).*

*Lloyd-*

I have great respect for you and the effort you and [your team] are making to carve out a niche for *TMW* in the machine tool magazine market. That said, I couldn't disagree with you more about Obama (Just watched your website's video). It is exactly the policies of Obama that will affect the businesses we both serve and make a big difference in how those businesses survive and thrive. Believe me, the very guys he'll target to pay for all the entitlements he plans to dole out are you, your readers, your advertisers and me. That's a fact. The gap between the cultures in America is probably not as wide as it was when we were both kids. I grew up in Humboldt Park [in Chicago], a Polish neighborhood far from the wealthy or intellectual crowd. But, through the hard work of my parents, combined with my own efforts over the years, I evolved and prospered. That clerk [you mentioned] at the SOS office was having a bad day — it happens. Those kids you cite in the video look and act the way they do by choice, not chance. As you might imagine, I'm a staunch Republican (and those hardworking parents of mine were both Democratic ward workers for Hizzoner's old hatchet man, Tom Keane) and will be backing McCain. Just my two shekels...

**Tim Daro**  
Bernard & Company  
Palatine, IL

*The video Tim Daro refers to can be seen at [www.todaysmachiningworld.com](http://www.todaysmachiningworld.com) — click on the videos tab on the left.*

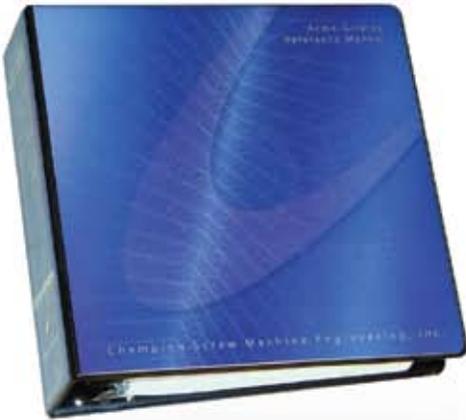
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# On The Block

I have been trying hard to find out what is really going on in the machining world.

On November 11, Bilvern Products Inc. was auctioned off in Mason, Ohio, near Cincinnati. Bilvern was a longtime screw machine shop and family business that overcommitted itself to one customer who quietly built a factory in China and almost overnight pulled the plug on their vendor.

The auction fetched decent prices on (3) year 2000 Mori Seiki CL3A lathes with LNS Sprint bar loaders. They averaged around \$33,000, plus a 10 percent buyer's premium. A 2006 Hardinge-Bridgeport vertical machining center with a small table and 4th axis brought \$44,000 plus BP and a Kia gang-type lathe sold for \$14,500. A National Acme 1 1/4" RB8 from the mid-1950s with threading and 2 Winter thread rolls went for \$15,000, and a 1" RAN6 with threading and

pickoff from the early 1970s brought \$9,000. Brown & Sharpes sold for \$1,000-2,000 except for a 3/4" #2 with a recent ServoCam conversion which brought \$7,500.

The sale indicated that buyers are cautious but will pay a decent price for CNC lathes and machining centers with a good pedigree.





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# swarf

I recently discussed business with an business friend with a substantial screw machine, CNC operation in upstate New York. He told me that he has cut his overhead from \$39,000 per day to under \$32,000 and his shop is making money. His head count is down, but cash flow is better because of lower metal prices. He hates to cut any operators or setup people because he fears he won't get them back when business rebounds. He has been paring his automotive business for several years to the current 10 percent range and expects to continue phasing it out of his business. He says he likes the fact that he has bunches of fresh quotes on his desk, which says customers are continuing to do business.

I talked with another business friend whose operation is about 90 percent automotive. His business is "brutal." He has laid off workers from his unionized operation and is expecting to be forced into more reductions.

The Graff-Pinkert business is tough but machines are turning over at depressed prices particularly in screw machines. Business in Europe is also weak. Container prices have fallen by half, reflecting the slowdown in world trade, particularly in China, which virtually stopped in July before the Olympics.

I also talked to a reader in Northern California who makes high-end furniture for rich dot-com people in the Bay area. For him business is still good.

The message is to stay diversified, shun automotive, hustle for customers and beat back the pessimism.

## I received an email from

John Griner of Griner Engineering Inc. wishing me well in my recovery, but also alerting me to the plight of Eclipse Aviation Inc., the small jet builder in Albuquerque we featured in a cover story about the budding air taxi business in the October 2006 issue.

Eclipse has built 200 twin engine jets — but its original business plan depended on building a much bigger number and driving cost down with economies of scale. Now the company says it needs \$300 million in fresh capital, because the air taxi market has been slow to develop. They missed the payroll on November 13, according to the Aircraft Owners and Pilots Association (AOPA) Web site.

Vern Raburn, its founder and the evangelist for the concept, is out at Eclipse. The idea seemed like a good one and probably still is, but the timing was bad for Eclipse.

## A couple of personal notes:

Darlene Miller of Permac Corporation, who Emily Halgrimson interviewed for the November 2008 issue, was interviewed by Fox Business TV, and the video also appears on Yahoo. Darlene's easygoing demeanor and great track record in building the business seem to be a magnet for the media. But she also has a knack for being in the right place at the right time to get her message out.

On a sadder note, auctioneer Lloyd Ashman of Ashman Company Auctioneers & Appraisers, Inc. in California, died. Lloyd was one of the most straightforward auctioneers I've ever dealt with — there were no games with him. He was blunt and operated like a one-man gang, running around looking at deals and doing the auctioning himself. He sold mostly smaller job shops in California and Nevada. You could rely on his word. We will miss him in the machining community.

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swarf

## As the stock market and

commodity exchanges lurch downward, the purveyors of panic such as cable network, CNBC, rack up huge ratings. There is big money in crisis mongering.

My belief is that the "financial crisis" that seemingly feeds on itself is a self-fulfilling prophecy that has gotten out of hand. Financial confidence has been decaying faster than a rotting tooth, abetted by cynical bears on Wall Street and "journalists" who have a vested interest in chaos. A financial "collapse" ahead of an election smacks of a quasi-terrorist attack on our financial system.

I am not saying that the recession is a figment of a fearful imagination. The overbuilding of new housing, abetted by callous loan facilitators, is a knotty problem exacerbated by Wall Street derivative traders who played hot potato with incredibly leveraged instruments they did not understand. But the panic did not have to happen. One cannot ignore the fact that Treasury Secretary, Henry Paulson, was an architect and advocate of 40 to

one leverage for "investment" banks when he headed Goldman Sachs, and Ben Bernanke, head of the Federal Reserve, was a student of the Great Depression as an academic at Princeton. So the fox, Paulson, is now guarding the chicken coop, and a professor obsessed by economic cataclysm is the power lever at the Fed.

My hope is that Barack Obama can bring in knowledgeable people to cool the rampant fear that seemingly pervades the country. I don't think Warren Buffet will go to Washington, but he is the kind of practical nonconformist who sees opportunity when others are sure the sky is falling.

Our job at Today's Machining World is to understand that fear is cyclical and wise people see through it to glimpse the prize at the other side.

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## Barack Obama's

candidacy and victory has given a lot of play to the campaign's unofficial theme song, Sam Cooke's, "A Change is Gonna Come."

Cooke was a brilliant songwriter and singer whose music has held up extremely well even though he was killed under mysterious circumstances by a hotel clerk in 1964 at the

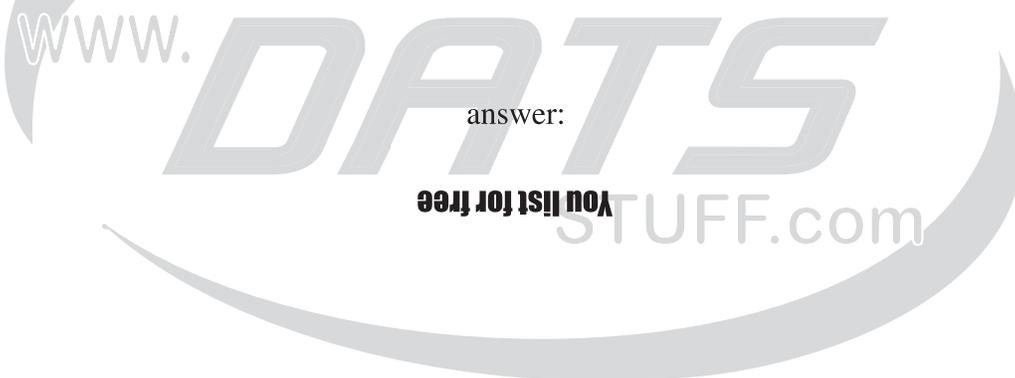
age of 33. Sam Cooke is still my all-time favorite singer and I listen to his music virtually every week in my car or on my iPod while exercising. His rendition of the spiritual "Amen" which he integrated into "This Little Light of Mine" was the song we closed with at every meeting of a men's group I belonged to for 10 years. We would huddle up in a circle and sing the song together to give the conclaves closure. In Cooke's rendition the word "Amen" sounds like "a man" which gave the music added meaning for our group.

When I was in the hospital I found Sam Cooke's version of "Amen" extremely useful in synchronizing my breathing — inhaling on "A" and exhaling on "men." It worked like a meditation, enabling me to fall asleep and also avoid narcotics.

Obama ran a masterful campaign. Sam Cooke was a nice little part of it. Amen.



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By CECILY FUHR

## *The World Without Us*

There is something deeply dispiriting about reading most environmentalist books. We all love our planet, no matter what our politics, and we all want it to be healthy, stable and capable of supporting our children and our children's children... and yet.

To read Al Gore's *An Inconvenient Truth* or any of the other myriad Earth-concerned tomes out on the market today is to spend an awfully large number of hours becoming more and more despondent about the future. As good citizens, we know that we should be concerned about climate change and resource consumption, but five pages into the first chapter, all of that dreadful news about the skyrocketing population curve and ocean temperatures and the decline of *everything* is enough to make you put the book back on the shelf and watch *Law and Order* reruns for a couple of hours just to get the taste of doom out of your mouth.

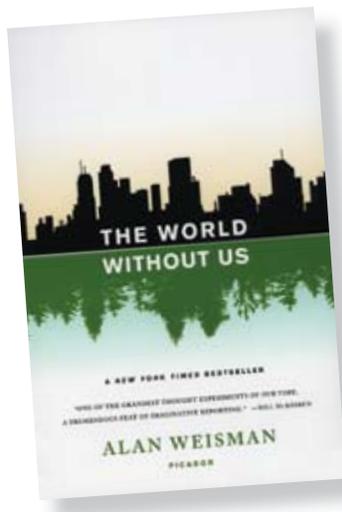
In his recent book *The World Without Us*, journalist Alan Weisman has found a creative way to get past this problem. Imagine, he proposes, that tomorrow we human beings suddenly just — disappeared. Wiped out. Extinct. It doesn't matter exactly how — a catastrophic disease, perhaps, or an alien invasion. What would happen to the world? Would any trace of us survive?

Contemplating the total extinction of the human race may not at first glance seem to be the cheeriest of improvements on the standard environmentalist's argument. But Weisman's doomsday scenario spins itself out in ways that are not only informative, but oddly soothing. He begins with a narrative of the slow, inevitable decline of an average single-family house's structure at the hands of nature. Without a resident homeowner around to shore things up the damage begins around the chimney flashing, as rain seeps beneath the shingles and begins to dismantle the roof. As the nails rust, the roof separates from the structural trusses, while mold busily breaks down the cellulose in the wood construction. Within 50 years, the house is gone. New York City gets its own chapter: As the subway system's pumps fail for want of power, the tunnels fill with water from the Hudson River, eventually collapsing the streets above them, and a long-buried Manhattan river establishes itself along Lexington Avenue. Weisman surveys a vast range of

human accomplishments, imagining their inevitable demise: Our petrochemical plants fall apart, our farms' hybrid crops are overgrown with tougher native and imported plants, the Panama Canal silts up — even the sea of non-biodegradable plastics we have created over the past half-century are eventually ground down like pebbles into sand and sink to the bottom of the ocean. Mt. Rushmore, carved into hard, slow-eroding granite, could survive as long as 7.2 million years to puzzle any species that takes our place, but otherwise very little of us would remain.

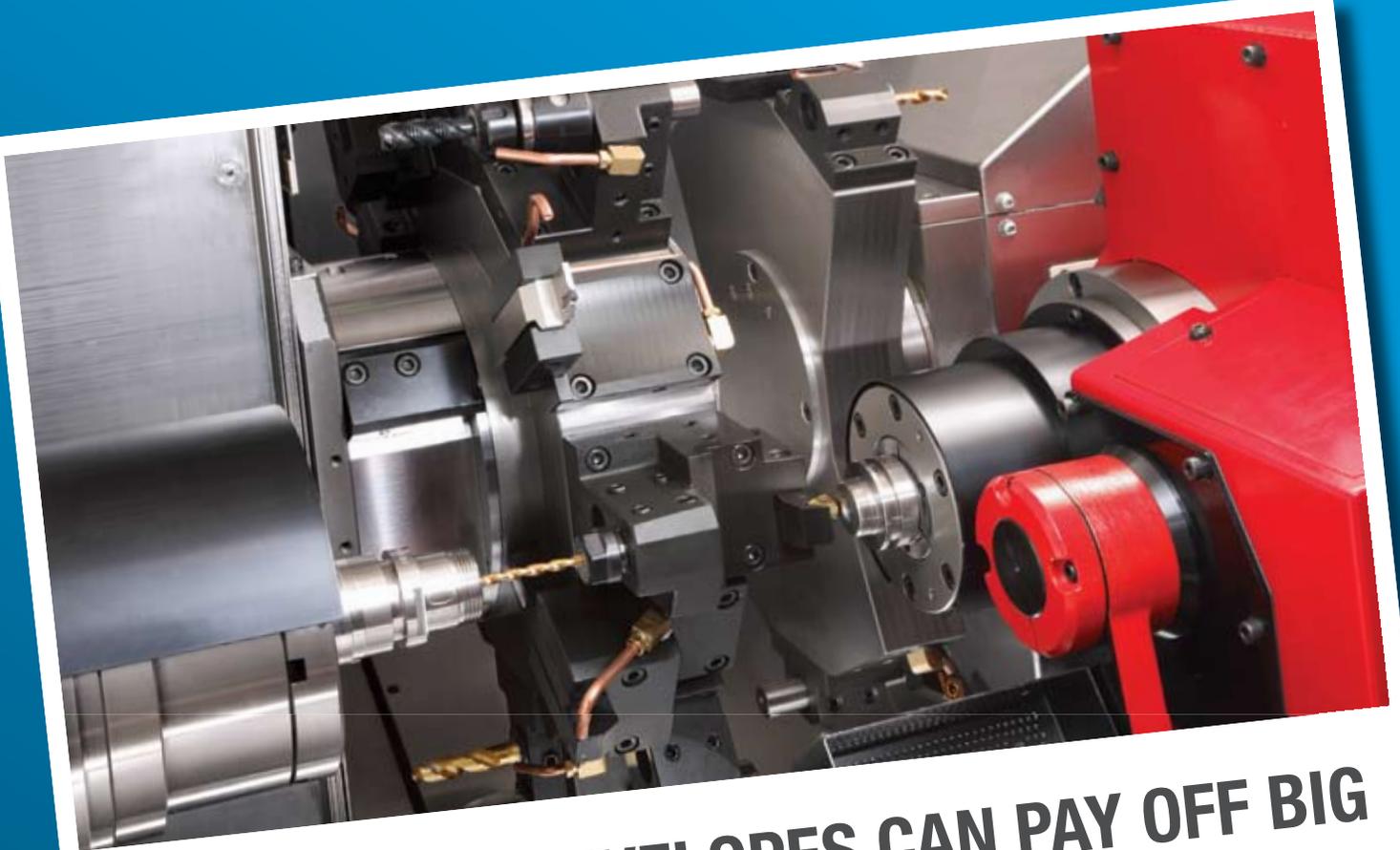
Nevertheless, the cumulative effect of all this is curiously heartening. So much traditional environmental literature focuses relentlessly on us — the danger *we* pose to our world, *our* unwillingness to make necessary changes. By focusing, quite literally, on a world without that *us*, Weisman shows us the other side of the equation: A dynamic system filled with persistent, adaptive, creative life that will swiftly fill whatever void would be created by our absence. We may feel — especially after a few rounds with more traditional environmentalist arguments — that the weight of endless environmental micromanagement rests upon our shoulders and ours alone. But as Weisman repeatedly demonstrates, all we need to do is get out of the way.

Of course, total human extinction is not the environmental solution that most of us would choose. But there are less extreme solutions to many of our environmental woes that represent a more manageable kind of stepping back — where fisheries are depleted, temporary moratoriums on fishing, followed up with prudent management would restore stocks. Significantly lowering the worldwide birthrate would, over time, lower the world population and allow the non-human world to recover. Weisman may not offer answers to all our problems, but his vision of our dynamic, living world is inspiration enough for us to stick around and solve them.



Comments? You can email Cecily Fuhr [cecilyfuhr@gmail.com](mailto:cecilyfuhr@gmail.com)

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**23**

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## ◀ Notoriously Big

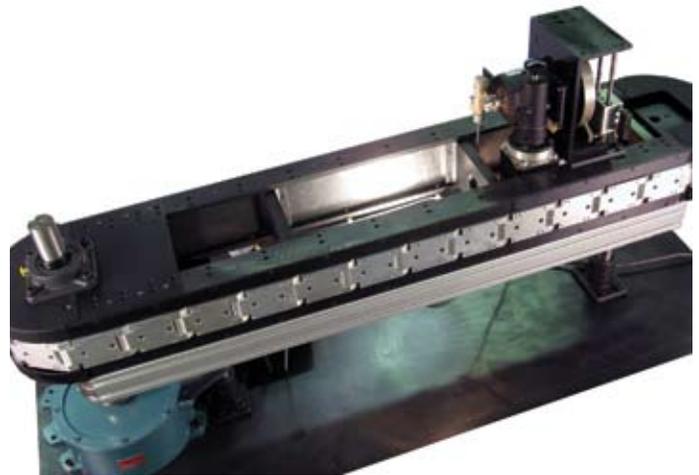
BIG Kaiser Precision Tooling Inc. introduces its newest Speroni benchtop presetter. The MAGIS is an ergonomically designed system that includes integrated calibration master, pneumatic axis locks, x and z Axis fine adjust, CCD camera and integral ISO 50 taper spindle with pneumatic spindle brake. The MAGIS is constructed of aged pearlitic cast iron and is thermo-balanced and artificially aged to ensure the equipment is fully isostatic and will not deform or distort over time or temperature change. The Speroni MAGIS has a standard X-axis range of -2.00 inches (50 mm) to +14.00 inches (350 mm) and is available in three column sizes, with 16-inch (400 mm), 20-inch (500 mm), and 24-inch (600 mm) travel in the Z-axis, to fit any company's tool measurement and presetting needs.

For more information, please contact BIG Kaiser at 888-866-5776 or visit [www.bigkaiser.com](http://www.bigkaiser.com).

## ▼ Gee it's Forceful

GF AgieCharmilles' FO550S — a new diesinking EDM from the company's "Speed Edition" range — enables fine, shiny surface finishes ( $\leq 0.4 \mu\text{m}$ ). With the movement speed of the Z-axis multiplied by two (295 in/min) and acceleration increased by five (197 in/s<sup>2</sup>), the FO550S excels in "blade" type applications and pre-roughed 3D cavities. GF AgieCharmilles designed the FO550S with a double thermo-stabilization system, allowing for maximum accuracy. Circulation of the dielectric is integrated into the worktable, which prevents the risk of thermal shocks when filling the tank. The FO550S features GF AgieCharmilles' industry leading DPControl, which is designed to suggest ideal electrode undersize and rationalize the number of electrodes necessary for effective machining.

For more information, please contact GF AgieCharmilles at 800-282-1336 or visit [www.gfac.com/us](http://www.gfac.com/us).



## ▲ Tri me out

DE-STA-CO's new CAMCO® Modular Tabletop Precision Link Conveyors are capable of being built from three feet to 30 feet and the conveyors can provide up to 400 workstations for the assembly of multiple-part products such as automotive fuel pumps, disposable medical devices and electrical switches. Station-to-station index times can be as short as 0.25 seconds, with positioning accuracy up to  $\pm .001$  inches. Other standard features include a pattern of tapped holes along the length of the conveyor to receive custom or standard tooling plates and an open backbone to allow electrical, pneumatic and mechanical components to pass through the conveyor. Central and offset jackshafts can be added easily.

For more information, please contact DE-STA-CO at 888-337-8226 or visit [www.destaco.com](http://www.destaco.com).

# fresh stuff

## ▼ Core of cutters

Sandvik Coromant's new range of damped silent tools brings performance benefits to the company's line of CoroMill® milling cutters. The integrated dampening of Sandvik Coromant's CoroMill 390 offers efficient, vibration-free machining that improves the performance of cutting tools working in deep cavities and pockets. This reduction in vibration allows for an increase in cutting parameters without compromising work piece quality. Additionally, the CoroMill 390 can be used with Coromant Capto® which results in even further stabilization of the machining process. Coromant Capto boosts the capabilities of long-reaching tools and achieves high stability and rigidity.



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



## ◀ Be a giant

Mitsubishi introduces the BA24, its new large-capacity, wire EDM. The machine was designed to accommodate a variety of machining needs, from parts to dies. The BA24's new compact head design increases nozzle accessibility to stepped workpieces and clamping fixtures. The flat plate type power feed terminal design simplifies replacement and indexing. The machine offers X, Y, Z travel dimensions of 23.6" x 15.7" x 12.2" with a four-sided work table and all stainless steel work tank and fluid system. The vertical front work tank door saves floor space required by a swing door and eliminates dripping on the floor.

For more information, please contact MC Machinery Systems, Inc. at 630-616-5920 or visit [www.mitsubishi-world.com](http://www.mitsubishi-world.com).

## ▼ Right attire

SolutionWare Corporation has enhanced their product line to include MazaCAM CAD/CAM and Editor's ability to output Mazatrol programs directly from SolidWorks: This product is PowerCAM, the CNC programming assistant, which for many parts can reduce programming time typically by 75 percent. The ability to take a Solid file with its feature data allows PowerCAM to designate tooling to make smart decisions in the form of pockets, drilling, tapping, etc.. These tools are selected from a predefined materials and tools library to include speeds, feeds, chip-load for various depths, and much more. The library is accessible to the user for customized materials and tooling.

For more information, please contact SolutionWare Corporation at 408-249-1529 or visit [www.solution-ware.com](http://www.solution-ware.com).





# 2008 Annual Forecast & Survey

Does Pollyanna wear a shop apron?

**P**essimism almost to the point of despair seems to be the prevailing feeling emanating from the financial media and the financial markets. Yet the readers of *Today's Machining World* present a much brighter picture of 2008 and 2009.

The *TMW* Annual Survey conducted in late October 2008 by the independent firm of Irwin Broh and Associates of Des Plaines, Ill., was sent via email for the first time. The response was remarkably robust, with almost 20 percent of those receiving the electronic request filling out the questionnaire. This stands in stark comparison to Broh's normal email survey response rate of only 2-3 percent.

I found the key findings about anticipated sales volume for 2008 versus 2007 surprising. Fifty percent of the anonymous respondents expect 2008 sales volume to surpass that of the previous year, with 22 percent not sure. A little over one quarter said 2008 will not exceed

2007 in sales volume. With the precipitous declines in car sales and residential building, and the alleged financial crisis in September, this optimistic report seems to be counterintuitive.

The positive outlook for 2009 is shocking. The survey showed 37 percent of respondents believing 2009 would top 2008 in sales, 37 percent unsure and only 26 percent expecting 2009 sales to be weaker.

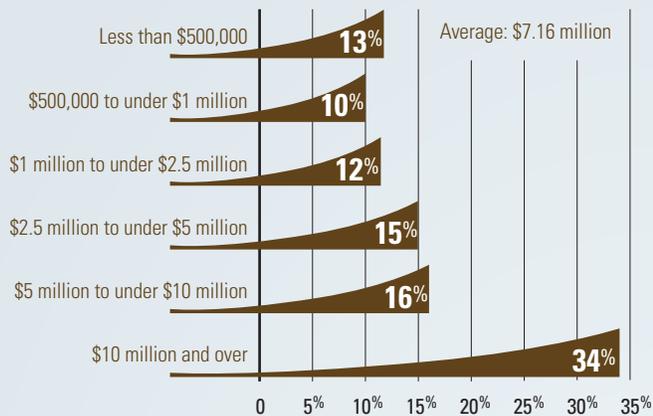
This data tells me that the machining companies that this magazine reaches are generally not deeply feeling the economic nastiness that is roiling retail, real estate and vehicles.

This is also reflected in hiring expectations. A remarkable 91 percent of respondents expect employment in their companies to expand or stay the same.

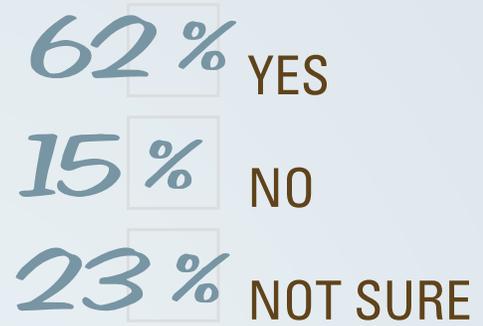
On capital equipment purchases, approximately one third of the questionnaire emailers plan to purchase CNC lathes and or CNC machining centers, while 20 percent

By Lloyd Graff

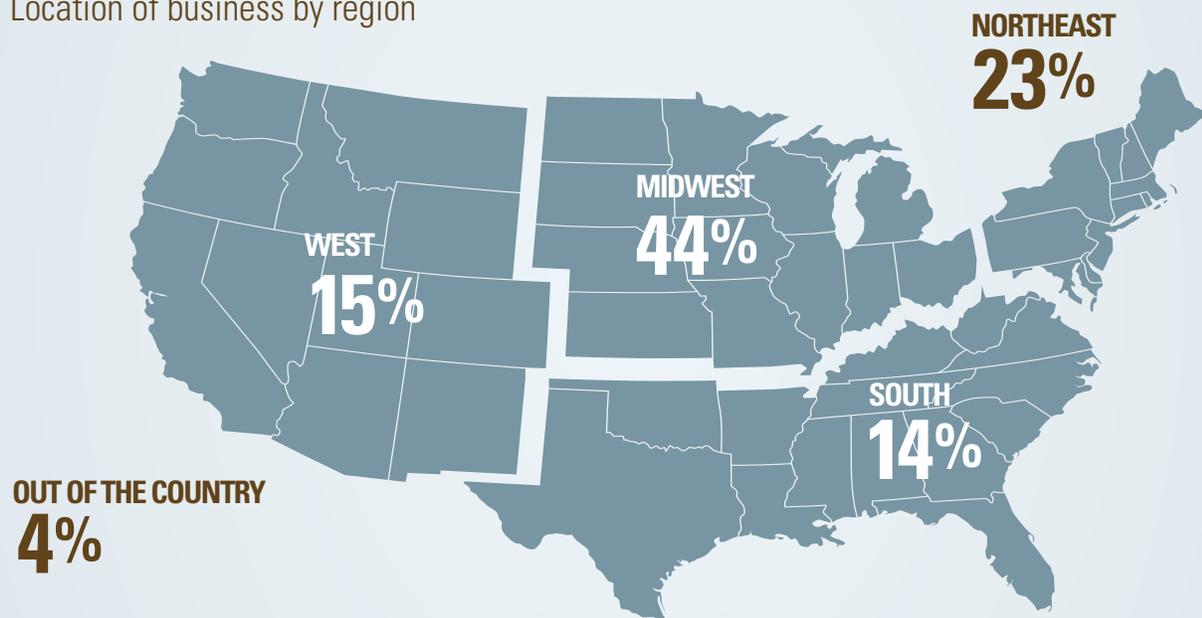
## Annual sales volume/value of goods



## Will election results affect your business



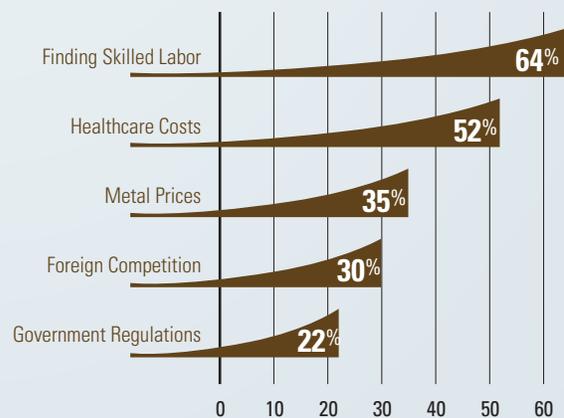
## Location of business by region



## Will your credit relationship be more difficult in 2009 than 2008

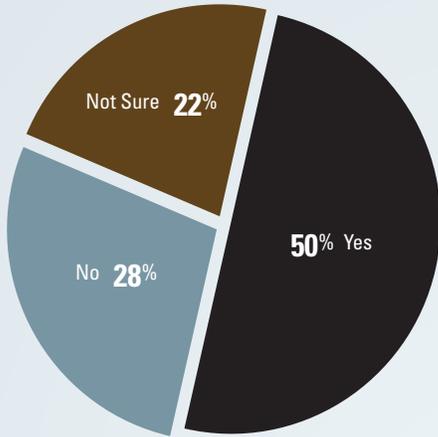


## Ranked in order of concern to your business

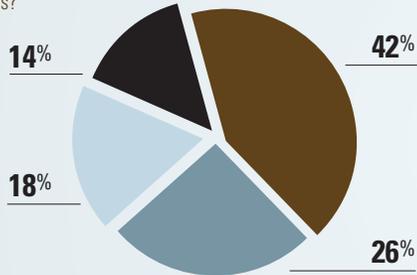


## Estimate of 2008 sales volume

Will your 2008 annual sales volume/value of goods produced exceed 2007 levels?

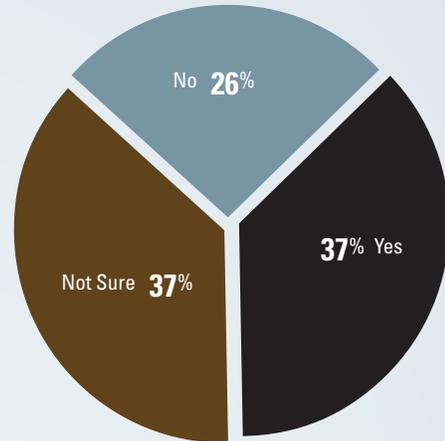


By how much will your 2008 annual sales/value of goods produced exceed 2007 levels?

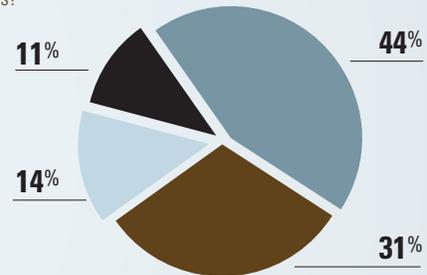


## Estimate of 2009 sales volume

Do you anticipate 2009 sales volume/value of goods produced to exceed 2008 levels?



By how much do you expect your 2009 annual sales/value of goods produced exceed 2008 levels?

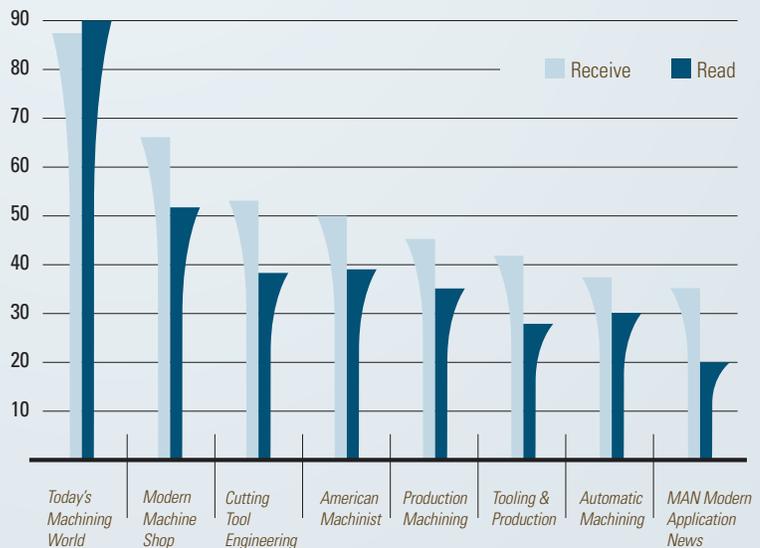


■ Less than 5% ■ 5% to less than 10% ■ 10% to less than 20% ■ 20% or more

In 2009, do you plan on adding, reducing or keeping the same number of employees?



Which publication do you receive and read regularly?



## Purchasing Choices Planned for 2009

Inspection Equipment - 45%

CNC Lathe - 36%

Vertical/Horizontal Machining Center - 33%

Training - 31%

Bar Loader - 22%

CNC Swiss - 20%

CAD Software - 17%

Shop Software - 14%

Grinding/Broaching Equipment - 14%

Storage Units - 10%

EDM - 9%

Mechanical Screw Machine - 9%

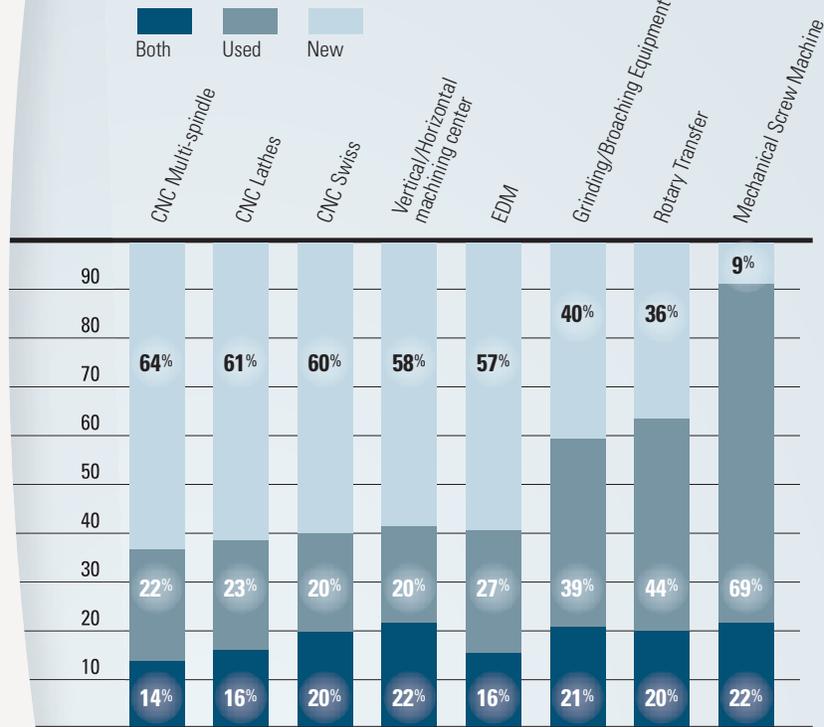
Pollution Control - 9%

CNC Multi Spindle - 9%

Chip Processing - 9%

Rotary Transfer - 4%

## Buying new, used or both?



anticipate purchasing a CNC Swiss type. Employee training is an expected buy for 31 percent of respondents.

Finding skilled people is viewed as the number one operating hurdle by 64 percent of respondents, though I wonder if finding new customers would have topped the list if it had been one of the questions.

I was surprised that almost two thirds of those surveyed believe the election will affect their business. In a follow up questionnaire I would like to drill down in that question to find out what they would like to see from the next administration.

More than half of the respondents were from job shops, with a majority of those doing more than \$5 million per year in sales. More than a third of the respondents feel that their credit relationships may deteriorate in the coming year and almost half feel that their clients will pay less promptly than this year. Considering the large percentage of our readers involved in the automotive industry, I

expected this portion to be bigger.

I must admit I am perplexed by the essentially upbeat answers we received in this survey, especially with the overwhelming mood of fear that I detect in Graff-Pinkert's customers and suppliers. But this data gathered at a time when gloom was pervasive, is a contrarian indicator of an underlying faith in business by the machining community. The people who took the time to answer the *Today's Machining World* survey wanted to volunteer their view of business in the trenches. The psychology of crowds would argue for an extremely negative response to be in line with the "majority" opinion, but the data goes the other way. To me that makes the contrarian view even more unexpected and useful.

The last question of our survey was parochial because it referred to the reading preferences of the respondents. The email recipients were on the *TMW* mailing list for the most part, but the 90 percent readership level was still stunning. Our 90 percent readership results crushed the runners-up, *Modern Machining Shop's* 52 percent rate and *Production Machining's* 35 percent readership. Combining that data and the remarkable percentage of email responses make one feel like we are connecting with the proud members of the machining community.



# WHO READS



**Driven** folks like **Scott Volk, vice-president** of **MetalQuest Unlimited** in Hebron, Nebraska.



Since I could crawl I've loved hot cars. I've transferred my passion for mechanical things to our shop of 19 CNC machines making product for energy distribution, hydraulics, and transportation. I read car magazines like Hot Rod and National Dragster. The only manufacturing magazine I read cover to cover is Today's Machining World.

## Today's Machining World?

# your ride

BY DAVE DIBBLE  
Electro Form Corp, Binghamton, NY.

## Built back in the day... “When trucks were steel and men were iron!”



**I** work all week at a precision hard parts and EDM job shop in Binghamton, N.Y. Evenings and weekends I spend a lot of time using my 1956 Dodge Power Wagon. It hasn't been restored but is in good repair and still working just as hard as its 52-year-old owner. It started life as a brush fire truck in the Pine Barrens of Pine Beach, N.J. The firemen pointed it at the smoke and drove over almost anything to get to the fire.

For me it's pulled out stuck tractors, disked fields and erected a barn. It's main claim-to-fame now is plowing snow on our 1,000 foot driveway with a 10 foot blade, but we still draw hay and silage wagons back to the barns with it in the fall. It's not fast but will go anywhere, even up trees with the front mounted winch. The air conditioning still works — if you open the windshield and cowl vent.

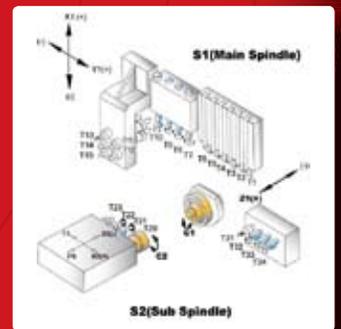


The wagon weighs 6900 lbs empty and regularly tows eight ton silage loads in the fall. The plow adds about 1500 lbs when hitched.

Have you got a favorite ride? Looking for antique cars, skateboards, motor-cycles or anything else that gets you around. Email your story and photos to [emily@todaysmachiningworld.com](mailto:emily@todaysmachiningworld.com).

The only thing more impressive than its brain...is its

# BRAWN



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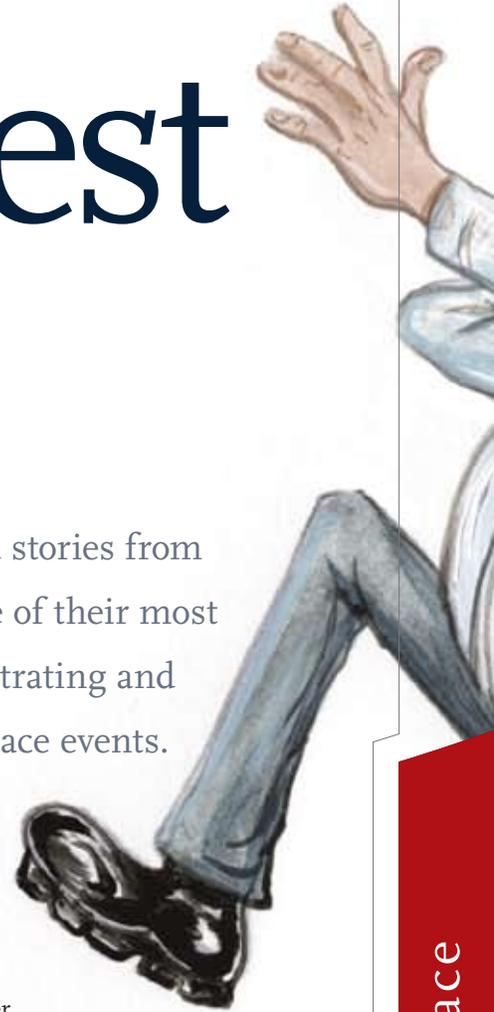
# Your worst and funniest workplace stories

TMW has collected stories from its readers on some of their most embarrassing, frustrating and astonishing workplace events.

*Illustrations by Rachel Patton*

I work in small job shop and our boss has this unusual anxiety over bad weather. When it's raining you can see him redden as his blood pressure shoots through the roof and all he can think about is having to drive home. But what really gets to him is the snow. The guys and I have learned that in the winter if we want to get out from our bosses critical eyes for an afternoon, all we have to do is start casually talking about how we heard a storm is on the way, or mention the menacing clouds that seem to be coming towards us. He usually stew for 10 minutes or so and then casually mentions that he'll be leaving for the day. Works every time.

*-Weatherman*



**I had just started a new job** at a used machine shop and was really happy to be there. I was working at a desk and the guys in the shop would come in to see me for parts or to help with customer's questions. This young guy, Steve, approached me one day and as we were talking he began to get this strange look on his face. As he was about to leave he turned to me and said, "are you from America?" Of course I said, yes, and he replied, "funny, I've never seen an American woman with a mustache." I was horrified and kept my hand over my mouth the entire rest of the day. I knew that the whole shop floor was laughing, and it took me months to feel completely comfortable with him again.

*-Stashed indoors*

**Pens were a big deal in my shop.** People were very possessive of them and I had a reputation for taking them from others. You could always tell that a pen was mine because the cap was missing — I never seemed to be able to remember to replace it. I was doing really well not taking other people's pens until one day, writing up an order, my buddy came by and just started staring at me. At first I had no idea what was wrong, but he started looking at my pen and I knew I had done something to make him mad. He looked at me and said, "is that my pen you have there?" I immediately yanked off the pen cap, threw it over my shoulder and said "absolutely not." We immediately started laughing.

*-Capping off*

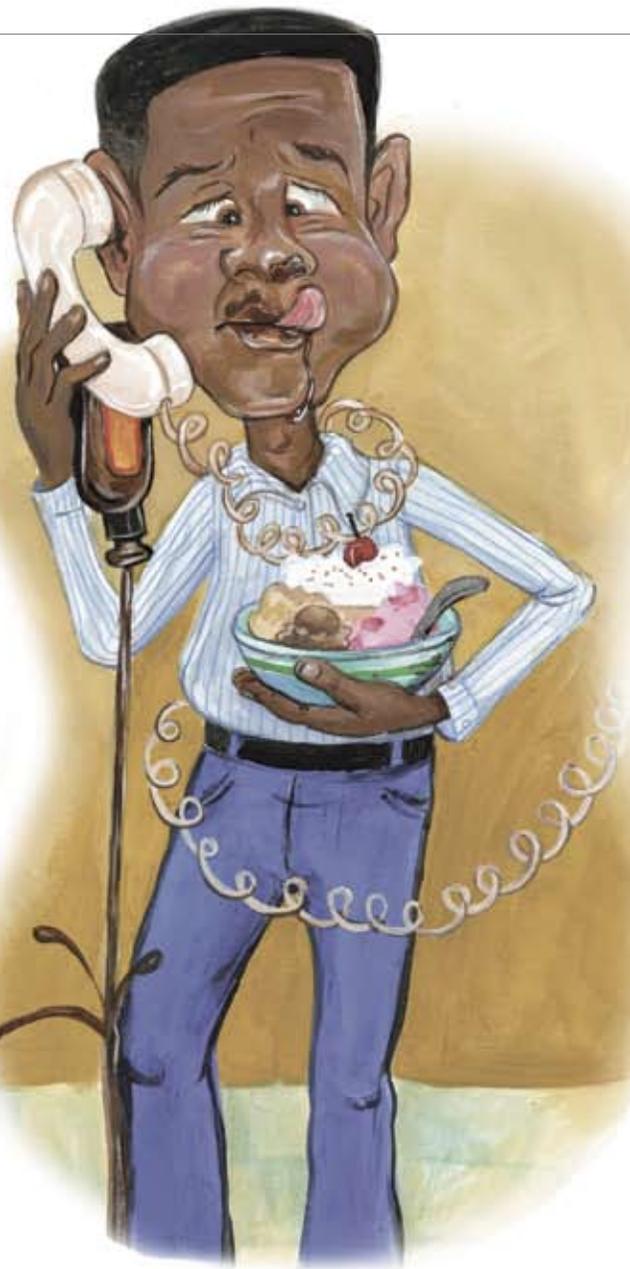


**I received a call late in the day** just before the most important Jewish holiday, Yom Kippur. The caller, who I did not know, said there was a plant full of late model Davenport screw machines available at an extremely cheap price in Los Angeles. It was the mid 1970s and Davenports were hot, but I said couldn't go because of the holiday. I told the caller that the deal would have to wait, but he said he couldn't. He called a competitor in Connecticut and they dispatched a representative immediately. When I returned to the office from the holiday I called the Los Angeles guy but he was not reachable. I mentally shelved the deal until I got a call from an FBI agent a few days later. He told me that the guy who went out to see the machines from Connecticut had been murdered when he began to question if the machines for sale were legit. It turns out that the unknown caller was a recently released felon whose brother worked in the factory where the "cheap" Davenports were roaming. If the holiday hadn't prevented me from traveling, it's almost certain it would have been me out there in Los Angeles that day.

*-Saved by the holiday*

**I was standing in the kitchen** of our shop, putting chocolate syrup on my ice cream (mid-day treat), when I heard my name on the intercom to pick up a phone call. I grabbed the nearest phone, chocolate syrup in hand, and had a lengthy conversation with a client until a co-worker came out of his office and yelled, "what the #%&\* is that!?" and pointed to a large, brown puddle on the floor, which actually had started down my leg and into my shoe before making a small syrup pond on the office floor. Rule number one: If you have a bottle of chocolate syrup in your hand and you are distracted, close the cap and keep it right side up! My co-worker still loves to tell that story!

*-Puddling along*



**One day at work**, my 12" crescent wrench came up missing. I back tracked my steps but couldn't find it anywhere. As the days went by, I started to get angrier and angrier at the co-worker that had either stolen it or forgotten to bring it back. Whenever I had a chance, I would even look through other people's toolboxes, hoping to find it. Eventually, I bought a new one and was reminded of the thief that I worked with every time I used the new wrench. One day while changing out the propane tank on the forklift, I found my old wrench behind the seat and immediately remembered exactly what I was doing a year ago and why I had left it there. The thief was me all along.

*-Only myself to blame*

**Back 30 or 40 years ago** our company was headquartered next to a chop shop. The boss left his Cadillac at the office one morning and by lunchtime the car's two front side doors were gone. His insurance company told him that it would take six weeks before they could get him some new doors. After registering some degree of shock at the long wait they slyly suggested that they might be able to get him some doors faster by going into the "secondary market." Although he preferred to go with new doors the six week wait was too much, so he decided give the "secondary market" idea a try. A week later he was delivered two doors that seemed to match the car amazingly well. It took him a good hour before he realized they were the exact same doors stolen from his car the week before.

*-Switched and baited*

**We were trying out a new guy** in the shop who happened to be a heavy smoker. He was doing a runoff on a machine with water-soluble coolant but kept going outside to smoke while the machine was running. We told him repeatedly to stop leaving the machine unattended, because obviously if the machine was having problems we might need to shut it down immediately — but he just blew us off. At the same time, we were doing a spindle bearing job, and we had some dry ice left over that we had been using to shrink the bearings. Someone in the shop took a lump of the dry ice and threw it into the base of the machine that the new guy was supposed to be watching. All of sudden he noticed a huge cloud of smoke coming off the machine and thought it was on fire. He came in running and almost had a heart attack. We never did hire that guy.

*-Crying fire*



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- 4 turret models to choose from, E series, F1, F2 and F4 series.
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www.schutteusa.com

Dear Shop Doc,

We have a very fussy customer who wants to inspect the screw machines that his parts are being made on. The machines are filthy with oil and compacted chips and we are worried that he may freak out when he sees the equipment. How can we clean the machines without disrupting our plant? I've heard dry ice blasting can be effective and relatively clean.

## Not down but dirty

### Dear Not down but dirty,

Traditionally, machines have been cleaned by hand using degreasing chemicals combined with good old fashion elbow grease to brush and wipe away the oily surfaces and compacted chips. One problem with this method is that the degreasing chemicals result in waste that can be a pain to dispose of properly. Also, hand cleaning may cause considerable downtime for your machine, which could be a problem in a high production plant.

Another cleaning option is to use a blasting method, which utilizes a pressurized stream of media to remove contaminants (i.e. pressure washing, grit blasting, plastic bead, glass, etc.). Hot water pressure washing will clean oily surfaces and compacted chips, however, you will still end up with wastewater to dispose of, and you may not wish to have certain types of machinery come in contact with water, especially while under power or during production runs. Grit or sand blasting methods also work but are not commonly used because dust created during blasting can build up in working components of machinery and be too abrasive on surfaces.

Dry ice blasting is an interesting, newer method to consider. Instead of using hard abrasive media to grind contaminants from a surface, dry ice blasting uses soft dry ice accelerated at supersonic speeds to impact the surface. Upon impact the solid dry ice (CO<sub>2</sub>) pellet sublimates (changes from a solid directly to a gas without existing in a liquid state). When sublimation occurs, the solid

dry ice pellet expands exponentially, popping the contaminate off of the surface. In your case, the oily residue and compacted chips could be safely removed from machinery and easily captured for disposal. Furthermore, dry ice blasting generates no additional waste because the blast media used does not leave any residue, which is why it's widely accepted as an environmentally friendly "Green Cleaning Technology."

In many cases you can safely dry ice blast while equipment is in operation because blasting can be done from safe distances — usually 2-3 feet away. The dry ice blasting equipment doesn't have a large footprint, and setup can be done quickly. A technician can clean surfaces many times faster than with hand-cleaning methods, so it can save you money by lowering production downtime and reducing rejected parts due to contamination.

One downside to dry ice blasting is that it can be noisy, requiring operators and personnel in the area to wear ear protection. It's also more expensive than hand cleaning or traditional media blasting. However, if it cuts downtime it could still save you money in the end.

Dr. Andy Getz  
React 365 Inc.

*Dr. Andy Getz, PhD is president of React 365 Inc., a company specializing in chemical cleaning, wastewater transportation and disposal. For more information, visit React 365 Inc. at [www.react365.com](http://www.react365.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).*

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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

*Today doctors often perform minimally invasive surgery, using small instruments fitting through 1 – 2 cm incisions. Still, procedures such as diagnosing symptoms and processing samples within a vein remain impractical with existing technology.*

“In 10 years, will doctors have singular devices small enough to do multiple, diverse medical procedures inside a vein?”

I believe that within the next 10 years we will see singular medical devices that, while fitting within typical catheters, can process samples, diagnose symptoms and enact simple medical procedures. As a micro-EDM manufacturer and supplier we rely heavily on our customers' needs and their future desires in bringing our next products online. One of our research departments that focuses on integrating these two processes to create multi-functional single devices, shows definite promise. Improved forms can be achieved to allow for enhanced chemical and biological micro-fluids, as well as more reliable mechanical and electrical systems all within the same component. By doing all of this from the same platform it should be functionally easier to micro-target and remove the problem while reducing impact to the surrounding tissues.

**Jonathan Montgomery**  
Research and Development Engineer  
SmaTEC International

The question evokes science fiction images of nanobots patrolling our veins and making repairs. Most of the experts I've heard or with whom I've spoken don't see this as feasible in the near future, if at all — I agree with them. It's a seductive but probably impractical image. Nevertheless, medicine is moving generally toward being less invasive and thus requiring smaller tools. Current nanotechnology is focused principally in materials rather than tools and devices. However, we are likely to see an array of very small medical devices in the next decade — although I doubt they will be able to perform multiple procedures in a vein independent of guide wires, introducers and catheters to propel and control them.

**Bernie Liebler**  
Director, Technology and Regulatory Affairs  
Advanced Medical Technology Association (AdvaMed)

## the facts:

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- Employ a wide range of engineering materials

Michael T. Postek (National Institute of Standards and Technology)

More than 60 drugs and drug-delivery systems are based on nanotechnology, and more than 90 medical devices or diagnostic tests, are already being tested, according to *NanoBiotech News*. One device includes the use of quantum dots, bits of material so tiny that they are often just a few atoms across. The dots are used as research tools to help understand how proteins, DNA and other biological molecules attach to transport systems inside cells.

## the facts:

### A micrometer equals one-millionth of a meter:

Micrometers are practical for measuring the width of a hair (measures about 200  $\mu$  across), a particle of pollen, red blood cells, baker's yeast and some bacteria.

### A nanometer equals one-billionth of a meter:

Nanometers are practical for measuring the size of bacterial cells (a few hundred nm across), viruses, width of strands of DNA and RNA or thickness of a cell membrane.

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The word nanotechnology was conceived by Norio Taniguchi in 1974 to signify machining with tolerances of less than a micron. Today it has been redefined as the world of controlling matter on the nanometer (one billionth of a meter) scale.

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one on one



Jerry Mraz, general manager and founder of SmalTec International in Lisle, IL.

Photo by TMW

**Jerry Mraz** is general manager and founder of SmalTec International, a leading high-tech manufacturer of micro-technology products. SmalTec is both a builder of micromachining equipment and a job shop which produces micro parts for the medical, aerospace and optical communications industries.

**Do you classify the machines you sell as micro-EDM?**

**JM:** Micro-EDM is the primary function of the platform, but they also have micro-milling, micro-drilling, micro-grinding and polishing capabilities as well. It depends what process you need. That's why I prefer to say "micro-technology," because we're not really just one process in the micro-technology world, we kind of cover them all.

**What can a job shop do to break into the medical sector?**

**JM:** The primary way we find leads in the medical device industry is by visiting or exhibiting at tradeshow. There are probably 15 different tradeshow around the U.S. that focus on the [medical] market. It's a matter of getting an introduction to that customer base. These shows attract a lot of medical device design manufacturers who are looking for solutions to manufacture their components.

**What's your biggest challenge as both a job shop and a machine tool producer?**

**JM:** I think the biggest challenge for everybody manufacturing these medical devices is how to make them smaller. [SmalTec] has specific or specialized machine tools that can go beyond [the capability] of what's [currently] being designed. I think our biggest challenge and our customers' biggest challenge is to educate designers and medical device manufacturers that things can be done better, smaller, and with tighter tolerances, using new technologies or current technologies that are available.

**What is the main drive for continuing to make parts smaller and smaller?**

**JM:** We made some tweezers with a pad that was probably about a millimeter by a millimeter, and on that pad were about 100 little grippers. It's very small but a very effective gripping tool. It enables you to pull the skin with very little pressure

while still having a very small incision. It gives you less chance of infection. That's really the big drive for these small tools in surgery. How do we get into the body without making a large incision that has to heal and opens the body to more possible infections? To make a small incision you need to have small tools. To get in and use that small incision you need even smaller tools.

**Tell me about one really exciting medical device you predict will be available 10 years from now?**

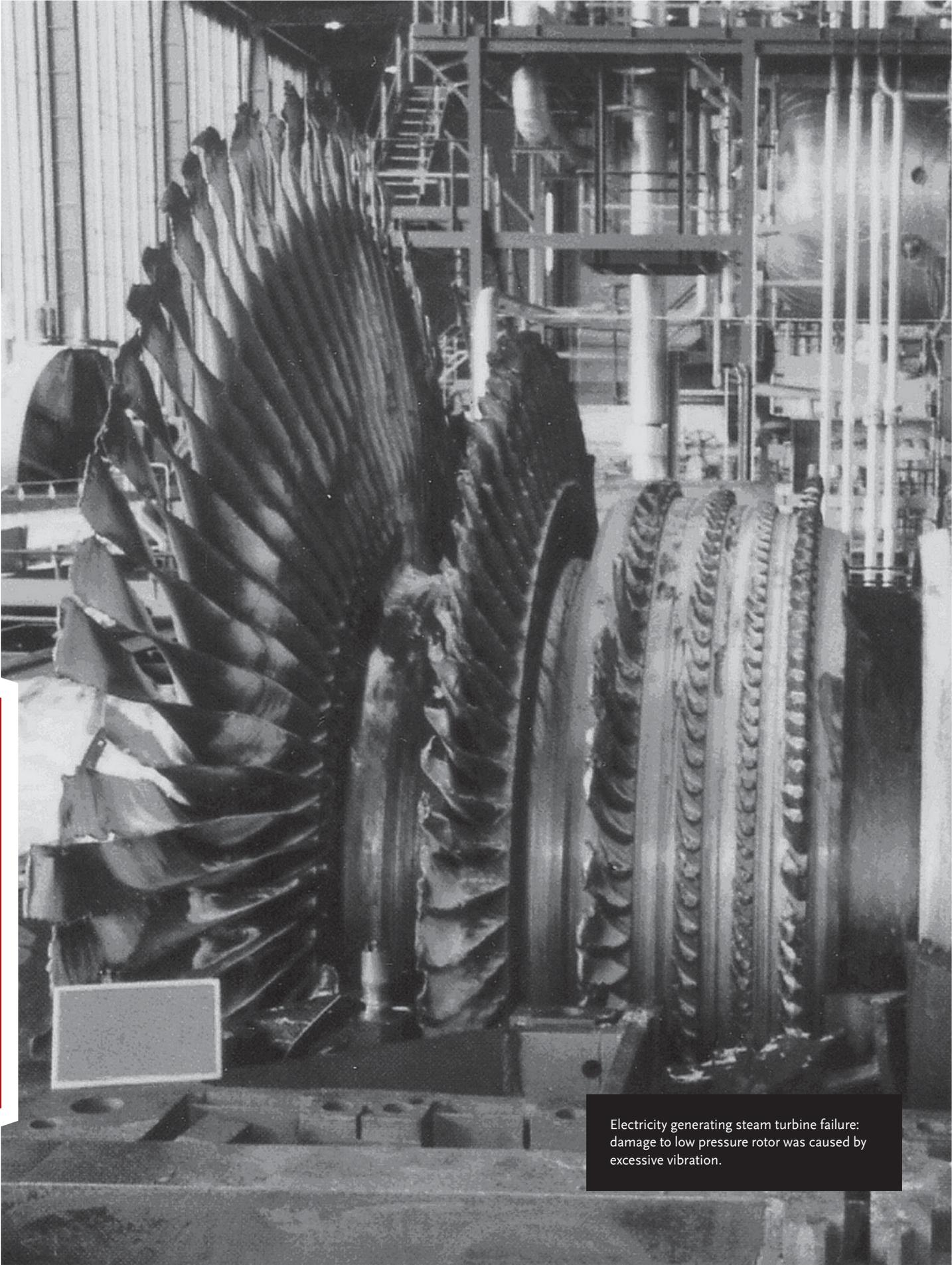
**JM:** There's a lot of development going into what's called "lab on a chip." You will take a fluid, and this little chip mechanism that's the size of a credit card will decide what's in the fluid, analyze the different antigen and protein that are in there and be able to detect different types of harmful things. In 10 years time I could see these micro-fluidic devices being available in doctors' offices, and 10 years after that being available on the shelf as a self-test kit. Imagine going to the drugstore and saying "I think I'll pick up that cancer test for early detection" — not necessarily a true test but like a pregnancy test. If it comes up positive then you go to the doctor to make sure.

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

**JM:** Well, obviously my machine, but I don't think we're the best at everything and I don't think there's one machine that is the best at everything. Things are getting so small you need to have different processes on one machine. That's one of the biggest challenges: How do you get one part located and do everything you can before you take it off? It's so small that once you take it off you're not going to be able to put it back and find the right location.

Swiss turning, CNCs, multiple axis machines — those are all great for certain things, but the parts are going to be too small to put on those platforms. Evolutionarily, the machine has to change.

what happened?



Electricity generating steam turbine failure: damage to low pressure rotor was caused by excessive vibration.

Photo courtesy of STI Technologies, Inc.

# What happened?

When parts break, an analytical lab can do the detective work to find out why.

**S**ometimes machined parts present a mystery. Why did this one fail? How was that one made? It takes a certain amount of detective work combined with laboratory analysis and knowledge about materials, processes and applications to figure out what happened. Did the end user overload the part beyond its design specs? Was there a design flaw? Was the right material used? Was something wrong with the manufacturing process? Many analytical laboratories and consultants specialize in failure analysis, reverse engineering and technical sleuthing to find out how the bad stuff happened.

## Failure! Preserving the evidence

When a part fails in your shop, or at a customer's, it is of utmost importance to "preserve the evidence," said Drew Killius, senior materials scientist at Analytical Answers, Inc., Woburn, Mass. Keep the broken pieces separate and do not do anything to them except wrap them in ordinary household aluminum foil to protect them until you can send them to a laboratory. Do not place the pieces in an envelope or plastic bag, as fibers or plastic may stick to the fracture surface.

Whatever you do, do not attempt to reassemble the part, Killius cautioned. "There is a huge temptation to see if the broken [pieces] fit together," he said, but "we're looking for features the size of bacteria." Just touching the fractured surfaces to each other can destroy those clues.

Write down what happened when the failure occurred. If you have other unbroken parts of the same kind send a few to the lab, along with the broken pieces. Find related paperwork, such as drawings and the mill certification for the raw stock, and include copies.

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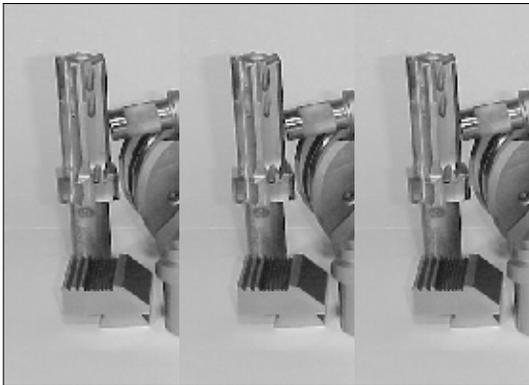
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**how it works**

**Finding out what happened**

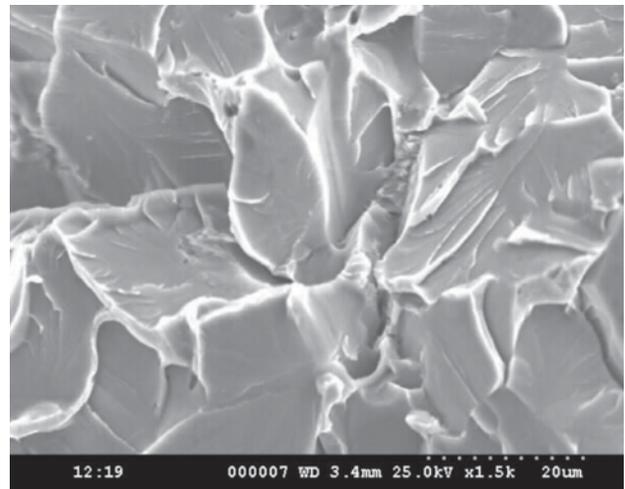
At the lab, "the first thing we do when we receive a part is to look at everything," said David Von Rohr, metallurgical laboratory manager at Stork MMA Testing Laboratories, Inc., Newtown, Pa. Besides the part itself and the drawings and samples you sent, any information and background about the part and the application might prove useful in analyzing why the part failed. What is the part used for, and how long had it been in service? Exactly what happened when the part broke?

The failure analysis laboratory will photograph the part, verify its chemistry, look at the fracture surface under a microscope and check for any defects originating in the raw stock or from machining operations. Is the part to print? Does the design include any features like sharp corners that could act as stress raisers?

Mechanical properties may be measured including hardness, and yield and tensile strength. Is the material in the correct state? Sometimes parts are shipped without being heat treated, or they are over-hardened. If the part is plated, is the plating correct?

A scanning electron microscope (SEM) is often used to obtain highly magnified images of the fracture surface to help determine the failure mode. An SEM image of a polished cross-section can also reveal plating thickness, and other instruments can identify the plating material.

Then, the laboratory staff sets about analyzing what happened, based on the data and background information.



**Brittle fracture.** This electron micrograph of a brittle-fracture sample shows the sharp straight lines of high-hardness materials after they fail. The crystallographic planes are cleaved in their weakest direction, leaving knifelike edges of the material.

Parts can fail in many ways, including fracture and wear. The most familiar fractures happen by simple overloading of the part until it breaks. You may encounter other types of fracture, some of which are described below.

### Fatigue: breaking bit by bit

Fatigue is probably the most common form of metal failure, said Salim Brahimi, consultant at IBECA Technologies Corp., Montreal, Québec, Canada. It is the result of cyclic loads on the material. Wherever there is vibration or other types of back-and-forth loading, fatigue may become a problem.

"The fatigue load is ever so slightly more than a piece can carry," said Killius. "If it were any lower, the part could carry it. On each cycle the load deforms the part ever so slightly in a plastic (non-elastic) manner." Fatigue failure can occur after thousands or millions of cycles. Examination of a failed part can reveal where a crack started and how it propagated through the material a tiny bit at a time. Typically, a series of lines on the fracture surfaces show how the crack deepened or widened progressively before failure.

### Embrittlement: strong materials breaking at low loads

Though metal fractures are often called "brittle" or "ductile," Killius said, "brittle" might better be described as when a material fails at a load much less than expected. A number of different mechanisms cause metals to fail in a brittle fashion. Hydrogen embrittlement is widely known

as a problem with high-strength fasteners, but it can affect other applications as well.

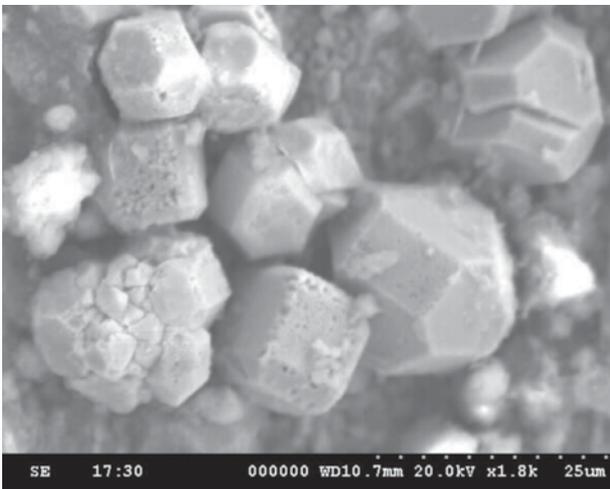
For hydrogen embrittlement to occur, three factors need to be involved, explained Brahimi. First, the material must be susceptible to hydrogen embrittlement. High-strength materials are often susceptible, and the harder they are, the more susceptible they are. Second, hydrogen needs to be present. Processes such as acid pickling or electroplating can generate hydrogen, or hydrogen may be generated as corrosion occurs. Normally, susceptible parts are baked after plating or pickling to remove the hydrogen. Third, the part must be subjected to sufficient stress, whether internal residual stresses or external stress from an applied load.

Within the metal, Brahimi said, hydrogen is drawn to the location of highest stress. For a bolt, this is likely to be under the head or in the threads. The hydrogen finds its way through the metal matrix to where the stress is concentrated, at the tip of a crack or notch, and congregates there, interrupting atomic bonds. This reduces the strength of the material in this area.

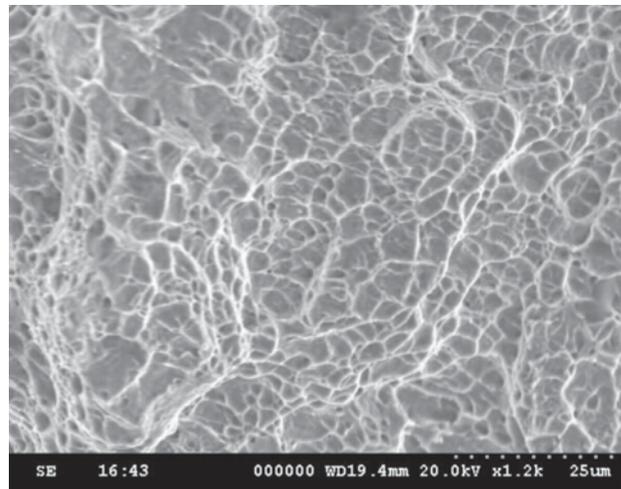
### Stress corrosion cracking

Stress corrosion cracking (SCC) occurs, said Killius, where there is a combination of a corrosive environment and stress. The stress can be either from an external load or from unrelieved residual stresses within the part. Even relatively mild corrosives can produce stress corrosion cracking. Many types of stainless steel are particularly affected by chlorides, such as the salt in sea water. Some copper alloys are susceptible to ammonia compounds.

This type of fracture is called "decohesive rupture," Killius said, in which "the metal grains stop sticking to each other." The corrosion goes along the grains, leaving the texture of the material similar to sand. The particles have a characteristic polyhedral shape (see photos).



**Corrosion.** This electron micrograph shows individual crystal formations of copper oxide from a surface that was not protected against the elements properly, and corroded.



**Ductile fracture.** This electron micrograph shows what a textbook ductile fracture looks like. The ductile dimple structure shows micro-void coalescence, which basically looks like clay that has been ripped apart.

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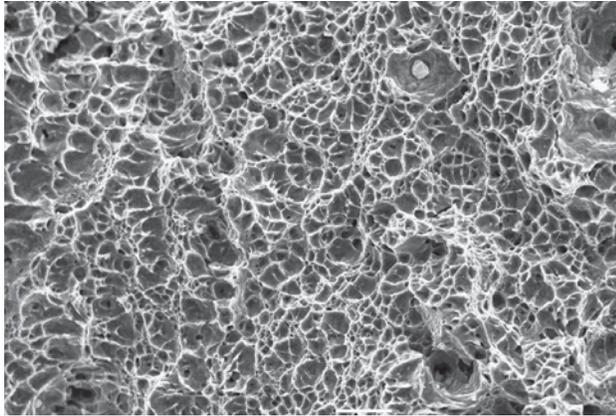
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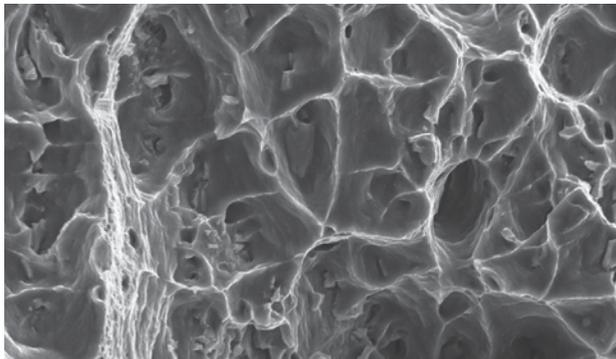


1000X electron micrograph, showing ductile failure due to gradual overload, in hardened steel.

## Mysteries solved

Every laboratory analysis has its own story. Here are some examples.

**Stealth design error:** Cam pins or cam screws are used in one type of locking assembly that fastens together panels of consumer-assembled furniture. In one application, Von Rohr said, cam screws about 3/8" in diameter and 2" long were machined from bar stock. A shop had been making these parts to the customer's print, and they worked fine. At least they did until the customer specified a less expensive material. Cam screws made of the new material broke on installation. Stork MMA Testing Laboratories investigated. The part was made exactly to the print. However, the print mistakenly showed a sharp corner on one of the four edges, while the other three edges had radii. This sharp edge acted as a stress raiser. Parts made with the old material could withstand the installation stresses, but parts made with the new material could not.



1000X electron micrograph, showing ductile failure due to gradual overload, in aluminum.

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# how it works

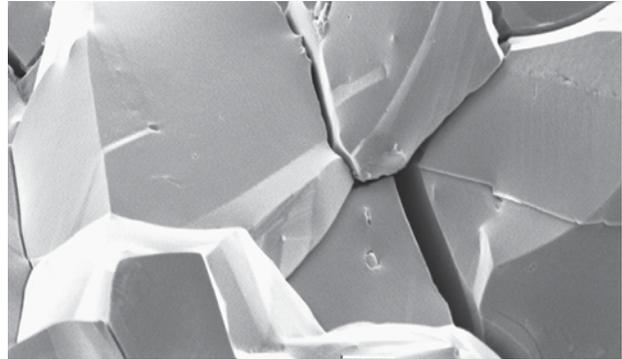
**Bad surface finish in disguise:** Killius related the story of small gold plated stainless steel electrical contacts that go into a million-dollar medical scanner. The scanner manufacturer bought 20,000 of the parts. At incoming, the inspector noticed that two pieces had spots on them, and decided to take a closer look at the whole lot and send them to Analytical Answers. The lab discovered the parts had a bad surface finish, which had been plated over.

**Bait & switch:** A manufacturer of parts for surgical instruments had bid on a particular stainless steel part. He later discovered that a competitor was providing the part, apparently made offshore, at the cost of the specified material alone. Curious as to how this could be, the manufacturer asked Analytical Answers to determine what the material was. After examining the competitor's part, the lab found it was not made from the specified stainless. It was chrome-plated carbon steel.

**Punching out:** In a heavy industrial equipment application, steel disks the size of hockey pucks were designed to carry loads of up to 60,000 pounds, Killius said. Over time, to save cost, the material was changed from precipitation hardening stainless steel, to 400-series stainless with nickel plating, to carbon steel with heavy galvanizing. When users discovered that occasionally smaller loads, in the 12,000-pound range, would punch right through the disks, the manufacturer asked Analytical Answers to determine what was happening. The lab discovered that disks were not galvanized, but heavily electroplated. Normally, to prevent embrittlement, plated parts such as these should be baked after plating to remove hydrogen, Killius said, but these parts were not.

## Failure prevention in the shop

"What you want to do when machining parts is to alleviate conditions that may cause premature failure," said Brahimi. When machining parts, make sure radii are



**2000X electron micrograph**, showing decohesive rupture due to stress corrosion cracking, in brass.

well controlled. Broken or incomplete radii can be stress raisers where a fatigue crack might start, so can notches or too-sharp, small-radius edges and corners. Alert your customer if you notice a potential problem with the design of the part.

Scratches, fins and internal burrs can all be stress raisers, Von Rohr said. Be careful to prevent tool chatter, too, as each chatter point is a stress raiser as well. And on threaded parts, if the thread pitch is off even slightly, this can lead to failure. "The incorrect thread will screw in OK, but the mating points will be in the wrong locations," he said.

Your customers and their end users depend on you to produce good parts. You can help prevent problems by paying attention to potential design problems in the parts you make and maintaining constant vigilance over the machining process. But if there is a failure, the "detectives" in the failure analysis labs can figure out what happened.



## For more information:

Analytical Answers, Inc.: [www.analyticalanswersinc.com](http://www.analyticalanswersinc.com)

IBECA Technologies Corp.: [www.ibeca.ca](http://www.ibeca.ca)

Stork MMA Testing Laboratories, Inc.: [www.stork.com](http://www.stork.com)

*Why Things Break: Understanding the World By the Way It Comes Apart*, by Mark Eberhart

[www.exponent.com/multimedia/](http://www.exponent.com/multimedia/)

"Material analysis for the machine shop,"  
*Today's Machining World*, June 2007

Failure analysis of a retention stud:  
[www.met-tech.com/cnc.htm](http://www.met-tech.com/cnc.htm)

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Today's Machining World

Each month *Today's Machining World* works to help you understand what's available in the precision parts industry and how you can run a more efficient and effective shop.

In this issue, however, we're focusing on innovative gadgets you don't find everywhere, including a device that keeps the feet free while sleeping, build-it-yourself robots and a way to use your laptop while walking!

Happy holidays to all, and happy gadget hunting!



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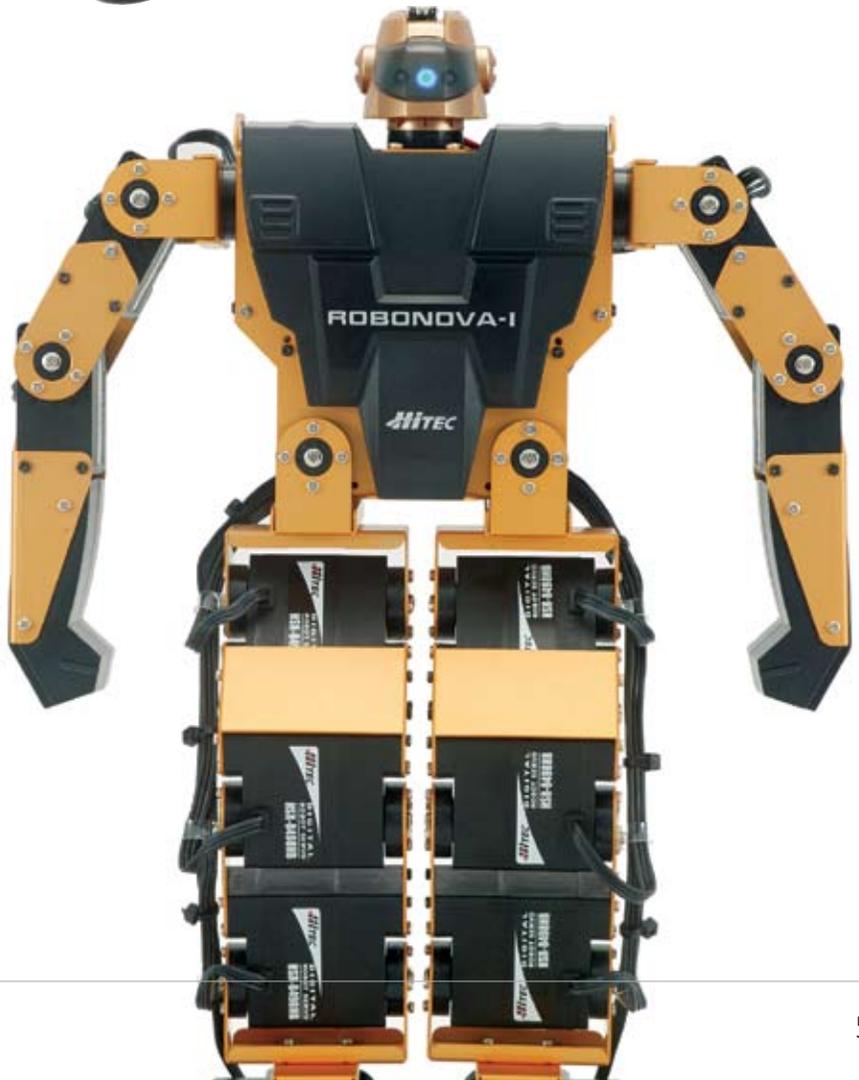
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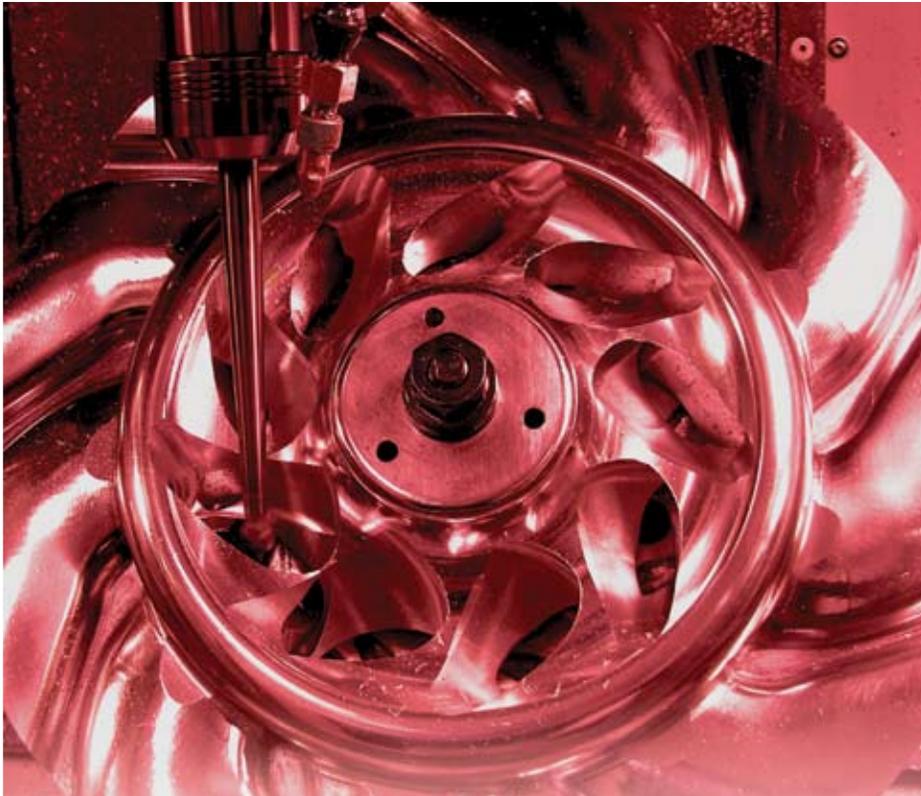
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think tank

## Airplane Shadow

An airplane flying at several thousand feet casts a shadow on the ground. Will the shadow be larger, smaller or the same size as the airplane? Why?



## Four Gear Shuffle

The chances are 33 percent because if you chose any gear, of the three remaining gears only one is the same size, so the chances of picking it are just one in three.

Puzzle found in the October 2008 issue

## Who's gearing up for stardom?

**Kevin Albright** of Gear Headquarters in Kansas City, KS; **Ron May** of Hunter Engineering Company in Bridgeton, MO; **Abdul Khatri** of Kamet Manufacturing Solutions in Sunnyvale, CA; **John Archibald** of Northfield Engineernig Co. in Northfield, MN; **Steve Arora** of National Distribution. Inc. in Farmingdale, NY; **Mark J. Brown** of Eagle Tool Company in Dyersville, IA; **Robert August** of Flashpoint Machining in Santa Clara, CA; **Terry Acosta** of Weatherford International in Woodward, OK; **Bob Cookson** of Cookden Industries in North Aurora, MA; **Jim Riddell** of Baker College in Flint, MI.

# postings



Noteable and newsworthy information and events for the month of January

## Pacific Design & Manufacturing Show

Anaheim, California

February 10<sup>th</sup> to 12<sup>th</sup>

[www.device-link.com](http://www.device-link.com)

## Platts Aluminum Symposium

Phoenix, AZ

Jan. 18<sup>th</sup> - 20<sup>th</sup>

[www.platts.com/Events/2009/gc903](http://www.platts.com/Events/2009/gc903)

## Tekno Tube Arabia

International Trade Fair for :

- Industrial Machinery
- Metal Working
- Machine Tools
- Tubes & Pipes

[www.alfajernet/tekno2009](http://www.alfajernet/tekno2009)

Dubai, UAE

January 10<sup>th</sup> thru the 13<sup>th</sup>

## LOGICON: Senior-level Supply Chain Strategies

January 26<sup>th</sup> to the 28<sup>th</sup>

Atlanta, GA

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

## International Consumer Electronics Show

Las Vegas, NV

January 8<sup>th</sup> - 11<sup>th</sup>

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

## Green Manufacturing Expo

February 10<sup>th</sup> to 12<sup>th</sup>

Anaheim, California

[www.device-link.com/expo](http://www.device-link.com/expo)

## NFL Playoffs

wild card games



Sat. Jan. 3<sup>rd</sup>  
Sun. Jan. 4<sup>th</sup>

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

Happy Birthday  
Elvis Presley  
Jan. 8, 1935

## Operation Desert Storm Launched

Gulf War  
January 17, 1991





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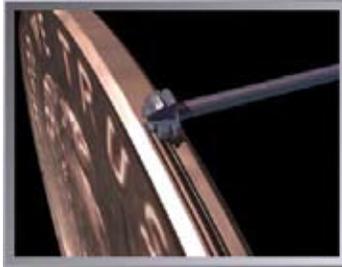
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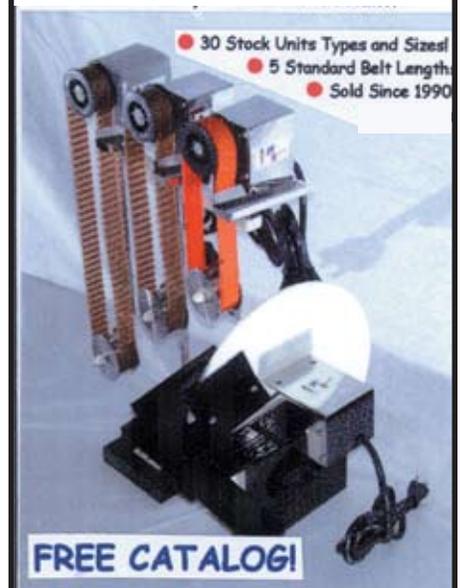
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Feedback is the "breakfast of champions" and I sincerely ask you to respond to this short questionnaire about *Today's Machining World*. Email Lloyd Graff at [lloydgrafftmw@yahoo.com](mailto:lloydgrafftmw@yahoo.com), fax 708-535-0103 or best yet, call me at 708-535-2200.

### I READ *Today's Machining World* MAGAZINE:

- ONLINE     PRINT EDITION ONLY
- A COMBINATION OF PRINT AND ONLINE
- HARDLY EVER     OTHER \_\_\_\_\_

### THE THING I LIKE MOST ABOUT *TMW* IS:

- SWARF     THE WAY IT LOOKS     FORUM
- PUZZLES     OTHER \_\_\_\_\_

### I READ *TMW* MAGAZINE:

- FROM COVER TO COVER
- FOR THE ADS
- BECAUSE I USUALLY LEARN SOMETHING
- I HARDLY EVER READ IT
- OTHER \_\_\_\_\_

### I LOOK FORWARD TO READING *TMW*'S ADS, ESPECIALLY:

- FULL PAGE ADS
- CLASSIFIED ADS
- BECAUSE I'M LOOKING FOR SOMETHING
- BECAUSE I'M LOOKING FOR NEW PRODUCTS
- OTHER \_\_\_\_\_

### IF THE MAGAZINE WAS WRITTEN JUST FOR ME IT WOULD:

- HAVE MORE ARTICLES ON THE SCREW MACHINE BUSINESS
- EXPAND THE SHOP DOC
- EVALUATE PRODUCTS THAT I MIGHT BUY
- RUN ARTICLES WRITTEN BY INDUSTRY LEADERS ABOUT THEIR COMPANIES
- USE A BIGGER OR     SMALLER FONT.
- OTHER: \_\_\_\_\_

### IF I COULD GIVE *TMW* A LETTER GRADE IT WOULD BE:

- A     B     C     D     F
- OTHER: \_\_\_\_\_

### IF I HAD TO CHOOSE ONE THING TO CHANGE IN *TMW* IT WOULD BE:

- HAVE MORE TECHNICAL ARTICLES
- INCREASE THE PRODUCT INFORMATION
- REDUCE THE AMOUNT OF LLOYD GRAFF'S WRITING
- NOTHING
- OTHER: \_\_\_\_\_

### I WOULD LIKE TO READ A NEW ARTICLE IN *TMW* ABOUT:

### I THINK THE MACHINING BUSINESS IS:

- THE BEST BUSINESS TO BE IN
- A LOUSY WAY TO MAKE A LIVING
- ON THE VERGE OF EXTINCTION IN NORTH AMERICA
- A BUSINESS I WISH MY CHILDREN WOULD GO INTO
- OTHER: \_\_\_\_\_

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