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July/August 2010 volume 6 issue 6

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Lloyd Graff is a words fan. During a recent power failure at his home he chose to play Scrabble by candlelight and flashlight against his wife Risa. He won. When he was a kid his hobby was reading the encyclopedia and the dictionary. He used to memorize the 1960 populations of cities, Columbus, Ohio—375,001. After his 2008 cardiac bypass surgery he could not talk for 12 days because he had a ventilator tube down his throat. He scribbled notes to his visitors with a Sharpie and a notebook which he keeps in his nightstand as a reminder of his fragility and resilience.



Paul A. Eisenstein is an award-winning journalist, broadcaster and photographer based in Detroit. He has spent more than 30 years covering the global auto industry and is today considered one of the leading experts on the fast-changing subject. His work appears in a variety of outlets around the world, including *The Economist*, MSNBC.com, *Auto Motor und Sport* (Germany's leading auto magazine), Britain's *AutoCar*, more than 100 newspapers and a variety of broadcast outlets. He is a regular commentator on both NPR and the BBC. Mr. Eisenstein was one of the first to publish an online automotive magazine and recently launched a new outlet, TheDetroitBureau.com, which borrows its name from the independent automotive news service he launched in 1979.



Jerry Levine worked in the oil business for over 35 years before retiring in 1998 to work in a friend's U.S. Senate campaign. Unfortunately the friend lost in a close election 50.5 percent to 49.5 percent, so Jerry retired again. Since then he has been an active volunteer in a homeless shelter project in Chicago's south suburbs. Currently, the shelter is building a 100 unit permanent supportive housing facility. The shelter activity takes up nearly as much of Jerry's time as his former paying jobs, but it provides much greater satisfaction.



Noah Graff has been blogging more lately on the *TMW* Web site and is highly amused that the mere mention of President Obama will garner at least 10 irate comments. He has also been on a hot streak with his tennis game lately and attributes part of his success to his Kobe Bryant shoes, Rafael Nadal Babolat racquet and Zone bars. Favorite quote of late, "Wherever you go, there you are." *Buddhist proverb.*



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editor's note

Living to Work

I just spent a week doing the most inefficient, labor-intensive, stupidly expensive, appallingly large carbon footprint use of my time I can think of. I schlepped to California and knocked on doors. It was one of the most satisfying weeks I've spent in 10 years. Every face-to-face call I made was productive. Each client and potential client I met with spent more time with me and was more open than I could've anticipated. I realized that old school active listening face-to-face was still magical.

Two of the clients I visited were Tony Maglica and Ray Fish, who continue to defy the odds and conventional business wisdom as they build their companies in ridiculously expensive Los Angeles. Tony is 80 years old and runs Mag Instrument Inc., the manufacturer of the Maglite® flashlight, out of an immaculate million square foot complex in Ontario, 30 miles southeast of L.A. Ray is 76 and runs Electro Adapter, which makes aircraft wiring hardware out of a functional 100,000 square foot plant in Chatsworth in the San Fernando Valley.

Both men work a dozen hours a day turning aluminum and other metals into countless perfect assemblies and finished products. Are they doing it for the money? Of course they are. And of course they aren't. Tony could have sold out for centimillions I'm sure, and Ray hardly needs a tag day, but the daily challenges continue to light their fires.

Both guys still love to buy machinery. They live for the bargains on cam equipment that their peers would call obsolete. Tony recently bought a batch of Davenport screw machines and Ray picked up ten B60 single spindle turret automatics and made five good ones out of them. He still has the extra carcasses laying around for useful scavenging. Tony Maglica's passion for unloved machinery brought him to the bankrupt assets of German rotary transfer machine maker, Eubama, which he picked up from the ash heap. Tony has long admired the small Eubama trunnion, and he's relishing the challenge of tweaking the design and making the key components in California and then shipping them to Germany for assembly.

Ray Fish was crowing to me about getting a steal on a Haas SL-20 lathe in a San Diego machine shop auction. The machine had 300 hours on the spindle. He had also just lowballed a dealer on a GT 75 Omniturn, even though he needs three of them right now. Ray knows what he wants, but the fun for him is buying it at garage sale prices.

When I spend time with manufacturing lifers like Tony Maglica and Ray Fish, I think of the aphorism, "Nobody says on their deathbed 'I wish I'd spent more time at the office.'"

I think these guys would laugh out loud at that common wisdom.

Lloyd Graff
Editor/Owner

editor's note



Today's Machining World

forum

Behind the Derby

"Saving Akron's Soapbox Derby" brought back memories. BAD ones! When I participated ('66 or '67), I was 12 or 13. With no allowance or chance of a part time job, I struggled to raise the cash to buy the official "parts kit" and build the car. (As I recall we were limited to a total expenditure of about \$40, but could use any materials we happened to have on hand.) The "parts kit" was a couple metal axles and four wheels. That's it. The Derby had strict rules for the car's length, height, width, weight and ground clearance, all seemingly designed to favor small kids over tall kids (me) or heavy kids. Ground clearance had a tight tolerance. Something like +/- 1/8". So if you were heavy, the floorboard had to be very stiff. I had to double up 3/4" plywood to ensure it wouldn't deflect under my weight. No money was left for the body. Crude chicken wire, fiberglass cloth, and resin. Since I was tall, my knees were in the way of the steering wheel. The car was so short it was all I could do to avoid pressing the brakes. The chicken wire pattern showed through the fiberglass. At least I knew I had done all the work myself, with only a little advice from my Dad.

On the day of the race, our cars were inspected. I was impressed with one heavy kid's car. He had done a beautiful job building a car he could fit in, despite the regulations. And I knew he built it himself. Unfortunately, he was 5 lbs. overweight, and the judges were unyielding. After he stripped off all extraneous clothing I watched him, teary eyed, cutting up his double floorboard with a hole saw. He made weight, but the floorboard deflected about 1/16" when he sat in the car, and he was disqualified before the heats started.

I ambled over to a car that everyone was admiring. The kid, who was very short and light, was bragging. It was a bullet that looked to be carved out of a solid block of wood with a slick bar top finish. Obviously his Dad spared no expense! It looked like a Ferrari factory car. The steering wheel had been bent into a butterfly shape and brazed to allow more room. Mods like that were supposed to be illegal, but the car was so beautiful the judges ignored the violation. I talked to the kid. He knew nothing about how the car was built. It was obvious to me his Dad had built the whole thing.

One run down the hill was all that was allowed. I lost my heat. I was ahead, but someone said my brake dragged partway down the hill. Probably pushed the thing in the excitement, as my legs were so cramped. I don't recall who won the final, but I know the bullet car placed high. I went home and sold my car to a neighborhood kid for \$5. Dad didn't want it in the garage, and I knew I'd have a tough time raising the money for next year. That year or the next, I recall the national winner got caught with an

electromagnetic device in the nose of his car. Pulled him out of the starting gate faster. He made it all the way to Akron before it was detected.

I wouldn't cry over the loss of the Derby. It was a contest for adults.

Jim C.
Applied Concepts

She Had me at Hello

I read with interest "She Had Me at Hello" in the June issue of *TMW*. Lloyd and I have something in common besides this wonderful industry—we each celebrated 40 years of marriage this year. Congratulations to you and Risa.

Chris and I were married June 6, 1970, in Dayton, Ohio. We met in late August 1966 at a dance on the old tennis courts during freshman orientation at the University of Dayton. Chris was a "townie" and I readily accepted many invitations to join her family for dinner. Our freshman year, I took the city bus out to her home in Kettering. Chris and her dad would drive me back to the dorm on campus. My future father-in-law was a 1923 graduate of UD and knew many of the older priests and brothers still at the school. As a young man he met one of the Wright brothers and Charles Kettering. His stories of growing up in Dayton, the expansion of NCR, and the influence of the auto industry on the city were fascinating and educational.

Chris and I have great memories of our college experiences and have been blessed with our children and grandchildren. Life is good.

Mike Duffin
PMPA

Go Cubs

I usually skim through the "Contributors" page of *TMW* and noticed that Emily had a write-up this month. I absolutely appreciate any mention a Cubs fan makes regarding our team. I remember reading about Lloyd Graff and his brush with Cubs fame also. Specifically though, what really caught my eye was seeing the picture of Todd Toborg raising the Cup. I can only imagine what the Blackhawks fever was like last month and it made me actually miss being home for once. I'm pretty sure I was one of only a few watching that series down here in Cincy. Reading your Contributor write-ups make me miss being in an office with fellow Cubs/Hawks/Bears/Bulls fans.

So from one Cubs fan to another: Go Cubs...There's always next year!

J.S. Habib
Hi-Tek Manufacturing, Inc.

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

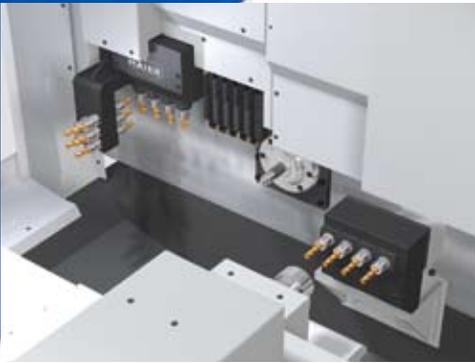
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BY JERRY LEVINE

Physics for Future Presidents

I retired in April, 1998 from Amoco, about three months before BP bought them out and after spending 20 years lobbying for Amoco and the oil industry. During that time I helped negotiate a significant amount of energy and environmental legislation and regulation.

One of the more interesting assignments I was involved in was preparing the U.S. to sign the Kyoto Treaty. Vice-President Gore's office convened a group of about 20 parties to develop plans to meet the treaty for the transportation sector. The parties included lobbyists from several environmental groups, consumer advocates, Ralph Nader's organization, federal and state EPA and DOE officials, ethanol and bio-diesel manufacturers, automobile manufacturers, electric and fuel cell car advocates, and one oil company—Amoco. A mediation firm ran the meetings and negotiations, and the White House Council of Economic Advisers did the cost estimates.

We met for a year, listened to scores of scientific and pseudo-scientific presentations, and reviewed myriad cost/benefit analyses. About a month before Mr. Gore left for Kyoto, the Senate passed a resolution by a vote of 97-0 not to ratify the treaty if the Vice-President signed it. He signed it anyway, and 13 years later it still sits not ratified.

When it comes to global warming, politics and spin doctors overwhelm the science. But in the end, the President has to make a decision on a course of action, and one hopes it will be based on sound science. Into this political maelstrom comes a wonderful book, *Physics for Future Presidents: The Science Behind the Headlines* by Richard Muller, a physics professor at UC-Berkeley and a past winner of the MacArthur Foundation Genius Award. The book lays out in math-free plain English the minimum a President needs to know to make informed and possibly life or death decisions.

Topics addressed include terrorism, nukes, space, energy and global warming. Each topic is addressed in 50-100 pages with a one page presidential summary. For brevity, I will only discuss the sections on energy and global warming.

Public knowledge concerning energy and global warming is filled with massive misinformation. America's economy was built around our cheap and abundant fossil fuels and the worldwide oil supply can still last several hundred years. Even though the U.S. has much less oil available, we still have several centuries of coal and natural gas reserves available. The downside of fossil fuel use is the environmental impact

from burning coal—notably, global warming. At current rates of CO₂ generation per GNP, the real global warming problem is in the developing world. Any CO₂ reductions made in the U.S. or Europe will be offset by major increases of emissions in China, India, Brazil and others. China and India's reluctance to commit to making significant reductions was one of the major causes of the collapse of the Copenhagen Climate Conference last December.

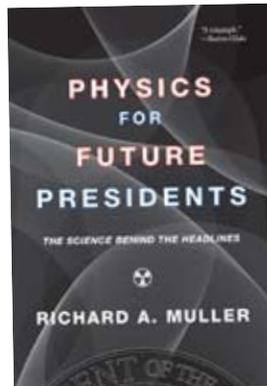
One of global warming's most public proponents, Al Gore, tends to exaggerate greatly. Muller chides Al Gore for "knowing so many things that just ain't so." As the exaggerations of the facts are exposed, already skeptics dismiss the dangers as well. Muller also attacks the scientist Michael Mann and his infamous and erroneous "hockey stick" plot of world temperature, which drove the UN's panel on climate change to warn of imminent danger. Interestingly, Muller's book was published in 2008, about one year before the "Climate-gate" scandal exposed Mann for statistical errors and obfuscating data. These revelations also helped bring down Copenhagen.

Muller is an advocate of big time energy conservation, significantly increased CAFE standards, clean coal, and more nuclear power. He encourages government support of wind and solar projects, but sees them as expensive and of limited value. He advocates canceling

the subsidies for corn ethanol while championing the growth of switch-grass and other efficient crops. On a smaller scale, he recommends efficient fluorescent and LED lights as well as building insulation and cool roofs, technologies that are even affordable in the third world.

Even after implementing all of this, CO₂ emissions would still not be back to where they were in 1990 (the Kyoto requirement), let alone back to where they were 100 years ago, which is where we need to be to control the CO₂-generated global warming.

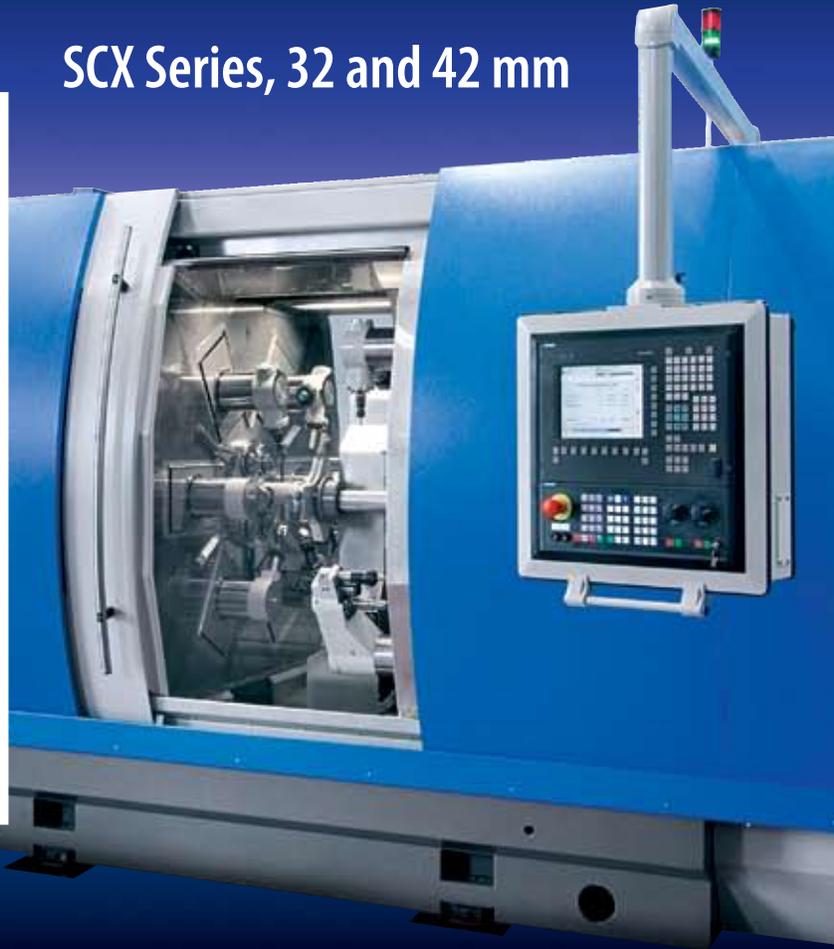
We live in complex times, and *Physics for Future Presidents* cuts through the multitude of current scientific and political issues in a straightforward manner. It exposes popular myths without a political spin. I wish I had this book when I was working. 



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

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BY LLOYD GRAFF

swarf

The Business Warrior

Tony Maglica, the owner, founder and embodiment of Maglite®, burns with the same intensity at 80 as he did when I met him at 40.

I saw the flashlight king recently at his million square foot plant in Ontario, Cal. I could tell from the moment he greeted me at the reception center and we walked up the 20 stairs to his large but surprisingly austere office, that the factory was Tony's home.

He immediately showed me a slide show on his Samsung 42" computer screen of his other home—the one he doesn't live in... yet—his villa on his home island of Zlarin in the Adriatic off Croatia. He grew up poor as dirt there, endured the Nazi occupation and the life altering experience of staring at a German machine gun in the town square as the officer in charge threatened to kill everybody in sight in retaliation for the ambush of a Third Reich soldier.

Tony Maglica, a fabulously successful American entrepreneur, dreams of going back to Zlarin as the patron of the island, developing his property, and bringing back his extended family for visits. He wants to plant olive trees and shake the fruit off them with the most modern Italian harvesting machines. He considered buying 75 cement mixers in Florida recently, but decided it was more practical to make a deal with a cement firm in Split, Croatia. He's sunk \$5 million into his land and buildings so far, fired his European architects, and hired an American one, but just can't find the time to get to the island this summer. He's too involved with a new flashlight rollout and the recent purchase of the German Eubama company out of bankruptcy.

I think the island villa is Tony's dream of going home

triumphant, but his real enduring and consuming passion is still building his business in America.

Tony Maglica at 80 is totally committed to making a brilliant and beautifully designed flashlight out of the best materials in America, the country that afforded him the opportunity to shine. He comes to the Mag plant at 6:00 a.m. every morning, stays 'til 7:00 p.m., and never lets his business flame flicker.

The Eubama purchase intrigues him because he gets the chance to refine a machine tool he respects by making the components in the U.S. He'll make them more efficiently and better by applying his intellect and zeal to the process. Tony says he'll be making money with Eubama by the end of the year. He's shopping for a big gantry mill to machine the castings he's having made here. Eubama is real and practical, and a potential moneymaker. Tony is into it.

Tony's obsession is making things at his California plant more efficiently and less expensively than in China. He says he's "a bad businessman" because he doesn't take the easy way out and buy product from Asia. That would just not be him. His life's work and daily passion is to continually improve his processes and products so he can successfully make them in California. Mag has a sophisticated new flashlight aimed at the camping and boating market. It is powered by three Triple A batteries housed in an elegantly designed plastic receptacle. Tony says he has a ridiculously inexpensive proposal to make the housing in China, but he won't do it. He'll invest heavily in injection molding and assembly equipment, and clean rooms. He'll do almost anything to make it here.

Tony Maglica is a business warrior and truly loves his America. He hates a government that he believes stupidly makes doing business much harder than it should be. He's politically incorrect, but doesn't care because he's absolutely sure he's right. Tony is a business anachronism and delights in it. He wants to run his business forever, the way he wants to run it, but his practical side tells him he needs a successor. He asked me if I knew of a manager who he could train to succeed him. I told him I would think about it, but where do you find another brilliant, America-centric, machining entrepreneur like Tony, who would have a small enough ego to learn the job and a big enough ego to stand up to the magnificent Mr. Maglica?

Left: Tony Maglica (left), with Lloyd Graff in front of Tony's plant in Ontario, Cal.



I received an email announcement entitled "AMT and NAM Announce Historic Partnership." I didn't know whether to laugh or yawn because of my gut cynicism about Washington based organizations. But then I thought about the financial regulation bill—the current obsession of D.C. politicians. Apparently the massive compromise bill's regulations are being written by a collaboration of Washington lobbyists and staffers.

Most of the lobbyists are former staffers, and many of the staffers are former lobbyists, so you need a scorecard to know the players.

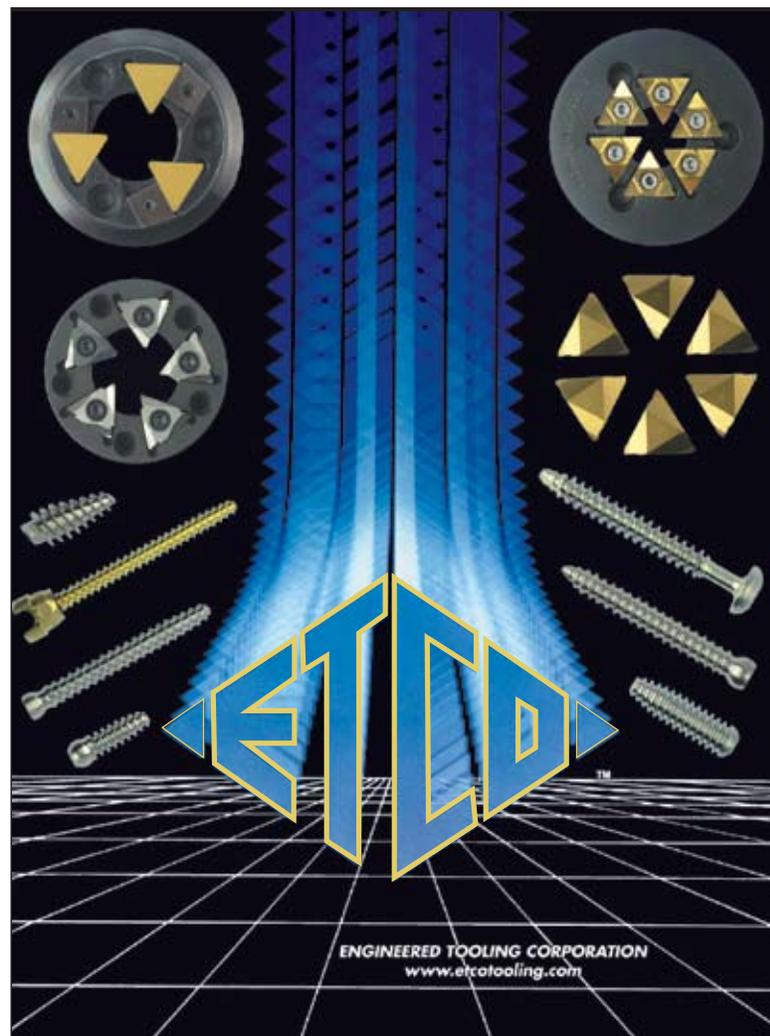
American manufacturing certainly needs an all-star team to advocate and trade for the interests of metal cutters and benders around the country.

The disconnect between the alphabet lobbying groups on K Street in D.C. and the contract shops of Dayton and Duluth has become a gulf. But behind my cynicism I'm hoping that our Washington advocates actually know the difference between carbide and high-speed steel, and can cut through the red tape and blather in the Capitol. That would be historic.

The post 4th of July period is a good time to celebrate the value of passionate and precise political advocacy. The Declaration of Independence was written by Thomas Jefferson, but his pure prose was edited and rewritten before it made the final scroll.

The reporters and public relations flacks will Red Bull it through windy John Engler's National Association of Manufacturers (NAM) speech at the International Manufacturing Technology Show (IMTS), but Bonnie Gurney of the Association for Manufacturing Technology (AMT) says they will stream IMTS interviews on the Web with real constituents to members of Congress, which may actually penetrate the Capitol Hill haze.

Tesla Motors went public at the end of June. The company's all electric roadster has *not* been a resounding success financially or mechanically, but has been a publicity magnet. Elon Musk, one of the company's founders, has an amazing track record as an entrepreneur. He has Toyota money behind him now and the modern Nummi factory in the Bay Area to make the new versions of Tesla cars. Tesla chose not to participate in the X-Prize competition to produce a production-capable 100-mile-per-gallon car, but the company could still be a big big winner over the next 10 years.



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Prices for nice CNC machinery at auction show some firmness in the market. On June 29, James Murphy Auctioneers sold a Mori Seiki 2007 NV5000/A1B40, 20" x 40" table for \$135,000. The machine had a Lyndex Nikken 5th axis trunnion. A 2005 NV5000/A1A40 Mori 23" x 30" table brought \$102,000. The sale at New Concepts in Redmond, Washington, also had a 2005 Mori DuraCenter, which sold for \$67,000 and a 2006 Doosan 3016, which fetched \$25,000. A 2006 Zeiss CMM Contoura G2 fetched \$61,000.

On the same day, Thompson Auction Co. sold Sherman Tool near Dayton. Two Hurco VMX 30 machines, new in 2004, sold for \$40,000 each, while a little Okuma ES-6 new in 2007 brought \$35,000, and a 1998 Okuma Cadet with a 16" chuck brought \$45,000.

In late June at a Winternitz sale near Duluth, Minnesota, a 2008 240-C Doosan 3-axis lathe sold for \$49,000.

I would describe these prices as reasonably strong, particularly for the Hurcos. On the other hand, a couple sales in Michigan, MetaVision in Traverse City and a Hilco/Maynards auction in Detroit, were softer for machines that ran mostly automotive related stuff. Dealers bought the bulk of the equipment, and at Metavision a lot of older cam equipment went straight to the scrap yards.

Statistics from the Precision Machined Products Association (PMPA) indicate that business among its member companies has made a full V-shaped recovery over the last 18 months. After business dropped by a third during the worst of the recession in the spring of 2009, it regained the base level of sales in May of 2010. The ascent of automotive business to the still not so lofty level of 11.5 million units and the rebuilding of paltry inventories everywhere have fueled the resurgence. Weak home sales, tepid employment growth and an undulating stock market have eroded confidence, but as the BP mess slips from the news and the stats show the world isn't coming to an end confidence will come back.

It's August, the corn is high, and everybody in Machine-toolville is getting stressed out because IMTS is getting close.

If you are showing in Chicago the tension is building. Are you spending too much? Will enough people show to justify the Benjamins?

On the flip side, IMTS holds the promise of giving business a big bump for the end of 2010 going into 2011. It will connect you with the foot soldiers who can make a difference for your product.

It can give you leads to drink from for a long winter. It will provide precious emails and cell phone numbers to bang away at.

IMTS is still important for showing off new machines and strutting your stuff. It establishes a pecking order in the key areas of metalworking. It's part of playing in the Big Leagues, but still, I always agonize about whether IMTS is worth the sacrifice of tripping through the maze of McCormick Place. I have lived with this schizoid view of America's machining festival for many years. When the holiday lasted 10 days it was an excruciating, foot killing, back cracking opportunity to press the flesh of the oil stained cognoscenti of Machinedom.

When there used to be tigers, contortionists and sexy German and Japanese models in the exhibits, IMTS was live theater. In 2010, the froth will be gone. It will be all "bidness" compressed into six days of hard selling.

God willing, I'll be there, peddling and schmoozing and wearing a tie. Oh, what fun—I hope.

On June 8, Meg Whitman, former eBay CEO, won the Republican primary for governor in resounding fashion. The same day Rod Blagojevich, former governor of Illinois, watched while his lawyers grilled potential jurors for his corruption trial.

Blago's father ran a numbers game in Chicago. Young Rod grew up in a world of payoffs and married the daughter of a rough local Democratic politician on his way up the political ladder.

Whitman used \$71 million of her own dot-com fortune to pave her primary campaign, while Rod Blagojevich shook down the paving contractors to get his political seed money.

Is Whitman more pure than the driven snow because she was recruited by venture capitalists to run the fledgling eBay after the company's founder realized he didn't want to run the business?

Do we prefer the Rockefellers, Heinzes and Whitmans, or maybe celebrities like Arnold and Ronald Reagan to run our country because the earthy Rod Blagojeviches are too untrustworthy? Do we want only the elite who go to Harvard and Yale Law on the Supreme Court, which we now will have when Elena Kagan is confirmed?

Maybe we want a House of Lords because the raunchy Rods and the slick Willies get too dirtied up climbing to the top.

When I wrote the blog about Meg Whitman using her eBay wealth to win the Governorship of California while Rod Blagojevich defended his mastery of payoff culture in a Chicago courtroom, I was unconsciously touching a bigger theme—the rise of women in American life.

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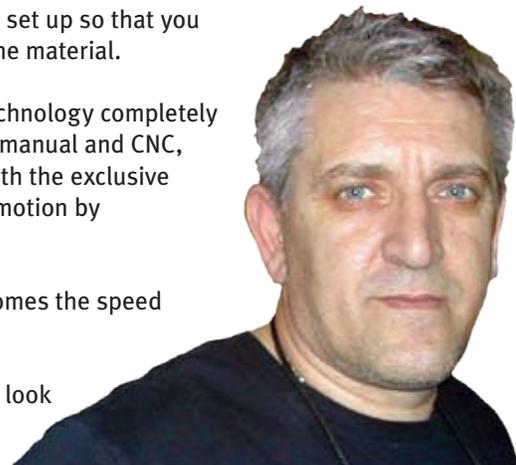
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Hanna Rosin's cover story in the July/August *Atlantic*—"The End of Men: How American Women are Taking Control of Everything"—tells the story of the decline of men in 2010. Economically, this trend is related to the decline of manufacturing and construction. Current unemployment is heavily weighted toward males but the long range trends are even stronger than recession related layoffs.

Testosterone, physical strength and a gambling spirit, the traits that tamed the Old West, are not as highly valued in today's world. Women are earning 60 percent of the college degrees now. Statistically men struggle more in school, and school is the gateway to advancement.

I think that the shift towards female dominance is less apparent in the machining world we inhabit, but I find women taking more of the purchasing agent roles. Men may still be making most of the stuff, but women are often signing the checks.

When Pierre Omidyar, founder of eBay, realized his business

was getting too complicated for him to manage, his venture capital investors found Meg Whitman in Boston bidding time as a consultant and brought her to San Jose to grow the business by harnessing the entrepreneurial fervor of mom and pop companies everywhere.

Meanwhile, Rod Blagojevich, who still can't use a computer, was wheeling and dealing in the backrooms of Chicago politics. His first big move was marrying a powerbroker's daughter. He then joined the law firm of Eddie Vrdolyak, a famous fixer and Chicago dealmaker. He used his smile and big hair to charm the voters all the way to the top of the State. Very competitive, very male, very Chicago, very corrupt, our Rod.

Meg goes to Sacramento if she beats the old liberal pol Jerry Brown, former governor of California from 1975-1983. Rod goes to prison if the wiretaps stick.

It's getting tough to be a good ole boy.



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I love the “Second Act” column which appears on Tuesdays in the *Wall Street Journal*. It recounts the stories of people who forsake their original career for one that promises more excitement, opportunity, fun or satisfaction than the career path they originally pursued.

On June 8, *Journal* writer Dennis Nishi told John Putnam's story. Putnam was a successful bankruptcy lawyer in Boston with a firm representing failed airlines and steel mills. While taking a deposition he had an epiphany. “Everyone there was very senior and making serious bucks. That's when I looked around and [realized] I didn't want to spend the best part of my life getting to where they are,” the *Journal* quoted him.

The rest of the story is about Putnam buying a farm in Vermont, taking a job with a Vermont law firm while developing the farm, and then chucking the law to make specialty cheese for a living.

He studied cheese making for four years and bought a custom made copper cheese vat to give his Alpine cheeses a unique flavor. A French college student taught him some tricks of the trade in a work-study exchange while he wrote his graduate thesis.

Putnam started making cheese in 2002 and his business was profitable in 2003. Today his Thistle Hill Farm sells eight tons of cheese a year and is making decent if not great money.

Doing *Today's Machining World* is the second act for this used screw machine dealer.

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BY BARBARA DONOHUE

Parts Cleaning Looking Good at the End of the Line

The right parts cleaning system will fit into your process and cost-effectively give you the clean you need. Some systems can even do deburring.

Parts come off your lathes and machining centers covered with oil or cutting fluid and a lot of chips. The customer probably wants nice, clean parts. The best way to clean those parts depends on:

- Part material
- Part geometry
- Debris and soil to be removed
- Cleanliness required by the customer's specs or for plating or other processes
- Other factors, such as the need to maintain lot integrity

An aluminum or plastic part might require a different cleaning approach than a steel part. A complex part with blind holes or small cavities will be more challenging to clean than a simpler part.

Parts are specified to be visually clean, maybe 50 to 70 percent of the time, said Jeff Brouchoud, president, Alliance Manufacturing, Inc., Fond du Lac, Wisc. Some customers want an "oil break" test—water beads up on an oily surface, but forms a uniform sheet on a clean part. For critical parts, a *Millipore test* is done, which collects debris from a part and analyzes it for particle size and quantity.



Above: Cutaway view of a part on a Bertsche high-pressure clean/deburr system shows internal features including angle passages, grooves and cross drilled holes. Features are deburred by spinning the part while high pressure water blasts the features.

Photo courtesy of Bertsche Engineering Corp.

A matter of chemistry

People in the part-cleaning business talk about the *chemistry* of the materials used in the cleaning process. Sometimes tap water, deionized, purified or distilled water can do the job. Often, a soap mixture is needed, and sometimes you'll need to use a solvent.

The chemistry is really important. If your parts are soiled with coolant, chips and oil, you'll probably use a high-alkaline soap solution, Alliance's Brouchoud said. But if the parts are made of aluminum and the soap is too alkaline, it can damage or discolor them, so you'd need to use a different soap.

With a given machine and chemistry, you can fine-tune the process by adjusting temperature and processing time, enhancing the cleaning action with ultrasound or agitation, using multiple cleaning baths, or adding stations to rinse, dry or apply an anticorrosion coating.

Taking a bath

A common cleaning method is to place parts in a bath of cleaning solution—water-based solutions rather than solvents, these days. Agitating the bath by moving the parts around enhances the cleaning action. Almco, Inc., Albert Lea, Minn., offers a different method, a rotary drum cleaning system in which parts are fed into a drum with helical vanes fitted inside. As the drum rotates, the parts follow the vanes. During part of the process the parts are immersed in the cleaning solution. When the parts emerge from the solution, nozzles spray them to remove oil or debris. The parts exit through the far end of the drum.



Tiny bubbles

Humans—at least the young ones—can hear sounds at frequencies up to 20,000 cycles per second (20 kHz). Higher frequencies beyond the range of human hearing are called ultrasound.

For difficult soils or to achieve cleaner parts, you can use an ultrasonic cleaning system. The parts are immersed in water or a cleaning solution in a tank fitted with sound transducers. An ultrasonic cleaner is essentially “a stereo system in water,” said Frank Pedeflous, president of Omegasonics, Simi Valley, Cal. A transducer similar to a speaker emits high frequency sound into the cleaning bath. A frequency of 40 kHz is usually used for cleaning machined parts, he said. Omegasonics designs custom systems and also offers standard systems ranging in size from a tabletop unit with a half-gallon tank to a standalone unit with 110-gallon capacity.

Each oscillation produces a bubble, so at 40 kHz you get 40,000 tiny bubbles per second from each transducer. Each bubble is a low-pressure region within the liquid in the tank. When a bubble strikes the part, it implodes, loosening soil from the part in a very gentle way, said Cheryl Larkin, director of marketing, Miraclean, Ashville, N.Y.

Lower frequencies produce a more aggressive cleaning action, Larkin said, and 25 kHz ultrasound may be used for applications like removing rust or removing mold release from an injection molding process. Higher frequencies—68 kHz up to 132 kHz—provide gentle cleaning, and the smaller bubbles created can get into the confined spaces like screw threads or small passages in parts. If needed, multiple frequencies can be used in multiple cleaning baths.

The Sugino U-Jet III cleaning system from Sugino Corp., Itasca, Ill., uses high-pressure water jets in a cleaning bath to create bubbles. The high-velocity flow in and around the

Left: A compact belt washer with a return conveyor, from Alliance Manufacturing, designed for cleaning a variety of smaller parts and for use by a single operator.

Photo courtesy of Alliance Manufacturing, Inc.

Below: An Omegasonics ultrasonic cleaning system.

Photo courtesy of Omegasonics.



how it works

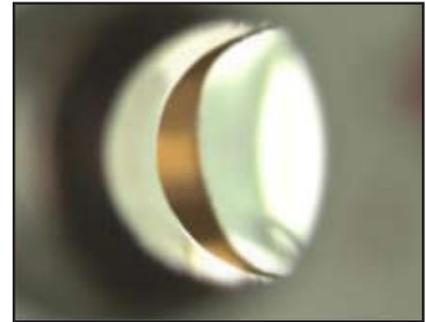


Left: The KP-200 vacuum parts washer, one of the iFP models from Gosiger Import.

Photo courtesy of Gosiger Import.

Below: Feather edge burrs formed at the intersection of cross drilled holes (left). High pressure deburring completely removes these loosely attached internal burrs.

Photo courtesy of Bertsche Engineering Corp.



parts produces cavitation bubbles, which implode and clean surfaces in a fashion similar to the bubbles produced by ultrasound. The Sugino U-Jet III controlled cavitation system has a workspace of 20" x 10" x 8" and can clean parts weighing up to 22 pounds.

Spray wash

Spray-type parts cleaning systems offer focused cleaning with spray nozzles that aim streams of cleaning solution directly on the parts. With spray cleaning, you have control over the cleaning process, Alliance's Brouchoud said.

Alliance Manufacturing, Inc. produces water-based spray cleaning systems for batch or continuous conveyorized processing. With the Aquamate cabinet system you can "put in the parts, close the door, hit the button and walk away," Brouchoud said. Conveyorized systems, often custom-designed, allow parts to be placed on a belt or fixture at one end and come out at the other end, cleaned and perhaps rinsed and/or dried.

CNC cleans: high-pressure clean/deburr

"We typically sell our machines as deburring and cleaning machines," said Rich Bertsche, president of Bertsche Engineering Corp., Buffalo Grove, Ill. While typical spray washing systems use pressures of 100 to 2,000 psi, systems from Bertsche use targeted jets of liquid at 10,000 psi or higher, impinging on the part's surfaces to not only clean, but also deburr difficult-to-reach locations. A CNC-driven ram holds the part and moves it to deburring stations where nozzles di-

rect high-pressure spray at the features to be deburred. Each nozzle is designed to deburr a particular kind of feature, such as a countersink or the intersection of two holes.

Jet Clean Centers from Sugino Corp. also use a high-pressure flow to clean and deburr in a 4-axis CNC configuration. Available in three models providing a range of pressures up to 10,000 psi, Jet Clean Centers also have a 600 rpm spindle that can operate brushes, reamers or other deburring tools for auxiliary deburring. Typical applications include high-precision/high-complexity parts, Sugino sales manager David Becker said, such as cylinder heads, fuel system components, valve bodies for antilock brake systems, or hydraulic valve blocks.

Environmentally friendly solvent cleaning

If the parts you make require solvent cleaning, you could use an environmentally friendly, self-contained washing system. These systems seal the solvent inside, clean it by distillation, and can reuse the same solvent indefinitely.

For example, the iFP vacuum parts washers from Gosiger Import, Dayton, Ohio, can operate with hydrocarbon or modified alcohol solvents. You place the parts to be cleaned in a basket and load it into the parts washer system. First, the system removes air from the cleaning chamber. Then, the parts washer introduces the solvent. Ultrasound and/or mechanical oscillation or rotation of the parts enhances the solvent's cleaning action. You can choose to have a rust inhibitor applied after cleaning and select a heated or unheated drying cycle.

“Using conventional solvent cleaning, a shop might expect to buy 150 to 500 gallons of solvent per year.”

The iFP vacuum parts washer systems come preprogrammed with fifteen preset washing cycles, said Mike Moore, product manager for the iFP unit at Gosiger Import. You can easily program a system to run different cycles if needed. The KP-12 Micro system handles batch sizes up to 25 pounds, and the KP-200, 65 pounds.

A self-contained solvent washing system reuses the solvent, but generally requires adding some makeup solvent to replace what is lost in normal operation. “We see about one gallon every 30 days,” Moore said. Using conventional solvent cleaning, a shop might expect to buy 150 to 500 gallons of solvent per year, at a cost of \$12 to \$22/gallon, he said, and then have to pay for removal of the waste solvent.

The right equipment for the job

To get the cleaning results you want, you'll need the right equipment, the right chemistry, the right temperature, the right cycle times, and the right ultrasonic frequency or frequencies if you are using an ultrasonic system Omegasonics', Pedeflous said.

If you have new or ongoing challenges in cleaning or parts handling, if you run high volumes, or are making parts for which you need to maintain lot integrity, you may want to investigate different systems to see if they can meet your needs more effectively.

When you contact cleaning equipment manufacturers, they'll ask you to describe the parts—material, geometry, size—and what needs to be cleaned. They also need to know production volume, cleanliness specs, any problems you've been having, and other issues you need to deal with, such as lot integrity requirements.

Ask the company to run some sample parts through the process, so you can see the results before you buy. To correctly size the machine you'll need to take into account the size of the parts and also the size of any lots you need to keep together.

Cleaning as part of your overall process

The process flow in your shop may influence the design of the cleaning system. If you want to use a conveyor-type system but need the parts to return to the operator who loaded them, you could use an Almco system that carries parts on

a flat stainless steel belt that travels in a U-shaped path, so the parts come back next to where they were loaded. In some cases, robot loading and/or unloading could help streamline your process.

Even if your current cleaning system is working well enough, you may be able to improve it by fine tuning the chemistry, or adjusting the cycle time or temperature. Talk to the system manufacturer or to the company that supplies your cleaning solutions. “It is a good exercise,” Larkin said, “to examine a cleaning process and make improvements to it.”

For more information:

Alliance Manufacturing, Inc.: www.alliancemfginc.com

Almco, Inc.: www.almco.com

Bertsche Engineering Corp.: www.bertsche.com

Gosiger Import: www.gosiger.com

Miraclean: www.miraclean.com

Omegasonics: www.omegasonics.com

Sugino Corp.: www.suginocorp.com

Videos: www.ctgclean.com/technology-library/videos

Particulate analysis of machined parts: www.millipore.com/techpublications/tech1/tn1510enus

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IMTS 2010, the largest manufacturing technology show in the Western Hemisphere, is the place to see and compare technologies from around the world. Efforts to reduce costs and improve the ease of attending the show by organizers have paid off. The Illinois Legislature recently voted to override an amendatory veto submitted by Illinois Governor Patrick Quinn and pass into law legislation that will implement reforms at McCormick Place. To keep up with IMTS news, subscribe to the *IMTS Insider* and the *IMTS E-Technology Newsletter* at www.imts.com. The following companies will be displaying at IMTS.



◀ BIG Kaiser Precision Tooling

BIG Kaiser Precision Tooling Inc. will be showcasing a line of new boring heads and tool holding products. The Kaiser EWN 2-54D Digital precision fine boring head for the diameter range of .078"-2.125" supports spindle speeds up to 20,000 rpm. The boring head features an integrated LCD display with one-button operation and .00005"/Ø resolution. This head is compatible with all existing Kaiser accessories including shanks, boring bars and insert holders.

For more information, please visit BIG Kaiser Precision Tooling at Booth W-1600 or visit www.bigkaiser.com.

▶ Doosan Infracore America Corp.

The new Lynx 300 has a 20 hp, high torque motor that provides the power for heavy cuts and the speed to produce near-mirror finishes. Its 10" diameter 3-jaw power chuck turns 3" bar stock at speeds up to 3,500 rpm. Widely spaced linear motion guideways allow high-speed rapid traverses—945 ipm on the X-axis, and 1,181 ipm on the Z-axis.

For more information, please visit Doosan Infracore America Corp. at Booth S-8100 or visit www.usa.doosaninfracore.co.kr.



► FANUC CNC America

FANUC CNC America will unveil advanced CNC control innovations, including the new 30i-B Series Control, an upgrade from the 30i-A Series. The 30i-B Series offers newly enhanced features and functions with new advancements in operability and maintainability including a USB memory port, enhancements in dual safety check, new punch press, and laser functionality.

For more information, please visit FANUC CNC America at Booth S-8919 or visit www.FanucCNC.com.



◀ Genevieve Swiss Industries

Genevieve Swiss Industries will feature the new MULTIDEC® 1600 series thin grooving and micro turning tools with insert widths from the thickness of human hair (.0019") up to .108" from UTILIS®. The 1600 series inserts are available with a variety of coatings and are capable of work under .125" in diameter with cutting edge repeatability within .0004".

For more information, please visit Genevieve Swiss Industries at Booth W-2334 or visit www.genswiss.com.

► INDEX Corporation

INDEX Corporation will present the new TRAUB TNL18 sliding headstock automatic lathe and its variant, the TNL18P production machine. The TNL18 can be changed over in minutes to produce precision parts with or without a guide bush for long or short parts from bar up to 20 mm diameter. Up to three tools can be on the part at once. The tool capacity of the TNL18 can be increased to as many as 54 tool places through dual- and multi-holders, extending productive times.

For more information please visit INDEX Corporation at Booth S-8136 or visit www.index-usa.com.



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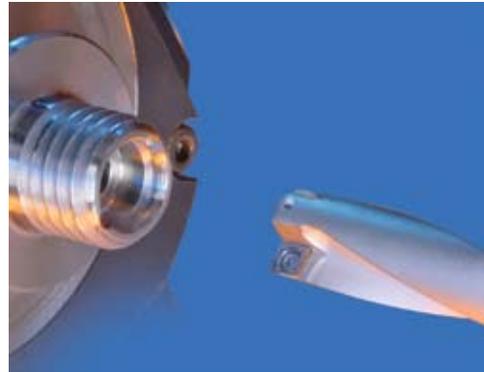


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product focus



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For more information please visit ISCAR at Booth W-1800 or visit www.iscarmetals.com.



▲ Marubeni Citizen-Cincom Inc.

Marubeni Citizen-Cincom Inc. (MCC) will display nine machines including four of their newest models: L20E, K16E, BNA-42S and BNX-42SY. The Cincom L20E offers a wide variety of re-designed L20 tooling as well as a rich array of NC functions. Citizen's control system enables smooth motion at high speeds, and the increased rapid feed rate of 32 m/min. successfully improves productivity.

For more information please visit Marubeni Citizen-Cincom Inc. at Booth S-9419 or visit www.marucit.com.

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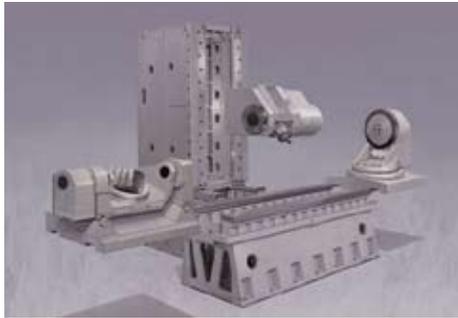
*According to various Swiss sources Tornos, Switzerland is no longer supporting Bechler and Petermann products as of May 1, 2009.

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For more information, please visit Mitsui Seiki at Booth S-8336, or visit www.mitsuisseiki.com.



▲ Nexturn/TMT Swiss

TMT Swiss, the USA importer for Nexturn Swiss Type Turning Machines, will display several new CNC swiss type models at IMTS. Nexturn's "E" Series of 7-axis Swiss turning machines has a variety of standard features traditionally offered as optional upgrades. Designed to minimize the effects of thermal displacement, machines in the "E" Series provide consistency and repeatability over extended periods of production. The line includes four models from 20 mm to 38 mm capacity. All models are equipped with Fanuc 31 Controls.

For more information, please visit TMT Swiss at Booth S-8646 or visit www.tmtswiss.com.

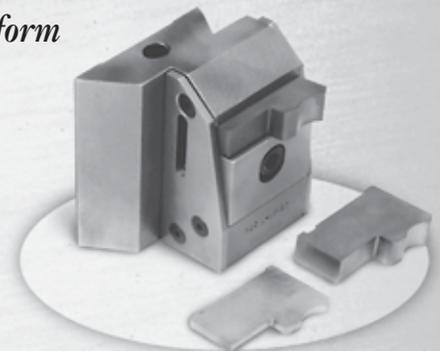
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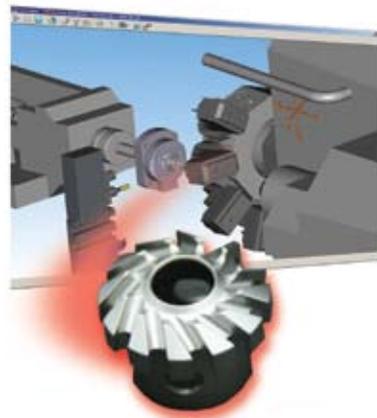
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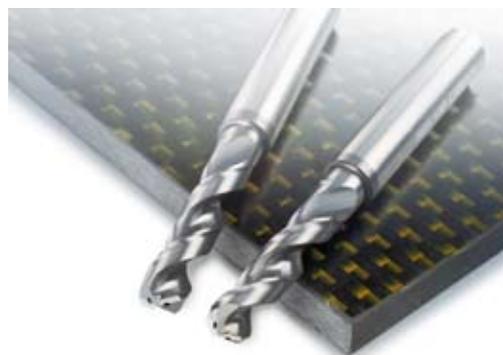
product focus



▲ PartMaker Inc.

PartMaker Inc., a division of Delcam Plc., will unveil its latest version of PartMaker Software for programming CNC Mills, Lathes, WireEDM, Turn-Mill Centers and Swiss-type lathes. Major highlights of PartMaker Version 2011 include more powerful milling functionality, new specialist turning routines, a more flexible tooling library, improved simulation of unique machine tool architectures and a host of additional productivity enhancements.

For more information, please visit PartMaker Inc. at Booth E-3922 or visit www.partmaker.com.



▲ Sandvik Coromant

To meet growing demand from the aerospace sector for reliable and efficient hole making technology in composite materials, cutting tool and tooling systems specialist, Sandvik Coromant launched its specially designed CoroDrill® 854 and CoroDrill® 856. These tools were developed to withstand the harsh demands of the latest CFRP materials and aluminum stacks, offering long and consistent tool life to meet tight tolerances time after time.

For more information, please visit Sandvik Coromant at Booth W-1500 or visit www.sandvik.coromant.com.

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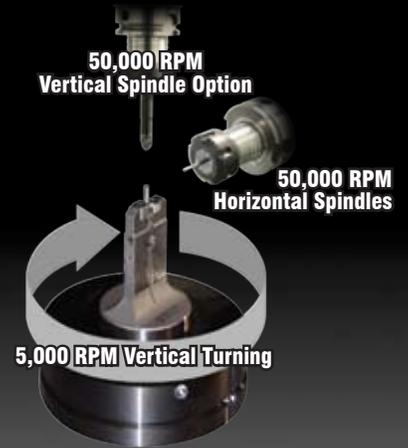
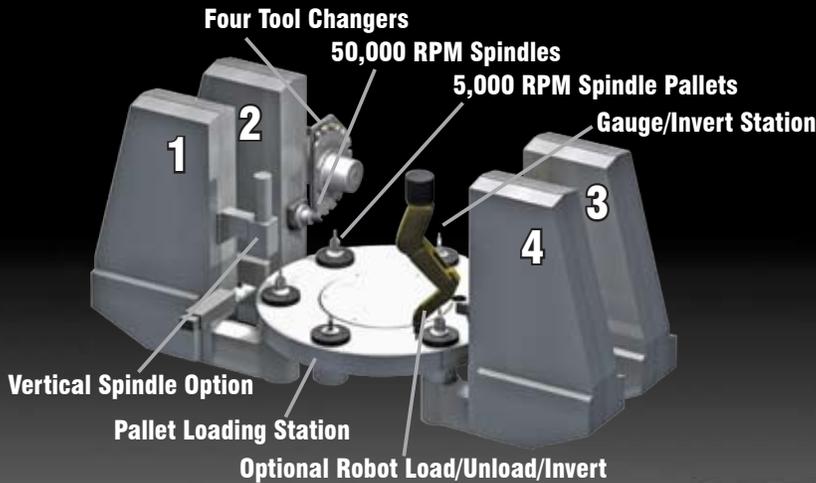
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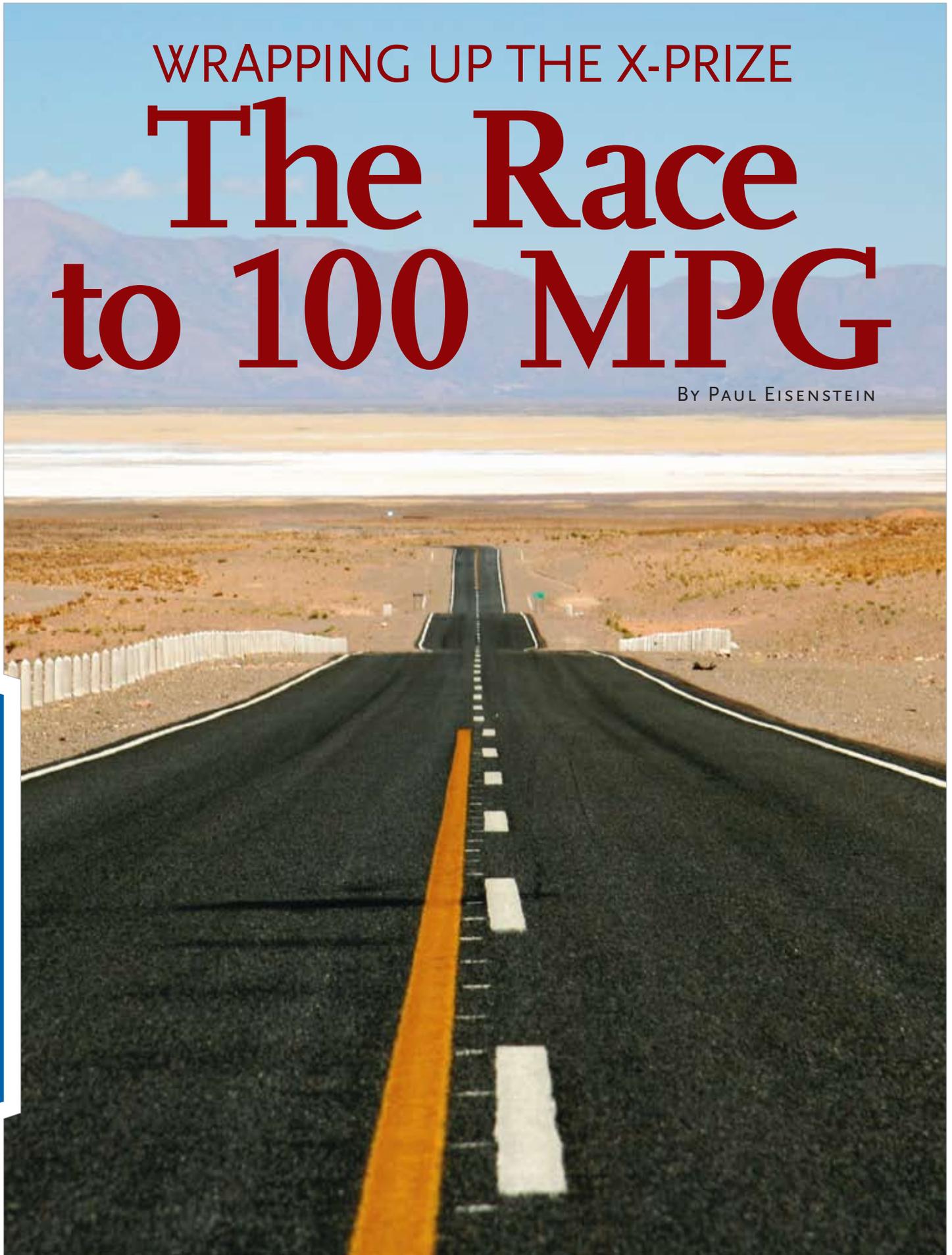


WRAPPING UP THE X-PRIZE

The Race to 100 MPG

By PAUL EISENSTEIN

auto x-prize



The disastrous blow-out of BP's well in the Gulf of Mexico is expected to have a devastating, long-term impact on everything from marine life to the region's tourist industry. If there's an upside to the murk of spilled crude it's the way the catastrophe is putting a renewed spotlight on the nation's dependence on petroleum, whether imported or domestic.

"We are concentrated on a single source of energy," says Eric Cahill, an energy researcher and now the senior director of the Auto X-Prize, but whether you believe in global warming, worry about the cost of importing crude or simply fear the potential for more disasters like the BP spill, there is increasing pressure to find alternatives to that primary energy source. Nowhere is that more visible than in the auto industry, where the strain on the global oil supply is already apparent.

In the U.S., the Corporate Average Fuel Economy, or CAFE, standard was recently raised 30 percent, and is set to reach 35.5 miles per gallon by 2016. Skeptics contend that increase could add significantly to the cost of the typical automobile, perhaps as much as \$9,000, according to a new report by the National Research Council, the research arm of the National Academy of Science.

But not everyone buys that argument. And that includes the organizers of what is now known as the Progressive Auto X-Prize. Formally unveiled at the 2008 New York Auto Show, it's a follow-up to the original Ansari X-Prize that helped spur the first private sub-orbital spaceflight in 2004. But its roots go even deeper, says Cahill, back to the early days of aviation, when the Orteig Prize helped spur Charles Lindbergh to make the first successful solo crossing of the Atlantic Ocean.

"We're not only hoping to accelerate the pace of change," says Cahill, "but also serve as a broker of information to the consumer."

The Orteig Prize carried a reward of what was, at the time, a princely sum of \$25,000. For the winners of the Progressive Auto X-Prize there's a significantly larger purse—\$10 million in total, divided between two categories of vehicles which must exceed 100 mpg or its equivalent. Five million dollars is allotted to the winner of the Mainstream category, for which cars must have 4+ wheels and 4+ passenger capacity. Another \$5 million is allotted for the Alternative category in which the car must fit 2+

passengers but has no requirement for number of wheels. The Alternative category is split into two sub-categories—one for side-by-side seating and one for tandem seating—the winner of each receives \$2.5 million.

It may sound like a lot, says Cahill, but even today's most conventional automobiles can cost hundreds of millions of dollars to design, engineer and put into production. "We know this won't be enough to build a car but we're putting a marker out there. It engages the entrepreneur and encourages the human need to compete." If the Auto X-Prize also encourages demand, well, all the better.



Above: Cars get ready for the knockout stage.
Photo courtesy of Autoblog Green

While building a better automobile may seem child's play compared to putting a man in orbit, the goal of topping 100 miles per gallon is no simple task. While skeptics contend that Detroit and its import competitors have no interest in increasing fuel economy, ignoring the stepped-up role

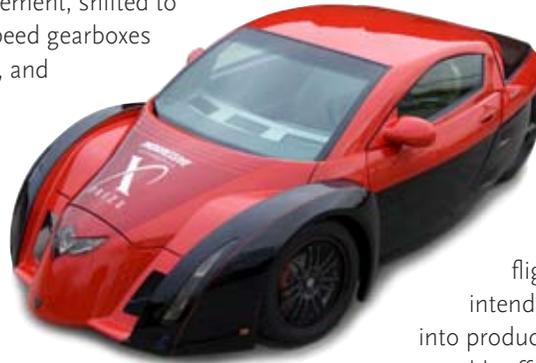
mileage plays in today's car buying market, most makers are quick to trumpet even the most marginal improvements, especially if they best the competition.

But the gains of the last few decades have been relatively easy, compared to what will be needed to move ahead. Makers have reduced engine displacement, shifted to direct injection, swapped out four-speed gearboxes for 6, 7, even 8-speed transmissions, and adopted the sort of aerodynamic enhancing tricks once reserved for Formula One race cars.

Vehicles entered in the X-Prize are taking things significantly further. The adoption of an assortment of advanced powertrains, most relying on some sort of electrification along with advanced lightweight materials, reflects the fundamental automotive truism that mass is the enemy of mileage.

By the time registration closed in February 2009, 111 teams paid the up-front \$5,000 fee, some fielding more than one vehicle design. "We've been narrowing the field ever since," notes Cahill, largely through the competition's strict initial guidelines, followed by a series of rigorous checkpoints. By January 2010, the field had been narrowed to 43 teams, which was further trimmed to 28

before the spring "Shakedown Stage." Only about 20 made it to the "Knockout Qualifying Stage," in June, and as this story was heading to print, around 10 made it to the final shakeouts. The three winners will be crowned in September, during a ceremony in Washington, D.C.



Above: Zap's Alias
Photo courtesy of Zap

The three winners will have to do more than just deliver a high-mileage prototype, organizers stress. "The point of this prize," says Cahill, "is that they have to be commercializable." As with the Ansari X-Prize, which is expected to lead to commercial space flights, the Progressive Auto X-Prize is intended to actually get 100 mpg vehicles into production—and, most importantly, at a reasonably affordable price.

"The potential is here," contends Gary Starr, founder and product development manager of Zap, a California-based electric vehicle manufacturer that, according to several observers, has a good chance of making it at least to the finals of the Auto X-Prize. "It's always nice to win," Starr says, though he doesn't feel that losing the X-Prize would be a major setback, since it would still shine a spotlight on his company's efforts.

The company's car, Alias, is one of the more radical designs entered into the competition. It's a 2-seat three-

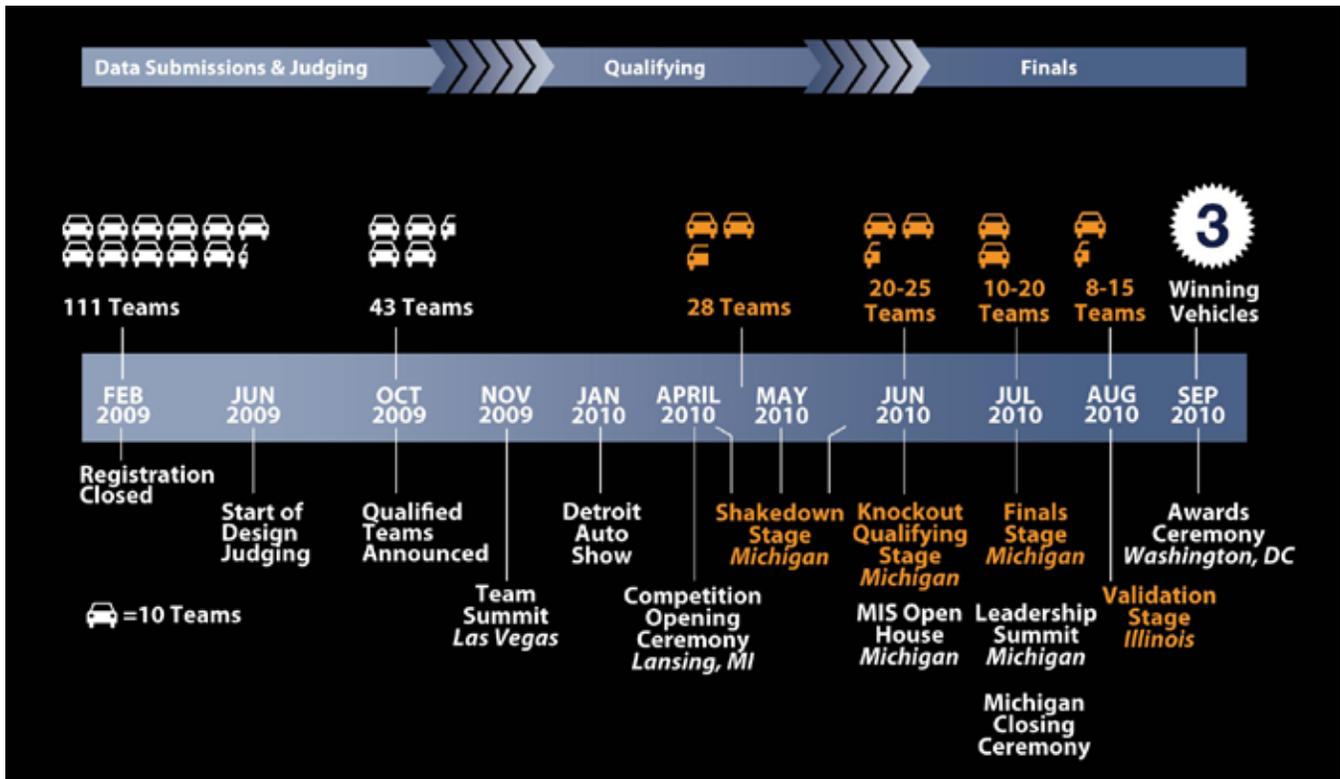


Image courtesy of Progressive X-Prize

wheeler—two in front, one in the rear—that relies on both battery power and the use of composite body components to maximize its range. It also delivers some surprisingly upscale touches, like leather seats and GPS navigation, for a target price of under \$35,000.

The X-Prize entrants cover a gamut of designs and technologies, as shown by the alternate power category's second class for tandem seating configurations—the approach taken by the Edison2 team with its entry, the Very Light Car (95). Hailed as one of the most stylish entries in the competition, the dart-nosed VLC uses a modified internal combustion engine running on E85 ethanol, but the key to its fuel efficiency is a focus on extremely lightweight body and chassis components, as well as efficient aerodynamics.

“If there’s any disappointment in the competition, it’s the lack of some big-name players.”

The Edison team has taken the unusual approach of entering cars into both alternative subcategories and the mainstream category of the Auto X-Prize competition. For the Side-by-Side and Mainstream classes the team adopted a racing-style design with outrigger wheels, but all use similar, ethanol-powered internal combustion technology.

While there are a number of commercial enterprises competing for the \$10 million X-Prize, the venture has drawn a number of student entries from universities such as Cornell, and even a high school—the Academy of Automotive and Mechanical Engineering, a part of West Philadelphia High School, based in one of the most disadvantaged neighborhoods in the city. The students are nothing if not ambitious, as they’re among the few

teams to field multiple entries. One approach, the EVX GT, converts a conventional Ford Focus to run on biodiesel. The other, the EVX Focus, is a lithium-ion-powered plug-in hybrid electric vehicle.

The Cornell entry, meanwhile, survived the preliminary cuts and was, as this story went to press, heading towards the final cut. Dubbed Redshift, the vehicle starts with an entirely

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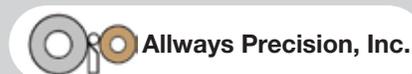
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Above: Cornell 100 + MPG team's Redshift vehicle.

Photo courtesy of Jon Liu

Left: Very Light Car from the Edison2 team.

Photos courtesy of SEMA

Opposite: Michigan Governor Granholm and X-Prize CEO Peter Diamandis in the AMP's Sky.

Photo courtesy of Autoblog Green



new mini-car design that relies on a diesel-based plug-in hybrid electric powertrain.

A number of teams have opted for designing their own vehicles from the ground up. Some, like Redshift, still manage to look relatively conventional, but others, such as the K-Way Motus, stretch the limits of automotive styling. Originally started by the Politecnico University of Turin, and later pursued by two independent start-ups, this Alternative/Tandem entry looks like a motorcycle (though there are actually two closely-set wheels up front), with an enclosed body that eliminates the need for wearing helmets. An active tilting system allows the Motus to be driven like a car but still lean into corners like a motorcycle. The gasoline-powered hybrid drivetrain is driven by a pair of motors inside the front wheel hubs.

If there's any disappointment in the competition, it's the lack of big-name players. But organizers knew up-front that major manufacturers might be reluctant to reveal proprietary technology.

One that did decide to participate is Tata Motors, the

ambitious Indian automaker best known for its \$2,500 Nano. Tata has recently made several moves into electrification, and is competing in the Auto X-Prize with its Indica Vista EV X, a battery-electric vehicle slotted into the Alternative/Side-by-Side class. It's a modified version of a conventional, gasoline-powered Tata Indica 5-door hatchback, running on lithium-ion batteries.

While some teams have pushed the envelope almost to the breaking point, Tata shows how some of the X-Prize entrants might be mistaken for conventional automobiles on the road today. For example, it would take a close look to realize that the entry from AMP isn't just an off-the-assembly-line Saturn Sky. The Ohio electric vehicle maker's auto is what's known as a "glider." But what starts out as one of General Motors' two-seat roadsters is stripped of its factory powertrain, which is replaced by AMP's electric driveline. A set of lithium-ion batteries powers the AMP prototype's two electric motors, delivering the equivalent of more than 100 miles per gallon, even with surprisingly peppy performance and a top speed of 100 miles per hour.

The glider approach has its advantages, says AMP's Mike Detkas. It allows the firm to deliver a vehicle that meets another X-Prize rule, that the cars meet current U.S. safety requirements. It also provides the sort of ride and comfort that a well-established maker like GM can readily deliver. "We like to think we're standing on the shoulders of giants," he says.

Those giants haven't been all that open to new entrants, cautions George Peterson, of the California consulting firm, AutoPacific, Inc. But the demand for cleaner, more fuel-efficient products has opened up a window, albeit one he

says may be short-lived, for new players to join the established automotive order. Some alternative energy based car companies, like Tesla Motors and Fisker Automotive, decided not to participate in the Progressive Auto X-Prize competition. But they could reap the rewards if the event boosts public awareness.

Even established makers are exploring the potential for new, green technologies. GM will launch its first extended-range electric vehicle, the Chevrolet Volt, late this year. Using a controversial standard proposed by the EPA, Volt would get the equivalent of 230 mpg, though what will matter most to potential buyers is its ability to run for up to 40 miles on a charge and then switch to an onboard gasoline engine that eliminates the so-called "range anxiety" associated with pure battery-electric vehicles. Meanwhile, Toyota, Nissan, Ford, Mercedes-Benz and a variety of other mainstream manufacturers plan to launch advanced, battery-based vehicles of their own in the coming year.



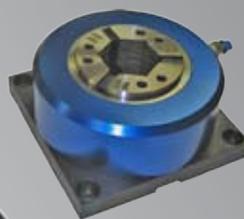
"I've got faith in the market to solve the problem," insists X-Prize director Cahill, whether it takes new players or the established order. As the world watches the devastation in the Gulf of Mexico, the market will come under increasing pressure to deliver a workable solution to our dependency on oil as quickly as possible. 

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one on one

Photographer Greg Davis
in Paupa, New Guinea.
Photo courtesy of Greg Davis

In 2004, **Greg Davis** quit his desk job and sold his belongings to travel the world for 14 months. He used a \$400 point-and-shoot Olympus camera to document his journey. After showing his photos to his girlfriend upon returning home, he realized he had a natural talent for photography. Many of Davis's images have been recognized by the art community nationwide, and he has just signed a contract with National Geographic's Image Collections.

Are your photos usually taken spontaneously, or do you spend a while setting up your shots?

GD: Ninety-nine percent of my work is a brief moment in a time. There's the shot, and there it goes. I can't ask the person to redo a situation that I saw but missed. The moment's there. I'm either present or I don't capture that image. I miss a lot of shots, and that's okay. I wasn't [supposed] to get that shot.

Are most of your photos portraits?

GD: I do like the portrait. There's something about the people that I have captured. They captured me first. Whatever was in their spirit, their soul, their eyes, the way that they looked at me, the way they presented themselves to me, the way that they were open to me, allowed me to capture what it is that you see.

I read on your Web site about a women in Vietnam who had a profound impact on you. Can you tell me about her?

GD: Nine months into my one-year trip my life was literally reborn the moment I crossed paths with the "The Blanket Weaver," which is what I call the image of her. It's an image of two hands—one green, one blue, colored by the dye from her work. I captured the image in the mountains of Vietnam on a remote trail outside of a village called Sapa. I took one photograph, smiled and walked on my way. I had no idea that that particular moment was going to define these last five years of my life.

Why was that photo so important?

GD: Because of the impact that it has on people who see it here in the States. I've done over 120 exhibitions in the last four years and I've seen a wide array of emotions this photograph has on people—I have had people stop dead in their tracks, I've seen people cry, I've seen people speechless. So in a sense, my fate lies in this woman's hands. My intention is to eventually go back and find the Blanket Weaver in the mountains of Vietnam and write a book about the whole thing.

Do you enjoy exhibiting and selling your work at art festivals?

GD: The \$500 [exhibitor fee] isn't a lot of money considering the number of people that can see my work, meet me and hear my story. Now, is it grueling? Is it grinding? Is it easy? If it were easy, everybody would do it. Do I get tired? Of course. Did I get tired of sitting at a desk? Of course. But to share the story directly with the person who is moved by the image—what a great thing.



Above: "The Blanket Weaver"

Photo courtesy of Greg Davis

If you could be any machine, fictional or real, what would you be?

GD: The first thing that comes to mind is a camera. In one brief moment, in a blink of an eye, this machine has the ability to capture an emotion that I think is unlike anything else out there. It creates an emotion in the viewer and possibly even a spiritual connection with that brief moment. That's an extremely powerful tool to convey a message.

You can view and purchase Greg Davis's pieces online at www.gregdavisphotography.com.

WITH NOAH GRAFF

shop doc

Today's Machining World's "Shop Doc" column taps into our 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 Shop Doc Blog at www.todaysmachiningworld.com.

Dear Shop Doc,

One of our operators came from another shop and told us that we can use Custom Macro for tool life management, but he doesn't know how. I checked the manuals but don't see anything obvious. Can you help?

Through the Grapevine

Dear Grapevine,

Custom Macro programming, also known as parametric programming, is capable of performing many different tasks, even ones not specifically outlined in the programming manual.

Macro programming allows the use of variables, logic, arithmetic, conditional branches, and custom alarms. For tool life management, we'll need to use most of those functions. Ideally you should make a flow chart to outline the sequence of events that need to take place. In this case, you want to check the life remaining on all tools and either run a part or have the machine generate an alarm to notify the operator that a tool needs to be changed. Since all this needs to take place before machining, you can put that part of the Macro at the beginning of the program.

You should use variables to hold the life count and the life number for each tool. I like to relate the variable register number to the tool number. Let's assume there are four tools and they are T0100, T0300, T1100 and T1400. We will use variable numbers 501, 503, 511 and 514 to hold the life count and variables 101, 103, 111 and 114 to hold the tool life value. Values stored in variables 100-149 are lost when the power is switched off. Variables 500-531 retain the value at power down.

```
O1234; (Machining program number)
#101=1000; (Tool life value for T0100)
#103=500; (Tool life value for T0300)
#111=775; (Tool life for T1100)
#114=2300; (Tool life value for T1400)
```

Setting the tool life from the program ensures that the proper values are used and saved. Next, you need to check the life of each tool. For this you can use a conditional BRANCH statement.

```
IF[#501 GT #101] GOTO 1000; (If the count in #501 is greater
than the life set in #101 skip to line N1000)
IF[#503 GT #103] GOTO 3000;
IF[#511 GT #111] GOTO 11000;
IF[#514 GT #114] GOTO 14000;
(Normal machining program goes here)
```

At the end of the program you need to add to the tool life count and list the alarms. With the alarms you will also reset the tool life count so that you don't have to rely on the operator to remember.

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

(End of normal machining program is here)

#501=#501+1; (Add one to the tool life count of tool T0100)

#503=#503+1;

#511=#511+1;

#514=#514+1;

GOTO 9999; (Skips over alarms and goes to M30 code)

N1000 #501=0; (Reset life count for T0100)

#3000=1 (TOOL LIFE OVER CHANGE TOOL T0100) (Alarm to stop machine with message)

N3000 #503=0;

#3000=1 (TOOL LIFE OVER CHANGE TOOL T0300)

(Repeat for #511 and #514);

N9999 M30; (End of program)

The GOTO statement will cause the program to skip over the alarms while the previous IF GOTO statements will cause them to be read. There are lots of different ways to program this.

Submit your program in the comments on the Shop Doc Blog at www.todaysmachiningworld.com.

Dan Murphy
REM Sales LLC

Dan Murphy is a regional sales manager for REM Sales LLC., a U.S. Tsugami distributor. He can be reached at dmurphy@remsales.com.



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◀ Haas Automation

Haas Automation, Inc., has expanded the capacity of its EC-1600 horizontal machining center with an additional 10 inches of Y-axis travel. The latest generation Haas EC-1600 HMC features a generous 64" x 50" x 32" work cube—10 more inches of Y-axis travel than before—as well as a 64" x 32" T-slot table and a powerful 6000 rpm, geared-head, 50-taper spindle. The fully enclosed machine includes multiple chip augers to evacuate chips and a flood coolant system with 95-gallon capacity.

For more information, please visit Haas Automation at www.HaasCNC.com.

▶ Hardinge Inc.

Hardinge Inc. recently introduced the GS 51 A Turning Center. This Automation machine is an addition to the GS 51 machine that was released in August of 2009. The GS 51 Turning Center features the Hardinge unique collet readyspindle to allow for better accuracy and surface finish. The GS 51 A with automatic gantry offers a unique compact design that harmoniously couples with the Hardinge GS 51 for easy installation and transportation.

For more information, please visit Hardinge Inc. at www.hardinge.com.



◀ Methods Machine Tools, Inc.

Methods Machine Tools, Inc., a supplier of innovative precision machine tools, has announced that they are the exclusive distributor of New VisionGauge® Digital Optical Comparators in North America. VisionGauge Digital Optical Comparators (patent pending), developed by VISIONx Inc. of Pointe-Claire, Quebec Canada, represent a breakthrough in noncontact comparative measuring technology. Methods will demonstrate, sell, distribute and support the comparators, which will be available at Methods Technology Centers and distributors.

For more information, please visit Methods Machine Tools and VisionGauge Digital Optical Comparators at www.methodsmachine.com.

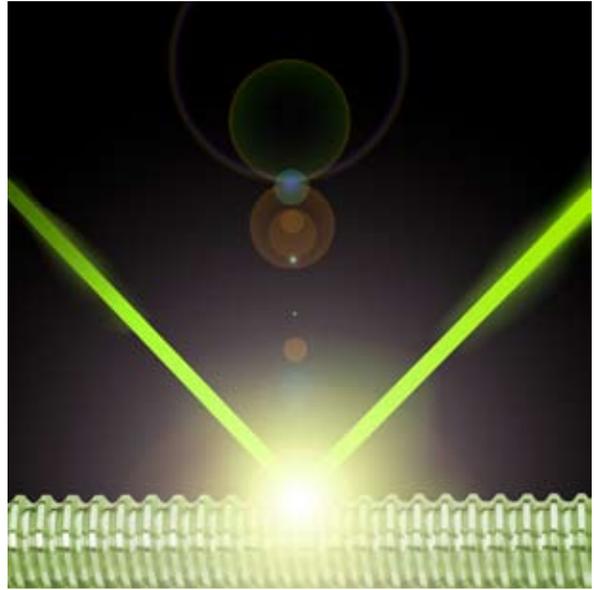


fresh stuff

► Nook Industries

Nook industries is a leading turnkey manufacturer of integrated linear motion components and has recently expanded its precision rolled ball screw quality verification and validation process measuring capabilities by implementing an advanced and customized Laser Lead Checking machine. The precision instrument's purpose is to verify the lead accuracy of precision ball screws to ensure a superior level of high precision tolerance consistency and quality in the production process. The screw's lead accuracy is measured by a laser beam at data points across a manually operated distance of up to 12 feet in order to "map the screw" and detect linear displacement.

For more information, please visit Nook Industries at www.nookindustries.com.



◀ Northfield Precision Instrument Corp.

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1" 6-spindle, 1985 (8), rebuilt
1" 8-spindle, 1980
1-3/8" 6-spindle, 1978
1-3/4" 6-spindle, 1965, 1984 (4)
1-3/4" 6-spindle 1984
1-3/4" 8-spindle, 1970
2-1/4" 6-spindle, 1962, 1973-79 (3)

ACME

1" RAN6 1970
1-1/4" RA6 1978-61 (9) - some
w/threading pickoff
7/16" RA6, 1975 & 1964
1-1/4" RB8, 1981, thdg., pickoff (2)
1-5/8" RBN8, 1979, thdg., pickoff (3)
1-5/8" RB8 thdg., pickup '68-72 (5)
2" RB6, 1967 & 1980
2" RB8, 1966 (2)
2-3/8" HSC chucker, gov't surplus
8" RPA8 chucker-as new
3-1/2" RB6, 1970

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ABC 60mm Index 1996
B60, 1985

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SWISS

Hanwha ML26H

Star SR20, 1999
Tornos Deco 26 2006
Citizen L-20, 1999

HYDROMATS & ROTARY TRANSFER

V12 Trunion (1990)
HW 25-12, 1985, 1994, 1997
HB45-16, 1989 - '97 chucker
36-100 Recess unit
Pro-20, 1998

EUBAMA

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S-8.1 1982

ESCOMATICS

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D6SR (2)
D-2, D-4, 1975

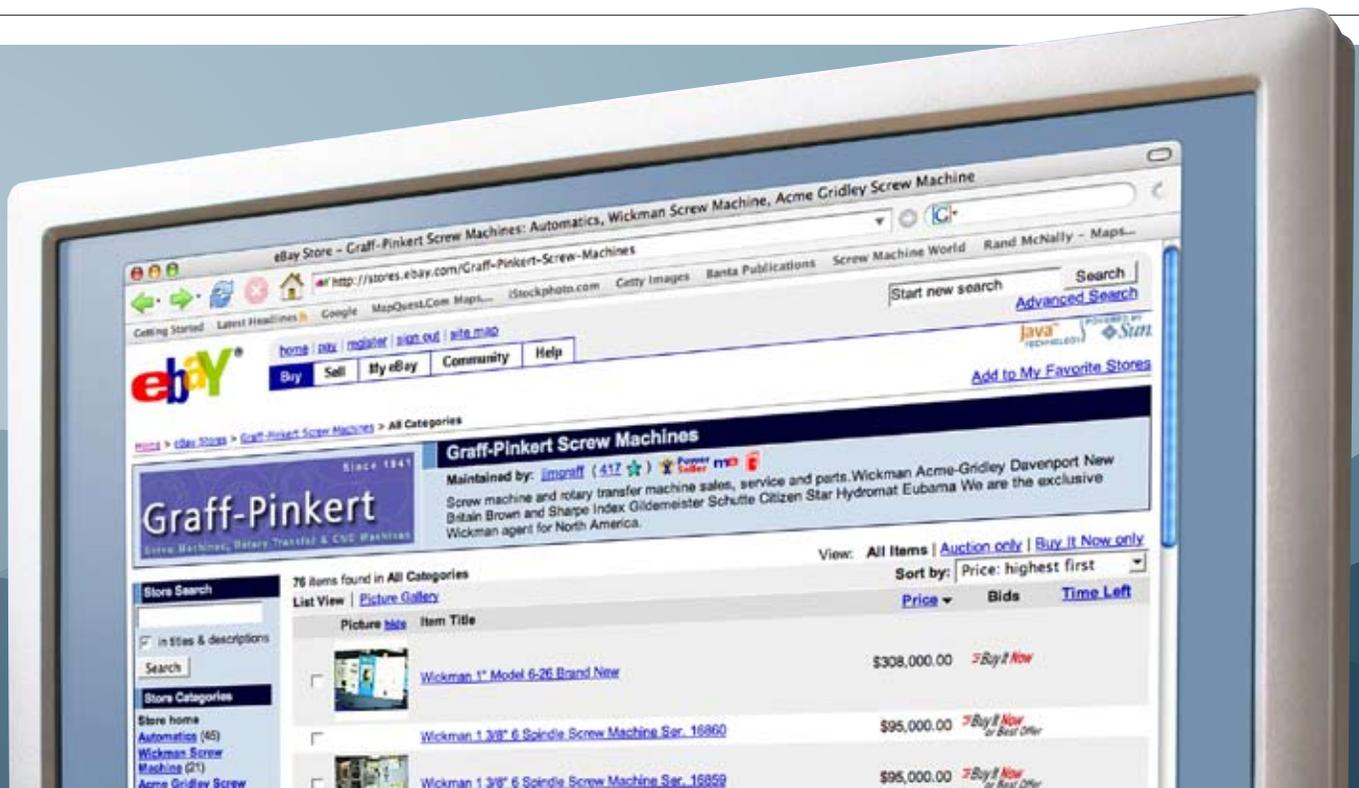
MISCELLANEOUS

Strausak CNC Tool & Cutter Spindle 1999

Cincinnati 107-4 centerless
2 5/8" RB6 spindle bearings
C-29 Index long turning
3-1/2 RB6 thdg. attachment
IMG recess 1-5/8" RB6 (2)
Hydromat recess unit and flange 36-100
Siemens varispeed motor off Wickman
Wickman thread chasing 5/8" - 3 1/4"
Every Wickman spare part
Haas VF3-2000
Okuma Crown, barfeed, 1999 (3)
Detroit Horizontal Broach-gov't surplus

WICKMAN AND INDEX

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If you're only reading "Swarf" in the magazine you're missing out! Every week, thousands of people log on to our Web site to read and comment on new articles on current interesting topics. Below are some recent comments from our "Swarfblog" readers at www.todaysmachiningworld.com.

Should Obama Go to IMTS?

Lloyd Graff blogged about the recently announced partnership between the Association for Manufacturing Technology (AMT) and the National Association of Manufacturers (NAM). He asked readers if they would welcome seeing President Obama come to IMTS.

Ken July 7, 2010 at 12:25 p.m.

NO! He would not know the difference between vertical machining and chrome muffler bearings. All he would do is find out more about manufacturing and use it against us.

Engineer July 12, 2010 at 5:33 p.m.

Of course he should if it is at all possible. That's not even a question. The idiots babbling here are the same type who complain that manufacturing doesn't get any visibility and good publicity with the general public, complain about the big bad government, but will jump at the first chance for a shot machining parts for a Recovery Act-supported job. They complain about foreign dumping but won't give the administration credit for pursuing it more aggressively, and complain nobody helps U.S. manufacturing, but won't say anything positive about someone who stopped the implosion of two of the U.S.'s largest domestic manufacturers, which would have further decimated large and small shops all over the country. Perhaps they'd like to return that brain surgeon W. to the White House. That worked out well, didn't it?

Are Women Taking Control of Everything?

June 8, Meg Whitman, former eBay CEO, won the Republican primary for governor of California, while that same day former Illinois Governor, Rod Blagojevich, began his corruption trial. Lloyd asked readers, "Do you prefer to be governed by the rich?"

Jackson June 11, 2010 at 10:05 a.m.

I do have to hand it to Blago on one thing, he tried to make the mo\$t of the \$ituation. But really... to compare a proven producer against a thug? I'd rather have the person leading us who grew a company making the tough business decisions daily than someone who plotted how to get his hair care products covered in his Governor's expense account.

Steve Baranyk June 11, 2010 at 4:09 p.m.

It is neither material wealth nor education that makes a person competent and honest with a deep respect for our Constitution and our Representative Democracy with all its flaws, it is the character of the person... Finally, our selection criteria should cause us to only elect to public office those who do not support either the Cubs or Da Bears (perennial losers that they are) but only those who know where to find a really good corned beef sandwich on rye at an affordable price.

The Human Instinct to Create

Noah Graff blogged about GM's new offer for buyers of a Corvette Zo6 or Zr1 to personally assemble their own car's engine for an extra \$5,800. He asked readers, "Is it human nature to create things?"

Buelldog July 14, 2010 at 1:34 p.m.

Mankind's ability to solve problems and express emotions in art is wonderful. Unfortunately, when it comes to creativity, not all humans are created equally. Some people are very creative, while others seem to have no ability or interest in creating. As far as paying \$5,800 to GM to allow me to assemble the engine for my new Vette, I believe I will pass this time. I think I'll probably need that money to help cover the cost of repairs when the security system components start failing. (—sarcasm alert—some of these statements related to GM may be dripping with sarcasm)



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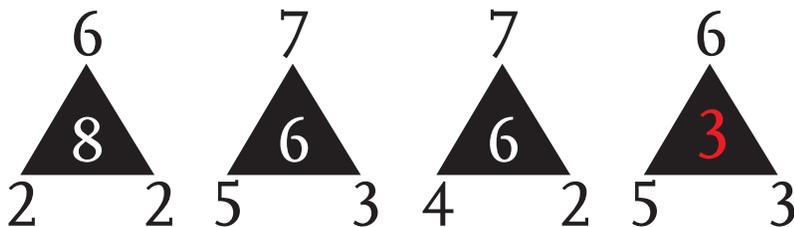
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think tank

Riddle

What is once in a minute,
twice in a moment,
and never in a thousand years?



Puzzle found in the June 2010 issue.

SOLUTION:

The top number minus the bottom left-hand number is multiplied by the bottom right-hand number to give the number inside the triangle.

Pattern Masters

Doug Whalen of Whalen Machine Inc. in Freeport, Ill.; **John Mandell** of Principal Point Technologies in Austin, Texas; **Kyle Hassen** of Machinery Source, LLC in Belvidere, Ill.; **Jerry Landman** of General Electrodynamics Corp. in Arlington, Texas; **Gene Wood** of Utility Solutions Inc. in Hickory, N.C.; **Herman Niekamp** of Niekamp Tool Co., Inc. in Kingston, N.Y.; **Bruce Renwick** of NAFCO in Loves Park, Ill.; **Cliff Dirksen** of Dirksen Screw Products Co. in Shelby Twp., Mich.; **Dan Horn** of Contour Wire EDM, Inc. in Elmhurst, Ill.; **Jeff Kovalenko** of Key Machine Tool Inc. in Elkhart, Ind.; **George L. Hernandez** of Kohler Co. in Malvern, Ariz.; **Elaine Moore** from Mount Prospect, Ill.; **Christopher J. Hetzer** of SKF/Gilman in Grafton, Wis.; **Marjorie Schuessler** of Dirt Road Mining Company in Borrego Springs, Cal.; **Mark Bos** of Robert Bosch Fuel Systems LLC in Kentwood, Mich.; **Lucien Peebles** of Peebles Machine in Stockton, N.J.; **Kellee Caputo** from Quail Run Elementary School in Phoenix, Ariz.; **Michael Merrill** of Swiss Automation in Barrington, Ill.; **Anton Lazaro** of Hardwood Line Mfg. in Chicago, Ill.; **Barry Halgrimson** of Wonderware Software in Salem, Oregon; **Larry Remaly** of Labern Machine Products in Branchburg, N.J.; **Rob Klancnik** of Universal-Automatic Corp. in Des Plaines, Ill.; **Lon Adamietz** of Bergmann Machine in Minneapolis, Minn.; **Jason S. Habib** of Hi-Tek Manufacturing, Inc. in Mason, Ohio; **Steve Richards** of Yamazen Inc.; **Philip D. Shaffer** of Milacron, LLC; **Jeff Riley** of Rawco Precision Manufacturing in Califon, N.J.; **Jack Steuby** of John J. Steuby Co. in St. Louis, Mo.; **Roselea Smith** of Smith Consulting in Burlington, Iowa; **Eric Sirois** of the University of Connecticut in Plainfield, Conn.; **Bob Cookson** of Cookden Industries in North Andover, Mass.; **Randy Grezenski** of Pointe Precision, Inc. in Plover Wis.; **Mike Witte** of W.B. Jones Spring Co., Inc. in Wilder, Ky.

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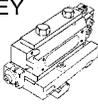
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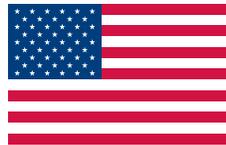
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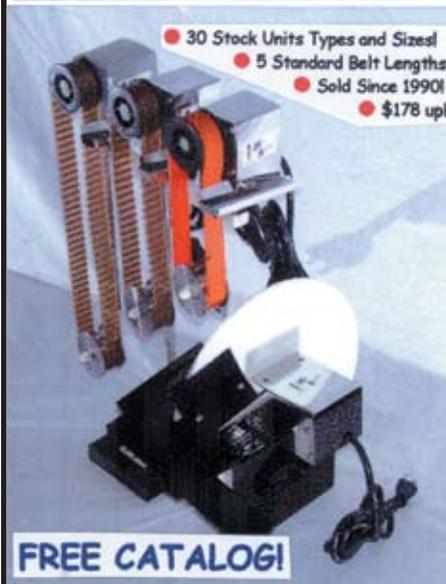
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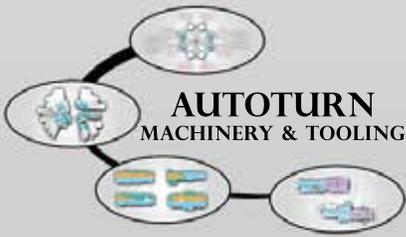
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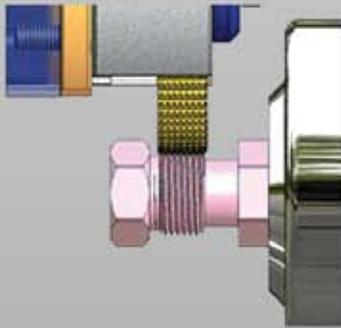
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afterthought

What We Do

The Budweiser radio commercial extols the virtue of beechwood aging and its beer's crisp, clean taste. Heaven knows what those revered adjectives mean. Bud's spot ended with a telling sentence, "It's what we do." That line meant something to me.

Budweiser was stating very clearly that brewing beer "is what we do," and I buy the premise—if not the product. Defining what we do is important.

Can you succinctly—in one pithy sentence—say, "I grow delicious potatoes," or "I make stainless steel," or "I fly a Boeing 737 for Southwest Airlines"?

In a sophisticated economy like America's, many of us have trouble devising a simple, declaratory sentence that explains what we do so clearly that we understand it, much less an uninitiated listener.

It's the cocktail party opener, the elevator speech, or the first sentence on the mortgage application.

But I think answering the question "what do you do?" for yourself is a deeper interrogatory that can bring clarity and momentum to a foggy, plodding career and even a floundering personal life.

For me, deflection, lack of focus, and drift are continual problems to deal with and often look away from. I've tried to do a lot of different things related to the machine tool industry, but my vexing conflict has been between creative deal making—buying and selling—and managing.

I have observed the people of the machining world joust with a similar conflict. Many people gravitate to the machining business because they love to make things. I remember my father telling me a vignette about Mr. William Simeon Davenport, the inventor of the Davenport screw machine. He was a brilliant inventor and tinkerer. He loved making machines but was lousy at running a business. The salient punch line of the story was that Mr. Davenport could make anything except money.

This is the story of so many terrific machinists who start companies out of the sheer joy of creating metal products more elegantly than anybody else ever had. They buy cool machines

that enhance their metalworking skills—but managing machinists, particularly those who lack their passion and skill—that is the rub.

If I were to ask a lot of folks in our business to tell me what they do, many would answer, "I machine perfect components." But if they own a shop that employs a number of people, they might fumble around before fabricating an answer.

I have complicated my own life story by starting *Today's Machining World*. I did it because I love writing, and I know a lot about the precision machining business because I have interacted with machining people for four decades. These days

“For me, deflection, lack of focus, and drift are continual problems to deal with and often look away from.”

I write several essays per week. It's what I do. But I also hustle ads occasionally, make personnel choices, crack the whip, and proofread. How I love commas and apostrophes.

So what do I do? I create machinery deals, I create a magazine, and oh yes, I run businesses that produce quality products that people buy.

The Busch family, who made beer for centuries, sold out to InBev, a Belgian-Brazilian alcoholic beverage conglomerate, in 2008. Do we accept beechwood aging or is it as dead as Ed McMahon? In the incredibly complicated world of international business "it's what we do" has little meaning. For InBev the answer is more accurately "we keep the stock price up."

But at the intensely human level of you and I trying to hold on to our personal and professional compasses, it is still a crucial issue that keeps us up at 3:00 a.m.

I like to pose questions—it's what I do.

Lloyd Graff

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