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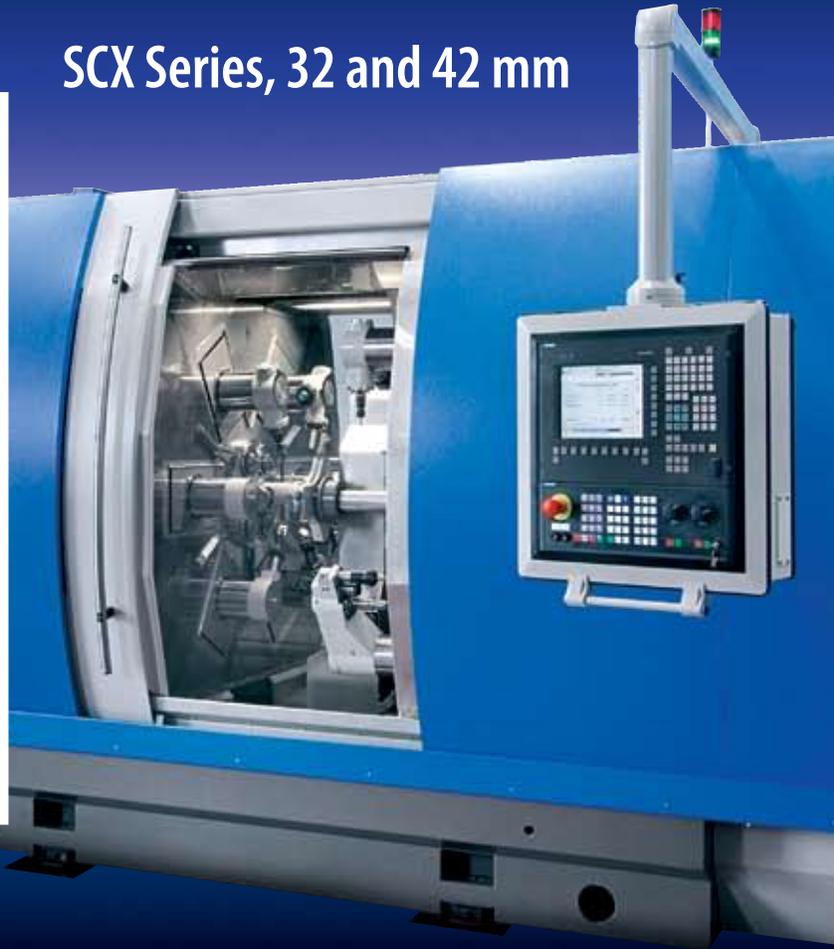
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in this issue



Today's Machining World

November/December 2010 volume 6 issue 9

26 Celebrating America's Love Affair with Machining

Although the American Precision Museum in Windsor, Vermont, displays mostly static relics from the glory days of machining, its contents also hold clues to what happened to America's dominance in industry. *by Alan R. Earls*

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Competing Successfully Using Older Equipment

Even if your machines are older, changes in your business strategy can keep you turning a profit. *by Barbara Donohue*

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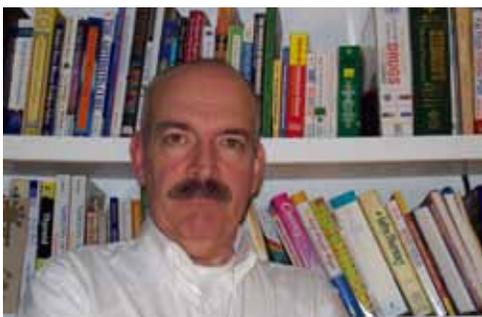
Lloyd Graff's journalism career began because of a failure. His high school baseball coach preferred another pitcher to start the majority of games, which Lloyd felt was a poor choice. He quit the team and went to work on the high school newspaper. Writing for the high school rag enabled Lloyd to write one of the highlight pieces of his career. In writing about a star basketball player for rival Glenwood Academy, Pat AKAKA, he described the player as a "greasy palindrome" because his name was the same spelled backwards and forwards. It may have been improper but it launched his journalistic career and laid the groundwork for future inappropriate descriptions in print.



Emily Aniakou has a Bachelors of Music from the Eastman School of Music, completed a year of service at an orphanage in Bangladesh, three years of training at a Zen Center, and most recently, a stint in the Peace Corps in Benin, West Africa. She recently adopted Penny, an exceptionally sweet four-year-old beagle, from All Breed Rescue and Adoption (ABRA) in Indiana. ABRA goes to dog auctions held for mass dog breeders to exchange wares in Missouri and Ohio and buys dogs that aren't bid on with pleasant demeanors to put up for adoption. Penny is transitioning beautifully from her former life as a dog-making machine living in a stack of wire cages to a house pet, and is a loyal and loving addition to the family. www.allbreed.webs.com



Barbara Donohue often writes the "How It Works" technology articles. An MIT-educated mechanical engineer, she changed careers to pursue journalism, marketing communications and tech writing about 20 years ago. In her off hours, she and her registered therapy dog, Luke, visit patients at a federal prison hospital. Barbara and Luke have previously volunteered with hospice and are currently in training as a reading-dog team with their local public library. (Kids who have trouble reading often find it easier to read to a dog than to a person.)



Alan R. Earls acquired a passion for gizmos from his father, a mechanical engineer. He is particularly fond of the technology back-stories that illuminate how change occurs and what it means. His articles have been published in daily newspapers, consumer periodicals and specialty publications, and he is the author or co-author of several books about technology history including, *Watertown Arsenal*, *Route 128 and the Birth of the Age of High Tech*, and *Raytheon Company: The First 60 Years*. Prior to beginning his writing career, Alan worked in a number of manufacturing positions in industry, gaining first-hand knowledge of machining processes and other manufacturing activities. He has also worked as a technical writer on missile and radar systems and is a licensed amateur radio operator.



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editor's note

Happy Again

Changing mindsets is essential to making us human. We normally develop expectations and then try to fit events and experiences into the mental molds we have machined into our brains.

For people in our line of work, the past several years, probably the whole decade, has been a zigzag of financial turmoil. The trend has been negative with huge structured change forced by the rise of China as a manufacturing goliath, to the detriment of domestic manufacturing. We may sugarcoat the reality in the trade press to make ourselves and our readers and advertisers feel rosier, but the enduring pain of angina in the heart of American manufacturing is undeniable.

Despite this, I have a sense that the decade of our discontent is ending now. Perhaps the IPO of General Motors this November was the signal of the resurgence of North American manufacturing. The mockers will pooh-pooh the Chevy Volt and the innovators of the X-Prize competition who are making a 100-mile per gallon production car, but these things are a big deal. MPG increases are going to be the big impetus for people to re-enter the new car buying market.

In this issue of *Today's Machining World* we have a piece about the American Precision Museum in Winsdor, Vermont. In its day the Precision Valley in Vermont was the Silicon Valley of its time. I see a comparable revolution in medical technology and robotics in the coming decade as American ingenuity and manufacturing push the envelope. The United States, for better or worse, is the leader in military manufacturing. As the world moves into an era of robotic warfare and drone reconnaissance America will dominate the field.

It is time to shed the negative mindset stemming from the decade of shrinkage. I've decided to get happy again.

Lloyd Graff
Editor/Owner

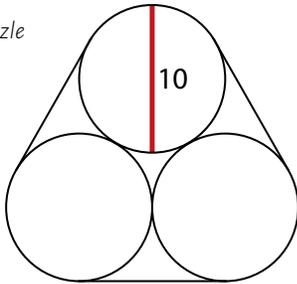
editor's note



Think Tank Competition on the Floor

Below are three proposed solutions to October's "Think Tank" challenge from three gentlemen at Conquest Machine in Las Cruces, N.M. They asked me to send them the answer immediately so their debate over who was correct could be put to rest.

Puzzle



How long is the rubber band?

Correct Answer

The straight lines are 10 cm x 3 cm.

All the curves will be exactly the circumference of a circle, which is $2 \times 5 \times 3.14159 = 31.4159$ cm.

Thus the total length is 61.4159 cm.

Proposed Answers:

Michael Blea: 66.27 cm (used CAD program)

Greg Coker: 64.135 cm (but wants to submit 65.00 cm) (drew actual problem and used a string)

Lee St. James: Answer 61.416 cm (50-year-old machinist manual and a calculator)

Winner

The 50-year-old machinist manual and a calculator!

A Space Fantasy

I always enjoy your magazine's wide spectrum of interesting subjects and voyages to places beyond traditional. The article in your October issue, "Manufacturing in Space" by Douglas Graham, is more like a voyage into a fantasyland. The article is an echo from Space Manufacturing 14, a gathering in California a few weeks back of XCOR and NASA PR people and university staffers who acted as snake oil salesmen and believers in miracles.

Shamelessly, the organization that organized this event, Space Studies Institute (SSI), and the presenters rolled truths, half-truths and fantasies into one marketable portfolio in hope of continuing government subsidies. The truth about return on investment from space manufacturing is more like a pipedream

that will never materialize. Outer space is not an ideal vacuum chamber but an extremely dangerous area filled with a myriad of solid and gaseous particles and extreme radiation. Forget about manufacturing out there, even continuous biological life similar to that on earth is impossible.

In reality, the whole article is nothing more than a typical Sci-Fi story. It is always important to have life leading targets, especially ones that are chosen for good of humanity. But the shameless sale of empty fantasies for the sake of squeezing money out of the skinny U.S. budget is immoral.

If readers of your magazine would like to find the real history about U.S. space exploration, I would suggest the book by Neil Sheehan, *A Fiery Peace in a Cold War*.

Val Parker
Parker Design Co.
Pittsford, N.Y.

The True Cost of Wire EDM

I wanted to comment on the "How It Works" article about Wire EDM in the October issue. I have been running wire EDMs since 1976 six to seven days a week. I have owned my own shop since 1983 and have owned and operated 34 different wire EDMs from five different manufacturers in the last 27 years. So I feel somewhat qualified to comment on some of the facts in the article.

On page 21, in the section, "Bringing wire EDM in house," the author states, "When shop management discovers it costs only \$5.00-\$6.00 per hour to run wire EDM they often quit outsourcing."

I have to take exception to that comment because it sounds like it came from a wire EDM salesman. Our machines cost anywhere from \$250,000-\$300,000 each and our wire costs alone run upwards of \$5.00-\$8.00 per hour. The author's source of information, Mr. Bond, neglected to mention the cost of the machine, insurance, rent, salaries, power and consumables like belts, guides, DI resin, etc.

In my opinion these comments severely understate the cost of owning, running and maintaining one of these machines. My current shop rate is anywhere from \$75.00-\$100.00 per hour. I hope none of my customers read this piece and misunderstand these misleading comments from Mr. Bond.

Mark Robinson, President
Microform Corporation
Auburn, Wash.

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

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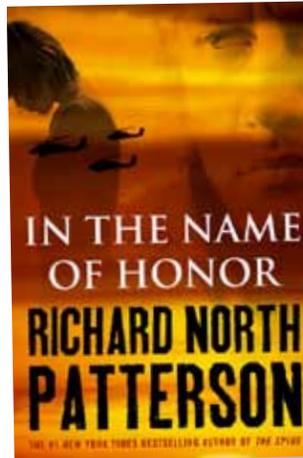
BY LLOYD GRAFF

In the Name of Honor

Richard North Patterson is one of my favorite authors, though I often find his novels hard to finish. He doesn't just write a story, though he is a wonderful story builder and teller. He lays out a problem—one that has no easy answer—and then illuminates it from several points of view.

He doesn't make it easy for the reader. He challenges the reader with a variety of logical yet conflicting views. *In the Name of Honor*, his most recent book, plumbs the knotty issue of the court martial of a decorated soldier who kills his former commanding officer, the husband of his lifelong friend and now lover, after both the men have come back emotionally scarred from tours in Iraq.

The salient issue that Patterson elegantly dissects in *In the Name of Honor* is whether post-traumatic stress disorder (PTSD) is a persuasive defense in a murder case. Patterson depicts confessed killer Brian McCarron as the "straight arrow" son of military heroes, brought up in a world of expected military service. Brian had been wounded early in life by the suicide of his mother and the "respect-hate" relationship with his war hero father, General Andrew



sister Meg, is determined to learn the truth about the case and mount the most effective defense possible. The defendant is often unhelpful in his own defense and is thought to be fragile and suicidal by his sister. He is surprisingly indifferent to the upcoming verdict. We see a combination of combat trauma, the influence of living with the military family's "code of honor" and his love of Kate, the woman he grew up with as almost a sister.

Joe DiBruzzi is Kate's abusive husband who continually sent Brian into enormously dangerous missions in Baghdad that had no strategic benefit. The author plays with the reader's sensibilities, painting DiBruzzi as both a monster and a victim.

Defense lawyer, Terry, unlocks the mystery of the twisted McCarron family story while falling for Brian's sad but manipulative sister, Meg. Terry employs the combat stress disorder defense very skillfully while the prosecutor, Flynn, pushes the case of lover's jealousy. The McCarrons are a messy family, which while engrossing, confuses the issue of whether a soldier who is emotionally damaged by experiences at war is still ultimately liable for his violent behavior against another soldier who is also experiencing guilt about his war conduct.

People of my generation still battle the demons of the Vietnam War. The 10

years of war in Iraq and Afghanistan have left a terrible residue of PTSD along with the bullet and roadside bomb maimings. I have to believe almost every person who went to the front has some emotional damage.

In the Name of Honor gives insight into the pain that lingers long after the warrior comes home. It also gives one a feel for the hard lives of military families. 

“ In the dream, he was thirteen, the age at which the image had first come to him. His father had just died; reappearing in Paul's sleep. Frank Terry assured his son that he was fine, just living in a different place. ”

-In the Name of Honor

McCarron, who arranges for Paul Terry, a superb defense lawyer about to leave the military, to defend him.

Patterson never panders to his audience. He really makes the reader work to see dozens of nuances in the case. While the Prosecutor attempts to make it a black and white case of a love triangle turned murderous, defense lawyer Terry, abetted by defendant Brian's amorous, protective and manipulative

Comments? You can email Lloyd Graff at lloydgrafftmw@yahoo.com

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The Gorbachev of GM

With GM going public and bringing back billions to the taxpayers, we are seeing a batch of revisionist opinion pieces about Rick Wagoner, former head of the auto giant.

Malcolm Gladwell, a favorite writer of mine, wrote a fascinating review of Steven Rattner's new book, *Overhaul*, about the restructuring of GM for the Obama Administration. Rattner is a Wall Street mover and shaker who headed the restructuring in Detroit. Rattner saw Wagoner as a bureaucratic company guy and ultimately fired him, bringing in crusty Ed Whitacre to oversee the saving of a big part of the American auto industry.

Gladwell sees Wagoner as the guy who did most of the heavy lifting—chopping people, making a historic deal with the UAW, building a Chinese business, developing the Cadillac CTS and Chevy Malibu, and initiating the Chevy Volt.

Holman Jenkins of the *Wall Street Journal* also wrote a laudatory ode to Big Rick, former bench warmer for Duke basketball.

I see Wagoner as the Gorbachev of General Motors. He was an important transitional figure who understood the company's problems and tried his best to save the company without blowing it up.

Like Gorby, he had to go when everything imploded. Rattner is no Yeltsin, but the oligarchs of Wall Street will make billions like their counterparts in Russia did after the fall.



We are seeing an acceleration of year-end buying in machinery for both new and used equipment. One reason for this is the widespread business expectation that prices for new machine tool inventory ordered from Japan will reflect the 25 percent drop in the past year of the value of the U.S. dollar versus the Japanese yen.

The Japanese importers generally erred on the conservative side when 2010 orders were placed, which means the cupboards are now relatively bare. I'm hearing that 10 percent to 13 percent price increases are coming on Japanese built equipment, indicating that the builders hedged the yen or they just don't think the American market will accept whopping increases in one gulp.

If we continue to see yen versus dollar in the current range of 80-85 it would not be surprising to see DMG/Mori Seiki USA bite the bullet and build a plant, probably in Davis, California. Other builders could follow suit if they see North America as a growth market.

Nevertheless, we Americans are so ethnocentric we still see ourselves as everybody else's primary focus. As President Obama learned at the G-20 meeting; China, India, Brazil, Korea and Southeast Asia are where the growth is if you are a world player.

With Japanese machine tool builders still recovering from an almost catastrophic 2009 they may be reluctant to invest big in a North American market with slow growth, a weakening currency, and an old workforce that is not being renewed by well organized worker training nor liberal immigration policies.

So in the foreseeable future, swallow hard, and pay the price if you want to expand.

The mood has changed in the precision machining world. It became real to me as I talked to folks at the Asset Sales auction at Caire Medical in Indianapolis on November 4th. There was an 18 percent buyer's premium tacked onto the bid prices. The equipment was superb and the bidding was spirited.

The hottest piece in the sale was a Citizen M32 Type V, new in 2007, with a FMB barloader. The bid price was \$262,500 plus 18 percent, taking it over \$300,000. There were (2) M32 Type III machines (new in 2003) which fetched \$160,000 and \$140,000 plus BP. An A-16 VIP Citizen (new in 2006) sold for \$50,000 plus BP.

Two Mori Seiki vertical machining centers (new in 2007) fetched \$73,000 each. A similar machine in Seattle three months before brought 65K. A nine-year-old Tsugami 10 pallet vertical machining center brought \$140,000. A Nakamura TW-20, (new in 1992) fetched \$95,000, and a similar machine (new in 1995)

brought \$65,000—don't know why the difference.

I talked to a lot of people at the sale and a recurring theme was "business is good and I want to get the year end tax break."

Citizen and Nakamura tooling and accessories were also keenly bid on. One Citizen lot of tooling fetched \$9,000. This was particularly interesting because conventional CAT 40 machining center holders brought modest prices.

What I gleaned from this sale is that "cream" machinery is escalating rapidly in price because of strong demand and the desire of successful entrepreneurs to capitalize on the raised expensing tax break in 2010.

The people of the machining world seem happy again. They have a bit of visibility about orders. Washington has been neutered. Tax breaks are out there to shield income. Free cash flow is increasing. The dollar is weak and interest rates are low.

The banks may be Scroogy, but just about everything else looks good. I see people rushing to get the last of the 2009 bust bargains, and since there are very few left they are willing to push up the price of used machinery to get the expensing tax goodie if they buy before the end of the year.

I can't back this conclusion up with statistics, but if you are slugging it out in the market everyday like I am you can feel it. The iron gets a life of its own. It morphs from cold casting to artistic sculpture and then into a gold and green life form. We are passing through one of those rare passages at the moment, and I am living in the present and loving it.

For used machinery dealers who are prepared to "detrashify" the ugly refugee machines emerging from the automotive flotsam being pushed into the market, 2011 stands to be a good year.

For example, Hilco and Maynards auctioneering firms are now selling off multiple GM, Ford, and Chrysler plants with thousands of motley machines. Machines like Twin Grip Cincinnati centerless grinders and 8-spindle National Acme screw machines are being sold for near scrap prices.

These are rugged machines that have been abused by indifferent operators and mindless management, but they are so durable that they can be brought back to life by skilled rebuilders.

For buyers who have long running jobs, often supplying the now healthy automotive companies, these machines have value if they are brought back to almost new condition. When compared to European or Japanese competition they are viable if the versatility of CNC is not a major factor, because they are running dedicated jobs.

Add in automation and robotics and the old “trash” machines become virtually equal to new.

The scarcity of skilled rebuilders means that those few players in the “detrashifying” game have a chance to make 2011 a big year.

I was talking to Greg Knight of AMT Machine Systems (ServoCam), whose company adapts old school cam Brown & Sharps into 21st century CNC hybrids. He was lamenting the difficulty he has selling his product to job shop owners who have no visibility of work from one month to the next. The days of consistent long-running contracts seem to have vanished like untaxed cigarettes.

In the used machinery business, and I’m guessing also in the new machinery business, we live with future blindness. Projec-

tions are difficult, which drives accountants and bankers mad, but they probably deserve it. Business people crave the myth of being in control. They think they deserve an accurate vision of the future. And now we must live with the blank order sheet and wait for the sketchy buyers to call or email their requests for parts in a week. “Sure,” you say obediently, and immediately order material for next day delivery. Welcome to the new normal.

Every time I proclaim that I do not pray at the “Temple of Lean” I am chastised as a manufacturing heretic. But in a sloppy, erratic, fog shrouded world, “lean” is a dream lived fully only in the predictable world of government contracts, lubricated by friendly politicians from “safe districts,” a rarity in our blindfolded world.

The Chinese want to sell the Europeans,

Japanese, and us the coolest high-speed trains in the world, but the train makers in Paris and Tokyo, whose technology the Chinese have stolen, are not smiling. The technology being used on the new bullet trains connecting Shanghai and Beijing is the best that money can buy, and the Chinese paid retail for it by purchasing trains from the best train makers in the world and copying it.

Now they have tweaked it and want to sell the trains directly against the people who sold the technology to them.

The Chinese don’t really deny their disrespect for intellectual property. The idea does not really translate in Chinese culture. Recently Honda decided to make their most advanced battery cars in China in exchange for clear access to the biggest potential car market in the world. Toyota declined. The trade is clear—access to an enormous market in exchange for theft of intellectual capital.

It is easy to criticize the Chinese for their thinking, but I’m not sure it’s completely fair. Honda knows what it’s doing. The managers at Honda must be betting that by the time the Chinese carmakers figure out how to copy their battery technology they will have developed a better mousetrap at HQ.

The train makers who are proclaiming “they are shocked, just shocked” about the Chinese actions are crying wolf. If you sell your stuff to China, you better be working hard on your next generation product.

On the day Apple reported that 14 million iPhones and over 4.2 million iPads had been sold, economist Nicholas Colas was discussing more obscure but equally interesting data on CNBC.

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First time gun sales have been rising over the last three months though ammunition sales are flat. People are buying guns, but not spending a lot of dough at the range. He found this info by monitoring FBI background checks.

Gold coin sales have leveled off over the past six months, but silver coin sales have been soaring. His guess is that gold's high cost has pushed people's fear of paper money debasement into the less expensive silver.

Food stamp usage is rising monthly as are the Google searches on how to apply for them.

Used car prices are steady, with demand growth stagnant and supply fairly constant.

These are all indicators, according to Colas, of weak consumer demand and a lot of fear in the population.

I am truly saddened

that the 2010 political advertising season has ended. The light these poisoned snipings shed on the candidates really needs to spread to the dull world of products like cars, which still feature zoom, zoom, zoom, motherhood, and apple pie to sell vehicles.

If Ford and Toyota were political candidates they would probably try something like this:

Ford-

"My Japanese opponent makes shoddy products that kill people. Ten million cars were so defective they were forced into repair facilities to prevent further carnage. This company lied to you when they sold you cars. It's signature model, Prius, means "junk" in Navajo."

Toyota-

My so-called American competitor, Ford, really makes its cars in foreign countries like Mexico and Canada and then pretends they are American. The founder

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of Ford, Henry Ford, great grandfather of the chairman, was a bigot and Hitler sympathizer.

The company is eliminating Mercury from its line, and sources indicate that the Focus and Fusion might be pulled in 2012."

It's a pity that the robocalls for politicians have been replaced by pleasant telemarketers for the symphony. Hopefully we can get down to the serious business of companies slandering their competition.

We just celebrated Thanksgiving, watched the NFL, sopped our dressing, and tried to sleep with reflux. But 10,000 miles away thousands of American men and women are trying to stay alive in Afghanistan.

Tell me, why?

We are propping up a corrupt Karzai government, playing ball with a Pakistan that harbors Al Qaeda, and inflating our monstrous budget deficit, to accomplish what?

I don't care if you are a lefty or a righty, counting the caskets of young Americans dying in the hundred-year quagmire called Afghanistan is ridiculous. Thirty years ago the Russians lost a generation of kids while we supported the Mujahedin, which spawned a Bin Laden. Tell me why it makes sense for Americans to emulate the Russian experience.

Afghans do one thing brilliantly—kill each other. It's their national sport or religion, or both.

If we have to indulge our own blood lust, buy 5,000 more Predator drones and play remote control war against the Taliban and Al Qaeda, but take the soldiers out of the field and away from

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the hideous roadside bombs.

I am grateful to our brave soldiers for their sacrifice to country, but I am sick of politicians sending kids out to be killed in another meaningless war we cannot win. Hell, we don't even know who's on our team.

For the last nine years I have bought the best dried apricots in the world from Gibson Farms of Hollister, California. I met one of the owners, Mr. Gilbert Gibson, at the Palo Alto Farmer's Market and we have become business friends. He asks me about my family; I ask him about the crop. He suggests I buy some walnuts; I usually just want the sweetest dried apricots I've ever tasted.

I always seem to run out of this perfect treat before my trips to the Bay Area, so I order them. No Web site. Just call the house and some nice lady will say, "What can I get for you, hon?" She'll take the order and say, "We'll ship Wednesday, I know your address." Credit cards are not taken. I once asked Gilbert Gibson how often he had been stiffed. He said, "Never."

When I get the Gibson apricots, and the enclosed bill I pay it immediately. He trusts me so I would never sit on the invoice like I might with Comcast or ComEd. How could I look him in the eye at the Market if I neglected his invoice?

I know piece parts aren't apricots and Ford isn't Snow White, but wouldn't it be nice? 

Detroit Automatic

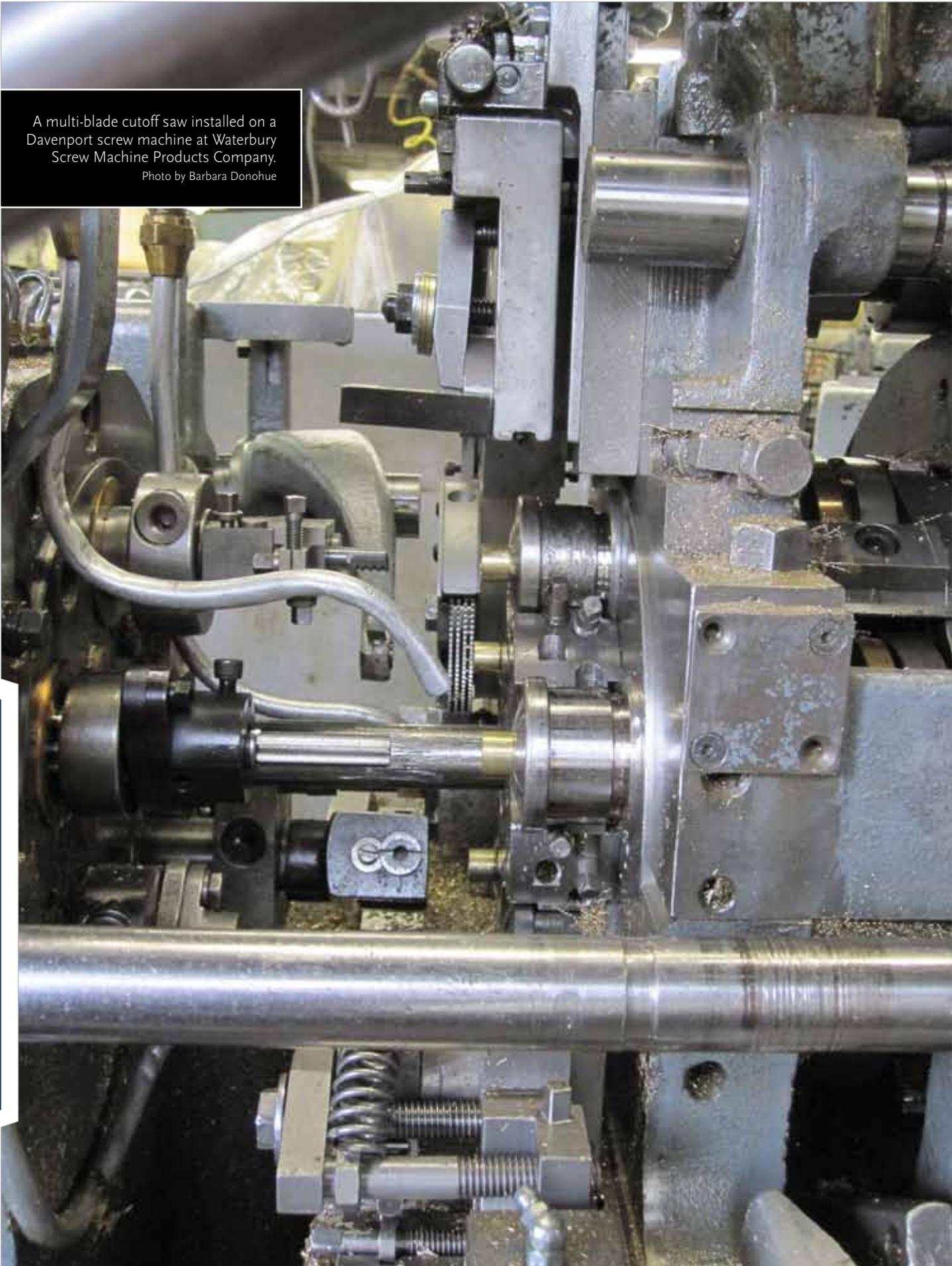
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A multi-blade cutoff saw installed on a Davenport screw machine at Waterbury Screw Machine Products Company.
Photo by Barbara Donohue



using older equipment

Competing Successfully Using Older Equipment

You can do a lot with what you have—and that doesn't mean just your machines.

In these tough economic times you're no doubt looking at how to bring in new business and increase revenue. As customers push hard for faster deliveries and lower prices, and move toward sending work offshore, what can you do to compete? Buying new machines may not be feasible, so what can you do to increase orders and raise productivity with your existing machines, without spending a lot of money?

Revival of a screw machine house

"We are not giving up on the industry," said Matt Corcoran, president of Waterbury Screw Machine Products Company, Waterbury, Conn. "Rather, we're focusing on what we've got here."

A year and a half ago, Waterbury Screw Machine Products was definitely feeling the effects of the recession. In business since 1938, the company has been led by third-generation owner Corcoran since 1988. The shop, in the same location for many years, runs cam-type, single- and multispindle screw machines: Davenport, Acme-Gridley, Brown & Sharpe. "Nothing is computerized," said vice president Charlie Smith. The company makes products mainly for the electrical switch industry—lots of toggles, nuts and other small parts, primarily in brass. Surprisingly, 90 percent of their production is used in Mexico and Costa Rica, Corcoran said.

Smith, also a third-generation machinist, joined the company a year and a half ago. Since then, he and Corcoran have figured out how to breathe new life into the business and have seen revenue increase by a factor of two and a half.

The changes they made could work for many shops that are feeling the pinch.

The right people

Corcoran and Smith restructured their personnel, building a workforce willing to work, pitch in, cross train on different machines, and stay positive. When the setup person for the 1 1/4" National Acme multi-spindle became seriously ill, Smith learned how to set it up. Then they made sure someone else learned. "The guy with 20 years on a

Brown & Sharpe can train to be an Acme setup guy," Smith said. "It used to be 'my machine.'" Not any more.

"They've got to have a sense of urgency: 'We've got to get that machine back up,'" Smith said.

"We hire on attitude," Corcoran said.

As sales have grown, the company has been able to hire, going from 24 or 25 employees to 43. "We're providing good-paying manufacturing jobs in a down economy," Corcoran said.

"We go on three principles," Corcoran said. "We pay a fair wage, we provide good health benefits, and we understand that life doesn't revolve around work." Workers go to their kids' games, for example, as long as they don't abuse the privilege.

Stretch to meet the market

"We quoted parts that we previously wouldn't have because they were too difficult," Corcoran said. Now they can quote thin-walled parts, long parts, and different materials like steel and stainless steel in addition to the brass and aluminum they have traditionally machined.

"We run big or small orders," Corcoran said. How small and how big? "From 50 or 100 parts, up to 9 million," Smith said.

Tweak your process

Engineering the processes has cut cycle times. Smith pointed to a Davenport making small brass parts. This part went from a cycle time of 2 seconds to half a second. How? It had been using a steel-threading method, he said, so changing to a brass-threading method saved time. Also, he reduced the drilling time by half using a rotating drill instead of a fixed one.

A thin nut made on a Davenport is now machined four at a time, connected end-to-end. Then a multi-blade cutoff saw separates them—so four parts fall per cycle. "If you can go from 1000 parts per hour to 4000, why not?" said Smith.

For flexibility, they plan tooling so a job can run on different machines. For example, one part runs on an Acme

how it works



Left: Cranking out product at Waterbury Screw Machine Products.

Photo by Barbara Donohue

Old machines still at it

Across the country in Northern California, Tim Haendle, owner of Timson's Screw Products, Willits, Cal., since 1975, also has a "quote-everything" attitude. "We don't turn anything down," he said. "We do the tough stuff. That keeps us alive."

"We do everything—centerless grinding, thread rolling, milling." His number one customer makes air brakes for heavy trucks. Other customers come from the aircraft and valve industries.

Haendle runs 20 Acme multi-spindles and some Brown & Sharpe screw machines. The capacity range is from 7/16" to 6" stock. "We use the Acmes for taking material off," he said. "We basically use our CNCs for finishing work."

"Learn to run your old machines," Haendle said. "There's nothing wrong with them." He talked about a 1 1/4" diameter aluminum part he makes for the gas valve industry. In 14 or 15 operations it's hexed, slotted and thread-rolled. "We're talking a 10-second part, complete."

A friend of his was taking a CNC machining class at the local community college, Haendle said. He gave the friend a complex brake system part he makes on a screw machine in 12 seconds. The friend showed the part to the CNC teacher who looked it over and said it would take two minutes to make—10 times as long.

"They've never proved to me they can make parts any faster," Haendle said.

Haendle recently paid \$499 on eBay for a used six-inch 6-spindle Acme from an East-coast bearing factory that was moving out of the country. One of his customers helped him find shipping for it that didn't break the bank.

"I started with old machines and still have old machines. There are 60- and 70-year-old machines still putting out product," Haendle said.

Fixer-upper

Richard J. Marsek, president, Maintenance Service Corp. (MSC), Milwaukee, Wis., a rebuilder of large machine tools, has a rule of thumb: "Any machine that costs less than \$400,000 new is not a candidate for a major rebuild, nor is any machine [whose rebuild] would cost more than 60 percent of the cost of a new machine."

However, your machine might not need a total rebuild. "Money is needlessly spent on a total rebuild or buying new

multi-spindle for large quantities and on a Brown & Sharpe for small quantities.

They look hard at machine setup time. On one machine, they got setup down to three or four hours, instead of two or three days, Smith said. He's looking into using preset, datum-based tooling to help streamline the changeover process.

Up in the office, they're bringing in software to help with scheduling.

Partner with customers

Waterbury Screw Machine Products is working more closely than ever with customers. Corcoran and Smith carry a BlackBerry or iPhone in order to be available to customers around the clock. They make sure to stay in touch and spend face time with the customer when possible. Recently, Smith attended a customer's four-day training session in Pittsburgh. Corcoran and Smith visit customers and customers visit them.

Partner with suppliers

They also pay suppliers promptly and work with them to maximize mutual advantage. For example, the company gives its tool business to LCM Tool, Waterbury, Conn., and LCM provides priority service, including one-day turnaround when needed.

Plating? "I've never seen parts plated so fast," Smith said. For rush jobs he can get one-day turnaround as a preferred customer.

Metal is arriving all the time. The shop uses 25,000 to 35,000 pounds of brass per week, 2,000 pounds of aluminum and 2,000 pounds of steel. "We pay in 10 days," Smith said.

By making the rest of their business strong, Corcoran and Smith pave the way for the machines to do what they're capable of.



when only part of the machine is a problem,” Marsek said. “What is cost effective is attacking the problem areas of a machine.”

Specific issues will point to problems. Tolerances going out in a certain place show where the ball screws or ways are worn, for example. “If you have a problem with a clutch, we’ll find that. Noise? We put a quiet hydraulic pump in. We do smaller chunks and see if it solves the problem,” said Marsek. “You can spend \$50,000 to fix the machine, instead of \$500,000.”

Marsek has seen old-style machines used in very up-to-date applications. One customer in the nuclear industry had MSC rebuild a number of manual milling machines. The customer uses duplex milling heads to remove large amounts of material from two sides of the workpieces. “They are making high-end nuclear components on [machines] folks would laugh at,” Marsek said.

CNC for Brownies

Retrofitting older machines with a CNC control can be a cost-efficient option too. AMT Machine Systems, Columbus, Ohio, has CNC retrofits for Brown & Sharpe Ultramatic #2 or #3 screw machines. The CNC controls allow faster setup and operation.

AMT’s ServoCam UltraSlide provides CNC actuation of the turret slide, precisely synchronized to the existing camshaft. According to Greg Knight, vice president for machine tools at AMT, this provides a typical increase in productivity of 40 percent. ServoCam UltraTurn CL replaces all cams with CNC actuation and provides a servomotor spindle drive for speed control and indexing.

New CNC option for old-style Hydromats

Until the 1990s, Hydromat rotary transfer machines were, as the name implies, operated hydraulically. The company changed to a CNC format in the 1990s, said Kevin Shults, director of marketing at Hydromat, Inc., St. Louis, Mo. You couldn’t retrofit CNC on a hydraulic machine until recently when Hydromat introduced RS and SS controls.

Left: Cincinnati 3-spindle gantry style machine with new MSC/SKF spindles and Fanuc control.

Photo courtesy of Maintenance Service Corp.

Above: Hydromat Epic SS, installed.

Photo courtesy of Hydromat, Inc.

The Epic RS controls up to three Epic toolspindles on one Hydromat machine, or a number of toolspindles on several machines. The retrofit includes a tablet computer with programming software installed. You program on the tablet computer and then upload the programs onto the toolspindle modules. The Epic SS provides control for up to six Epic toolspindles on one Hydromat machine.

Machines, but more

Yes, you may be running older machines, and maybe you wish you could replace them all. But even if that’s not in the cards right now you can still make the most of what you’ve got and keep the orders coming in and the parts going out. Some general principles can help:

- Make sure you have staff that is willing to work and think.
- Stretch the kind of work you’re willing to do.
- Partner with customers and suppliers.
- Continually improve your processes.
- Update, rebuild or repair equipment as needed.

You’re in the machining business, but there is a lot more to it than just the machines. 

For more information:

AMT Machine Systems: www.amtsys.com

Hydromat, Inc.: www.hydromat.com

LCM Tool Co.: www.lcmtool.com

Maintenance Service Corp.: www.msccservice.com

Timson’s Screw Products: 707-459-6728

Waterbury Screw Machine Products Co.: www.wsmpco.com



◀ DMG/Mori Seiki USA

DMG/Mori Seiki USA's new DMU 50 eco machine is designed to be the ideal 5-axis machine tool for low-cost, high-quality parts machining with a shortened delivery time. This next-generation standard machine reduces cost by also reducing fixturing and setup time while improving accuracy. Offering excellent cost performance, the DMU 50 eco is especially advantageous for users who are introducing 5-axis machining to their manufacturing process for the first time. Equipped with the same configuration as the DMG DMU 50, the DMU 50 eco has all basic functions necessary for indexing 5-axis machining.

For more information, please contact DMG/Mori Seiki USA at 847-593-5400 or visit www.dmgmorseikiusa.com.

▶ EXAIR

Exair's new 30-Gallon Chip Vac picks up chips and delivers them to an ordinary 30 gallon drum. It can be moved from drum to drum easily to keep different materials separate for recycling. It is used to clean chips from fixtures, floors and work surfaces of machining centers, lathes, saws, mills and other industrial equipment. The compressed air powered Chip Vac creates a powerful direct flow action that effectively moves metal, wood or plastic chips into the user's 30 gallon drum. Dusty materials such as absorbents are trapped by the 0.1 micron filter bag to keep the surrounding air clean. No motors to clog or wear out assures long life with virtually no maintenance. The Chip Vac is covered by a five year warranty.

For more information, please contact Exair Corporation at 800-903-9247 or visit www.exair.com.



◀ FANUC FA America

FANUC FA America introduces a full range of complete laser bundles in the new Laser C series, which pairs a full FANUC laser source with a new FANUC L series (laser) CNC control system. The new FANUC laser bundles are complete, fully integrated laser solutions and include FANUC laser source, FANUC CNC laser control, amplifiers and servo motors that are designed to optimize performance, speed and accuracy.

For more information, please contact FANUC FA America Corp. at 888-326-8287 or visit www.FanucCNC.com.

fresh stuff

► LNS America

The new Turbo MH500 chip conveyor can handle a multiple range of applications, material and chip types. One of the biggest benefits of the Turbo MH500 is the reduction of maintenance required on the machine tool coolant tank. Unlike other products on the market, it can handle a multiple range of applications and material, from brass to aluminum, as well as all different chip types. Additionally, the Turbo MH500 guarantees a high filtration level to keep the machine tank clear of chips.

For more information, please contact LNS America Inc. at 513-528-5674 or visit www.lns-america.com.



◀ Sandvik Coromant

Sandvik Coromant has launched more than 300 inserts in a new series of optimized ISO S turning geometries with easy-to-choose guidelines for every machining requirement. Used for turning HRSA and titanium alloys, the ISO S turning geometries can provide roughing to finishing for continuous to interrupted cuts. These new geometries ensure easy optimization, improved productivity, increased process security, and high surface quality. The six different geometries are designed to handle depths of cuts from 0.008" to 0.393" with excellent chip control and low tool pressure.

For more information, please contact Sandvik Coromant at 800-SANDVIK or visit www.sandvik.coromant.com.

► Sumitomo Electric Carbide

The SumiMill GOALMILL has tangentially mounted inserts accompanied by easily adjustable axially mounted wiper inserts. Each insert offers eight indexes when using single-handed cutters. Four indexes can be used on the periphery pockets, and flipping the insert on its side allows for four more indexes in the finishing cartridge. A total of 12 indexes can be used when employing both right and left hand cutters. GOALMILL cutters are available for roughing (<math><50Rz</math>), semi-finishing (<math><18Rz</math>), and finishing (<math><12.5Rz</math>). Left-handed cutters are made to order.

For more information, please contact Sumitomo Electric Carbide, Inc. at 800-950-5202 or visit www.sumicarbide.com.



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5/8" 6-spindle, thdg., pickoff, 1981
1" 6-spindle, 1966-82 (6), rebuilt
1" 8-spindle, 1980
1-3/8" 6-spindle, 1978 (4)
1-3/4" 6-spindle, 1965, 1984 (4)
1-3/4" 6-spindle 1984
2-1/4" 6-spindle, 1962, 1973-79 (3)

ACME

7/16" RA6, 1975 & 1964
3/4" RA8, 1974
1-1/4" RA6 1978-61 (9) - some
w/threading pickoff
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)
3-1/2" RB6, 1970
2 5/8" RB8, 1980
2 5/8" RB6, 1980
1 1/4" RB8, locked spindle, Aero '68 (2)

HYDROMATS & ROTARY TRANSFER

HW 25-12 chucker 1998
HW 25-12, 1994, 2001, 1989
HB45-16, 1997, bar and chuck (2)
Pro-20, 1998
HB 45-12, 1991
HB 45-12 chucker, 1996

SCHUTTE & GILDEMEISTER

SF51, 1985-79 (3)

SWISS

Tornos Deco 20 mm, 2000
Index TNL 12, 2000
Citizen FL42, 2005

NEW BRITAIN

Model 627, 2 5/8" 1980
Model 630, 3" 1980
812, 1 1/4" 8 sp., 1981

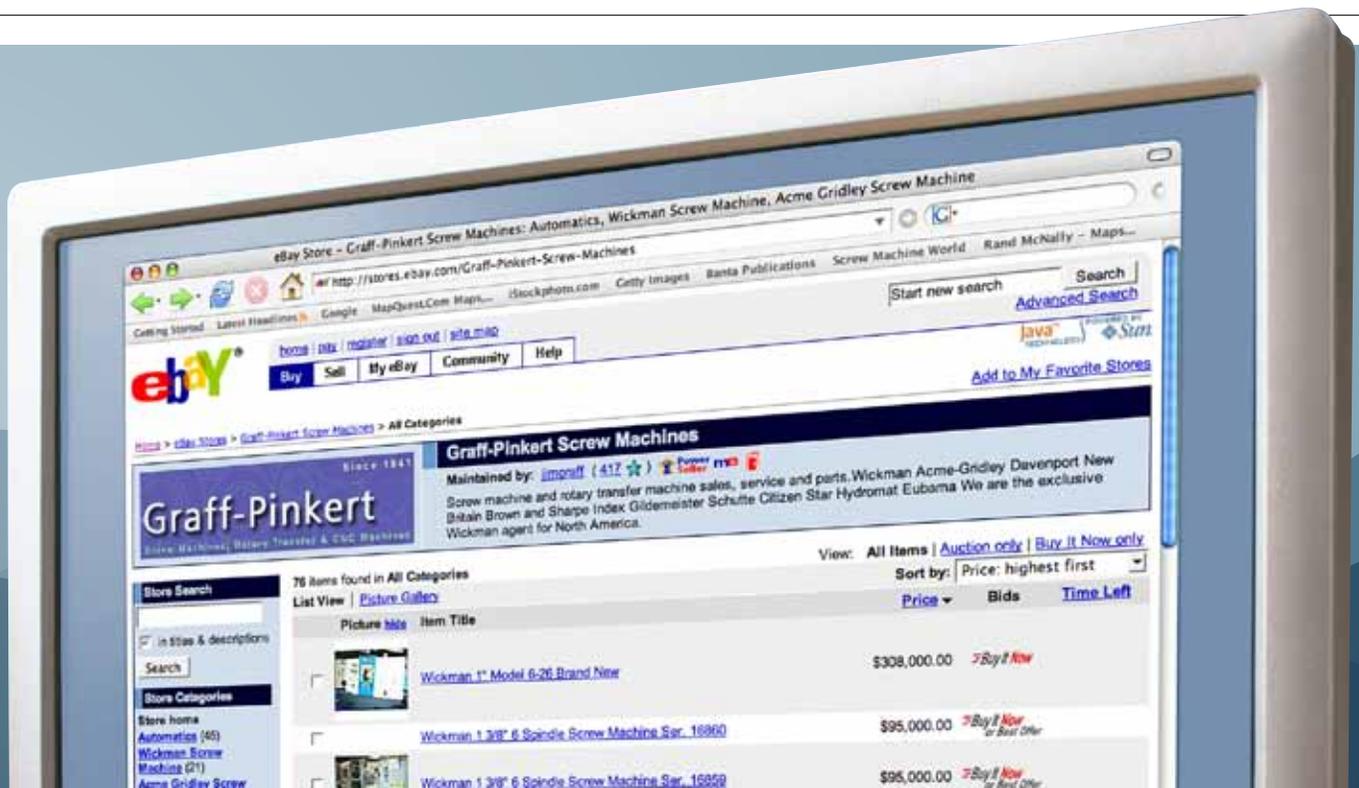
ESCOMATICS

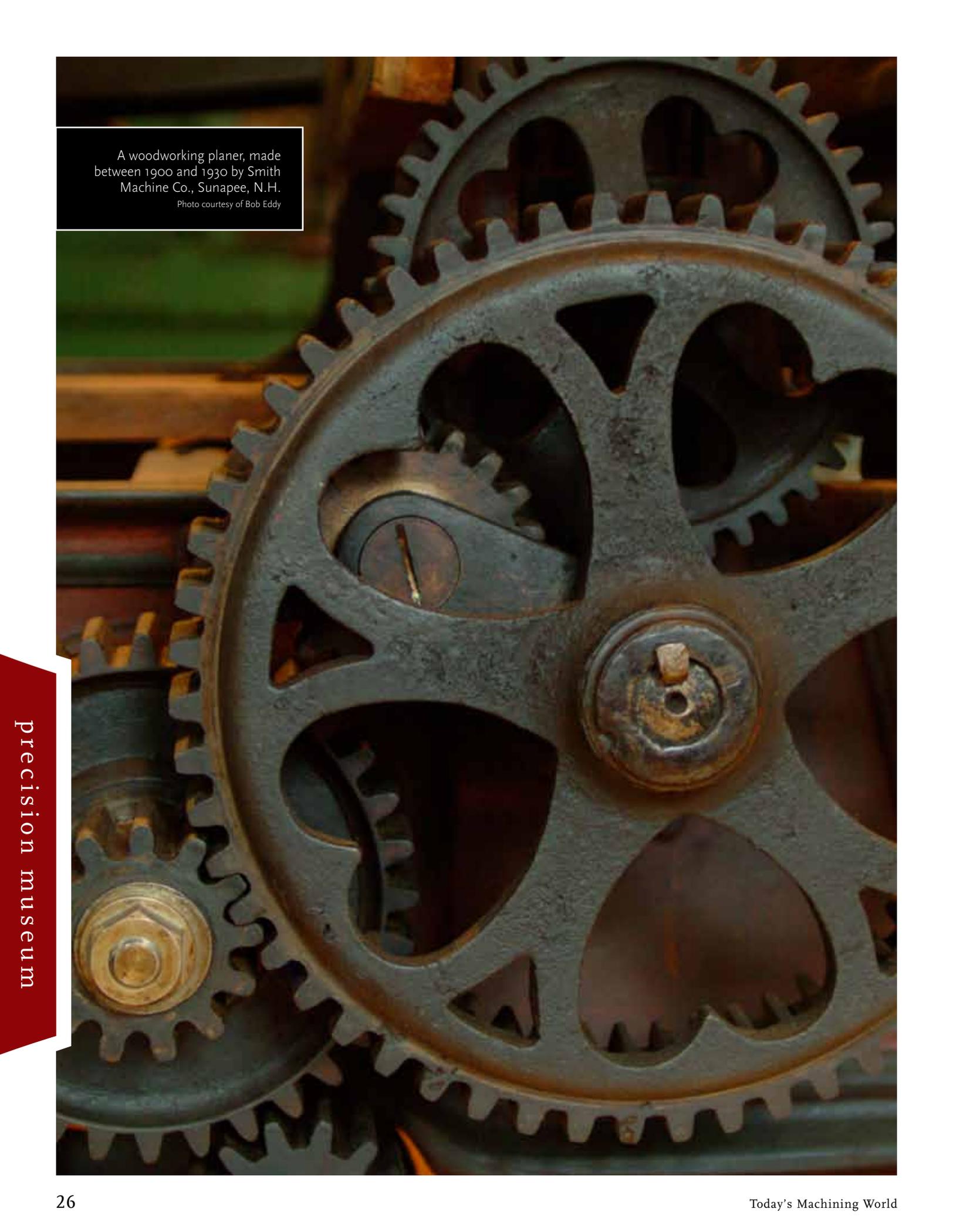
D9 (2), 1995
D6SR (2)
D-2, D-4, 1975

MISCELLANEOUS

Strausak CNC Tool & Cutter Spindle 1999
Cincinnati 107-4 centerless
5 1/4" RAC Nat. Acme spindle bearings
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"
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A woodworking planer, made
between 1900 and 1930 by Smith
Machine Co., Sunapee, N.H.
Photo courtesy of Bob Eddy

Celebrating America's **LOVE AFFAIR** with Machining

BY ALAN R. EARLS

The American Precision Museum is headquartered in a former armory that helped perfect the manufacture of interchangeable parts. Its collections showcase two centuries of American machining ingenuity.

The Beginning of Machining in America

There may not be any single place that can properly claim to be the origin of the modern machine tool industry, but this place certainly merits top mention. At first glance, Windsor, Vermont, is not the kind of locale one would associate with advanced machining technology, nor with industry in any form. It is a picture perfect model for a quiet, old New England town; its most obvious attractions being the Cornish-Windsor Covered Bridge (the second longest in the U.S.) and the Old Constitution House, in the past a tavern where the Republic of Vermont, which lasted 14 years, was born in 1777.

But Windsor is also home to an unusual institution—The American Precision Museum.

Windsor, it turns out, is one of the key communities in an area long known as Precision Valley because it was home to a once vast machine tool industry. Dig a little deeper and you discover that the name of the town and its neighbors, Hartford and Springfield, were borrowed by early settlers who came up the Connecticut River Valley from communities with those same names in the Nutmeg State (Connecticut) and Massachusetts. According to Merritt Roe Smith, a historian of technology at MIT, it was in Windsor that the

idea of manufacturing based on precision measurement, tooling, machinery and repeatable processes was pioneered.

Companies at the Forefront of Machining

In Windsor, inventors and entrepreneurs took those ideas to an even higher state of development, launching the likes of Robbins & Lawrence, whose original armory building, complete with overhead shafts and belts and the remains of a waterwheel, now houses the museum. Nearby was Jones & Lamson Machine Tool, Bryant Chucking Grinder Company, Lovejoy Tool, Cone Automatic Machine Company (later known as Cone-Blanchard), and The Fellows Gear Shaper Company. In fact, so great was the concentration of important machine tool companies in the region, that the valley was reportedly ranked among the top 10 potential targets for enemy attack during World War II. During the Cold War the valley was a site for a massive nuclear civil defense evacuation exercise.

But you would never know it today. The demise of machining in the region didn't take a nuclear attack or enemy sabotage—just a combination of rapid technical change and shifting economic sands. Today, even the church at the

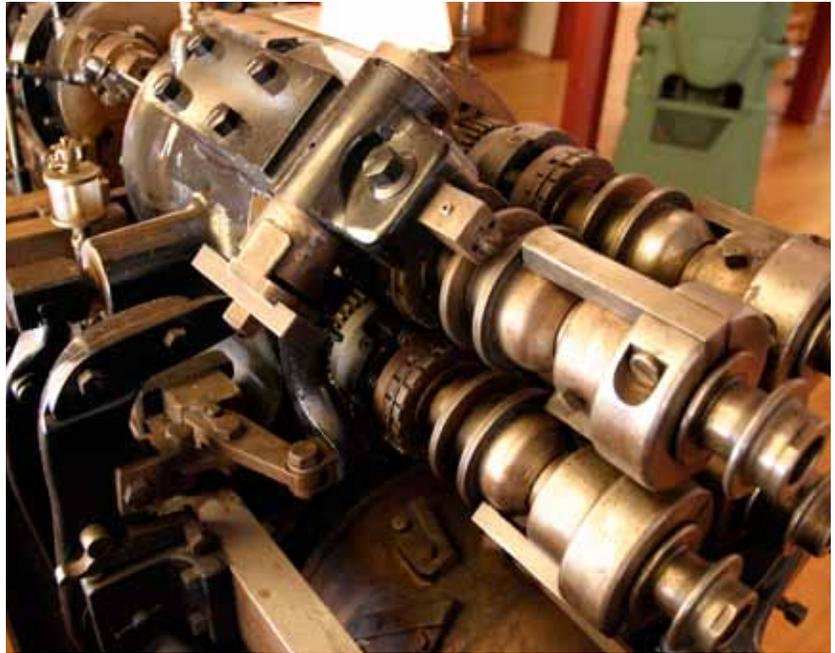


Above: Intern Ben Holleran demonstrates a turret lathe made by Pratt and Whitney Co., Hartford, Conn.

Photo by Medora Hebert

Right: A piece from the National Acme Mfg. Co., Cleveland, Ohio, 1911.

Photo courtesy of The American Precision Museum



center of Windsor boasts a forlorn sign on the front steps, begging anyone with money to donate funds to keep the ceiling from collapsing.

Yes, admits Nancy Hoggson, development and communication manager at the American Precision Museum, the region's economy has changed drastically and only a handful of machine tool or manufacturing companies remain in the area. However, she notes, the museum's deep connection to the machine tool industry persists—the River Valley Technical Center provides student interns for museum programs demonstrating both traditional machining and modern CNC techniques; the museum has developed a multimedia curriculum “kit” that helps schools in northern New England teach about industrialization and technology; and in September, museum staff traveled to the International Manufacturing Technology Show (IMTS) in Chicago to showcase the museum and the story of America's brilliant start in manufacturing technology.

On Display at the Museum

That brilliant start is well catalogued at the museum, though the decline is implicit, too. The core of the museum remains in its early 19th century building, overflowing with a trove of machine tools (many in working condition), measuring

devices, and samplings of early products made possible by machine tools. According to both Hoggson and Smith, the Museum's machine tool collection is one of the most extensive in the world. Included are single and multiple spindle lathes, shapers, planers, milling machines, single and multi-spindle drills, and grinding machines spanning over 200 years, right up to the introduction of CNC control.

An example stationed near the entrance is an 1825 engine lathe (maker unknown) with massive features—twin granite beams supporting the bed, and broad, multistep wooden pulleys to power the spindle and chuck. The use of granite is presumed to have been due to the higher cost of iron castings of comparable dimensions at the time.

But that's just the beginning. A nearby corner features all the equipment that would likely have been found in a mid-19th century machine shop, in particular those items which Robbins & Lawrence would have used to manufacture parts for firearms. Most were designed, developed and manufactured by the firm itself or by neighboring companies in Windsor, including a threading machine, rifling machine, turret lathe, index milling machine and drill press. Using these tools and the gauge blocks and measuring instruments that emerged in this

Visiting the Museum



The American Precision Museum is in a quiet section of southeastern Vermont and attracts about 5,000 visitors annually. Due to high energy costs, the building is only open from late May through October, from 10-5 daily. More information, including the Machine Tool Hall of Fame, can be found on the museum's Web site: www.AmericanPrecision.org.

period, the company made some 25,000 Harpers Ferry type guns in 1846 to 1850, all with fully interchangeable parts.

When the company showcased its products at the famous Crystal Palace exhibition in London in 1851, they won a prize for their rifles. More importantly, the British were so impressed with the machine tools that they ordered enough Robbins & Lawrence production equipment to refit their Enfield Armory. They even sent a group of observers to Windsor and the Springfield Armory itself to learn about what they soon dubbed the “American System.”

The Growth of the Industry

With triumphs like that, firms like Robbins & Lawrence soon spawned other firms, filling the Windsor area with enterprising new machine tool companies.

Like today’s Silicon Valley, Precision Valley seemed to have both attracted and created innovators. Well represented in the museum collection are artifacts linked to one of the most outstanding innovators of the bunch—James Hartness, an inventor, engineer, businessman, leading amateur astronomer, aviator and politician. He began his career in Connecticut, but after an employer cut him out of revenues from one of his inventions, he headed for the hills of Vermont, where in the 1880s he revitalized established machine tool maker Jones & Lamson. His 120 patents include the design for the original flat turret lathe, which provided greater rigidity, precision and higher speeds and feeds. Hartness also developed an improved roller bar feed and die head designs. Later in life he was chairman of the National Screw-Thread Commission, which worked to create international standards for the measurement and sizing of screw threads.

This work dovetailed with his interest in optics (the valley still hosts an annual meeting of amateur telescope makers,

which began some 80 years ago under his auspices) and resulted in the optical Hartness Screw-Thread Comparator, versions of which are on display at the museum and still common in industry.

As if those accomplishments weren’t enough, Hartness also eventually rose to top management at Jones & Lamson, which he ran for many years, assisted other machine tool entrepreneurs, and even served as governor of Vermont.

Gems on Gisplay

If you’re scouring the American Precision Museum for an example of modern machining, how about the first, serial number one, 1938 Bridgeport milling machine. It’s a gleaming neighbor to an older J&L turret lathe and defines yet another corner of the building where the Lilliputian wonders of John Aschauer, a German-born tool maker who immigrated to the U.S. and settled in Warren, Michigan, hold pride of place. In some 40,000 hours of “spare” time, he created two extensive working model miniature machine shops, with each machine reaching only inches tall. The first, a “general purpose” shop, includes four shapers, eight drill presses, a surface grinder, three lathes, a pedestal grinder, table saw, two band saws, an arbor press, and a surface plate. Not only do all of the components operate, but the tiny shop even includes miniature hand tools.

Another display offers a miniaturized automobile engine production shop complete with miniature planers, vertical boring mills, drill presses, lathes, vertical and horizontal drilling machines, and the crowning achievements, a V-6 cylinder bore transfer machine and a 45-degree drilling and tapping machine.

There’s plenty for visitors that’s hands-on to complement the static display cases, including a demonstration area

Below: A line shaft and belting display illustrates the setup of early gunmaking machinery.

Photo courtesy of The American Precision Museum

Right: A visiting family enjoys the miniature models built by John Aschauer.

Photo courtesy of The American Precision Museum



frequently manned by interns or museum volunteers. On the day I visited I met Clay Washburn, who in addition to knowing about all kinds of machining, claims for himself the dubious distinction of being the last employee of the Cone Blanchard Machine Company, which was sold and effectively went out of business in 2002. Washburn, who arrived in the region in the early 1960s, had a variety of positions at Cone Blanchard, the last involved helping to complete the company's largest surface grinding machine, with a 120-inch chuck, and, according to Washburn, some 12 miles of copper wire. His current "job" is less daunting, turning tiny "goblets" from brass stock for visitors so they can see a machining process in action.

Wasted Talent

Not surprisingly, Washburn feels the talent still residing in the region could have sustained Cone Blanchard and other now defunct firms. He says it was the financial maneuverings of owners and investors that undercut the operation—not foreign competition or obsolescence. Museum Trustee Roald Cann agrees, in part. He watched the industry melt down from his position in charge of R&D at Bryant Grinder Corporation before its acquisition by EX-CELL-O and through its subsequent demise under later owners, Textron and Goldman Financial. However, he notes, the precision machine tool business didn't disappear. What did disappear were the firms who were able to compete in the mass production markets. The U.S. was largest provider of machine tools in

the world in 1980, but today ranks well behind Korea and Italy in the value of its production.

The American Machine Tool Industry Falters

Philip B. Scranton, a historian at Rutgers University, Camden, N.J., has focused on the history of the U.S. machine tool industry since World War II. He says the collapse was the result of three primary developments. First and foremost was the slow adoption of numerical control. Although pioneered in the U.S. (Cann notes that Bryant had the first CNC grinder on the market) American machines tended to be slow, fussy and inflexible, and did not always adopt the fastest or best electronic technology available. "Many manufacturers were satisfied to run the machines from punched paper tape," he says.

By contrast, others, particularly the Japanese, were eager adopters of CNC technology and crafted new product lines around numerical control. As more value came from ever-improving electronics, the more durable and expensive American machines, usually with fewer bells and whistles, rapidly became less competitive. "Buyers were discovering that they could afford to buy less robust machines from overseas and simply replace them every few years with newer machines that had more capabilities," says Scranton.

Another factor contributing to the U.S. problems, Scranton believes, was the smaller scale and family ownership patterns in much of the industry, which made them vulnerable to "conglomerators." "These [small] companies could

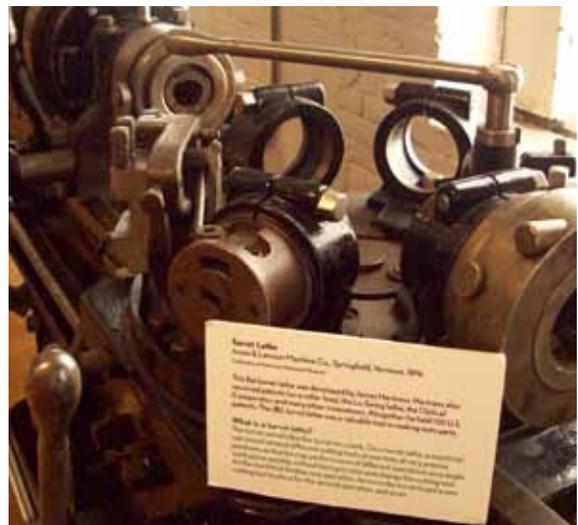


Left: Staff John Alexander with visitors and the Gay & Silver milling machine, manufactured 1840-1850, N. Chelmsford, Mass.

Photo courtesy of Bob Eddy

Below: Flat turret lathe by Jones & Lamson Machine Co., Springfield, Vermont, 1896.

Photo by Alan Earls



The Rise and Fall of American Machining



According to Merritt Roe Smith, the Leverett and William Cutten Professor of the History of Technology at MIT and author of “Harpers Ferry Armory and the New Technology,” published in 1977 and nominated for the Pulitzer Prize in History, it was the U.S. armory at Springfield, Mass., that most critically influenced the creation of modern precision machining and manufacturing in the U.S. and elsewhere.

In the wake of the War of 1812, which had revealed disastrous flaws in military procurement, the Ordinance Department embarked on a quest to build on earlier experiments in France and manufacture guns using interchangeable parts. Springfield became the prime mover, not only as a place where guns were being made for the government in a government-owned factory, but as a contracting organization that developed deep linkages with industry through its force of inspectors.

Those inspectors could be the bane of individual entrepreneurs but turned out to be wizards when it came to improving the whole industry. For example, says Smith, when a government inspector was sent out—say to Simeon North, who got the first private contract from the armory to build guns with interchangeable parts, they also looked around his shop and came back to tell the armory superintendents about the new machines and new tools or anything else they found there that might improve the gun making process. “Such a report was almost always followed by a letter to the particular contractor saying, we saw this

be relied on to produce a steady profit and when they were taken over were often milked until there was nothing left,” he says.

Finally, Scranton fingers the recession “engineered by Paul Volcker’s Federal Reserve policies to stop inflation in the early 1980s.” Inflation was stopped but manufacturers, particularly the already vulnerable machine tool makers, suffered.

machine that you have and we would like to replicate it at Springfield, please send drawings or allow us to make copies,” says Smith. In the case of Simeon North, one of the most innovative inventors of the time and the person who first conceptualized the modern milling machine, this policy meant a huge loss of potential revenue. Still, like many others, his desire to keep his government contract meant he put up with the bullying and allowed the free use of his inventions by the armory.

While this situation was arguably bad for some individuals, like North, it was good for the government and ultimately good for the machine tool sector as a whole. Other companies or entrepreneurs, bearing the recommendation of a congressman or local official, could gain entrance to the armory and, in most cases, were allowed to copy designs and learn about processes at will. Thus inventions at one company were quickly replicated at other companies, and often further improved. “As a result, the armory became a clearing house,” says Smith. Companies proximate to the armory, which included the rising stars of the Precision Valley, availed themselves of these opportunities, creating a business environment not unlike today’s Silicon Valley—with ideas flowing rapidly from one company to another and new firms and spin-offs being formed at a rapid rate. “Springfield was known as the Grand National Armory for a good reason,” adds Smith.

Even the Shakers—a pacific religious sect that blossomed in the 19th century—made pilgrimages to Springfield. “They wanted more time for prayer and contemplation and the innovations they learned about at Springfield helped them to improve and automate their woodworking machinery,” says Smith.

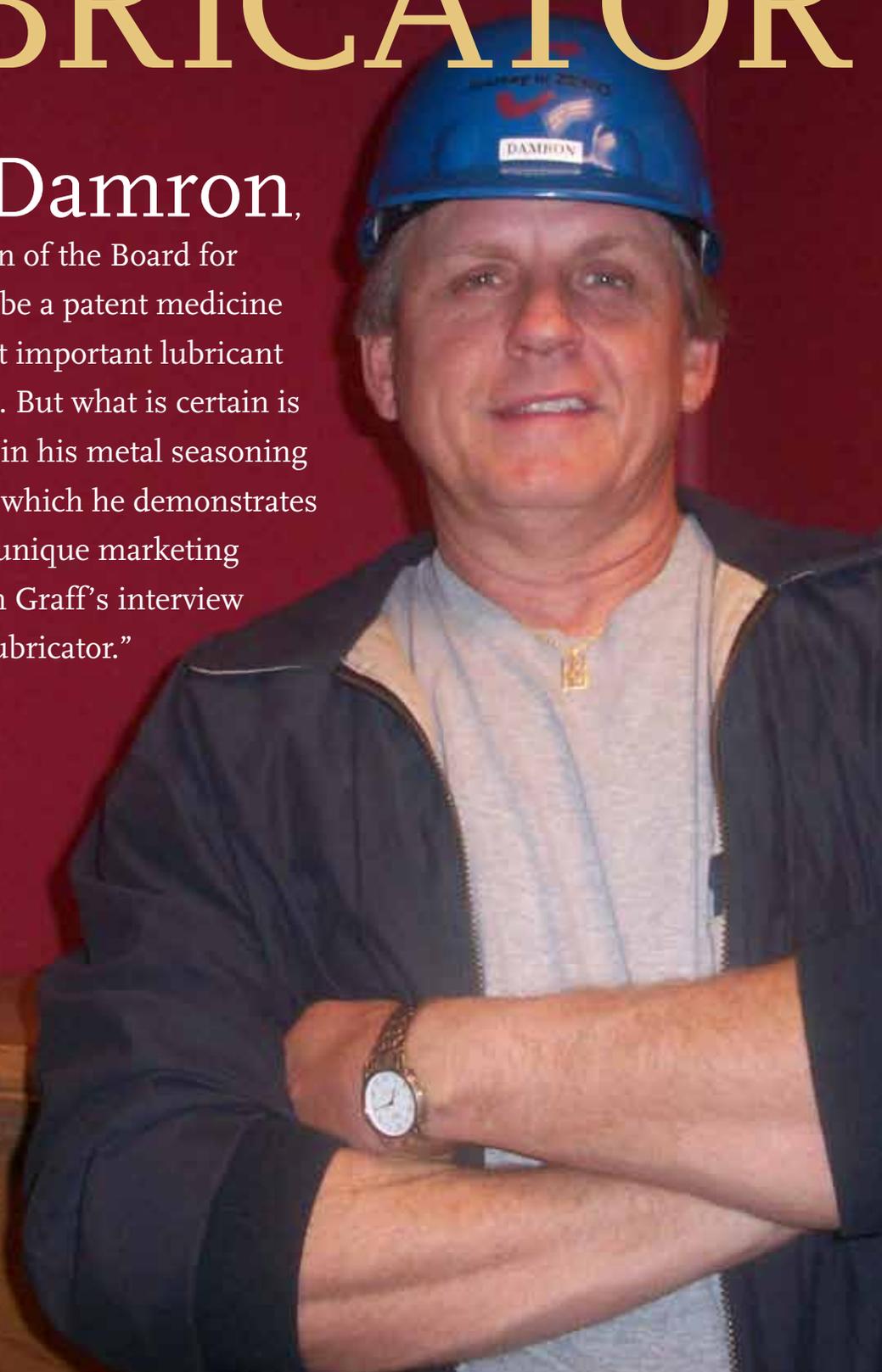
Today, says Smith, the closest parallel to the American System in its impact on business is probably the open software movement, which has helped create many powerful applications and even operating systems that are now available at low cost. Another modern point of comparison is GPS, which was created by the Air Force but ended up spawning a global industry. “I know there are many Air Force people still upset that they didn’t recognize the profit potential and find a way to cash in,” says Smith.

Taking the long-term view of the Windsor region specifically, MIT historian, Smith, who also does not see the decline as inevitable, says what hurt the Connecticut River Valley the most was the government’s decision to close the Springfield Armory in the late 1960s. “It had been at the center of this community for 150 years and without it, things just fell apart,” he says. 

The Singing LUBRICATOR

Howie Damron,

Owner and Chairman of the Board for DCS Solutions, may be a patent medicine charlatan or the most important lubricant developer in decades. But what is certain is his passionate belief in his metal seasoning product “NuBricity,” which he demonstrates with energy and his unique marketing approach. Read Noah Graff’s interview with “The Singing Lubricator.”



Noah Graff: What is NuBricity and where did the idea come from?

Howie Damron: It's kind of hard to say what it is in a nutshell because [discovering] it was a 20-year mission. NuBricity works through a metal seasoning process. You've seen a well seasoned cooking pot, that's what we do to the metal. We go inside and we season it. The best part is we don't have to turn it black like cookware. It's important that everybody understands that you can't just put NuBricity on a metal surface and expect it to season. It actually takes metal-to-metal contact. People everywhere need to realize that metal conditioning is the solution to all the insanity involved in conventional lubrication. [With regular lubricants] you've got to dispose of them afterward and then make more. You've got to bring it in by truck in bulk.

NG: Who developed it? Were engineers involved?

HD: I developed the product back in 1995. I was actually working in industrial lubrication maintenance, and I started looking at all the different technologies out there. I wondered why [these technologies] were not being utilized fully in all industrial [applications]. I started going to visit some of the greatest lubrication engineers, metallurgists and tribologists in the world. About two and a half years ago I discovered the product and found that it worked great on all of my own test equipment. I then realized that once NuBricity is applied, it is not coating, it actually penetrates into the steel and you can't get it off.

NG: What are your qualifications to make these claims about the product? Are you an engineer?

HD: I don't have an engineering degree. When people ask me what my background is I tell them I have 20 years of on the job training and learning about grease from others. This mission has not been and it never will be about putting money, fame, or fortune in Howie's pocket. That's not what I'm after. What I'm doing here is trying to educate everyone that there is another way of lubricating equipment without continually having to reapply. If you can actually stop the heat and the wear on that metal surface, well, you've accomplished a bunch, mostly [reduced] the wear on the equipment.

NG: How did the product get its big break?

HD: We started taking it to different industrial applications. A barge company allowed me to go in and do field-testing on their stuff. They would come and ask me, "Have you got a

product for our chains?" I said, "Well, yeah, I can do that." So I started to package it as a chain lube, and then for firearms, and as a penetrated spray lube. It started working everywhere. We had the product tested at Clark Testing Facilities at the Clark Labs in Pittsburgh. When they called back, the results were overwhelming. I had anticipated good results, but I had no idea the guy would say that it surpassed anything they'd ever tested.

NG: So is this a documented study?

HD: Yes, it's a documented study.

NG: Are the numbers out there online for everybody to check?

HD: Not yet. We're marketing by word-of-mouth, We're [still trying to] understand exactly how much of the product the customer is going to need. We are growing. In December, we'll be pretty much ready to go.

NG: Is there a money back guarantee on NuBricity?

HD: Soon we will have a guarantee and warranty, which will include liability insurance.

Some customers wonder if we fall into the "snake oil" category. So we have [potential] customers actually call the people who have done the studies and the tests.

NG: The general public can't buy it yet?

HD: It's an industrial product, and at this point we have no intentions of going consumer. We have customers that have spent a tremendous amount of money over the years testing the product and we don't want them to look on TV and see it selling for \$19.95.

NG: What industries do you market to?

HD: We are real strong in the mining industry, marine industry, heavy tugboat industry and steel mills.

NG: So you're selling to these guys already?

HD: Oh yes, we're selling to them now.

NG: How many employees do you have?

HD: In our mother company, DCS Solutions, there are five of us. But there are probably 60 distributors around the country.

Below: Middle: Howie Damron greasing rail wheels with NuBricity at McGinnis Inc. Right: Howie Damron performing at the 2010 DeMolay International Youth Conference in Kansas City, Mo.





Above: DCS Solutions/NuBricity staff (Howie Damron, center) with representatives from McGinnis Inc., a barge company in South Point, Ohio.

NG: What is your role at the company?

HD: I'm Chairman of the Board. And I go out and work directly with the customers. I'm not afraid to put on my old clothes, go 1,600 feet underground and help them with the lubrication problem. If you're too good to get down and help your customer figure out their problem and not worry about getting dirty, you're just too good—we don't need you. And we don't want customers just buying the product and not understanding exactly the strength of what they've got in their hands, so we work with them one on one.

NG: Do you see a future for NuBricity in precision machining?

HD: Most definitely. My distributors call me from all over the country wanting to go in to talk to the machining industry. We have dozens of people calling and talking about the positive results they're seeing with NuBricity in the machining industry. We're really excited about it.

NG: Let's talk about your marketing strategy. What is the "Singing Lubricator"?

HD: I've been an entertainer since I was eight years old. I've played the guitar, sang and have been on one stage or another for many years. Then I became a mainstream Nashville entertainer and went on the road with my own show and worked with many of the biggest country stars out there. I've sat on the back deck of Johnny Paycheck's home with Merle Haggard, Willie Nelson and Kris Kristofferson. I also write niche songs for all different types of things, and I do [the music for] hunting and fishing shows like "Big Horn Outdoors." It's on Direct TV, Channel 608, the Pursuit Channel.

NG: What does that have to do with NuBricity?

HD: Well, a lot of people know when they bring me on stage that I'm going to talk about my mission for industrial lubrication. A lot of the shows that I'm doing now are on a tour called "The Masonic Pride Tour." But I do every venue you can imagine.

NG: How big are these concerts for the Freemasons?

HD: The one that I did in British Columbia not long ago was about 2,900 people. They bring me up there on stage and introduce me as "The Singing Lubricator." They want to hear

the hunting songs that they're hearing on national TV and the Masonic songs that I've written for fundraisers. And at the very end of it I talk about the banner that's hanging up behind me for NuBricity. I don't go into a sales solicitation. All I do is just say, "If any of you out here are involved in industrial lubrication, if any of you are looking for ways to save your overhead by finding a good lubricant for your program, give me a call or I'll talk to you after the show." It's been one of the greatest marketing tools we have. Guys will then come up to me and they'll say, "I own this machine shop" or "I am the maintenance director for a steel mill."

NG: Is your product patented?

HD: We're going through a patent process right now.

NG: Can you give me an example of how NuBricity has worked for a client?

HD: Here is a real interesting scenario. In coal mines, the greasing pins on a 988 loader are probably the most important lubrication points on the entire loader itself. When the bucket is picking up tons of coal the operator can tell when the pins need lubrication. So he will send the truck down three times a day into the pit to grease these pins. After the guy put the NuBricity grease on there, he went from three times a day to one time a week. Then he noticed it only took one or two squirts.

NG: What is NuBricity made from?

HD: In its raw form it's organic. It comes from tree and plant saps and contains all natural bean oils.

NG: Do you worry about people stealing the formula?

HD: No. There are nine components in NuBricity. All nine of these components come through years of relationships and friendships with each one of the owners of these components. Once you have all nine of the components sitting in front of you, you can't just blend them together. The secret is in blending them together correctly. If it's not done correctly, you have nothing.

NG: How did you come up with your suggested retail price of \$13 a tube? That seems pretty cheap if the product is so good.

HD: Well, that's true, but [at that price] a customer will look at you and say, "Thanks for not gouging me. I'm going to get you 10 other customers." It's just like with your magazine, I had never heard of *Today's Machining World* until I started talking to customers since you and I talked. I said, "Have you guys ever heard of a magazine called *Today's Machining World*?" and they said, "Absolutely. We get it. It's a great magazine. Man, they put some phenomenal articles in there."

NG: That's awesome.

HD: So that right there made me go: Holy Smokes, and I started checking out *Today's Machining World* [online]. I cannot wait for you to hear the song I've written for you.

NG: You've written a song for us?

HD: I've written your song.

For more information on NuBricity visit www.nubricity.com or email Howie Damron at cdamron1@aol.com.

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,

In our facility we do a lot of general purpose face milling applications. We've got a new job for which we're using a 40 taper vertical machining center. Our problem is that when we enter into cut the cutter vibrates and we get chatter on the part. The only way we can diminish the problem is to turn the feedrate down. This works but it's frustrating, can you help?

Bad Vibrations

Dear Bad Vibrations,

By turning down the feed you may be hiding the problem, and you are probably losing productivity. The good news is that you can fix this by using a simple programming solution called the "roll-in" technique.

How you approach the part is very important. The first thing you need to consider is how the chips are being formed. The position of the cutter forms each chip. To ensure immediate cutting action you want a thick chip as you enter into the cut. When exiting cut, you want to generate a thin chip. That will put less stress on the insert.

Your chatter and vibration issues are happening because you are generating a thick chip on the exit. With the roll-in technique you focus on easing the inserts into the cut to ensure a thick chip on entry and a thin chip on exit. It is important that you are always rolling in the correct direction, which is clockwise under normal spindle rotation. If you approach the component in the counterclockwise direction it will take you right back to where you began—generating a thick chip on exit, with vibration, a bad sound and a poor part finish.

I mentioned earlier that the position of the cutter forms the chip, so let's discuss that in more detail. A common mistake is that too much of the cutter diameter is used to take radial depths of cut. An example of this is using a 4 inch diameter facemill and taking a 3-1/2 inch to 4 inch radial depth of cut (85-100 percent of the cutter diameter). This may seem as though you are "getting as much out of the cutter as possible," but actually the end result is detrimental to productivity and tool life.

This large radial cutting depth distributes radial cutting forces around the cutter diameter, resulting in opposing forces that cause vibration tendencies as well as improper chip formation.

The general rule of thumb regarding radial engagement for facemilling applications is to use 70 percent of the cutter diameter. This guideline will ensure a thick to thin chip formation and the radial cutting forces will be focused on one side of the cutter diameter, eliminating vibration tendencies through the spindle.

Programming the roll-in technique is simple. Start as you normally would with a rapid traverse move to your "X," "Y" and "Z" starting positions. The only change is to ensure you leave enough room in the radial direction to clear the part and position the cutter to allow for a clockwise entry arc into the part (common practice for your entry arc is at least one half the cutter diameter).

The roll-in technique is a very simple programming solution. Simply add one line to your program to allow the cutter to arc into the cut in the clockwise direction. Using the roll-in technique gives you a secure process, good surface finish and part quality, as well as increased tool life and productivity.

Kevin Lorch
Sandvik Coromant

Kevin Lorch is Project Manager of Business Strategies and Development at Sandvik Coromant.

You can view a video on the "roll-in" technique at www.todaysmachiningworld.com/shop-doc-blog.

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.



Grant Weaver with Target Chip Ganassi Racing Indy cars from past years.
Photo by Noah Graff

Grant Weaver is one of the team managers for Chip Ganassi Racing in Indianapolis. He is in charge of production, purchasing and preparation of subassembly components for Ganassi's ROLEX GRAND-AM Racing and IZOD IndyCar Series, both 2010 champion teams.

What is a typical piece of pit equipment you'd build in the team's machine shop?

GW: We build all of our pit equipment here. We make timing stands, fuel rigs, wheel carts. Everything has to be as quick as it can be, so we try to make everything down to the wheel guns that take the nuts off the race car. We use air jacks—a pneumatic jack to lift the car. We look at every aspect of the car to try to make it go faster or make it lighter.

What's the difference between Formula 1 cars and Indy cars?

GW: The cars look pretty similar but a lot more money is spent developing Formula 1 cars. Also, the rule sets are different and the minimum weight of [Indy] cars changes depending on the track, whether it's an oval or road course or super speedway. [Indy] cars are around 1,600 pounds empty, while Formula 1 cars are 1,200 pounds. Indy cars have about 650 horsepower, and Formula 1 cars have about 750 horsepower. A Formula 1 car would not be able to race at the Indianapolis 500 because the parts and pieces on it aren't designed to take the G-loadings and the high speeds.

Is there a lot less contact between cars in an IndyCar race than a NASCAR race?

GW: In NASCAR, it's a little easier for you to lean on your friends than it is in IndyCar. In IndyCar, if you touch wheels, one of them is going to go flying. In NASCAR, you can bump a little bit, but the idea is that the cars are so tweaked aerodynamically that if you're rubbing fenders or banging on somebody, you're changing your aero, and that car might not work as well as it was previously.

How much does one Indy car cost?

GW: Basically you can say the initial expense is about \$375,000 for a rolling car. You add \$100,000 worth of electronics. We lease the engines [from Honda], and the lease is approximately a million dollars per year per driver. The brakes don't come on

the car and the drive shafts don't come on the car. So when all is said and done and you put a car on the racetrack, there's about a million dollars rolling around on the road.

How important is the speed of the pit stops? It seems strange to me that the cars actually stop in the middle of a race.

GW: That's a relative word, "stop." The driver is never fully stopped. You've got to think about stick and ball sports like football and baseball. When the offense is on the field, the defense is resting and vice versa. A race car driver's only reprieve is during that pit stop. He's got to be able to put the car on an exact spot in his pit box so that his guys can perform their tasks without having to move. Right now it takes less than six seconds to fuel an Indy car during the pit stop with 22 gallons of ethanol, while changing all four tires at the same time.

How has safety for Indy cars improved over the years?

GW: The cockpit area of the car is phenomenally safer than just a few years ago. The seats [are safer], [the helmets] have a HANS device to keep the driver's head realistically attached to his body. There are different seatbelts and special padding that go around the cockpit. All help contribute to the driver being able to walk away from a horrendous crash.

What are your favorite racing movies?

GW: I have a couple favorite movies. *Grand Prix* with James Garner from around 1966, which went during the Formula 1 season that year. *Le Mans* with Steve McQueen, which played a lot around the Le Mans 24-hour race of 1970. And, not so much for the drama part, but Paul Newman in *Winning*, which is from the 1960s and also focuses around the Indianapolis 500. They haven't made a lot of good movies about racing since then. *Talladega Nights* is the worse movie I've ever seen in my life. Didn't think much of *Days of Thunder* either.

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PROVIDED INFORMATION ON CAD/CAM SOFTWARE

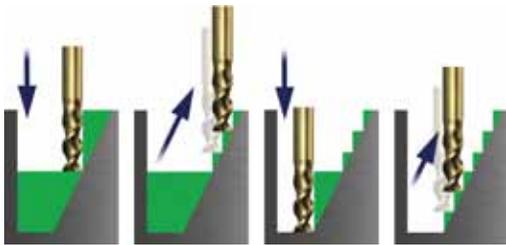
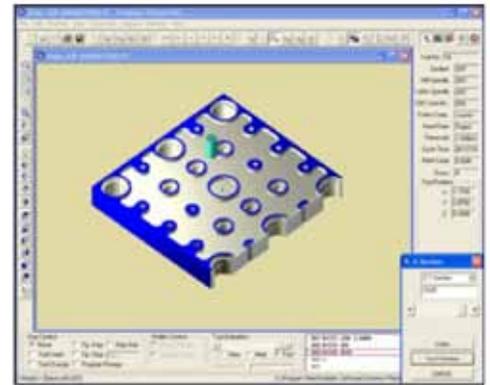
product focus

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For more information, please contact BobCAD-CAM at 877-262-2231 or visit www.bobcad.com.



◀ CNC Software

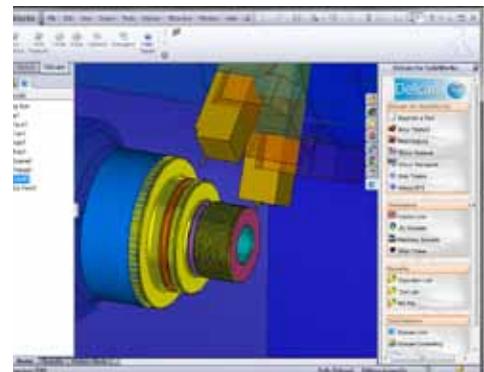
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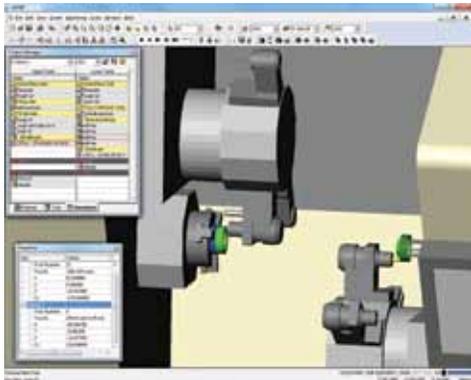
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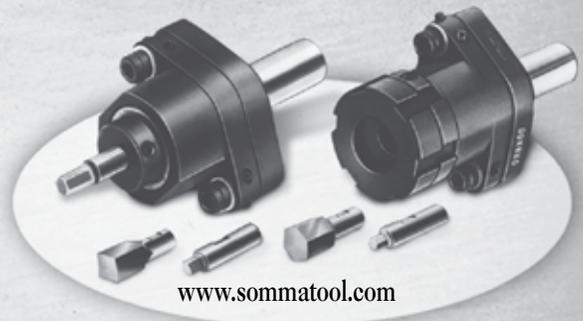


▲ Epicor Software

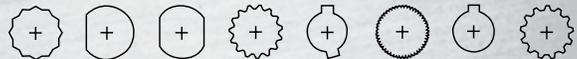
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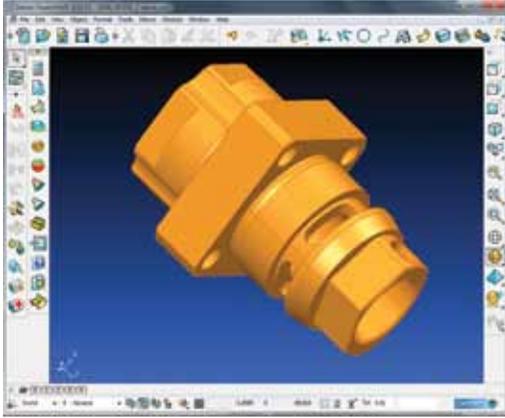


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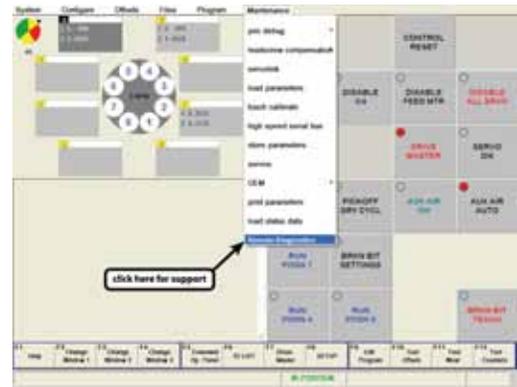
PartMaker Inc.'s new PowerSHAPE Companion is based on Delcam's PowerSHAPE design software, used at thousands of manufacturing facilities around the world alongside Delcam's PowerMILL CAM system for high-speed and five-axis machining. This 3D CAD offering includes functionality for creating solid models, data repair, editing part designs for manufacture, and for the design of machining accessories like tool holders and machine components. Like the PartMaker CAM suite, the PowerSHAPE Companion for PartMaker is based on the Parasolid Solid modelling kernel, assuring interoperability with both PartMaker and all other major CAD/CAM systems.

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

▶ Sieb & Meyer

Sieb & Meyer provides a CNC software application for real-time service over the Internet. On the Series 8 CNC, the customer initiates the connection to the service system, which allows the Sieb & Meyer support team access to the machine as if they were standing in front of it. This allows Sieb & Meyer to debug part programs, configure amplifier parameters, add special machine features (high pressure coolant), or diagnose a fault. Problems can be identified in minutes, which gets the machine up and running sooner, and service can be provided anywhere in the world.

For more information, please contact Sieb & Meyer at 513-563 0860 or visit www.sieb-meyerusa.com.



◀ Siemens

SinuTrain is Siemens' CNC training software that provides milling and turning machine operators with a high degree of practical hands-on experience, prior to using the CNCs on their actual machines. It is designed to run on Windows XP operating systems. With SinuTrain, actual NC programs are developed and simulated, using a direct connection to the company's CAD systems to further speed the program generation protocol. Machine tool operators not only learn the control language commands, but also visualize part programs on a PC screen identical to the machine screen. Programs generated through SinuTrain on the PC software can also be used on the machines.

For more information, please contact Siemens at 800-879-8079 or visit www.usa.siemens.com/cnc.



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

CNC Automatics Bought and Sold

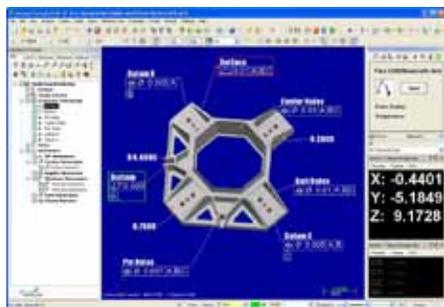
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▲ Verisurf Software

Verisurf recently released the 5th generation of its Verisurf X software. With Model-Based GD&T inspection technology at its core, the new computer-aided inspection and reverse engineering software inspects parts faster and more accurately without any need for 2D drawings, and Verisurf's new 3D Feature Scan technology automates the collection of discreet inspection points on 3D CAD models.

For more information, please contact Verisurf Software, Inc. at 714-349-7976 or visit www.verisurf.com.



▲ Vero Software

VISI NC Optimizer takes the post processed code from VISI Machining and optimizes the NC program based on the volume of material to be removed. With the modified NC program, the machine tool works with a higher average feed rate providing more cost-effective machining. VISI NC optimizer adapts the NC program feed rate to match the machining conditions based on the volume of material to be removed. In areas with low cutting volume and favorable milling conditions, the feed rate is automatically increased.

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	8	3						
1	5					6		9
		4			9		6	8
	7				8	4		
8								5
	4	8			6		1	
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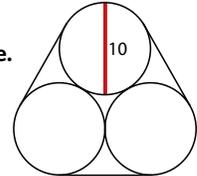
SOLUTION TO "HOW LONG IS THE RUBBER BAND?"

The straight lines are 10 cm x 3 cm.

All the curves will be exactly the circumference of a circle, which is $2 \times 5 \times 3.14159 = 31.4159$ cm.

Thus the total is 61.4159 cm.

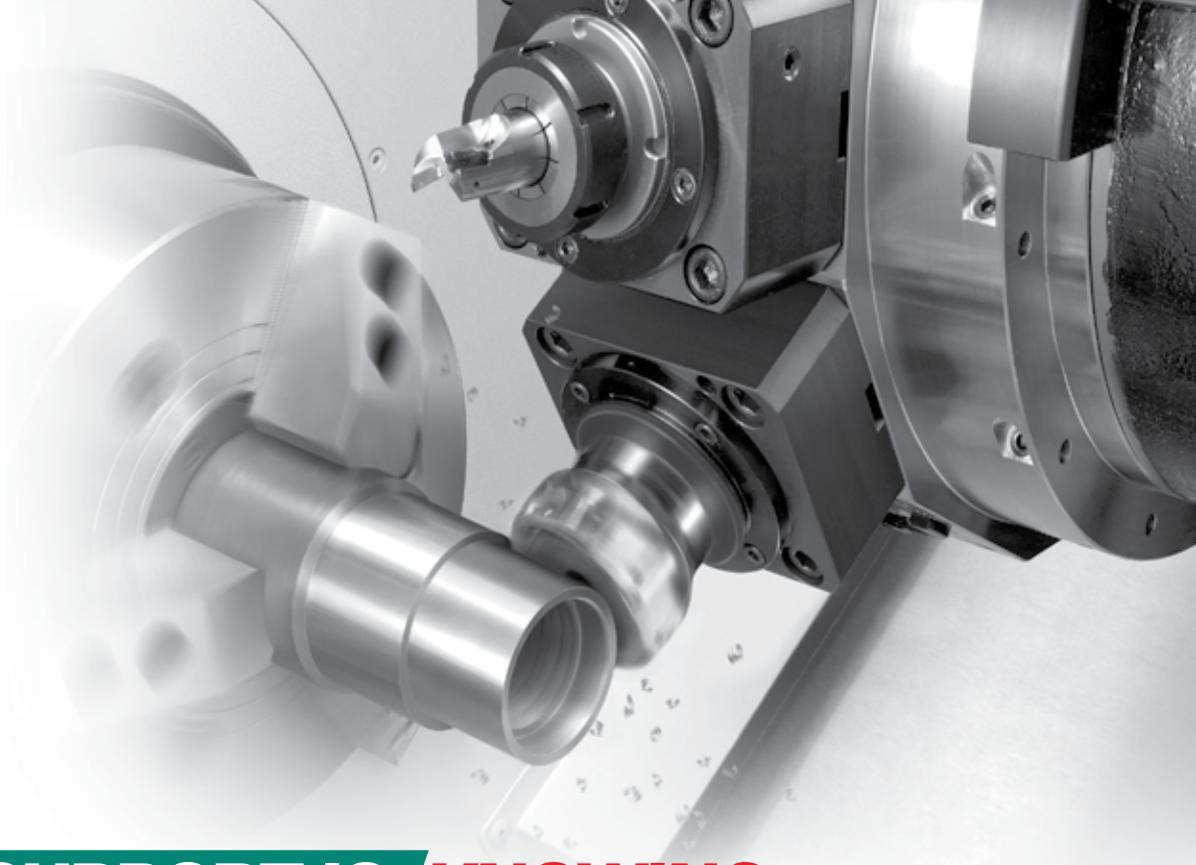
Puzzle found in
 the October issue.



Who Remembers Their 10th Grade Geometry?

Al Bjork of Toledo Screw Machine Products in Rockford, Ill.; **Graham Anderson** of Deka Batteries in Lyon Station, Pa.; **David Smith** of Electroswitch Electronic Products in Raleigh, N.C.; **Fred Messmer** of BIG Kaiser in Hoffman Estates, Ill.; **Donald W. Mast** of Federal Broach & Machine Co. in Harrison, Mich.; **Adam C. Doughty** of Worthington Armstrong Venture in Colubus, Ohio; **Dan Miller** of Iten Industries in Ashtabula, Ohio; **John Schmitz** of Orscheln Products in Moberly, Mo.; **Mark Rippy** of Proto Laminations Inc. in Santa Fe Springs, Cal.; **John Mandel** of Point Technologies in Austin, Texas; **Jim Lawrence** of Precision Piece Parts, Inc. in Mishawaka, Ind.; **Lee St James** of Conquest Machine in Las Cruces N.M.; **Lee Baker** of Surface Manufacturing Inc. in Auburn, Cal.; **Larry Rode** of Dornier Mfg. Corp in Hartland, Wis.; **Mark Schramm** of Lockrey Manufacturing in Toledo, Ohio; **Ron Cvar** of Harman Products, Inc. in Brookfield, Wis; **Joe Norris** of Technobox, Inc. in Lumberton, N.J.; **Frank Dunleavy** of Brush Wellman Inc. in Mayfield Heights, Ohio; **Paul T. Prikos** of X-L Engineering Corp. in Niles, Ill.; **Randy Grezenski** (sorry Tom) of Pointe Precision, Inc. in Plover, Wis.; **Gary Brown** of Heule Tool Corp. in Cincinnati, Ohio; **Pat Abbondanza** of AA Precisioneering Inc. in Meadville, Pa.; **Frank Gorman** of Astro Met, Inc. in Cincinnati, Ohio; **John W. Smith** of Smith Consulting in Burlington, Iowa; **Tim Stolar** of Superior Diesel, Inc. in Charleston, S.C.; **Daniel Horn** of Contour Wire EDM in Elmhurst, Ill.; **Jim Brown** of Apogee Machining Services, Inc. in Salem, Mass.; **Steve Ciocci** of Apex Gear & Machine Co. in Newark, N.J.; **Lucien Peebles** of Peebles Machining in Stockton, N.J.; **Lon Adamietz** of Bergman Machine in Minneapolis, Minn.; **Ronald Korczynski** of Erie Engineered Products, Inc. in North Tonawanda, N.Y.; **Eric Rueb** of Northrock Industries, Inc. in Medford, N.Y.; **Monique Foster** of All Pins Mfg. in Wilseyville, Cal.; **Tanner Mayhew** of Vektek, Inc. in St. Joseph, Mo.; **Ray Frattone** of Jesel Inc.; **Paul Kovatchev** in Troy, Mich.; **Ken Morgan** of Perfecto Products, Inc.; **Orvie Smith** of Regenco; **Jason S. Habib** of Hi-Tek Manufacturing, Inc. in Mason, Ohio; **Herman Niekamp** of Niekamp Tool Co. in Kingston, N.Y.; **George Stringe** of Highland Service in Frederick, Col.; **Jerry Goldlust** of Dielectric Sciences, Inc. in Chelmsford, Ma.; **Brian Rychcik** of Rensselaer Polytechnic Institute in Troy, N.Y.; **Kevin Albright** of Gear Headquarters in Kansas City, Kan.; **Pat Muscarella** of PLM Teknologies, Inc.; **Karl A. Reuther**, II of Reuther Mold in Cuyahoga Falls, Ohio; **Paul Stinedurf** of Montague Latch Company; **Alexandra Dankert** of Global Shop Solutions in The Woodlands, Texas; **Rick Kosarchuk** of J.W. Done Corp. in Hayward, Cal.; **Jim Riddell** of Baker College in Flint, Mich.; **Duane Steele** of Wallace Steele Co. Inc. in Nam Lake, Minn.; **Bob Goulding** of Seco Tools Inc.

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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 thought-provoking topics. Below are some recent comments from our "Swarfblog" readers at www.todaysmachiningworld.com.

The Greatest Player Ever

In honor of the October baseball post-season, and because it's just fun to talk about baseball, Lloyd Graff asked readers if they thought Barry Bonds was the best player they had ever seen, and if not, who they thought was.

Donald Green October 8, 2010 at 11:22 a.m.

I agree with those who say it's impossible to truly compare players from different eras, and especially difficult when you think about if those who used performance enhancing drugs hadn't, and if those who didn't, had.

That said, what do people think of a great who was both physically handicapped, and actually inhibiting his own performance? Mickey Mantle may not have had the biggest numbers in every stat, but I think most baseball fans consider him one of the Greats. He managed this while suffering from osteomyelitis, which caused him great pain in his legs, and while being an alcoholic (I doubt it had the same effect as steroids).

The 2011 Elections

On election day Lloyd lamented about the negative political attack ads in the media and pondered what it would be like if car companies advertised like politicians. He asked readers if they cared about any of the 2011 elections.

Deborah Rudy November 2, 2010 at 11:54 a.m.

Oh, my. Knowing you personally, I know that you are neither Democrat nor Republican. I understand why some folks might

think you are a Democrat, because I am often told, "I know you're Republican," by people who know me, simply because my beliefs are more center right than the current administration and Congress (at least until tomorrow). I can't ever remember voting a straight line ticket, and today will be no exception. The advertising is what it is. We can't change it, but we don't have to let it drive our decisions in the voting booth. If we're over 18 and can read, we have ample opportunity to learn about the candidates and make an informed decision. If our vote is important to us, than we have a responsibility to read, think, fact check and decide. The Internet makes it easy—it's all just a few key strokes away.

Lean is a Dream

Lloyd blogged about a colleague at AMT Machine Systems who was having trouble selling his product to shop owners who had no visibility of work from one month to the next. That inspired him to ask readers if they thought lean manufacturing was impractical for most job shops in today's economy.

Jeff Pagano October 7, 2010 at 2:15 p.m.

Lean is really nothing more than some procedural steps to eliminate waste and more effectively run your business. To say that it "does not work" in any environment is not understanding the concept at all. Lean is always relative and based on the elements of your environment under your control. You really need to work at it and it pays dividends. It is not a magic cure for an otherwise poorly run business.



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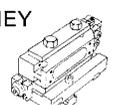
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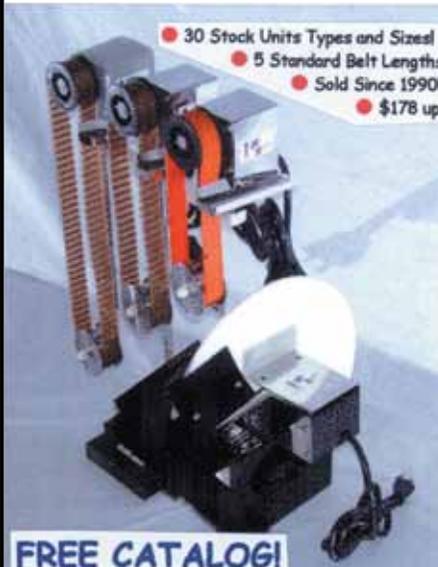


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Go to the Basket

I'm writing this column two weeks before Thanksgiving. I think the business world has changed a lot in the past year, but many people are so focused on looking backwards that they may have missed it.

Business in the domestic manufacturing world has turned decisively better, yet we see a torrent of auctions because legal bureaucracy moves slowly. The two big Detroit auction houses, Hilco and Maynard's, have been selling off the rationalized flotsam of GM, Ford and Chrysler. These are the forlorn assets of yesterday's Detroit and they will continue to pour into the system into 2011.

Still, looking backwards we have the huge overflow of foreclosed and soon-to-be foreclosed residential property. The muddling legal process helps keep the backlog of homes trickling onto the market, which will keep house prices at the shrunken "new normal" for years.

I think we can ascribe 9.5 percent unemployment primarily to the housing bust. When you are building 500,000 new houses a year instead of two million, you need a lot fewer hammer swingers, plumbers and drywallers.

But focusing on the Detroit implosion and the real estate bust is the preoccupation of a negative and biased press. What I'm seeing today is the continuation of a significant upturn in business for machining firms. This coming New Year should be the best since 2007.

Why?

American manufacturing is lean and hungry coming off a horrible 2009 and a rebounding 2010. I see companies

at a perfect fighting weight. Add in the weak dollar versus the euro and yen and big demand from China and India for American agriculture and industrial goods as well as services. Throw in nice tax breaks like the \$500,000 expensing provision and accelerated depreciation through 2011. There is also the likelihood Obamacare will be revamped and there will be gridlock for new Democrat-pushed legislation, which gives you a balmy economic climate.

The big deflation scare has blown over with the aggressive monetary easing of a Bernanke led Federal Reserve Bank. Some doomsayers are looking for rollicking inflation to come, but I believe they are living in a 1970s view of the world. We will get a little price bump, but if you are in

business you can adjust and enjoy it. Deflation is economic cholera and we appear to have dodged that plague, unless we are house heavy.

So what is the game plan for 2011? Put simply, "It's time to play offense." If last year's message was "stay in the game" this year's is "put up points."

This is the year to expand, take risks, add good new people, take on inventory, gamble to bring in new clients, and export. We get windows in business and in life to score. You can't win the lottery if you don't buy a ticket.

Believe me, 2011 is the year to light up the scoreboard. Forget about looking backward. Go to the basket.

“If last year's message was “stay in the game” this year's is “put up points.””

Lloyd Graff

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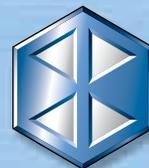
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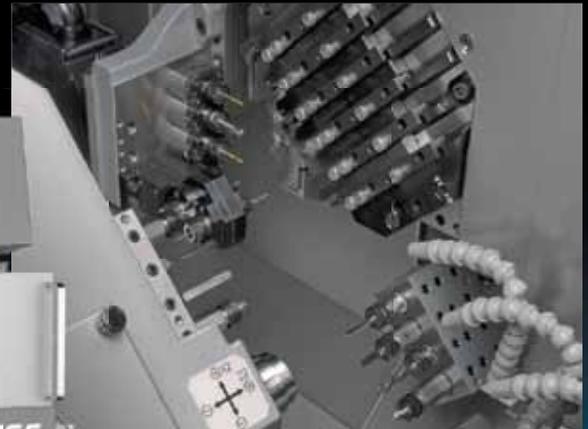
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Same quality you've come to expect with
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Machine specifications

Maximum machining diameter (D)	Ø116 mm (.63")
Maximum machining length (L)	200 mm (7.87")/1 chucking
Main spindle speed	15,000 rpm
Back spindle speed	10,000 rpm
Live tools	7 standard

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