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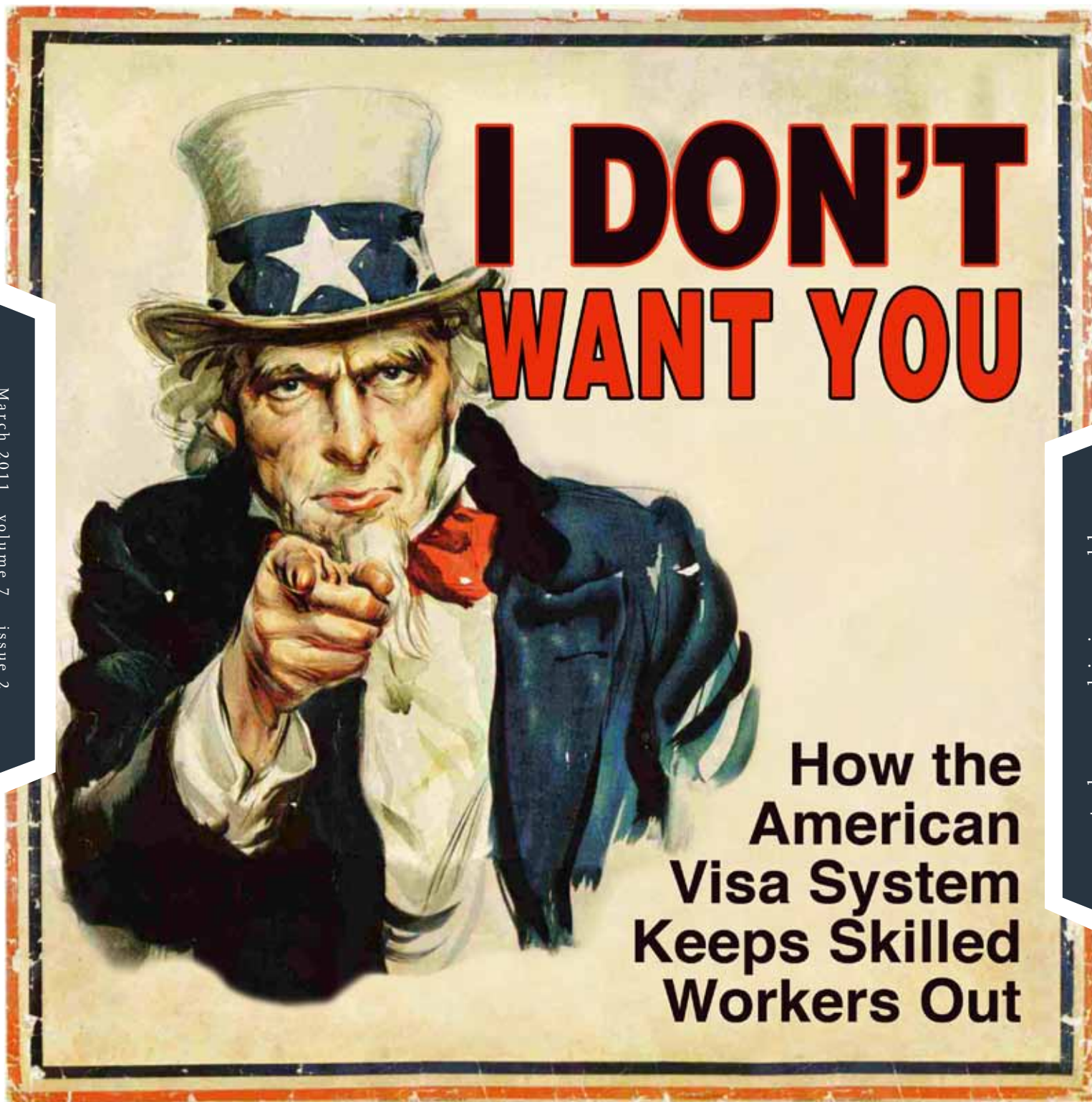
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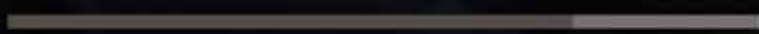
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editor's note

The Fiction of Money

The New York Mets ownership group is trying to sell 25 percent of the team because they are being sued by the attack-dog lawyer representing the victims of Bernie Madoff. The lawyer, Irving Picard, claims that the hedge fund operators who own the Mets realized huge "profits" from Madoff and should have known he was running a Ponzi scheme.

This brings up an idea I have been thinking about for a long time, the "fiction of money."

In our Graff-Pinkert & Co. machinery business we are often asked to do appraisals of machinery, usually for financial institutions or consultants. We had a call recently from a consulting firm who wanted prices on a group of National Acmes. "Make the prices on the high end," he requested. We said we would give him information for a fee. "Oh, I didn't plan to pay for information," he said. Real pulp fiction writer.

But so much of what masquerades as fact is bogus when it comes to money.

What happened to the trillions of dollars lost in the real estate meltdown of the past few years? The value of the mortgages and bricks were a fiction that evaporated in a few months.

The value of stocks are a fiction, too. General Electric Corporation is the same company at \$50 a share or \$10.

Accountants fret over financial statements like they are stone tablets, but they are often more interested in being legally bulletproof than reflecting the health of the business they audit.

So Bernie Madoff goes to jail for his Ponzi scheme, but unknown thousands of financial fiction artists run free because the system requires universally accepted fictions to operate smoothly.

I am at home in this world of ambiguity because I see it as a useful sham that lubricates the flow of money. I think our readers like to live in the world of "facts," of chips and index times. Hopefully TMW can bridge the gap between the fictions that shape our lives and the "facts" from which we think we earn our livings.

Lloyd Graff
Editor/Owner

editor's note



Lloyd Graff is a true lover of sports. A highlight of his sporting career was a tryout with the Chicago Cubs. Great photo opportunity, but it ended without a contract offer. Aside from baseball his favorite sport is table tennis. He met his wife, Risa, with a ping pong paddle in the pocket of his corduroy sports jacket. "Conversational ping pong" was a way of connecting with his children when all other approaches failed. Sadly, six eye surgeries for retina detachments have limited his ability to cover the backhand side



Alan R. Earls wasn't "present at the creation" but he does remember when computers and CNC machines communicated happily via punched tape. 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*. He is currently looking forward to a family field trip to tour the innards of a 19th century hydro-electric power plant. For the past 15 years, he has been self-employed as a writer, editor and researcher from his home near Boston.



Bridget Mintz Testa has lived in Houston, Texas, for nearly 30 years and almost qualifies as a native of the Lone Star State. She has been a freelance writer for nearly 18 years. Prior to that, she worked for five years as an engineer at NASA Johnson Space Center, first in lunar and planetary exploration, then in space station robotics operations. When not working, she enjoys reading, film and travel.



Noah Graff has been working at *Today's Machining World* since 2005. He is the features editor and "Web guy" of the magazine. Since completing his reality show on YouTube called "Jew Complete Me" documenting his search to find the Jewish love of his life (not a Hollywood ending), he has been working on editing a new documentary about the Chicago locations of his favorite film, *Ferris Bueller's Day Off*. Latest quote on his mind, "Nobody's a mind reader, so if you want something you have to ask for it." *His Mom*.

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Today's Machining World

forum

Looking Good in 2011

Note: Harrold Vonage lives in Silicon Valley and is our unofficial Mennonite historian.

Your piece on 2011 really got my attention! I attempt part-time machine sales and recently called on a number of successful 15–200 man shops and I was amazed. They were producing flat out! They were purchasing large horizontal cells, new and used, acquiring nearly new buildings from short sales, and renting additional space! Today dealers cannot find enough product. They completed 2010 in great shape and the year is becoming a barnburner right out of the blocks.

In October I toured Ukraine and Crimea. My ancestors, the Mennonites, were invited by Catherine the Great to develop the Steppes of Ukraine to Agriculture in 1788. It became the breadbasket of Europe; 7-8 story flour mills, large factories, employee housing; they became a state within a state, virtually self-governed. One of the large flourmills is still functioning. Stalin and WWII ended it. The remaining 40,000 inhabitants (only 35 percent of families had fathers) walked to Europe in 1943. In 1945, when they arrived and lacked proper documents they were repatriated to Russia. You can imagine what happened to them. No country would accept them except Paraguay. They were shipped to the Chacho, the "green hell."

Today they provide most of the dairy products and meat to Paraguay and they operate a successful leprosy hospital. Our history has some parallels to the Jewish holocaust on a smaller scale. We are a smaller ethnic group. Thousands were dispossessed and slaughtered. My people left for America in 1874, they were the lucky ones. The entire village of Alexanderwohl migrated in 1874 to the Newton, Kan., area bringing "Turkey hard red winter" wheat seed with them and subsequently established the winter wheat industry in America.

All my business friends and dealers know about your magazine and read it. Keep up the good work.

Harold A. Voshage



A Waste of Money

In response to your blog about upgrading train service throughout the country, you're so right, Lloyd. U.S. trains are decidedly third-rate, and there is no point in spending a lot of money to improve them to second-class. Intercity train travel is fun, I suppose, if you can "take it as it comes," if you don't have to be anywhere at any particular time, and don't mind sharing your ride with rude or noisy fellow travelers.

It's true, highways and airways became superior to rail travel largely by government subsidy. But that was then and this is now. I see no reason to repeat the mistake with high-speed trains.

High-speed train travel is the shimmering chimera pursued by big-government and make-no-small-plans people who thrive on spending other people's money on grand social engineering projects. Make no mistake, that's what "high speed rail" is all about. It's people who don't want, need or value independence in their transportation instructing the rest of us how we should travel. Telling us, as usual, that they know better than us how we should move around. And they're prepared to spend a lot of our money to prove it to us. They say, "Let's be environmentally aware, let's be part of a community of travelers instead of anti-social drivers, let's pretend we're making a difference. And for God's sake let's do what the Europeans do; they've really got it going on." Pay no attention to spending more billions that we don't have on a system that very few Americans will use.

Question: Who besides a rail fan will ride on a train for three or four hours on an inconvenient schedule when you can fly from Chicago Midway to St. Louis in little more than an hour, almost any time you want, for around a hundred bucks?

Richard Rudy

It's Gonna Burst

In response to your predictions for 2011 from the Nov/Dec issue "Swarf," I'm with you, Lloyd. A lot of investment banks and equity groups are growing tired of sitting on the trillions of dollars in cash reserves they've got laying around. Now that the Republicans are gaining ground and the tax break issue is resolved (sort of), natural human impatience will prevail. I've been telling people the same thing, spring 2011 will burst. Now would be a good time to position yourself into a few choice stocks.

Ted

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

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Working Under the Table

I am seeing a lot of anecdotal evidence of people playing the system when it comes to receiving unemployment benefits. Our used machinery business, Graff-Pinkert & Co., has been seeking to hire a part-time office worker, but the person we were pursuing turned us down because they do not want to jeopardize their unemployment benefits, and they already have a part-time gig where they're paid in cash. I know of another person looking for a full-time sales job who is getting by on unemployment and bartending.

I think one of the reasons unemployment statistics seem so peculiar during this broad based recovery period, is the reluctance of many unemployed workers

to give up unemployment benefits, which can last two years and sometimes longer if they are in school.

Another reason for the funky numbers is that older men are apparently dropping out of the active labor force in droves. I know of several 50-somethings who have abandoned the job world and then retired or opted to start off-the-books cash enterprises. Others have taken early social security or part-time jobs.

The excruciating cost of benefits is restraining small businesses from hiring full-time people. The availability of long-term, almost endless unemployment benefits is a benevolent social safety net, but it is making the hiring game more confusing than ever.

I've survived the Great Blizzard of 2011 in Chicago. Fortunately, I have the money to hire a fellow with a pickup and plow to clean my driveway. For me, the storm was an event to celebrate, not fear, but I still had to work around the aftermath for a few days.

Just before the blizzard my wife and I visited friends in Austin, Texas, who have a different approach to Chicago winters—they avoid them. Ricky and Debbie have a home and business in Chicago but also spend lot of their time in Austin. They bought a home there, enjoy the music scene, love the winter temperatures and enjoy the new friends they've made there over the years.

Ricky runs his industrial distribution business successfully while he's away from Chicago. He has a camera matched to his computer in his home office in Texas and his business office in Chicago. People can see him at his desk, and he can see them at work and talk to them. Ricky has managers and sales people who report to him regularly. He will travel to visit key customers or go to meetings that are crucial for the company. He is fully engaged in the company, but not engaged in blizzards.

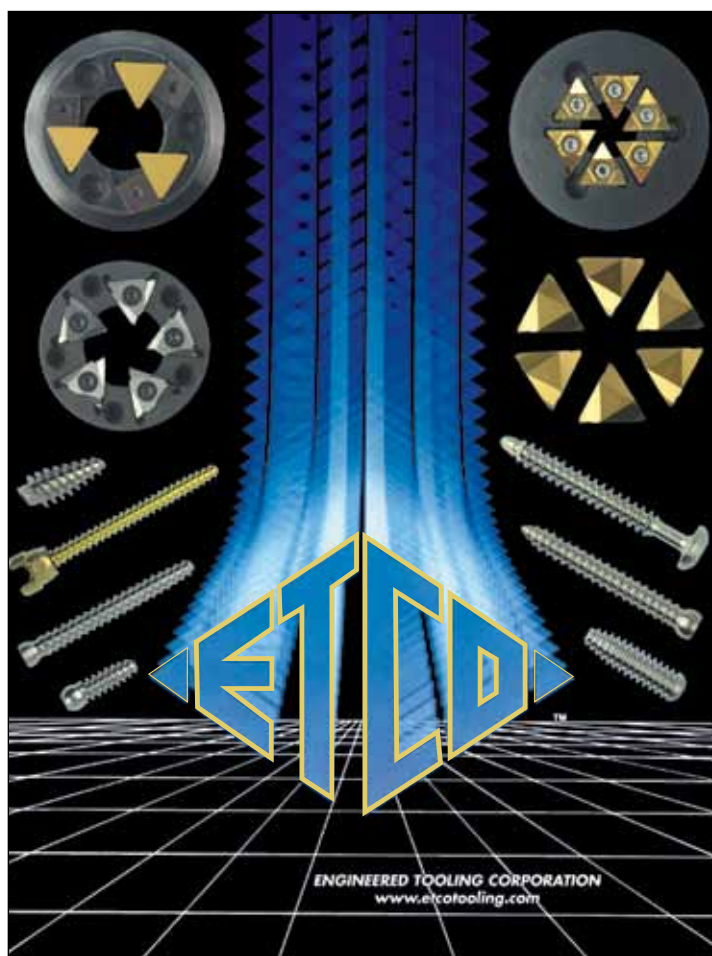
Ricky is a very smart and organized CEO/Owner. To my surprise, and possibly his, too, he is able to successfully run the business without freezing in Chicago in January.

It is the rare small- and medium-sized business operator who owns a business rather than having the business own him. Technology may be making it easier to pull off today.

What do you do when business surges after you've been in backpedal mode for three years? This is the situation we find ourselves in today at Graff-Pinkert & Co., our used machine tool dealership, and judging by the surge in manufacturing reported by the Purchasing Managers Index, we are not alone.

We have too many machines to get out the door in the next three months than our present shop personnel can handle. The solutions we are weighing include adding hours, adding employees, hiring part-timers, bringing in temps, and bringing in contract workers.

The bias that pervades our decision making is that we prefer not to hire full time workers who will get the expensive benefit package that our core workers receive. This probably sounds harsh, but after building a bloated payroll in the '90s and early 2000s, which we were loathe to trim, we are paranoid about retracing those steps.



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If we knew that the rush of orders would continue for a year, we would be inclined to hire two or three people in the shop and office, but visibility is foggy.

So today we are adding a guy for three months at \$10.00 an hour and are planning to add office help for 20 hours a week. Hours will also be added to shop overtime. Graff-Pinkert is in the interim stage of hiring, where I believe many firms are today.


Raphael Nadal is the best tennis player in the world. He was ranked #1 going into the current Australian Open. If he won the Melbourne tournament it would be four straight wins in a row, not done since 1969.

But he lost in the quarter finals in straight sets (6-4, 6-2, 6-3) to fellow Spaniard David Ferrer, ranked seventh in the world. It was a match that perhaps should not have been played because Rafa

injured his hamstring in the very first game. He gutted it out for three sets and Ferrer played well (yes, being an idiot tennis junkie I watched it at 4:00 in the morning on ESPN).

On the football front, Jay Cutler, the Chicago Bears quarterback, sustained a sprained knee in the first half of the NFC championship game against Green Bay. He left the game after playing poorly on the gimpy leg. Cutler has taken a lot of heat for supposedly wimping out. According to some sources, he wasn't even given the choice by the coaches to stay in the game. But for the sake of argument, let's pretend that it was Cutler's choice whether or not to stay in.


The two cases are not exactly parallel, but bring up the question of whether you do yourself or your team a disservice by playing hurt. Is it really the noble thing to do for Nadal or Cutler to play at 60 or 70 percent, when it could threaten their own future health and longevity?



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Personally, I think in both of these cases the player would have done the right thing to accept injury—in Nadal's case, conceding the match to his countryman rather than giving him a hollow victory, and in Cutler's case, allowing an able bodied quarterback to get in the rhythm of the game before it was out of reach.

I laud the Republican effort in the House to repeal the new health care law, not because it might succeed directly, but because it will rekindle the debate about how we balance the needs of the uninsured, share the costs, and allocate the control of health care in the U.S.

Everybody knows the old system was a patchwork improvisation which developed over 50 years. We've adjusted to it over

time, but it really isn't serving us well with constantly escalating prices and 30 million uncovered. I do not pretend to know how to fix what ails the system, but I assume the new law is a mess of regulations that must be shaped by experience.

I see the health care debate now entering a new and hopefully more realistic phase of negotiation between insurance companies, big business interests, small business advocates, doctors, and patients mediated by government. Health coverage will gradually be worked out over several years with the 2012 election affecting the negotiations.

We will have theatrics in Congress, but the real action will be in the haggling over regulations and finding out how the insurance exchanges will work in practice. The new law may be horrible or it may not be half bad. In 12 to 18 months, after hundreds of wrestling matches in private, we'll have a better idea of what works. 

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BY JERRY LEVINE

review

The Tenth Inning

Spring is coming, the time when young men's hearts turn to what else—baseball. This magical game, invented 150 years ago, has undergone many recent changes, yet most of it has stayed the same. In spite of the MLB's recent problems with money squabbles and performance enhancing drugs, all the statistics and records set by great athletes decades ago still stand with those of today—albeit with a few asterisks.

The Tenth Inning, the recently released sequel to Ken Burns' renowned documentary, *Baseball*, lovingly puts into context baseball's excesses of the past two decades, as the game was tested by the players' union, strikes, owners' greed, lockouts, replacement players, corked bats and steroids. In the end, it reached a new equilibrium, with an international manpower pool, a global TV audience, and record attendance.

Baseball is a part of me. It tugs at my heart that the American game my immigrant father loved so much and loved taking me to watch is the same one that my son played so well, and is the game that my son and I love taking his son to see.

Money has always driven baseball, occasionally corrupting it. Initially, each owner kept most of the team's income. As revenue grew, this was a model doomed to fail. Everyone wanted a bigger piece of the pie—notably the players, their agents, and the small market owners who couldn't compete financially. In early 1994, the owners approved a revenue sharing plan tied to a salary cap, but the players adamantly opposed any cap—neither side trusted the other. Negotiations dragged out through the summer until the players went on strike. The season was canceled.

The 1995 pre-season opened with replacement players. The strike finally ended when the future Supreme Court Justice, Sonia Sotomayer, issued an injunction against the owners. The millionaire players had prevailed over the billionaire owners, but the fans, irritated by both sides, were slow to return.


The players' skyrocketing salaries created several side effects—most notably the internationalization of the sport and the rampant use of steroids. Foreign players were abundant, talented and cheaper. Nowhere was this truer than in the Dominican Republic where the saying goes, "No one walks off the island; you have to hit your way off."

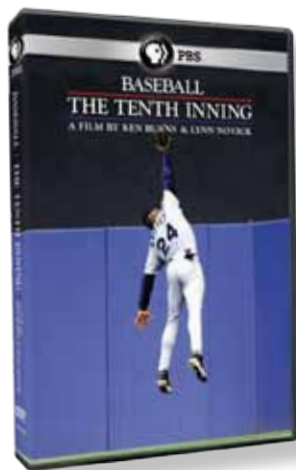
With greatly increased financial incentives, many players turned to steroids to help them capture mega-million dollar contracts. Mammoth home runs made the highlight films and commanded players really big money. They started breaking records, which brought fans back to the stands. Cleaning up the drug mess would have meant bringing down the players who had revived the game. Neither the owners nor the union would address the issue, so Congress eventually stepped in.

Jose Canseco and Ken Caminiti confessed their own steroid use and named other users. A fairly strict drug policy was adopted, and players' bodies and home run numbers shrunk in size. One of the last holdouts, Barry Bonds, continued to deny his drug use, but when his contract expired three years ago no one picked him up. He is now out of baseball, and even though he is the all time home run leader, it is doubtful that he will ever make it to Cooperstown.

Towards the end of the film there is a segment on baseball's "Curses." It had been 86 years since the Boston Red Sox had won the World Series, a victim of the "Curse of the Bambino." The Cubs were jinxed by "The Curse of the Billy Goat" in 1945 and still have not won a World Series since 1908. But in 2004, to all of New England's delight, the Red Sox finally beat the Yankees in the playoffs and swept the World Series. In 2003, the Cubs were only five outs away from going to the World Series when the

Billy Goat curse struck again in the form of a loyal Cub fan. Steve Bartman allegedly plucked a foul ball out of the Cubs' left fielder's glove and the team unraveled.

Mike Barnicle, a Boston journalist and rabid Red Sox fan, summed it up—when you leave this life, your children will remember you in many ways. They will think about the time they spent with you as a father, and baseball will be a big and blessed part of those memories. 



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

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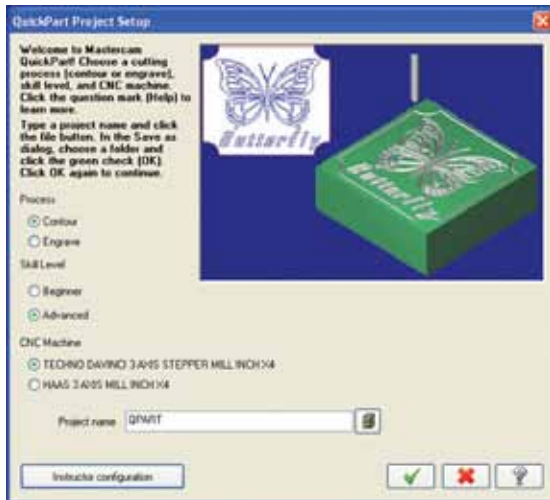
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◀ CNC Software

Mastercam QuickPart gives students a fast, easy way to design and cut parts while learning the principles of CAD/CAM. Mastercam QuickPart is easy to use, and takes a student step-by-step through a basic CAD/CAM application. It uses Mastercam functionality to let a student first design a part, and then create toolpaths to cut the part. From material selection to stock size to tool selection, a student will learn the methods involved in manufacturing with state-of-the-art CAM software.

For more information, please contact CNC Software Inc. at 800-228-2877 or visit www.mastercam.com.

▶ DMG/Mori Seiki

DMG/Mori Seiki introduces the new NTX2000 integrated mill turn center. The NTX2000 is a compact integrated mill turn center with a maximum workpiece of 660 mm x 1,540 mm. This machine is suitable for complex and high precision machining, which is required to cut parts used in the aerospace, medical equipment and semiconductor industries. The machine meets many different needs with features including: Mori Seiki's original technologies, high productivity, space saving, high precision, MAPPS IV + ESPRIT and a wide choice of models.

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



◀ FANUC

The new FANUC Series 30i-MODEL B Control is an upgrade from the Series 30i-MODEL A Control. The Series 30i-MODEL B offers newly enhanced features and functions with new advancements in operability and maintainability including: a USB memory port, enhancements in dual safety check, a new punch press, and laser functionality. For advanced machining with high accuracy, the 30i-B boasts advancements in high-speed 5-axis capabilities with proven architecture and software algorithms to drastically reduce cycle times while improving part accuracy and quality.

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

fresh stuff

► Hardinge

The new FlexC collet system proudly falls in the “special accuracy” collet classification having guaranteed accuracy within .0004” (.010 mm) TIR for both collet system styles A (pull-back stationary stop) and D (pull-back thru-hole) and .0008” (.020 mm) TIR for style DL (push-to-close dead-length®). These systems achieve the same gripping capability as conventional collets while using less draw bar force. Additionally, the all-too-frequent variation in bar stock will no longer be a hindrance. The collet head has a gripping range of $\pm .020$ ” (.5 mm) of its nominal size to allow variation in bar stock without having to change the collet.

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



◀ INDEX TRAUB

INDEX TRAUB announced the new TNL18 sliding headstock automatic lathe and its variant, the TNL18P production machine. The TNL18 can be changed over in minutes to produce precision parts with or without a guide bush for long or short parts from bar up to 20 mm diameter. Up to three tools can be on the part at once. The machines are ideal for medical component machining, delivering precision and qualified surface finish in a single operation.

For more information, please contact INDEX TRAUB at 317-770-6300 or visit www.index-usa.com.

► Lexair

Lexair (Production Dynamics) introduces a new low-profile stationary collet closer that uses quick-change vulcanized collet heads. These collet closers were designed around the Hardinge® Flex-C™ collet heads, and will also accept other brands of vulcanized collets on the market currently being used in lathe applications. Lexair Flex-Grip Collet Closers can be used horizontally or vertically on mill tables, tombstones or rotary trunnions. Lexair Flex-Grip Collet Closers have a through-hole, double-action, fixed-length design allowing long parts to be accommodated through the body.

For more information, please contact Lexair Inc. at 859-255-5001 or visit www.lexairinc.com.





◀ Mitsui Seiki

Mitsui Seiki's new 2500 mm HU100A-5XLL Horizontal Machining Center is now available and designed for machining large, complex, and heavy (up to 6600 lbs.) hard metal parts. The HU100A-5XLL offers an X, Y, Z working envelope of 2500 mm x 1750 mm x 1400 mm (98.4 in. x 68.9 in. x 55.1 in.). The A and B tilting and rotating trunnion table axes represent the 4th and 5th axes of motion. The standard spindle offering is a 50 taper, although many manufacturers taking extra heavy roughing cuts in titanium and tough steels could opt for the HSK 100 or HSK 125 spindle with extra high torque—3332Nm (2457 lb.-ft.).

For more information, please contact Mitsui Seiki USA Inc. at 201-337-1300 or visit www.mitsuiiseiki.com.

▶ Rustlick

Rustlick is excited to announce the release of ULTRACUT Aero, a new premium water-soluble oil optimized for high-tech ferrous and nonferrous metals including titanium, aluminum, Inconel and stainless steel which are widely used in aerospace, medical and the electronics industries. ULTRACUT Aero uses the latest lubrication and antimicrobial technologies to create a cutting fluid that is "high-performance and long-lasting" and it is proven to offer maximum bioresistance against bacteria and fungus.

For more information, please contact Rustlick at 847-657-5343 or visit www.rocolnorthamerica.com



◀ Sandvik Coromant

Each carbon fiber material has its own demands, which increases the risk for delamination or splintering. The new CoroDrill geometries reduce this risk, ensuring the stringent hole tolerances are met with exceptional finish and quality. The range includes reamer geometries and a countersink tool with microstop for chamfering.

For more information, please contact Sandvik Coromant at 201-794-5000 or visit www.sandvik.coromant.com/us.

fresh stuff

► Seco Tools

The Jabro line of end mills features five new cutter geometries, designed to prevent delamination and fiber shattering across a range of processes. The tools utilize Seco Tools' DURA diamond coating to resist the abrasion that impedes the performance of traditional end mills. Jabro products are ideal for slotting, as well as roughing and finishing operations for side milling and copy milling.

For more information, please contact Seco Tools at 248-528-5200 or visit www.secotools.com/us.



◄ Stama America

Stama America, announces the MC 726/MT-2C mill/turn, twin spindle machining centers for the automotive, fluid power, tooling, medical and other industries. Two independent spindles are onboard, each on a traveling column assembly and each supporting an independent swivel table, one of which acts with a bar feeder mechanism. Workpieces are introduced to the turning spindle, transitioned by a conveyORIZED gripper assembly to the milling indexer, and fed to the milling spindle before finally exiting the work area.

For more information, please contact Stama America at 630-233-8101 or visit www.stama-america.com.



► ZPS America

ZPS America announces its newest Swiss CNC, the ZPS Swiss series, which covers 3 mm to 32 mm bar diameter. The rigid, European-built machine is designed for the continuous or series production of precision turned parts. Solid base casting ensures maximum rigidity and stability. The Swiss style turning centers provide outstanding accuracy and quality surface finish conditions for precision parts. The machines are equipped with the GE Fanuc 160i control systems and drives that are capable of handling up to 12 controlled axes.

For more information, please contact ZPS America at 317-452-4030 or visit www.zpsamerica.com.



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WICKMAN

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

ACME

7/16" RA6, 1975 & 1964
3/4" RA8, 1970
1-1/4" RA6 1978-61 (9) - some
w/threading pickoff
1-1/4" RA6, thrdg. pick-off 1987
1-5/8" RB8 CNC slide
1-5/8" RBN8 CNC slide, 1996
1-1/4" RB8, 1981, thdg., pickoff (2)
1-5/8" RBN8, 1968
1-5/8" RB8 thdg., pickup '68-'72
2" RB6, 1967 & 1980
2" RB8, 1966
3-1/2" RB6, 1970
2 5/8" RB8, 1960 w/CNC slide
2 5/8" RB6, 1980
1 1/4" RB8, locked spindle, '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
HB 4516, 1988

SCHUTTE & GILDEMEISTER

SF51, 1985-79 (3)

SWISS

Tornos Deco 20 mm, 2000
Ganesh Cyclone 32 w/ LNS express, 2006

NEW BRITAIN

Model 627, 2 5/8" 1980
Model 630, 3" 1980
812, 1 1/4" 8 sp., 1981
Model 52 1 1/4" 6-spindle, 1979

CNC Lathes

Mori-Seiki ZL150, 2002
Murata, MW120, 2004

ESCOMATICS

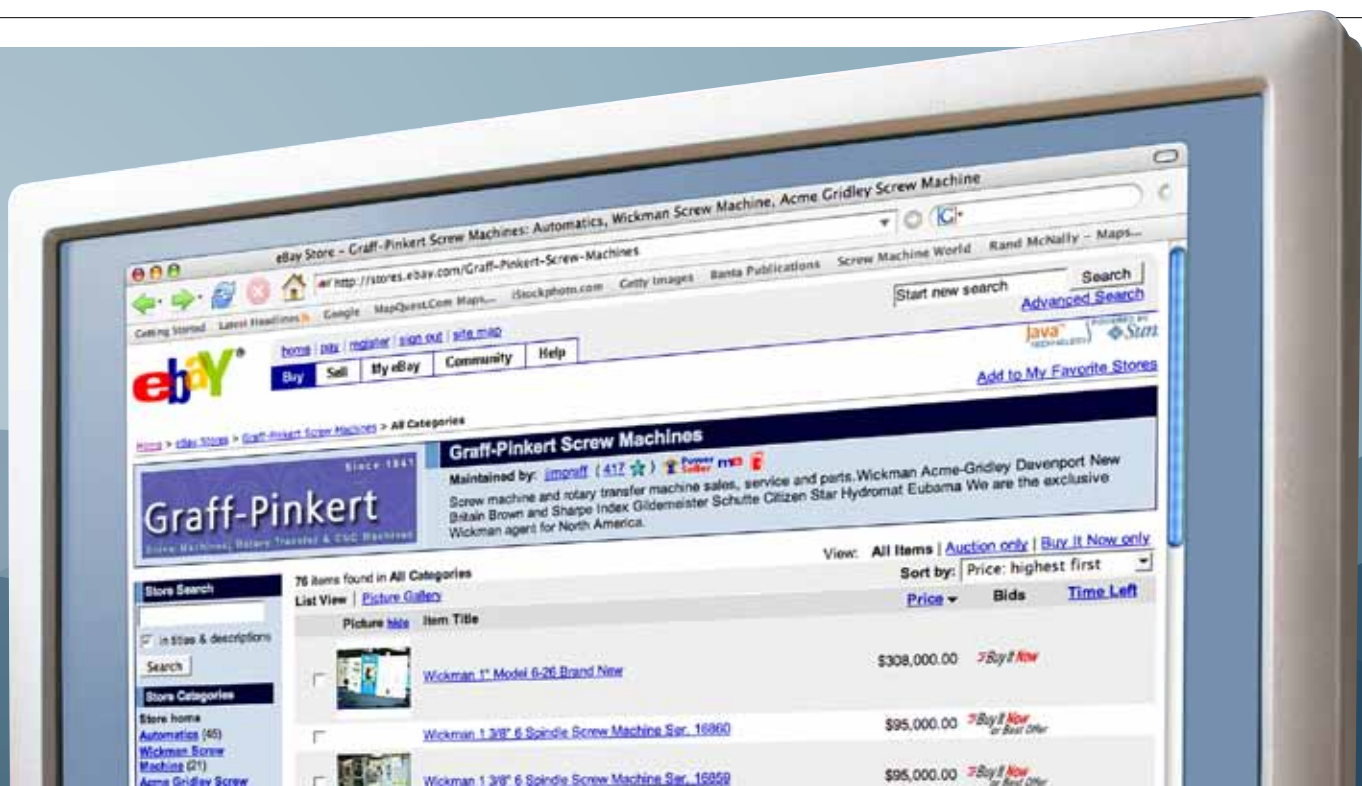
D9 (2), 1995
D6SR (2)
D-2, D-4, 1975

MISCELLANEOUS

5 1/4" RAC Nat. Acme spindle bearings
3-1/2 RB6 thdg. attachment
Hydromat units
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Hartford 10-300R flat die threads
Sweco 6 cu ft.
Agathon 175 grinders (3)

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A Maegerle creep feed grinding machine.
Photo courtesy of PGM Corp.

creep feed grinding



Don't Call it "Grinding"

Creep feed grinding, a high stock removal technology, uses abrasives to cut any material you can think of, precisely and nearly burr-free.

What is it used for?

Creep feed grinding, an underutilized and maybe unfamiliar technology, is ideal for heavy material removal. It cuts difficult-to-machine materials, easily holds precision tolerances, and leaves few, if any, burrs.

Creep feed grinding uses much deeper cuts and a decreased feed rate compared to conventional grinding. "Grinding is often thought of as a finishing operation. Creep feed grinding takes it to a whole new level by combining the higher stock removal operation with a finishing capability, all at once," said Ken Kummer, CEO at Abrasive Form, Inc., Bloomington, Ill., a machine shop specializing in creep feed grinding.

What's in a name?

So why, with all these advantages, isn't everyone using it? The problem is it's called *creep feed grinding*, said Stuart C. Salmon, Ph.D., president of Advanced Manufacturing Science & Technology, Rossford, Ohio, who has been called the father of creep feed grinding. "You've got *creep* in there, and worst of all, *grinding*, because everybody hates grinding."

People who could use it won't even read an article with *grinding* in the title, Salmon said. They will think, "Well, here's a process that takes forever to remove hardly any material." And *creep feed* sounds like it should be even slower. "Everybody thinks it has to do with grinding, but it's really a high stock removal process," he said. It's milling, but with an abrasive tool.

Creep feed grinding was developed more than 50 years ago in Germany and has made inroads in Europe and in some shops in North America. But now the technology may

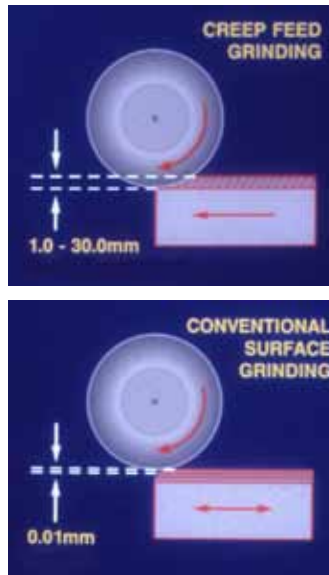
be coming into its own. "Aerospace super-alloys give people fits. You can't use conventional tooling on those. Then we start moving into the area of ceramics and cermet-type materials," said Salmon. "Even something that sounds like it should be easy—whisker-reinforced polymer. If you try to fly cut or mill it, the plastic machines easily, but the fibers get torn out by the big cutter. With grinding, you get an absolutely smooth finish."

No matter what you call it, this technology deserves attention. "I have not come across a material I cannot creep feed grind," said Salmon, and as a longtime consultant in abrasive machining technology he's seen a lot of materials. "One of the latest ones has been cermet materials for racing cars—titanium aluminide. It work-hardens if you try to machine it with big-chip machines, but you can grind it very easily."

Big chip, little chip

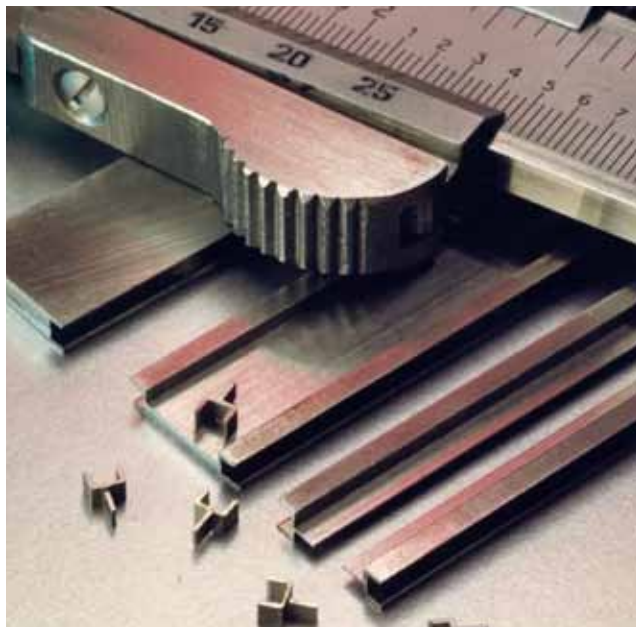
"What's happening with creep feed grinding is much like a milling process, but using a grinding wheel instead of a milling cutter," Salmon said. It's just making a lot more, smaller chips. "We're taking a depth of cut similar to that with which you would use a milling cutter and plowing through material at milling-type speeds. And you say, 'Well, so what? What's the big deal there?'"

"A fine example is with a hand gun manufacturer. When the Brady [handgun] bill [passed] manufacturers couldn't make guns fast enough. They had to look at how they could increase production," Salmon said. One manufacturer looked at improving the process for milling the forms on each side of the barrel.



Above: Creep feed grinding takes a depth of cut 100 or more times that of conventional grinding.

Illustrations courtesy of Advanced Manufacturing Science & Technology.



how it works

Left: Tiny terminal clips made by creep feed grinding. The process, from left: Slots cut into both sides of the blank. Material removed from the center of the blank. Blank cut into two strips. The strips cut into clips.

Photo courtesy of PGM Corp.

Below: Creep feed grinding in action.

Photo courtesy of PGM Corp.

They considered creep feed grinding, but for the actual machining process, it was a wash. No savings. However, “milling left you with a gnarly looking surface and a big burr on the end of the part,” Salmon said, “Whereas the grinding process gave you a very smooth finish and virtually no burrs, which meant the hand benching and polishing of the gun barrels was minimal and the saving was huge.”

The process is economical in many ways. “Forms are normally ground from the solid with no pre-milling or forming required,” Kummer said. “If a part requires heat treating, grinding from the solid after it is hardened eliminates an operation and circumvents the distortion problems associated with the old ‘pre-mill then grind’ process. Furthermore, the process is close to burr free, and burrs can be an expensive problem.”

Unintentional discoveries

Edmund and Gerhard Lang first performed creep feed grinding back in the 1950s in Germany, quite by accident, Salmon said. They were experimenting with an electrolytic grinding process and “one day, so the story goes,” he said, “they forgot to turn the current on. The grinding wheel walked through the workpiece with no electrochemical anything.” Creep feed grinding was born from that experiment.

In the 1970s, Salmon was working at Rolls Royce and made his own surprising discovery. “Then I came along,” he said, “not trying to find any particular process. I was doing some analysis of why creep feed works the way it does. I decided if I could maintain the grinding wheel’s sharpness, I could analyze a little more of what’s going on.” So I continually dressed the grinding wheel as I was grinding with it, and all of a sudden my specimen material, which was supposed to be unmachinable, was machining like butter—there was never a burn or a burr on it,” he said.

“I just kept increasing the feed rate and [went from] feeds of millimeters per minute up to meters per minute. That’s how the continuous dress creep feed process came up,” Salmon said.

Wheels

“Traditional creep feed grinding demands a high-porosity grinding wheel. It looks very open, and you could almost pick the grains out of it with your finger. It has the delicate skeletal structure of a grinding wheel, because it needs lots of room for the swarf. The uninitiated [might say], ‘This wheel—it seems as if I just sneeze at it, it falls apart—how can it machine material as fast as a milling cutter?’ In the creep feed process, I’m spreading [the force] over a very large area—it’s actually much lower, if you look at [pressure], than it typically is for a conventional grinding wheel [high force over a small area].” Aluminum oxide and silicon carbide are the usual abrasives.

Wheels using superabrasives—cubic boron nitride (CBN) and diamond—made possible a new type of creep feed grinding: high efficiency deep grinding (HEDG). These wheels made of metal have a single layer of the superabrasive on the surface. Run at extremely high speeds, the HEDG process rapidly removes material in fine, dust-like particles, so you don’t need the porous wheel, and it doesn’t require wheel dressing.





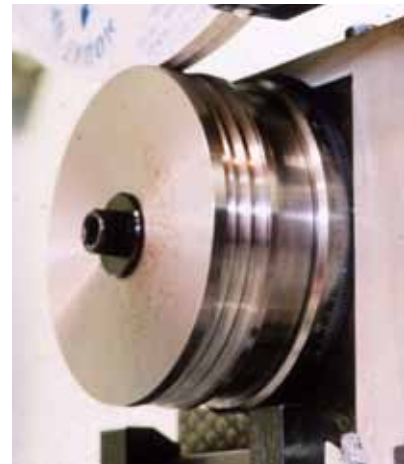
Left: On this compressor disk, slots were cut by creep feed grinding (left side), leaving only a small amount of material to remove with a small broach to create the final form (on right side). Previously, the whole form was cut with an expensive broaching process.

Photo courtesy of Advanced Manufacturing Science & Technology.



Middle: Clippers like these require deep precision grooves in hardened steel, ideal for cutting by creep feed grinding. The result: No distortion in the part and minimal burrs.

Photo courtesy of Advanced Manufacturing Science & Technology.



Right: Creep feed grinding of a round part.

Photo courtesy of Advanced Manufacturing Science & Technology.

Do not try this at home

Some who hear about creep feed grinding will try it on their own conventional grinding machines by taking a heavy cut, Salmon said. But this provides disappointing results, and then they may reject the creep feed concept. Creep feed grinding requires the proper combination of the right machine (rigid and high-powered), wheel (extremely porous, designed for the job), coolant delivery (high pressure and in the right place) and other factors. People in the business will tell you that any one factor can ruin the process's efficiency.

Grinding tolerances at milling speed

"Anything that is a form-milled process if you think of it, is so easy because grinding machines hold to less than a thousandth. You say, 'Oh, easy. Plus or minus half a thousandth, that wouldn't be too difficult, either,'" said Salmon. "But if you said those sorts of tolerances to a milling person, it would be, 'Oh my goodness—I need to make a way around that.'"

Applications

A common type of application is "putting slots into a pump rotor for a vane pump," Salmon said. "To put in the slot accurately, straight, with no burrs, is difficult to do with a milling cutter, but with a grinding wheel you can just plunge it in, and go on to the next one."


PGM Corp. uses creep feed grinding for parts used in many different industries, including firearms, copiers,

pumps, and actuators, said Todd Hockenberger, corporate vice president, at PGM Corp., Rochester N.Y., a shop that offers creep feed grinding. His company uses the process for surgical and other blades, giving a nice, sharp edge. Using creep feed grinding to make the blades for a bagel cutter allowed them to produce the serrations and the edge in one shot, he said.

Abrasive Form specializes in blades for turbines, for both aerospace and power generation, Kummer said. The company's 50 creep feed grinders also crank out parts for other markets, including medical, dental, automotive, pulp and paper, heavy machinery and hand tools.

A problem-solving technology

"It is exciting when people see the process. It's quite an eye-opener, especially if they have some difficult-to-machine material—here's this monumental problem they have and all of a sudden this wheel walks right through it," Salmon said. "And relief comes over their face. It's really quite something."

"I would say that if you mill or turn or broach, maybe you should consider creep feed grinding," Salmon said. You can check out the technology by contracting work to a shop that specializes in the process. 

For more information:

Abrasive Form, Inc.: www.abrasive-form.com

Advanced Manufacturing Science & Technology:

www.moderngrindingtechnology.com

PGM Corp.: www.pgmcop.com

United Grinding Technologies, Inc.: www.grinding.com

"What is Abrasive Machining?":

<http://tinyurl.com/abrasive-machining>



I DON'T WANT YOU

How the American visa system
keeps skilled workers out

BRIDGET MINTZ TESTA

i don't want you

Although the nation-wide shortage of workers in science, technology, engineering and mathematics (the “STEM” fields) is well-known, the comparable and equally critical shortage of skilled workers in fields like manufacturing has hardly been publicized at all.

Most efforts by American industry, including those specific to machining, have focused on improving programs and training for young adults; even trying to grab the interest of students as young as 12 or 13 to entice them into a career in the skilled trades. Despite these efforts, nobody knows if the U.S. will produce enough skilled laborers to support the manufacturing sector in the coming years.

Unlike in the STEM fields, there have been few government-sponsored visa programs to bring skilled trade workers to the U.S.—so the affected industries have been left to solve the problem by themselves. One part of the solution to the skilled labor shortage could be to hire skilled trades-people from Europe’s strong apprenticeship system and bring them into local machine shops. But how does a shop go about doing this, and is it worth the time and cost? These questions bring up the role legal immigration could play in supplying the necessary amount of talent to support the U.S. manufacturing industry in the coming years.

An intro to the U.S. visa system

Each year the U.S. makes available 140,000 employment-related visas that can lead to permanent residency by awarding a permanent resident card, or “green card,” and 65,000 H-1B visas, which are strictly employment-related and have an expiration date. Another 225,000 family-related “green cards” are also issued annually, but these have nothing to do with employment. All “green cards” are permanent, although they sometimes have conditions and must be renewed periodically, like drivers’ licenses. Employment-related visas are issued based on the applicants’ education level, and there are multi-year backlogs to get one, said William A. Stock, an attorney specializing in business immigration with the Philadelphia law firm Klasko, Rulon, Stock & Seltzer, LLP.

The H-1B visa, which is good for six years, is one of an alphabet soup of temporary visas that companies can use to sponsor foreign nationals to come and work in the U.S. Other visas used for this purpose include the H-2A, H-2B, L and E visas. H-1Bs are different from the other temporary visas in that someone in the U.S. with one is eligible to apply for permanent residency.

The recession lessens demand for workers from abroad

For fiscal years 2007 and 2008, all 65,000 H-1B visas were taken by the end of the first day they were made available, said Lynn Shotwell, executive director of the American Council on International Personnel. ACIP is an organization of U.S.-headquartered companies from all industries with more than 500 employees that have an interest in employment immigration.

Since the recession began, it takes as many as six to eight months for all H-1B visas to be taken. Companies are now able to hire from within our borders because of the surplus of American workers available. For fiscal year 2011, it took from April 1, 2010, until January 26, 2011, for all 65,000 H-1B visas to be taken. No more applications can be accepted until April 1, when the 2012 visas become available. In any year, after they receive their H-1B visas, recipients can’t start work until the following October 1. So individuals who received visas on April 1, 2010, are eligible to start working on October 1, 2011.

Unlike these temporary visas, “green cards” award permanent residency and the right to work in the U.S. on the same terms as a citizen. “The normal “green card” process takes two to 10 years,” Stock said, “but it can take more. The higher the level the job is, the faster the “green card” will be issued.” With jobs requiring only a bachelor’s degree getting a “green card” can take six to 10 years.

Who gets first dibs?

“The 140,000 employment-related visas (‘green cards’) issued every year go first to highly educated people, such as scientists, authors, corporate executives—known as the ‘first call’ people,” Stock said. “Forty-thousand of these visas are reserved for ‘first call’ people.”

The “second call” category is made up of doctors and lawyer types, “those at a master’s



i don't want you



degree level or above,” Stock said. Another 40,000 visas are reserved for this category. The third level includes everyone else—those with only bachelor’s degrees and skilled and unskilled labor, he said.

The problem is that in practice the categories aren’t clear. Because so many people are interested in working in the U.S., there is a lot of spillover from one level to another. There may be 60,000 people in the “first call” category, so 20,000 of them spill over to the “second call” level, which means they get priority. Now there are only 20,000 “second call” visas left that year, and perhaps 60,000 applicants in that category as well. This group gets the remaining “second call” visas and all the remaining category three visas, too.

It can take years

On top of the spillover problem, there’s an enormous backlog. “In 2000, 2002 and 2003, the Immigration and Naturalization Service (now the USCIS) didn’t process half the visas,” Stock said. “In 2007, the State Department and USCIS had a feud over visas. The State Department told the USCIS to process all new applications as though there were no backlog.”

Today, there’s a backlog of more than 100,000 visas being worked on at a rate of 140,000 visas per year. But that doesn’t count new visa applications coming in. “Every year is the same—they start at the top and work down in terms of skills,” Stock said. That is, it’s not first in, first out. It doesn’t matter how long your application has been on file; what matters is whether you’re in the “first call,” “second call” or “third call” group. “So the immigration process [can] take 10 years,” Stock said. “Unskilled workers can’t get in at all, and the laws don’t work for skilled labor, like machinists, either.”

An option for the well educated

H-1B visas can only be used for jobs that require a college degree, and the people who get H-1B visas must have a degree related to their profession to get the visa. “My American Council on International Personnel (ACIP) members are spread across all industries, and they’re hiring people with a minimum of a bachelor’s degree,” Shotwell said.

“Frequently, they’re hiring people with higher educational levels.” And when Shotwell’s members are hiring via H-1B visas, they use them as a way to allow the person to work here while they wait on a “green card.”

“When our members are recruiting at college campuses in the United States, they find that more than half of the graduates in science, technology, engineering and math are foreign nationals—especially in the advanced degrees,” Shotwell says. “So they have to use the visa system to hire these people.”

Little help for the skilled trades

There are some visas available for trade positions, but they don’t help machining companies or other industries trying to recruit skilled labor. H-2A visas are specific to agricultural workers, only last for about nine months, and can’t be renewed. H-2B visas could be used for machinists, but like the H-2A visas, they only last for nine months and can’t be renewed. Additionally, both the H-2A and H-2B visas take so long to get that by the time the sponsored employee arrives, your need for them may have passed.

Strangely enough, there are two visas, the L and E visas, available strictly for companies based outside the U.S. but with facilities on U.S. soil, or for U.S. companies that have foreign facilities. But these visas are good for just a few months and focus on special projects. They too can take a ridiculous amount of time to process. “It may take an employer anywhere from three to five months to get H-2A and H-2B visas, and four to eight weeks for L and E visas,” said business immigration attorney William Stock.

You said, how much?

Besides the hassle and time commitment of working through the USCIS system, another deterrent for companies trying to hire from out of the country is the cost. It takes several thousand dollars to obtain an H-1B visa, including the legal costs. “The legal fees to hire someone on an H-1B visa and then get them a “green card” can run more than \$30,000,” Shotwell said.

Training at home

Ted Toth, president of the third-generation family-owned firm, Toth Technologies, and secretary-elect for the National Tooling and Manufacturing Association’s (NTMA) 2011 board of directors, started the organization’s Precision Jobs for American Manufacturing program and ran it for four years. “It’s a means of supporting training centers,” Toth said. “It helps support recruitment and training of manufacturing, placement and retention of employees, and how to build a good advisory board. We want to start recruiting in elementary school,” he says. Toth also mentioned the

NTMA's National Robotics League's competitions as a strong recruitment device, and Toth Technologies is currently sponsoring a student in community college.

Roger Sustar, president of precision manufacturing company Fredon Corporation in Mentor, Ohio, started sponsoring high school and vocational students in 1992 to

buildannons so they could learn machining skills. Sustar has hired about 350 "graduates" of the Cannon program since its start. It is a feeder system for Fredon.

Just last year, the northeast Ohio Alliance for Working Together, also initiated by Sustar, partnered with Lakeland Community College to develop a two-year manufacturing associate degree. It's intended to help address the area's projected need for 60,000 skilled workers in the next 10 years.

For the long-term, Sustar foresees no machinist shortage for his company or community thanks to the Cannons of Fredon and the Lakeland Community College programs. "For my company there is no shortage because I work hard on it with the local community," he said. "The community college system will feed the community. These kids are our future."

Immigration Reform Today



Many proposals have been made to fix the U.S.'s broken immigration laws. Last September, Senators Robert Menendez (D-NY) and Patrick Leahy (D-VT) introduced the Comprehensive Immigration Reform Act of 2010. The bill included demands from both Republicans and Democrats concerning employment visa systems, a legalization plan for undocumented aliens, and mandatory employment verification.


In December, Senate Majority Leader, Harry Reid (D-NV), and Majority Whip, Dick Durbin (D-IL), introduced a new version of the DREAM Act, which would have given legal status to undocumented aliens who were brought to the U.S. as children, grew up there, did well in school, and wish to attend college or join the U.S. military.

"There are so many stakeholders in the immigration debates, and they can't agree," says H. Robert Sakaniwa, associate director of advocacy for the American Immigration Lawyers Association. Truly comprehensive immigration reform must address legalization of undocumented aliens. As long as the anti-amnesty champions focus on preventing any change in that one issue, no immigration reform can succeed.

"There is a whole faction that is totally opposed to providing legal status to those who are currently undocumented," Sakaniwa says. "They will work hard to stop anything with this type of reform from moving. Even if they support business immigration reforms, their priority is to prevent the creation of a path to legalized status for those who are here now. [They will do that] at the expense of the other reforms they support."

Where the system stands now

Even with the efforts of people like Sustar, the number of people graduating with the skills to work in machining is not enough. And it doesn't seem like visa sponsorship programs or legal work-based immigration will be able to fill in the gap any time soon. Neither of the two pieces of legislation that address immigration reform, the Comprehensive Immigration Reform Act of 2010 nor the DREAM Act, were passed in the last Congressional session. That means efforts to craft bi-partisan, far-reaching immigration reform starts all over again with the new Congress.

The new Congress' first effort concerning immigration was a hearing convened on January 26, by the House Subcommittee on Immigration Policy and Enforcement. Its goal was to determine whether the U.S. Immigration and Customs Enforcement's worksite verification practices were strict enough. This is what is known as an "enforcement-only" solution, but in no way does it address actual immigration reform. In lieu of such reform, industries that need trained, skilled labor are still on their own. 



i don't want you

BY ALAN EARLS

origins

Today's *Machining World's* new feature, "Origins," tells the stories of how successful technologies, companies and people got their start. This month we discuss the beginning of CNC technology, and the resistance that came along with adapting this new, and at one time radical, technology.

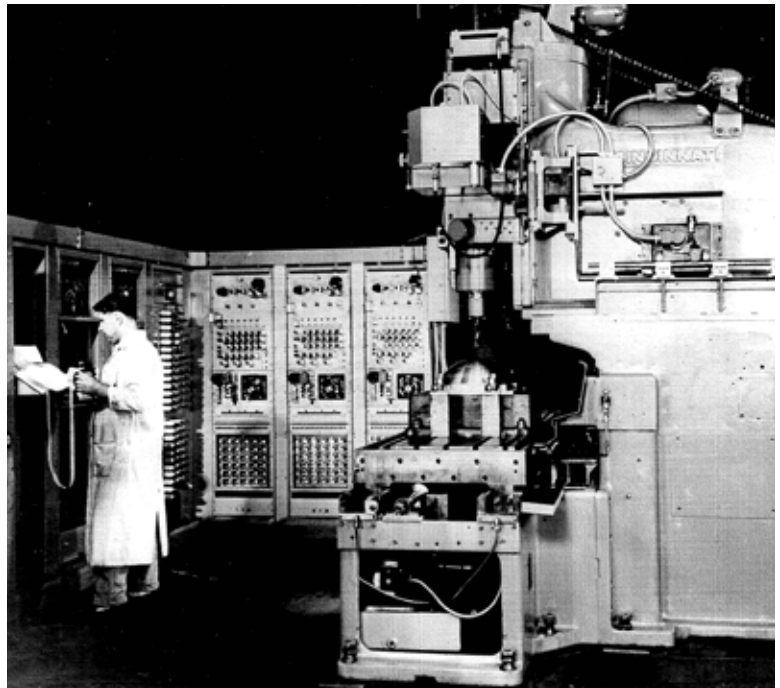
A Break from the Grind

Despite saving labor and making possible new and better products, in its beginning, CNC machining got off to a slow start.

Automation. You gotta love it. Sure, there are traditionalists who decry the "deskilling" of the work place. Maybe they are right. But think of the billions of man (and woman) hours spent by human beings as mere helpmates to machines—manufacturing parts in an endless cadence of repetition. More than 30 years ago, John Hovorka, an early punk rock pioneer, captured this unvarnished reality when his band recorded "Bridgeport Lathe"—three minutes or so of discordant complaints about a deadening job in manufacturing, punctuated by the refrain, "The Bridgeport lathe is driving me insane."

Allowing for some poetic license (Bridgeport never made a lathe), the song does a good job of capturing the mental state of the anonymous worker, making part after part and scarcely daring to look up to watch a girl from the front office go by, lest he lose a limb to the unforgiving machinery.

The alternative to all that hand work, automation, got a surprisingly slow start in the U.S. after the end of World War II, but then a modest boost during the Cold War, thanks in part to generous department of defense funding. In fact, according to the late David F. Noble, the author of *Forces of Production: A Social History of Industrial Automation*, it was in part the military's fear of subversive elements among union members that increased the military's



Above: MIT's Servomechanisms Laboratory played a key role in the development of CNC technology between 1949 and 1960. The MIT system used a Cincinnati Hydro-Tel milling machine (above) controlled by custom-built computer. Photo courtesy of MIT Museum.

interest in automation. For businesses, too, workers, with their propensity to strike, were problematic, which made automation an appealing option. Still, despite automation's appeal, it took time and experimentation to get it right.

Though by no means the only pioneer in the field, the immediate "father" of modern precision machine tool automation, credited as such in the Machine Tool Hall of Fame, is John I. Parsons. In the late 1940s, following some promising experiments within his company, Parson proposed to develop a three-dimensional numerically controlled

machine tool and persuaded the Air Force to fund the project. Eventually, however, the project was transferred to the boffins at the Servomechanism Laboratory of the Massachusetts Institute of Technology (MIT), which had established a strong track record during the war for making sophisticated gadgets. Still, it was Parsons who got the first patent.

Under the auspices of MIT, the project grew in size and expense. The boys at MIT succeeded in harnessing early (and expensive) electronic circuitry to the task of running machine tools, using punch tape and later magnetic tape.

Importantly, the machine didn't just make a series of cuts at specific points, as originally proposed by Parsons, it traversed between points, milling a smooth surface in the desired shape. The demonstration project was conducted using a Cincinnati Milling Machine Company Hydro-Tel machine dolled up with gears and servo-motors to replace the handwheels. It also incorporated a massive and complex controller, which had 250 vacuum tubes and 175 relays.

At first, the MIT project, and those of its competitors, operated with "numeral control," which is to say lots of manual setup and programming. In fact, one study estimated that the early CNC systems hadn't necessarily saved much

POST, AUGUST 3, 1952

MILLING OF PARTS DONE BY A ROBOT

M.I.T. Now Operates Mathematical Wizard

A mathematical wizard is in operation at the Massachusetts Institute of Technology which performs in minutes many of the tasks that in current practice take hours. The numerically controlled milling machine, believed to be the first of its kind in the world, represents a new and pioneering step in the automatic control of machine tools.

RESPONDS TO NUMBERS
The M. I. T. robot responds to instructions transmitted to it as numbers, and substitutes mathematical operations, which are performed on modern computing devices for many of the hand operations now required in industrial production. The numbers which direct the

M. I. T. machine are derived directly from the drawings and specifications of the part to be worked. This digital information is coded and punched on a paper tape similar to that used in the automatic transmission of teletyped messages.

The information on the tape is interpreted by the machine director which employs standard electronic information-processing techniques. The commands are then carried out by power amplifying devices called servomechanisms.

Servomechanisms, or servos, came into prominence in World War II when they were used in the control of radar systems, shipboard guns and secondary equipment for military needs.

This robot has been developed at the Servomechanisms Research Laboratory at the Massachusetts Institute of Technology under contract to the Air Materiel Command at the Wright-Patterson Air Force Base. Its development was supervised by James O. McDonough, project engineer, under the direction of Professor William M. Pease.

He points out that once a tape is properly punched, it provides a permanent, compact control record which may be used at any time for the milling of duplicate parts.

"Such a tape," he says, "guarantees a tremendous saving in time to an industry like the aircraft industry where a single machine must mill a variety of parts on a staggered schedule."


An article published in the *Boston Post*, 1952.

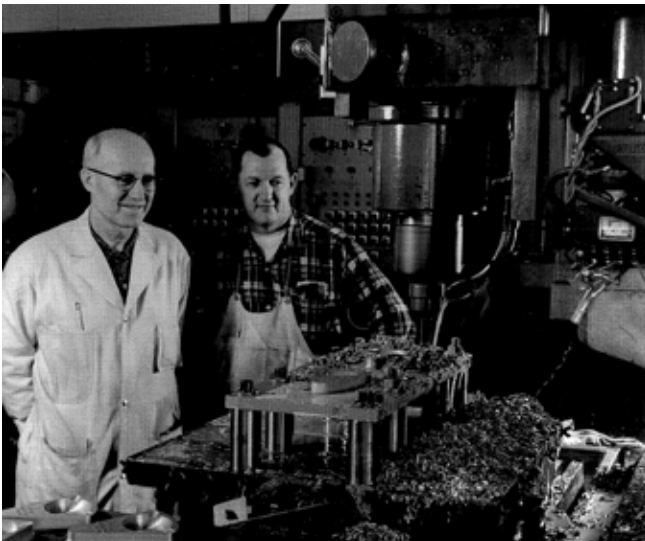
Photo courtesy of MIT Museum.

labor—they just moved it to a different kind of worker. However, in 1956, work began on the APT programming language, which helped make possible full computer control and much more rapid setup. In 1959, as a demonstration project, a fully computer controlled milling machine was used to produce a commemorative aluminum ash tray (yes, once upon a time, ash trays were considered a fashionable accessory for any desk).

Still, the adoption of CNC technology by the industry was very slow, partly due to cost and reliability issues but also perhaps because CNC represented such a dramatic change. As Noble noted in his book, "The dreams of those who promoted numerical control did not translate automatically into any major industrial transforma-

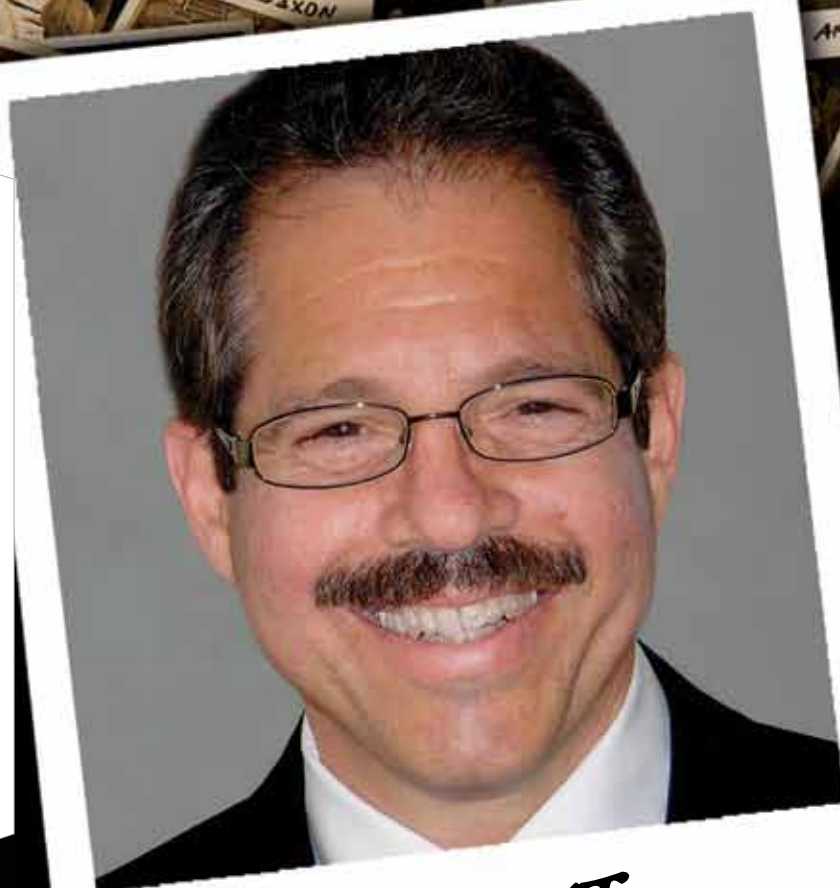
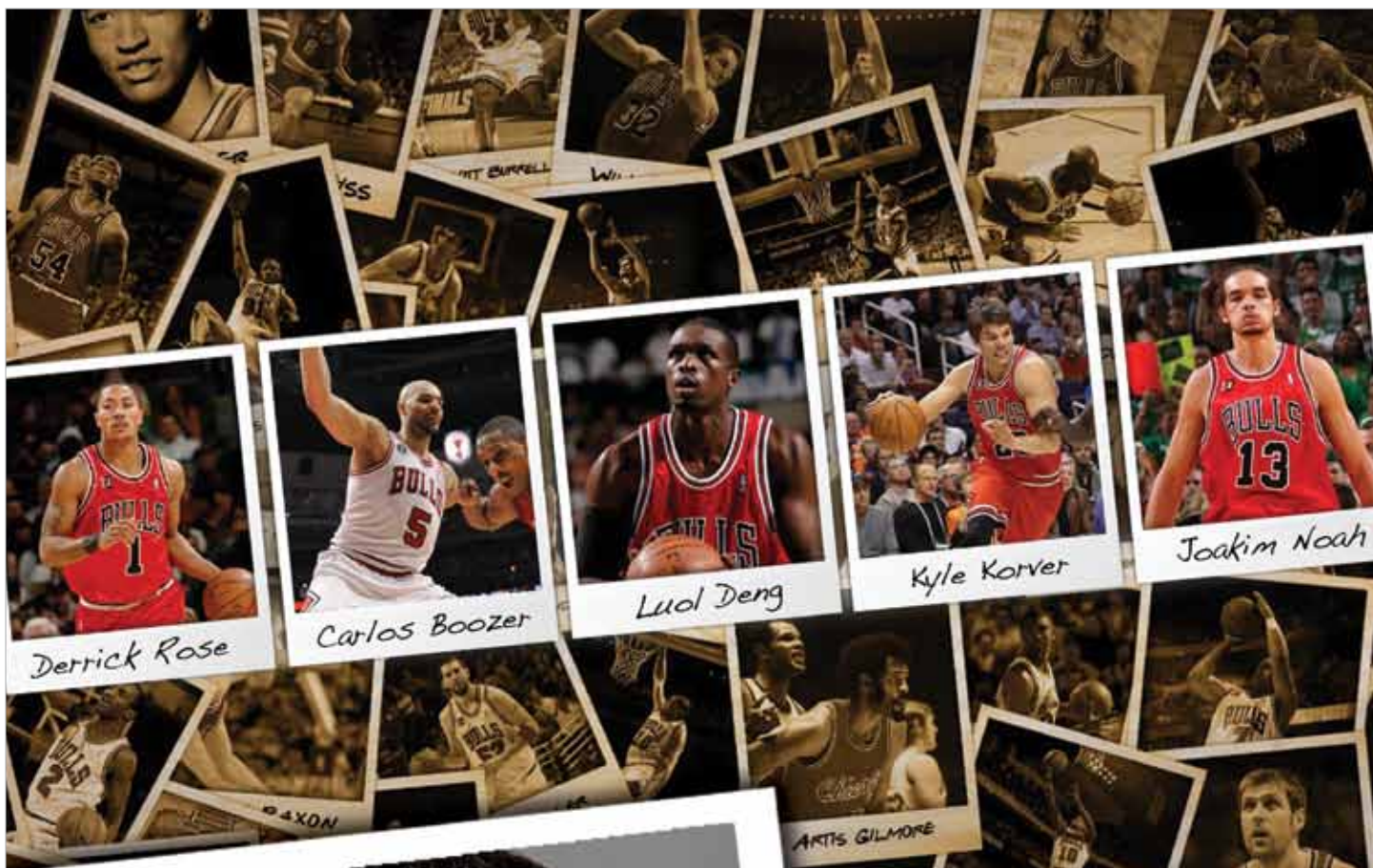
tion." At least not at the time.

But eventually change did occur. "When it comes to adopting a new technology like CNC machining, it takes time for people to see the value," says John L. Kenshalo, Jr., today the president and CEO of a small CNC job shop in central California. But over time, people did. Maybe it's time for John Hovorka to compose a new, more upbeat tune. Maybe about the operator of a CNC machine. 



Left: Technicians observe the action of the MIT milling machine.

Above: A close up of a cutting tool as it mills out an ashtray using APT programming language. The ashtrays were given away as souvenirs following key demonstrations. Photos courtesy of MIT Museum.



DR. J

Dr. Steven Julius,

also known as Dr. J, has served as team psychologist for the Chicago Bulls since 1988. He is also the founder of the Human Resource Consulting Group, which advises senior executives of major corporations, entrepreneurial companies, professional service organizations, and government agencies.

How did you become the Bulls' psychologist?

SJ: I was brought in by a friend who had a relationship with the general manager at the time, Jerry Krause, to help out with some organizational issues. After that they began to ask me questions during the draft. It was the draft when Shawn Kemp, Stacey King, and BJ Armstrong came out. And from there the relationship simply grew.

So they wanted you to evaluate the players?

SJ: We evaluate players and determine their capabilities to not only make it in the NBA but also to adjust to going from high school or from a very short time in college straight into a professional job. The Bulls were one of the first teams back in the days of Tim Floyd to develop the Player Development Program. It helps some of the younger players with their adjustment so they can acclimate themselves, not just as athletes, but as independent self-sufficient adults in the pros. They learn how to manage their sleep, how to manage their money, how to find the right place to live, and how to manage their time effectively.

What does your job entail? Do you have therapy sessions with the players?

SJ: I spend the bulk of my time with the players, and even with the coaching staff, helping them on the mental aspects of the game—like managing stress, using performance anxiety as fuel rather than having it be like a stone tied around your neck, learning how to stay focused and to concentrate, and how to develop what we call “discipline persistence.” In particular, we teach players the importance of spending time dealing with the frustration of working on their weaknesses, rather than over-relying on practicing their strengths.

It must be a challenge to work with players who used to be “The Man” before the NBA but who now have to ride the bench.

SJ: Yes. One of the things we try to get across to these young athletes is that the time to work on their game may be in practice. They may not get a lot of playing time during the game. But every time they hit that wall and learn how to play through it or how to continue to practice as hard as they can as if it were a game, they are developing a level of maturity and emotional and mental toughness that will stand very well once the time comes for them to be in the game.

Do people come to you for help when they are in a shooting slump?

SJ: Oh yeah, over the years I've had people with shooting slumps come to me to learn how to work their way through it. It's often not just physical, but mental. Sometimes they just have that momentary doubt because they are focusing on whether the shot is going to go in or out, versus figuring out how best to put themselves in position to take the right shot at the right time. All of sudden everybody starts worrying, “I've got to hit that shot,” rather than, “I've got to slice off that screen or that pick and roll just right so that when the ball comes I take my shot.”

Are the methods used to succeed in sports similar to those used to succeed in business?

SJ: It's interesting that when I talk to the players as a group they're more interested in hearing stories from the world of business than they are from the world of basketball. Just as the business [people] want to hear sports analogies. At first, I was a little surprised by that, but we all learn by example, and sometimes it's easier to look a step or two outside of our own context to clear our minds and our biases and hear how things are done. Then we can reincorporate it into the way we operate.

What do you think of the old saying, “Chemistry doesn't create winning, winning creates good chemistry”?

SJ: There are short-term [benefits] that come from winning that can overcome problems with chemistry. But over the long-term, there's a reciprocal relationship between the two. It's the mark of a good manager in business or coach on a sports team to recognize that the first thing you need to have to really get people to work together is a goal that they all can aspire towards. Something that's emotionally elevating, that actually motivates people to sacrifice their individual needs for the good of the team. On really high performance teams, every individual on that team holds themselves accountable, not because they're afraid they'll be in trouble for failing, but because they'll let their teammates down.

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 comment on these articles on the Shop Doc Blog at www.todaysmachiningworld.com.

Dear Shop Doc,

We need to make multiple passes back and forth to clean a part, but we need to compensate for brush wear. Cutter compensation has so many stops and starts and weird movement limitations regarding rotation direction and feed direction. There has to be a better way.

Done Compensating

Dear Done,

I too have experienced irritation when dealing with cutter compensation. There may be another way, but it depends on your machine.

Some machines have what are called "common variables." They are variables you can use for part counting, tool life tracking, or other uses. How the machine uses these variables is defined by the program.

I used variables in a similar situation on a RoboDrill machine with a Fanuc control.

My repetitious move was to be along the X axis, so I needed to define the location of the surface on the Y axis. This was programmed in a G57. If I called up the G57 and Y zero, the machine would bring the wheel to a location where the edge of a new wheel would lightly touch the part surface if moved across the part. When the brush wears, it no longer performs adequately.

To compensate for the change in wheel diameter we need to modify the Y position. I chose to use variable 514 for the wear compensation. In the following program excerpt, the program calls up the work shift, subtracts wear value 514 from the Y zero

position, stores the result in 524, then moves the part to the new Y location stored in 524. Using the variable in this manner allows the machine to move in both the X+ and X- directions without stopping the spindle. This method can be used for any side of the part with minor changes to the program and math.

```
G57XoYo
#524=O-#514
Y#524
GoZ-30.0
G1X100.0 F250.0
Xo
X100.0
Xo
X100.0
```

There are some risks involved with this method. For example, if a mistake is made when entering the value into the variable cell, a machine crash could result. An easy solution to this problem is to have the program check the value of the variable against a predetermined min/max value before making any tool move.

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.

In the program example below, the value in cell 514 is checked to make sure it is between zero and 7.01. If the variable check is false, the program jumps to block 778, which stops the program and prints the following message to the screen: **#514 OUT OF RANGE**

Locate near top of program:

```
IF[#514GT7.01]GOTO778
```

```
IF[#514LT0]GOTO778
```

Locate after the M30:

```
N778#3006=1(#514 OUT OF RANGE)
```

The method as detailed above requires the machine operator to maintain the proper amount of variable value required for acceptable performance results. An automatic method is also possible, but only if the tool wear is predictable and consistent. In the example below, the value in cell 514 is incremented by 8 microns each time the program runs. The increment value can be whatever the expected wear-value per part is. This method also allows the machine operator to override this value by changing the 514 value manually.

```
#534=#514+.008
```

```
#524=0-#534
```

```
#514=#534
```

```
Y#524
```

The common variables and math functions can be used for many things. Read your machine manual or contact your machine service company for more information on your machine.

A longer more detailed version of this "Shop Doc" can be found at www.todaysmachiningworld.com.

Mark Bos
Robert Bosch Fuel Systems

Mark Bos is a manufacturing process engineer with Robert Bosch Fuel Systems in Grand Rapids, Mich.

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THE FOLLOWING COMPANIES HAVE PROVIDED
INFORMATION ON VERTICAL MACHINING CENTERS

product focus

This month's "Product Focus" is on Vertical Machining Centers. Super small and super large parts are in demand today, and VMC's offer the flexibility to get the job done.

► Doosan Infracore

Doosan Infracore introduces the DNM 400A vertical machining center, designed for high productivity with precision tolerances, and built to fit the most crowded shop floors. The DNM 400A's rugged, one-piece casting is strategically ribbed to prevent distortion during heavy or interrupted cuts. Fine grain Meehanite is selected for its superior dampening characteristics and ability to dissipate heat. Widely spaced linear guideways give excellent support to the saddle in all locations, regardless of the table's load distribution. Each guideway is induction hardened and precision ground. Rapid traverses are 1181 ipm along all three axes.

For more information, please contact Doosan Infracore at 973-618-2500 or visit www.infracoremt.com.



◀ EMCO Maier

The vertical 15 hp 10000-rpm (12000 rpm optional) spindle makes milling, drilling and rigid tapping operations easy and cycle times brief with the 4042L VMC from EMCO Maier North America. Axis travel is direct driven 40" in X, 21.65" in Z and 24" in Y. The 43" X 19" table can handle loads up to 1543 lbs. Rapids in all three axes is 1181 ipm. Up to 20 BT40/CAT40 tools are accommodated in the Geneva-type automatic toolchanger for full machining of a wide range of prismatic parts in a single setup.

For more information, please contact EMCO Maier at 614-771-5991 or visit www.venturemachinetools.com.



▲ Haas Automation

The new VF-12 vertical machining center from Haas Automation, Inc., easily accommodates the large-volume machining found in the aerospace, automotive and mold and die industries. The Haas VF-12 VMC features travels of 150" x 32" x 30" (xyz) and has a 150" x 28" T-slot table. It is available in both 40- and 50-taper configuration, with spindle speeds to 10,000 rpm. Standard equipment includes a side-mount tool changer, chip auger system, programmable coolant nozzle, rigid tapping, 95-gallon flood coolant system, 15" color LCD monitor with USB port and much more.

For more information, please contact Haas Automation Inc. at 805-278-1800 or visit www.haascnc.com.



▲ Hardinge

Hardinge Inc. announces the newest version of the Bridgeport GX-1000 40" x 21" vertical machining center designed with the Okuma OSP-P200 Control, drives, motors and encoders. With a combined total of over 40,000 OSP controlled Okuma machine tools installed; Hardinge's U.S. distribution network will now be able to serve a broader base of customers with a consistent message of the advantages of OSP controls. "Combining the Hardinge GX-1000 vertical machining center with Okuma's world leading open architecture control system will enable customers seeking a value priced VMC to enjoy the productivity benefits of the latest CNC control technology," said Lee Morris, Chairman and CEO of Morris Group, Inc.

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

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◀ Hurco

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For more information, please contact Hurco at 800-634-2416 or visit www.hurco.com.

▶ Kitamura

From orthopedic implants to extremity fixation and micro machining of the smallest medical devices, Kitamura's Mytrunion-1 offers the versatility of 5-axis simultaneous for the machining of ultra-high precision, complex parts. This next generation machining center combines machining, grinding and turning processes in a single set-up with the benefit of super fine finish capabilities. The four models of the Maus MTM series VTL's are MTM 300, MTM 500, MTM 1000 and MTM 1250, and all are suitable for the machining of parts from 200 up to 1250 mm.

For more information, please contact Kitamura Machinery at 847-520-7755 or visit www.kitamura-machinery.com.



◀ Methods Machine Tools

Methods Machine Tools, Inc., a leading supplier of innovative machine tools, automation and machine tool accessories, now offers from stock Feeler High Performance HV-Series Vertical Machining Centers. Feeler HV-Series machines utilize a finite element analyzed, honeycomb ribbed cast column resulting in superior torsional torque resistance and superior low frequency resonance stability. The Z-axis is driven by a direct drive servo-motor and uses a no-counterbalance design which eliminates chain vibration and results in outstanding surface finishes. All Feeler machine tools from Methods come with a two year warranty.

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





▲ Mitsubishi

MC Machinery Systems, Inc. introduces the new Mitsubishi Roku-Roku RMX-5, the newest high-speed, high-precision vertical machining center. The RMX-5 delivers the highest precision and productivity for five-axis milling. The new machine construction is built to jig-borer standards of quality and accuracy. It features bridge construction with Meehanite GC for both the base and bridge casting material. This material provides excellent shock and vibration dampening as well as minimal thermal distortion in normal working environments.

For more information, please contact MC Machinery Systems, Inc. at 630-616-5920 or visit www.mitsubishi-world.com.



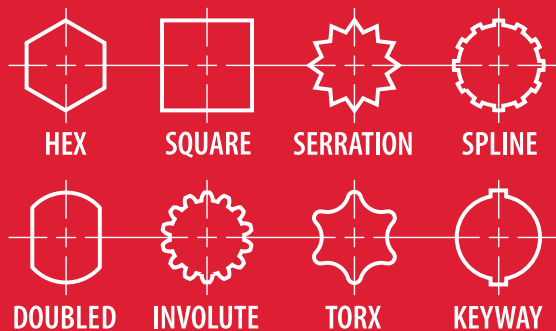
▲ Okuma

Okuma's GENOS M460-VE CNC vertical machining center marries value with high performance machining technology. It adopts a powerful double column structure to deliver the most machining in the least floor space. Total travel measures 30" (X), 18.11" (Y) and 18.11" (Z) with a rapid traverse rate of 1574 ipm. Standard features include a high power 40 Taper 12,000 rpm spindle with a 30/25 HP VAC liquid cooled integral motor and a 32-position ATC. Thermal deformation is minimized with Okuma's industry-leading TAS-C/TAS-S compensation system.

For more information, please contact Okuma America Corp. at 704-504-6324 or visit <http://oac.okuma.com/m460ve>.

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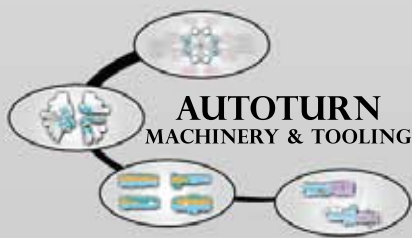
*According to various Swiss sources Tornos, Switzerland is no longer supporting
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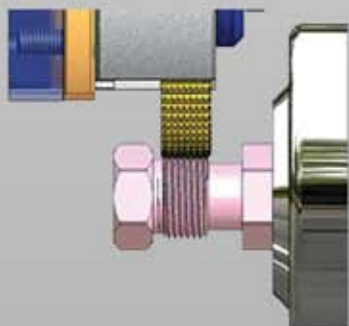
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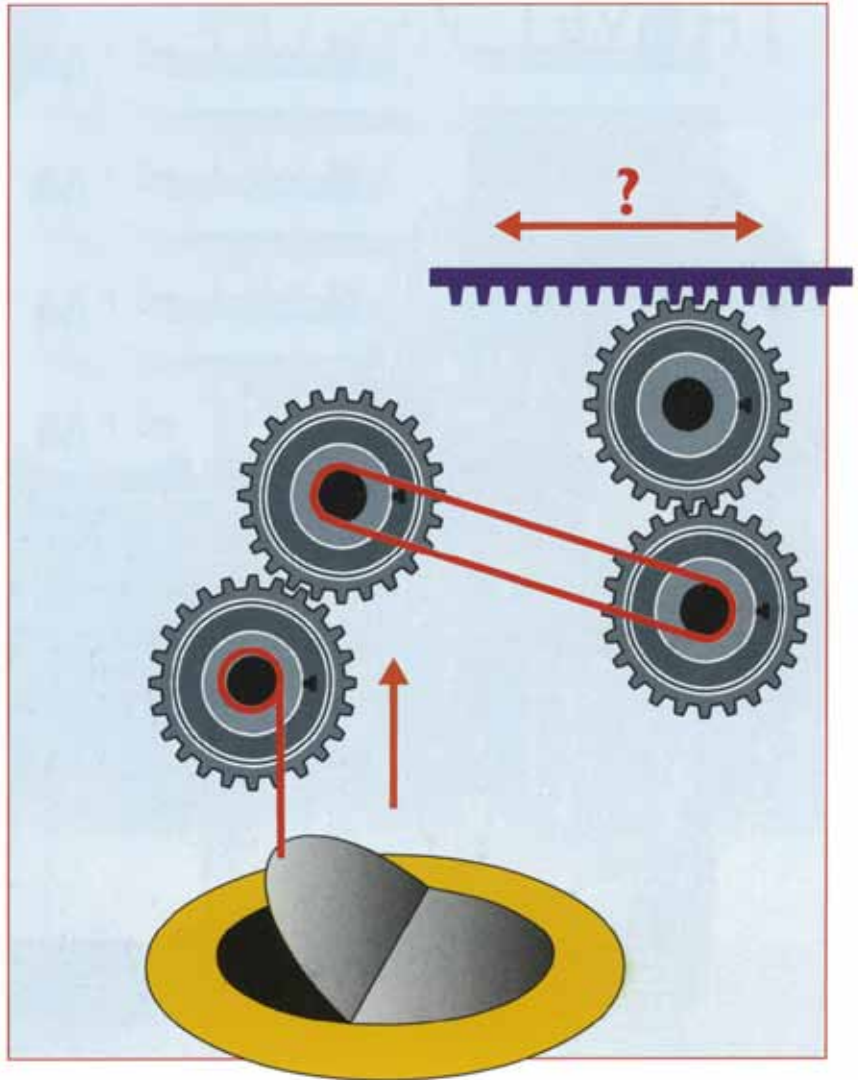
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Open the Trapdoor

To open the trapdoor, do you need to push the rack to the left or to the right?



Because of short lead times, we will have to print names of the people who solved the Jan/Feb “Think Tank” in the April issue. For those of you who can’t stand the suspense of not knowing, here is the solution to last issue’s “Think Tank”: A simple closed curve is one that does not cross itself. A loop of string that follows that rule can always be stretched into a circle; likewise, a circle of string can be pulled to form a loop. But with a loop or a circle, there is always an inside and an outside. One way to determine whether a point is on the inside or the outside is to carefully shade in all the interior spaces of the loop. But that is time-consuming. A short and elegant solution is to draw a line connecting the point to an area clearly outside the loop and count the number of times the line crosses a curve. If it crosses an odd number of times, the point is inside the loop; if it crosses an even number of times, it is outside the loop. The rule is known as the Jordan curve theorem.



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 Chinese Mom Syndrome

Lloyd Graff blogged about a recent article in the Wall Street Journal about Amy Chua, author of the new book Battle Hymn of the Tiger Mother, which criticized today's American parents for not being tough enough on their children. He asked readers if they agreed with her rigid style of parenting.

David Blackburn January 25, 2011 at 11:00 a.m.

Kids are spoiled brats these days and it gets worse with every generation. I think Amy is only doing the bare minimum that needs to be done with our lazy kids. When Amy's girls are grown up they will appreciate all that she did for them. It's a tough world and we need to get tougher on our kids if we want them to survive.

Russ January 25, 2011 at 12:34 p.m.

Let's go ahead and ask a Chinese what car or computer or other useful tool they've invented in the last 2000 years? All of this hard work does what? Makes good worker bees who have no dreams and are crushed by the expectations of their parents. I know of no Chinese who is happy, either. So, go ahead and be harsh, the world needs more suicides.

Getting By With Temps

Do to a recent surge in his used machinery business, Lloyd Graff recently decided to hire several temp workers. He asked readers if they thought this was a good period to hire full-time workers, or if it was smarter to skate by with temps.

Matt February 1, 2011 at 1:12 p.m.

If you get a qualified person you should hire them! When is the "right" time to hire? Probably about the same "right" time

it was to get married, have kids, invest in real estate, divest in real estate, play the stock market, and get out of the stock market, etc. Let me know how your timing works out.

Charles F. Somers February 1, 2011 at 12:37 p.m.

Temps fill a void when you don't know where the near future is headed, but if you get a good person and don't hire him full-time he has no loyalty to you and will move on to something better as soon as he can.

Dan February 1, 2011 at 7:43 p.m.

Temps are the way to go right now. You don't know what the future holds and it is a win-win situation. The employer gets someone who wants to work and the employee gets some much needed experience. I am working on contract right now and if I play my cards right, there will be a full-time job afterwards.

Hopeful On Obamacare?

Lloyd Graff blogged about the repeal of the new health care law. He asked readers if they were hopeful about the outcome of the debate or if Obamacare will simply be a disaster.

Matt January 21, 2011 at 3:52 p.m.

Never assume. By using the term "Obamacare" you have officially aligned yourself with the trash-talk and gullibility of the current batch of weirdoes, wackos, wingnuts and witches that make up the noisiest right of the political spectrum. For me, I do not wish to be the recipient of any email or commentary from people of your ilk. Please delete me from your distribution.



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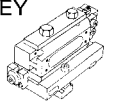
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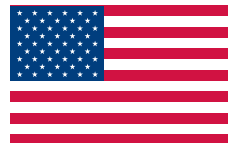
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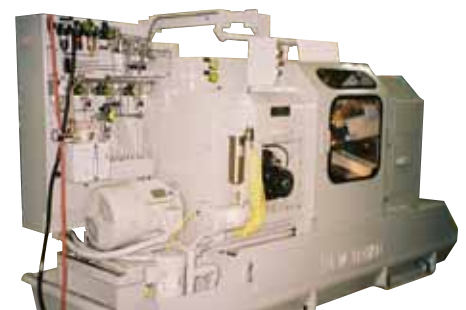
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afterthought

America Moves On

Noah and I are huge basketball fans. We were recently talking NBA and Noah broached the idea that you could have a great all-star team of mixed-race players with Blake Griffin, shoo-in rookie of the year, leading the way.

I know this is a politically incorrect topic to write about, but I think it is a really important topic—so what the heck.

Race relations have been the dominant issue in America in my lifetime. Jackie Robinson broke the color barrier in Major League Baseball in 1947, but it was six more years until the Chicago Cubs brought in the great Ernie Banks to play shortstop for my team. As a young kid, my conception of a black-white relationship was shaped by my friendship with our family's maid, Thelma Lee Jefferson, and the images of Banks and Roy Campanella, Larry Doby, and Jr. Gillian on TV, along with basketball stars Bill Russell and Wilt Chamberlain. All were very dark skinned, and we called them "Negroes." American life was still black and white.

My grammar school was tribal and racial with 48 kids in a class. The teachers were almost all Irish female lifers in the Chicago Public School System.

We sat in rows of eight, dictated by grades or the teacher's conception of smarts. The classroom was almost totally segregated with black kids on one side of the room and white kids on the other. We rarely ever talked to each other, so inviting the black kids to the house would have seemed ridiculous.

But we lived on the south side of Chicago, so black people were all around us—and were to be feared. The public high school that I would have attended was 90 percent black, so in my parents' minds the options were to move or send me and my siblings to a private school—and there was a very good one 10 minutes from the house, University High School, a part of the University of Chicago.

High school in Chicago was the time I started recognizing my own and my culture's endemic racism. I played high school basketball and several teammates were black. We connected on the court but not much socially. I noticed black women in classes, but I was afraid to talk to them. The social boundaries were so clearly defined that they didn't need to be articulated. To us, black people were dangerous. You had to

be careful to not touch. I also had the Jewish identity test as an ongoing challenge. Date only Jewish women—don't even talk to non-Jewish women because God forbid, "you could get involved," my parents instilled in me.

This was my America "back in the day."

My America has changed. I have changed. America has begun to become a mixed race country.

While I was desperately trying to wall myself off from racial connection, my human side was observing the civil rights movement and the hypocrisy of our divided and fearful country.

I chose to raise my family in an integrated community and send my kids to integrated public schools, a rarity in the Chicago area. I studied my own racism—the gut fear that made me see danger when I saw a black man walking toward me.

I am a victim of American racism—and of my own knee jerk racism. The synapses of fear fire indiscriminately no matter how I cognitively reject them. I despise my racism, but it is an omnipresent companion, like knee pain.

But I have changed. I have real black friends. Many of my neighbors are black. Most of the customers at my local Starbucks are black.

The most respected baseball player today—not the best, but the most respected—is Derek Jeter, of mixed parenthood. Jason Kidd, Joachim Noah, Tony Parker, Blake Griffin, etc. make an NBA all-star team.

And now we have Barack Obama as President. Case closed. America has changed in my lifetime. In the bad old days it was said we could never elect a Catholic—and then we voted in John F. Kennedy. Maybe a Jewish Michael Bloomberg will be next in 2012.

Racism is still strong in America. It is deep in the bones. But the beauty of this great country is that it does change. It gets better. It gets worse, but it keeps moving.

In business and life we tend to get stuck in our pasts. They will always affect us—but they do not own us.

“High school in Chicago was the time I started recognizing my own and my culture's endemic racism.”

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