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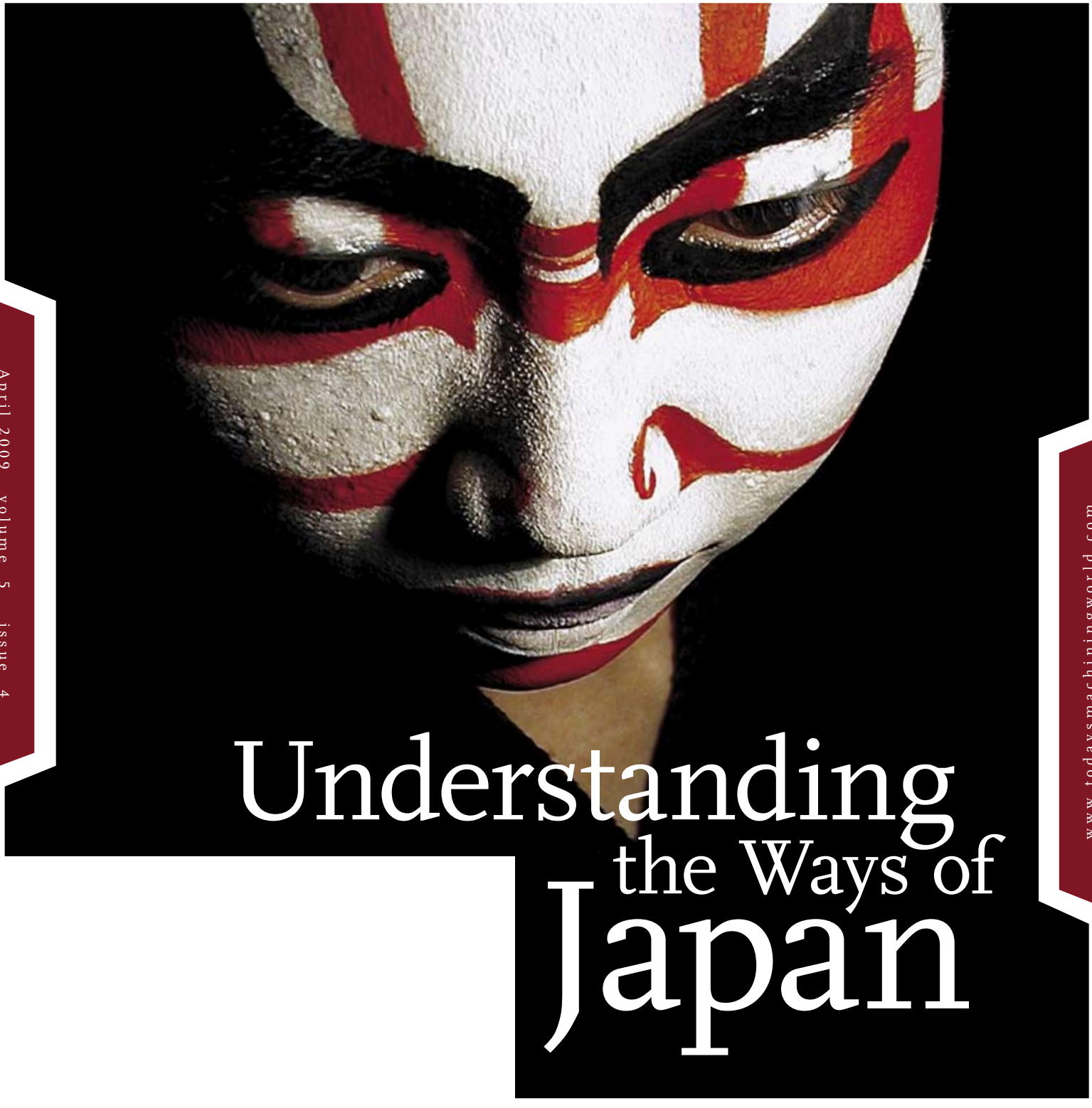
Today's Machining World

THE MAGAZINE FOR THE PRECISION PARTS INDUSTRY



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April 2009 volume 5 issue 4

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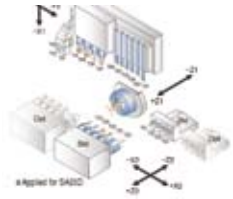

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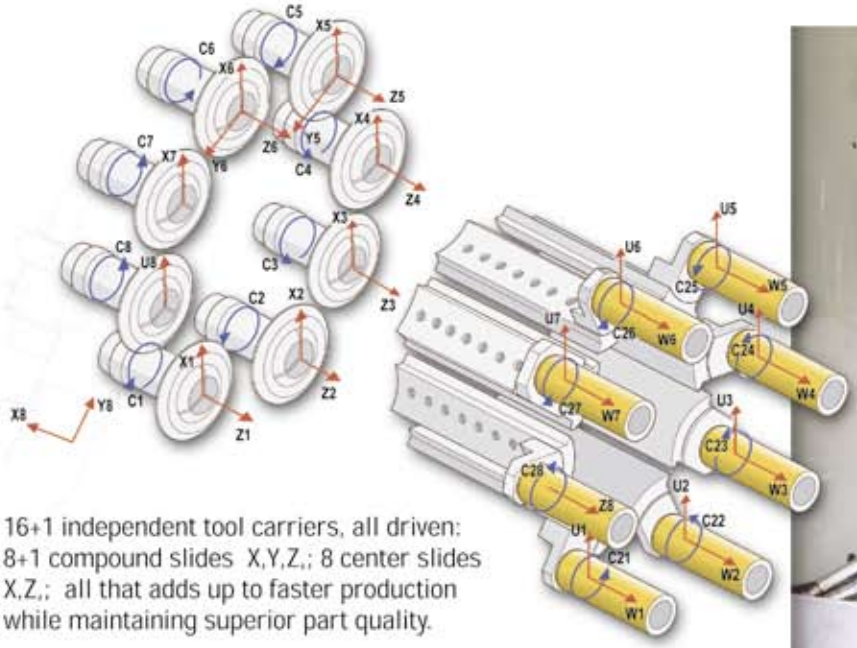

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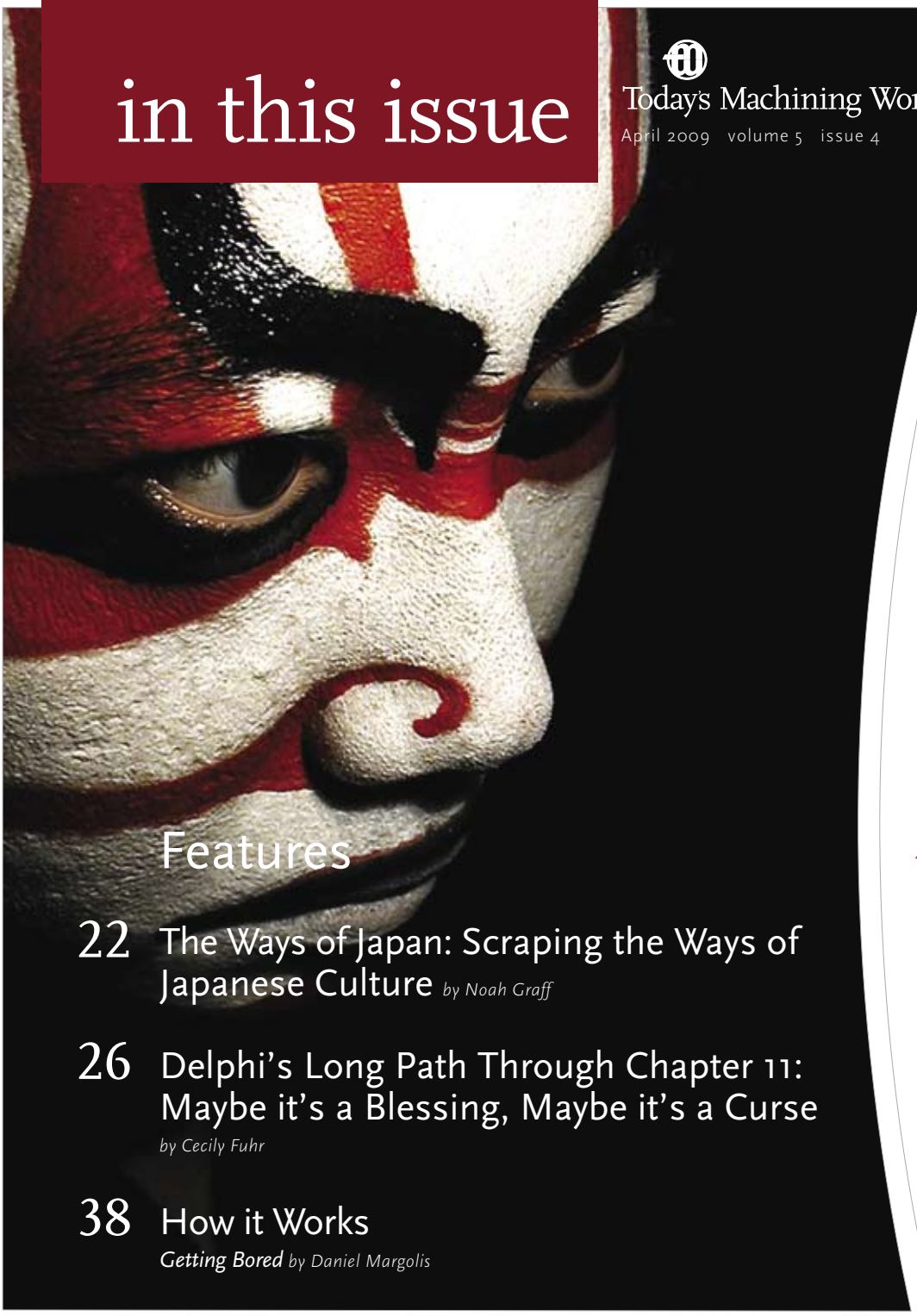
in this issue

Today's Machining World
April 2009 volume 5 issue 4



Features

Departments

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Stepping out of the box

Do you know your neighbors?

Today's Machining World is a magazine with a big global focus. Noah Graff's piece this month recounts his journey to Japan, and the "Next" feature discusses China buying American debt. But in business the big picture is often best illuminated by getting to know your next-door neighbors.

An article I've been working on for awhile is built on a series of interviews with the people who work within a 10-minute walk of the *TMW* office.

I have long been a fan of an author named Tracy Kidder, who writes books about the building of one house or a year spent watching a teacher in a school. The micro sheds light on the macro.

If we all took the time to visit with our business neighbors and honestly exchanged ideas over coffee, we would learn a lot of useful stuff, and probably find some business we never knew existed.

Even if you discovered no new business from your actual knocking on doors, but instead found a potential partner to join you in an afternoon walk or a person who shared your love of baseball, gardening or sushi, would that be so bad?

It is finally spring. You won't freeze your butt off if you walk down the street. Put on your best smile and surprise your neighbor with some brownies.

Lloyd Graff
Editor/Owner

contributors

Lloyd Graff has had a love of writing since getting his first letter to the editor published by the *Chicago Daily News* when he was 12. In high school he wrote short pieces for *Reader's Digest*. He became Sports Editor of the University of Michigan's *Michigan Daily*, and weighed a career in Journalism before joining the family used machine tool business in 1969. His passion for writing never died as he wrote a "magalog" called the *Graff-Pinkert Times* in the 1990s. In 1999 he decided to build on his knowledge of the machining world and his writing experience by starting *Screw Machine World*, which became *Today's Machining World* in 2005. He considers the development of the magazine to be the culmination of his business and creative careers.

Emily Halgrimson, Managing Editor of *Today's Machining World* has a degree from the Eastman School of Music in French horn performance, did a year of service at a Bangladeshi orphanage, trained at a Zen Center, and most recently did a stint in the Peace Corps in Benin, West Africa. A friend of hers, Kate Puzey, a fellow Peace Corps Volunteer, was recently murdered in her village about 45 miles from Emily's village, which she left in March of 2008. Kate was a light and a wonderfully dedicated English teacher. This is the second time Emily has felt death just miss her. The first time was when the village she stayed at, south of Colombo in Sri Lanka, was washed away in the 2004 tsunami a year later to the day she sat on its beach.

Cecily Fuhr is an attorney and freelance writer. After a stint as an employment lawyer and litigator in Seattle, she relocated to the East Coast, where she now works for a Zen Buddhist meditation center in Rochester, N.Y. In her spare time, she cultivates a succession of profoundly nerdy hobbies, including digital photography, filmmaking, composing fifteenth-century counterpoint and learning Hindi.

Noah Graff has been working at *Today's Machining World* since 2005. He is the features editor, videographer, and "the Web guy" of the magazine. He graduated from the University of Wisconsin majoring in film and history. He currently has a reality show on YouTube called "Jew Complete Me" documenting his search to find the Jewish love of his life. Noah's favorite movie is *Ferris Bueller's Day off*. Favorite quote: "Try not. Do or do not, there is no try." *Yoda*.

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forum

Today's Machining World

Shop Doc Forum is the newest online addition to the *TMW* family. Now through April 15th, post on the forum and you will be entered to win a Gerstner toolbox. The following thread gained steam as the weeks wore on. See some of the most interesting replies on the current state of business in Michigan, below.

www.shopdocforum.com

To readers and forum members in Michigan, how is business out there? Are shops seeing an increase in business due to economy-induced industry shake out? Is the faltering state of the automobile industry affecting your business?

Shops aren't seeing an increase in business because others are closing. It doesn't work that way. The faltering state of the automobile industry is squarely to blame. This entire region was built on it and now it's crumbling out from underneath us. There's nothing below to catch us, so we fall into the deep, black abyss of an uncertain future, our hands grasping madly at the air as we fall, hoping to catch something before we hit the ground and go splat!

-Masterssullivan

I see that Empire Tool is being auctioned online by Hilco starting March 5th to March 12th. Empire was the crème de la crème of cutoff tools for screw machines and made a good shave tool holder and other assorted screw machine holders and attachments. Who is picking up this business? Who picked up the goodwill and intellectual property? The demise of Empire is a nasty commentary on the state of the screw machine industry today. On the other hand, I found the management of Empire difficult to deal with. They thought their products were gold plated and charged accordingly. They neglected to advertise or participate with trade groups. They stayed in a fading product category too long. This is not a Michigan issue. Empire had a wonderful franchise. I am sad to see that they are gone.

-Lloyd

As for Empire cutoff tools, there are other firms that are making and providing cutoff tools as good or better. Much like the precision parts industry the tooling market is getting smaller. There remains within the industry a high level of quality and availability. The real bottom line, Lloyd, is that the industry is getting smaller. May we all pray that the U.S. wakes up before this true asset and the people who work in it disappear forever. We cannot become a country based on a service economy; if we do we are dead.

-Toolman

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

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

Or email us at: emily@todaysmachiningworld.com or lloyd@todaysmachiningworld.com

By Lloyd Graff

The Money's in Ideas

The future of manufacturing in the U.S. may be visible in some of the most mundane businesses you could think of—T-shirts and socks.

The T-shirt business has become a creative fashion business with stores like American Apparel and upscale mail order shops like Territory Ahead, making the prosaic shirt a staple of their stores. Certainly you can buy a dull shirt made in China or Bangladesh at Wal-Mart, but the value-added for T-shirts is in the design.

Threadless continues to lead the way in creative ways to make money and have fun with T-shirts, their primary product. Each week they invite members of their Web community to submit designs for new shirts and to choose the best of the week's designs to be picked for reproduction at their Chicago plant.

The new shirts, which have a limited run and generally a short shelf life, are sold for $18 each. The designers receive $2,500 for each design chosen for print. If the design is a big hit and Threadless reprints it, the artist gets an additional $500. The Threadless viewers vote for each design, and monthly "Bestee" contests are run to stimulate more interest.

The company has been incredibly successful and recently acquired a whopping infusion of venture capital money. They have opened a retail site and operate a gallery which sells Threadless poster art.

The specialty hosiery business is another growing industry with high profits. As I write this article I'm wearing a pair of $1 socks from Pakistan, which are comfortable and keep my feet warm. I bought them on impulse at Menards, a big-box hardware retailer. The Pakistanis and Chinese dominate the high-volume, cheap sock business and it must be hard to beat them on price.

I was talking to Scott Livingston, who we interviewed in our March issue. We were discussing the future of machining in North

America, which then morphed into a discussion on the hosiery business. Scott has a company cycling team which his firm, Horst Engineering in East Hartford, Connecticut, sponsors. He outfits the team in special shirts, shorts and socks. The socks come from specialty producers like SockGuys and Defeet, who make their high value-added footwear domestically. They sell special socks for events and teams, and allow buyers to design unique, custom socks with a Web template. They sell their own proprietary designs to specialty stores around the world, primarily aimed at the athletic market but now branching into kitschy fashion socks for women.

The opportunity for manufacturing in high labor markets like the U.S. and Italy, another big player in fashion socks and value-added machining, is creative marketing combined with skillful manufacturing and quick turnaround. An American hosiery company will go broke trying to beat a Karachi sweatshop paying kids $10 a day to churn out dull but functional socks by the container load.

The money is in the ideas—often the ideas of kids—à la Threadless, or the packaging of team colors by SockGuy. Hockey socks sell for $14 per pair, and colorful acrylic socks are $9 to $12 per copy. Where would you like to position your business?

It's April, which means it is baseball season, which means besides rooting for my beloved Cubbies, I get to do Fantasy Baseball.

For the uninitiated, Fantasy sports are played online on venues like Yahoo or ESPN. Each player drafts a team at the beginning of the season and plays a statistical contest against 10 or 12 other teams. You pay $25 to the online company to keep track of the stats of your players, which determines how you rank in the league. Usually you can trade players and drop and add guys on your team.

For me the fun has been to team up with my son-in-law, Scott, who is a computer whiz in Silicon Valley. During the season we talk several times each week to plot strategy. My specialty is evaluating players, because I watch a lot more games than he does. He makes sure that we have a competitive team everyday, which requires more computer expertise than I have.

Fantasy baseball is for me like Sudoku and crossword puzzles are for other people. I study box scores and pour over statistical abstracts of players' records. There is an amazing literature called sabermetrics that weighs the comparative abilities of Major League Baseball players. How does X player usually hit off Y pitcher? Do you play a mediocre lefty hitter against a tough right-handed pitcher, or play a better right-handed batter who does not hit a particular pitcher historically?

This is the kind of judgment that professional managers make everyday, and I find it a fascinating intellectual challenge. It also gives me a chance to argue with Scott, who prefers to go by the numbers while I like to take a shot with a guy who is hot.

I find parallels between Fantasy Baseball and operating a business. Research is the baby's milk of Fantasy. If you just blindly use the numbers available for every Fantasy player, you probably will do poorly over a season. You win by acquiring superior information about players. Does a guy have an injury that he is likely to recover from in three weeks, or does he suffer from a groin or hamstring problem which will hamper him all season? Is a player a strong starter and a dud late in the season, or vice-versa? Decisions in Fantasy are often made by looking backwards at the available stats, but many times a young player on the rise will look like nothing at the beginning of the season but turn into a star as he becomes accustomed to the competition. And it can go the other way. An April phenom who is scouted and found to have few weaknesses, may end up a 180 hitter by August.

I think that in business we have a tendency to look at the same information month after month and can be very reluctant to jump out of our comfort zone.

I believe there is never one way to run a job. There is rarely a perfect machine for a job or a perfect process. Tried and true assumptions are always suspect. The stats may point to one particular approach, but that may mean you are staring at the wrong set of stats.

I am always suspicious of people who say "this is the only way to do this." There are always other options. How about a different choice of machine, a more viscous coolant, or thread cutting rather than thread rolling?

Fantasy baseball can drive you nuts, because there is always another number to consider. But I believe that in business we often get into such a rut of conventional thinking that we do not find the energy to look for the path seldom taken.

A Reply to Greg Knox

Letter found on page 13 of the Feb 09 issue.

Mr. Knox,

First I'd like to apologize for not remembering you when we first met, and also that I didn't leave you with a very good first impression. We have met, haven't we? Because you seem to know me. Me, one of the people you refer to in your letter [where you said], "our factories have been filled with the world's most overpaid, arrogant, ignorant and laziest entitlement-minded laborers."

Let's address the overpaid issue first. I'm a Journeyman Tool and Die Maker, which means that I spent four years of my life going to school while working 40-60 hours a week at the expense of family time so I could make a better life for us. I even finished in three years. I've been a journeyman for

20 plus years and my base salary is about $30 an hour. I guess you believe that with my schooling and work, just because I work in a factory I should make very little money.

Are you one of those people who actually believe the media when they say that we make $72 an hour? Lets take one of your workers with an average salary, add what you think that it costs you to provide health care, or maybe you don't do that for your employees. Add life insurance and any other benefit that you see fit. Then add in the cost of 10 years of pension. That's right, they add this in, too. Add all this up and let me know what you actually pay your employees. If it's very much different than [what I get] I guess I won't be applying for a position at your company.

It was obvious that you hadn't been near a plant in quite some time when I read what you said about working overtime on weekends, electricians being lazy making lines wait on repairs and scare tactics for sub-par performance of new workers. [This] may have been a practice back in the 1980s, but things have changed a lot since then. For the past 15 years I have worked 40 hours per week and on only a handful of weekends. Although you are right in saying that the people who jump the border really don't deserve free health care, you slip in the next statement [where again you discuss wages].

swarf

Being a Die Maker, I'm one of the top on the salary list and I don't even come close to $85,000. Don't get me wrong, there are people who make that, but it's at the expense of family life because they are living in the factory working overtime instead. So when you say that a forklift driver makes $85,000, you once again don't have your facts straight.

We actually do agree on one concept. I also believe that the youth of today are held by the hand way too long and not held responsible for their actions. Hurray for that great comment!

Sincerely,

Tom Howard
UAW Member
Journeyman Tool & Die Maker

A note on Mr. Knox and Mr. Howard's Comments from Lloyd Graff

Over the years I have visited a hundred General Motors and Delphi factories. I have done business with many of them. I've encountered many business-like and affable folks, but the environment they worked in was inefficient, slow and wasteful.

I can attribute part of the malaise to being so big, but another part stemmed from a built-in animosity between the UAW and GM. It was like how Lech Walensa, head of Polish workers' rebellion against communism, described his country in the 1980s. "We pretend to work, they pretend to govern."

The factories were so enormous that they seemed impossible to manage. Everything took a long time to happen. There was no sense of joy in these plants. The atmosphere was sullen.

Do I think Greg Knox overstated the case about the mess in automotive land? Yes, but not by much. I have little doubt that Mr. Howard is a talented and committed employee, but the system he worked in found GM and the UAW distrusting one another, promoting gross inefficiency on the floor and in the office. I have a sick feeling that a GM bankruptcy and eventual dismemberment may be the best hope for the eventual revival of a creative and growing American automotive business.

swarfblog.com

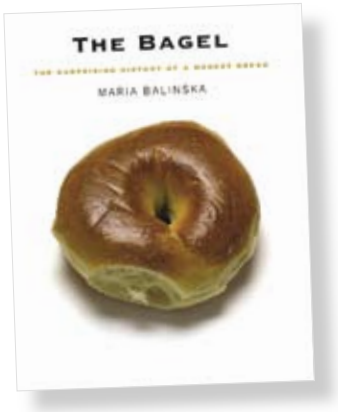
By Jerry Levine

The Bagel

Barack Obama is just like me. When in Chicago he often starts his day with a bagel from Manny's Deli. Millions of people throughout the world start their day with a bagel. If not in the South Loop of Chicago, then in one of a hundred places on New York's lower east side, at Shapiro's in Indianapolis or the Bagel Brothers in the Tokyo train station. Maria Balinska's delightful little book traces this Jewish staple's adventuresome history from 13th century Poland to main street America, and at the same time uncovers some interesting Polish, Jewish and American history.

A bagel is traditionally made of yeasted, high gluten, wheat dough, which is first boiled in water and then baked. Until the 1950s bagels could not be machine made, but relied instead on experienced rollers and bakers.

What makes the bagel Jewish? Although similar rolls appeared in Italy, Spain and even China at about the same time, the bagel has a unique history. Starting in the Middle Ages, religious fervor led some Christians to insist that because of its connection to Christ, bread be denied to Jews. Polish mobs attacked Jews who dared to buy or bake bread. One local ruler argued that only something baked could be called bread. The Jews saw the loophole and began boiling their rolls. Later boiling followed by baking became the standard. That process worked well with Polish wheat, which contains about 30 percent more gluten and produces the uniquely chewy yet crispy bagel.



Bagels came to America in the late 19th century, mostly being produced on New York's lower east side. Bakeries were inexpensive businesses to start up and a slew of them were located on—or actually under—Hester Street. Bakers worked 13 or 14 hour days and slept between the mounds of rising dough, along with the cats, rats and roaches.

These abject working conditions led to the creation of the Jewish Bakers Union Local 338, which had a strong socialist bent. The union slowly gained strength and passed the New York bakeshop law in 1895. The new law banned employees from sleeping in bakeries, specified drainage and plumbing to keep the bakery sanitary, limited work hours and established an inspectorate. Cats, however, were allowed to stay—probably to control the rats.

A union label was pasted on all bread and the union picketed non-union bagel shops, giving away free bagels to would-be customers to keep them out of the shops. By 1950 Local 338 bagel bakers were earning $150 per week versus the $50 per week of the average New Yorker. The union jobs were limited and you had to know someone to get in. Once in you had to be able to roll 700 to 800 bagels per hour to stay.

The high pay began to unravel the union stranglehold. New high tech ovens and a rolling machine were developed. The addition of preservatives to extend the five-hour shelf life of bagels allowed them to be baked outside New York and shipped in.

The most recent and dramatic development, what the author calls "The Bagelization of America," began in the 1970s. As a result of the civil rights movement of the 1960s, Jews along with other minorities began assimilating rapidly into American culture. The bagel moved with them to the suburbs and through Main Street.

Much like Americans throughout the decades have adapted to living in the U.S., the bagel has adapted too—from the original chewy, plain or salted, into a myriad of flavors, textures and shapes to fit America's taste.

In my 70-year lifetime I've seen a world of change in how American Jews view themselves. In the aftermath of World War II we saw ourselves as victims of discrimination at home and mass murder abroad. We kept our heads down and flew under the radar.

Today we are light years away from that place. A few years ago I attended a friend's swearing-in ceremony to a very senior position in Washington. I had tears in my eyes as I watched him put his hand on the Jewish Bible and swear to uphold the Constitution of the United States, with his wife and daughter at his side. In a short span we have moved from a place somewhere on the outside right into the mainstream. I'm sure every African-American felt the same way watching Barak Obama being sworn in as President—even without a Manny's bagel.

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

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◂ Hanwha Machinery America

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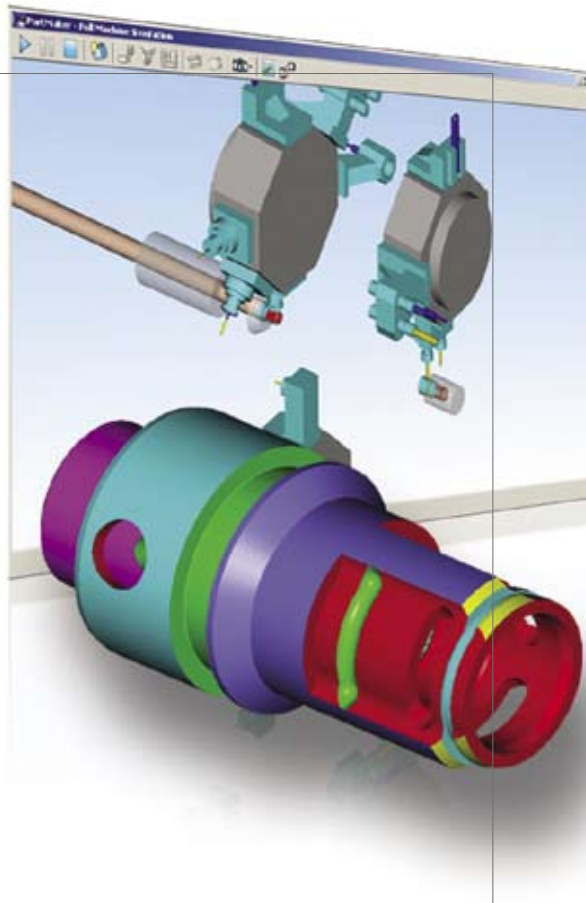
Hanwha is introducing one of its newest CNC Swiss turning centers, the XD12H. This ultra high-speed CNC Swiss turning lathe is designed for universal and precise machining. It has a large bed, a built-in motor on the main spindle, a spacious tooling area and a safe working environment. The XD12H is structured to enable shortened cycle time and increase productivity and has a stable headstock design. A built-in motor enables accuracy and power and keeps noise and temperatures low.

For more information, please visit Hanwha Machinery America at booth #223.

fresh stuff



▶ PartMaker Inc.

PMTS Booth #846

PartMaker Inc. will demonstrate the most recent version PartMaker® CAD/CAM software for CNC Mills, Lathes, WireEDM, Turn-Mill Centers and Swiss-type lathes. Improvements to PartMaker include a revamped and more productive user-interface, improved capabilities for programming directly on solid models and the ability to automatically generate descriptive and visual set-up information. The latest version of PartMaker also gives users the ability to carry out programming directly on a solid model. In PartMaker, a solid model can be directly integrated into the programming window and tool paths can be assigned directly to the solid model. Critical manufacturing data is automatically retrieved from a solid model using the software's new "Extract Parameters from Solids" feature.

For more information, please visit Partmaker Inc. at booth #846.

◀ Lyndex-Nikken

PMTS Booth #678

Lyndex-Nikken will offer a variety of live tools designed to enhance the performance of a CNC lathe. Lyndex-Nikken's live tool offering includes high-speed tooling, coolant feed thru tools, axial tools, radial tools, dual output radial tools and universal tools. Straight and offset units, modular quick-change systems and tapping quick-change holders are also available. Advantages include lifetime lubrication of bearings, high torque transmission, internal coolant and length adjustment.

For more information, please visit Lyndex-Nikken Inc. at booth #678.

▶ LNS AMERICA

PMTS Booth #115

The newest member of the LNS barfeed line is the Alpha series. Model ST 320 feeds round bar stock from .12" to .78" diameter while Alpha ST 212 is designed to load small diameter, round bar stock from .078" to .47" using a positive mechanical device to advance bar stock into the loading position. From this point a nylon screw and gravity feeds the bar into the channel. A synchronization system for use with high-speed sliding headstock machines or for running special materials is standard on Alpha ST 212 and optional on the ST 320.

For more information, please Visit LNS America at booth #115.

◀ AMT Machine Systems

PMTS Booth #345

The new UltraTurn™ XL from AMT Machine Systems, a 7-axis CNC screw machine, will be introduced at PMTS. UltraTurn™ XL now features variable-speed servo-drive for live turret tooling. This versatile drive will also power a live sub-spindle, providing two-axis ID and OD backworking capabilities. The sub-spindle uses the popular 5C collet system. Also new is the Tool Sentry™ tool monitoring software, which automatically detects dull tools, missing tools and short parts.

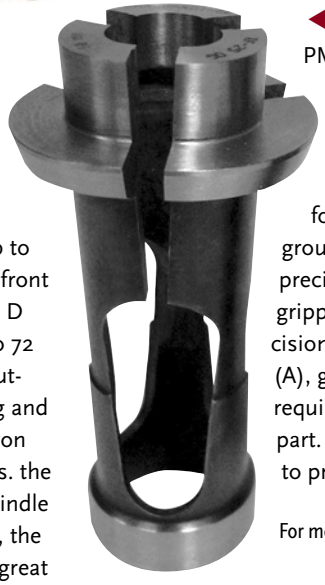
For more information, please visit AMT Machine Systems, Ltd. At booth #345

▼ ZPS America

PMTS Booth #655

ZPS America will introduce the new 8-spindle Mori-Say TMZ 867 CNC multi-spindle multi-function production center. The new TMZ 867 can accommodate bar stock up to 72 mm diameter and can operate as an open-front chucker. Provided with a double Siemens 840 D CNC, the European-built machine offers up to 72 CNC axes and can perform nearly any metalcutting operation on precision parts from drilling and tapping to milling and hobbing. With a cast iron base and total weight of more than 30,000 lbs. the TMZ 867 is said to be the most rigid multi-spindle available. Combined with high spindle torque, the stable 867 can handle difficult materials with great precision.

For more information, please visit ZPA America at booth #655.



◀ Hardinge

PMTS Booth #501

Hardinge's collet design incorporates teardrop slots and reduced wall thickness for maximum flexibility for the overgrip pick-off process. A double-angle taper reduces the contact surface, which provides for quick opening of the collet. Hardinge hardened and ground collets provide accuracy and repeatability with precision in the collet back bearing and concentricity at the gripping area. Order holes are finish-ground on a high-precision Tripet internal grinding machine. The grip diameter (A), grip length (B) and the recessed part diameter (C) are required to manufacture the overgrip collet for your specific part. A semi-finished stock program is in place at Hardinge to provide a quick turnaround from time of order.

For more information, please visit Hardinge at booth #501.

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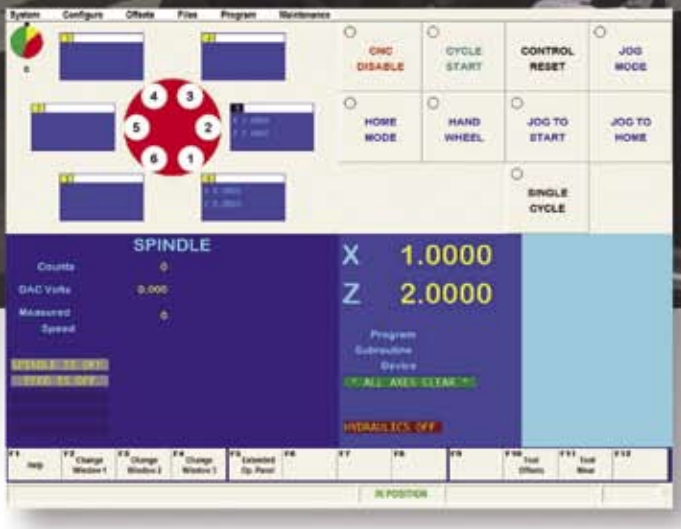
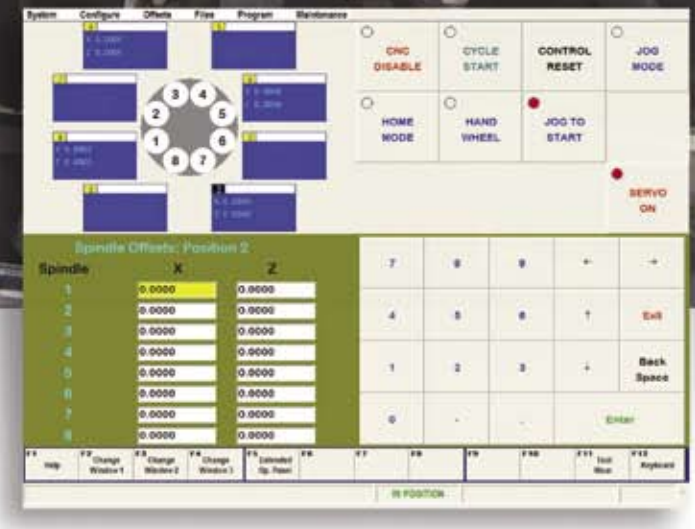


Main Window



Spindle Offset Window

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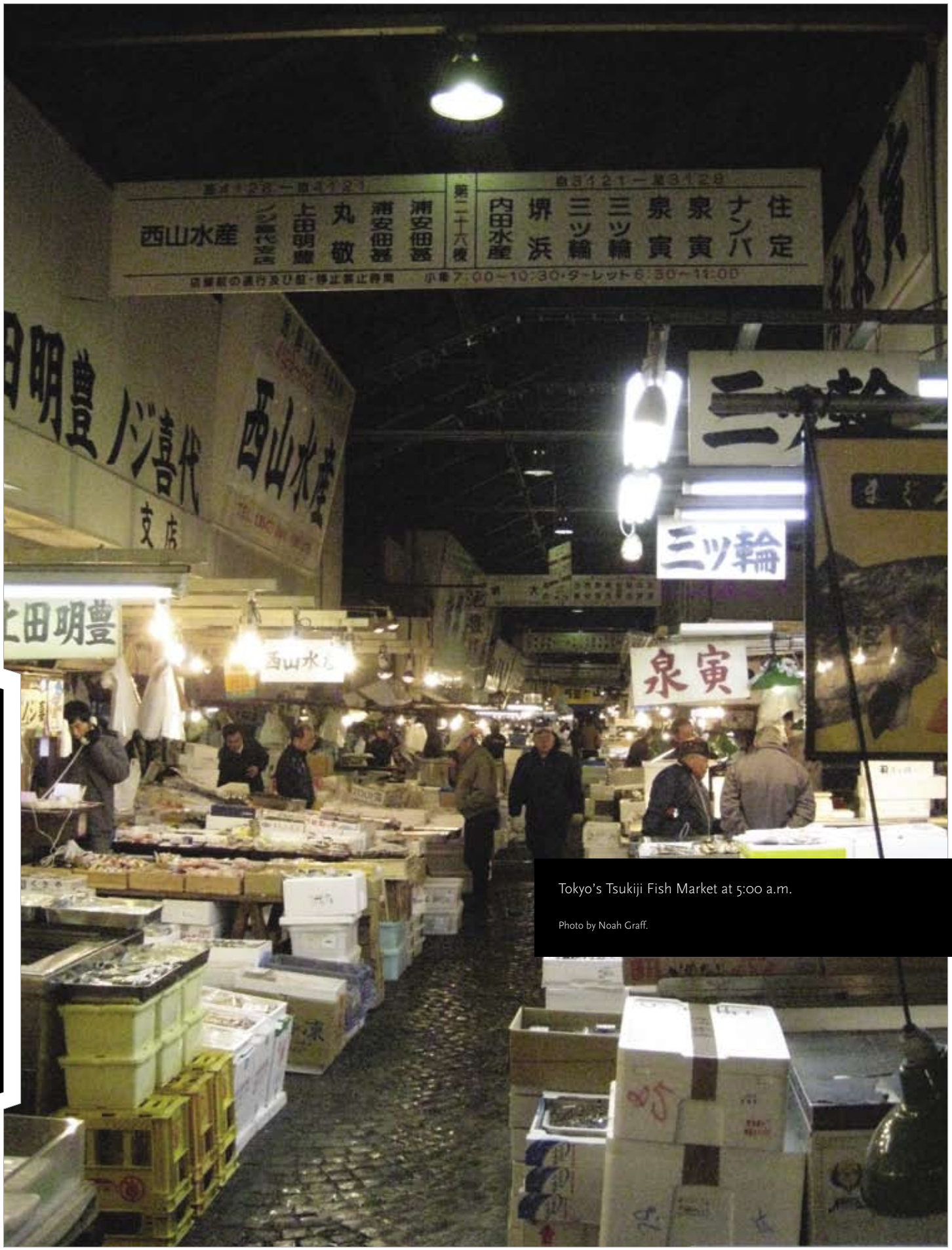

Tokyo's Tsukiji Fish Market at 5:00 a.m.

Photo by Noah Graff.

The Ways of Japan

Scraping the Layers of Japanese Culture

by Noah Graff

Mitsui Seiki factory worker preparing to hand scrape ways.

Photo courtesy of Mitsui Seiki.

February 16-28, 2009, I traveled to Japan; with business class plane fare and three days of accommodations and activities generously paid for by Japanese machine tool builder, Mitsui Seiki. I was part of a group of 15 people, comprised of the company's sales managers, salesmen, distributors, prospective customers and one other journalist from *Aerospace Manufacturing and Design*. Scott Walker, president of the American division for Mitsui Seiki and organizer of the trip, explained to me that the purpose of the trip was to foster relationships between the company's brass and prospective customers, which would hopefully lead to selling some machines. It made sense—do some fun activities, bond, network—but I still didn't fully understand the overall significance of bringing everyone across the globe until after the company's program ended and I traveled around the country on my own for a week.

At 5:00 a.m. on the first morning, Scott took us to Tokyo's Tsukiji fish market. It's the world's largest fish market and a beautiful, raw demonstration of capitalism, where giant fish are auctioned off for the equivalent of tens or even hundreds of thousands of dollars. It's not a tourist attraction—and if you don't watch your back the fish vendors can run you over with their motorized carts. We walked it, smelled it, photographed it (we weren't supposed to), and breakfasted at one of Scott's favorite ramen noodle stands.

A few hours later the group was bused out of Tokyo to Mitsui Seiki's headquarters where we received a tour of the facility and a presentation from Scott demonstrating the extreme accuracy of Mitsui Seiki machines and the company's distinct business model. He emphasized that what sets Mitsui Seiki apart from other machine tool builders is that every one of its machines is made to fit the customer's specs—every component is produced in-house and the ways are all hand scraped. The company only produces 25 machines per month, lately focusing on 5-axis horizontal and vertical machining centers. Its main market is aerospace, which utilizes the machines' capability to reach an accuracy of 20 microns.

In the Mind of a Japanese Business Man

One of the top journalistic priorities for my trip to Japan was to interview a "quote-un-quote" Japanese businessman. It's an archetype you see in movies—the small Japanese guys walking around in black suits, riding the busy subway to go to work at large corporations. The trip's organizers, Lynn Gorman and Scott Walker, warned me that finding someone willing to be interviewed wouldn't be easy because it might be construed as singling out one person as more important than his peers, which is taboo in Japanese culture. Fortunately, Roy Kawakami, senior general manager of corporate finance and accounting in overseas operations for Mitsui Seiki and close colleague of Scott Walker, casually agreed at dinner the night I arrived to let me interview him. Mr. Kawakami turned out to be a great source for perspective on the differences between Japanese and American business culture. He had received his CPA in the U.S., and he spends two weeks a month in the States working for the company.

Roy explained that one of the fundamental differences in the philosophy of American companies and Japanese companies is that U.S. companies focus on the contributions of individuals, while Japanese companies value the performance of groups or teams. In the U.S. if an employee performs poorly he can be fired, but in the Japanese business model the group manager is held responsible for an employee who is not performing well. This custom is coupled with a traditional Japanese business practice which grants lifetime employment. Thus workers must be motivated in different ways than in the U.S.

Another difference Roy brought up is that unlike most American companies, Japanese companies don't base their business systems entirely on the goal of meeting monetary targets. He said that in the U.S., companies systematically try to reduce manpower, calling it a "direct approach to results—meaning cutting costs," while the Japanese emphasize and pay more money for processes. He said he thinks that the philosophies of Japanese businesses are gravitating a little bit towards those of the U.S., but he reiterated that traditional culture is still very important in Japan, which means taking care of customers and giving great service. "Even the McDonalds atmosphere is different," he said.

It was a great interview—for me at least. But I could sense that Roy wasn't feeling great about it. He told me afterward that he was little embarrassed about doing the interview. I then felt uncomfortable because I knew Roy was stressed out. I was also undergoing a bit of culture shock. It bothered me a little when Roy didn't look me in the eye during the interview, likely because eye contact can be seen as aggressive in Japanese culture. I was also bothered by what he had told me about the Japanese view of individualism. It was counter intuitive to the way I approach life. I'm paid to think as an individual, to write about new ideas, to make people think. Suddenly it clicked—I was truly in a new culture, but not surprisingly, I was learning as much about myself as I was about Japan.

Above: The Mitsui Seiki sponsored group at the Onsen Hotel before dinner. Far right: Scott Walker, to his left, Roy Kawakami.
Photo courtesy of Noah Graff.

As I expected, the plant was quite clean. The tables were laid out in a way that clearly pointed to the impressive precision of the ways. I've had tours at some impressive machine tool builder plants before—Haas in California, ZPS in Czech Republic, to name a few, but it took my 11 days in the country to understand how Mitsui Seiki builds its machines and runs its company in its own "Japanese way." What first comes to mind is a parallel between Mitsui Seiki machines and Japanese cuisine. I see a Mitsui Seiki machine like a piece of sashimi sushi. Sushi, as with most Japanese food, is delicately prepared, and presented with the utmost of care. The knives used to prepare sushi are as sharp as possible so each piece of fish can be sliced with the greatest precision possible. The quality of the fish is also essential—if the fish isn't truly fresh it has an inferior taste. Sushi is often quite expensive and if improperly cut could even cause death, in the case of fugu (blowfish).

Seventy five percent of Mitsui Seiki's products stay in Japan. But still, the company knew it was important for us "gaijin," or foreigners, to experience the culture that produces the machines to really understand how Japanese products are unique. The longer I remained in Japan, the more I realized that in Japanese culture, presentation is vital to demonstrate a product's quality, a company's quality and a person's quality. After we visited the company's plant we were taken to a traditional Japanese hotel called an "onsen," where we all were required to change into kimonos. We sat on the floor for a traditional Japanese meal of several courses served on individual trays. Numerous small dishes were meticulously arranged on the trays, and contained various raw fish, tempura, pickled vegetables and strips of beef that were cooked in front of us. While we ate, four geishas poured us sake, played instruments, danced and joked with us, putting cheesy, feminine wigs on our heads. We were entertained in a centuries old tradition by women whose lives' work was, again, devoted to presentation. After the Mitsui Seiki tour ended and I traveled to Kyoto, my fellow hostel dwellers were envious of my geisha experience. Most of them hadn't had the opportunity to even see a geisha, let alone be entertained by four of them. There are only a few thousand geishas left in Japan, and their services cost thousands of dollars. But I'm pretty sure that the expense of the geishas wasn't even debated when Mitsui Seiki planned the trip. It came down to presentation once again. I believe the company hired the geishas because it was the Japanese way. It was the same reason they flew us all business class. They didn't have to. I would have flown crumpled in coach in a heartbeat, but business class was the civilized way to travel. It was the proper way to represent the company.

Above: Noah watching karaoke with two geishas.
Photo courtesy of Noah Graff.

Still, it took me several days after the night with the geishas to identify Japan's obsession with presentation. It finally hit me when I bought one small cookie at a train station in Tokyo. In 30 seconds, the vendor quickly inserted the cookie into its own individual plastic sleeve, sealed it and then placed the sealed cookie into a larger paper bag. To finish the experience, the vendor presented me the cookie followed by the receipt with two hands carefully balancing the items as though she were presenting me a sacred samurai sword. It was a true Japanese experience. Thirty seconds later it was a real pain to open the packaging, and the excessive paper was terrible for the environment. But this was Japan, and I was starting to get it.

By Cecily Fuhr

Maybe It's a Blessing, Maybe It's a Curse:

Delphi's Long Path Through Chapter 11

There's an ancient Chinese story about an old man and his son, who lived in a village on the outskirts of the Chinese empire. One day the man's mare, his most valuable possession, ran off to the wasteland outside the village. When his neighbors extended their sympathy for his sad plight, the old man shrugged and said, "Maybe it's a blessing, maybe it's a curse."

Two months later, the mare returned to the man's barn, followed by a magnificent wild stallion. To his neighbors' expressions of amazement at his good fortune, the old man replied again, "Maybe it's a blessing, maybe it's a curse." A few weeks later, the old man's luck changed again: while trying to tame the stallion for riding, the old man's son was thrown to the ground, breaking his leg and rendering him lame for life. The old man's response, again: "Maybe it's a blessing, maybe it's a curse." When springtime came, the imperial army came through the village, forcibly drafting every man of fighting age to help them fight off the empire's enemies. Only the old man's lame son was spared, and helped the village survive the difficult year that followed. The old man's response, as always, was a shrug, "Maybe it's a blessing, maybe it's a curse."

Over the past 10 years, the executives, employees and investors of Delphi Corporation surely must have absorbed some of the equanimity in the face of events displayed by the old man in the Chinese parable. Despite its separation from GM in 1999 and its ongoing efforts to diversify its clientele, the auto parts manufacturer has remained inextricably tied to its parent company in ways that are sometimes a blessing and sometimes a curse. And as Delphi draws near its make-or-break moment in its attempts to emerge from years of Chapter 11, its ties with GM will likely be the deciding factor that dooms the company, or saves it.

Delphi and GM: The Ties That Bind

Delphi began its life as GM's Automotive Components Group. In 1999, GM spun off Delphi as an independent, publicly held corporation in an effort to get the automaker's cost structure under control. Not surprisingly, GM has always been Delphi's largest customer, though its share of Delphi's revenue has dropped slowly but steadily from 76 percent in 1999 to 31 percent in the third quarter of 2008. Nevertheless, Delphi's fortunes continue to be inextricably tied to those of its former parent company.

On October 8, 2005, after an SEC investigation into irregular accounting practices by top Delphi executives, Delphi filed a voluntary Chapter 11 reorganization petition. The next year, the company closed 21 of its 29 remaining plants in the U.S. and cut more than two-thirds of its hourly workforce. Remaining workers endured significant cuts in pay and benefits. The drastic cuts undoubtedly improved Delphi's bottom line, but the company still struggled to meet its employee pension obligations.

Throughout this process, GM and Delphi have by neces-

sity relied upon each other. For GM, Delphi represents a near-irreplaceable source of supplies. If Delphi were to fail, GM's manufacturing processes would be severely, perhaps fatally, affected. For Delphi, GM has represented an ongoing source of investment and assistance. To keep the parts manufacturer alive, GM has promised to absorb $3.4 billion of Delphi's pension obligations into its own large pension fund, as well as provide an additional $10 billion in loans and other assistance. The two organizations need each other to survive.

Struggling to Emerge from Chapter 11

If GM's support has been a blessing to Delphi's ongoing journey through Chapter 11, it has inarguably cursed the company's attempts to emerge from Chapter 11's protections. Delphi has had ongoing difficulty getting commitments from private investors—difficulties attributable largely to its ongoing relationship with GM. In December 2006, Cerberus Capital Management committed $3.4 billion dollars as part of an initial turnaround plan, but backed out of the deal only five months later because of concern about Delphi's ability to get significant wage concessions from employee unions reluctant to give up lucrative GM-legacy compensation packages. Then in July 2007, Appaloosa Management stepped in, offering a $2.55 billion investment to help bring Delphi out of Chapter 11. In January 2008, U.S. bankruptcy judge Robert Drain approved Delphi's proposed turnaround plan, based in part on Appaloosa's commitment. Again, however, the private investor withdrew at the last minute, citing Delphi's ongoing dependence on GM's support and concern about GM's increased investment giving the automaker too much power over Delphi's development. Appaloosa backed out last April, leaving Delphi once again without adequate funding for its emergence from reorganization.

Time is running out for Delphi. As part of its original bankruptcy plan, Delphi procured $4.35 billion in debtor-in-possession loans from lenders willing to loan money to assist Delphi with operation expenses while it reorganized. Those loans had been scheduled to expire on December 31, 2008, leaving Delphi operating out of its meager cash reserves—reserves which Delphi's own projections suggested would be almost 50 percent exhausted within only three months at the company's current rate of cash burn. Based on these projections, Delphi's creditors agreed to extend the company's bankruptcy operations loan to December 1, 2008. Under the new agreement, Delphi can continue to use proceeds from the loan and delay payment until June 30 of this year, buying the company more time to hammer out agreement among its investors on a modified turnaround plan.

GM's Woes: A Curse, or a Blessing in Disguise?

Delphi's interdependence with GM makes it even more vulnerable to the automaker's financial troubles than other companies down GM's manufacturing supply chain. GM reported a $9.6 billion operating loss in the fourth quarter of 2008, raising the very real specter of a GM bankruptcy. Industry watchers fear that GM's failure would force Delphi out of the protection of Chapter 11 into a full-blown Chapter 7 liquidation. Under Chapter 7, a bankruptcy trustee would be charged with gathering all of Delphi's assets, selling them off to the highest bidder and then dividing up the proceeds of the sale among the company's creditors. Delphi as we know it would be no more.

"Industry watchers fear that GM's failure would force Delphi out of the protection of Chapter 11 into a full-blown Chapter 7 liquidation."

Even if the worst should happen, however, Delphi's continuing interconnection with GM's manufacturing may work to its advantage. Federal bankruptcy law provides for so-called "critical vendors" of a bankrupt company to receive priority in a reorganization, meaning that such vendors will be moved to the head of the line of creditors

waiting to receive payment from the reorganized company's limited resources. Delphi's current role as GM's largest supplier means that a Delphi failure would leave GM unable to maintain the manufacturing capacity it would need to exit bankruptcy, giving GM a strong incentive to argue that Delphi should receive "critical vendor" status.

GM's other creditors, however, may be less than pleased with Delphi's designation as a critical vendor. One of those creditors is the Pension Benefit Guaranty Corporation, the federal agency that insures the private pensions of almost 44 million Americans. If GM's Chapter 11 resources are sufficiently limited, Delphi's critical vendor priority could mean that GM would have to default on its pension obligations, transferring liability for retired GM employees' pensions onto the federal government and ultimately onto American taxpayers. Nevertheless, critical vendor status would go a long way toward ensuring Delphi's continued solvency in the face of bankruptcy by its largest customer.

likely have a materially adverse effect on employment and thereby produce negative spillover effects on economic performance."

Many market analysts read these provisions as significantly extending the scope of TARP, opening up the possibility of bailout assistance to companies farther down the supply chain, including parts manufacturers such as Delphi. Not only does Delphi's role as a key GM supplier make it vital to GM's continuing manufacturing production, GM's dependence on Delphi's production means that the automaker will have difficulty attracting additional private capital while Delphi's future is still up in the air. In order for any bailout of GM to succeed, Delphi must succeed as well. If Delphi does become one of the lucky recipients of federal bailout funds, those funds could go a long way towards replacing much of the private investment money that has been so hard to come by and that Delphi requires so urgently to emerge from Chapter 11.

"The interconnection with GM that has plagued Delphi throughout its life may end up being exactly the thing that ultimately restores the company to full financial strength."

Congressional Bailout: The Ultimate Blessing

But an even rosier scenario has recently become a real possibility. In recent months, the financial industry's ongoing difficulties have led Congress to create the Troubled Asset Relief Program (TARP), a taxpayer-funded bailout program providing loans to entities including GM, Chrysler, and GM's finance arm, GMAC. Although the program has largely been presented as an assist to financial institutions, the Treasury department now appears to be contemplating expanding the program's reach to troubled auto suppliers like Delphi. On December 31, the Treasury released new guidelines laying out criteria for determining which companies might be eligible for TARP assistance. When considering a particular institution for bailout investment, the Treasury notes that it will consider, among other factors, "the importance of the institution to production by, or financing of, the American automotive industry." Specifically, the Treasury now states that it would weigh "whether a major disruption of the institution's operations would

There is no question that GM's uncertainty is affecting Delphi's corporate health. Despite sales of $22.3 billion in 2007, Delphi is currently trading at around $0.07 per share, with the stock price falling as low as $0.02 last November. Much of the depression in value is attributable to sheer uncertainty: will Delphi's GM connection condemn it to liquidation in response to a GM bankruptcy? Or, will it lead to a significant investment by the federal government? If the bailout plan does swing the way that it appears to be moving, the infusion of federal cash could well drive the stock price up and attract additional private investment, allowing Delphi to finally emerge from the gray zone of Chapter 11. Ironically, the interconnection with GM that has plagued Delphi throughout its life may end up being exactly the thing that ultimately restores the company to full financial strength. The curse of entanglement with GM's problems may become, for Delphi, the greatest blessing of all.

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1-3/4" 6-spindle, 1965, 1993 (10)
1-3/4" 8-spindle, 1970
2-1/4" 6-spindle, 1962, 1973-79 (3)
6-5/8" 6-spindle, 1979

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

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

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

CNC SWISS
Star SR-20, 1998

BROWN & SHARPE
00-R/S 1/2" B&S
#2 1-1/4" 1974 B&S
#2 1-5/8" 1975 B&S

DAVENPORT
3/4" thdg., pickoff, longbed (4)
3/4" 2000, Tamer
3/4" thdg., pickup, 1977-66 (8)
Noise Tamers

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

EUBAMA
S-20, S-12

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

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

BY NOAH GRAFF

next

Utilizing its enormous trade surplus, China has become the largest holder of U.S. treasury bonds.

If the U.S. buys fewer goods from China, will China buy fewer American bonds?

Over the long run, the U.S. will inevitably buy less from China, simply because U.S. households will have to save more and consume less to repair their financial problems. That means that over the long run, China will have less of a trade surplus and will add less to their official foreign exchange reserves. Their new trend of buying all types of foreign assets, of which treasuries are the most important, will also slow down. But in the short run, there is no close link between U.S. buying decisions and Chinese decisions over how they hold their foreign exchange assets. In fact, China wants stability in those holdings.

Professor Barry Naughton
University of California, San Diego

I foresee that China will continue to buy U.S. dollar denominated debt, particularly that which is guaranteed by the full faith and credit of the U.S. government. In the volatile market condition that we're in today you should be seeing that China is buying more U.S. treasuries as long as China's export machine continues to churn out billions of dollars worth of export trade surplus on an annual basis. Whether China exports more or less to the States has no impact at all. If they don't export as much, the Chinese government still has to find a place to invest its U.S. dollars because China in the foreseeable future is the world's biggest exporter of goods and services.

Benjamin Wey
President, New York Global Group, Inc.

the facts:

After making direct net purchases of $46 billion in bonds from Fannie Mae and Freddie Mac in the first half of 2008, China's government and companies were net sellers of $26.1 billion in the five months through November 2008.

The Wall Street Journal

China owned $727.4 billion of U.S. treasury bonds by end of 2008. In December 2008, it bought $14.2 billion of U.S. bonds.

U.S. Department of the Treasury.

China's exports plunged 17.5 percent, to $90.45 billion, in January 2009, compared with the previous year. However, its imports dropped even further, by 43.1 percent, or $51.34 billion, reported China's Xinhua news agency.

CNN.com

It depends on why the U.S. is buying less goods. There are three scenarios—number one is that the U.S. purchases less goods due to the general economic decline, number two is that competitive forces arrive in the U.S. and they are able to produce certain products for the same cost as China, number three is that there is a political backlash against imports from China through tariffs or some other political activism. In the case of the first two scenarios, I do not believe that the Chinese will reduce the purchase of U.S. securities because they are still the highest grade debt in the world today. However, in the third scenario, I believe that tariffs or some other political activism mixing economics and politics could cause the Chinese to use their leverage in the bond market to create pressure on the United States.

Robert Newman
The Newman Law Firm PLLC

the facts:

How the Chinese banking system works

When Chinese companies export goods they are paid in dollars. They exchange the dollars for Yuan at local Chinese banks who are then required to turn over money to the People's Bank of China (China's central bank). Unlike in other countries, small banks in China cannot invest how they choose. The Chinese government decides what to do with the surplus.

Reasons for China to keep money in the U.S.

- Safety benefits of keeping money overseas.
- Creates a "connection" or leverage with the U.S.
- The government is concerned about inflation if too much money is spent domestically.
- It's a solid investment.

Albert B. Albrecht of Richmond, Indiana was in the machine tool business for over 50 years.

Photo by Jim Graff

Interviewed by Noah Graff

Albert Albrecht worked in the machine tool industry for 57 years and is writing a book about its history and importance in the future success of America's economy. He began writing in earnest after a walk through IMTS 2008, which confirmed for him the suspicion that 85 percent of modern, successful machine tool builders were foreign.

How did you get into the machine business?

AA: My dad and uncles were in the industry. If I had gone in another direction I probably would have been put out of the family. In those days not everyone went to high school, you did an apprenticeship with the tool and die makers. You would spend 8,000 hours in an apprenticeship and then you could go out as a certified tool and die maker.

What were the "golden years" in American machine tool building?

AA: The golden years were from about 1940-1982, when there were 154 American machine tool builders. America started out exporting machine tools because they were better and had better technology than you could get in Europe. People wanted U.S. technology. In 1982 we lost that to Japan, and we've never really recovered—at that time we were $5 billion in production and it dropped to $1.9 billion. That was the first recession—it took us 15 years to recover. 2003 was another extremely devastating period with a repeat of 1982's drop. We're at $3.3 billion right now, we still haven't come all the way back.

Who are the companies producing in the U.S. today?

AA: This is one of our problems—we have an industry that is made up of only six truly international companies—MAG, Hardinge, Gleason, Minster, Haas and Moore. Japan and Germany are number one and two as exporters. 112 of the 145 companies that were alive during the golden years have closed their doors. That's an estimated loss of $4.3 billion and around 50,000 jobs.

What caused the decline?

AA: The economic ups and downs of the business. One of the problems in the industry has been the availability of financing from banks. Banks haven't always been kind to it—they see it as a high-risk business. This led to consolidations and mergers and a reduction in the size of the industry. Also, the conglomerates, who made a lot of acquisitions in the 1940s and 1950s when the companies were attractive, drained them of cash and dumped them off for liquidation. One of the problems we have today is that we talk about creating jobs, but nobody speaks about manufacturing or the loss of the industrial base in this country.

Who were the pioneers of American machine tool building?

AA: Warner Swasey, Cincinatti—they were the innovators, the real machine tool people. They didn't think they were doing anything [special], they were just doing a job. But in doing that job they were producing a quality product with innovation ahead of what was already out there, and they built companies on it. When those companies were sold off machine tool people did not take over. They were MBAs and were only looking at the bottom line. They were interested in cash flow and what the companies could produce, not in the long-term. The original owners were dedicated to the business, had long-term objectives and loved the product they produced. I was one of those people. I was part of that generation.

What's your goal in writing this book?

AA: Having been a person who was part of the industry—and there are not too many of us left—I think the story of the industry's growth and its importance to the country needs to be told. More important than anything else is establishing a business environment today that will encourage manufacturing and the recovery of our industrial base. Not just in high-tech industries, but the base of manufacturing. The machine tool industry is no longer a dirty, grubby industry—it's clean floors, high-tech and computers. Yet we tell our young people, "Manufacturing, no. You want to be a doctor or lawyer." I want this book to change the mindset of our country in regards to the importance of manufacturing. Yes, we can buy and consume goods, but one of the things we don't realize is that if we buy [foreign] machine tools, even if those tools are produced in this country, the profits and earnings go back to Japan.

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shop doc

With Noah Graff

Dear Shop Doc,

We are a large precision machine shop with approximately 50 machining centers ranging from vertical mills to CNC turning centers. As the machining centers get older we are experiencing shorter coolant life due to increased tramp oil leakage into the coolant sumps. I've heard that oil skimmers could be an economical solution to remove the oil from our coolant pumps. What are the other options?

Skimming by

Dear Skimming by,

Using an oil skimmer is a very effective and inexpensive way to remove tramp oils from a coolant sump. The most common types of skimmers are the belt, disk and tube. Things to consider when choosing which skimmer fits your machining center are tank size, access to the coolant and the required oil removal rates.

The belt skimmer works by mounting it to the top or edge of a tank and running an endless belt (made of plastic, stainless steel or poly material) into the tank. The belt is held in the vertical position with a motorized head pulley and free-turning tail pulley. The belt travels through the surface of the coolant and collects the oil. It then passes through either single or double wiper blades where the oil is wiped off.

Belt skimmers are compact, so they require very little operating space. They also have good oil pickup rates of up to two gallons per hour depending on belt width, which is comparable or better than other skimmer types. They can also handle fluctuating coolant levels while still maintaining minimal operating space. Stainless steel is the standard belt material, which makes them capable of operating in high temperatures without added expense. The cost of a belt skimmer is comparable to other types of skimmers.

The tube skimmer works by mounting it onto the outside of a coolant tank and running an endless, small diameter tygon tube onto the surface of the coolant. The tube collects the oil and brings it back to the skimmer where it is removed and deposited into a proper disposal container.

Being able to mount this skimmer on the side of a machine's coolant tank is this unit's best advantage. It allows it to work where vertical access is not an option. The biggest disadvantage of tube skimmers is their minimal oil pickup rate (approximately one quart in 24 hours). The cost of tube skimmers is comparable to other oil skimmers.

The disk skimmer works by mounting it to the top of the tank and running a large diameter disk into the coolant surface. The disk itself is made up of either plastic or stainless steel. As the disk passes through the coolant surface, oil is picked up and wiped off with a set of wiper blades as the disk passes between them.

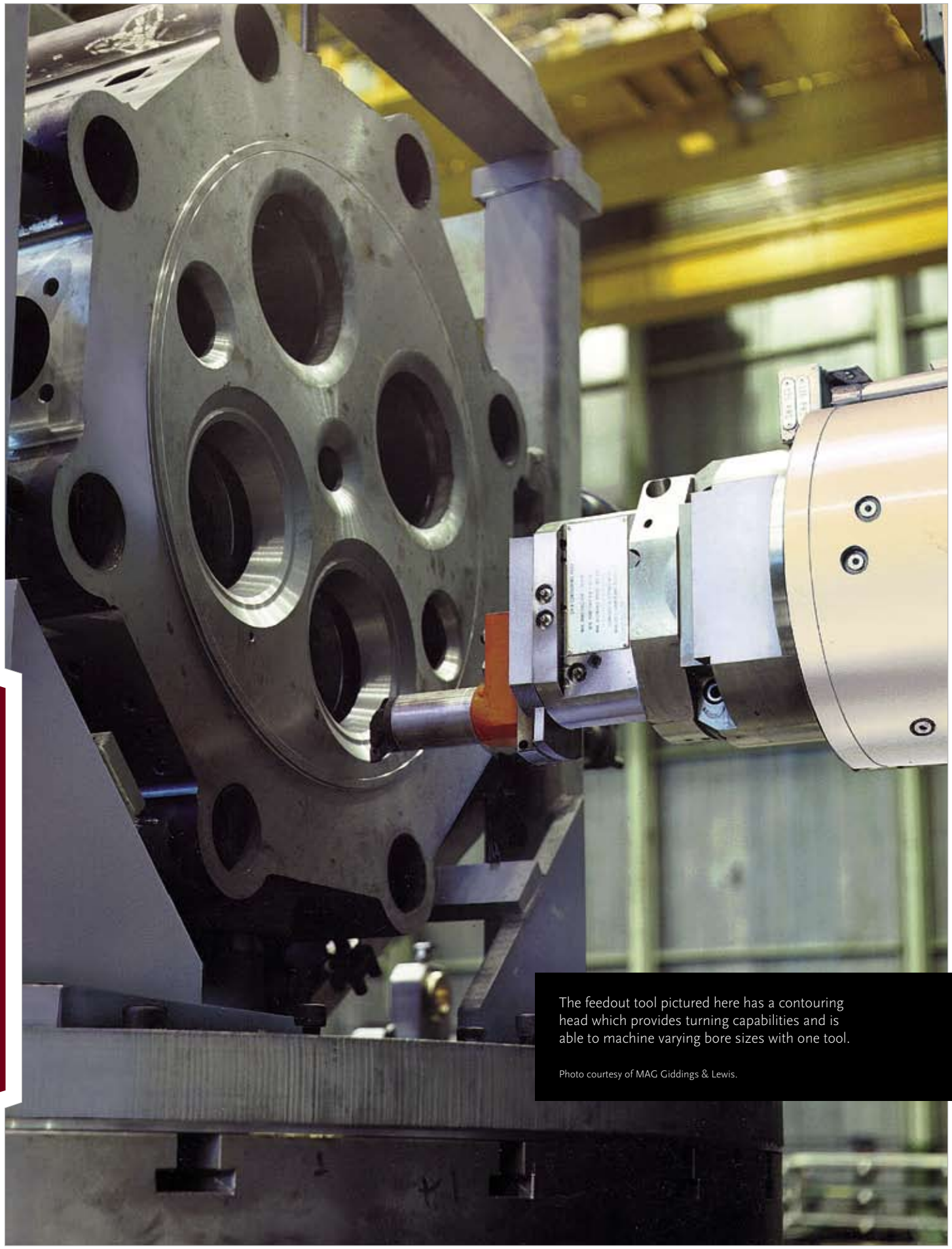
The advantage of a disk skimmer is a slightly higher pickup rate (approximately 1.5 gallons per hour) than other types of skimmers. They also tend to be on the lower end of the price scale. One of the few disadvantages is they require a large operating space. For example, a 24" diameter wheel is required to reach a depth of approximately 12". The disks cannot handle fluctuating water levels, and standard plastic disks cannot handle high operating temperatures.

Christopher Ott
Abanaki Corporation

Christopher Ott is a product manager at Abanaki Corporation, a leading manufacturer of oil skimmers.

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

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.



The feedout tool pictured here has a contouring head which provides turning capabilities and is able to machine varying bore sizes with one tool.

Photo courtesy of MAG Giddings & Lewis.

By Daniel Margolis

Getting Bored

Boring machines remain vital in recession-proof industries.

Though they don't boast as many bells and whistles as other, flashier machines, boring mills perform machining operations that are in demand across the board in today's global manufacturing market.

"Every type of big industry out there that uses machinery will sooner or later require a boring mill," said Bob Conners, vice president of sales and marketing at United Precision Services, Cincinnati, Ohio, an importer of Union Boring Mills.

"They're precise, intricate, capable machines that have a lot of versatility," added Greg Morgan, president of job shop CNC Industries Inc., Fairmont, W. Va.

Boring is a machining process in which a drilled hole is enlarged using a single-point cutting tool in an internal turning operation. Boring can be used for roughing or finishing an internal surface. Tolerances are generally held within ±0.002" to ±0.0005".

Why Bore

There are two main advantages to using a boring mill rather than another machine tool. In general, they have a larger configurable envelope for a part; very large parts can easily be machined on a boring mill. "Boring mills are synonymous with large envelope work," Conners said. "So any workpiece that has to be machined and has dimensions beyond about a 60" envelope is typically routed toward a boring mill, because the traditional horizontal machining centers aren't built for larger envelopes."

Another advantage is that a boring machine features a spindle that advances out from its headstock, allowing the end user to reach into small cavities. "With a live spindle you have the opportunity to keep the tooling short from the cutter point to where it fixes to the spindle and you minimize tool deflection," said Kenneth Campshure, director of sales for boring machine manufacturer MAG Giddings & Lewis, Fond du Lac, Wis.

how it works

Boring Options

There are two types of boring mills, horizontal and vertical. On a horizontal machine the spindle is mounted horizontally and on a vertical machine the spindle is mounted vertically. The main difference between the two is that on a horizontal boring mill, the workpiece is stationary and the tool turns, while on a vertical boring mill, the tool is stationary and the workpiece turns. The shape of a workpiece will generally determine if a vertical or horizontal machine is used.

"On a horizontal you have more versatility, because it doesn't limit your part size," Morgan said. "You might only be working on three feet by three feet of it but you could put a 10' tall part on the table, whereas with a vertical machine you could only put maybe a three foot part on the table."

Despite these differences, vertical and horizontal mills generally see equal amounts of use. John Ilczyszyn, owner of job shop Pride Machine Tool Inc., Melrose Park, Ill., has both types in his shop and finds it difficult to say which is more popular. "All of our machines are busy and we have just as much work on the vertical boring mill as we have on the horizontal boring mill," he said.

How to Bore

A boring bar consists of an indexable insert, a spindle and an anchor where the spindle is anchored to the machine. The length by which the spindle extends from the anchor is its overhang.

End users seek to limit overhang as much as possible, as the longer a spindle extends from the anchor, the greater the risk of deflection, which can lead to chatter and insert failure. "You're machining with a flagpole, so the longer the flagpole, the weaker it is," Campshure said.

Machinists generally judge acceptable overhang by the ratio of overhang to the diameter of the bar, which should be as large as possible. Some peg this ratio at four to one, overhang to diameter. According to Conners, the ratio can go as high as 10 to one, but that would be "absolute worst case." Ilczyszyn's shop's boring mills have bar diameters between 5" and 6", and his machinists try not to overhang more than 36". He says that an eight to one ratio can be achieved without any problems at all.

The diameter of bar on a machine will determine how much horsepower is needed. "A 5" spindle is roughly 50 to 70 horsepower, as you go larger in diameter you can also increase your horsepower," said Gary Carlson, vice president of machine tool manufacturer WMW Machinery, West Nyack, N.Y.

Where the rubber meets the road on a boring mill, is the insert. What type of insert is used is determined by whether an end user is roughing or finishing. "On the finishing side, we make specific wiper geometries that we refer to as a knife-edge," said Tony Williams, solutions leader at Sandvik Coromant, Pontiac, Mich. "You get a clean, sharp cutting edge, which allows the boring tool to pass through the bore at a higher feed rate and still generate a nice, smooth surface finish."

According to Williams, the most popular type of material of boring mill inserts is cemented carbide. The type of insert coating used is determined by the workpiece material that a shop is machining, but Williams noted that aluminum oxide is almost always an ingredient in the coating.

Above: This workpiece is for a stone crusher. It's being machined on a horizontal boring mill. Photo courtesy of Pride machine Co.

History of Boring

The history of boring mill machines goes back 100 years. MAG Giddings & Lewis built its first boring machines in 1905.

The biggest change in boring mills since they emerged has been their controls. CNC controls were first applied to the machines in the mid-1950s.

"They started as gear-driven, mechanical machines," Carlson said. "The operator would throw levels to engage clutches and change feed rates, and even have to crank large wheels to move an axis. Now of course it's evolved to totally CNC-controlled, lights-out type machining. The program is downloaded from the production manager's office and the operator just calls it up, sets the workpiece and goes on to something else."

This is due not to just the addition of CNC controls, but also to how motors and drives have increased in quality and speed.

Above: This workpiece is a clutch for a press brake being machined on a manual, vertical boring mill.
Photo courtesy of Pride machine Co.

Above: Giddings FTR5000: The latest HBM from MAG is the floor-type FT and FTR Series for extremely large parts. The model pictured includes an optional right-angle head for additional machining flexibility. Photo courtesy of MAG Giddings & Lewis.

Not all job shops have upgraded to CNC controls. Dusan Radakovic is owner of job shop Field System Machining Inc. in South Elgin, Ill., and he continues to use manually-controlled boring mills. He says the one-off, custom nature of his work makes CNC not worth the expense. He asked, "If you want to make just one piece, why would you spend $20,000 for upgrading to CNC?"

Cost and Demand

The cost of a boring mill machine can range from roughly $500,000 to $5 million. Demand for boring mills remains consistent, but since the machines are long lasting and expensive, the market is small compared to other machine tools. Like all other industries, it's currently somewhat flat due to the state of the economy.

"Now, at this particular time in the economy, [people are] going to be repairing what they have," said Campshure, who explained that up until recently people were prone to buy new boring mills because of advancements in technology on the machines and because "the used market was pretty much scarfed up, the good stuff was gone."

Some manufacturers, however, are not seeing any slowing of sales for boring mills. Ralph Appleby, president of TOS Trade North America, Mt. Juliet, Tenn., a seller of horizontal boring mills, reports having a "guilt complex" over his sales. "Because you hear what's going on in the country, it's depressing and I'm thinking 'But why is business so good for me?'" He offers this explanation: "If you're in energy, you're going to be busy, or you should be busy, and a horizontal boring mill really suits itself for energy."

Boring the World

Boring mills are used to machine parts for use in the energy industry, oil and gas production, windmill manufacturing, mining, printing, chemical processing, aerospace, ship building, communications, construction and even machinery manufacturing itself.

According to Ilczyszyn, the current state of the economy has driven up demand for boring work as it's led to a shakeout of boring job shops. "A lot of people went out of business and there are not many of us left," he said. "That's why we [are getting] a little bit more work than usual."

A good deal of the work shops see on boring mills are repair jobs, where a part, such as a large shaft or valve, needs to be repaired rather than replaced because of the size and the cost of the component.

how it works

"If you think of a digger with a long arm on it, every one of those joints is a shaft and a bushing where it swivels, and those wear out," Carlson said. "So they use the boring mill to create a straight, larger diameter bore and then install a new bushing and reinstall the shaft."

Carlson estimates that 90 percent of such parts are sent to a shop for repair. In instances where this isn't possible, a shop sends its boring mill to the job site and performs the repair onsite. Field System Machining is one such shop that designs and makes boring machines capable of going to a job site.

For such jobs, the shop's crews may be onsite for two to three weeks in locations all over the world. Frequently the crews are reporting to jobs where the repair needs to be

Above: A MAG PT Series plain table boring mill installed at Busch Precision in Milwaukee. Photo courtesy of MAG Giddings & Lewis.

Above: CNC controlled vertical boring mill no longer in use.
Photo courtesy of Pride machine Co.

performed immediately, so the shop exercises all possible options in terms of shipping its machinery.

"For example, about a month ago we had to go to Hawaii," Radakovic said, "and luckily for the customer we were able to put [the boring mill machinery] in two small boxes 48" long by 10" high and 30" wide," so it could be shipped by plane. In instances where larger equipment is needed, Field System Machining moves its equipment by ship or ground transportation.

A Boring Day

The day-to-day reality of a boring mill shop is often custom machining. Some end users of boring mills are making their own product for resale, but most are taking on contract parts. "In terms of a job shop getting boring mill work, they advertise what they [have], not specifically by brand but by envelope capacity, spindle size [and] spindle power," Campshure said.

When Field System Machining gets contacted for a job, Radakovic and his staff look at its specifications and schematics to see if they can take it on. If they decide they have the necessary capacity, they decide which machine to use and begin designing custom fixturing.

"When we look at the drawings we have the fixture in our head right away [from] how the piece looks physically," Radakovic said. Ilczyszyn reports that his shop's boring mills are used continuously during every shift. Conners feels this level of use is required if a shop is going to own a boring mill.

"If it's in a shop it has to see use of 40 hours a shift, three shifts a week, because it's an expensive piece of equipment; it's a big investment," he said. "Nowadays, as closely as justifications are looked at, you need a full work schedule to justify the use."

how it works

Boring Labor

As in other types of industrial manufacturing, good, experienced help is hard to find for boring mills these days. With boring, however, finding a skilled machinist is of paramount importance due to the high cost of parts a shop is likely to run on a boring mill.

"If you have a small machining center and your material costs are $10 then it's easy to [use] a young man who is learning and can scrap three or four of them before he gets it right," Conners said. "But if you're putting a casting that costs $100,000 on a boring mill, you don't want to scrap that."

However, as the machines themselves evolve, the level of skill needed to run them is changing. "We find that a lot of old timers who are excellent tool-and-die makers or machinists, are afraid to switch over to a CNC boring mill," Carlson said. "So the new operators are all younger guys who don't necessarily have the experience yet, but the machine does a lot of what the tool-and-die maker used to do as far as the calculations and the actual machining and setup."

For more information:

CNC Industries Inc.: www.cncindust.com
Field System Machining Inc.: www.fieldsystems.com
MAG Giddings & Lewis: www.giddings.com
Pride Machine Tool Inc.: www.pridemachinetool.com
Sandvik Coromant: www.coromant.sandvik.com
TOS Trade North America: www.tos-trade.com
United Precision Services: www.unitedprecisionservices.com
WMW Machinery: www.wmwmachinery.com

Video:

Videos show how boring works. On YouTube, search "boring mills" for a demonstration, or go to: http://video.aol.com/video-detail/giddings-and-lewis-340t-horizontal-boring-mill/970796359.

product focus

The following are companies who have given information on mill/turn machines

By definition a mill/turn machine sounds like the makings of a great multi-tasker. Indeed, machine tools with mill, turn and drill capability perform simultaneous milling and turning operations on the front and back of a part in a single setup. Combined with the right CAM system for your machine, a mill/turn machine allows for complex multi-tasking, meaning potential for both increasing profitability and the production of complex, multi-faceted parts.

Doosan Infracore

The dual spindle, multi-tasking Puma MX2100ST cuts parts as large as 21.25" diameter by 52.5" or 72" long and is built for heavy and interrupted cuts and long-term accuracy. The 12-station turning-tool post is non-lifting to protect the coupling from chips and other contaminants, and indexes station-to-station in a quick 0.2 seconds. Live or static tools can be mounted at any station and oriented toward either the main or sub-spindle. Live tools are powered by a 7.5 hp (15 min.) motor with a maximum speed of 5000 rpm. The motor is built into the headstock casting, with its spindle fully encased in an oil cooling system. The beltless design eliminates backlash, feed-back error and vibration. A combined B-axis (tilting) and Y-axis milling spindle maximizes the number of geometries that can be machined without the need for custom, rotary tool holders.

For more information, please contact Doosan Infracore at 973-618-2403 or visit www.infracoremt.com.

▲ Haas Automation

The live tooling option for Haas SL-series turning centers allows the use of standard VDI40 axial or radial driven tools to perform secondary operations such as milling, drilling, flatting and tapping—both on the face of the part and around the diameter. The option includes a full C-axis, which provides interpolated, bidirectional motion at precise speeds and feeds for part positioning and repeatability. A powerful hydraulic brake locks the main spindle during secondary operations. The C-axis provides high-precision (±0.01 degree) bidirectional spindle motion that is fully interpolated with X and/or Z motion. Speeds are programmable from 0.1 rpm to 60 rpm, and Cartesian-to-polar interpolation allows programming of face machining operations using traditional X and Y coordinates.

For more information, please contact Haas Automation at 800-331-6746 or visit www.HaasCNC.com.

◀ Hardinge

The new fully-integrated 5-axis XR 600 5AX vertical machining center is the newest member of the Bridgeport XR Series of VMCs. The Bridgeport XR 600 5AX features a rigid bridge-style design, 45 mm, fixed, pre-tensioned, double-nut, cooled ballscrews on all linear axes and a 600 mm (23.62") diameter integrated dual-axis rotary table with 150 degree tilt and 5-arc second accuracy. The 48-tool carousel-type automatic tool changer (ATC) features random access, bidirectional indexing and 4.9 second chip-to-chip change time.

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

▼ Hurco

The TMX8MY and TMX8MYS slant-bed lathes with live tooling have rapids of 950 (X-axis) and 1,200 (Z-axis) and 14,500 spindle speed with peak spindle motor horsepower of 36, in addition to a live tool turret with Y-axis capability. Also included are an all-digital control, drives and motors with absolute encoders on all linear axes. The TMX8MYS has a programmable synchronous sub-spindle with C-axis control and bidirectional part transfer capability. The TMM8 and the TMM10 slant-bed lathes with live tooling include C-axis standard and program to .001 of a degree. Any station can be a live tool and Hurco uses a fast servo turret instead of a hydraulic turret.

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

product focus

▼ INDEX Corporation

The new INDEX Traub TNX65/42 turn-mill centers are designed to machine parts from bar diameters to 65 mm (2.60") and a length of up to 300 mm (11.8"). The modular machine design includes identical 37.5/32.2 hp (28 kw/24 kw) main and counter-spindles and may be equipped with two, three or four turrets, each capable of holding 10 live or fixed tools, and each of which travel in X and Z direction 175 mm (6.9") and 650 mm (25.6"), and optionally ± 40 mm (1.57") in the Y direction. Up to 80 tools can be accommodated using double tool holders. The new TNX65/42 machines reach cycle times typical of multi-spindle automatics.

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

product focus

▶ Mazak Corporation

Mazak's new INTEGREX i-150 features a single, horizontal, main spindle with 15 hp and 5,000 rpm for turning and C-axis control. The 6" through-hole chuck provides generous bar capacity of 2.56". A powerful 10 hp, 12,000 rpm milling spindle is mounted in the vertical rotating B-axis with a range of -10 degrees to 190 degrees. The machine can also be equipped with an optional 20,000 rpm spindle. The compact INTEGREX i-150 has a Y-axis range of ±3.94" (± 100 mm). X-axis travel is 14.57" (370 mm), Z-axis is 17.13" (435 mm) while maximum swing is 15.75" (400 mm). Also included is a multi-purpose part-handling device, which can index to an NC tailstock for shaft turning or be used as a vise for holding the workpiece while multi-face operations are performed. An unloader is included for automatic part removal and the machine is equipped with an automatic bar feeder.

For more information, please contact Mazak Corporation at 859-342-1700 or visit www.mazakusa.com.

◀ Okuma

The Multus B400 has a wide, rigid bed with a guideway system that features X-Y-Z-axis roller guides with high rigidity (2.6-3.0 times that of a ball guide), antiwear and vibration damping. An equally powered sub-spindle or tailstock is optional. The Multus B400 has a powerful, compact turret, and an Okuma PREX motor. Also featured is the Collision Avoidance System software and Okuma's THINC-OSP control, which can run the entire machining simulation and catch potential collisions before they create scrap.

For more information, please contact Okuma at 704-588-7000 or visit www.okuma.com.

▶ Mori Seiki

Mori Seiki's NT6600 DCG/4000CS offers a maximum turning length of 13.3". The machine employs DCGÒ (Driven at the Center of Gravity) technology and combines the box-in-box construction of the NH Series horizontal machining centers with the NL Series of CNC lathes. The NT6600 DCG contains a B-axis that uses a DD (direct drive) motor, eliminating backlash and making high-speed rotation possible. It is available in 12 variations, including three types of maximum machining length and two types of maximum spindle speed, enabling users to choose a machine based on the size of targeted work.

For more information, please contact Mori Seiki at 847-593-5400 or visit www.moriseiki.com

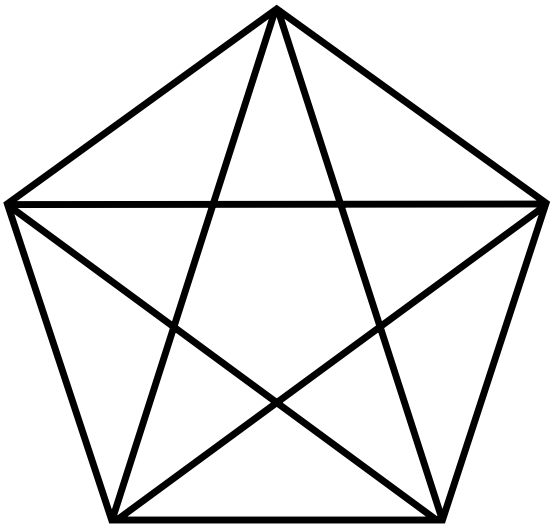
▲ STAMA America

STAMA offers a line of mill/turn machines with one or two milling spindles and trunnion rotation for fully automated production from blank bar or chuck. Full 5-axis, 6-sided machining capability in one work cycle is standard, with only two chucking operations to produce the finished parts. 64-position tool changers are available with external magazine capability to 180 tools, maximum workpiece sizes to 250 mm length x 350 mm diameter and rapid traverse to 60 m/min. All machines in the STAMA line are equipped with Siemens or Fanuc CNC onboard.

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

Send in your answer—quick!
Fax Emily at 708-535-0103, or email
emily@todaysmachiningworld.com

think tank



How Many Triangles Can You Find?

Game Show Answer

If you stick with your initial choice, your chances of winning are one in three. That means the chance of the car being behind one of the doors you did not initially chose is two in three. When the host reveals the monkey behind one of the two doors, that additional information suddenly changes the odds. The host, of course, will not open a door that reveals the car. And the host's choice of doors depends greatly on your initial choice: if your door hides the car, the host can pick either remaining door; but if your door hides a monkey, the host must pick one and only one door to open. The possibilities for the doors you did not pick have been constrained. Therefore, if you switch, you have a two-thirds chance of selecting a door with a car behind it.

Puzzle found in the February 2009 issue

Who Switched their Door?

Nathan Henderson of Greentec Precision, Inc. in Beavercreek, Ohio; **Joel Gray** of Service Industries LLC in Rolling Meadows, IL; **Jim Riddell** of Baker College in Flint MI; **Miles Free** of Industry Research and Development, PMPA in Brecksville, OH; **Bob Cookson** of Cookden Industries in North Andover, MA; **Frank Dunlevey** of Brush Wellman Inc. in Mayfield Heights, OH; **John M. Bacsik III** of Air Parts Mfg. Co., Arlington, TX.

postings

Noteable and newsworthy information and events for upcoming months.

PMTS

April 28th thru 30th

Columbus, Ohio

www.pmts.com

Manufacturing Matters Conference

May 19th

Milwaukee, WI

www.manufacturingmatters.org

Design-2-Partshows

Find design and contract manufacturing suppliers

May 5th & 6th

Schaumburg, IL

www.d2p.com

Introduction to CNC

Sandvik Coromant Company

Schaumburg, IL

May 28 & 29

www.sme.org

Advanced Manufacturing Pavilion at PMDS 2009

May 12th thru 14th

Montréal QC, CAN

www.sme.org

EASTEC Exposition

May 19th thru 21st

W. Springfield, MA

www.sme.org

Composites Manufacturing

San Diego, CA

April 29th to May 1st

www.sme.org

Charles Lindbergh flew across the Atlantic

May 20-21, 1927

Kentucky Derby

May 2nd

Happy Birthday Mr. T

May 21st, 1952

Happy Birthday Frank Perdue

(Perdue Chicken)

May 9th

1920 - 2005

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afterthought

Spring Hope

I used to have a concrete patio in my backyard. Over time it developed a few annoying cracks—not gaping fissures—just hairline crooked lines in the slab.

Occasionally dandelions and weeds poked up during the summer and fall, which we Round-upped into decaying chlorophyll. But once—out of the tiniest of jagged openings—a beautiful squash plant took hold and grew into a flowering fruit, producing vines smack-dab in the middle of the dull grey square.

"Belief in a better future is stomped on and poisoned everyday by pervasive gloom and cynical negativity in the public media."

I have no idea where the seed came from, but it appeared as a gift begging for nurture. We monitored its growth and talked about it at the dinner table. It was the plant from nowhere that never should have survived, but it did.

It reminded us of plants we saw growing in the Wailing Wall in Jerusalem, which seemingly had no source of sustenance yet survived anyway.

I think we are at a juncture in the economic cycle of America. We need to look for the signals that tell us life finds a way, but it is up to us to make sure we don't mistake greenery for a weed when it sneaks through a crack.

Belief in a better future is stomped on and poisoned everyday by pervasive gloom and cynical negativity in the public media. We feel it in the darkness of suffocating bedrooms at 3:00 a.m. Life seems so uncertain, so unrelentingly hostile, so agonizingly bleak.

But every morning life asks you to put one foot in front of the other and trudge into the fog of fear. It's hard to try and be happy when you feel like you are floating in a slough of abject negativity.

I learned a few things about the relentless pull of negativity competing with the steadfast pull of committed hope when I was in my recent tug-of-war for life.

I spent 12 days on a breathing machine with a dozen tubes sending fluids into my body and flushing them out. I am convinced that the ventilators and the medicines alone would not have been enough to enable me to pull through. The absolutely essential piece for me was hope, belief in my recovery and knowing that I was surrounded by loving people who refused to submit to fear and paralysis.

I knew I was a mess with all the tubes flowing and the monitors beeping, but I stayed upbeat because it felt like everyone around me, including the nurses and doctors, were confident. I learned later that my loved ones weren't so buoyant as they kept vigil at midnight in the hospital waiting room. But when family and friends strolled into the ICU they radiated confidence in their smiles and words.

I emerged from the maelstrom of heart failure and bypass with renewed respect for the power of positive vibes. They charged my chemistry.

Spring is here now, after a withering winter of chills and bleakness. I am hopeful that business will start to turn around soon for the people who have hope, and especially for those who give hope. Hope, confidence and belief in a better future are without a doubt the most valuable gifts one person can give another. But it has to be real, saccharine words on greeting cards are worthless. The conveyance of hope has to be authentic, even if the hoper is soggy with doubt.

Our bodies are hormonal factories. Negative energy produces destructive hormones. In our current economic lives we are assaulted everyday by the raging hormones of fearful angry people.

But most of us possess the antidote if we are capable and willing to access it and then hand it off to others.

Give hope. It is the blossom that sneaks through the tiniest crack in the concrete.

Lloyd Graff

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