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March 2010 volume 6 issue 2

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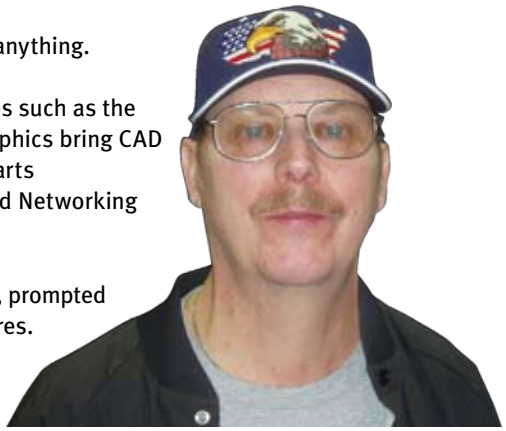

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in this issue

Today's Machining World
March 2010 Volume 6 Issue 2

Features

COVER: Set for Elton John and Billy Joel's 2009 tour, designed and manufactured by Tait Towers in Lititz, Pa. *Photo by Paul Pelletier*

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contributors

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 cover the backhand side.

Noah Graff has been working at *Today's Machining World* since 2005 (Wow!). He is the features editor, videographer, and "the Web guy" of the magazine. He recently completed his reality show on YouTube called "Jew Complete Me" documenting his search to find the Jewish love of his life (not a Hollywood ending), and now has begun 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*.

Barbara Donohue has been turning technology into English since 1993. An MIT-educated mechanical engineer with more than a decade of industrial experience, she started her career in journalism as editor of a small-town weekly newspaper. A more recent reporting gig took her to a simulated Iraqi village at the Marine Air Ground Combat Center in 29 Palms, California, with a group of journalists embedded for four days with a New England based Marine reserve unit undergoing counterinsurgency training prior to being deployed. Barbara was the only one of the journalists to be captured by the Marines during the Urban Assault exercise.

Robert Strauss is a former reporter for *Sports Illustrated* and the *Philadelphia Daily News*, and a news producer at KYW-TV in Philadelphia. Now he is a freelance writer based in Haddonfield, N.J., where he revels in his two daughters' basketball prowess and their eye rolling at his bad puns. He went to his first rock concert too long ago to see the Cream, and will admit to liking Taylor Swift and Lady Gaga when the teenagers put them on the car radio. He has written for *TMW* on the manufacture of, among other things, mousetraps and marching band instruments. His work appears most often in the *New York Times*, the *Washington Post*, the *Los Angeles Times* and *Today's Machining World*.

Today's Machining World

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BPA WORLDWIDE

editor's note

Not For Everyone's Taste

Malcolm Gladwell is the writer I'd like to be when I grow up. His new collection of articles, *What the Dog Saw*, mostly written for the *New Yorker* magazine, sets the standard for journalism in current publications.

He wrote a piece about why branded food products like ketchup and tomato sauce are successful or get ignored.

He spent a significant portion of the article on Prego tomato sauce, which is a Campbell's product. The brand was sagging several years ago when they went to a guy named Howard Moskowitz, who analyzes why people like a food item and continue to buy it. He discovered that folks liked Preggo's sauce a lot, but they also liked other sauces with slightly different flavors. This information inspired Campbell's to come out with different varieties of Prego—with mushrooms, chunky tomatoes, basil, etc. Over the years, Campbell's marketed 20 different varieties of Prego and greatly expanded the brand.

On the other hand, H.J. Heinz has been building its ketchup brand for a 134 years, but has rarely tinkered with the basic flavor that defines the food category. Heinz *is* ketchup, though there are many tiny tomato "catsup" brands begging for notice in gourmet shops. Heinz's big innovation was the squeeze bottle, which has boosted sales dramatically because kids love the control it affords.

I've had the dream of *Today's Machining World* becoming as ubiquitous as Heinz ketchup in the industrial community, but I realize that it's not everybody's taste.

But I'm going to continue to make it unique and eclectic, with some sugar and vinegar and saltiness. Each issue is a little different, but I hope we will earn your loyalty to our brand.

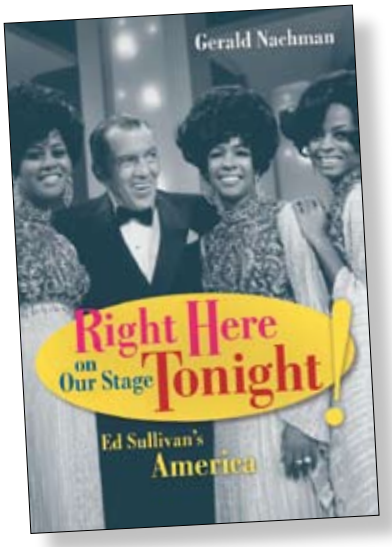
Lloyd Graff
Editor/Owner

By Jerry Levine

Right Here on Our Stage Tonight

I started watching TV in 1947 on a little six inch Farnsworth. My friends came over in the afternoon just to watch the test pattern with its obnoxious hum. There was Howdy Doody and an occasional Cubs game, but not much else. Then suddenly, the medium exploded with three networks vying to dominate the airwaves. Ed Sullivan's "Toast of the Town" soon ruled Sunday night.

Sullivan took an essentially dead genre—vaudeville—and transformed it into the variety show. The book, *Right Here on Our Stage Tonight* relates the saga of Sullivan's 23 years as the nation's promoter of traditional American values and barometer of popular culture. Author Gerald Nachman takes us through those years from dog acts and plate spinners to Elvis, the Beatles and beyond. Sullivan was the first impresario to regularly feature black performers, including Nat King Cole, the Supremes, James Brown and Richard Pryor—he even hugged Ella Fitzgerald, challenging both his and his audience's conservative values.



Even though the show featured an astonishing 10,000 acts, it is mostly remembered for two momentous events—Elvis Presley's first national TV debut and the Beatles' four huge appearances. Yet I remember with great nostalgia the famously silly recurring acts like ventriloquist Señor Wences, who spoke through a mouth scrawled on his fist, Pegleg Bates, the one legged tap dancer and Topo Gigio, the mouse puppet that signed off with the familiar "Kees-a-me goo night, Eddie." Then there were the "aging" (even for my generation) legends—Maurice Chevalier and Sophie Tucker.

But most of all, everyone remembers Sullivan as the uncomfortable stiff in front of the camera. Though he could easily ad-lib with a banquet audience, or even a studio audience during rehearsal, he could not perform well in front of that non-human, one-eyed mass of steel and wires. His unique speaking voice also provided fodder for comic imitators: "Laze and gennulmen, tonight's really big shew—the Bea'les." He looked like a mechanical man wound up with a key and set loose onstage.

In 2006, the History Channel named Elvis' appearance on the show one of the "Ten days that changed America," along with Antietam, the discovery of gold in California and Einstein's atom bomb letter to FDR. In 1956, Elvis drew a record 60 million people, 82.6 percent market share, numbers today's Super Bowl rarely reaches. While Elvis was clearly not Sullivan's taste in music, Ed passed his blessing on to the new generation calling Presley "a nice, polite young man." After the performance, Sullivan even praised the young audience that he had lectured before the show, saying, "I wanna tank all you youngsters; you were very, very good."

In the end, it was the Beatles that changed the Ed Sullivan Show; first elevating, then transforming and eventually diminishing it. Once Sullivan opened the door to 1960s and 1970s music, the old "family" audience began dying off, both figuratively and literally. Viewers complained that what had been a good family show was now dominated by suggestive dancers and that "disgusting Tiny Tim."

In 1970, the show dipped to number 27 in the ratings, and in 1971, it was cancelled. Sullivan himself declined physically and died less than three years later. His obituary read in part, "He was an excellent judge of entertainers. He was so honestly ill at ease on the program that viewers came to affectionately feel sorry for him." The writer added, "He despised bigotry, fraud and irresponsibility."

I remember that before there were 500 channels of cable, Internet and the iPod, there was Ed Sullivan, and he was, "The Toast of the Town."

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

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Cutting Edge, and Gone

Lloyd, I'll be letting my subscription to *Today's Machining World* run out. Your magazine has always left me a bit uncomfortable because of its slightly left leaning take on the news. I can't put a finger on any one thing in particular; it's sort of like a bad odor that seems to come from everywhere yet nowhere. Your views on Obama, your interview questions and your recent comments about Scott Brown (online), in which you imply that his only qualifications [for Senate] are posing nude for *Cosmo* and his daughter's dubious accomplishments. Do you smell that? These all add up to a stink on my desk. You are certainly welcome to your views, I'm just not interested in finding them in my mailbox. Your magazine is cutting edge, relevant, slick, interesting and gone.

Michael

Response to Michael's Comment Above

I would consider myself centrist leaning right, and I find most of the op-ed pages that Mr. Graff writes are smack dab to the right, where does that put you? I read the "Swarf" for the entertainment and the articles because they are relevant to the machining industry and downright helpful at times. I fear Senator Brown is an unqualified pretty boy who will do more to hurt this country than help, so he should fit right in on the Hill.

Bill Moore

Oh, How I Miss Don Woods

Stop sending me the Obama propaganda, and these stupid emails. Ah what am I saying, you retards don't even read them. Lloyd, you may have not started speaking until the age of age three, when are you going to start thinking? Oh how I miss Don Woods.

Tim Breen
Lee Machine

Response to Swarf about Electric Vehicles

January/February 2010 Issue

Having been a prototype vendor on both the Volt battery and the last several versions of the hydrogen fuel cell vehicles, I have come to the conclusion that to marry these two advancing technologies may be the best route for the future. The idea of zero emissions and less dependence on foreign oil being the selling points. Recently I was able to drive a "Project Driveway" hydrogen fuel cell equipped Chevy Equinox. It was amazing, the acceleration and ride were truly unexpected. This test drive was on about 35 miles of open country road, not a test track. The vehicle was a bit front heavy due to the old 4.5 version of the fuel cell, but newer cells have shrunk in size and weight significantly. Combined with a developed lithium battery system, these technologies and changes in our infrastructure could be a win-win for the country and fuel a new economic recovery. Think about it, would you rather have jobs created in new and advanced infrastructure, or jobs created in new government bureaucracy?

Steve Jackson
West Michigan Tool and Die Inc.

Responses to Swarf about Bolivian Salt

January/February 2010 Issue

What nonsense. All salt is sodium chloride. It's all the same stuff. Whether its mined as salt deposits millenniums ago by lakes or extracted from current salt water, it's all the same stuff. This kind of stuff reminds me of what Warren Buffett said about fancy high cost wines. He said, "maybe the best wines do come from a small area in France, but I suspect that the difference is 99 percent in the telling and one percent in the drinking." Many of the so called high-end gourmet foods are nothing more than marketing hype. A con job to be frank. So you are now advocating we become con artists as a way to compete? For shame!!

Paul

Lloyd, I worry about you. You should not be adding salt to your omelets or tomatoes! I did enjoy your story about the Bolivian Salt, but didn't you have a heart attack awhile ago? Ease up on the salt, but use the good stuff when you have to.

Ted Roberts
Roberts Automatic Products Inc.

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 lloydgrafftmw@yahoo.com

By Lloyd Graff

Battling for Steel

I recently talked to General John Batiste who I interviewed three years ago in *Today's Machining World*. Batiste served 30 years in the U.S. Army before walking away from the carnage in Iraq before the surge turned things around.

He went to work at Klein Steel in upstate New York, helping to run the large steel service center business. Today he says he's happily hustling steel and sees business improving.

General Batiste had been stationed at Fort Hood in Texas during his military career. I asked him about the psychiatrist, Major Malik Nidal Hasan, who turned militant and allegedly killed 13 people on base during his rampage. He said he was appalled that Hasan had not been ushered out of his position after displaying so many signs of erratic and potentially dangerous behavior. He says the Army has clear procedures for such cases, and he saw a lot of troops in Iraq who needed counseling who he made sure were channeled correctly.

I asked him if he had seen the movie, *The Hurt Locker*, about a bomb diffuser in Iraq. He had seen it, but felt it didn't realistically depict the standard procedures and discipline of the U.S. Army, though he believed the film gave an accurate portrayal of the addiction to adrenaline that combat can create.

The General didn't want to talk about the Afghanistan war, but after I prodded him he said that it is looking like a quagmire.

Three years removed from the Middle East, John Batiste sounds quite content to battle for steel orders far away from the cold steel of rifle fire.

swarf

I talked to Joe Hammer recently to see how his company, Process Screw Products Inc. was fairing and he was quite upbeat. Joe runs an old school screw machine shop with 100 Brown & Sharpes in little Shannon, Illinois, 125 miles west of Chicago.

Joe bought a dozen nice Brownies out of the Micro-Master auction sale four months ago. Most of the value in that sale came from the late model Star Swiss CNC machines, but there was a lovely B&S department that sold for $500 to $1,500 per machine.

Joe Hammer has put six of the machines into production and is delighted with the buy he made. His business, which was started by his father 50 years ago, runs well because of the homegrown talent. Sons and daughters and assorted family members make up the core team and enable him to compete successfully in a CNC world. And he may not be the lone contrarian.

Lately I've been getting a lot of calls for Brown & Sharpes, which seem to fit a niche for 1,000 piece orders that repeat.

Is something old becoming something new?

Seth Godin's new book *Linchpin*, is troubling and provocative. Godin is a brilliant marketing commentator who has now tackled the subject of how to make yourself indispensible to an organization. It is troubling because the skills which make a person the glue that holds a place together are not what is being taught in school. President Obama and talking heads in government and the media extol the value of "education" and learning math and science like it is the Holy Grail of the country. But Godin argues that high schools and colleges are turning out people who fit a 1960s and 1970s world of assembly line workers and interchangeable and expendable people. Godin's message is that every worker needs to strive to be the crucial piece of a firm, "the linchpin" that cannot be let go. The linchpin is the glue person, the one connected to clients and the staff or the one who knows the recipe of the company's secret sauce. This is not what school trains you for. The specialist may get hired, but then he or she must quickly master the keys to the organization if they want to be fireproof.

The cross currents of job growth, environmental protection, energy and raw material security for the United States make for a public policy jumble. The Obama administration is showering incentives to build alternative energy facilities using wind and solar under the "green jobs" theme, and some Republicans have joined in the chorus. The sad fact is that the subsidies usually benefit foreign manufacturing more than domestic. Bloomberg recently ran an informative piece talking about a $2.1 million subsidy for Suntech Manufacturing to build a polysilicon solar panel plant in Goodyear, Arizona. It will employ 70 workers who will assemble 30 megawatts of power. Meanwhile in China, Suntech plans to boost production 40 percent to 1,400 megawatts. In Wuxi, China, where the Suntech plant is located, minimum wage is $141 per month, about 15 percent of the U.S. minimum wage. The stimulus package contained $2.3 billion in tax credits for renewable energy manufacturers. Obama wants to expand it to $5 billion next year. The unfortunate fact is that the big solar producers are making their stuff in China and Malaysia. "Green workers" will install it here, but the incentives will benefit big multinationals more than local American manufacturing companies.

This year's Super Bowl hinged on the recovery of a surprise onside kick by the New Orleans Saints at the beginning of the second half. Saints coach Sean Payton gambled that his team could recover the ball and change the momentum of the game. It worked. The Saints then outscored Indianapolis 25 to 7 in the second half to upset the Indianapolis Colts. I laud Payton for the gamble. Most pro coaches are extremely conservative in mapping a game, but Payton was willing to gamble, as he had done late in the first half by shunning a sure field goal to go for a touchdown from the one-yard line on fourth down. The Colts stopped the run, but New Orleans still made a field goal just before the first half ended. According to the blog, Advanced NFL Stats, the Payton gamble was not roulette. The blog reports that although the success rate of NFL onside kicks is 26 percent, the success rate of surprise onside kicks is actually around 60 percent. The reason they have a bad name is because they are usually attempted when the other team is expecting them and playing a "hands team" of ends and backs who practice receiving onside kicks regularly. I submit that teams should make the onside kick a more common practice. If kickers became extremely proficient at onside kicks like they are for field goals, they could completely upset the special teams' return game. Large segments of the field would be vacant, and blocking schemes would be a mess if teams routinely used "surprise" onside kicks. In business, most people live in the world of routine.

They play it safe, follow accepted practices and live in the world of the average—perhaps a little below or a little above. We all need more onside kicks. Actually, we need to get more kicks period.

I read an interesting piece about a new nickel mine being developed at considerable cost by Kennecott Eagle Minerals Company in the Upper Peninsula of Michigan.

It will produce 300 million pounds of nickel per year when it hits its stride in three years. But naturally it is being challenged by environmentalists and Native Americans, who believe it will endanger the Coaster Brook Trout and pollute tribal lands. Normally I pooh-pooh the Greenies, but I have actually caught trout in the U.P. and I believe in the value of bio-diversity.

Before we dismiss the Sierra Club as nuts we should consider the hellhole China has become from gross pollution which shortens the life of its citizens and even floats across oceans to mess up the world.

The importance of humble species of reptiles like the Gila monster is dramatized by the advent of Amylin Pharmaceuticals' diabetes drug BYETTA®, which is improving the treatment of the dreaded disease in a meaningful way. In a few months we will see an injectable BYETTA®, which will allow a diabetic person to require only one shot per week. The active part of BYETTA® came from Gila monster saliva. No Gila monster, no BYETTA®.

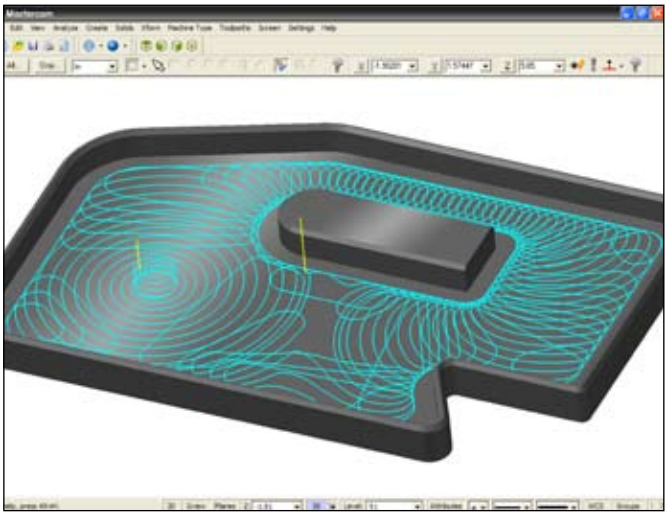
The nickel mine will be the only U.S. nickel mine and will help meet the demand for more stainless steel. But it would be a pity to ignore the Coaster Brook Trout. The balance is hard to find, but even a Green doubter like me is grateful that the big miners have to allow for the complaints of fishermen before they push the earth around to make a buck.

Is paying ovetime rather than bringing in new employees a lean manufacturing practice? For adherents to lean concepts, the question of how to handle a "bullwhip" effect where companies need to rebuild inventories is a challenge for suppliers. People who were laid off may be unavailable for a call back or may be happily pruned. Overtime is expensive, and eventually core workers get burned out working six or seven days a week or 12 hour shifts. Temps are often an imperfect answer because they

require significant training and may be poorly integrated into a group of standoffish employees who are offended that old employees are not being rehired. As contract shops reach the "bullwhip" phase of inventory rebuild, how do you think workforce additions should be handled?

Hans Peters needs some help. He recently bought a machining business with several late model Citizen CNC Swiss-type lathes. He has business, but his key setup and programming guy was the previous owner who temporarily stayed on to ease his path into the operation. But he's moving on shortly to run another company he owns, which leaves Hans in big need of a sophisticated CNC person to join his firm, M&M Specialties, in the small town of Greeneville, Tennessee, located between Knoxville and Nashville. It's not an area like the Twin Cities, or even Memphis or Puerto Rico, where you have a well established medical manufacturing complex that supports CNC training. So Hans figures he needs to import somebody. He has contacted three recruiters, but so far no cigar. Even with 10 percent unemployment and 16 percent shadow unemployment, it is hard to find the type of skilled people Peters needs who will relocate. Peters understands the rigors of relocating. His wife and young children are at the family home in Delaware, where previously he had been in business with his three siblings. At 44 years old he wanted to run his own shop, and spent close to a year looking for the right situation. He went into the precision machining business because he saw opportunity in the depth of a recession. It was a gutsy call, especially for somebody who lacked technical sophistication. Hans Peters is 600 miles away from his family, and his programming lifeline is moving on. Is there anybody out there who can help?

They say tough times are the best ones in which to start a business, and Zach Peterson hopes to build his new machining company, SoDak Machining Inc., near Rapid City, South Dakota, out of the ashes of the recession. Zach is 28, with 13 years of being around machine shops. He grew up in Gillette, Wyoming, where his father mines coal. He took high school shop classes, did a two-year tech college stint, and has worked on lathes and mills all along the way. He started up in a pole barn outside of Rapid City, about the same time his wife became pregnant. His first machine was a Hwacheon CNC lathe with a 12" chuck, manufactured in 1997. He then picked up a Mazak vertical machining center with the help of a Twin Cities dealer, new in 1998. He had $20,000 in personal seed money to start and went to a local bank for instruction on how to acquire an SBA loan. He said the paperwork was amazingly easy to navigate. The bank steered him to a consultant who helped him write a business plan with projections. In a short period of time he had $50,000 for capital investment and a $95,000 line of credit. He has found clients by knocking on doors and using some of the contacts he had in the coal and oil industry in Wyoming. Business is growing. He hopes to acquire a larger vertical mill soon. His wife has helped in the office and the plant, but with the baby imminent, she's about ready for some maternity leave. Zach was proud to tell me that his first non-family employee was starting work on Presidents Day.



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For more information, please visit Delcam at www.delcam.com.

◀ Emuge Corp.

BOOTH #2319

Emuge Corp. will be displaying a new line of milling tools developed for the advancing field of dental prosthetics manufacturing at WESTEC. The tools' carbide construction, cutting geometries and coatings have been engineered specifically for use with today's dental materials. The new tool line consists of solid carbide ball nose and torus end mills which are designed for optimum machining of zirconium oxide, PMMA, wax, cobalt chrome and titanium—the most commonly used materials in making dental prosthetics.

For more information, please visit Emuge Corp. at www.emuge.com.

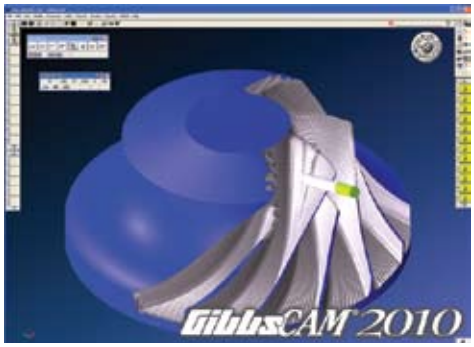
fresh stuff

▶ Ganesh Machinery Inc.

BOOTH #2301

Manufacturers looking for "affordable cost reduction" for CNC lathe work should look at the Ganesh Cyclone 52-TTMY CNC Mill/Turn center, with 32-tools and MITUSBISHI control. It features full bar, chuck, and shaft machining capability; with 2.0" bar capacity and 6" chucks. The integral main and integral sub-spindles both feature 6,000 rpm capability for fine surface finishes. Both spindles feature a C-axis so that milling and drilling operations can be completed all in one operation on the front and back-side of the workpiece. The Y-axis features ±40 mm of off center movement to allow the completion of off center work in the same chucking.

For more information, please visit Ganesh Inc. at www.ganeshmachinery.com.



◀ GibbsCAM

BOOTH #2236

GibbsCAM has added many capabilities to make programming and machining easier and more efficient, especially with new features in 5-axis and solids machining. It has also implemented 64-bit operation to enable faster processing of long programs and complex parts, added support for new tools and tool holders, extended functionality within various modules. and extended and updated interoperability with various CAD systems.

For more information, please visit GibbsCAM at www.gibbscam.com.

▶ Haas Automation Inc.

BOOTH #2200

Haas has redesigned its entire VF product line to incorporate a wide range of enhancements. Haas engineers reviewed and made improvements on all aspects of the machines, from motion control, coolant containment and chip evacuation to ergonomics and serviceability. To ensure smooth, precise motion control, the 2010 Haas VMCs use next-generation digital servomotors and high-resolution encoders on all axes. Combined with significant software and motor-control advancements on the new machines, these yield higher accelerations and better surface-finish performance than ever before.

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

◀ Hardinge

BOOTH #2018

Hardinge will be previewing the new GD160LP rotary table at WESTEC. The GD160LP provides rigidity, speed, accuracy, low-profile and repeatability in an affordable package. The hardened steel worm and gear provide long life and continued accuracy and the double eccentric design offering the finest possible gear mesh. The 5C A2-4 spindle allows the customer to use their existing 5C spindle tooling without adaptors. The clamp/brake system is fast and clamp release is in milliseconds. An optional pneumatic collet closer is also available.

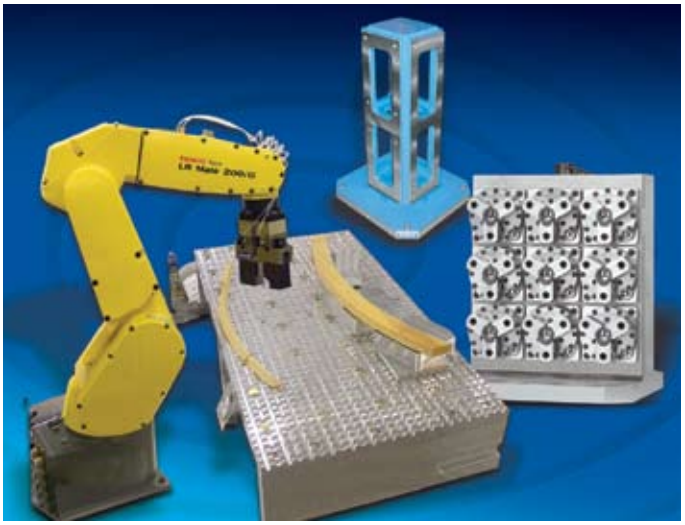
For more information, please visit Hardinge at www.hardinge.com.

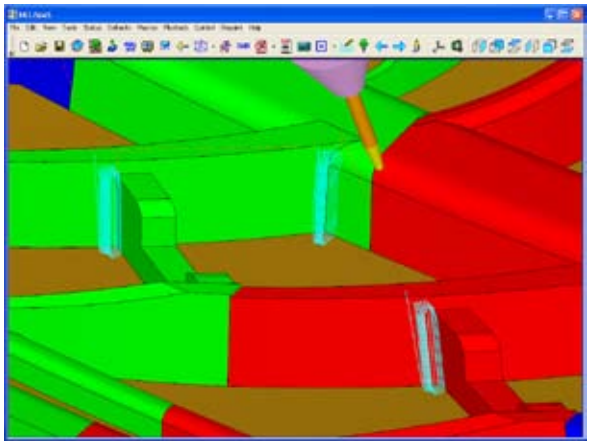
▶ Kurt Manufacturing Co.

BOOTH #1810

Kurt will unveil an array of new workholding and exceptionally high productivity products at WESTEC 2010 to meet the needs of rapidly changing manufacturing industries. These include automated workholding systems, multi-chuck clamping systems, cast caged tombstones and custom engineered workholding.

For more information, please visit Kurt at www.kurtworkholding.com.





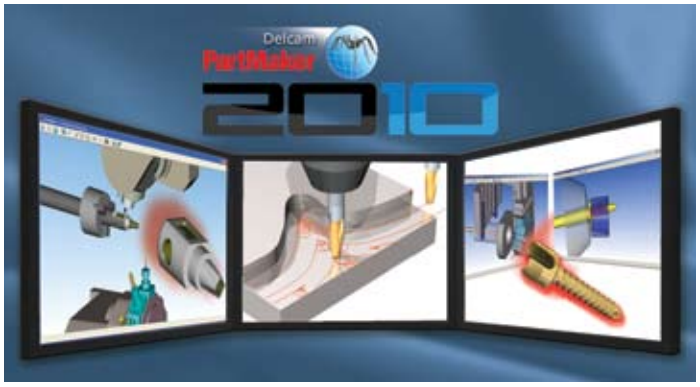
◀ Numerical Control Computer Sciences (NCCS)

BOOTH #2149

NCCS, the developer of NCL multi-axis machining software, used extensively in the aerospace, automotive and turbo-machinery industries, will showcase the latest version of their flagship product, NCL V9.8, as well as other state-of-the-art manufacturing solutions including PostWorks, an advanced multi-axis universal postprocessor and NCL/Machine Simulator which provides high performance, realistic, simultaneous material removal and CNC machine tool simulation.

For more information, please visit NCCS at www.nccs.com.

fresh stuff



◀ Partmaker Inc.

BOOTH #3282

PartMaker Inc., a division of Delcam Plc, is pleased to announce that PartMaker Version 2010, its latest version of PartMaker Software for programming CNC Mills, Lathes, WireEDMs, Turn-Mill Centers and Swiss-type lathes is now available. PartMaker Version 2010 is the most significant PartMaker release made to date, as it features a number of new powerful features and enhancements that will allow users to program faster, make more complex parts and take advantage of the latest in machine tool technology.

For more information, please visit Partmaker at www.partmaker.com.

▶ Rego-Fix

BOOTH #2919

REGO-FIX® will showcase its new program of Xtended Length toolholders at WESTEC 2010. Available in the ER and powRgrip® product lines, the new XL toolholders provide an extended reach up to 14." The Xtended Length toolholder program features the new (patent pending) Micro-Friction-Dampening System, which reduces holder and tool vibrations. The extended reach toolholders will be offered with CAT, BT and HSK tapers in 2" increments up to a maximum length of 14." Versions of the products will be available in the ER 16, ER 32, PG10, PG15, PG25 and PG32 series of REGO-FIX toolholders.

For more information, please visit Rego-Fix at www.rego-fix.com.

◀ Renishaw

BOOTH #1909

The QC20-W ballbar is an all-new design featuring a Renishaw-developed linear sensor and Bluetooth® wireless technology. This provides greater ease of use and enhanced durability, and allows for testing even in "closed door" manufacturing, where access for wiring can raise safety and procedural issues. The new design also allows testing in three orthogonal planes through a single reference point. A single, simple hardware setup means quicker testing and the ability to produce a representative volumetric measurement of positioning accuracy.

For more information, please visit Renishaw at www.renishaw.com.

Exair 2" Super Air Nozzle, showing pattern of air flow.
Illustration courtesy of Exair Corporation.
Opposite: Coromill 300 cutters.
Photo courtesy of Sandvik Coromant U.S.

By Barbara Donohue

Rapid Material Removal

With the right tools and a little know-how, you can remove a lot of metal in a shorter time than you thought possible.

The customer sends you a print. It specifies material, dimensions and surface finish. It's up to you to make the part to spec, and you're hoping to put in as little machine time as possible. You know how long it would usually take to make the part, but you have control of many aspects of the process, and maybe there is something you can do to speed it up. You select the tool and set the feeds and speeds, and your CAM system provides the tool path. You can select the mechanical capacity of the machine, within the limits of the machines you have in the shop.

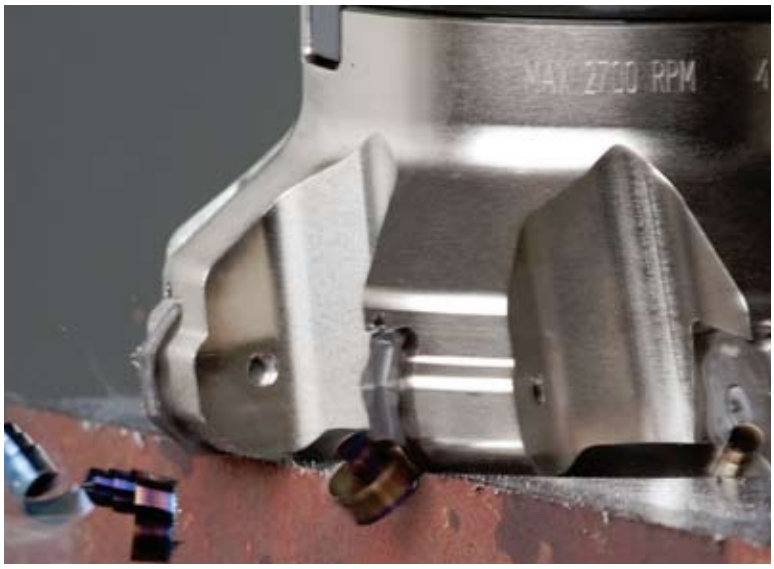
Where there is a lot of material to remove, as with dies, molds, aerospace parts and a variety of other jobs, a big part of how you stay competitive is in being able to remove as many cubic inches of metal as possible per minute while maintaining good surface quality and acceptable tool life. There are many different approaches to maximizing those cubic inches/minute. A good place to start investigating your options is with your tooling supplier. Most have had a lot of experience with applications like yours. They can offer a range of cutting tools to do the job and provide help in applying them, no matter which way you decide to maximize your material removal rate.

Large Depth of Cut

The first approach you might think of is to take a larger depth of cut than you might normally—as large of a depth of cut as possible. You'll need lots of torque and horsepower, strong tools designed for this type of service and superior workholding. If you're set up for this kind of heavy material removal, it can save you a lot of machining time on the parts that need it.

Many shops are accustomed to thinking in terms of going light and fast, said Kenneth Accavallo, product specialist for milling products, Sandvik Coromant US, Fair Lawn, N.J. "It's hard to explain when a company is not used to doing heavy milling. They have to look at the machine's horsepower, rigidity, torque, the size of the spindle" to get those cubic inches of material removal.

Accavallo said he has been seeing more interest in this approach recently. "A lot of manufacturers of machine tools seem to be going bigger now—bigger machines, bigger spindles. Customers buying them want to explore the capabilities of [their new] machines."



Above: Next Generation Double Octomill—for cast iron and steel machining.
Photo courtesy of Seco Tools.

Tooling is critical for these challenging applications. Accavallo explained two new face mill lines from Sandvik designed for heavy material removal. The CoroMill 300 features round inserts, he said. The round shape gives the inserts extra strength. The CoroMill 360, available in sizes up to 20 inches in diameter, is designed to take up to a 0.709" depth of cut. One application in the nuclear industry, Accavallo said, is heavy roughing on Inconel billets. "Customers want to take off as much material as they can."

High-feed

If you reduce the depth of cut from the usual, you can run more surface feet/minute (SFM) and feed faster, said Todd Miller, milling product manager, Seco Tools, Troy, Mich. The net result can be material removal rates up to one-third faster than the conventional approach, with the added benefit of increased tool life.

Miller gave the example of machining steel, 4140. With a conventional 4" face mill with seven teeth, as listed in the tooling catalog, you'd take a 0.120" depth of cut, with 650 SFM, and a feed of 0.012" per tooth. This would give you feed rate of 52" per minute, and you'd remove 25 cubic inches of material per minute. With a high-feed 4" mill, you'd take a 0.060" depth of cut, 0.040" feed per tooth, 985 SFM. That would give you a 245" per minute feed rate, and 63.6 cubic inches/minute of material removal. This represents a 27 percent increase in material removal rate.

The extremely fast feed—in this example, 245" per minute versus 52" per minute for conventional machining—can be alarming when you first run it, Miller says. And older machines may not be able to handle that rate of feed. The mechanical stability of the ways and feed mechanism, as well as the machine control, need to be able to handle it.

Tool Path

Another way to increase material removal rate is to use your CAM system to provide a tool path that allows the highest material removal without undue strain on the tool. An innovative way to do this is to optimize the angle at which the tool engages the workpiece. This can minimize the forces on the tool, allowing you to run it to remove material as fast as it is capable.

Mike MacArthur, applications engineer at RobbJack Corporation, Lincoln, Cal., gave an example of a titanium part that had previously taken about four hours to cut.

Above: Family of high feed milling tools from Seco Tools.
Photo courtesy of Seco Tools.

Left: Seco Tools next generation Double Octomill, normal pitch with screw down insert.
Photo courtesy of Seco Tools.

With the controlled-engagement-angle approach and the proper tooling, the cut was complete in 15.7 minutes.

He gave other examples. "We cut stainless steel at 150" per minute and titanium at 75" per minute, instead of 2" per minute," MacArthur said.

> "Where a conventional tool would **squeal and vibrate and damage** the cutting edges, this line of tools stays very **stable and quiet while it cuts.**"

The different CAM software packages have their own names for this capability. MacArthur has found that customers often already have the capability in-house in their existing CAM system, but don't know how it works. He recommends they call their CAM software provider and ask, "Does this software have the ability to control the tool engagement angle?"

Tool manufacturers are designing tools that take advantage of these newer programming approaches. For example, RobbJack has a 3-flute end mill designed for use in aluminum, which incorporates vibration dampening. In another line of tools designed for high removal rates, the flutes are designed with different helix geometries to prevent vibration. This can allow up to double the material removal rate, he said. Where a conventional tool would squeal and vibrate and damage the cutting edges, this line of tools stays very stable and quiet while it cuts, MacArthur said.

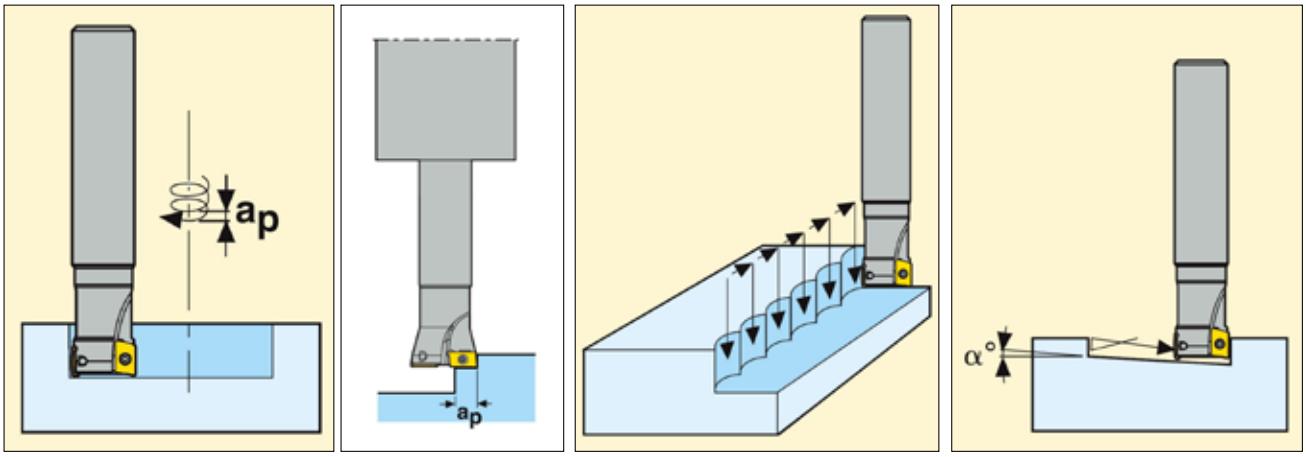
Other tool-path methods are available that can improve material removal rates are:

Plunge milling

As the name suggests, a specialized plunge mill cuts into the material in the Z direction, then withdraws and plunges again about half a diameter away. Plunge milling can be done from an edge or the outside of a hole, or the tool can gradually ramp its way into the workpiece. Repeated plunges can remove a lot of material. Because the cut is in the Z direction, the cutting forces are transmitted straight into the spindle, which minimizes side loads and vibration.

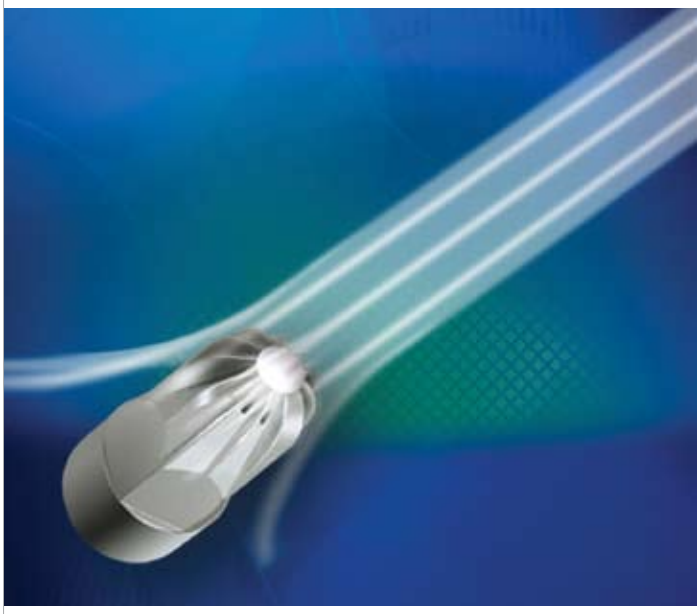
Helical interpolation

The tool starts on the surface and ramps its way into the material in a circular pattern, making a hole or pocket.



Above (left to right): Helical interpolation. Plunge milling: Depth of cut is ap. Plunge milling: Z-axis plunge followed by stepover. Ramp milling: The ramp angle, [alpha], is determined by the geometry of the cutter.
Illustrations courtesy of Seco Tools.

Below: Exair 1100 series Super Air Nozzle, showing pattern of air flow.
Illustration courtesy of Exair Corporation.



Trochoidal milling

This uses a similar tool that cuts into the workpiece from the side, making a slot. The tool is generally about half the width of the slot and advances along a straight line, making small circles in a swirling kind of motion, gradually advancing the slot through the material.

Chip Evacuation

Tool manufacturers recommend dry machining for many heavy material removal processes, especially in steel, Miller said. Since you're not applying a flow of cutting fluid, chip evacuation can become a challenge when cutting dry. On horizontal machines, this doesn't pose a problem, of course—the chips fall out of the cut by gravity. On vertical machines, however, chip accumulation can be a problem, especially when you're working in cavities or pockets. In this case, Miller suggests using an air blast to blow the chips out of the way. As a last resort, you could use a stream of cutting fluid, but that tends to reduce your tool life considerably, Miller said, as the cooling effect on the tool can produce thermal cracks in the tool's coating.

Specially designed high-power air nozzles can remove chips effectively from the cutting area with a maximum of pressure and a minimum of noise. Exair Corporation, Cincinnati, Ohio, manufactures a line of high efficiency air nozzles that provide a high-force, focused-flow, low-noise air blast suitable for chip evacuation, while using a relatively small amount of compressed air. Which nozzle to use? If you can use a normal compressed air gun to blow chips off the part, Exair's 1100 family of Super Air Nozzles will do the job, Exair marketing manager Gary Gunkel said. If a higher-force air blast is necessary, Exair's 2" Super Air Nozzle provides higher force, also in a controlled pattern and at high efficiency.

No matter which approach to high material removal you decide to use, you will be able to turn more metal into chips faster using these methods. The job, the material and your machining and programming capabilities will determine which approach you can take. In the past, high material removal rate machining had the reputation of being a "black art," MacArthur said. But you should talk to your tooling vendor. With the proper tooling and the right programming, machining at a high material removal rate is very predictable, he said.

Videos

To find these, go to **www.youtube.com** and search on the video title.

Kennametal Z-Axis Plunge Milling Cutter
http://www.youtube.com/watch?v=OBvf2Vv7wl4

RobbJack High Speed Hard Metal Trochoidal Machining 54 HRc Hardened H13 -
http://www.youtube.com/watch?v=JATjRSzXgjw

RobbJack HM cutting a hardened metal file
http://www.youtube.com/watch?v=DeJCzN90Aj4

Sandvik CoroMill 210 - High feed face mill (Shows high-feed face milling and plunging)
http://www.youtube.com/watch?v=yUWTObO4dvI

Seco Tools High feed milling from Seco Tools:
http://www.youtube.com/watch?v=aXa6p77uXlw

For more information:

Exair Corporation: www.exair.com

RobbJack Corporation: www.robbjack.com

Sandvik Coromant US: www.coromant.sandvik.com/us

Seco Tools: www.secotools.com

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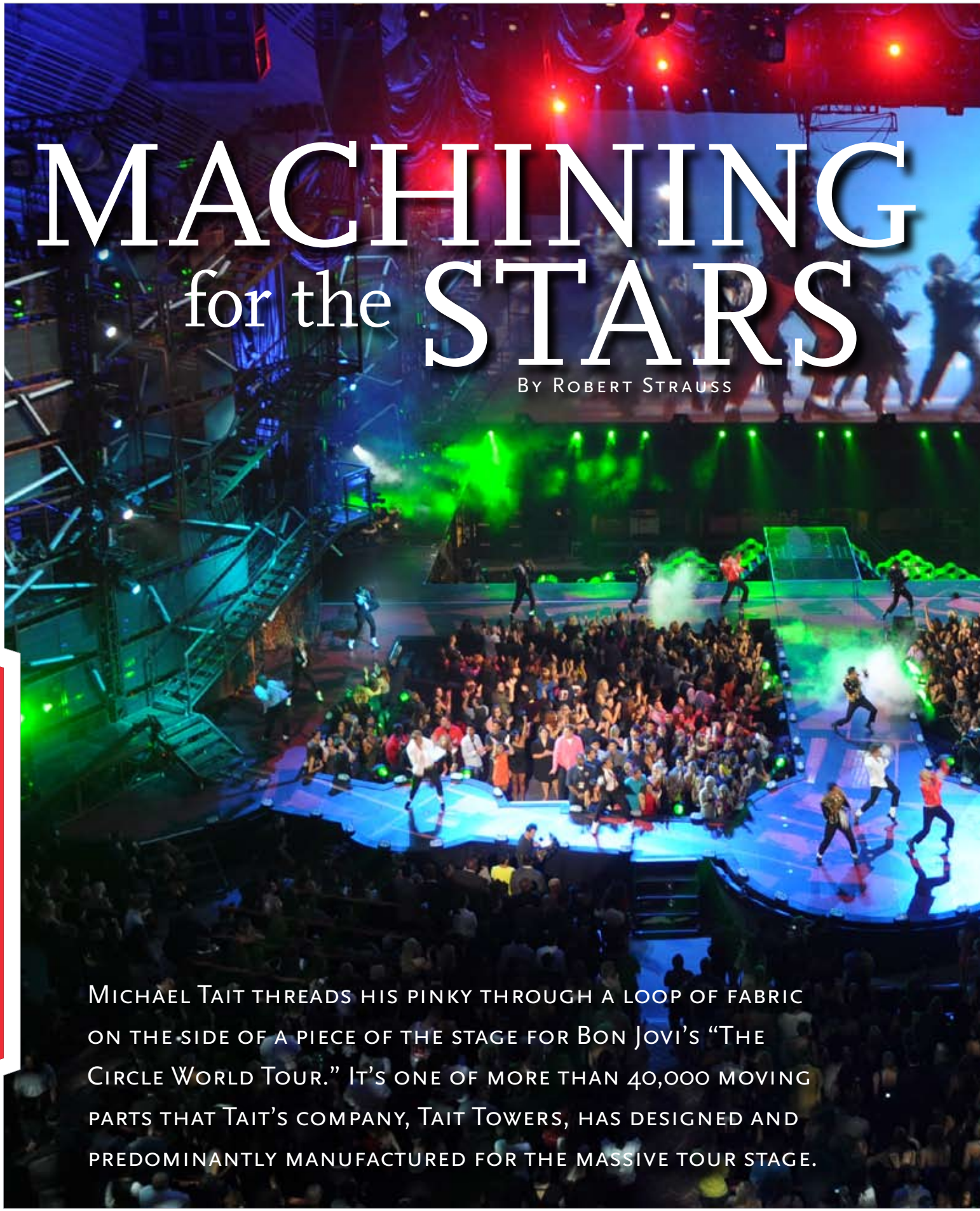
2010 EDITORIAL CALENDAR

MONTH	PRODUCT FEATURE	HOW IT WORKS	CLOSING DATE
January/ February	CNC Swiss	Reducing Energy Costs	01/08/10
March	WESTEC • Mill/Drill Turning Machines	Deep Cuts/Material Removal	02/19/10
April	Cutting Tools	Workholding	03/19/10
May	EASTEC • Parts Cleaning Equipment	Automatic Measurement	04/23/10
June	CNC Controls	Linear Motors	05/28/10
July/August	Pre-IMTS • Machining Centers	Parts Cleaning	07/14/10
September	IMTS • Stainless Steel	Machining Graphite and Carbon Fiber	08/20/10
October	Coolant/Lubricating Systems	Manufacturing Wire EDM Parts	09/24/10
Nov/Dec	Software	Successfully Competing with Old Machines	10/29/10

MACHINING for the STARS

By Robert Strauss



Tait Towers

Michael Tait threads his pinky through a loop of fabric on the side of a piece of the stage for Bon Jovi's "The Circle World Tour." It's one of more than 40,000 moving parts that Tait's company, Tait Towers, has designed and predominantly manufactured for the massive tour stage.

2009 MTV Music Awards
Photo courtesy of Tait Towers

"You think this looks simple, but roadies come in and tell us that this should be up three inches or to the right a bit. We've got to be precise, got to get it right," said Tait, a former roadie and lighting director himself back in the early 1970s for the band Yes. "We have some of the world's most demanding customers and they can't bear to have things screwed up."

Tait Towers is the premier builder of sets for rock tours and elaborate casino and set shows. It's a fun business, Tait admits, but it would be nowhere without his sophisticated machine shop filled with CNC machines. His designers and machine operators play the computer keyboards like Rachmaninoff at the piano and most often come up with staging as mellifluous and intricate as any of the great composer's concertos.

When it isn't Bon Jovi counting on Tait's headquarters way out in Pennsylvania's Dutch country it's Bruce Springsteen, for whom Tait developed a now-ubiquitous click-and-lock, thus nut-and-boltless connecting system for decking and modular parts.

"This is a business that relies on getting from place to place, mostly on a daily basis," said Tait. "The easier we can make it to take apart and put together these sets, the more valuable we are. And I have to say that CNC has made our growth, production and our advances really possible."

Tait studied engineering at the Royal Melbourne Institute of Technology in his native Australia before wandering off to England, entranced by the rock scene. The Clair brothers, owners of a leading audio, video and lighting/design firm, invited him to sleep on their couch when he wanted to devise what was then an elaborate set for Yes. It was circular and cut in pie-shaped pieces so the band could play in the round and, thus, have a bigger audience encircling them.

Top Right: Aluminum Extrusion Inventory Racks.
Bottom Right: CNC Mill for machining aluminum staging members.
Photos courtesy of Tait Towers

"But we did it with saws and rulers and whatever passed as modern in the 1970s," laughed Tait, leaning on his Haas CNC lathe, one of a dozen CNC machines the company uses in its four-building campus. "When one part didn't fit because it was too wide or not straight enough, we sanded it and did it again."

"It's almost laughable now that we have minute tolerances from the CNCs, but you did with what you had back then. Now you can do just amazing stuff without worries," said Tait.

Teaming up with the Clair brothers, Tait built up his rock staging reputation and soon, like the better mousetrap maker, everyone started beating a path to his remote door in Lititz—ironic because also headquartered in Lititz is Woodstream, the makers of the Victor mousetrap, the largest-selling trap in the world.

"With Woodstream, our businesses and Wilbur Chocolates and others, we have an amazing workforce here," said Tait, who employs about 120 workers, almost all hailing from the Lititz/Lancaster area.

One of them is Jared Keim, who at 25 is Tait Towers' machine shop manager. Keim was an avowed motorhead in high school and didn't think he would ever go to an academic college. Instead, he headed to Thaddeus Stevens, a local technical school, and discovered that working with computers and machines was his thing.

"I really didn't know that Tait was this rock business. It was just a job where I could use the CNC training I got," said Keim, talking while squeezing a box on his computer that would display a part for the stage of Lady Gaga's tour. He showed off a coffin lock, perhaps the most integral part of any rock stage, he said. It comes apart like those Russian dolls-within-dolls, a set of three larger pieces, each containing several smaller metallic and plastic parts. The coffin locks bind together the larger slab parts of the staging—which for Tait usually measure four by eight feet. The coffin locks have both springs to make sure the staging has a little give for the always-bouncing rock stars and, on the outside, a plastic sheathing that keeps it tight as well. Tait laughs and says that in the rock world, that piece is called a "fluffer." "That's what they call the woman in porn movies who, well, keeps things rigid," he said.

It's CNC technology, said Tait, that keeps things going at Tait Towers, which he said is set to be a $50 million business in 2010.

"When I bought my first Komo 15 years ago people thought I was nuts," he said. What was the purpose of that? How was I going to make enough use of it?

"In the end, though, rock bands wanted more and

Top Left: CNC Plates being deburred.
Top Right: Aluminum components for the Bon Jovi show.
Photos courtesy of Tait Towers

more bells and whistles. With those CNCs, we were able to make whatever parts we could design," he said.

Take the Bon Jovi tour set, for instance. Bon Jovi wanted innovative video as part of his tours. Tait Towers came up with a sort of Venetian blind effect, with double-sided video screens that open and close, expanding from 10-by-10-feet to 10-by-30 feet. When they are closed, crowds see full video 360 degrees around. When they separate, the crowd sees Bon Jovi live.

"As you may imagine, there has to be precise tolerance for all of that," said Tait. "It is used many times and has to be packed away carefully to go to the next stop. You just couldn't do that before CNC. We discovered that first, so we got the reputation and the business."

Back in his Yes days it was a big deal to have two trucks to cart sets around. Now, Tait said, it is not unusual to have 20 trucks carrying a set from a Friday night show in Seattle to a Saturday show in Portland, or wherever. He estimated that the Bon Jovi set Tait is currently working on would need 23 trucks. For the last U2 tour, the group's elaborate set had to go by plane to its opening show in Barcelona—a cost of $300,000 just to start.

"We are not cheap, at least up front," said Tait, who would not reveal any particular charges but noted that seven-figure design and construction costs were the norm. "What we save them in road workers and break-down and put-together costs are immense later on."

> "In the end, though, rock bands want more **bells and whistles**. With those CNCs we were able to **make whatever** parts we could design."

Tait moves his hand along a piece of staging from Metallica's last tour. The ends are rounded, the connecting parts smooth and with precise tongue-and-groove fits, no bolts are seen. With shipping and tight corners in trucks, he said, jagged corners are intolerable. There are no jigsaws or power drills in rock-roadie hands any more.

"We machine everything as smooth as we can," he said. In her 2006 tour, Barbara Streisand wanted to come down a long staircase with sparkling railings along the side. Naturally, those railings had to come in pieces, but Streisand was going to slide her hands down them. "Each piece had to fit seamlessly together. Imagine Streisand gasping after she caught her hand on some edge, or if she even looked unsteady. Our machines were able to

Top Left: Welded Frame Assembly.
Top Right: Bon Jovi Robot Video Screen Mounts.
Photos courtesy of Tait Towers

> "These orders are from some of the **great artists of our time** who know what they want—or at least have **cocktail napkins** that say what they want."

make it seemless, and have it be taken apart and put back together just as precisely at each stop." Tait repeated that seamless railing for the Michael Jackson show that never happened because of the singer's death. It's not only older singers who need such joints on long, cylindrical items—as is apparent in Britney Spears' pole-dancing sets or Lady Gaga's almost-maniacal acts.

Down the road a bit from Tait's unobtrusive building in the middle of a small industrial park is Tait's new warehouse. It stores lots of old sets and items that rock groups either don't want any more or couldn't store anyway. In a way, it is a sort of rock museum. There are the spray-foam guns that Tait designed for the Jonas Brothers, Britney Spears' mainstage decks, Elton John's piano deck and Springsteen's video walkway. Each piece still has its sign and coding along the facing, so it could be snapped together again if another date came up—Metallica, the Eagles, Radio City, celebrating the stages of life.

"You could say this is just another boring machine shop, because in some ways it is what anyone would do—have an order and get it done," he said. "But then these orders are from some of the great artists of our time who know what they want—or at least have cocktail napkins that say what they want."

Tait said that his company has thrived, ironically, because the recording business has dived.

"They have to make their money on tours, and thus they want everything newer and newer, but want to know it won't fail them," he said. "Our reputation as a machine shop is important. We're not just pie-in-the-sky, but people who can talk to their tech guys and assure them that it will all go together and come apart, so all [the artists] have to do is play the music and dance."

Actually, said Tait, few if any musicians come to Lititz. The rock tour business is larger—the design and tech employees outnumber the musicians these days, and that is who Tait deals with. He had lunch with Bette Midler in downtown Lititz once, but he said no one even asked for her autograph.

"The people out here are respectful of your business, and they keep to theirs," he said. Tait recalls a story that his sound-company friend, Roy Clair, told him about the day Billy Joel came to Clair Brothers to do a little testing.

"He was on the main street in the back of a car and was a bit lost," said Tait. "He rolled down the window and asked someone where Clair Brothers was. The person said, 'Oh, I can't tell you that. They like to be private.'

"This is why I am in Lititz," said Tait with another Australian chuckle. "Billy Joel, be damned. We are a good machine shop."

Tait Towers

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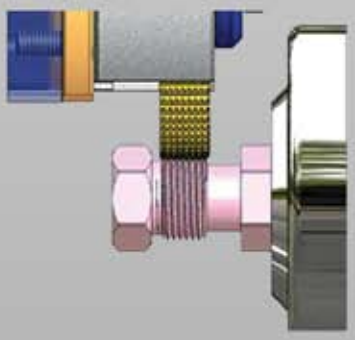

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The thread milling operation is obtained by a particular cutting tool, which is helical shaped with the same pitch of the thread. This tool rotates at the same spindle's speed, the feeding stroke is radial, as the attachment is placed onto the lathe's cross slide. The thread milling unit can be used on aluminium, brass, lead free brass and steel (using solid carbide cutters or HSS); the thread can be located in the front side of the part and also behind a shoulder, near the collet.

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WICKMAN
5/8" 6-spindle, thdg., pickoff, 1981
1" 6-spindle, 1985 (10)
1-1/4" 8-spindle, 1980
1-3/8" 6-spindle, 1967-1979 (3)
1-3/4" 6-spindle, 1978 w/spindle stop
1-3/4" 6-spindle, 1965, 1984 (4)
1-3/4" 8-spindle, 1970
2-1/4" 6-spindle, 1962, 1973-79 (3)
3-1/4" 6-spindle, 1986
1 3/4" 6 spindle, 1978
5-5/8" 6-spindle, 1978

ACME
1" RA6 1956 (3)
1" RA6 1970
1-1/4" RA6 1978-61 (9) - some w/threading pickoff
7/16" RA6, 1975 (2)
1-1/4" RB8, 1981 (2)
1-5/8" RBN8, 1979, thdg., pickoff (3)
1-5/8" RB8 thdg., pickup '68-72 (5)
2" RB6, 1967
2" RB8, 1966 (2)

CNC INDEX
G200, 1997, Index
G300, 1997, Index
ABC 60mm Index 1996

SCHUTTE & GILDEMEISTER
SF51, 1985-79 (3)
AS-14, 1975 (2)

CNC SWISS
Star SR20, 1999

CNC MACHINING CENTER
Mazak VTC-20c, 1996
Haas EC400, 2004
Haas VF2, 1996

HYDROMATS & ROTARY TRANSFER
V8 Trunion (1995)
HW 25-12, 1985, 1994, 1997
HB45-16, 1989 - '97
HS16, 2001
Rismat 154-12 1990 (5)
VE 20/80 QC unit
36-100 Recess unit
Gnutti FMF 15/100 28.1305, 1997
Gnutti FMF 15 UA/100, 1991
Gnutti FM 15/100-op sp, 1984

EUBAMA
S-20, S-12
S-8.1 1999
S-12, 1998

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

MISCELLANEOUS
2 5/8" RB6 spindle bearings
New repair parts- 3/4 RA8, 1-5/8 RB8
Reed B-13 thread roll attachment (1)
3-1/2 RB6 thdg. attachment
IMG recess 1-5/8" RB6 (2)
C&M Wickman pickoff 1" and 1 3/4"
Hydromat recess unit and flange 36-100
Siemens varispeed motor off Wickman
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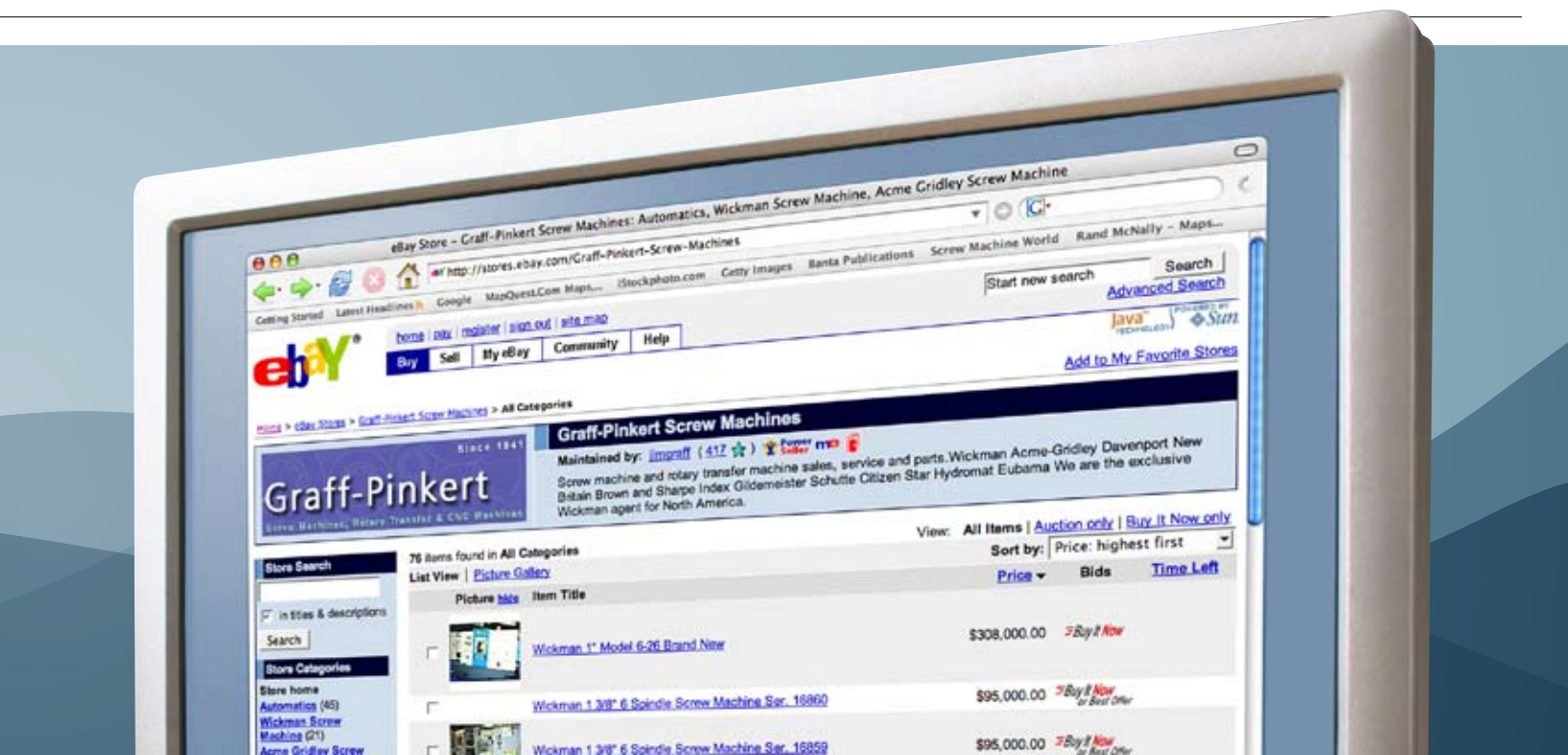


Dr. Polonsky is a leading researcher in diabetes.
Photo courtesy of Dr. Polonsky

Interviewed by Noah Graff

Dr. Kenneth Polonsky is the Adolphus Busch Professor of Medicine, a Professor of Cell Biology and Physiology, and the Chairman of the Washington University Department of Medicine. He began doing diabetes research 32 years ago at the University of Chicago and is today considered one of the most prominent doctors in the field.

Give me a brief definition of diabetes, and tell me what the difference is between type 1 and type 2.

KP: Diabetes a disease in which the body either doesn't produce enough insulin or it doesn't respond to normal amounts of insulin, which you need to keep blood sugar under control. As a result, the blood glucose level in the bloodstream rises. This increase in glucose is the hallmark of diabetes.

Type 1 diabetes is an autoimmune disease that occurs predominantly in children, in which there is destruction of the cells that produce insulin, the pancreatic beta cells, by the body. So the patients who have this disease have destroyed their own beta cells.

In type 2 diabetes, the body doesn't produce enough insulin and doesn't respond to the insulin that is produced. The failure to respond to insulin is called insulin resistance. Type 2 diabetes occurs mostly in older people, although it's occurring younger and younger. It's becoming quite common now in teenagers who are sedentary and overweight.

Thirty years ago, did you expect our knowledge and treatment of diabetes would be where it is today?

KP: I don't think I had very clear expectations. There have been a lot of advances in our knowledge and some advances in treatment. But it's a disease that has become more and more common, and we've been unable to prevent that from happening. There's an underlying genetic predisposition, but it's mainly related to the fact that we're getting more and more overweight.

How good are the drugs we have today for treating diabetes?

KP: There are a number of very good drugs. But the drugs are not as effective as changing your lifestyle. If we could get everybody to lose weight, exercise more and eat in more modest amounts, we would not entirely eliminate diabetes, but could eliminate probably two thirds to three quarters of cases.

Is there any alternative medicine for diabetes?

KP: We've actually done some research on ginseng. Ginseng has been used all over the world, but particularly in Korea and Japan, to treat a variety of ailments including diabetes. [Our studies found that] it worked in mice but it didn't work in humans. I don't think there's any really good [scientific] evidence that alternative medicines prevent diabetes or can treat it.

Can a person get rid of diabetes once they have it?

KP: Sure. If you're very overweight and you really lose weight and keep it off you can get rid of [type 2 diabetes]. You may not be able to get rid of it permanently, but you could certainly make it go away for prolonged periods of time. It may come back when you're much older, but it will come back in a milder form. You can postpone it coming back for 20 or 30 years.

Has anyone cured type 1?

KP: Curing type 1 is not easy. I don't want to say it never happens, but it would be an extraordinarily uncommon circumstance.

What are you most excited about as far as diabetes research on the horizon?

KP: I think the most encouraging thing is that we're relatively close to very important understandings of why we develop the disease. We've understood it at a certain level, but now we're going to be able to understand the specific proteins that are abnormal, the biochemical pathways that are involved and the genetic abnormalities that are responsible. It wouldn't be surprising if within the next 5-10 years, at least in understanding how the disease develops, there were major breakthroughs. That's likely to be the first step in developing better treatments.

With Noah Graff

shop doc

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 and new Shop Doc Blog at www.todaysmachiningworld.com.

Dear Shop Doc,

We are a new job shop looking to add some equipment. We are wondering whether we should invest in used rotary transfer machines like a Hydromat Legacy or stick with multi-spindles. When would we want to use a rotary transfer machine versus the traditional multi-spindle?

When to go Hydromat

Dear When to go Hydromat,

Great question. While rotary transfers and multi-spindles can produce the same parts, a good used Hydromat Legacy will cost from $80,000 to $180,000, while a used multi will cost less than half of that. So it's important to figure out which machine suits your specific job.

The following are some important factors to consider when choosing which machine is best suited to accomplish the most productive end result. This is not limited to just the Hydromat or multi-spindle. In some cases a CNC Swiss may be a viable alternative.

Quantity of parts: Hydromats are ideal for high volumes. For jobs making less than 20,000 pieces, the multi-spindle is the right choice. This is the case even for complex parts, because with a few exceptions they are easier to retool than a Hydromat Legacy. This is because there is more open space in the machine, which makes the spindles easier to access.

Complexity of parts: For machining complex parts that are hard to hold in collets or chucks yet can be run complete by holding onto the bar in a multi-spindle machine, it makes sense to use a multi-spindle, because there is more holding surface to grip.

But Hydromats are more versatile, because they can have 10, 12 or 16 tool spindles horizontally, or up to eight vertically. For example, machining off-center holes, radial or axial, on-center holes, drilling four holes radially and not all the way through, or machining an eccentric dimension on both sides of a shaft, would be easy on a Hydromat. But doing those operations on a multi-spindle would likely be quite difficult and would add significant cost because of high cycle time.

Shape and type of material: The Hydromat is more versatile for machining different material shapes than the multi-spindle because the bar remains stationary rather than rotating. For example, machining hex material on a multi-spindle machine produces an extraordinary level of noise, while on the Hydromat there is very little or no increase in noise. The type of material you are machining should not make a difference when choosing between the multi-spindle and a Hydromat, as long as the material removal is within the limit of the motors on the Hydromat.

Tolerances: In most cases both multi-spindles and Hydromats hold comparably tight tolerances. One big advantage with a Hydromat is that it can turn a part around and machine the other end with a number of features as

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.

long as there are free stations. Back-finish on multi-spindles with close tolerances is more difficult but usually required on one or more operations after it is partially finished.

However, multi-spindles have an advantage when you need to make a number of recesses (grooves) with a tight concentric requirement. In this case, it is more difficult to hold on the Hydromat, especially when the grooves are larger. It is hard to beat a form and shave tool, if it is in capable hands.

It's also important to note that a lot of shops have been successful in combining both types of equipment by pre-machining or roughing parts to a semi-finished stage on a multi-spindle and then finishing them on a Hydromat.

Flavio Rovertoni
FM Rovertoni Co.

FM Rovertoni Co. specializes in engineering/consulting, sales and service, and re-tooling of Hydromat machines.

The following companies have provided information on Mill, Drill and Turning Machines.

product focus

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, a mill or turn machine allows for complex multi-tasking; meaning potential for both increasing profitability and the production of complex, multi-faceted parts.

▶ Advanced Machine & Engineering Co.

Ambush, hydraulic squeeze bushings are used to clamp moving shafts to fixed housings in a wide range of applications. Type ASA squeeze bushings are designed to resist axial forces only. They are commonly used in fixturing and reciprocating shaft applications and are designed to resist torque as well as axial forces. One or two holes for dowel or roll pins have been provided in the mounting cap to resist the torque and to insure that the squeeze bushing does not move.

For more information, please visit Advanced Machine & Engineering Co. at www.ame.com.

▲ Eurotech

Eurotech's "Star Wars" machine, a B765Y3 turn/mill center with three Y-axis turrets with 14 axes, is capable of using up to 288 tools and is now offered in a smaller size with 1.77 mm bar capacity and a larger size of 2.75 mm capacity. The B765Y3 can quickly be changed from bar work to chucking work. Both the main and sub-spindle can be equipped with up to 8" chucks ideal with Eurotech's custom software features for robotic or mechanical loading.

For more information, please visit Eurotech at www.eurotechelite.com.

Fortune International Inc.

The Vturn-X200 multi-tasking machine tool is a a multi-tasking machine tool in Victor Taichung's family. It is designed for medical, auto parts, defense, industrial and other general machining. Controlled by Fanuc's latest control 31i-A5, this twin-spindle lathe includes a rotary tool-spindle (B-axis) which swivels at 115 degrees to 110 degrees at maximum speed 12,000 rpm and 40 tool magazine for arbitrary angle milling along the work pieces clamped by the 1st spindle or 2nd spindle chucks to reveal a versatile application in a single machine set-up.

For more information, please visit Fortune International Inc. at www.fortune-cnc.com.

Haas Automation, Inc.

The new DT-1 from Haas Automation, Inc., is a compact, high-speed drill and tap machine with full milling capabilities. The machine features a generous 20" x 16" x 15.5" work cube and 26" x 15" T-slot table while maintaining a very small footprint. A powerful BT-30 taper spindle spins to 15,000 rpm and allows tapping at speeds to 5,000 rpm. The spindle is coupled directly to the motor for smooth, quiet operation and extreme thermal stability. A 15-hp vector drive system provides 46 ft-lb (peak) of cutting torque for milling and boring operations.

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

Hardinge

This machine to be shown at WESTEC is a RS T-42 SP MSY. The Super-Precision™ model features the Hardinge unique collet-ready spindle, which allows for better part accuracy and surface finish. Hardinge will partner with Gosiger, Inc. in booth #2401. They will also feature the Bridgeport GX 1000 Vertical Machining Center and the Kellenberger Kel-vita CNC Universal Grinding Machine.

For more information, please visit Hardinge at www.hardingeus.com.

product focus

▲Mazak

Mazak's INTEGREX i-150 multi-tasking center brings together versatility and accuracy for manufacturers of small, complex components from bar stock. The multi-tasking center is the latest space-saving innovation from Mazak, with a compact 58 sq. ft. footprint that allows for easy installation and maintenance. The INTEGREX i-150 features a single horizontal main spindle with 15 hp and 5,000 rpm for turning and C-axis control, as well as a 6" through-hole chuck that provides a generous bar capacity of 2.56".

For more information, please visit Mazak at www.mazakusa.com.

▲Okuma

Okuma's LB-EX MY series of horizontal lathes provides high quality multi-tasking capacity for a 2-axis lathe. Built on a box slant bed with a thoroughly tested thermo-friendly design, the LB-EX is able to achieve machining dimensional change over time of less than Ø5µm, allowing part runs from a cold start. The TAS-C feature senses temperatures and automatically compensates for thermal deformation, providing improved precision.

For more information, please visit Okuma America at www.okuma.com.

▲ Soraluce America, Inc.

Soraluce America, Inc. is now offering the Soraluce boring-milling machines in North America. Soraluce is a European manufacturer of technologically advanced boring-milling machines. They offer a complete range of high quality machines and boring/milling heads. Soraluce's FXR Boring-Milling Machine offers a vertical stroke greater than six meters, cross travel of 1.9 meters and spindle power to 71 kW.

For more information, please visit Soraluce America, Inc. at www.soraluce-america.com.

swarfblog.com

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 and interesting topics. Below are some recent comments from our "Swarfblog" readers at www.todaysmachiningworld.com.

Is Lean Manufacturing to Blame for Toyota's Woes?

Lloyd Graff blogged about the connection between Toyota's lean manufacturing tendencies and its recent trouble with quality control. In closing he asked, "Do you think Toyota's commitment to lean manufacturing was a significant contributor to its current crisis?

Marci February 3, 2010 at 7:52am
Toyota rightly deserves to be in the mess it's currently having to dig itself out of. I have this timeless quote from philosopher John Ruskin posted at the counter where we wait on customers: "There is hardly anything in the world that someone cannot make a little worse and sell a little cheaper, and people who consider price alone are that person's lawful prey."

Raymond T. Frattone February 2, 2010 at at 2:39pm
If Toyota designed the mechanism and CTS made it to specifications, Toyota is at fault, lean or not. If Toyota designed the mechanism and the supplier failed to produce it to specifications, Toyota is at fault, lean or not. If Toyota purchased the mechanism design from CTS, and accepted it, Toyota is at fault, lean or not. For these reasons, I believe being lean is a non-issue in this case.

Snooty responder February 2, 2010 at 12:50pm
Seems like a bit of a leap. If GE has a quality problem do we then blame Six Sigma for it? Lloyd, this is about the 3rd article in two years where you question lean. Did something happen in your childhood that made waste something to desire? Nothing sells better than pointing at the best in class and clapping for a failure.

Industry Scuttlebutt

Jim Graff, Lloyd's brother discovered an online business in England called Hemp Technologies that produces "The Green Grinder" on a Wickman lathe. Lloyd asked, "If somebody contacted you to make a part used in cigarette manufacturing, would you take the contract?"

John Petro January 28, 2010 at 1:13pm
In 1990 I had an old friend call me asking for some work for a new Swiss shop he was starting up. I asked him to come in and I offered him some gun parts that would have been nice runs on an old Tornos M7. He refused the work on moral grounds and needless to say I offered him nothing more. I saw him recently and inquired how he was doing. He complained that he was out of work and that nobody is hiring for the cam machines anymore. Is there a moral to this story?

Retirement

Lloyd's "Medicare" birthday led him to reminisce about his heart attack over a year ago. He asked readers if they thought they would retire at 65, or at any age for that matter.

Ben Guthrie January 7, 2010 at 1:07pm
I've been Type 1 diabetic since age 12, and I'm 48. At 12 I began enjoying today and hoping to make it to 40. At 27 I began enjoying my kids, hoping to see them graduate from high school, and knew I wouldn't live to retirement. My last daughter starts college this fall, and I'm still healthy, thank God. Now I'm hoping to see marriages and even grandkids, but I'm not attached to retirement. Plenty to live into today! Without diabetes, I might have spent the last 36 years without intention. So I'm thankful.

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

What is a Cryptogram?

A cryptogram is a block of text rendered unreadable with one letter substituted for another (G becomes A, F becomes P, etc.). Letter and word positions, spaces and punctuation remain unchanged. Cryptograms have been used as a means of protecting sensitive information for thousands of years, though today computers and more advanced cryptographical methods have made simple substitution ciphers much less practical.

A	B	C	D	E	F	G	H	I	J	K	L	M
			7				24					

N	O	P	Q	R	S	T	U	V	W	X	Y	Z
							14					

How to solve a cryptogram

First try pattern recognition. The easiest to recognize are single-letter words, which generally can only be A or I (or, rarely, O). Then there are a limited number of two-letter words such as IN, IS, IT, TO, AN, AT, AS, WE, HE, US, etc. One trick in particular is to look for the common TH-words, i.e. THE, THAT, THEN, THEY, THERE, THEIR.

You can also use letter frequency. The twelve most frequently used letters in the English language are ETAOIN SHRDL, in that order. The least common letters are JXQZ. When all else fails, simple trial and error can generally fill in the gaps.

_ _ _ H _ _ _ _ _ _ _ _ _ _ _ _ _ _ H _ _
20 19 4 24 8 8 23 3 13 16 20 17 5 3 17 8 16 23 8 24 3 18

_ _ U _ D . _ H _ _ _ _ _ H _ _ _ _ _ _
17 22 14 18 7 8 24 19 17 19 17 1 24 6 17 22 21 16

_ _ _ _ _ _ _ _ _ _ _ _ H _ U _ _ _ _
11 16 22 11 20 16 3 11 11 16 3 23 9 23 19 4 24 8 14 18 8 19 20

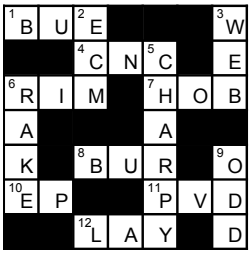
_ _ U H _ _ _ _ H _ _ _ _ _ _ _ .
6 22 14 24 16 3 23 8 24 16 21 17 11 16 3 25

Puzzle Crossed.

Who Crossed their Mind?

Mike Grube of BFG Manufacturing Services in Punxsutawney, Pa.

Answer to the Jan/Feb puzzle



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Toyota's Lean Mistake

For me, lean manufacturing is like the Talmud, the Jewish commentaries on the Bible. You can find an explanation for everything if you stretch far enough.

Lean is getting a bad rap these days because its great champion, Toyota Corporation, is under siege for lapses in quality. I wrote a "Swarfblog" column on February 2, attributing some of Toyota's current misery to their commitment to lean and received the expected brickbats from the lean proselytizers. After talking to several leanists, I admit that they are right—but so am I.

> "The **huge irony** of Toyota's sticky gas pedal debacle is that it came right after they took over the mantle of the **world's biggest car company**."

If you define lean manufacturing as an approach to problem solving that establishes procedures to remove wasteful processes in the making of product, it is hard to blame Toyota for embracing lean unequivocally.

But if you take a more nuanced view, that a tunnel vision approach to lower inventory and a less expensive standard is the company's goal, you may end up with a four million-car recall that jeopardizes the entire Toyota vehicle brand.

The huge irony of Toyota's sticky gas pedal debacle is that it came right after it took over the mantle of world's biggest car company. Is Toyota the new Microsoft, offering its flawed version of Vista when Apple was already eating its lunch in the under 30 market demographic?

My critique of lean manufacturing derives from the observation of just-in-time manufacturing becoming the mantra of the contract machining world over the last 20 years.

I do understand why big manufacturing companies want product delivered on an "as need" basis. Contract shops have adapted by buying CNC equipment, which is well suited to make small lots with quick changeover. But in the real world of imperfect predictability of demand, design error and failure of suppliers to deliver good product, the contract shop becomes the buffer against disaster. Big companies commit to big yearly quantities and then ask for product sporadically.

In an immaculately lean world, everybody makes things on demand, but the dirty secret of lean is that it depends on small firms shrewdly holding crucial inventory.

What do you do if you are running a funny stainless concoction that Schmolz + Bickenbach produces once a quarter? If you are smart, you stock extra material, which crimps cash flow.

One of the most successful machining firms I know breaks most lean commandments. They make aircraft components primarily from aluminum. They stock tons of extra bars in the Southern California sun where they occupy some of the most expensive Los Angeles industrial space, vying with Disney when new buildings become available in the neighborhood. They keep a huge inventory of finished product because their value added proposition is that they always have their product in stock, even if they sell two pieces a year. They consider their "unleanness" a virtue.

This company produces much of their key products on CAM operated multi-spindle screw machines and has been consistently moving jobs to the screw machines from their CNCs.

Does this mean lean manufacturing is overrated? Certainly not, but it is an argument for diversity of approach, and not being wedded to practices that reduce immediate availability in a world that expects goods to be available on demand.

When Toyota landed in a public relations pickle because they had focused on fat floor mats causing the gas pedal problem rather than admitting to an imperfect pedal design, they picked a medium sized contract manufacturer in Grand Rapids, Michigan, to bail them out. Grand Rapids Spring and Stamping sprang into action to make the fix, running 24 hours a day. Obviously, Grand Rapids Spring and Stamping had the extra capacity available to help Toyota through its lean moments.

Lloyd Graff

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