



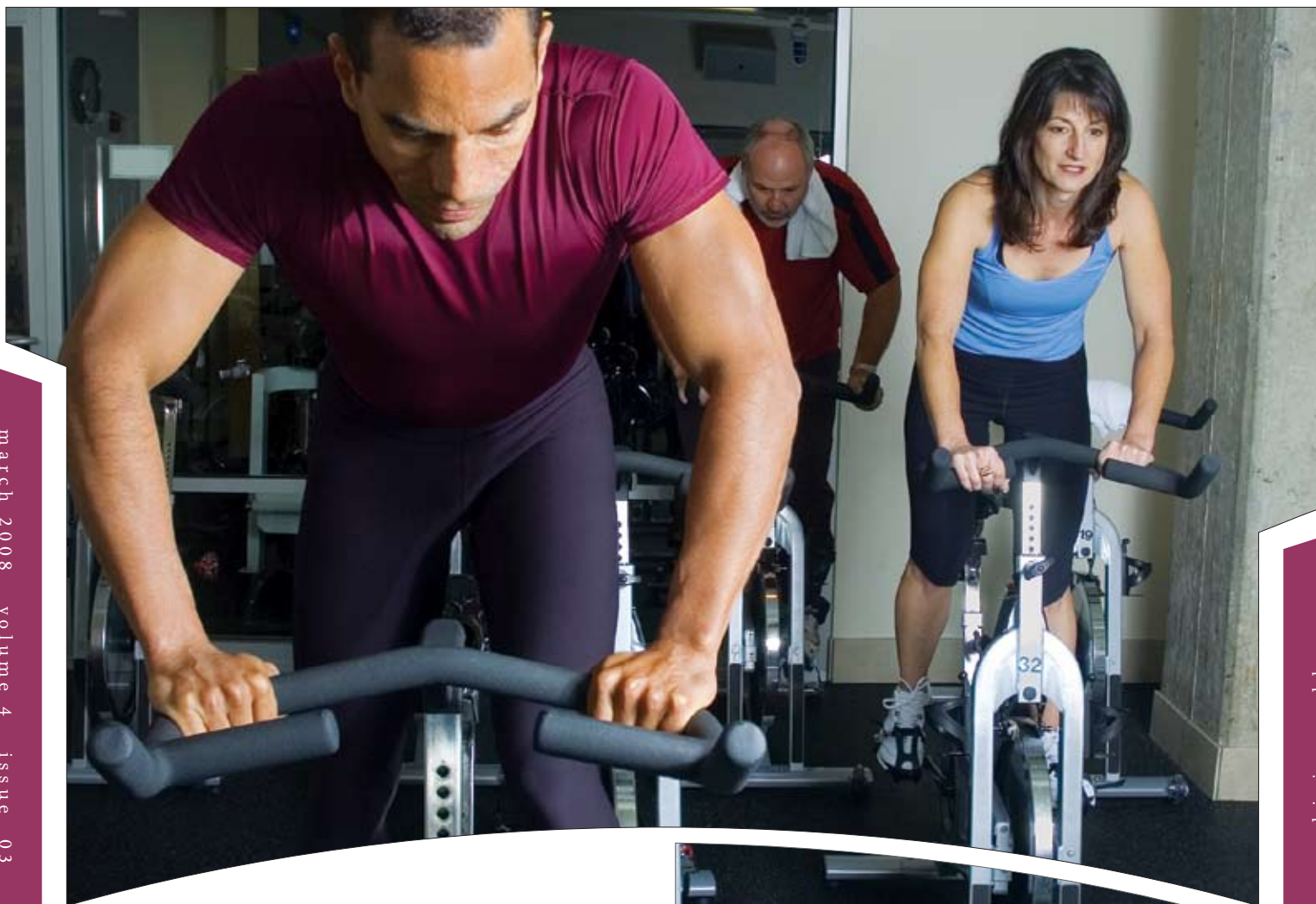
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march 2008 volume 4 issue 03

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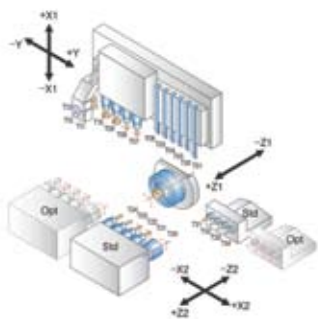
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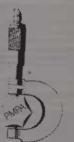
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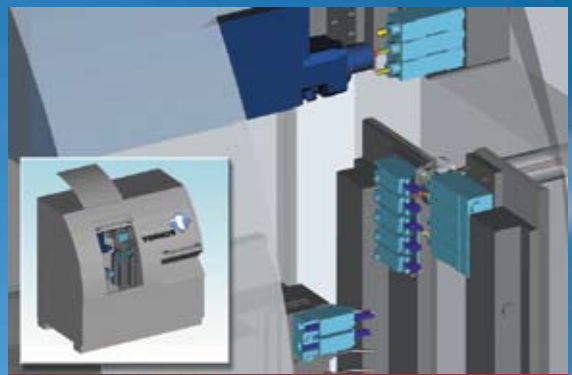
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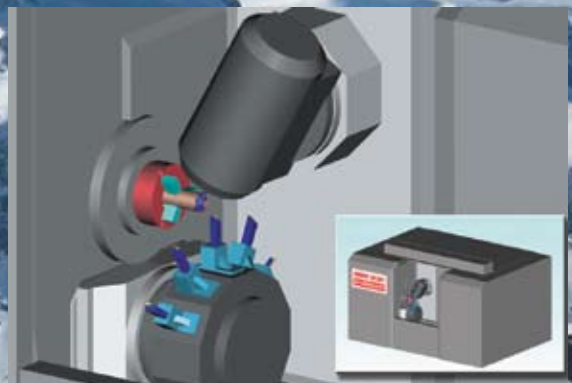
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editor's note

To Your Health

*T*oday's Machining World is putting on weight. We are gaining a lot of new advertisers, despite the alleged recession in the American economy and depression in print media.

As the magazine gains girth I have decided to add a new columnist, Larry Espinoza, to write about health and fitness issues aimed at our primary demographic – men 40 to 70 years old who live in the North American manufacturing world.

Larry is 49 and a little hefty. He is a professional trainer, former college tennis player, with a Master's degree in Exercise and Health Management from Concordia College. He trains world class athletes and 60-something limpers. In this month's issue he will discuss men using hormone replacement supplements to push back the nasty effects of aging. I like the fact that Larry is a native, not a tourist, in writing about the health issues facing middle-aged, menopausal – yes, there is a male menopause – guys, and I believe that our women readers will find his work highly worthwhile too.

Why do a health column in TMW? I want this magazine to engage the readers on dozens of levels. You are the smartest group of people I know, with a myriad of interests. If you only read one magazine per month, I want it to be TMW. My hope is that with Larry's column we keep getting more readable and valuable to you.

Lloyd Graff
Editor/Owner

editor's note



Noah Graff has been working at *Today's Machining World* since 2005. He graduated from the University of Wisconsin Madison, majoring in film and history. He is the features editor for *Today's Machining World*, as well as the videographer for *TMW* and Graff-Pinkert & Co., producing training videos on screw machine maintenance and video stories for the *TMW* website. Noah enjoys investing, filmmaking and improvisational comedy. He is also a master of the sacred art of live band karaoke.



Mary Ethridge spent 18 years with the former Knight Ridder newspapers. She recently covered business news for the *Akron Beacon Journal* in Ohio where she won several awards, including her enterprise reporting by the United Nations and the Associated Press. Her work has appeared in the *Philadelphia Inquirer*, *Cleveland* magazine and the *Miami Herald*. She graduated from Princeton with a degree in English literature. Ethridge is known for getting sources to spill all: Cindy Crawford once confessed to her an addiction to blueberry Pop-Tarts. Currently, her biggest challenge is coming to terms with her teenager's nose piercing.



Lloyd Graff has had a love of writing since getting his first letter to the editor published by the *Chicago Daily News* at age 12. In high school he wrote short pieces for Reader's Digest. In college he became Sports Editor of *The 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.



Barbara Donohue received her mechanical engineering degree from MIT. She worked in design, heat transfer and manufacturing for several years before changing careers to become a journalist. Now she writes about technology and business from her home office in Acton, Massachusetts. When not writing, she sings in a choir, volunteers as a literacy tutor, and is weekend "foster mom" to a yellow Lab puppy named Tikva that is training to become a wheelchair assistance dog.



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Bearing With Us

I always look forward to each month's issue of *TMW*. In my opinion you folks do a great job of providing relevant and insightful articles of topics that interest today's PM shops.

In the December issue, Lloyd talks of the hardship of purchasing Timken bearings for our machine repair needs. It does seem to be a challenge facing our industry and it's great to point this out in hopes that someone may have solutions to the problem. Lloyd seems to insinuate that this problem is brought on in some part due to "an homage to the lean gospel and the bottom line." Later he writes that bearing distributors, "also worshiping at the temple of lean, are reluctant to stock expensive bearings." I don't believe that the correct application of lean practices would cause a shortage in a product. In fact it should make the product available in a very timely fashion.

I'm concerned that Lloyd is painting a bad picture of Lean Manufacturing to the readers. It seems as though Lloyd is aware of some program at Timken calling itself Lean and that it is resulting in our problem of [not] getting the bearings we need. I have no idea what Timken is doing but if it's real Lean it would not be causing this issue.

I hope in the future Lloyd will refrain from throwing out the "Lean" word to describe problems that I believe are actually caused by other factors. It's my opinion that eliminating waste & improving flow (the tenants of Lean) is a goal every company should be striving for to remain competitive in today's world. If Lean has anything to do with the bearing supply issue then it would be the incorrect use of Lean. Please be sure to note the difference.

Brian Hoff
Micron Manufacturing
Grand Rapids, MI

Dear Dickensian Curmudgeon & Seasonal Grinch,

As Abe Lincoln once said to a jury in his closing statement as a defense attorney, "Friends, the prosecutor has

his facts right but he's come to the wrong conclusion." The problem of lack of timely supply of precision bearings for rebuilding Acmes and other workhorse machine tools is not the result of applying Lean methods to manufacturing. In fact, it is the opposite; it is the result of NOT applying Lean methods.

The father of Lean, Shigeo Shingo, would denounce putting the blame on the application of Lean principles. The key objective of SMED is to achieve an economic lot quantity of ONE. If our dear friends in North Canton would only apply the principles of SMED, which is the progenitor of Lean, then they would be able to profitably meet the demand of all of their customers regardless of the number of cups and cones involved. They have indicted themselves publicly by telling you that they ration their manufacturing capacity based on some outdated E.O.Q. formula which is driven by long setup times.

The reason they can get away with this is they lack good competition. Good competition would force them to adopt SMED and Lean throughout their operations or find another line of work. Taper Roller Bearings is attempting to fill the void but since they do not manufacture the bearings they are dependent on Timken for a sufficient supply. Consider just how inefficient this process is. But, if Taper Roller Bearings had the bearings you need to rebuild your equipment, you would gladly pay their price, inefficiencies included, because their selection process adds value to you in the form of availability, which Timken is not providing.

In today's machining world, inefficient suppliers are driven to the wall by the good competitors who do not expect the market to pay for their inefficiencies. This makes me wonder about Timken's true motives in demanding government protection from foreign competition. At some point, other competitors will enter the market with precision taper roller bearings and Timken will be forced to change.

Oh, and the jury voted to acquit.

Steve Baranyk
Baranyk and Associates
Carmel, IN

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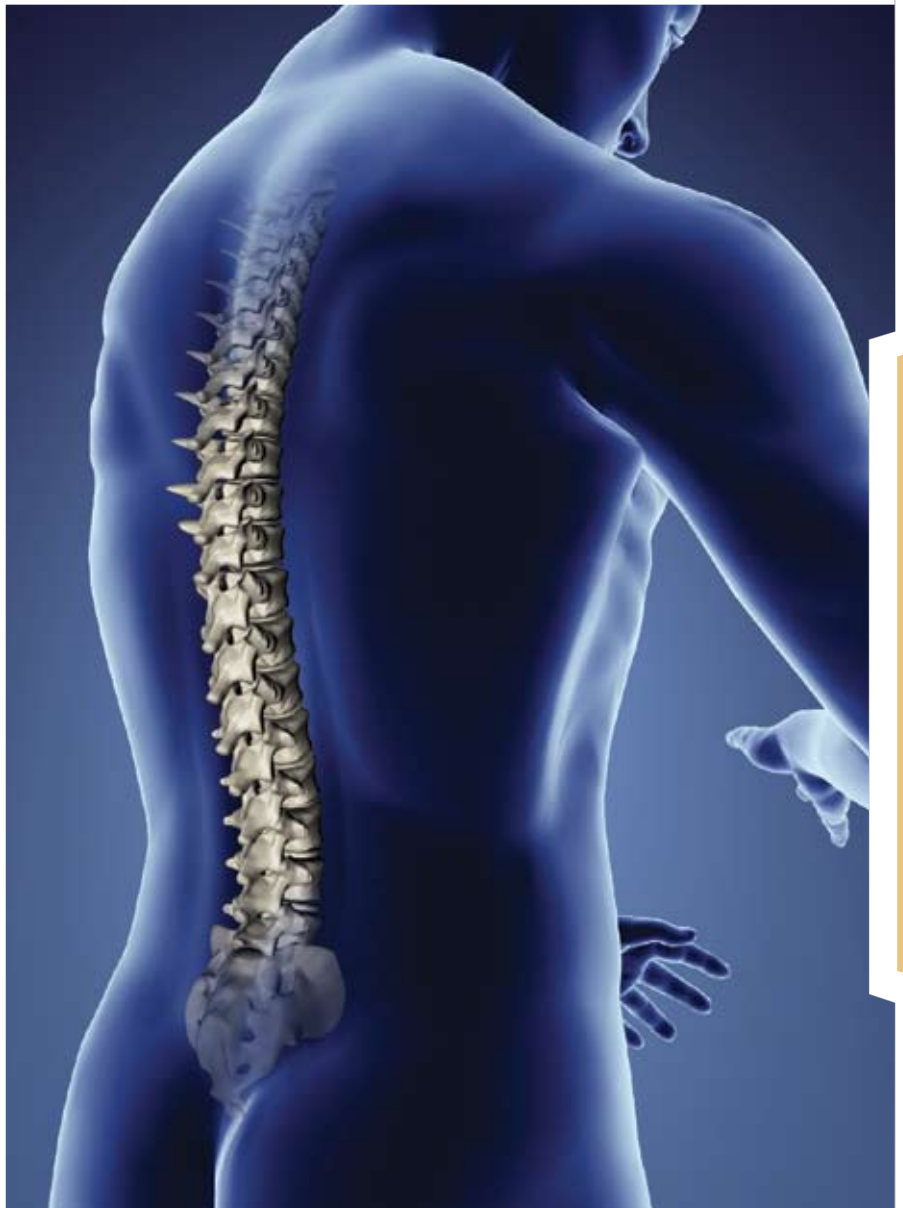
Spine Chilling

In the movie *The Fugitive*, a long-time favorite of mine, the evil doctor kills Dr. Richard Kimball's wife and frames Kimball (Harrison Ford) because he is afraid Kimball will discover he cooked the test results of the drug Provasic, in which he has a big financial interest. Now do we have reality imitating fiction, with the disclosure of the investment of 11 spinal surgeons in ProDisc, an artificial disc implanted in the spine to reduce pain?

This is not an ugly story like the recent kickback lawsuit and settlement between the Feds and Zimmer Holdings and four other orthopedic implant manufacturers, but it focuses a gauzy light on the way medical research works, particularly in the United States.

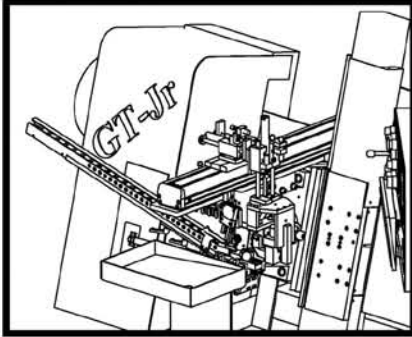
This is how the deal worked, according to a January 30, piece in the *New York Times*. A venture capital firm in New York City, Viscogliosi Brothers, helped start Spine Solutions along with a German medical instrument firm. Anthony Viscogliosi, one of the three brothers in the company, was the chairman and CEO. He enlisted prominent back surgeons around the country to become both investors and researchers to get FDA approval as quickly as possible.

(Swarf continued on next page)

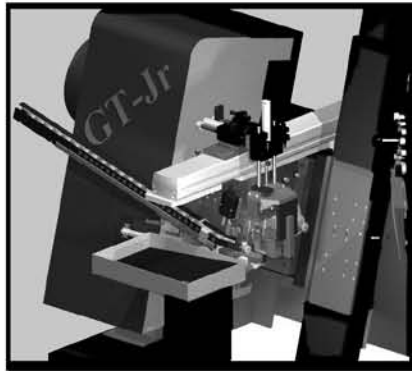


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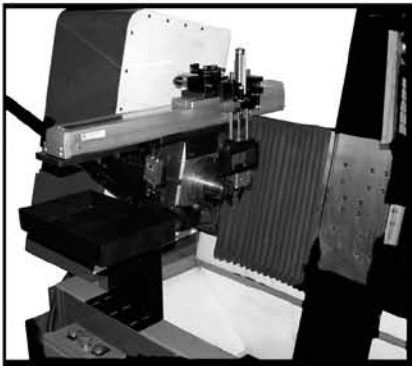


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(Continued from previous page)

The artificial disc was implanted in thousands of patients as a substitute for the often unsuccessful spinal fusion technique. Now we are starting to see the lawsuits from the dissatisfied patients, which does not mean ProDisc was a failure or that the investor docs fudged the data. But the taint of possible conflict of interest for the prestigious back surgeons is the stuff of a tort lawyer's dreams.

Unfortunately, back surgery is still a crap shoot. The ProDisc certainly sounds like a good idea that should work, but the results have been somewhat inconclusive as an improvement over fusion, therefore the questions over whether it is kosher for the investor surgeons to be providing most of the data to the FDA.

One issue that the *Times* article discussed was the validity of withholding the 50 "training cases" as part of the study results, which compared ProDisc insertion versus fusion. Those cases, along with 21 other cases, were excluded from the submitted data, which prompted Medicare to decline reimbursement for the procedure.

Spine Solutions company was sold in 2005 to Synthes-Stratec, a Swiss medical manufacturer, for \$175 million with another \$175 million to be paid upon regulatory approval.

This is not a good against evil story. The coterie of back surgeons the Viscogliosi group enlisted are some of the most prestigious in the country, and they invested their own money in the venture, rather than taking shares for their name value. There is no intimation of kickbacks or real evidence of fudging. From a business standpoint, there is a compelling argument to enlist the talents of surgeon investors.

But in a litigious world, with cynical media, and patients praying for relief from constant pain, the doctors left themselves exposed to second guessing and doubt by having perceived conflicts of interest.

I admit that I have sympathy for the spinal surgeons, because I have been accused of having a conflict of interest in doing this magazine while competing in the used machinery business.

Frankly, if a doctor told me that he had an investment in a product like ProDisc, and he believed in the product and the procedure, I would probably be more inclined to trust in him. But if he hid his pecuniary interest, I would run (hobble) from his office as fast as I could.

Unfortunately, how many of us would even think to ask about personal investment when we are sweating in fear in a doctor's office?

Barely have I ever seen such a dramatic

glass half empty, glass half filled story.

The pessimists, the bears, the media based in New York and the economists who work for money center banks see an economy tanking, dollar falling apart, housing dead for a decade, and a stock market shuffling in the mud. Virtually, blood in the streets.

The optimists see a slowdown in housing offset by a surge in exports. They see softening interest rates, a useful fiscal stimulus package, a bottoming residential



real estate climate very inviting to speculators, and booming economic growth in the U.S. by late 2008. They also see oil softening to \$75 a barrel and refiners keeping gas well under \$3 per gallon. The only real inflation is caused by the idiotic ethanol boondoggle which has screwed up the old balances in American agriculture.

When I look at the two scenarios, the glass half filled view looks much more likely, particularly in the industrial arena.

Wall Street has taken a series of body blows because of the latest derivatives fiasco. The sub-prime mortgage market is unwinding, but the refinancing wave will begin very soon as 5 percent money becomes available to solvent borrowers. If you add this to benign commercial rates, tax cuts for individuals, weak dollar, modest inflation, cheaper gas, a national election, and accelerated depreciation and small business write offs, it spells explosive rebound. Man on the street confidence is soft now, and business has caught the fear bug because of the shrill, no-nothing New York media clique, but this will turn as the election gets closer. People are tired of Bush. An Obama presidency is both enormously bullish for personal confidence and very scary because of the Senator's leftist rhetoric.

A Clinton nomination probably means another Republican in the White House, which means gridlock, which is usually bullish.

So at the end of January 2008, the year looks very promising – if we are not blinded by the sourpusses.



The stimulus package, which was

recently rushed through Congress, was an incumbent retention ploy by the politicians, but the business proposals, which have received no press because the media doesn't understand them, are going to be a wonderful boon to the machining world.

Lurking in the opaque legalese is the doubling of the \$125,000 expensing provision. This means that if you buy a new Citizen for 200 grand and your business shows \$200,000 of pretax profit you can cancel out your taxable income. This is good only until the end of 2008, so I foresee a big rush of buying by small businesses as the year winds down.

The other bauble Congress and the President are tossing is the accelerated depreciation of capital goods, which will double the speed of writing off equipment during the first two years after acquisition. This only applies to capital equipment bought in 2008, so it will goose purchasing by money making firms. Unfortunately, these two financial goodies only help you if you are making money.

The depreciation section applies only to new capital goods, but the now \$250,000 expansion provision will work for new or used.

We are seeing consolidation in

the industrial auction business. Go Industry recently closed a deal to acquire DoveBid, based in the Bay area. This mates two of the largest commission-orientated firms under the Go Industry banner. Go is on the London Stock Exchange with its stock valued at well under \$1.00. This appears to be a merger of two financially weak players who are praying that they can get the stock up so the investors can get out. They were formed during the great Internet bubble and both gobbled up independent entrepreneurial auctioneers with the seed money of investors intoxicated by a stock market hungry for roll-up stories based on the promise of the web. DoveBid and Go Industry are the survivors of the crazy era. They have succeeded in making the sale of redundant assets more efficient and transparent, but they have struggled to make money for the investors.

Meanwhile, many of the small entrepreneurial auctioneers, who chose to remain independent or bought back or reformulated their businesses, have survived – and some have prospered.

In another piece of consolidation Hilco Auctioneers

picked up Winternitz Auctioneers of Chicago.

Hilco is run by Robert Levy who had sold his family firm, Norman Levy and Associates of Southfield, Mich., to DoveBid at the peak of the frenzy. He left DoveBid after becoming disenchanted with the money-losing firm that missed its small chance of going public when the stock market tanked.

Robert dabbled in horses and photography until Hilco approached him to start up an entrepreneurial auction firm four years ago. He hired many of his old people from Levy, took a piece of the action himself, and has the backing of a successful financial deal-making firm based in a suburb of Chicago. With the acquisition of Winternitz, Hilco gets some experienced people and a long, well-established appraisal business, which is often the most lucrative part of an industrial auctioneer's portfolio of services.

Looking at the auction business as an observer who has been active on both the buying and selling sides, the trend is currently favoring the buyers. The Internet sales technology with streaming bidding from photographs saves time and money for buyers. The "buyer's premium" fee does not appear to be high enough for Go and DoveBid to make money so they are hoping to get economies of scale by combing their I.T. departments and reducing competitors in the field. Their logical competitor, eBay, has faltered after the idiotic Skype acquisition for \$2 billion and the



continued loss of capable people who had a feel for the industrial auctioneering game. While they diddle with their fees and try to be Amazon lite, the business loses its energy.

The more things change, the more they stay the same. The Internet technology has forever changed the auction business, but the big players like Go Industry and DoveBid and eBay struggle to thrive against their more agile competitors who can now afford to buy the technology on the cheap.

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Olaf Tessarzyk has left Index

Corporation of Noblesville, Ind., and I will miss him. He is smart and affable and a good listener and served Index well.

Management shifts and rotations are a fact of life in business, but I think European and Japanese machine tool builders face unusual challenges. The culture in the American machining world, with the shortage of skills, lack of apprenticeship programs and unfavorable regulatory and tax climates must be baffling for distant managers.

If a multinational firm wants to really succeed abroad, it helps to be in synch with the culture of the country it is selling into. Sometimes the home office folks think that they know best and they want the key people to hold beliefs congruent with their own. Interestingly, Olaf's replacement, Jeffrey Reinert, is an American who had sold Index products from 1986 to 1992.

The big Japanese builders generally use a variety of dual leadership schemes, with an American head acting as the day-to-day face of the firm, but keeping Japanese leadership behind the scenes to monitor, report home, and suggest. This collegial approach seems to have worked well for many builders. The Japanese firms generally rotate their Japanese employees every three to five years.

On the other hand, European firms have tried a lot of different styles. Bruno Schmitter of Hydromat came to the U.S. 30 years ago as a young man in a young Swiss company, stayed in St. Louis, and built the company to reflect his personality.

DMG has rotated its leadership frequently, which in recent years has promoted a sense of stopping and starting in the American machine tool community. They appear to understand this now and the company has moved into a beautiful new headquarters in Itasca Ill., and appears to be getting more traction as they push toward IMTS with their always impressive presentation.

I have not met Index's Jeffrey Reinert, but I know he will face tough challenges with the weak dollar and soft automotive business, despite their outstanding product line. I wish him well negotiating the difficult issues of managing in an American market that may seem a million miles away from the leadership suite in Esslingen, Germany.

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When I interviewed Dick Goodall

for the piece in *TMW* (see page 42) he mentioned that he had just returned from a stimulating morning in second grade. Dick and 27 other Dixon people volunteer in the local Chestertown, Maryland school system as part of a program called "Character Counts." The business people teach values to the kids within the structure of the program. He says the great benefit for him comes from the preparatory meeting with his people before they descend on the schools. The energy and enthusiasm that the collegial volunteering imbues in his people, and indirectly the company, makes it a highlight of his week.

Personally, I've had an experience that I've found extremely rewarding in mentoring a young entrepreneur who is focused on building his laundromat into a million dollar business. We meet at Starbucks on weekends and some weekday evenings. He is the epitome of the eager student, taking notes and responding with the enthusiasm of a protégé who strangely believes in what I have to say.

The irony is that I always walk out of our meetings feeling that I've learned more from the process of connecting with him than he could possibly learn from me. I often think to myself, "if only I could follow my own advice, how much could I achieve?"

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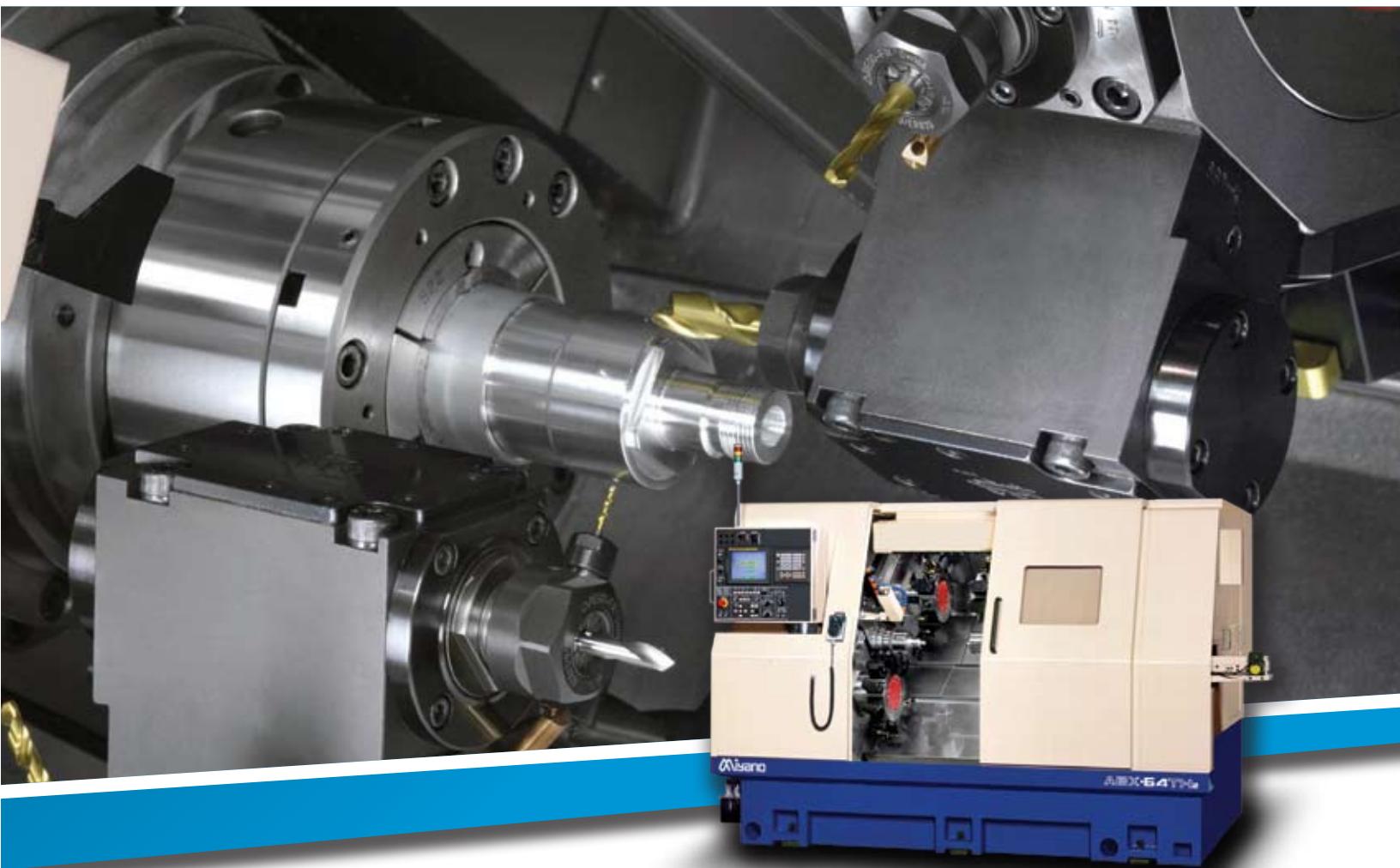
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BY JERRY LEVINE

Abraham's Children

The study of genealogy is fascinating, and opens a myriad of questions. Where did each of us come from, and how are we all related? What branch are we on mankind's family tree?

Genetic science is now beginning to poke its fingers into our complex multiethnic world, and some surprising answers are popping out— answers thought to be lost to antiquity. Three major religions – Judaism, Christianity and Islam – all trace their ancestry to Abraham. Jon Entine, in his new book *Abraham's Children*, probes the question “Who is a Jew?” but also cites DNA projects examining many other ethnic groups.

According to Biblical accounts, after the exodus from Egypt about 3,500 years ago, Moses' brother Aaron was selected as the first high priest (Kohain) of the religion. This position was then passed on from father to son throughout the generations. Unbeknownst to them, their Y-chromosome also went along for the ride. Now, over 100 generations later, Aaron's male descendants still have the identical Y-chromosome, and it can be used to trace their descent from him.

About five percent of Jews worldwide have an oral family tradition of being Kohains – descendants of the high priest Aaron. When tested, about 50 percent of these people have the same six DNA markers called the Kohain Modal Haplotype (CMH). According to Judaism, the Kohanim are regarded as retaining their original sanctity, and have a status of waiting in readiness for service in a restored Third Temple during the Messianic era.

Judaism has been a religion on the run for much of its history. Many books have been written on how it has managed to survive. One factor is that intermarriage with non-Jews has been frowned upon, and for centuries this helped maintain consistent DNA lines.

While Jews make up a tiny percentage of world population, pockets of adherents are found in almost every culture. They may blend into the rest of the population, but still practice some recognizable variant of Judaism, and have a tradition dating back thousands of years to the early Kingdom of Israel. Are these people really descendants of ancient Jews, or did they merely

join the religion at some unremembered point in the past?

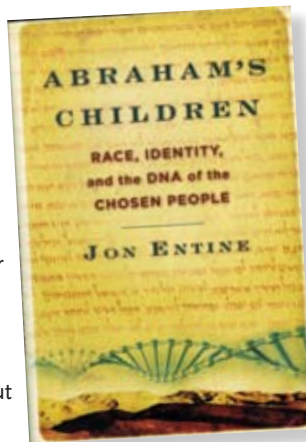
Entine traces these so-called “Lost Tribes of Israel” in Africa, India, Asia and the American Southwest. He not only finds many of these groups are a genetic match to other Jews, but some carry the CMH DNA. He has a long and fascinating discussion of the Lemba people of Zimbabwe and South Africa. They have a strong Jewish tradition, and place restrictions on

intermarriage with non-Lemba. In one sub-clan with a priestly tradition, the Buba, over 50 percent of the males have CMH DNA. Many Jews believe that the discovery and gathering of these lost tribes is signaling the beginning of the Messianic era (of which the Kohanim will help usher in).

He presents a case study of Father William Sanchez, a Catholic priest in Albuquerque with Jewish DNA. Father Sanchez is part of a sizable community in the Southwest whose ancestors fled the Spanish Inquisition in the years after 1492 and eventually made it to safety in the New World, but hid their religion. While only non-religious remnants remain, many of these crypto-Jews are discovering their ancestry through DNA testing.

I decided to do the DNA test. Six weeks and \$200 later I had a 37 marker analysis. The first test showed I have Kohain Modal Haplotype (CMH). Using the more extensive analysis, I found my DNA was closely related to Aaron and Moses, but with a slight variation. We do have a common ancestor, but he dates back several thousand years before the exodus.

I recommend this book for those interested in genealogy and our genetic codes, as well as an interest in the genetic link between Judaism and Christianity. Entine lists several DNA testing facilities specializing in specific groups, e.g., Africa, British Isles, Native Americans, etc. DNA testing is opening many new avenues of discovery, and a great reminder that, although our DNA possesses our most unique traits and markers, we truly are all connected by God.



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



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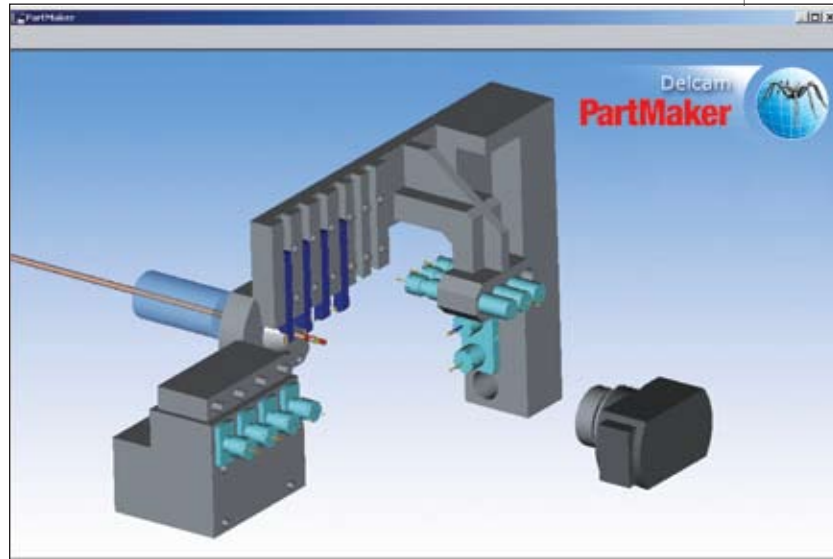


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Partmaker- Booth #3368

PartMaker Inc. will demonstrate Version 8.5 of its PartMaker® CAD/CAM software for CNC Mills, Lathes, WireEDM, Turn-Mill Centers and Swiss-type lathes. PartMaker Version 8.5 marks the introduction of the PartMaker Documentation Wizard (PDW), an optional module which allows the user to create, preview and print documents with multiple views. With PartMaker Version 8.5, users can create horizontal, vertical, linear, circular and angular dimensions in every Face Window separately by picking geometric entities. PartMaker Version 8.5 features the ability to link CAD to CAM to automatically update programmed features when a geometry change is made. Tool path profiles can also now be modified once they have been created. PartMaker Version 8.5 also supports the import of files from SolidWorks 2008 and Autodesk Inventor 2008.

PartMaker Inc.: 215-643-5077 or visit www.partmaker.com.



Hurco- Booth #2500

Hurco will officially kick off its 40th Anniversary by featuring three of its newest machines, including the VMX42SR, Hurco's newest 5-axis machining center; the VM1P production machining center; and the TMM8 lathe with live tooling. Hurco designed the VMX42SR with a swivel head and horizontal rotary table, plus a special version of WinMax control software specifically designed to simplify setup and programming of complex, multi-sided parts. The TMM lathes with live tooling include C-axis standard and programming to .001 of a degree. The VM1P has fast rapids, fast tool changes, and the ability to tap at 4,000 rpm. The VM1P is a vertical machining center with drill/tap functionality.

Hurco: 800-634-2416 or www.hurco.com.

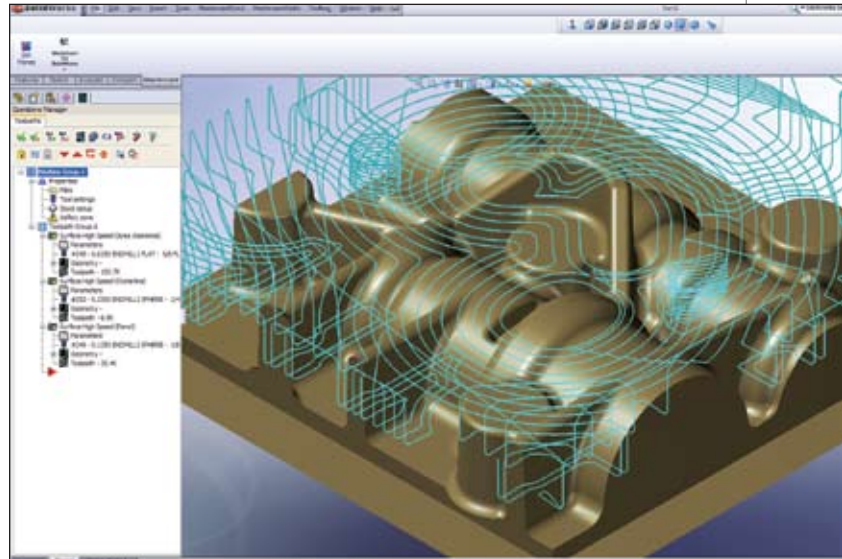


fresh stuff

Mastercam- Booth #3258

Mastercam will unveil two major developments in CNC Software's Mastercam CAD/CAM software. Mastercam's new Feature-Based Machining automates the machining process. Mastercam's FBM will automatically evaluate the part and program pockets, contours, bosses, and drilling routines with minimal user input. New users to Mastercam will be machining 2D solid parts sooner thanks to FBM's ease of use and short learning curve. SolidWorks users can now program their parts directly within SolidWorks using Mastercam's industry-leading toolpaths and machining strategies. Mastercam's latest release, X2MR2 will also be demonstrated. Features include the new Peel Milling toolpath, which moves the tool in and "peels" away material, layer by layer, and the Operations Manager pane, which can now float to a different area of the graphics window or to a separate screen when you are working with dual monitors.

Mastercam: 800-228-2877 or visit www.mastercam.com.



IEMCA and Star CNC- Booth #3500

IEMCA will showcase its bar feeder technology. IEMCA's Genius 120 magazine bar feeder will be operating on a Star SR20 CNC automatic lathe inside the booth. The Genius 120's hydrodynamic guide channel system enables simple, quick changeover and reduced noise and vibrations. The guide channel design allows the guide diameter to be changed by only changing the front guide sections. The bar pusher is contained in a tube fixed to the upper wall of the rear guide. The internal diameter of the tube varies depending on the bar pusher it contains, while its external diameter remains unchanged.

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Emuge Corp.- Booth #4233

Emuge Corporation has introduced a new series of Miniature Solid Carbide Thread Mills, designed for easy machining of difficult materials. The thread mills are available in both 1 flute and 3 flute versions, and eliminate the need for hand tapping during full bottom threading applications. Bottom threading can be performed to within 1 pitch. The miniature thread mills function with externally supplied coolant and eliminate the need for thread cutting oil, so parts and coolant reservoirs are not contaminated. The Thread Mills include a controlled pitch diameter and offer thread depth controls, up to 2xD, so that one tool can be used for both through and blind holes. Overall length of the thread mill is 1 5/8" with a shank diameter of 1/8". The line includes thread sizes of #0-80, #2-56, #4-40, #5-40, #6-32 and #8-32, and cutting diameters from 0.045" - 0.124". Thread length ranges from 0.125" - 0.328".

Emuge: Visit www.emuge.com.

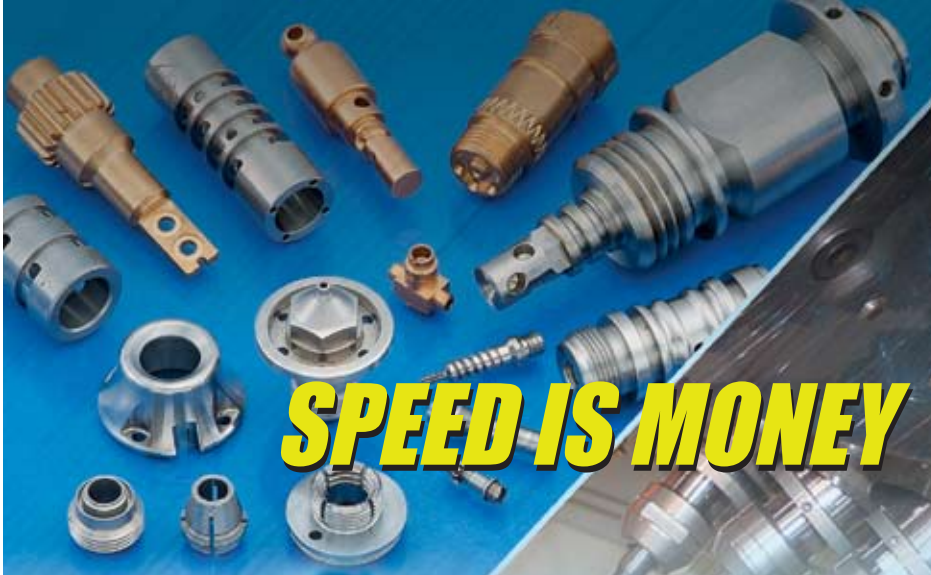


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Sunnen- Booth #2916

Sunnen's new SV-1015 series vertical CNC honing system with integrated air gaging system will be demonstrated. Matched with Sunnen's diamond-plated CGT Krossgrinding® tools or MMT TurboHone® multi-stone mandrel, the air-gage-equipped machine can automatically control hole size to accuracies of $0.25\mu\text{m}$ ($0.00001''$) without operator intervention, working in a size range of 3-65 mm (0.120 - $2.56''$) diameter. The new machine provides closed-loop control of tool size, along with downloadable SPC data, making it ideal for automated, high-Cpk production of small engines, hydraulic valves/bodies, fuel injectors, gears, compressor parts, turbocharger housings and gun barrels, in medium and high volumes.

Sunnen Products Co.: 800-325-3670 or email sales@sunnen.com.



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Royal Products — Booth 2312

Royal Products has introduced the exclusive Bolt & Go™ mounting feature for their line of Low Profile Accu-Length™ CNC Collet Chucks. The mounting feature is defined by a full contact taper/face connection between the chuck body and back plate. Collet chucks featuring the Royal Bolt & Go™ system take just minutes to install, and are guaranteed accurate within 0.0003" TIR when bolted to a lathe spindle nose. Royal Low-Profile Accu-Length™ CNC Collet Chucks are available in all common spindle nose configurations and cover a wide variety of collet styles ranging from 5C (1.06" capacity) to S-40 (4" capacity).

Royal Products: 800-645-4174 or visit www.royalprod.com.

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Chick Workholding- Booth #4423

Chick Workholding Solutions, Inc. is unveiling the QwikStack, a modular subplate designed for small workpiece fixturing. The QwikStack is designed to utilize large workholding systems for high-density, small workpieces by interfacing directly with Chick System 5 1550 QwikLoks and MultiLoks. This also creates a pallet changing system that allows for seamless transition between jobs, since the QwikStack is easily removed in seconds. The QwikStack can also be mounted to a VMC's T-Slotted table or Chick Foundation using toe clamps. Up to ten 50mm (2 inch) Chick QwikLoks can be mounted horizontally, creating twenty small-part clamping stations, or six QwikLoks can be mounted vertically to add even more versatility to the QwikStack.

Chick: 724-772-6146 or visit www.ChickWorkholding.com

FUJI- Booth #2950

FUJI will showcase the new TNW-3500R automated lathe, which provides turning, drilling and milling operations all in one machine. Twin spindles, a gantry robot and slant bed are among the features of the TNW-3500R. A live tool turret performs secondary operations; live tool motor power is 3/5 hp. For built-in automation, the TNW3500R features a FUJI gantry loader with a 22 lb. capacity and dual 10 tool turrets. The TNW3500R's A2-6 spindle turns with a 15/20hp spindle motor and operates at a maximum of 4,200 rpm. A work stocker (12 stations), chip conveyor and a set of turret holders are included as standard.

FUJI: 847-436-2744 or visit www.fujimachine.com.

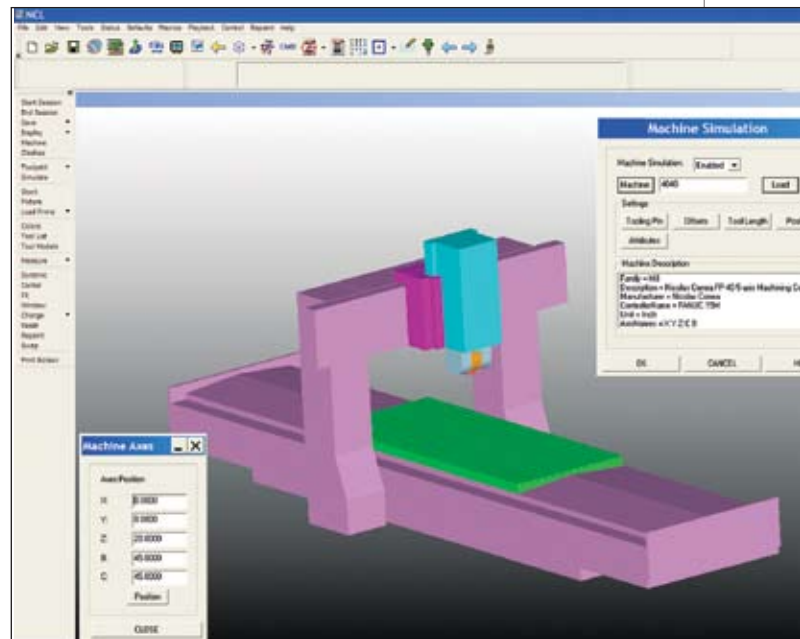


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NCCS- Booth #3175

NCCS (Numerical Control Computer Sciences) will present the latest version of NCL. New strategies have been added to the flowline milling feature. Users now have the ability to machine multiple surfaces in a single operation, the ability of milling around avoidance surfaces, and the ability to control the axis of the tool with a secondary part surface to assist in machining highly curved surfaces. A new visual calculator has been implemented within NCL version 9.6. This feature gives users more functionality in a single interface and is a quicker way to compute geometric entities.

NCCS: Visit www.nccs.com.



Heidenhain- Booth #2612

Heidenhain will include its latest entry into the digital readout (DRO) market with the ND 500 system, and two ground-breaking tool touch probes. Heidenhain newest ND 500 mid-level DRO is now coupled with a Heidenhain LS linear scale. The ND 500s come in two- or three-axis versions, an LCD screen and offer many standard functions for both milling and turning applications. Also on display will be Heidenhain's TS 444 battery-free probe, featuring a built-in air turbine generator and capacitors using the same burst of air that cleans the part and is charged and ready to probe within seconds. The TS 740 probe, boasting a $\leq 1\mu\text{m}$ accuracy with repeatability of $\leq 0.25\mu\text{m}$, is coupled with the use of an innovative low force analysis triggering method.

Heidenhain: 847-490-1191 or visit www.heidenhain.com.



Kaiser Tool- Booth #3557

THINBIT®, manufactured by Kaiser Tool Company, simplifies their product offering with the new GROOVE 'N TURN® toolholder system. Specially designed to work with GROOVE 'N TURN® inserts, this toolholder will replace several existing toolholder styles. GROOVE 'N TURN® toolholders can be used on conventional, Swiss and CNC machines to hold grooving and face grooving inserts in sizes from .004" to .150" and threading inserts. They are available in square shank sizes 5/16" through 1 1/4" with straight and 90° presentations. THINBIT® will trade older style S-series holders for the new GROOVE 'N TURN® toolholder style.

Kaiser Tool: Visit www.thinbit.com

Toyoda- Booth #3232

Toyoda Machinery will display its newest horizontal and vertical machining and grinder technology with the company's west coast distributor, Selway Machine Tool. Products will include Toyoda's new line of vertical machining centers and the new FH550SX HMC with a matrix tool magazine. The FH-SX horizontal machining center is designed to provide 20 percent faster feed rates. Features include a newly designed column and high-torque spindle to speed through steel without compromising rigidity. The SX Series machines have a 40 horsepower, 6,000 rpm spindle. The high-performance spindle has double the driving force on the Y axis, with a ballscrew and motor on each side of the spindle. The SX Series software has automatic compensation to protect against thermal growth in the ballscrew. Thus, the integrity of the ballscrew is not compromised by internal cooling mechanisms. Also on display will be a BM vertical machining center.

Toyota: 847-253-0340 or visit www.toyodausa.com.



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Haas- Booth #3200

Haas will have 31 machines on display and making parts, including the new EC-630PP horizontal machining center. The Haas EC-630PP features a 40" x 33" x 35" work envelope, a 50-taper geared-head spindle, a six-station pallet pool with 630 mm pallets, and a high-precision, 1-degree pallet indexer. The EC-630 is equipped with 72-pocket side-mount tool changer, a large-volume coolant tank and a high-capacity belt conveyor for chip removal. Also standard are 710-ipm rapids, a 15" color LCD monitor with USB port, 1 MB of program memory, a flood and washdown coolant system and a programmable coolant nozzle. Each of the 630 mm pallets in the EC-630PP's 6-station pool has a load capacity up to 2640 lb. The pallets can be scheduled individually according to priority and sequencing requirements.

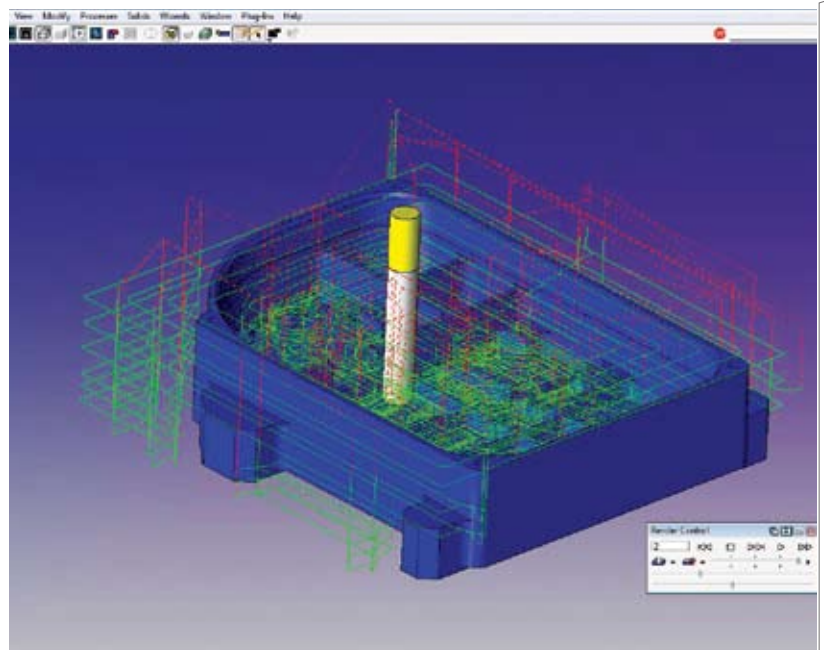
Haas: 800-331-6746 or visit www.HaasCNC.com.



Gibbs and Associates- Booth #3268

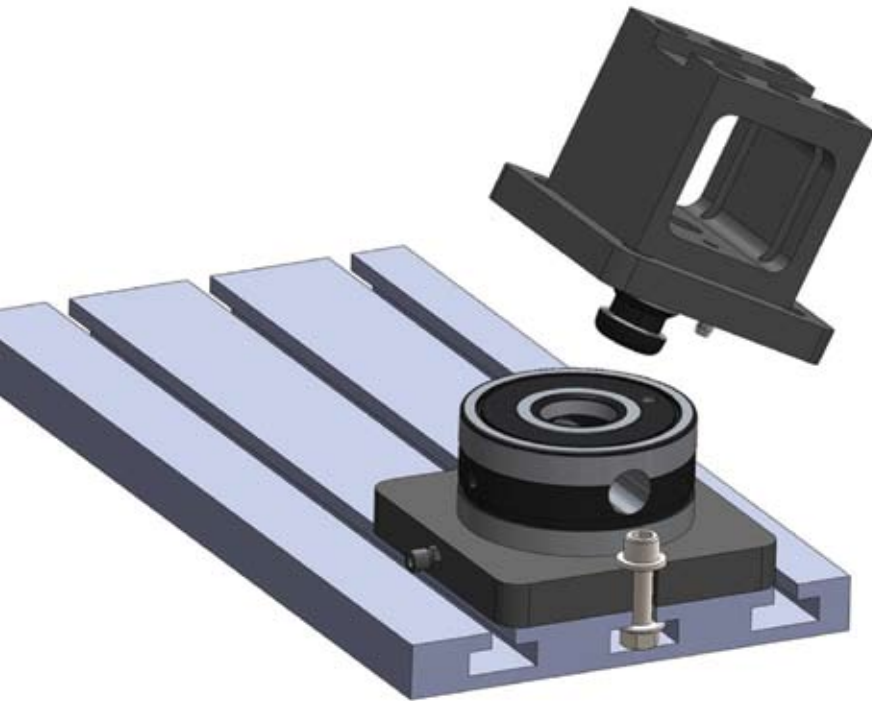
Gibbs and Associates will be previewing GibbsCAM 2008. This release introduces enhanced capabilities across the entire GibbsCAM product family, along with a complete range of 3-axis milling functionality with support for high speed machining. Bill Gibbs states, "With this release a majority of enhancements have been made to system core, so all GibbsCAM modules benefit from them. There are new 3-axis surface machining capabilities that provide more control and flexibility in toolpath generation with integral high speed machining support."

GibbsCAM: 800-654-9399 or visit www.GibbsCAM.com.



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BIG Kaiser- Booth #2632

BIG Kaiser Precision Tooling Inc. will showcase what's new from BIG Daishowa, Kaiser, Sphinx, Speroni, Unilock and more. BIG Kaiser's new C-Cutter Mini's high speed back chamfering capability reduces hand de-burring, and face milling is possible with a 45 degree chamfering type with .394" square insert. The C-Cutter Mini is available in single insert and 4-insert designs. BIG Kaiser's New EWB UP (Ultra Precision) Finish Boring Head is a new series of Kaiser boring tools with an adjusting resolution of .001mm steps of diameter corrections (.00005" on dia. for inch graduated heads). New from Unilock is a starter kit that allows users to plug the components immediately into their production cell.

BIG Kaiser: 847-228-7660 or visit www.bigkaiser.com.

Mitsubishi/MC Machinery- Booth #3532

Mitsubishi will highlight the latest EDM, hole popper, waterjet, and high-speed vertical machining equipment. The new FA10 Advance wire EDM features a new M700 Series Mitsubishi control. The machine has a 3D adaptive EDM control, which can analyze 3D data and recognize shape characteristics. Waterjet Powered by Mitsubishi Electric has been designed to complement EDM and laser technologies with the precision of Mitsubishi controls and servo system. The 4-axis Waterjet Suprema's software features Intelligent Tapering Control, which corrects the natural tapering of the cut automatically. Through the CNC it inclines the water jet up to ± 2 degrees while pointing the jet towards the cutting direction. This process allows for the optimum cutting speed in a contour with accurate wall straightness.

MC Machinery Systems: 630-616-5920 or visit www.mitsubishi-world.com.



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Manufacturing Muscle



Photos courtesy of Star Trac.

Second to man's search for the meaning of the universe may just be our quest for a beautiful body in which to navigate it. At least one would think so from hearing the siren song of infomercials promising mastery of every imaginable body part for five easy payments of \$29.99. Stroll the strip malls and city streets of America and take note of the workout centers popping up as quickly as extra pounds over the holidays. The number of fitness gyms, led by specialty chains such as Curves International, increased by about five percent in 2006, the latest industry statistics show. Their memberships rose nearly 34 percent from 2001-2006 to nearly 43 million.

The U.S. Boom in Fitness Equipment

BY MARY ETHRIDGE

While the success rate for members trying to shape up might vary widely, the literal nuts and bolts of the fitness movement – its equipment manufacturers and their suppliers – are already well conditioned and in the race.

“The growth of the fitness industry has been a big plus for the companies that make fitness gear as well as the companies that supply the necessary parts for these machines. As more and more Americans put fitness and exercise at the center of their lives, the industry will continue to blossom on all levels,” said Mike May, spokesman for the Sporting Goods Manufacturers Association, a trade group based in Jupiter, Fla. “In short, it’s definitely a good time to be in the fitness equipment business.”

During the 1990s, industry growth was somewhat flat as companies reckoned with the overbuilding of the 1980s, May said. But as greater numbers of Baby Boomers armed themselves against aging by embracing exercise, the industry picked up again after the turn of the millennium.

Suppliers: Along For A Fast Ride

May is paid to sound optimistic, but he’s right on this one. Consider that all these new health clubs must be equipped with machines alluring enough to convince us to shed our money and street clothes. The old gyms must keep pace or die, he said. And the home exerciser, perhaps having been exposed to commercial equipment in gyms at work or school, is looking for more and more for comparable gear for the workout room, industry trends show.

Indeed, sales of U.S. fitness equipment manufacturers reached about \$4.7 billion in 2006, experts say, a nearly 12 percent rise from 2004. The market is closer to \$7 billion when U.S. parts suppliers are considered. And there are many. Even a simple treadmill has dozens of parts, ranging from electronics and rollers to blow-molded cup holders and extruded aluminum frames. No manufacturer does it all.

“Oh, we’ve studied it all. For instance, we learned

just enough about injection molding to know we didn’t want to get into it,” said Jon Williams, a product development engineer at Concept2 Inc., a rowing machine company based in Morrisville, Vermont. “We depend on someone else for that.”

As a rule, companies consider supplier names proprietary information, but it’s easy enough to see fitness equipment manufacturers don’t go it alone.

As the pace of demand for equipment – with an emphasis on the new and sophisticated – increases, companies are seeking suppliers who can deliver high quality on time and on budget with a minimum of handholding, said Greg Hebson, senior vice president of sales and marketing at the Staci Corp., a Florida-based company with a manufacturing network dedicated primarily to the fitness business. Fast turnaround is essential since the pace of product innovation has reached unprecedented levels.

“We’re seeing the kind of volumes that signal a nice, vertical market for us that is most definitely growing,” said Hebson.

Jiggle Belts to Juggernaut

Unfortunately, it’s not vertically that most of us seem to be growing. We may be a nation obsessed with fitness, but we’re also the fattest population on the planet. There’s a simple reason for that disconnect; exercise is work. If it weren’t, we wouldn’t need anything to entice us beyond health benefits.

Those of a certain vintage may remember the *I Love Lucy* episode when Ethel and Lucy wanted to get in shape. They went to a gym where they had a choice of a jiggle belt or a sweat box. Fifty years later, the choices are staggering. Product quality ranges from downright dangerous to luxurious and loaded. Do you want to play video games while you work out? You can do that. Or read, watch TV or DVDs, listen to your iPod, control your workout, monitor your vitals.

Two decades ago, the product turnover in a commercial gym was about 10 years. Now it’s more like three to



Exercise equipment awaiting assembly at Star Trac.

four, experts say.

"Maybe you won't see much change at a gym from one year to the next, but over five years, it's amazing," said May.

Those who will be successful are manufacturers of high quality, user-friendly equipment that makes exercise less of a chore, he said. Fitness equipment consumers are savvier these days. They've been trained to expect frequent changes and improvements from the industry. They are technology minded and perhaps have been burned before by buying bargain-basement equipment.

Sometimes, that's literally true. A heavily advertised abdominal belt that claimed to work muscles by stimulating them with electric currents was banned from shelves a few years ago after the U.S. government found it was burning the skin of users to the blistering point, among other fairly horrifying things.

So, let the buyer beware in more ways than one. And be thankful people such as John Cook have got your back – and abs, legs and biceps.

Rapid Pace Of Change

Cook is director of industrial design at Star Trac, a commercial grade fitness equipment manufacturer in Irvine, California. He recently left BMW Designworks-USA, whose clients have ranged from John Deere to Mary Kay cosmetics, to work full time with Star Trac because he wanted to focus on fitness.

"At the end of the day, if I can say I encouraged someone to exercise, to make them healthier, I feel great," he said. "I know that sounds corny, but I have to say that's the overall feeling around here."

Star Trac introduced a couple of new products annually as recently as five years ago. Now, they launch 50 to 60 in a year. Star Trac says its year-over-year sales have been increasing at 25 to 30 percent. Their treadmills run as high as \$7,000, so they aren't for the bargain minded. As a private company, they don't routinely release sales numbers, but they are said to be among the fastest growing fitness equipment companies in the country. Other front-running manufacturers trading in the high end include Vermont-based Concept2, credited with bringing rowing machines from boathouse to basement, giants ICON Fitness & Health (NordicTrack, Pro-Form), Nautilus Inc., Precor, and Tunturi of Finland, which started as a bicycle repair business in 1922 and now makes a broad range of high-end equipment.

Star Trac Tough

All of Star Trac's products are made to withstand the demands of the commercial market, which currently makes up 95 percent of its business. Some low-priced treadmills out there are designed to run about 100 hours; Star Trac's are made to run 10,000, according to the company.

"It's like designing a rental car. Everyone who uses it probably abuses it," said Cook. "These things are always on and always in use. You have to have a piece of equipment to withstand that."

Star Trac begins its creative process by viewing potential customers in five exercise categories ranging from "not now and not ever" to "it's an ingrained habit," according to Terry Woods, director of commercial marketing for the company.

"The challenge is to move people along the spectrum. How should we do that? If people are at least thinking about exercise, we've got a chance with them," said Woods.

Star Trac launches actual product development by gathering a team of designers and engineers together. Keeping the five types in mind and wielding some data from consumer and trend studies, they go to work imagining the new and better workout machine.

Engineer Mark Chiles, Star Trac's cardio platforms



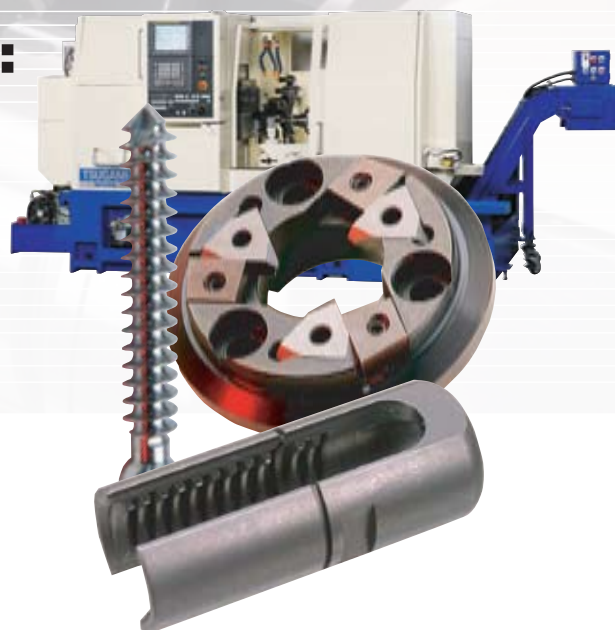
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Checking the control panel at Star Trac before assembly.

manager, says merging art and science is a bit like making sausage – better not to see it done.

“Engineers and artists don’t always speak the same language. There’s a lot of back and forth. There’s some fighting sometimes,” he said.

Cook agreed.

“It’s almost like a game of Pictionary with people drawing and waving their hands all around. They’re passionate,” he said. “There are crazy, funny ideas like putting rotating knives in the back of a treadmill to keep people motivated, but it leads to creative thinking.”

The designers study color and material trends. Cook recently attended a major home furnishings show in Milan, Italy. They also study other products, such as garden tools, to learn what manufacturing methods such as hydro forming can do.

Baby Boomers Stretch, Shape Supply

A recent Star Trac success story involves the Baby Boomer market, which is by far the fastest growing demographic for health clubs and home fitness machines, according to industry statistics. The number of health club members 55 and over increased 387 percent from 1987 to 2007 to nearly 8 million.

Recumbent stationary bikes, said to be easier on aging backs and joints, are popular among Baby Boomers. So, Star Trac went to clubs and watched hundreds of people get on and off the bikes. (They’re the sort of bikes that allow the user to recline a bit). They noticed people

sometimes struggled to step over the bar to get on the machine. It was simply inconvenient for some, but a literal barrier for others.

“So, we split it. It’s open. Now, you can just walk right through ours and get on,” Cook said. Star Trac researchers also noted that more than 60 percent of people who rode recumbent bikes read books while using them, even when other entertainment options were available. In response, they created an adjustable reading station which extends toward the user and includes page clips. Armrests alleviate tension in the shoulders and allow for a more relaxed posture. There are multiple cup and accessory holders, and several places to put reading material.

“It’s all about providing creature comforts,” said Cook. “If you can get them to sit down and move their legs for 10 minutes, that’s great.”

Mark Chiles’ job is to keep Cook’s artists in the zone of the possible.

“Sometimes they go way out there and add on and add on,” said Chiles. “Manufacturability, obviously, is essential.”

“Engineers and artists don’t always speak the same language.”

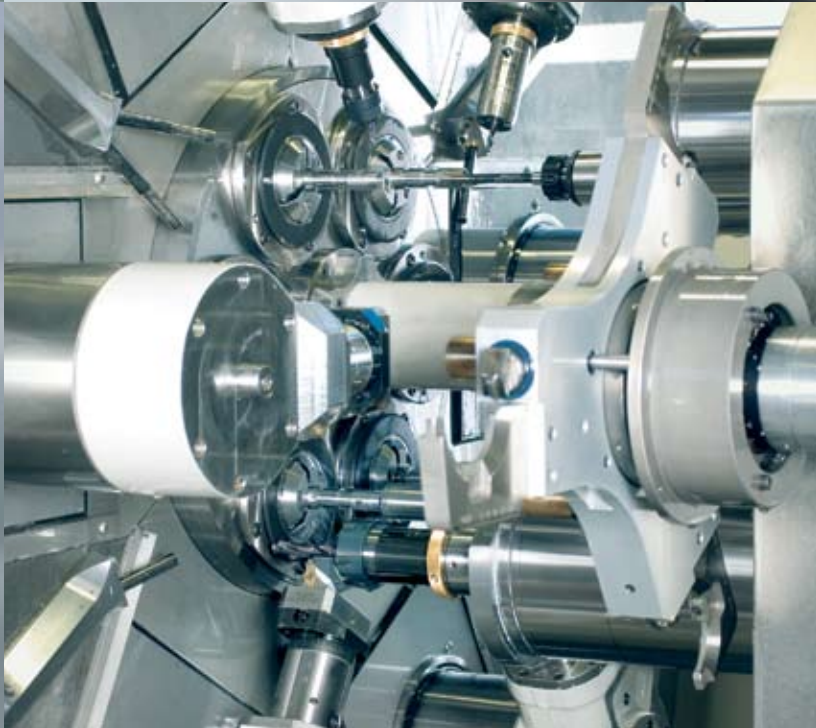
A mechanical engineer, Chiles has five other engineers working with him to take a concept and turn it into a prototype. Star Trac has a full machine shop a step away from the engineering department. It is equipped with a Trak DPM-SX5 CNC bed mill and a Trak TRL 1840SX CNC lathe dedicated to making prototypes. The engineering shop also has a few older mills and lathes, along with all the other metalworking and welding equipment necessary to make complete prototypes of new fitness equipment. All of the company’s engineers have extensive machining and fabrication skills, he said.

“We can CAD or shop a prototype,” said Chiles. “We’re a prototype-intensive company.”

Once a product’s design is finalized, Chiles said, about 30 or 40 are produced and put in field test clubs for 30 days with eight hours of continuous use.

“If we get a failure, we set the clock back and start again,” he said.

(The company also has an on-site test center employ-



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View of Star Trac's treadmill monitor. Readout and TV make the laps go easier.

ees call the “torture chamber” where machines are robotically put through their paces at extreme levels.)

U.S. Versus Offshore Suppliers

Chiles said Star Trac buys major subcomponents such as AC motors, running belts, treadmill decks, aluminum extrusions, wiring harnesses, keypads, motor controllers and display electronics from U.S. sources. The company also uses a number of local metal forming suppliers for some of the smaller parts in their assemblies and local distributors for bearings and fasteners.

Star Trac buys some parts off shore – usually low-tech, fabricated metal parts, or commodity items such as plastic wheels, connectors and some hardware items, Chiles said.

“Obviously, there are price pressures in our industry. However, we have to make certain everything we use meets our standards,” Chiles said.

Most of Star Trac's heavy manufacturing is done by partners in Taiwan, Italy, and Mexico or at the company's production facility in Irvine.

The Irvine headquarters has research and development laboratories (including the torture chamber), and administrative offices. A 55,000 square foot, state-of-the-art

manufacturing plant has continuous-flow assembly lines, as well as electronic assembly, machine and weld shops.

Star Trac recently bought a gantry mill that in two minutes machines eight aluminum extrusions that form the main chassis of a treadmill. It replaces a two punch press operation and allows more flexibility in their manufacturing, Chiles said. The facility has room for a 300 percent increase in production, if necessary,

Out Of Order, Out Of Business

Star Trac's Woods and Williams of Concept2 stress that sales, service, and generous warranties are key to retaining customers in the long run.

May said the point can't be emphasized enough.

“Nothing does more to damage a club's reputation than to have out-of-order signs on its equipment. Not only is it inconvenient for members, it sends a general message of poor quality,” said May.

Somewhat surprisingly in these days of Everyday Low Prices, the cost of machines is becoming less of a consideration among health clubs and even consumers of home equipment.

“You want [equipment] to be easy to use, appealing and durable, and then probably comes price on the list,” May said.

He added that companies such as Star Trac and Concept2 have enormous power to seize an even bigger piece of the growing global and U.S. markets, as quality rises on the list of selling points.

“America has some of the highest quality products out there in our industry. American manufacturers have much value in the eyes of the global consumer,” said May.

What's That Smell?

In a poem entitled “Adam's Curse” by Irish writer W.B. Yeats, he muses, “It's certain there is no fine thing since Adam's fall but needs much laboring.” Until someone comes up with a machine that will truly make us fit while sitting on the couch, plus provide the mental and emotional benefits of exercise, we're going to have to sweat.

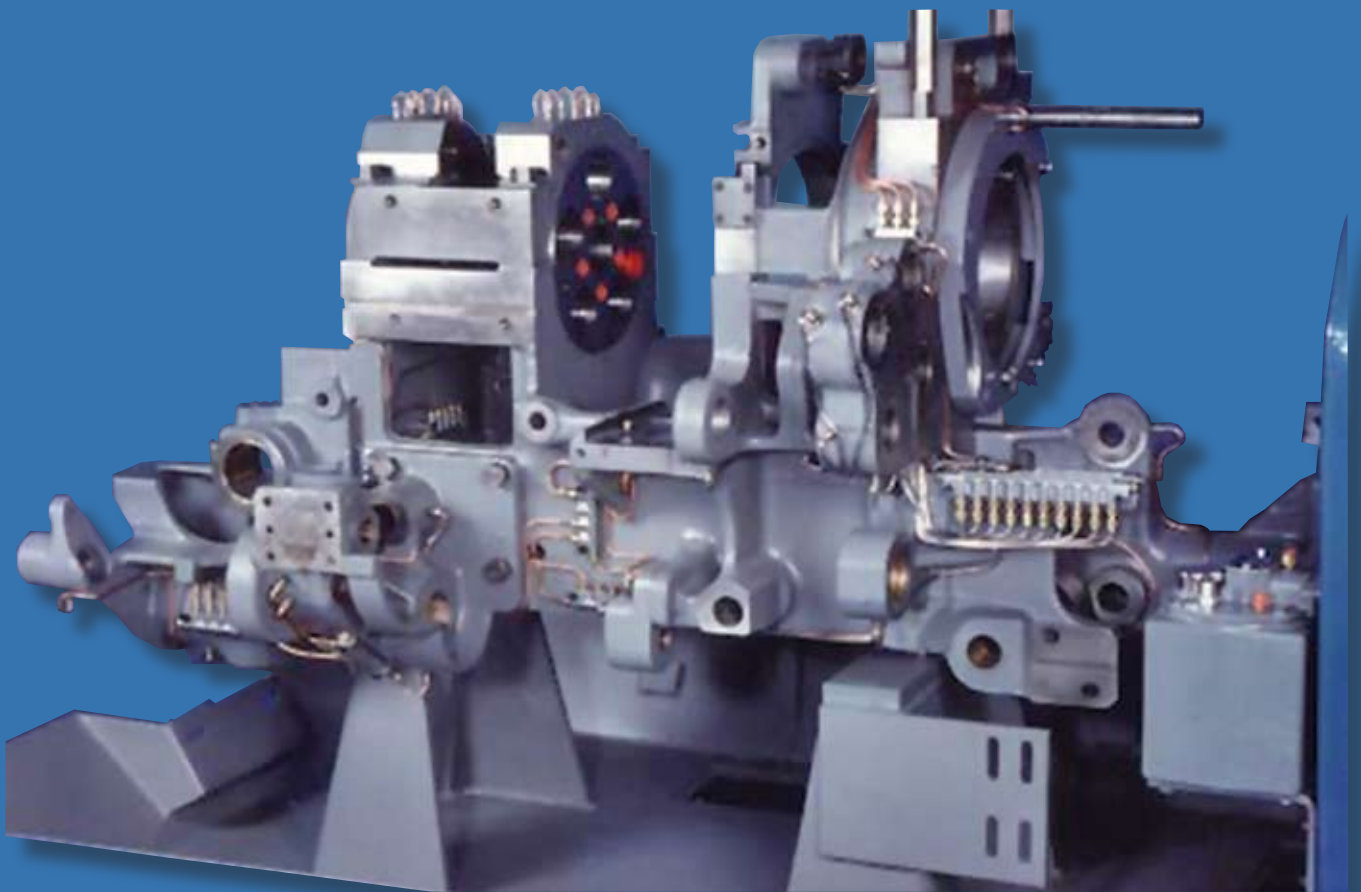
Kind of stinks, doesn't it? For most of us, maybe. But to the U.S. fitness industry, it's the sweet scent of success.



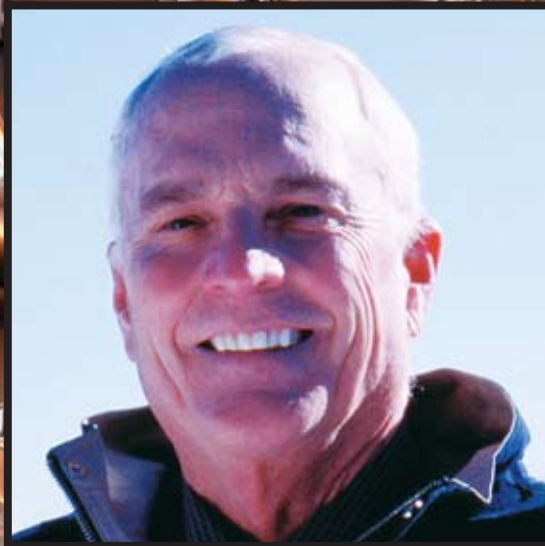
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An Interview with



Dick
Goodall

dixon valve

BY LLOYD GRAFF

Dixon Valve

Fittings Maker

LG: Dick, you sell what some people might see as a mundane and generic product – hose fittings and couplings. How do you see your product?

DG: Couplings are like hinges on a door – somebody always thinks of what the door looks like, but not about the hinges. Every door needs a hinge and every hose needs a coupling. No matter what kind of industry you're in, you're going to need a fitting on the end of that hose.

LG: What competitor do you fear the most?

DG: There are a lot of good competitors, good companies that make product. In the quick disconnect stuff, there are the Parkers of the world. But a lot of the stuff that we developed years ago comes from China now.

LG: What is your China strategy?

DG: We opened up a distribution facility in Shanghai. Our number one goal is to be selling into China. We're selling to these folks and we're starting to establish distribution in China and India. The infrastructure of those countries is where our country was 60-70 years ago. They're building roads, dams and buildings, and we have products that they use, and we want to be there selling them product. I think it's obvious to anybody in our business that a lot of the manufacturing of the product has gone to China. We do some procurement in China of which we notify our customers. But we try to have and maintain the capabilities to make it in United States still. We sell a lot of cam and groove fittings for the petroleum industry and we're very proud of the designs we have in our manufacturing. We spent a lot of dollars. We have a lot of people manufacturing those products in this country, but some items in that line are made in China.

LG: Describe cam and groove.

DG: It's the stuff you see on the tanker trucks for loading or off loading. We have a facility in Canada and we make it here in Chestertown, Md.

LG: Do you import product from China?

DG: We do, but not a lot. Let me define something here for you. We have a global market. We have facilities in China; in Europe; we're selling into Mexico and Canada. We don't manufacture in Australia anymore – we used to, but that market has totally become a Chinese imported product, not by us but by other folks. Most of our export product that we're making in the States is going into Australia and Europe. We do have a manufacturing facility in Preston, England, but they're making more high end stuff for the oil fields like the North Sea.

“We have a global market. We have facilities in China; in Europe; we're selling in Mexico and Canada.”

LG: You've acquired a number of smaller fittings players in recent years. What has been your acquisition strategy?

DG: We've never gone out and deliberately looked for an acquisition. When opportunities arise in business, we've asked: Can this enhance our distributor-base to sell product to their end customers and our end customers? If the answer is yes, then we look at the opportunities: Does this make sense? Does this add to our expertise? If the answer is yes, then we'll pursue that acquisition. One example was Bradford and Bradford. They make sanitary fittings for food and wine. The fellow came and said, “I've owned this company for 20 years, developed it and I'm not going to be in this business anymore. Would you

be interested in buying my company?” We bought that company and brought it under the Dixon label; now it’s called Dixon Sanitary, the Bradford line of fittings. His daughter is our general manager of that business unit.

LG: How do you develop the Dixon Valve brand?

DG: Our name is a misnomer. We haven’t made valves for 30 years. It’s fittings. All the big guys in the world that make the valves have that market pretty well wrapped up, and we represent some of those lines in our product mix. We pride ourselves on service. We have a quality product; we will not ever sacrifice the quality of what we make for any reason. The difference is that we’re shipping 99.4 percent of the product out within 12 hours of the order being received, including items we stock from other manufacturers like filters, regulators, lubricators or gauges. We can fill our distributors’ needs quicker than they can going to the source supplier because we service the hell out of these guys. That’s probably the secret of our business.

LG: That goes to the heart of the brand building.

DG: Absolutely. The brand has been around since 1916. I’m not trying to be an infomercial, but we spend a lot of time making sure we satisfy our customers on delivery and service. It’s really important because our guys then don’t have to stock stuff themselves.

LG: Does this strain you to hold inventory in stock?

DG: If you talk to the bankers, that’s what they don’t like. We have a lot of inventory, but we do that deliberately. You can’t service out of an empty bucket.

LG: Do you think lean is a myth?

DG: Lean is not a myth. We’re working on lean shop floor stuff all the time; on value stream mapping; in our distribution; our accounting, our sales, marketing, everything. Lean is not a myth. It’s continuously trying to get better at everything you do and measuring that. Once you measure, you change. We’re measuring an awful lot, not just in production metrics but throughout our business; otherwise, we couldn’t still be here competing. I think it’s where a lot of manufacturing guys have given up. They say, “Well it’s just as easy to get it made overseas.” We really believe that there’s a lot of future left for manufacturing in this country.

LG: Why do you believe that?

DG: Because we’ve got a lot of smart people here, not just in our company but in our country, and you treat your people the way they should be treated and encourage them to work as teams and things seem to happen right. We’ve been blessed over the years with some absolutely terrific people.

LG: Then why do you think so many people have given up on manufacturing domestically?

DG: Because it’s really easy to meet up with some importer or rep from some China organization who’ll say, “Oh, we’ll make that for you. You’re paying \$15 where I can make it for \$6.” You say, “Well, your quality is not quite as good, but it’s good enough and I could be more competitive,” so people just give up. It’s the easy way out.

“We’ve got a lot of smart people here, not just in our company, but in our country.”

LG: I’ve been in your plants and I see a lot of multi-spindle National Acme and New Britain screw machines. You’re committed to keeping a robust but highly varied inventory. Where do the old cam operated screw machines fit into an operation like yours?

DG: It’s interesting you mentioned lean. Where we might’ve run 10,000 to 40,000 of a hose coupling and run it three, four times a year, you might be running items now seven, eight, 10 times a year, the same product, running smaller quantities. The screw machine is a little more difficult to get those economic values on how many you run at a time, but we’ve been able to service ourselves and continue to use that kind of equipment, and filter it into our lean philosophy of running things more often.

LG: You must be successful in doing it because you’re competing against a lot of imported goods and a lot of highly skilled people who are very good at what they do.

DG: Absolutely. Most of the competition that’s left the United States is pretty good, which is good. I think we all like having good competition. It makes life more interesting. What worries you as an individual and a citizen of the U.S. is that some of the key products we



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need in both our military and our industrial complexes are being made in China now, and that's scary.

LG: Where do you see growth in your business?

DG: We're in a lot of different markets. Hopefully when one market is facing tough times, another market picks up. Growth may come with some of the federal programs and road building and dams; we're into that. We think some of these things are going to be going on for years and we're going to work hard to be the best supplier that our distributors can get, and try to build that brand. That's why we started *Boss* magazine, trying to build the brand not only through distributors but continue to try to pull it through to the end users through the distribution channel.

LG: Do you have much family in the business?

DG: The families originally formed by my grandfather and my brother and I are here at the company. We have people who aren't family but been around forever. Our president of our company, Lou Farina, has been with the company longer than I have, and his dad's been with the company 56 years. It might not be blood family, but it's family. They've been with the organization and we feel a lot of responsibility to those folks to maintain and work hard. We try to empower them with a lot of the responsibilities in the organization.

LG: Why have you chosen to stay private?

DG: It's nice being able to do things without going through layers of bureaucracy. If our folks need a new machine, we get the new machine. With acquisitions, if an opportunity arises, we do things rather quickly, and you can't do that all the time in public companies.

LG: How about export? Is this a thriving area now with the "weak" American dollar?

DG: It's exciting. We always sold into Mexico through distribution channels. About five years ago we put our own warehousing facilities in Mexico. We've been doing great and now we're going into Central and South America. We're selling and sending our first lot of product into our warehouse in India. We have a guy in Russia.

LG: How much does the weak dollar have to do with this?

DG: I don't think it has a lot because we were doing this before the dollar got weak. It does make it easier, but it's

more or less getting in front of the customer, enhancing the brand, identifying the brand. Most people globally know our brand. We're a little company but our brand is bigger than we are. Once we made our model the way we wanted to by stocking and delivering to our customer, we've been getting business.

"We started *Boss* magazine trying to build the brand and pull it through to the end users."

LG: Is your business price-driven or brand-driven?

DG: It's not price-driven. I think brand-driven is part of it. I think we're service-driven and brand-driven. You can't be off price much. You can't be the lowest priced guy and the best quality and best delivery guy. You can't fit all those things into one bucket. We are very price competitive and we do lead in some price areas, but we don't ever give up that to sacrifice quality or service.

LG: How important is it for you to develop team spirit?

DG: The culture of the organization has to do with the people who are in the organization. We spend a lot of time talking to people, whether they're the people running a machine downstairs, sweeping the floor or one of our vice presidents of accounting. We have meetings with every one of our employees. We meet in groups of 10 to 20 people four times a year, and we talk about how the business is going. We economically share with our people when we meet our growth above and beyond our compensation programs. We realize our people are the key to our longevity and success. We believe in it, and it's manifested in people staying a long time. The continuity of effort means people know our business; we know how we want to conduct business and conduct it that way.

LG: I think cumulative memory is one of the most misunderstood and least valued items in today's business world. When a company has people who've worked in the company for a long time, they have company memory. That is extremely valuable.

DG: You're right. When your employees start feeling part of the company rather than just an employee or a worker and they feel they have some value, if they feel

they can help make changes, it reinforces the culture of working together. About 25 years ago, we started asking how to get more people involved in our decision-making processes. We realized we were having a lot of fun, but how many other people were having it?

LG: What do you do besides business?

DG: I love working out, did triathlons until I messed up my Achilles. In the summertime, I love boating.

LG: Do you abide by the argument that there isn't a shortage of jobs; there's a shortage of skills?

DG: I'm not sure I agree with either. There might be a shortage of skills but those skills can be taught.

LG: You've been in business for 92 years. You've defied the odds of having a family business survive at least three generations. You've defied the odds as far as having a machining business thriving in the U.S.

DG: We continue to buy equipment. We think that's

important. Did you read Jim Collins' book *Good to Great*?

LG: I did.

DG: There's one thing in there that I read and read it again and didn't get. I had an opportunity to be at a meeting where Collins was and I asked him about it. He said it is about the "who," not the "what." Without the "who" you're never going to be successful. That may sound a little crazy if you haven't read that book. But if you have the right folks doing whatever job they're doing, you're going to be successful. I believe that it's good people who make it all possible.

LG: It's the job of management and owners to find the good people; it's also their job to give good people interesting problems to work on and then reward them in satisfying ways.

DG: You get the right people, you treat them right, and they'll treat you and the business right.



Not all parts are created equal.

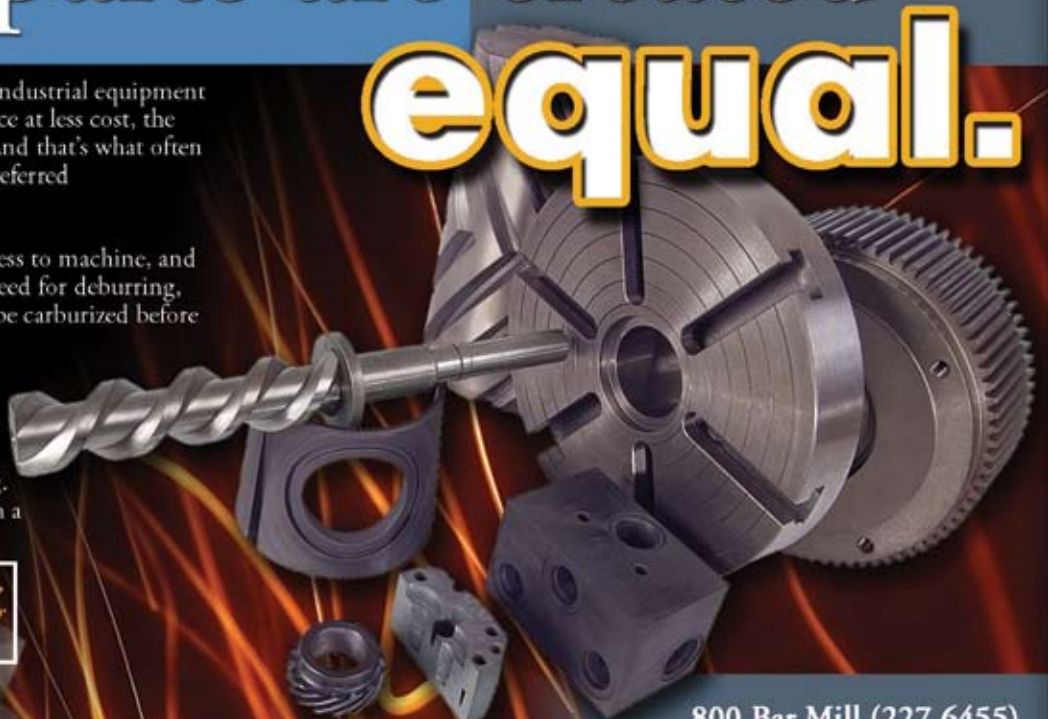
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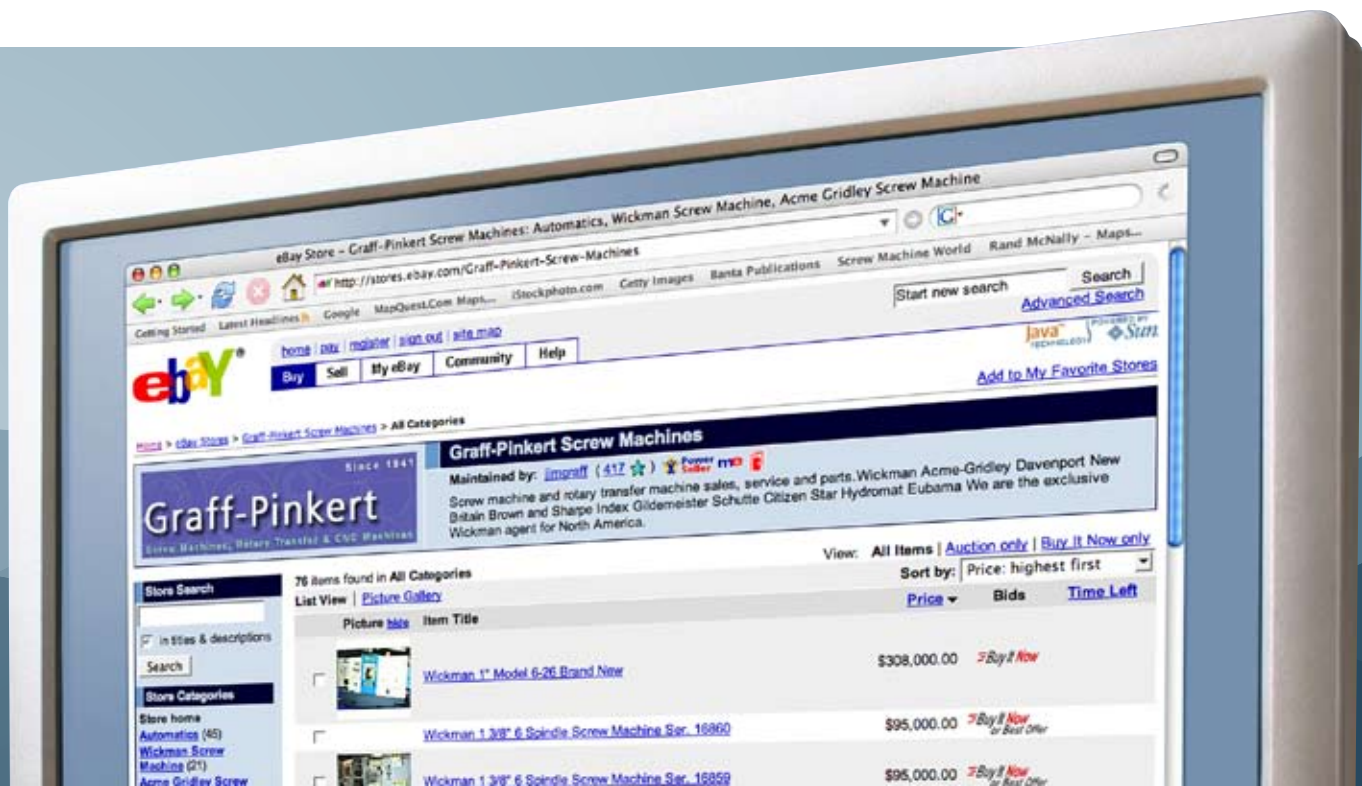
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Dear Shop Doc,

We are trying to stamp our company logo on components produced on our CNC Swiss type machines. In the past we've had no problems, but we've recently taken on a new project where the parts are much smaller. Now the parts are either getting bent or the impression is not being fully formed. Our typical process is to machine all the features of the component and stamp on the last operation. We've tried different brands of tools and have even tried to use a "roll stamp," but we still have the issues with small components.

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Dear Mr. Logo,

I have the solution to your problem. Most of the difficulties in machining micro-precision parts can be attributed to work holding and rigidity. The reason why you haven't seen these problems on large components is because the "machined" portion of the component was strong enough to withstand the stamping process. But now that you are making a smaller part you don't have the same strength in the partially machined component. Let's look at what you can do in this particular application.

One of the great benefits of Swiss-type machining is that the material is being fed through a guide bushing into the cutting tools. When the guide bushing is adjusted properly and the material is consistent, the guide bushing acts as your support. When you incorporate Swiss-type machining with the limitless possibilities in CNC programming, you may forget that when you are moving the material back and forth (Z-axis movements) you must realize that if you removed any material from the outside diameter, the component is no longer supported by the guide bushing. So, if you machined the entire component (before parting off) and then try to stamp your logo, the part is not being fully supported. Even though the part is still attached to the bar stock it is still not very rigid. This also keeps the impression from being fully formed because the part is

pushing away from the stamping tool at an angle.

Here's a couple of tricks I've used in the past to solve this problem. If your machine has an extra tool position opposite of the stamping tool, put a support tool in that extra position. Next, program the position of the support tool, in the X-axis, into the part. For example, if the diameter you are stamping is .060", position the X-axis to a diameter of .058". This will push the part about .001" in the direction of the stamping tool, and when you stamp the part it will be held rigid by the support tool. If your machine doesn't have the extra X-axis try this: machine your outside diameter to the linear position of where the logo is supposed to be (plus clearance for your stamping tool), stamp your logo, and then go back to finishing the outside diameter. This will keep the bar stock at its original diameter and supported by the guide bushing.

David Cogswell

**Director, Precision Machining Operations
Bal Seal Engineering, Medical Products Group**

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

next

BY NOAH GRAFF

In 10 years will men catch up to women in higher education?

In 1980, the men/women ratio attending college was 50/50. By 2006, women made up 57 percent of American college students. By 2010, the U.S. Department of Education expects the ratio to be approximately 60/40. *U.S. News and World Report*

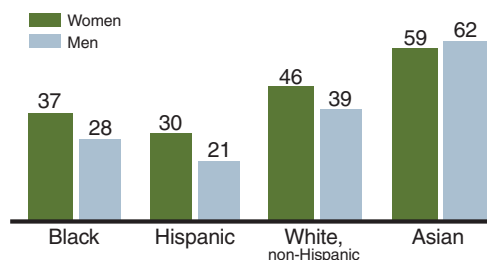
Men will not catch up to women in higher educational performance and attainment in 10 years. In 1970 there were 1.5 million more men than women in higher education. By 2005 there were 2.7 million more women than men. Men's participation rates in education have been flat since 1970, but participation rates for women have doubled, tripled and even quadrupled during the same period. The education system in place since 1970 is geared exclusively toward expanding educational performance of women. Unless and until K-12 education gets as serious about educating boys as it has been about educating girls since 1970, the gap in educational attainment between men and women will continue to widen indefinitely.

Tom Mortenson
Higher Education Policy Analyst

Projections of college enrollment send us a clear and discouraging message: Men will continue to fall farther and farther behind. Today's college-age women brim with confidence and optimism. Most have a clear and productive script for their lives: "Don't depend on a man to support you. Go to college. Find a satisfying career." Many young men are drifting and confused. They no longer see themselves as providers. They dislike feminized schooling and do not want more of it. The results will be tragic both for them and for American society. The income of high school graduates is dropping in real dollars. A college education predicts not only higher income but also better health, less crime, more stable families, and higher civic participation. Now boys are in trouble, and we are doing nothing about it. We are stuck in the mindset of the feminist era.

Judith Kleinfeld
Professor of Psychology
Director, Boys Project

U.S. College Enrollment Rates in Percentages by Race and Ethnicity, 2005



Data reflect persons ages 18-24 enrolled in college, graduate, or professional school.

Source: U.S. Census Bureau

It is true that women are going to college in greater numbers today than ever before, but the proportion of young men attending college is also higher today than ever before in history. So women's gains in college have not taken away opportunities for men. It is true that men of Latino and African American backgrounds are underrepresented in our college community, which is a problem, but I don't think that's really true for white men. Among traditional age white students (age 18-24), men and women are equally represented. The main challenge for both men and women, and I think this will remain a problem for the next 10 years, is the cost of college. We need to do a better job making college affordable for women and men.

Catherine Hill, Ph.D.
AAUW Educational Foundation

the facts:

According to the Department of Labor, the unemployment rate is:

- 8.2 percent for high school dropouts.
- 4.7 percent for high school graduates with no college.
- 3.7 percent for workers with an associate's degree or some college.
- 2 percent for workers with a bachelor's degree and higher.

<http://finance.yahoo.com/expert/article/economist/63874>

In 2005 there were 530,000 black males age 18-24 in college and 193,000 black males the same age in prison.

The NAACP www.naacp.org

Many colleges, in order to create gender balanced student bodies, have given males higher admissions rates. In 2004, male applicants for William and Mary were accepted at a rate of 43 percent vs. 31 percent for women, Boston College at 37 percent vs. 29 percent, and Tufts 30 percent vs. 25 percent. Females, meanwhile, had an easier time getting in to tech schools. MIT favored women in its admit rate by 16 percentage points, Carnegie Mellon University by 13 points, and California Institute of Technology by 12 points. *U.S. News and World Report*



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“THE” Questionnaire

“Please look this over,” she said. “The doctor will see you right away.”

Let me see: “Do I have a lack of energy? No sex drive? Sadness? Am I grumpy? Are my erections less?”

What kind of questions are these?? And what in the world have I gotten myself into?

I was here because my gal threatened that IF I didn’t get a check up she was going to either kill me (I wasn’t worried – she’d threatened before and nothing ever came of it), or never play between the sheets again. That was new. I made the call.

Forty minutes later, the tap on the door woke me up. “Mr. Espinoza,” the doctor said, “may I look at your questionnaire?” His furrowed brow got my attention. “You have andropause, or male menopause, and you’ve got it bad.”

“Huh? How do you know?”

The doctor replied, “You answered ‘yes’ to almost all of the questions! Let’s order a blood test to see how much ‘bioavailable’ testosterone you have in your system.”

“An unpredictable decline in testosterone levels will occur in virtually all men.”

Men between 45 and 55 can experience a phenomenon similar to female menopause. Unlike women, men do not have a clear-cut signpost such as the cessation of menstruation to mark this transition. Both, however, are distinguished by a drop in hormone levels. Changes occur gradually in men and may be accompanied by changes in attitudes and moods, fatigue, a loss of energy, sex drive and physical agility. Studies show that this decline in testosterone can put one at risk for other health problems like heart disease and weak bones.

Unlike menopause, which generally occurs in women during their late-forties to fifties, men’s “transition” may be gradual and expand over decades. Attitude, psychological stress, alcohol, injuries, medications, surgery, obesity and infections can contribute to its onset.

With age, an unpredictable decline in testosterone levels will occur in virtually all men and there is no way of predicting who will experience a severe enough drop in their hormonal levels to seek medical help.

Is this a new phenomenon? Andropause was first described in medical literature in the 1940s, so it’s not new, but our ability to diagnose it properly is. Tests for bioavailable testosterone weren’t around, so andropause has gone through a long pe-

riod of being underdiagnosed and undertreated.

Because of the vague symptoms associated with andropause (let alone Man’s inability to admit there might be a problem), physicians didn’t always think of low-testosterone levels as a culprit. More often doctors concluded that symptoms of fatigue and lack of performance were related to other medical conditions (i.e. depression) or were simply related to aging and often encouraged their patients to accept that they were no longer “spring chickens.”

There are several treatment options to increase testosterone levels, especially if some less-than-healthy lifestyle habits are part of your routine. If you make a decision to raise testosterone levels with supplements, treatment can consist of forms of the hormone using a variety of delivery systems, mainly injections and gels.

The simplest way to get around the absorption and rapid breakdown problems is also the oldest way to administer testosterone. When testosterone is injected into muscle, usually in the buttocks, it is absorbed directly into the blood stream. The early forms of injectable testosterone broke down rapidly in the body so injections had to be given every two or three days to maintain proper blood levels. Newer injectable testosterone products are more reliable and longer acting and may even reduce the frequency of shots to one every two to four months.

The newest therapy, the gel, can produce consistent serum testosterone levels. The hormone is applied each day and absorbed into the skin, which releases testosterone steadily into the bloodstream over a 24-hour period. The gel is a clear, colorless mixture that dries quickly.

If you are experiencing some of the symptoms outlined above, make an appointment with your doctor. You might find yourself feeling more energetic in a very short period of time. In the course of three weeks using Androgel, I definitely did. Today, I have renewed energy and can remember facts and numbers easily. More importantly, I keep a smile on my face – it’s fun to keep the folks in the office wondering!



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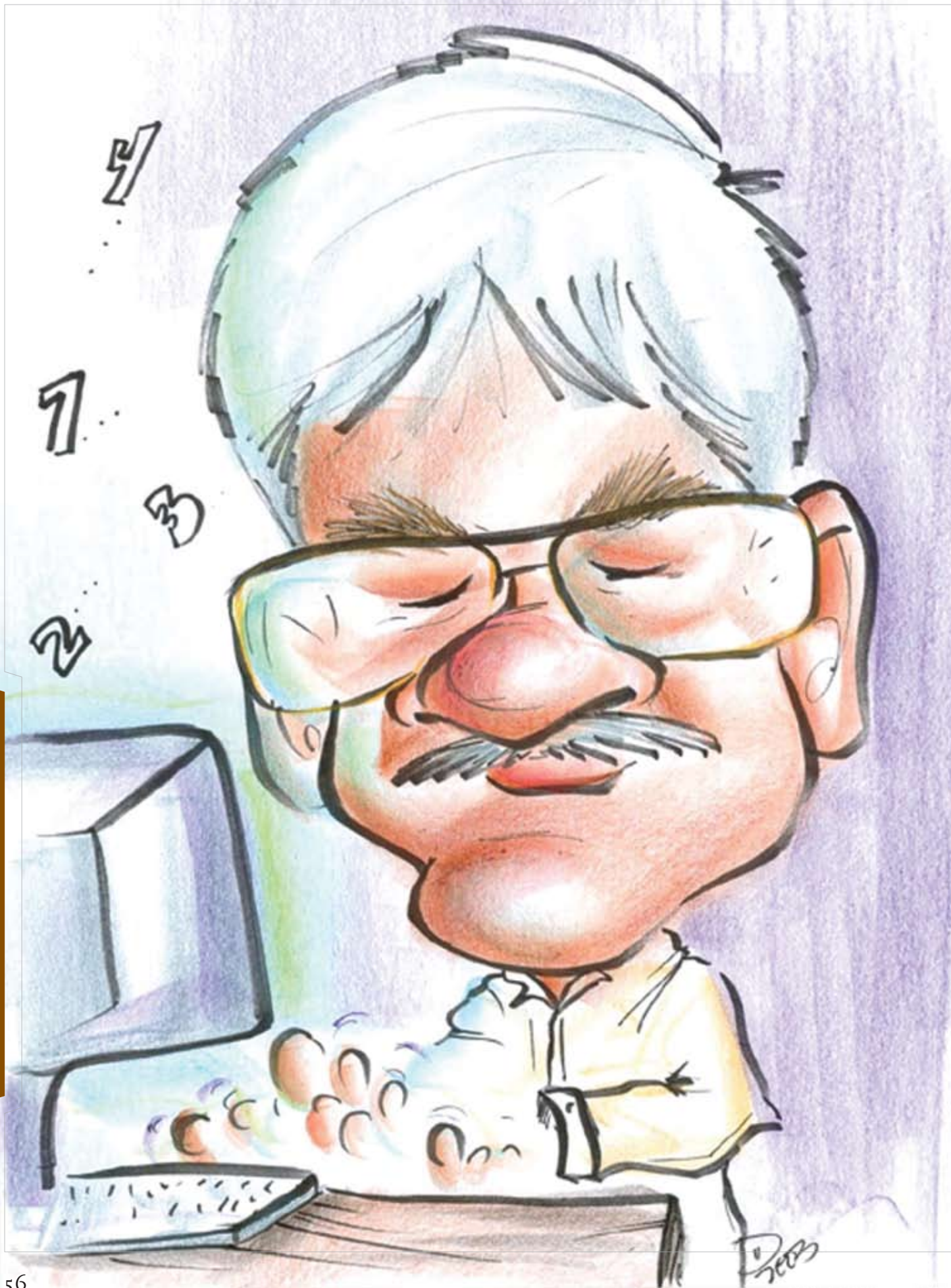
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Tom Mortenson is a Higher Education Policy Analyst and senior scholar at the Pell Institute for the Study of Opportunity in Higher Education.

NG: Why is having a liberal arts or traditional college education vital for young people today?

TM: A liberal arts education informs you why you are doing what you are doing, not necessarily what the specific skill is. And “why you are doing what you’re doing” is a much more valuable skill to have as the economy changes and the business that you’re in changes.

NG: Is the number of people going to college growing or shrinking?

TM: There are about 15 million undergraduate students currently in the United States, and that number will continue to grow for another year or so before we get into a baby bust situation where the number of high school graduates starts to drop.

NG: Is our university system better than those of other countries?

TM: Certainly it is in some respects. We have the finest research universities in the world. But looking at what I see going on in Europe and Asia at the undergraduate level, our universities are no more than average. I see other countries aggressively expanding the proportions of their population being higher educated, basically preparing them for better jobs in a now global human capital economy, but I don’t see that we’re making that progress at all. We are clearly slipping.

NG: Are students more committed there? Do they have a different attitude?

TM: They work harder. We’re doing a study right now that shows that on an average day a full-time American undergraduate student spends 2.9 hours per day either in the classroom or studying, and an average of about 4.5 hours per day at recreation and sports.

NG: Do you believe in affirmative action?

TM: I am a strong advocate of educational opportunity for students from low income family backgrounds. I believe our

nation’s future depends on how effectively we reach out to and serve this kind of population. When we look at the ACT and the SAT as college admissions tests, we would basically get the same results if, rather than asking students to take those tests, we simply asked the parents to file a copy of their income statement.

NG: But is it just a socioeconomic issue, or is it cultural as well?

TM: There are cultures associated with race that get in the way of education. The most glaring example I can think of is the world that black boys are growing up in, where they are taught by their peers that to be good in school is not cool, but to wear baggy pants that show your butt is cool. I say that because I am effectively the father of a black boy who is living that life right now and I keep telling him, “You can’t dress like this and get a good job. You can’t walk into a bank and apply for a job dressed like this with your butt hanging out.”

NG: What are your greatest fears about the future of the U.S. education system?

TM: That we’ve lost our commitment to education. We tend to view education merely as a commodity, something that’s only of value to individuals and not society, and not worth investing in socially. That we will become poor, more divided, less cohesive, a weaker country in the future.

NG: What are you most optimistic about?

TM: If you survey parents, almost all of them want their children to go to college. Also, if you look at the college graduation rate for those that start college, for about 60 years we’ve been stuck at around 50 percent. In Europe it’s about 70 percent. But in the last 10 years, we’ve seen the college graduation rate for those that start college edge upward. We’ve had to bring people into higher education that higher education has never served well, and we’re actually learning how to support these people and make their college experience successful.

NG: Thanks Tom.



how it works

BY BARBARA DONOHUE

Made to order.

Custom alloys and customized service

Relief when you need material that is out of stock – or doesn't exist.

Hot rolling a specialty alloy ingot into bar. (Photo courtesy of Sophisticated Alloys, Inc.)

how it works

When you're going to make a part for a customer, you usually just look at the drawing and order the material from your supplier. Then it shows up on your dock and you can start making chips.

But sometimes it's not that easy.

Sometimes, for performance or machinability, you need to source a high-purity version of an alloy or a precision form of the material. Sometimes, a customer may specify a material that is out of stock everywhere, with a 40-week lead time, or maybe the mills just don't make that particular alloy anymore.

Occasionally, perhaps for a brand new application or for a super-high-performance part, none of the available materials will do the job. Your customer may work with a company that specializes in custom alloys to develop a new alloy to meet the requirements of the application.

Unique alloys

Sophisticated Alloys, Butler, Pa., has melted just about every imaginable kind of alloy, from ordinary ones that happen to be unavailable from stock, to specialized magnetic alloys used in computer disc drives, to reactive solders, to high-temperature materials used for coating jet engine components. Company president Jim Patterson said once he even worked with a cinematic special-effects expert to provide a metal that was liquid at room temperature for a particular movie.

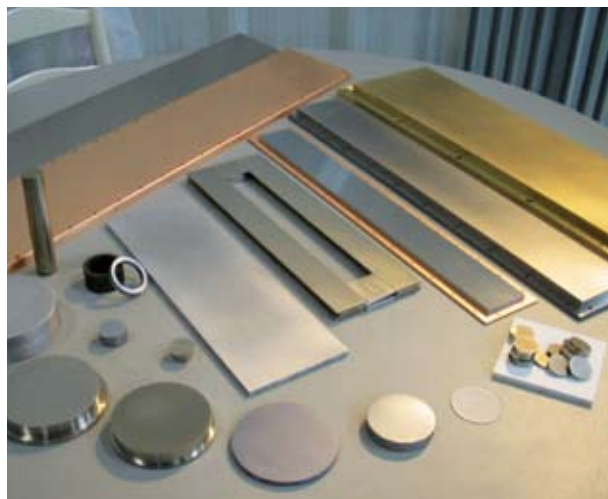
Orders usually range from a few pounds to a few hundred pounds, said Patterson, though sometimes a client wants only a few grams for research purposes. "We're a place of first choice for some people, or of last resort [or others]," he said.

Starting with high-purity raw materials, Sophisticated Alloys prepares alloys in one of five vacuum induction melters, the largest of which has a capacity of 400 to 500 pounds. "What we do is make any type of alloy you can think of. We don't stock any materials except raw materials," said Patterson.

One of Sophisticated Alloys' specialties is sputtering targets. Sputtering is a type of physical vapor deposition process that lays down a very thin layer of a material on a part or substrate. In sputtering, a cathode, or "target" made from the desired coating material is bombarded with ions. This causes atoms or molecules to come off of the target, and then attach themselves to the part being coated. Sputtering is used to place the metalized layer on compact discs, add anti-reflection coatings to optics, deposit thin layers of material during semiconductor fabrication, and in manufacturing many other products.



Machined sputtering targets. (Photo courtesy of Sophisticated Alloys, Inc.)



Machined sputtering targets. (Photo courtesy of Sophisticated Alloys, Inc.)

how it works

Designed to order

A custom-alloys house works with clients to develop materials that have the properties needed for specific applications. “We know the addition of different alloying elements can do different things,” said Susan M. Abkowitz, vice president, technology and operations, Dynamet Technology, Inc, Burlington, Mass. Dynamet Technology specializes in titanium alloys produced from powdered metal.

A client might say, “We like titanium, but would like it to be stronger at higher temperatures.” Another might want better wear resistance or higher stiffness. In some medical applications, the desired quality is lower modulus of elasticity so the titanium alloy will more closely match the mechanical properties of bone.

Dynamet Technology’s process produces full-density, near-net-shape parts from powdered metal mixtures through a process of cold isostatic pressing, sintering and then hot

isostatic pressing. Working with powders allows the creation of novel materials, Abkowitz said, some of which could not be made by melting methods. In addition to near-net-shape parts, the company also can provide material in bars or other forms.

Composites

Besides Dynamet Technology’s range of new titanium alloys, the company also uses powdered-metal techniques in designing and producing the CermeTi family of titanium metal matrix composites.

One type of composite is made from titanium and tiny particles of titanium carbide, a ceramic similar in properties to tungsten carbide. The resulting composite material has improved wear resistance over titanium metal. Different formulations of this titanium/titanium carbide material are being used in and developed for an extremely diverse range



Inside view of vacuum induction melting chamber showing melt coil and crucible. (Photo courtesy of Sophisticated Alloys, Inc.)

of applications: In medicine, CermeTi composites can be used to fabricate orthopedic implants with wear-resistant surfaces, as well as titanium's excellent biocompatibility.

In the aluminum casting industry, CermeTi composite shot sleeves withstand the flow of molten aluminum for 10 to 15 times longer than the tool steel components they replace. The composites can even be used in sporting goods. Hockey skate blades made from a titanium/titanium carbide composite will stay sharp longer than blades made from conventional materials.

Machining custom alloys

Sophisticated Alloys provides customers with the alloy they want in the form they want it. Some parts are shaped on EDM machines. Some are machined. Patterson has a number of machine shops he depends on. "These materials [can be] difficult to work with. I need to find machinists that are flexible... and able to work in these materials. [They] have to be able to think on their feet."

Often, because customers need the parts to be super-high-purity, the machining requirements may seem downright strange. For example, to prevent contamination, some sputtering targets destined for the electronics industry, need to be machined with isopropyl alcohol as the cutting fluid. "You've got to be really [aware of] what your customer wants," said Patterson. What you normally do may not work.

Some of the products from Sophisticated Alloys contain costly metals such as platinum, so when they're in the machine shop, it's important to collect and save the chips, and to keep the blanks, parts and chips secure from theft.

Composites can pose their own challenges in the shop. Though Dynamet Technology's composite parts are made to near-net-shape, they do require finish machining. The material looks like titanium, Abkowitz said, and can be machined with conventional uncoated carbide tools.

But the carbide particles in the composite tend to cause increased tool wear. Grinding, honing, and water-jet cutting work well with these materials, she said.

Obtaining the unobtainable

Do you need bar stock in an odd size? Did your customer specify an obsolete alloy for a mil-spec part? Did you try to order material for a job, only to discover it's out of stock, and you would have to order 20,000 pounds from the mill and wait nine months to get it?

About four years ago, when the metals market got very tight, said Lewis A. Weiss, president of All Metals & Forge, LLC, Parsippany, N.J., he started hearing from customers who were desperate to get the material they needed to run jobs. "Is there anything you can do?" they would ask.

All Metals & Forge is a stocking distributor of metals,

from carbon steel to superalloys, and provider of open-die forging. But Weiss listened to the need, and before long, the company started offering custom melting and custom rolling to provide those hard-to-get materials that customers needed.

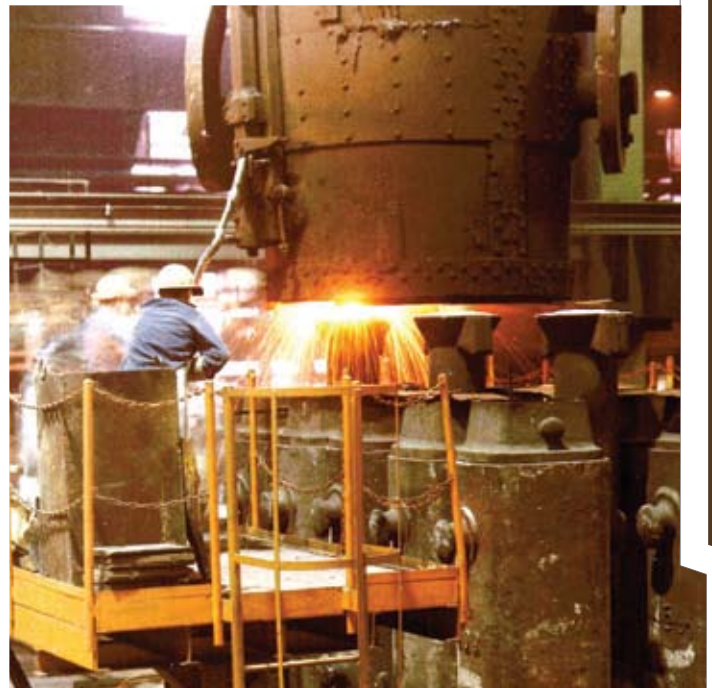
Of course, this custom work is not cheap, Weiss said. The price can run \$50 per pound or higher. However, with custom melting and hand rolling, metal can be available to the customer's exact specifications in weeks instead of months. Custom melting might take two or three weeks, and custom rolling another 10 days. "I can produce something that's unobtainable – in four weeks," Weiss said.

Or sometimes sooner. In one case when an oil drilling operation had to stop due to a broken part, All Metals & Forge got the melter to produce a couple hundred pounds of the needed alloy, on overtime. The forging shop turned out the part overnight. Then it went for heat treating. Obtaining that part would normally take months, Weiss said, but this time it happened in days.

When an oil drill is out of commission or a ship is disabled due to a broken part, the cost to the customer can be enormous. A ship sitting idle can cost \$150,000 a day, Weiss said. In such situations, fast turnaround is critical, and the cost of the metal is of very little concern to the end user.

Special grades and forms

You may never need a designer alloy, but sometimes perhaps a variation on a standard alloy will improve your



Bottom pouring of tool steel into ingots. (Photo courtesy of SCHMOLZ + BICKENBACH.)



Electro-slag remelt (ESR), showing an ingot in the process of remelting.
(Photo courtesy of SCHMOLZ + BICKENBACH.)

process or product.

Many suppliers offer special-purpose materials and services. For example, Schmolz + Bickenbach (formerly known as Ugitech USA), Doylestown, Pa., has a line of “screw machine quality” (SMQ) bar stock that has better diameter tolerance and straightness than mill-run bar, at less additional cost than centerless grinding. Bar ends can be ordered chamfered or pointed. The company also makes this type of bar in special UGIMA XL alloys, which offer ease of machining and guaranteed lot-to-lot consistency.

For applications that require superior toughness or polishability, such as dies for die casting or molds for plastic, you can get tool steel that has been remelted to improve its purity, uniformity and microstructure, according to John Stocker, technical director at Schmolz + Bickenbach. The electro-slag remelting process available from his and other companies, for example, uses a layer of molten alumina or other material to capture impurities as an ingot is melted. After remelting, the material ends up more uniform than it was after the initial melt.

You can get what you need

There’s a lot happening out there in the world of materials. You may be able to gain an edge over your competition when bidding a job by quickly sourcing the needed alloy, or maybe simply by being able to find it at all. And, if you are ready to deal with the newest types of alloys and composites, that could be a path to increasing your customer base – and your profits.

how it works

Alloys and composites

An alloy is “a substance composed of two or more metals or of a metal and a nonmetal intimately united usually by being fused (melted) together and dissolving in each other when molten,” according to the Merriam Webster online dictionary. Many alloys are familiar to the lay person. Steel is an iron alloy containing a small amount of carbon that makes it stronger than pure iron. Silver is alloyed with copper to make sterling silver, a stronger material.

In general terms, a “composite” is a mixture of different types of materials. In the metals world, composite might be defined as a mixture or alloy of a metal and a nonmetal. One of the most familiar composites in the machine shop is the cemented carbide used to make cutting tools; it is made up of particles of tungsten carbide bound together with a metal such as cobalt. (See *How It Works*, *TMW* October 2006, “From Ore to Insert: Making Carbide Cutting Tools”).

Contributors to this article:

All Metals & Forge, LLC: www.steelforge.com

Schmolz + Bickenbach (formerly known as Ugitech USA):
www.schmolz-bickenbach.com,
www.uginestainless.com

Dynamet Technology, Inc.:
www.dynamettechnology.com

Sophisticated Alloys, Inc.: www.alloys.com

For more information:

Screw machine quality (SMQ) bar:
www.ugitechusa.com/pdfs/newds/smq_linesheet.pdf

Sputtering: www.angstromsciences.com/technology/sputtering-technology

Electro slag remelting: <http://web.ald-vt.de/cms/en/vacuum-technology/systems/esr/>

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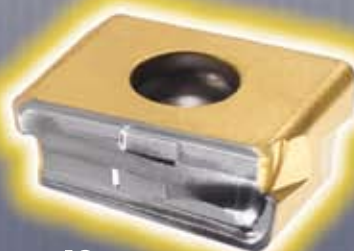
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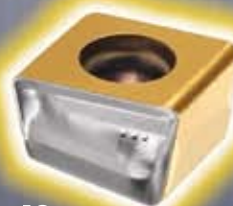
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THE FOLLOWING ARE COMPANIES WHO
HAVE GIVEN INFORMATION ON
3-AXIS LATHES

product focus

Each month, *Today's Machining World* works to help you understand how the precision parts marketplace works, what's available in the industry, and how you can use available resources, as well as knowledge, to run a more efficient and effective shop. In every issue, we'll feature a product category and focus on equipment key to remaining competitive in our marketplace.

A machine axis is commonly defined as the travel direction of the workpiece (usually Z-axis) and either the longitude/latitude direction of the cutting tool (usually X and Y axis). These are considered the "cutting axis" which vary from builder to builder. Some builders use an assortment of different alphabetized axes depending on the part process of their equipment. Some include a "non-cutting" axis such as an "A-axis" that opens or closes a chuck or workholding clamp. A 3-axis machine (either Mill/Drill) consists of a solid workpiece machined by table movement (table back/forth X axis, table in/out Y axis, and table up/down Z axis).

Miyano Machinery

The BND-51SY2 from Miyano Machinery is a twin spindle compact turning center that features a single 3-axis turret (X, Y and Z) as well as a programmable subspindle and two programmable C-axis spindles. It has a maximum bar capacity of 51mm (2.0).

A Y-axis for machining is standard with the BND-51SY2. The CNC program moves the turret along the Y-axis slide to perform more complex milling and parallel hole drilling/tapping operations when the optional live tools are used. This assists the BND-51SY2 in performing secondary machining operations. The BND-51SY2's tooling system also contributes to its versatility and ability to complete parts in a single setup. The main turret holds tool holders in both directions, and all of the twelve tool stations are capable of using live tools. Double-tooling allows up to four tools to be mounted on each station, expanding the maximum number of available tools.

For more information please contact
Miyano Machinery USA at
630-766-4141 or visit
www.miyano-usa.com.

Doosan Infacore

Doosan Infacore's Puma 280LM horizontal turning center features a 12-station, radial BMT turret and live tooling. The Puma 280LM machines complex geometries in a single chucking. Its elongated bed accepts parts up to 16.6" diameter and 40.6" long. Bar capacity is 3". Its slant bed design enhances rigidity, allows easy access to tools, chucks and work pieces, and improves the flow of chips and coolant. Torque tube construction eliminates torsional stresses, and provides a through-the-casting conduit for cool air. The heavy-duty, 12-station turret BMT provides 0.0005 deg. repeatability, longer tool life, and mirror finishes. Next-station indexing is 0.15 sec. A non-lifting turret design prevents chips from reaching the coupling.

A 30 Hp motor drives the spindles at speeds up to 3,500 rpm and generates 461 ft-lbs of torque. The Fanuc 21iTB controller has an embedded Ethernet function, allowing easy exchange of NC programs, tool offset data, and system parameters between the controller and a personal computer.

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



Kitako

Kitako has added the HS4200i four-spindle CNC lathe. The Kitako HS4200i boasts x-axis gantry loading feed rates of 6,700 ipm. Operating like a pallet changer on a machining center, parts are transitioned in and out of the machining zone in as little as .8 seconds each. The HS4200i's four spindles are mounted in a horizontal, square pattern in a large carrier drum. Spindles are generally partnered as pairs so as the carrier is indexed 180 degrees; two spindles rotate to the machining area as two spindles move out for loading and unloading. The two spindles in the machining zone along with the respective slides and turrets work simultaneously as well

as independently. This dual-slide flexibility offers a variety of part processing methods including The main spindles of the HS4200i are hardened, precision ground and supported by accurate double row cylindrical roller bearings and angular contact bearings. Box slide-ways on both the X-axis and the Z-axis can achieve high chip removal rates.

For more information, contact SB Machine Tools at 847-882-9600 or visit www.sbmachinetools.com.



Mori Seiki

Mori Seiki has developed the NL2000SY, which features a milling motor inside the turret directly coupled to the milling tool. This patent-pending design reduces the transmission losses and inherent vibration associated with competing designs, which use a series of gears and belts to provide a milling feature. The direct-coupled milling motor reduces tool spindle acceleration time by $\frac{2}{3}$ and diminishes vibration and noise by $\frac{1}{2}$. Additionally, the NL2000SY's box way construction reduces vibration and increases rigidity, resulting in greater cutting depth and feed rates.

For more information, please contact Mori Seiki at 847-591-5400 or visit www.moriseiki.com.

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product focus



Haas Automation

The new SR-200 Sheet Router from Haas Automation, Inc., is a lighter-weight, gantry-style, 3-axis CNC machine with 148" x 76" x 8" (xyz) travels. It easily accommodates 6' x 12' sheets of material, and accepts ISO standard G-code programming through the Haas CNC control.

The router comes equipped with a 24,000-rpm, 5-hp (continuous) 30-taper spindle for cutting and drilling various plastics, sheet metals and other light materials. An optional 10-pocket automatic tool changer is available for unattended operation using multiple tools. The open-frame design of the SR-200's steel-beam base allows users to design their own table and fixturing specifically to meet their individual needs. The overhead gantry assembly travels the full length of the fixed table on precision, low-friction linear guides. Powerful brushless servomotors on all axes produce high-speed rapids (up to 2,000 ipm in X and Y) for fast cycle times.

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

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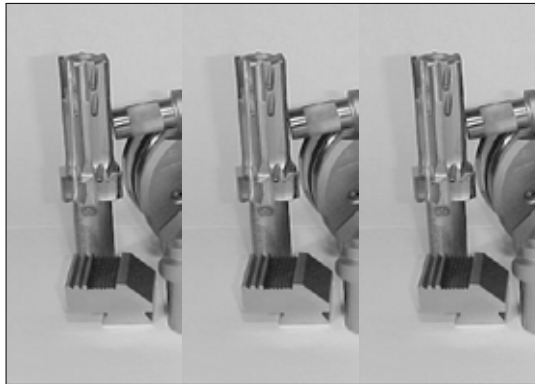
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Tsugami (above)

The new Tsugami SS 32 offers 32 mm capacity, and also offers users a modular tool zone, increased capability over previous gang type models, and a roomier tool zone for easier setup. The SS-32's standard main spindle configuration includes seven turning tools, five cross rotary tools, and five ID tools, while the standard sub spindle setup includes four ID stations, two face drills and two cross rotary tools. Quick changes to the configuration of main and sub spindle cross rotary, ID, and turning tools can be made. Thread whirling, polygon turning and angular face drilling operations are possible with an adjustable face tool attachment. In addition to these attributes, the SS 32 comes with CAD/CAM software.

For more information on Tsugami's new SS32, please visit www.tsugamiusa.com.

product focus

Ganesh (below)

Ganesh's CYCLONE-25 CS is a 7-axis sliding headstock CNC Turning Center with a counter spindle. Armed with up to 27-cutting tools and the ability to do simultaneous work with the main spindle and the counter spindle, the Cyclone-25 CS allows you to complete your parts in one setup. Do front end, backend, turning & milling work all on one setup. It features a full C axis and a full Y axis. The CYCLONE-25 CS configuration also allows for shorter cycle-times because the Counter Spindle can work simultaneously with the Main Spindle. The CYCLONE-25 CS does not require the use of ground barstock. You get a lot of precision production capability for only \$99,900.00.

For more information, please contact Ganesh at 888-542-6374 or visit www.ganeshmachiney.com.



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Tornos (right)

Tornos has introduced the Sigma 20 BioPak, a sliding headstock turning center featuring a thread-whirling capability on the main or counter spindle, making it possible to eliminate secondary finishing operations. Designed with a done-in-one philosophy in mind, the machine can hold up to 14 front and 8 back working tools, all of which can be loaded in a single setup.

The Sigma 20 BioPak boosts faster cutting speeds and the ability to simultaneously turn parts on both spindles. Tool life has been improved, with the ability to turn up to 2,500 titanium parts without breakage. The machine possesses the ability to machine to the bottom of very small threads and blind holes. The Sigma 20 BioPak contains everything required to turn medical parts, eliminating the need for tooling and accessory decisions.

For more information please contact Tornos at 630-812-2040 or visit www.tornos.us.



KSI Swiss (left)

KSI Swiss, Inc. features the SQC series machine, which comes fully loaded with 9 live tools, 22 standard tools, C-axis both spindles, a dual path 18iTB control, all Fanuc electronics and motors and a 2 year Fanuc warranty. KSI Swiss, and HJC international have entered into a joint venture. This new resource will allow KSI Swiss to improve current design, launch new products with even more value and speed to its customer's floor. KSI has also launched a new value pricing structure, new sheet metal design, as well as a new color scheme for 2008.

For more information, please contact KSI Swiss at 952-564-3290 or visit www.ksiswiss.com.



product focus

DMG Chicago (below)

The new DMU 40 monoBLOCK® Universal Milling Machine offers 5 axes in the standard version and up to 200 percent higher dynamics in the rotary axes. Features include a compact design, the milling head with a B-axis, standard hydraulic clamping for 5-axis machining and the possibility of machining with negative angles. High traverse speeds and accelerations in all linear and rotary axes are added to the process.

The DMU 40 monoBLOCK® offers a work area of (X,Y,Z) 450 x 400 x 480 mm and a milling head with a B-axis combined with the CNC rotary table in the standard version. The core of the DMU 40 monoBLOCK® is the milling head with a standard B-axis that operates via a hydraulic clamp. The drive of the B-axis operates with a bevelled, serrated, pre-stressed dual cog wheel. The swivel range of the B-axis complies with the installed spindle options, whereby all constructions basically make processing with a negative angle possible. As with the standard spindle with power at 15 kW, a torque of up to 130 Nm and 12,000 rpm rotational speed, and as with the 18,000 rpm spindle (also in the SK 40 design), the swivel range averages 125° (+30° to -95°).

For more information, please contact DMG Chicago at 630-227-3927 or visit www.dmgamerica.com.



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product focus



Miyano Machinery (above)

The BND-51SY2 from Miyano Machinery is a twin spindle compact turning center that features a single 3-axis turret (X, Y and Z) as well as a programmable subspindle and two programmable C-axis spindles. It has a maximum bar capacity of 51mm (2.0). A Y-axis for machining is standard with the BND-51SY2. The CNC program moves the turret along the Y-axis slide to perform more complex milling and parallel hole drilling/tapping operations when the optional live tools are used. This assists the BND-51SY2 in performing secondary machining operations. The BND-51SY2's tooling system also contributes to its versatility and ability to complete parts in a single setup. The main turret holds tool holders in both directions, and all of the twelve tool stations are capable of using live tools. Double-tooling allows up to four tools to be mounted on each station, expanding the maximum number of available tools.

For more information please contact Miyano Machinery USA at 630-766-4141 or visit www.miyano-usa.com.

Mazak Corporation (below)

With advanced integral spindle/motor technology, spindle output on the NEXUS QTN 250-II MSY is 35 Hp, 4,000 rpm on the main turning spindle (10-inch chuck) for heavy-duty metal removal and high-speed cutting of aluminum and other non-ferrous materials. The second opposed spindle has a 6-inch chuck size, 15-Hp output, and 6,000-rpm maximum spindle speed. The rotary tool spindles for milling feature 7.5-Hp output and 4,500-rpm maximum speed. Rotary tools and fixed turning tools alike can be mounted at any position of the 12-station drum turret, and quick-change toolholders can be loaded or unloaded with a single turn of a wrench.

A workpiece can be quickly transferred between the first and second headstock to complete machining operations, front and back. Rapid traverse in the X axis is 1181 ipm, 826 ipm in Y, and 1299 ipm in Z. Single-step 12-tool position turret indexing time of 0.2 seconds per position minimizes idle time, which increases productivity. Another benefit of the NEXUS QTN 250-II MSY is the "Tool Eye" automatic tool presetting arm. Simply bring the tool tip into contact with the Tool Eye, and offset of tool nose position, tool measurement, and data registration are done automatically.

For more information, visit the Mazak website at www.mazakusa.com.

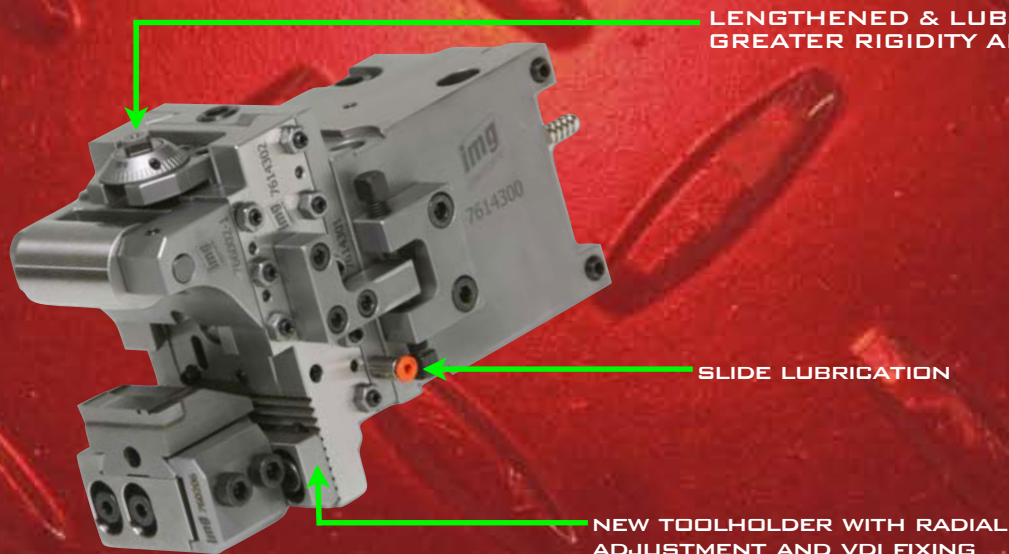


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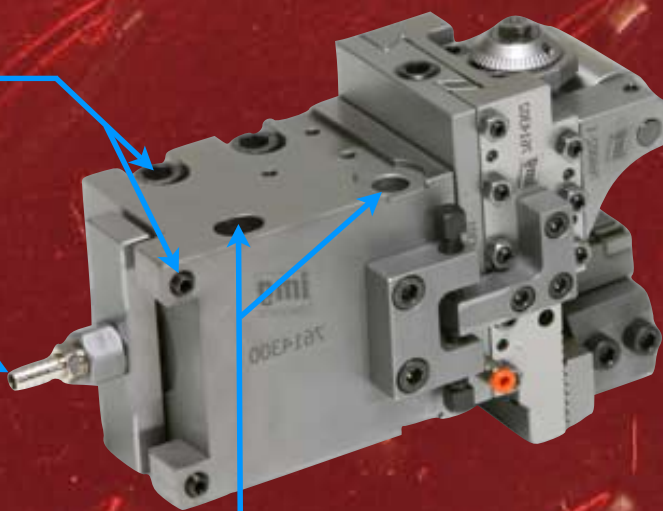
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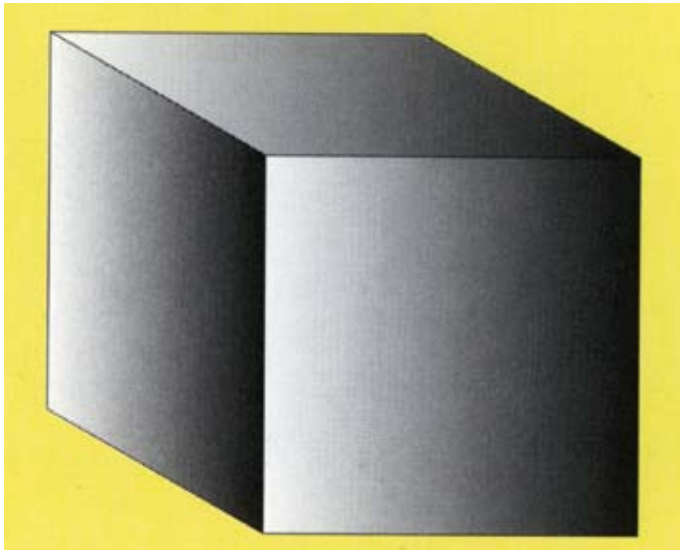
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The cube has many more rotational symmetries than a two-dimensional figure. Can you find them all?

Pattern 30

The number 2,520 is divisible by 5 and 10. But since all 5 of the numbers are single-digit, 10 is excluded.

So the third number must be 5. Adding the known numbers (8+1+5) gives us 14. Since 30-14=16, the total of the remaining two numbers must be 16. Multiplying the known numbers (8x1x5) gives us 40. Since 2,520/40 = 63, the product of the two remaining numbers must be 63. Only 9 and 7 can be added to make 16 and multiplied together to make 63, so the answer is 5, 7 and 9.

$$\text{Yellow} + \text{Orange} + \text{Red} + 1 + 8 = 30$$

$$\text{Yellow} \times \text{Orange} \times \text{Red} \times 1 \times 8 = 2,520$$

Who patterned it correctly? (We had so many we couldn't fit locations in! Please forgive us if we missed someone):

Adam Doughty of Wave Armstrong Venture; John Mandell of Point Technologies; Manuel Martinez of Horst Engineering; **Danielle Allen** of Motoman, Inc.; Bruce Renwick of NAFCO; Greg Tetrick of Cass Screw Machine Products; John Wallenburg of Double HH Manufacturing; Jason Tepp of S & S; John Tackes of Delta Power; Cara Bradshaw of Midwest Screw Co.; Larry Moody of Engineered Production Equipment; Abdul Khatri of Kamet Manufacturing Solutions; Michael Perry of Peterson, Inc.; Steve Richards of Yamazen, Inc.; Ralf Mauthe of Abbott Workholding Products; Ron May of Hunter Engineering Co.; John Seefus of Rosene Machine Co.; Daniel K Schlepp of Wacker Corporation; Kurt J Munn of Team CNC Co.; Jim Mishek of Vista Technologies; Louis Bertoletti of Calumet Screw Machine Products; Steve Arora of National Distribution; Chris Nelson of Arc Technologies; Dan Horn of Contour Wire; Kristopher Wilson of Engineered Controls Intl.; David Gray of Sun Machinery Co.; Nancy Weber-Zehren of Weber Systems, Inc.; Dave Parker of USA Tool; Gil Durbin of Durbin Machine; Derek Lord of Precision Machine; Jeff Kovalenko of Key Machine; Ron Smith (retired) of Kaddis Manufacturing; Asher H. Sharoni of BAR; Pat Muscarella of PLM Teknologies; David Smith of Electroschwitch Electronic Products; Milan Markinkovic of Vallorbs Jewel Co. in; Mike Droitcour of Droitcour Co; Douglas Edwards of BorgWarner Emissions; June Roesch of the PMPA; Sean Brazill of Guide Engineering; Rob Klancnik of Universal Automatic Corp.; Kim Gardner of Comco Inc.; Bill Todd of Michigan Rebuild and Automation; Rocco Sarro of MAHLE, Inc.; Erik J. VanDusseldorp of Omnitech Systems, Inc.; Mike McCaul of Absolute Turning & Machine; Ian Vivero of the Wilson Arms Co.; Steve Sutton of Craft Precision; Larry Monahan of Edelbrock Shock; Thomas Garvey of Chemglass; Warren Judd of P.N Condit; Pat Huff of Western Machine Tool; Al Kasper of Ideal Carbide Die; Tom Lozier of D & S Machine; Al McBride of Threading 101; Andy Maliszewski of Camcraft; Patrick Fitzpatrick of Amerikam; Uli Kuster of Blaser Swisslube; Paul Zysk of Detroit Automatic Tooling; Gary Sewell & Lynne Weixel of G S Design; Chris Morgan of K & M Precision Products; Minesh Patel; Alden at Orion Precision Machining; Jim Brown of Apogee Machining Services; and Rich Omdahl of WARD Performance.

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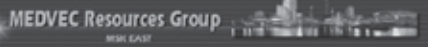
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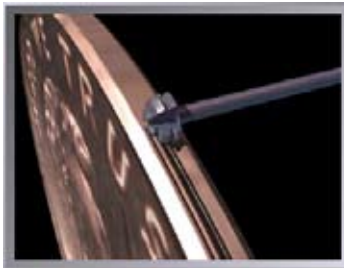
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Bursting Bubbles

I have always savored bubbles. Not the Bazooka or Topps variety, but the market manias, the panic buying we've seen so often since the tulip frenzy of the 1520s in Holland.

With better communication tools like TV and the Internet, we are getting more frequent bubbles. We've seen two humongous bubbles in 10 years with the dot-coms and the residential real estate. So where is the next ridiculous spasm of excess that we will look back on as a bubble? Here are a few ideas.

How about starting pitchers in Major League Baseball? Today a decent starter who is a free agent is worth about a million dollars per victory. A 14-game winner like Mark Buehrle of the Chicago White Sox recently signed for \$14 million per year for five years. Carlos Zambrano of the Cubs signed a long-term contract for \$18 million a year on his way to an 18-victory season. This strikes me as gross

"I cannot tell you when the Google bubble will burst, but April is tulip time in the Midwest."

overvaluing of starters when the middle relievers, who often take over in the fifth and six innings, make a relative pittance.

Billy Beane, the brilliant general manager of the Oakland A's agrees, as he routinely trades away his potential free agent pitchers like Mark Mulder and Danny Haren, and allows a Barry Zito to sign with his Bay area competition, the San Francisco Giants, for silly money and a long-term contract.

One reason I call starting pitching contracts a bubble is the strong likelihood a starter will blow out his arm. Cris Carpenter, Josh Beckett, Kerry Wood, Rich Harden, Freddie Garcia, Rick Ankiel, and Francisco Liriano are a few of the great arms that have recently frayed.

Starting pitching in the Big Leagues, I call it a bubble.

Another bubble is on Wall Street. When I hear that 90 percent of the best and brightest guys from a Dartmouth fraternity are planning to take jobs in the investment banking world for stupid rookie money I call it a bubble. Noah Graff's childhood best friend is finishing up his MBA at Columbia University and is expecting to go to work for an old Wall

Street investment banker when he graduates soon. He worked for them as an intern last summer and they think he has the right stuff to work a 100-hour week and mix well with the other Masters of the Universe. He expects to make around 400 grand with bonuses his first year. After the recent catastrophic losses at Citibank, Merrill Lynch and Bear Stearns on sub-prime mortgage derivatives, this is a bubble waiting to pop.

I'll toss out a few more over-inflated possibilities and I solicit your suggestions.

Oil at \$90 a barrel smacks of excess. The run up has been so swift and the real possibility of 100 mpg cars in five years and pure electric autos in ten makes \$25 a barrel oil in a few years a legitimate option.

Credit card interest rates at 22-25 percent looks like a bubble. With a 5-year Treasury bond under three percent and mortgages under six percent, credit card firms cannot get away with that kind of usury forever. It's a bubble.

The price of a Starbucks latte could well be a bubble as McDonalds attacks them with coffee from Green Mountain Roasters, cinnamon roll hearts and edible breakfasts.

The \$40 audio book at Borders is bubble-like as iTunes hits it with a \$10 download to an iPod.

And then there's Google, which is still a one-trick pony, despite throwing money at a myriad of other ventures. I think that their search experience is stinko and the merit of their advertising is hugely overvalued. Sergey Brin and Larry Page are Emperors clothed in bubble wrap.

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