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# Today's Machining World

THE MAGAZINE FOR THE PRECISION

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June 2010 Volume 6 Issue 5

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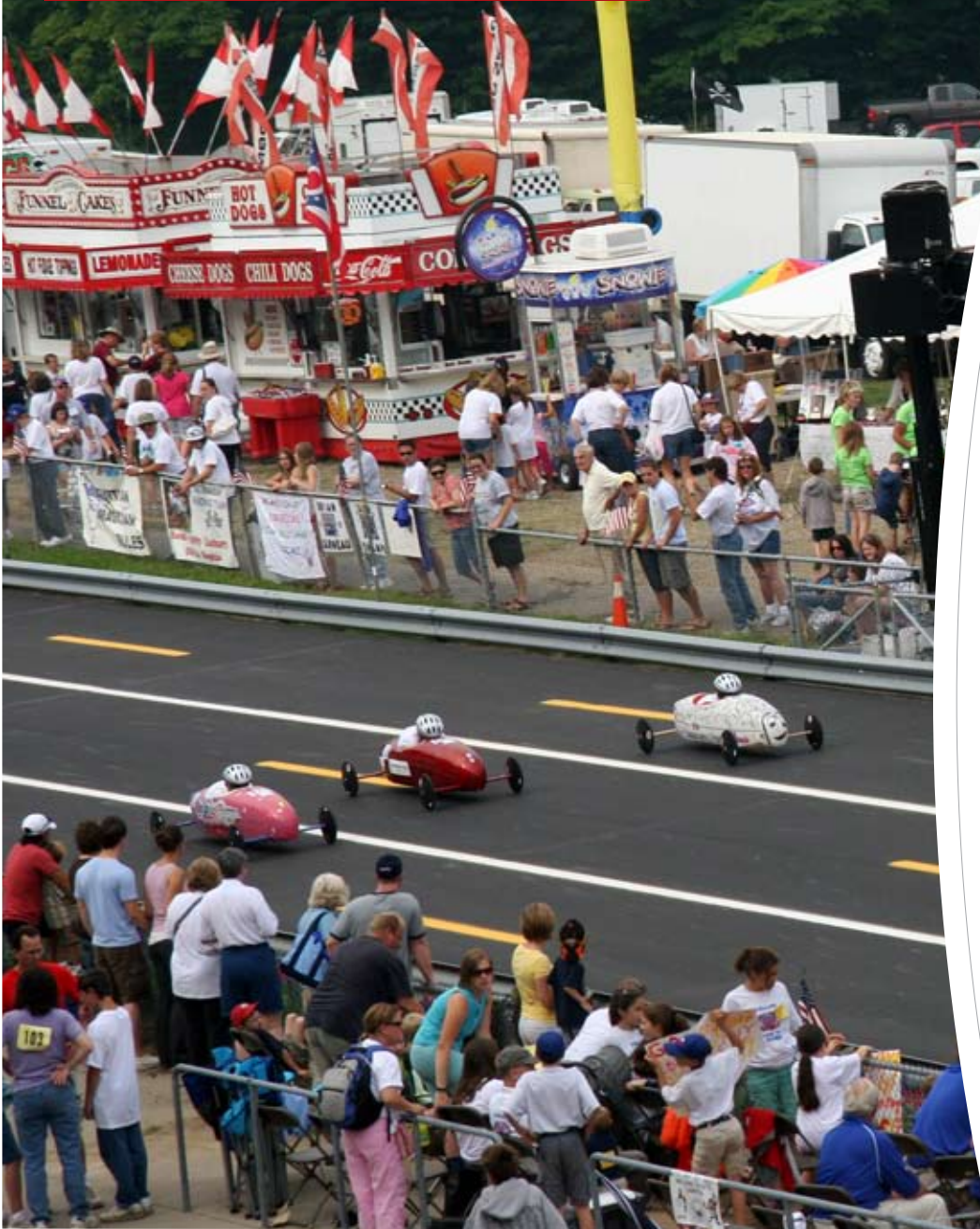


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**Lloyd Graff** is the founder and owner of *Today's Machining World*. He also co-owns Graff Pinkert and Company—a machinery trading firm—with his brother, Jim. He has been around metalworking equipment since he was a child, when his father, Leonard, would bring him to the screw machinery factory he owned. *Today's Machining World* developed out of his love of writing and his fascination with buying and selling used machinery. In his spare time he watches TV and worries a lot.



**Mary Ethridge** is a freelance journalist in Akron, Ohio, where she's working hard to get over the Cleveland Cavaliers loss to the Boston Celtics in the NBA playoffs. When she's not busy producing a movie with Corbin Bernsen, Ethridge writes for several publications. Her work has appeared in many print and online sources, including *Newsweek*, the *Miami Herald*, the *San Jose Mercury News*, *MSN.com* and her favorite, *Today's Machining World*. Ethridge is a graduate of Princeton University where her classmates included former N.Y. Governor Eliot (Client No. 9) Spitzer and current U.S. Supreme Court nominee Elena Kagan.



**Emily Anaikou**, managing editor of *Today's Machining World*, completed a degree from the Eastman School of Music in French horn performance, a year of service at a Bangladeshi orphanage, training at a Zen Center, and most recently, a stint in the Peace Corps in Benin, West Africa. She was lucky enough to get box tickets to the Cubs versus Sox game at Wrigley Field but arrived just a few minutes before the game and all the seats in the suite were taken. So she sat on a concrete step holding onto the front railing to experience what she enjoys most about baseball, her fellow Cubs fans.



**Todd Toborg**, *TMW's* creative director has nothing but love for the city of Chicago. The summer offers so many options from street fests and al fresco dining, to beach volleyball tournaments and baseball games, of which he plans on enjoying many of. One of his favorite things to do during the summer is participate in the many running races and triathlons that the city and surrounding area has to offer. He is especially looking forward to the Warrior Dash at the end of June because who wouldn't enjoy running through mud, fire and other interesting obstacles. And yes, that is *the* Stanley Cup he is raising.



# Today's Machining World

www.todaysmachiningworld.com

A Screw Machine World Inc. Publication  
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**SUBSCRIPTION/CHANGE OF ADDRESS:** Basic subscription rate: US\$40 for domestic/US\$55 for international.

**Send address changes and/or subscription inquiries to:**  
Today's Machining World, P.O. Box 802, Skokie, IL 60076 or email  
emily@todaysmachiningworld.com

**CPC Publication Agreement Number 40048288**

**Canadian Return Address:**  
World Distribution Services, Station A, P.O. Box 54, Windsor, ON N9A 6J5  
email: cpreturns@wdsmail.com

**Today's Machining World** (USPS 024-909) (ISSN 1945-4643)  
is published nine times a year; January/February, March, April, May, June,  
July/August, September, October and November/December by  
Screw Machine World, Inc., 4235 W 166th Street, Oak Forest, Ill. 60452.

## POSTMASTER:

Send address changes to Today's Machining World,  
PO Box 802, Skokie, IL 60076.

Subscribers may also e-mail address changes to  
emily@todaysmachiningworld.com

Periodical postage paid at Skokie, IL and additional mailing offices.

CPC Publication Agreement Number 40048288

**Canadian Return Address:**  
World Distribution Service, Station A PO Box 54, Windsor, ON N9A 6J5  
or email: cpreturns@wdsmail.com



# editor's note

## The Room Service Soda

I know I'm supposed to celebrate milestone events. I have a lot to celebrate—a 40th wedding anniversary (see “Afterthought”), the marriage of my son Ari, almost two years of life since my quadruple bypass surgery and the 10th anniversary of this magazine.

I feel enormously grateful for all of these gifts and I count my blessings every day, but celebration is something I have not quite mastered.

In an earlier issue I recounted a story that my father Leonard told me as a kid, but I'll retell it now. He was just starting out in the used machinery business and was travelling the Midwest with his partner, Uncle Abe. Abe was a fat, garrulous guy who didn't know a mill from a lathe, but he gave my dad confidence and kept him smiling. My father was focused on the prize and Abe was focused on how he was going to spend it.

One day they arrived in Kalamazoo, bought rolls of dimes, commandeered the yellow pages and phones at a downtown hotel and starting calling local machine shops. They found a fellow who had a Becker milling machine for sale and immediately drove out to inspect it. They bought it on the spot for \$500. This was 1942, World War II was on and machine tools were turning into gold. After buying the Becker they returned to the hotel and my dad called Adams Machinery in Chicago. He offered the machine to Eli Blumberg for \$5000.

Blumberg countered at \$4000 and they settled on \$4500, subject to inspection. My father and Abe felt like millionaires. This was a deal to paint the town for, but they were stuck in Kalamazoo. Abe had the answer.

“Len, we're going up to the room to order two ice cream sodas on room service in the middle of the day.” And they did. They must have been wonderful because my dad told me this story many times. I never tired of listening to it.

My brother Jim and I have shared occasional ice cream sodas along the way, but I doubt they tasted quite as splendid as those Kalamazoo black and whites.

I have worked on my celebration piece for decades, but it doesn't come naturally for me.

In the Yiddish language we have an expression “Kinahora,” which means roughly, “if you think things are good, wait a minute and they'll turn sour.” I've always had a bit of a “Kinahora complex” and I'm bloody tired of it.

This September I'm buying black and whites at IMTS for anybody who'd like to celebrate with me for 10 years of *Today's Machining World* and two years of life after heart surgery.

To the black and white ice cream soda.

Lloyd Graff  
Editor/Owner





## Today's Machining World

forum

### Life Choices

I often wonder why I've spent all these years making parts. Did I just think it was necessary to follow in my father's footsteps? Do I honestly really enjoy coming to work each day and facing the constant dilemmas put forth by this industry? I wonder each day if I had gone into another field of endeavor, would I have been happier? Perhaps I'm just tired and would rather retire to my boat. Then again, I'd probably miss breathing in the fumes from toxic materials and solvents, the constant hum of the compressor, the beat of the machines, the finished product and all the frustration of dealing with people in general. So to coin a phrase, I guess we're just "gluttons for punishment."

Chuck DeLong  
Eastmar, Inc.

### Being the Boss

*Responses to Lloyd Graff's "Swarf" on page 14 of the May issue about Brian Capece, who questioned his choice to be a shop owner instead of an employee.*

Not that doing so is easy, but if a business fails the employees go find a new job. What they may not realize is the owner of that failed business probably lost his life's savings, possibly his house and perhaps his marriage. But at least some of the world's problems were solved with all the taxes extracted from this evil greedy individual who had the audacity to try to operate a business!

Jim Whitney

I have been in the industrial machine shop business for 27 years, and would absolutely not trade it to work for any company. I feel that a business owner has many more tools to get tax deductions than a person working for a W2. I have had eight to 11 machinists through the years and been able to keep them mostly busy. I haven't worked in the shop myself for 20 years, so that is always a fall back position. I would tell Brian to stick with it, he will be better off in the long run.

Pete Goebel

Years ago I heard someone say, the people that own a business are the ones who don't know enough to not own a business, and I thought there may be some truth in that. I think these tough years have taught me to admire those with the guts to take it on. Win or lose, there must be a sense of satisfaction and pride knowing you provided jobs for others, paid more than your debt to help society and had the audacity to take an idea and make it happen. Cheers to the entrepreneurs!

Brian "Dwight" Hoff

You can make a small fortune in the machine shop business—if you start with a large one. It is not what it was 10 or 20 years ago, and it's getting tougher every year. I have been a small shop owner (mostly just myself) for over 28 years, and it now seems that I made the wrong decision. The USA is no longer manufacturing friendly, and taxes, utilities and regulations have a chokehold on all small manufacturers. As a small business (typical job shop with a focus on production turning 1" and under) in upstate N.Y., I am seeing many job and fab shops close and many local customers close or shrink in size, which is scary. The ones that are left are now on net 60, 75 or 90-day payment terms, but I cannot wait three months to get paid. How long can this continue?

Dan K.

### More than One Way

I know this is no big deal—just thought I would throw it out there. I believe there is more than one correct answer for the Missing Numbers puzzle in the May issue. I did not send in my answer, but I work out the puzzles all the time. When I saw the answer to "Who found their numbers?" I was surprised that I had it wrong. So, I checked and re-checked. I only mention this as there may have been submitted answers that were correct and did not receive recognition. I'm in manufacturing engineering, and part of my job is to verify everything the engineering dept. throws over the fence. I guess this carries over into other aspects of my life.

John Adamission  
Bird Electronic Corp.

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

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

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## *The Big Short: Inside the Doomsday Machine*

We all know the 2008 stock market collapse had something to do with sub-prime mortgages and credit default swaps (CDS), and that AIG and Goldman Sachs received billions of bailout dollars. But how it all happened remains a mystery to most of us.

In his new best seller, *The Big Short*, Michael Lewis attempts to clear up the confusion by following three savvy hedge fund investors who saw the crisis coming and placed bets on the market's collapse. Big investment firms had packaged high-risk loans into securities that could be traded and persuaded the rating agencies to give them low-risk AAA ratings. These hedge fund investors saw through the sham and made fortunes on their bets against a market so complex and obscure that almost no one on Wall Street understood it. The following are a few explanations to make sense of the 2008 debacle.

### **What are sub-prime mortgages?**

Sub-prime mortgages are home mortgages, sometimes very large, given to people who can't afford them. These mortgages require little or no money down, have a low "teaser" interest rate for the first two or three years and then adjust.

### **What is a consolidated debt obligation (CDO)?**

Originally, it was a consolidated group of corporate or municipal bonds that could be easily rated. It functioned like a fantasy football league, mimicking the real market, and was traded among the players. Like the commodities futures markets, its volume could be multiplied hundreds of times larger than the real market as long as there were traders to take both sides of the buy/sell arrangement and settle up their bet. One could also buy insurance, a credit default swap (CDS), on these bets.

### **What is a CDS and what is it used for?**

Originally a CDS was an insurance policy that one could purchase to insure against a bond failing. The risk of a AAA corporate bond or a whole group of them in a CDO failing is very low and the insurance was very cheap. However, as

the situation developed the insurance covered CDOs filled with poor risks such as sub-prime mortgages, auto loans and credit card debt, yet the rating agencies continued to rate them AAA.

### **Why did the rating agencies (Standard and Poors, Moodys) do this?**

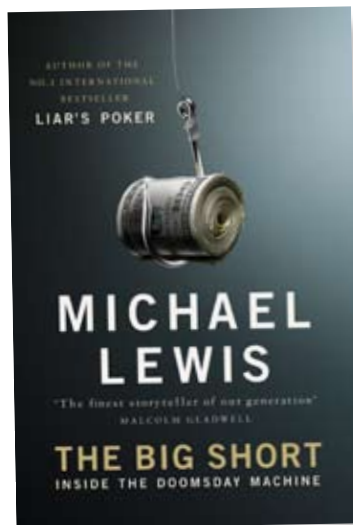
The rating agencies had a huge conflict of interest. Not only did they have no model to rate the creditworthiness of a home mortgage, they took advice from firms like Goldman Sachs, who were creating and selling them. They also did this because they wanted other more lucrative Goldman Sachs business.

### **What did the hedge fund operators who bet against the sub-primes see?**

As early as 2004, a few small hedge fund operators realized that many CDOs were soup bones masquerading as T-bones. They realized that the sub-prime ARMs would readjust heavily in 2007, causing a huge number of foreclosures and the house of cards to collapse. Amazingly, it didn't. Mortgages failed and foreclosures skyrocketed, but the CDO and synthetic CDO markets remained stable. To cash in, the hedge fund operators needed the market to crash.

### **The final worrisome question is—could it happen again?**

Sadly, it's almost a surety. A new term, "A Minsky Moment" was coined following this debacle. Hyman Minsky, a relatively unknown counter-culture economist, wrote 25 years ago that by its nature capitalism is unstable and unfair. Some innovative trader will at some point create a new high-reward, high-risk instrument to captivate the market's collective greed until the bubble bursts. Many Wall Street firms and banks are deemed "too big to fail." The Fed will always bail them out, so Wall Street gets the upside reward while taxpayers cover the downside risk. ⓘ



Comments? You can email Jerry Levine at [jerroldlevine@yahoo.com](mailto:jerroldlevine@yahoo.com)

## The Money Gravitates West

**L**et's connect a few dots. The head of the Russian government, Dmitry Medvedev, is coming to visit Silicon Valley because he wants to build a competitive science center in his country. He hopes to learn something about what makes the Bay area so attractive to the Apples, Googles and Genentechs of the world. Toyota is putting a sizeable investment into electric carmaker, Tesla Motors, and is providing the closed Nummi factory in Fremont, Cal., to make Tesla cars. The DMG/Mori Seiki collaboration is probably going to manufacture machine tools in Davis, Cal., near Sacramento.

While the California government may have to pay people with IOUs, the state is still a magnet for investment and young people looking for opportunity. With Wall Street's reputation muddled up by financial scandal, the best and brightest are turning to the left coast again for opportunity. This is a good thing. In the mid 2000s it seemed like every smart kid wanted to trade derivatives on the Street. A lot of young people actually wanted to be the next Gordon Gekko.

The pendulum has swung the other way today. Apple, Google and Genentech are hiring tons of people now. Soon Tesla and DMG/Mori Seiki will be in full swing. The momentum is moving west again. The economy is turning toward making things in the highest labor market in the country. Money gravitates to energy and creativity. The magnetism of northern California is strong right now.



**Right:** Apple Inc. headquarters in Silicon Valley, Cal.

Photo courtesy of Flickr



**After the Memorial** Day weekend I posed the question, “Should we be economic patriots?”

When I wrote the car buying stories for the April and May issues, I took heat from readers who felt I was derelict in not coercing my sons to buy American cars rather than Hyundai Sonatas.

It turns out that the Sonatas are made in Montgomery, Alabama, and have more than 50 percent American content. Hyundai spent \$1 billion to build a factory, and the workforce is almost entirely Alabaman, but ultimately my sons’ buying decisions were based entirely on the products and price. Economic patriotism had nothing to do with it.

Do you buy a Haas vertical machining center because it is American or because it is the best machine for the money? Do you pass on bananas because they come from Honduras? Do you shun an iPhone because it was made in China at a FoxComm plant that has had 10 suicides among its workers this year? Where does your economic patriotism start or end?

Personally, I am not an economic agnostic. I have never bought a German Mercedes or BMW because of the Nazi atrocities of 70 years ago. But considering most of the taxis in Israel are Mercedes, I know that particular economic discrimination is now ridiculous.

Many of my long time screw machine customers have shops in China now. Are they economic Benedict Arnolds?

I recently talked with Joe Arvin who owns a big aircraft gear company near Chicago. He considers himself an economic patriot because he will not put up a plant in China, even though his clients are pushing him to do it.

Do you think our soldiers died for Ford or for the economic and political freedom to buy oil from Saudi Arabia to drive a BMW to the sushi restaurant?

**Here’s the good news** and bad news. Bad news—75 percent of Americans are overweight. We’re French frying ourselves to death. Good news—it’s going to be great for the precision machining business.

Dr. Uli Sutor, key account manager at DMG, gave an illuminating talk at the first day of DMG/Mori Seiki’s Innovation

Days, May 24, at its national headquarters in Hoffman Estates, Illinois. The event was a combination sales and networking event for the collaboration between two of the biggest players in the world machine tool business.

Sutor’s presentation discussed the opportunities in the medical machining business. As he sees it, orthopedics, primarily knee hip and spine, are the biggest growth segment. The passage of Obama’s health care plan in the U.S. will expand the area even faster. According to the literature it takes 40 minutes to do a knee replacement—20 if there’s no insurance.

A person who is at least 30 pounds overweight is three times more likely to need a knee or hip replacement than a trim person. It’s easy to see that the obesity trend is the friend of orthopedic surgeons and hospitals.

Sutor mentioned the number of bone screws and plates produced in the world. His number astounded me—200 million orthopedic screws and plates last year.

Last year 1.1 million knees and hips were replaced in the U.S. The expectation is 4.6 million per year by 2030, partly because a joint replacement lasts 10-12 years, so many people will need redos if the obesity trend continues.

Dr. Sutor gave the presentation from the DMG point of view. He employed a lot of data from the European perspective. One piece of information I found valuable was that “turbo whirling” is now being made by DMG for bone screw threads. The process employs linear technology, which uses no gears or belts and provides a superior surface finish. This is particularly valuable if a doctor will eventually remove the screw from the repaired joint.

**The \$64 billion dollar** question for the economy is, what will happen to employment? What happens to unemployment is related, but the two numbers do not always shift in tandem.

We are seeing a strengthening in manufacturing now and the overtime strategy seems to be waning. Productivity stats are still impressively bullish but they are starting to level off. You can only squeeze so much juice out of the lemon. The Labor Department acknowledges that people are being hired in

manufacturing and my anecdotal evidence confirms this.

New construction is still pathetically soft in most markets, but we are seeing a weird anomaly in the most devastated markets of Nevada, Arizona and Florida. Builders are starting to build houses. According to a recent article in the *New York Times*, the most devastated housing markets are starting to get hot. It appears that some buyers just want a new home and hungry builders with low cost lots are providing value. Buying out of foreclosure or employing a short sale is such a hassle it is pushing buyers to new. According to the article, individual buyers are losing out to out of state buying syndicates who are picking up large collections of foreclosures at cheap prices and paying cash. Perhaps the dreaded foreclosure overhang will prove to be similar to a mild flu season, which bodes well for employment—but not necessarily unemployment.

Juan Williams, the astute Fox and NPR commentator, recently did an interesting piece on the composition of today's long term unemployed. The stubborn unemployment is in older, white, blue-collar workers. He compares this demographic slice with black factory workers laid off in the early 1980s downturn. That group was very slow to get new work, saw families dissolve and higher levels of drug abuse and births out of wedlock. According to Williams, we are seeing similar trends now from the blue-collar, white, male demographic.

When I talk to people in the machining world I often hear confirmation of this employment issue. Company owners do not necessarily want to retrace their steps on new hiring. They may be looking for different skills and younger workers who are willing to start at a cheaper wage and be less insistent on health insurance. Immigrant workers with a strong work ethic may look more appealing than a 50-year-old former union guy who has been out of work for nine months.

I think the recovery of 2010 will be a little different than past rebounds. Companies will be hiring, but not necessarily rehiring. Unemployment will be sticky, but millions of people will be finding jobs.

**The hot movie at the** Cannes Film festival was *Wall Street: Money Never Sleeps*, the sequel to Oliver Stone's *Wall Street* (1987). Michael Douglas plays Gordon

Gekko again, who returns to the Street after spending eight years in prison. Art imitates reality. Reality imitates art.

I just finished Michael Lewis' brilliant new book, *The Big Short: Inside the Doomsday Machine*, about the appalling fraud among the big shooters on the Street during the subprime fiasco. He could have used the same title he used for his last best seller, *The Blind Side: Evolution of a Game*, because of the duplicity and stupidity of the bond packagers and the rating agencies who blind-sided the government regulators and most investors.

In my callow youth I thought Wall Street banks were conservative stewards of investor money. *The Big Short* exposed them as crooked, dumb, cynical casino operators who lacked the scrutiny of Las Vegas.

I think the civil suit against Goldman Sachs was a preliminary probe by the SEC. Goldman's management probably saw it as a political stunt to help the Obama 2010 Congressional election effort. But Lloyd Blankfein's poor showing in Washington seems to have emboldened the Feds and New York's Attorney General, Andrew Cuomo, to keep the pressure on. I'm sure Obama and Cuomo have read Lewis' book, which lays out the derivative conspiracy with dramatic clarity. The big players—Morgan Stanley, Bank of America (Merrill Lynch), Bear Stearns, UBS, Goldman, AIG—are the names under scrutiny.

I really think we are going to see criminal indictments and "show trials" down the road. Lewis' number one bestseller lays out the trail like dropped breadcrumbs.

There will be a few Gordon Gekko's headed to the penitentiary this time around, but unless we shut down the taxpayer funded Wall Street casino, it will all happen again in a few years.

## Industry Scuttlebutt

- I understand that some Japanese machine tool builders are running painfully short of inventory in the United States. Sales in Japan are up 260 percent year to year. The American distributors under-ordered last year and the Japanese factories slowed production, while huge Chinese orders flooded in several months ago. Six hundred CNC Swiss lathes were sold by one builder and 285 machining centers went to another for cell



“I don’t always read magazines.  
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*Today’s Machining World*.”



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“Stay reading my friends.”

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## 2010 EDITORIAL CALENDAR

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

# swarf

phone dies, swamping the companies. Now American demand is perking up, and the cupboards are bare. It will be interesting to see if ¥92 to the dollar will justify higher prices at IMTS.

- The liquidation of Fadal machines in California has surprised the doubters. The liquidator, Machinery Network Auctions, has sold over 100 machines and has about a dozen left.

- We hear that companies like Caterpillar, Deere and Case are still starving for inventory. They are pressing their vendors hard and their projections for next year are even more bullish.

- On June 28 Cy Zvonar of Industrial Machinery Corporation of Milwaukee turned 99 years old. He still comes to work every day wearing a suit and tie like he has since 1939. It's an incredible coincidence that three generations of Zvonars, Joseph, Cy and Jim, were all born on the same day of the year.

- The authorities that operate McCormick Place in Chicago, where IMTS will be held Sept. 13-18, have awakened to the threat posed to its convention business by Orlando and Las Vegas. Millions of dollars will soon be flowing into marketing, but unless the total expense of exhibiting and attending is addressed, I can see the day when IMTS leaves the Windy City.



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**Elena Kagan has** impressive credentials to become a Supreme Court Justice, but her nomination brings up some interesting questions about the composition of the Court. If she is confirmed there'll be three Jews and six Catholics on the High Court—no Protestants, Buddhists, Muslims or evangelical Christians.


Four of nine Justices will be from New York city if Kagan gets in, one from each borough except Staten Island.

With Kagan's appointment all nine Justices will have gone to either Harvard or Yale Law School. There will then be three women on the High Court, which would be a record number.

Kagan has written about the confirmation process, criticizing the charade of candidates for the bench who dance around their beliefs about crucial cases which the Court will hear. Now that

she's the one in the hot seat we will see if she's as candid herself.

Ms. Kagan clerked for Abner Mikva who was one of Barack Obama's early mentors. She was brought to Harvard by Larry Summers, who is head of Obama's National Economic Council. She also worked in Bill Clinton's White House with Rahm Emanuel. This woman has great connections.

The only drama I anticipate is that a senator will ask her about her sexual orientation. If Ms. Kagan is gay, as has been speculated, it may come up in testimony about cases of special interest to gays. Personally, I hope she addresses the whispers. I would like to see a gay woman on the Court—especially a Court that begs for diversity. 

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# The Line on Linear

linear motors

Linear motors produce fast, precise, straight-line motion without ball screws or other additional mechanisms. This can be a big advantage for many applications, including machining.

A linear motor from Siemens.  
Photo courtesy of Siemens Industry, Inc.

# how it works

BY BARBARA DONOHUE

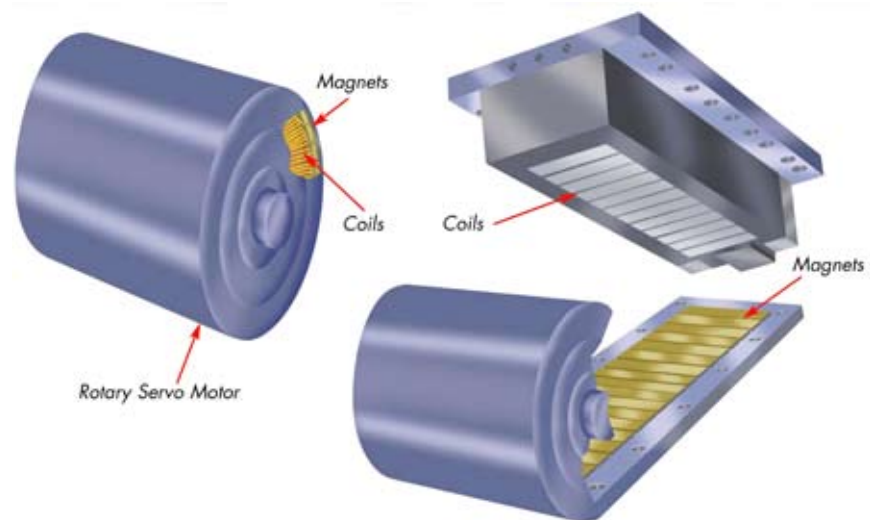
**E**lectric motors go around and around, right? Not necessarily. About a hundred years ago, the idea of a linear motor was conceived—a motor that directly produces straight-line motion, rather than rotary motion. Over the years, inventors and engineers developed many different types of linear motors, suitable for many kinds of applications. You’ve probably seen machine manufacturers touting products with “linear” in the name, as these unusual motors have begun making their way into machine tools in recent years.

## How a linear motor works

The familiar type of rotary motor depends on magnetic attraction to make the shaft rotate. Magnets located around the circumference interact with the magnetic field produced by windings affixed to the shaft, which pulls the windings around and makes the shaft turn.

You can think of a linear motor as the same thing—magnets and a coil. But they are “unwrapped” to lie flat. There is a fixed component (called the track, platen or secondary) and a moving component (called the forcer or primary).

In this type of linear motor, the track, or fixed component, contains a series of permanent magnets laid side by side along its length, and the moving component contains electrical windings. When current flows through the windings, the resulting magnetic field engages with the field from the magnets in the track, causing motion. You can increase the length of the motor simply by adding more fixed sections. In one machining application, the linear motor was 100 feet long.



**Above:** Unrolling a rotary motor to show how it relates to a linear motor.

Illustration courtesy of Sodick, Inc.

Manufacturers build many types of linear motors, large and small, with different technologies and capabilities. MicroMo Electronics, Inc., Clearwater, Fla., produces a tiny linear motor that uses piezoelectric “legs” that essentially



# how it works

walk the output shaft back and forth with nanometer resolution. Baldor Electric Company, Fort Smith, Ark., manufactures dual-axis linear motors that position the moving component anywhere on a rectangular platen, across both the length and width.

The linear motors designed for various types of machine tools are typically linear servomotors. For some applications—most often the X and Y axes on a vertical machining center, for example, or all three axes on a laser cutting machine—linear motors provide distinct advantages over the usual rotary-motion-into-linear conversion through ball screws or other devices.

Each model of motor has its own dynamic and force characteristics. When a single motor generates insufficient force, adding a second moving component on the same track can increase the load capacity, said Steve Czajkowski, application engineering manager, motion control business—machine tools; Siemens Industry, Inc.; Elk Grove Village, Ill. This is similar to connecting two rotary motors to a single shaft to produce higher torque.

## The operating characteristics of a linear motor

Linear motors bring several advantages to an application:

- High traversing speeds
- High acceleration
- High precision
- Elimination of mechanical transmission elements, such as ball screws
- Long life: only one moving part, and, because the motor elements don't touch, no need for lubrication

Linear motors directly produce the back-and-forth linear motion required by machine tools and many other applications. Where a conventional rotary motor is used to drive a load in a linear motion, some kind of mechanism is required to transform the rotary motion of the motor shaft to the desired straight-line motion. A mechanism such as a linear ball screw, rack and pinion assembly or linkage can do the job. Each type of mechanism places one or more components between the motor and the load. Each component deflects to some degree, and everywhere components connect there is a potential for backlash.

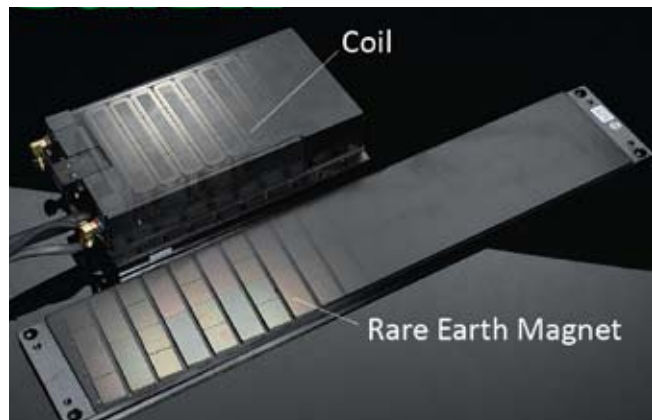
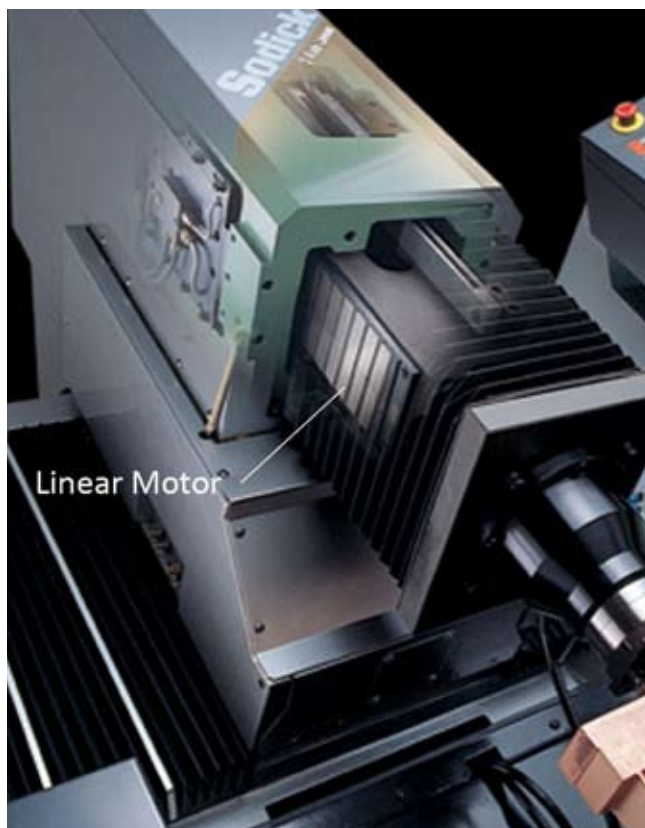
With a linear motor, the moving component moves the load to the desired position. A linear encoder, sometimes called a tape scale, reads the location precisely. According to Siemens literature for 1FN series linear motors, "If suitable

**Left:** A sinker EDM machine showing a linear motor in use.

Photo courtesy of Sodick, Inc.

**Below:** The parts of a linear motor. The moving component is labeled "Coil." The base contains the magnets, as shown. High-strength magnets used in linear motors contain chemical elements such as neodymium, which are in the family of elements known as the rare earths.

Photo courtesy of Sodick, Inc.



**Right:** The Mazak F3-660L horizontal machining center uses linear motors.

Photo courtesy of Mazak Corporation.



measuring systems are used and the temperature conditions are appropriate, the motors can be positioned in the nanometer range.”

Because linear motors can accelerate and move very quickly, the controller needs to be able to handle such rapid movement. “It’s not just the motor components. It’s the control,” as well, said Dave Thomas, president of Sodick, Inc., Schaumburg, Ill. “You can add a linear motor to a machine, but if your controller can’t handle it, it loses [some of its] advantages.”

“With a traditional ball screw or rack and pinion there is a good deal of mechanical stiffness,” or resistance to movement of the load, Czajkowski said. A linear drive, by contrast, depends on the control system to realize constant position. To test dynamic stiffness, the mass is struck and the axis deflection measured as a function of the force of the hit. This can be compared to the force of a cutting tool coming into contact with a workpiece. The lower the deflection for a given external force, the better.

The linear motors are fast, and are especially good for use where the table needs to be traveling fast, aerospace and automotive applications, for example, said George Yamane, marketing manager, Mazak Corporation, Florence, Ky. The force the linear motors are capable of providing is less than a conventional drive setup can achieve, so they are best suited for applications with lower cutting forces, he said.

Because linear motors accelerate and move so fast, they can cut machining time if the tool needs to move frequently from place to place on the workpiece. Even short distances add up, Yamane said, and high acceleration and rapid traversing can save considerable time.

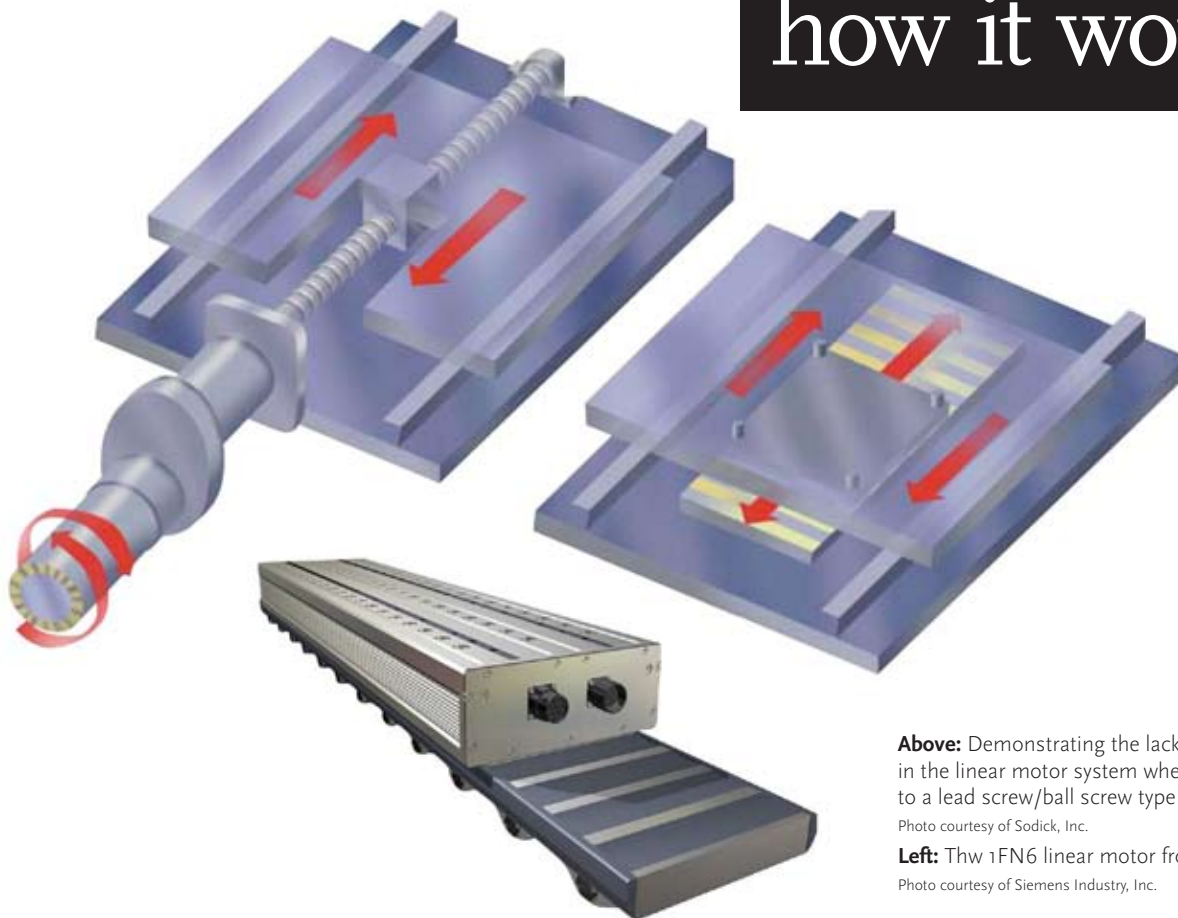
To operate at their full rated capacity, linear motors may require special cooling, with air or liquid.

### Linear motor applications in metal cutting

Linear motors were first applied to metal cutting back in the 1990s, in a laser cutting machine, Czajkowski said. Since then, linear motors have found application in machining, laser- and water-jet cutting, electrical discharge machining (EDM) and honing, he said.

The precision and stability of linear motors makes them ideal, even for some applications that do not need their speed. Sodick, Inc., makes linear motors and controls, and builds EDM systems that use them, said Thomas. The linear motors provide better positioning accuracy than ball screws, he said. Ball screw machines typically showed a loss of accuracy after one or two years, and high-precision customers often needed to replace the ball screw drive after three years. Linear motor EDM machines showed no detectable loss of accuracy over five years. By 2001 all Sodick machines used linear motors, Thomas said. Sinker EDM systems take advantage of the linear motor’s speed, too, by

# how it works



**Above:** Demonstrating the lack of backlash in the linear motor system when compared to a lead screw/ball screw type design.

Photo courtesy of Sodick, Inc.

**Left:** Thw 1FN6 linear motor from Siemens.


Photo courtesy of Siemens Industry, Inc.

using the advancing tool to flush out debris from the hole or cavity, he said. This eliminates the need to drill flushing holes in the workpiece.

More recently Sodick developed a line of linear motor machining centers. They are high speed surfacing machines designed for high precision, small features and producing a fine surface finish. "We are able to do what is not possible with a ball screw, which has inherent vibration and backlash," Thomas said. Linear motors produce next to no vibration and have zero backlash. For operations with very small cutters, linear motor machines provide the acceleration necessary for keeping the tool in the work with the correct chip load. Consistent loading and the lack of vibration help extend tool life and prevent breakage, he said.

Mazak Corporation uses linear motors in some of its machining centers. "The F3-660L [horizontal machining center] is designed for automotive applications, especially for die-cast aluminum," said Yamane. "Automotive manufacturers put a lot of money up front for die castings such as transmission casings," where the F3-660L would be used for operations such as facing and hole making, he said. This machining center uses linear motors for X, Y and Z axes, and offers a traverse speed of up to 208 meters/minute (8189 inches/minute), according to product literature.

## Simple concept, big benefits

A machine tool that uses linear motors will offer faster traverse speeds, higher precision, lower vibration and lower maintenance cost than a similar conventional machine. Linear machines can also provide longer tool life and lower operating cost. If you have a suitable application, linear may be worth considering the next time you're planning to buy. 

## For more information:

**Cincinnati Incorporated:** [www.e-ci.com](http://www.e-ci.com), [ed.bosse@e-ci.com](mailto:ed.bosse@e-ci.com)

**Mazak Corporation:** [www.mazakusa.com](http://www.mazakusa.com)

**Siemens Industry, Inc.:** [www.usa.siemens.com/cnc](http://www.usa.siemens.com/cnc)

### DIFFERENT TYPES OF LINEAR MOTORS:

[www.baldor.com/products/linear\\_motors.asp](http://www.baldor.com/products/linear_motors.asp)

### VIDEO

Go to [www.youtube.com](http://www.youtube.com) and search on "Demonstration Linear Motor and Ball Screw Drive Comparison"



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## ◀ Acme Industrial Company

Acme Industrial Company, a subsidiary of Jergens, Inc., has announced a new line of Key Locking Studs. These key locked fasteners (also known as staked studs), have a solid one-piece design to provide high pullout strength and torque-out capabilities. They are used in original equipment, or to repair damaged threads. The studs' keys are driven down into the threads of the surrounding base material to securely lock them into place and to provide a mechanical lock against vibration.

For more information, please visit Acme Industrial Co. at [www.acmeindustrial.com](http://www.acmeindustrial.com).

## ▶ AMSAW®

AMSAW® high-speed, production saw machines are specifically designed to use carbide blades to improve the cutting speed of ferrous and non-ferrous material, bars or billets, rails, profiles, pipes and tubes. Standard design features include a compact rigid design, hardened spindle gears ground for minimum backlash, special saw blade guide and dampening device for accurate cutting to stabilize the blade and prolonged tool life and saw blade changeover in less than three minutes.

For more information, please visit AMSAW® at [www.ame.com](http://www.ame.com).



## ◀ Ganesh Machinery

The Ganesh Cyclone 52-TTMY CNC Mill/Turn center comes with 32-tools and a MITUSBISHI control. It features a full bar, chuck, and shaft machining capability with a 2" bar capacity and 6" chucks. The integral main spindle and integral sub-spindles both feature 6,000 rpm capability for fine surface finishes, as well as a C axis so that milling and drilling operations can be completed in one operation on the front and back-side of the workpiece. The Y axis features  $\pm 40$  mm of off-center movement to allow the completion of off-center work in the same chucking. The machine will be displayed at Ganesh's open house on July 20th at 20869 Plummer Street in Chatsworth, Cal.

For more information, please visit Ganesh Machinery at [www.ganeshmachinery.com](http://www.ganeshmachinery.com).



# fresh stuff

## ► Han-Kwang USA

Han-Kwang USA announces the introduction of its largest laser model, built to date. The FS8025 is a flying-optic CO2 laser cutting system with dual shuttle tables, each measuring 26' long by 8' wide. It is said to be the only laser in the industry with a cutting head covering the entire workspace without repositioning the table.

For more information, please visit Han-Kwang USA at [www.hankwangus.com](http://www.hankwangus.com).



## ◀ HEIDENHAIN Corp.

HEIDENHAIN is offering the new HR 1120 electronic handwheel, which will simplify retooling and setup processes. This robust handwheel is used in association with the machine control. Despite its compact dimensions, it is suitable for both portable and stationary housings. The mechanical detent, with 100 positions per revolution, permits very precise and exact control of movement. The electrical signal output at TTL levels with differential signals as per RS422, allows connection to many standard programmable logic controllers (PLC) and PC slot cards.

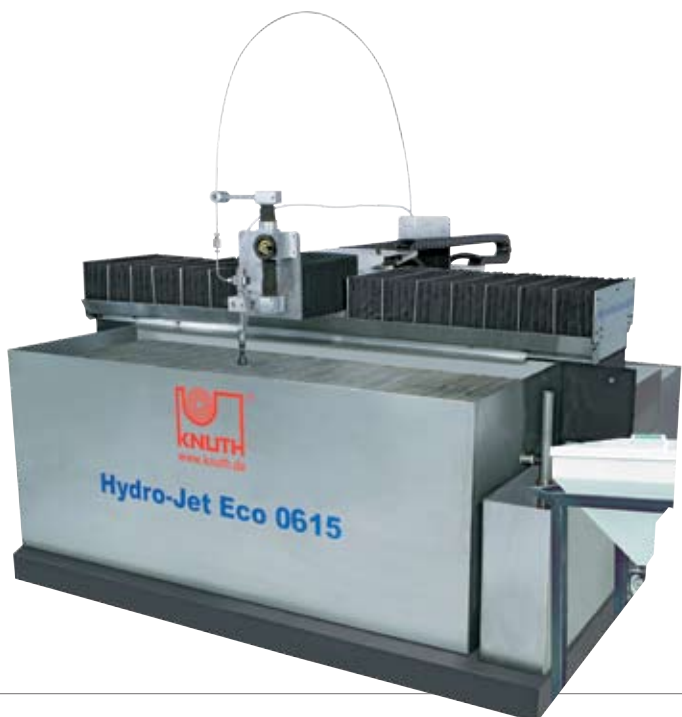
For more information, please visit HEIDENHAIN CORPORATION at [www.heidenhain.com](http://www.heidenhain.com).



## ► KNUTH Machine Tools USA

KNUTH Machine Tools USA is offering the Hydro-Jet Eco 0615 S, a compact machine featuring a high-precision, low cost water-jet cutting system. The Hydro-Jet allows small business owners the ability to manage deadlines and quality control by bringing outsourced work in-house with minimal installation. This versatile water-jet cutting solution offers distortion free contour cutting on virtually any type of material including coated and uncoated metals, aluminum, copper, stainless steel, stone, marble, glass, ceramic, composites, plastic, rubber, foam and more.

For more information, please visit Knuth Machine Tools USA, Inc. at [www.knuth-usa.com](http://www.knuth-usa.com).

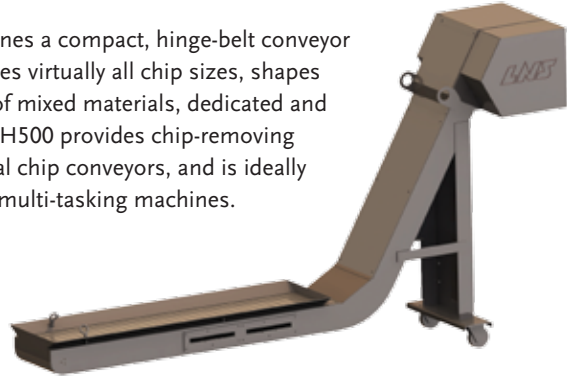




## ► LNS America

The new Turbo MH500 filtering chip conveyor from LNS combines a compact, hinge-belt conveyor with 500-micron coolant filtering efficiency. The conveyor handles virtually all chip sizes, shapes and materials including fine, broken, coarse and stringy chips of mixed materials, dedicated and ferrous materials, cast iron, brass and aluminum. The Turbo MH500 provides chip-removing versatility and coolant filtering capability not found in traditional chip conveyors, and is ideally suited for sliding headstock machines, machining centers and multi-tasking machines.

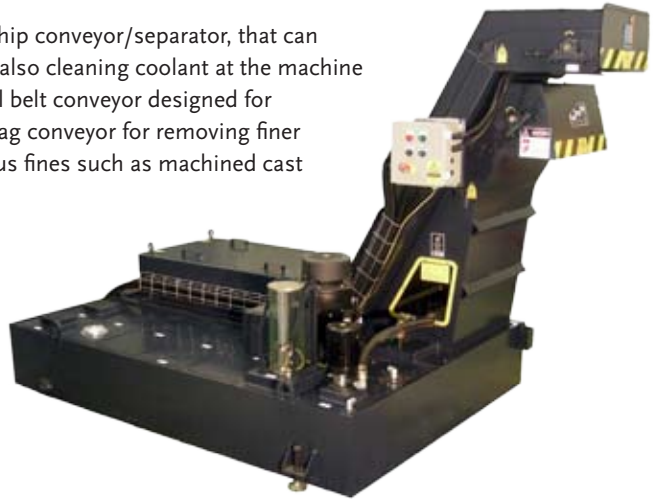
For more information, please visit LNS America Inc. at [www.lns-america.com](http://www.lns-america.com).



## ► Mayfran International

Mayfran International introduces the ConSep® Flex universal chip conveyor/separator, that can efficiently handle a full range of materials and chip types while also cleaning coolant at the machine tool. The ConSep® Flex combines the features of a hinged steel belt conveyor designed for optimal removal of most chips and turnings, with a scraper/drag conveyor for removing finer chips. The addition of magnetic bed technology captures ferrous fines such as machined cast iron, which are removed by the scraper.

For more information, please visit Mayfran International at [www.mayfran.com](http://www.mayfran.com).



## ◀ Micronor

Micronor's new MR266/MR267 series Remote Control Potentiometers are turn-key solutions for upgrading manual potentiometer and rheostat process controls to PLC controls. These products operate at 24VDC and following options: 4-20mA or 0-10V input/output control, non-isolated or isolated interfaces, and front panel or DIN rail mount. The MR267 series replaces low power (<5W) potentiometer controls in resistance values of 100Ω to 100KΩ—prices start at \$995. The MR266 series is offered in resistance values from 2Ω to 50KΩ, 20/60/170/300 Watt options.

For more information, please visit Micronor at [www.micronor.com](http://www.micronor.com).





## ◀ Nagel USA

Nagel USA introduces the ECO 40, a new flexible stroke honing system which was developed specifically for low and medium volume production applications to hold submicron bore sizes and mirror finishes. The system can have up to three honing and post process gauging stations and can finish bore sizes from 3 mm to 40 mm. The honing spindle and the stroking system are driven by AB servomotors. A compact gear driven index table enables part loading/unloading during the finishing operation. The system can either be fully automated or tended manually.

For more information, please visit Nagel USA at [www.nagelusa.com](http://www.nagelusa.com).

## ▶ The Cryogenic Institute of New England, Inc.

The Cryogenic Institute of New England, Inc. is pleased to announce the introduction of its Nitrofreeze® Uphill Quenching Service to maximize stress relief in cast, heat-treated and forged aluminum parts. The process enables critical components made from aluminum to achieve a superior level of material stabilization. The Nitrofreeze® Uphill Quenching Process eliminates the resident residual stresses in the raw cast or forged aluminum block as well as those that are created during CNC machining operations.

For more information, please visit the Cryogenic Society of America at [www.nitrofreeze.com](http://www.nitrofreeze.com).



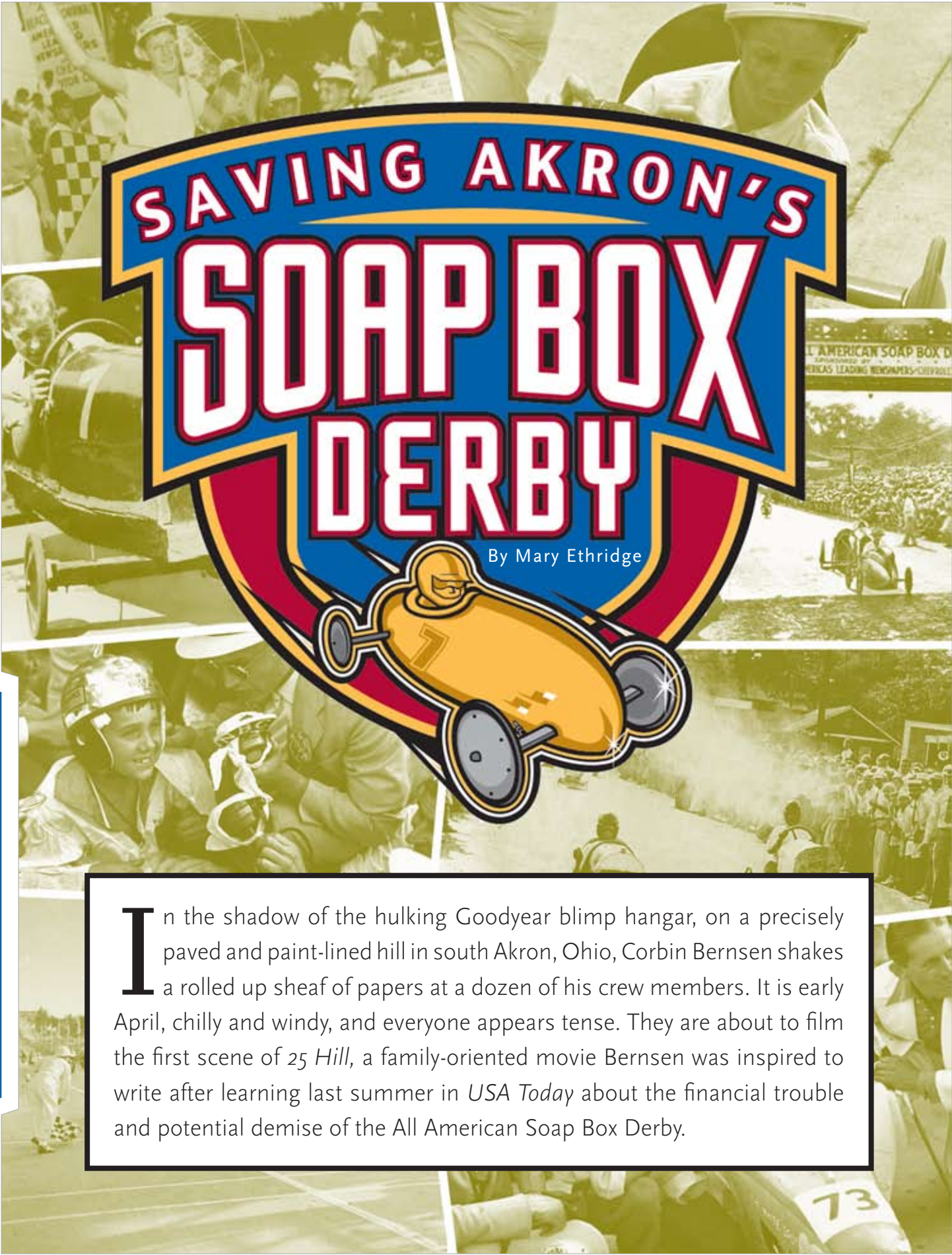
## ◀ Northfield Precision Instrument Corp.

Northfield Precision Instrument Corp. introduces their model 450WHF chuck. It uses a special 4-port air tube (and special piston) to allow for open, close, auto lube or air-detect functions. The top plate is a radial banking surface which picks up the side of the customer's part when it is loaded and twisted into position into the chuck. The three small pads with tiny holes in the very center of the chuck are used to rest the part against while the holes are used for the air-detect function, which gives positive indication that the part is indeed loaded into the chuck.

For more information, please visit Northfield Precision Instrument Corp. at [www.northfield.com](http://www.northfield.com).

# SAVING AKRON'S SOAP BOX DERBY

By Mary Ethridge



In the shadow of the hulking Goodyear blimp hangar, on a precisely paved and paint-lined hill in south Akron, Ohio, Corbin Bernsen shakes a rolled up sheaf of papers at a dozen of his crew members. It is early April, chilly and windy, and everyone appears tense. They are about to film the first scene of *25 Hill*, a family-oriented movie Bernsen was inspired to write after learning last summer in *USA Today* about the financial trouble and potential demise of the All American Soap Box Derby.



The scene begins but the actor's words are swallowed by the spring wind. No matter. I know them by heart now.

I would have relished my life's U-turn at 21, but now, at 51, I find it a little terrifying.

It all started because of a phone call I made last summer to a writer friend of mine at *USA Today*. I asked her if someone there would be interested in writing a story about the Derby's financial problems. Someone was and did. Corbin Bernsen read it, and seven months later I'm helping the Hollywood actor produce the movie he says will unify Akron and help save the Derby.

I knew who Bernsen was, of course. I'm a fan of *Psych*, the USA Network's longest-running original series in which the now-nearly bald Bernsen plays the main character's father. I remember him best in those bespoke double-breasted suits as the handsome womanizer Arne Becker in the 1990s hit, *L.A. Law*. He's beloved in Northeast Ohio for his role as the Cleveland Indians' fussy third baseman Roger Dorn in *Major League*.

Until late last summer, I hadn't had much to do with the Soap Box Derby, which has been headquartered in my hometown of Akron, Ohio, since 1933. As a writer for the *Akron Beacon Journal* for 18 years, I'd covered some of its events on occasion. And one of my personal claims to fame is that I went to high school in New Hampshire with a cousin of the Derby racer who cheated in 1972.

But last summer when I heard the Derby was heading into its third year without a title sponsor and falling deeper into debt, I felt surprisingly indignant. My civic pride was insulted. The Derby may be seen as old-fashioned by some people, a little hokey perhaps or too slow-moving in these days of turbo tweeting techies, but it has been ours—Akron's—for decades, and it is a very good thing.

To build a Derby car—which is powered only by gravity—children work closely with an adult, usually a patient parent. During that one-on-one time, the garage becomes a place where things that might not be said otherwise are said. The children learn about math, physics,

communication, teamwork and the vital lesson that if you hope to win, you have to finish what you start.

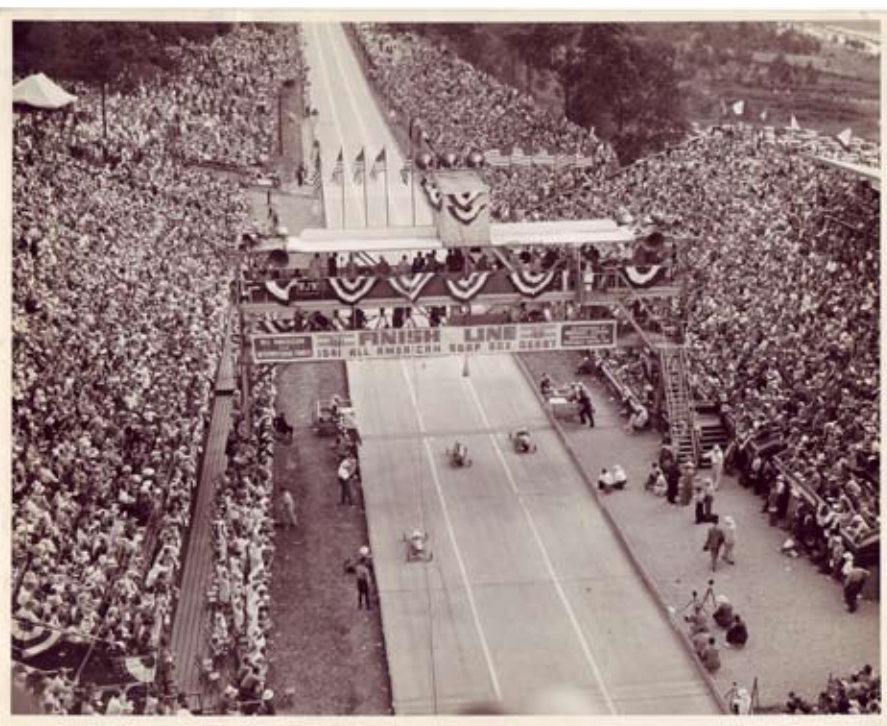
I couldn't believe a corporation wouldn't step up to support such a rare program. It just seems like a no-brainer for a marketing team: spend \$250,000—pocket change

in the multi-million dollar sponsorship world—help kids, and be associated with a wholesome bit of Americana with a 75-year legacy. Beyond that, racers come from 150 cities in 43 states and seven countries. Although its image may be local-yokel, Fourth of July

and Main Street USA, its reality is far more than that. The All American Soap Box Derby is a year-round effort that requires a paid staff of engineers, machinists, marketers, secretaries and maintenance workers, as well as a board of directors, to steer it. In the spring and summer race season, its volunteers number in the thousands.

Chevrolet sponsored the All American Soap Box Derby from 1936 to 1972. In the Derby's heyday in the 1950s, Chevrolet spent millions of dollars sponsoring and marketing the race. Chevrolet's presence attracted smaller sponsors as well as plenty of Hollywood glamour. Celebrities including then-actor Ronald Reagan, Rock Hudson, Evel Knievel and

“Until late last summer, I hadn't had much to do with the Soap Box Derby, which has been headquartered in my hometown of Akron, Ohio, since 1935.”



**Above:** Cars race down the Derby Downs hill in Akron in 1941. The next year the event was cancelled because of the U.S. entry into World War II.

Image courtesy of the All American Soap Box Derby



**Above:** Pre-race festivities 2009 at Derby Downs.

Photo courtesy of W.K. Taylor

**Left:** Corbin Bernsen addresses a group of reporters on the first day of filming at Derby Downs in Akron, Ohio.

Photo courtesy of AP Photo/Phil Long

O.J. Simpson came to mingle with corporate executives and fans. The late actor Jimmy Stewart attended six times.

Back then, crowds numbered in the 60,000s, compared to the 15,000 who've come in recent years. Despite the financial troubles of the Derby, it's more popular than ever among young people. In 1975, about 100 competed in the championship race in Akron. Last year a record 603 did, although that includes a new Ultimate Racing League for competitors 18-21. (Standard races are for children 7-17.)

**“As something that sprouted from a unique time in the nation’s history—the Great Depression—the Soap Box Derby certainly qualifies as a living piece of America’s heritage.”**

When I met Bernsen, he expressed other reasons to save the All American Soap Box Derby. The United States is a relatively young country, said Bernsen, and we must preserve those few traditions that have become part of the fabric of the nation. As something that sprouted from a unique time in the nation’s history—the Great Depression—the Soap Box Derby certainly qualifies as a living piece of America’s heritage. Although it has remained the same at its core, the derby has also changed with the times as its tricked-out cars attest; its history is ours. In this time of war, Bernsen believes, the American-grown Derby provides a patriotic rallying point for the country’s declared and instinctive values of family, faith and freedom.

Sadly, the world of corporate sponsorship has changed drastically, according to Roger Rydell, a public relations executive with Goodyear Tire & Rubber Co. and a new member of the Derby board.

“Corporations are looking for return on investment,” Rydell told the *Wall Street Journal* in a recent story about 25 Hill. “It could be that the metrics associated with that return have become a little more mercenary than in the past.”

Nevertheless, I expressed my outrage to William Evans, president of the board of the Soap Box Derby. Knowing of my media background, Evans asked if I could help get the word out nationally that the Derby needed help. That’s when I called the columnist friend at *USA Today*,

and she passed it on to her colleague, marketing writer Bruce Horovitz. In early September, *USA Today* published Horovitz’s story that outlined the seriousness of the Derby’s financial trouble and its efforts to modernize itself without a pile of cash.

The Derby had lost money four out of the past five years and was, according to Horovitz, “living hand to mouth.” It owed its lender, Akron-based FirstMerit Bank, more than \$500,000. It had been making interest-only payments on its loan some months and the bank had cut the line of credit the Derby uses to buy materials to make car kits—a primary source of revenue. If the Derby didn’t get help soon, Horovitz wrote, it would be bankrupt within months.

Our hope with the *USA Today* story was to attract a new national sponsor. What we got was Corbin Bernsen.

As Bernsen tells it, he had nothing to read on that September afternoon as he was stuck on a plane stranded on a tarmac. He grabbed a discarded *USA Today* from a nearby seat pocket and read about the Derby's woes.

He felt so upset about the possibility of losing an American tradition, he decided to write a screenplay about it. Seven weeks later, screenplay done, he wanted to come to the Derby's racetrack, Derby Downs, to see the place for himself.

At the Derby Downs office, Evans, Huntsman and I listened as Bernsen outlined the story for us, which incorporates the real-life troubles of the Derby. In the film, the Derby dreams of 11-year-old Trey Caldwell are threatened, first when his father is killed fighting in Afghanistan, and then when the Derby is shut down because of money troubles. Nathan Gamble, a 12-year-old whose credits include major studio films *Marley & Me* and *The Dark Knight* plays Trey. Tim Omundson, who stars with Bernsen on *Psych*, plays Trey's father. Through the efforts of Trey and his peers the Derby is eventually saved.

Bernsen then told us he needed about \$1 million to make the movie. He envisioned 40 investors at \$25,000 each. Then, he turned his intense, blue-eyed gaze on me. "Mary, do 40 people in Akron have \$25,000?" he asked. I felt the color leave my face; I could sense what was coming. Rather than turning to his usual Hollywood sources, Bernsen said, he wanted 25 *Hill* to be an Akron movie—funded and made possible by the people of the community that has nurtured the Derby all these decades. "If I went to L.A. for funding, they'd have only the bottom line in mind. They'd want to make it where and how it would be least expensive," said Bernsen. "But if the project is funded by the Akron area, then it's Akron's movie, not L.A.'s."

I told him that yes, more than 40 people in Akron had \$25,000, but getting them to part with it to invest in a movie would be a challenge.

"Well, let's do it, Mary. Get me a dozen or so of these people in room and we'll just talk and I'll tell them what I have in mind," Bernsen told me. I wanted to run and hide but I just nodded. I knew what we were in for. Akron is a conservative community that is willing to change, but changes very slowly. Filmmaking is about as far out of Akron's realm as tire building is out of Hollywood's.

Two weeks later, I managed to gather a group of wealthy community leaders to listen to Bernsen speak about the Derby and the proposed movie. He gave a speech I would hear over and over, in various forms.

"Computers and televisions are great. Nothing wrong with them, but that's not all there is to the world. Every kid has the instinct to put wheels on a piece of wood and make it go, and we need to nurture that kind of creative thinking," Bernsen said. The Soap Box Derby is also a way of life. It's about families coming together to make something with their hearts and hands.

"It's spirited competition rooted in community and innovation," Bernsen said. "We just can't lose that. If the Derby disappears, the world won't fall apart, but what will go next?"

Two weeks later, Corbin made the presentation to another group I put together, and two weeks later to another. After four visits to Akron, Bernsen didn't have one check in the account for 25 *Hill* Akron Filmworks, the LLC we set up for the investments.

There were two primary obstacles. People wanted the Derby fixed first; then we could talk about a movie. Bernsen explained to those people that a movie would bring thousands of new "eyeballs" to the Derby, which meant a



**Left:** Selection of cars in the 2009 race.

Photos courtesy of W.K. Taylor

**Below:** The winner of the first Soap Box Derby, held in Dayton in 1933. It was an informal event; cars were made of construction scraps and home items such as baby buggy wheels and orange crates.

Photos courtesy of W.K. Taylor





higher profile, a better chance at sponsorship and more awareness among kids. Also, potential investors had little idea how an independent movie makes money and seemed skeptical that they do. They were also tired of throwing money down Akron's gaping booster hole. After awhile the good feelings run out.

So Bernsen gave them a mini-lesson in film industry finance, dancing painfully around statements that might get him in trouble with the Ohio Securities Commission. He talked about a "typical" independent film of the sort he wanted to make. Such films, he said, can possibly double or triple an investment over a period of 30 to 36 months, a relatively long lag time because of the post-production work that needs to be done on such a "typical" film as well as the hashing out of agreements with distributors.

Long gone are the days when movies went automatically to the theater; long gone even are the days when going straight to DVD was seen as the mark of schlock. The marketing costs associated with putting a movie in theaters across the country are so enormous now, in part because of the skyrocketing number of advertising outlets (millions of Web sites; thousands of cable stations), that even if a film does well at the box office, it may lose money for investors. Today, we can get our movie from a vending machine, on our computer, at the video store or straight from our cable company in addition to seeing it at a theater.

In a late night phone call with Bernsen—and there were dozens—he told me he'd never done anything so difficult in

his life. It took two months and a lot of ups and downs to get our first check. It came from someone who wasn't even at any of our meet-and-greets with Akron leaders and Bernsen. An architect in an Akron suburb had happy memories of the Derby from his childhood in the 1940s and 1950s. He'd heard about the project and thought it would be "fun" to invest in it. Where were more of those people? How could I find them?

Looking back, I think I turned to the obvious choices first to find investors, which meant I was mining a tired, compassion-fatigued lot. And although we did get support from some of those traditional Akron leaders, most of the money came from sources that surprised me or of whom I'd never heard—mainly doctors, lawyers and other professionals whose names aren't found on city buildings. These were primarily average upscale Joes, not the Fortune 500 executives and medium-sized business owners I expected. As this issue goes to press in June, we're still seeking a few investors so we can finish up the movie the way Bernsen envisions. The filming


for *25 Hill* is scheduled to finish on July 24, at the real-life International Championship of the All American Soap Box Derby.

The Derby is also faring better financially. In December, Akron-based FirstMerit Bank, which held the Derby's loan, sued the Derby for the \$623,000 it was owed. It looked more and more like the Derby would be put on the auction block. But within weeks, the City of Akron stepped in with a plan to back the Derby's loan, and the bank set up new, more favorable terms.

If the Derby failed, Akron would have to take over the \$42,000 annual principal payments, which the city pointed out are less than the \$60,000 a year the city has been giving the nonprofit.

"The last thing we want to see is Derby cars coasting down the hill in another city," Akron Councilman Mike Freeman told the *Beacon Journal*. The Greater Akron Chamber agreed to help with a business plan and fundraising. The Derby board was remade to include more members of the corporate community, including representatives from Goodyear Tire & Rubber Co. and FedEx Custom Critical.

One thing hasn't changed since the Derby's early days: "You're going to Akron," are the sweetest words a soap box racer can hear. Having lived in Akron most of my life, I've suffered through every Rust Belt, Rubber and Dacron joke imaginable. It's a bit startling and wonderful to hear my hometown's name said with such reverence and longing. That, to me, is a reason to save the All American Soap Box Derby.

There are plenty of them, just ask me. And bring your checkbook. 

““You’re going to Akron,”  
are the sweetest words a  
soap box racer can hear.””

**Below:** Crossing the finish line in the 2009 Soap Box Derby.

Photos courtesy of W.K. Taylor



# How a Derby Car is Made

At the top of the Derby Downs hill, known appropriately enough as Topside, Derby track manager Ed Del Ferraro leads his own production. A character based on Del Ferraro, a master carpenter by trade, is played in Corbin Bernsen's *25 Hill* by Ralph Waite (the father in the 1970s series *The Waltons*). But Del Ferraro likely will always be best known in Derby circles as the father of Danielle, the Derby's first two-time world champion (1993-94) and the head of production for Derby car kits.

All Soap Box Derby racers must build their cars from kits purchased from the Derby, where they are partially machined and packaged for shipping. It standardizes the racecars, giving all kids an equal chance, and provides about 65 to 70 percent of the nonprofit Derby's revenue, said Jim Huntsman, president and chief executive officer of the All American Soap Box Derby. Kit prices range from \$425 to \$610, depending on which division—stock, super stock or master's—the child is racing in.

Del Ferraro and his team—machinist Duane Burkhamer and shipper Jim Crawford—work inside a low-slung, metal-clad building more akin to a large storage shed than a production plant. It's here they punch holes in axles using a homemade CNC pneumatic drill and cut wood floorboards and brake pedals using a ShopBot PRT/alpha. The rest of the parts needed for a Derby car—fasteners, rotationally molded plastic or fiberglass car bodies, nylon and fiberglass wheels—are all made by nearby manufacturers and gathered at Topside where they

are put together in kits at a rate of about a 10 a day during the busy spring season.

"Hiring a jack of all trades like Ed has paid for itself several times over," said Huntsman. "He's figured out what we can do in house and what's more cost-efficient to outsource. If it weren't for these kinds of cost savings, I don't think we'd still be around."

There was actually no industrial production at Derby Downs until 2001 when Del Ferraro and part-time electrician Tim Cape created a pneumatic axle drill using a Yamaha Robot Controller—basically a moveable arm with a pneumatic drill—and a Mitsubishi Programmable Logic Controller. The Yamaha controls all of the move locations or points and the pneumatic valves. The points are stored in the point table and are adjusted to compensate for mechanical wear of the fixture. The Mitsubishi keeps track of the number of holes drilled by each bit, and the number of axles—front, rear and total—drilled. The axles, made of cold rolled steel come to Del Ferraro prefabricated except for the axle holes.

Del Ferraro believes his semi-homemade drill system allows him to do a job that would usually require an expensive end mill with expensive capabilities he doesn't need.

The Topside building's humble appearance belies its nearly sacred significance to thousands of soapbox racers across the world whose goal it is to make it to Derby Downs for the International Championship in July. A trip to Akron for a shot at being world champion is the reward youth racers receive for building their cars, and winning local and regional races. They come from California and Canada, Alabama and Australia, and they haul with them their hopes, their supporters, and—on specially designed trailers or in carefully packed crates—the precious Derby cars they've spent hours constructing, using parts Del Ferraro's team has fabricated in the Topside building.

**Below:** Corbin Bernsen directs members of Ohio's Springfield Township Fire Department who play the firefighters in *25 Hill*.

Image courtesy of: Todd Biss of Todd Biss Photography



# CURRENT INVENTORY

Serviceman available with machine purchase. All machines can be equipped with threading, pickoff or thread chasing. As you want it.

## WICKMAN

5/8" 6-spindle, thdg., pickoff, 1981  
1" 6-spindle, 1985 (8)  
1" 8-spindle, 1980  
1-3/8" 6-spindle, 1967-1978 (6)  
1-3/4" 6-spindle, 1965, 1984 (4)  
1-3/4" 6-spindle 1984 (on a bar feed)  
1-3/4" 8-spindle, 1970  
2-1/4" 6-spindle, 1962, 1973-79 (3)  
3-1/4" 6-spindle, 1978

## ACME

1" RAN6 1970  
1-1/4" RA6 1978-61 (9) - some  
w/threading pickoff  
7/16" RA6, 1975 & 1964  
1-1/4" RB8, 1981, thdg., pickoff (2)  
1-5/8" RBN8, 1979, thdg., pickoff (3)  
1-5/8" RB8 thdg., pickup '68-72 (5)  
2" RB6, 1967 & 1980  
2" RB8, 1966 (2)

## INDEX

G200, 1997, Index  
G300, 1997, Index  
ABC 60mm Index 1996  
B60, 1985  
C-29 1980 (3)  
C-19 1970

## SCHUTTE & GILDEMEISTER

SF51, 1985-79 (3)

## SWISS

**Hanwha ML26H**  
Star SR20, 1999  
Tornos Deco 26 2006

## HYDROMATS & ROTARY TRANSFER

V12 Trunion (1990)  
HW 25-12, 1985, 1994, 1997  
HB45-16, 1989 - '97 chucker  
HS16, 2001  
36-100 Units (3)  
36-100 Recess unit

## EUBAMA

S-12 1998 (2)  
S-8.1 1982

## ESCOMATICS

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

## MISCELLANEOUS

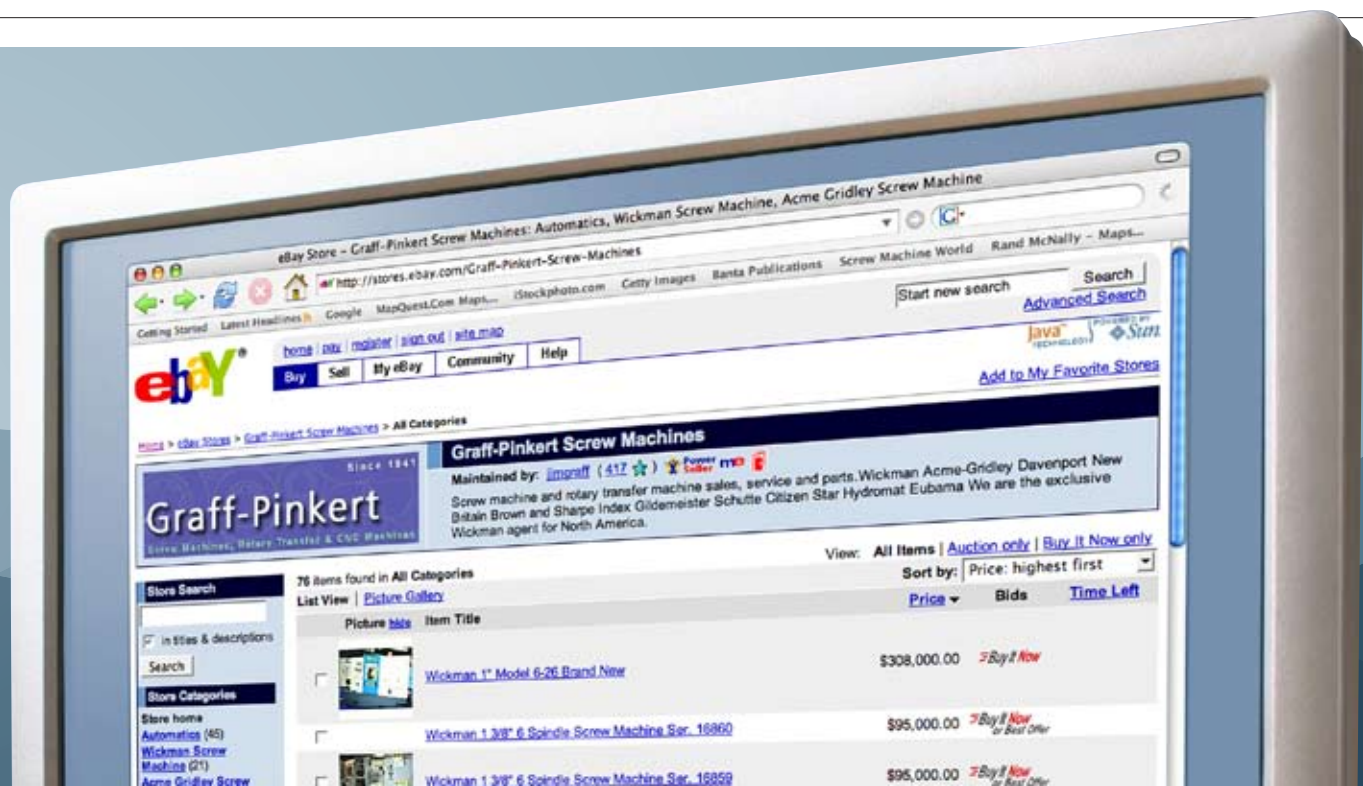
### Strausak CNC Tool & Cutter Spindle 1999

Cincinnati 107-4 centerless  
2 5/8" RB6 spindle bearings  
C-29 Index long turning  
3-1/2 RB6 thdg. attachment  
IMG recess 1-5/8" RB6 (2)  
Hydromat recess unit and flange 36-100  
Siemens varispeed motor off Wickman  
Wickman thread chasing 5/8" - 3 1/4"  
Every Wickman spare part  
Telhurst 48" spinner  
Goss 1-2-3 brass 1980

WICKMAN AND INDEX

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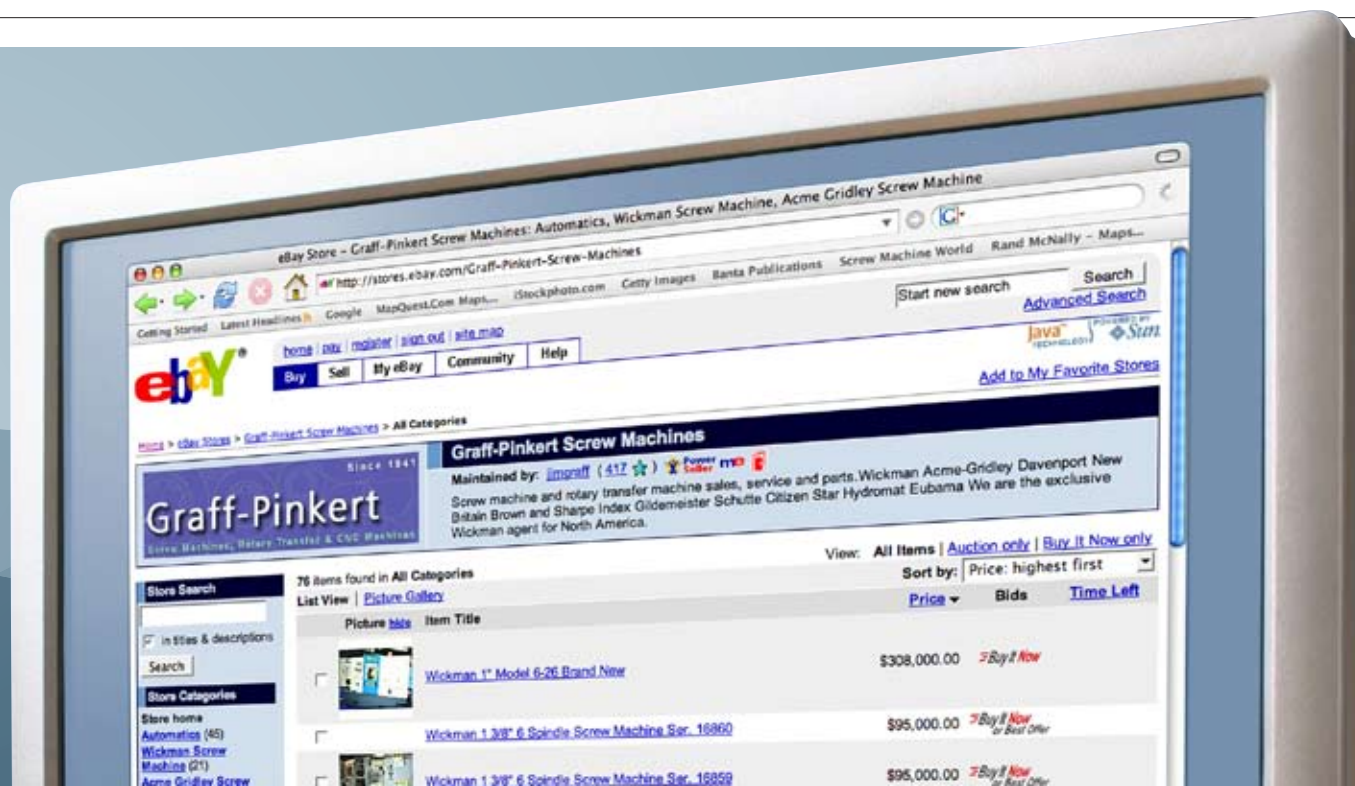
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WICKMAN AND INDEX

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WITH NOAH GRAFF

# shop doc

*Today's Machining World's "Shop Doc" column taps into our contact base of machining experts to help you find solutions to your problems. We invite our readers to contribute suggestions and comments on the Shop Doc's advice. If you consider yourself a Shop Doc or know a potential Shop Doc, please let us know. You can also check out the Shop Doc Blog at [www.todaysmachiningworld.com](http://www.todaysmachiningworld.com).*

Dear Shop Doc,

I'm running a part on 8620 steel. I'm expected to get 350 parts per shift off my 2006 CNC lathe, which I am doing, but I am burning up the profit on carbide insert costs. What can I do to maintain productivity without killing the profit from the job on tooling?

Burned Up in Birmingham

Dear Burned Up,

In today's difficult economy we are all trying to make parts faster and cheaper. Unfortunately, making parts faster is often at odds with making them cheaper.

I have learned from experience that sometimes a machine will consume less money if you slow it down a little and try to find the proverbial "sweet spot." The fastest spindle speeds and the highest feed rates may not be the best way to run the machine. It may be difficult to convince your boss that this is true, but having real data to prove it can be helpful.

Tooling costs or machine repair costs can go up significantly if the machine is pushed too hard while trying to reduce cycle time. When I get involved in a process I like to track tool life. If I don't know what my tool life was before I make a change, I can't accurately measure the performance gains or losses caused by the change. I always share my tool log results with the machine operator, as part of his or her involvement in the process improvement.

The following is a good example of slowing a machine down to get better performance. The part was made on an Index ABC lathe. This machine was plunge-roughing the OD of a cylindrical part made of 8620 steel, using a .3" wide carbide insert-type OD roughing tool. The tool had problems with durability. The average tool life for this tool was little more than 200 hits per edge. When the edge went bad, it happened quickly and would cause problems for the finishing

tool that followed it. This roughing tool is one of 11 tools used to make this part on this machine.

The first thing I checked was the feeds and speeds. The actual surface speed for the roughing tool was 1100 ft./min., while the recommended surface speed range, per the insert manufacture's catalog, was 250 to 600 ft./min. After reducing the spindle speed by 50 percent to obtain a more suitable surface speed, I steadily increased the plunge feed rate to a value 60 percent higher than it was. After these adjustments the chips curled up tightly, with a nice sizzle when they came off.

The net effect of my changes on the cycle time was an increase in cycle time of less than 1 percent. I was lucky that I was nearly able to completely compensate for the decrease in surface speed by increasing the feed rate.

The tool life results went from little more than 200 hits per edge, to more than 1200 hits per edge. This resulted in a \$330 reduction in tooling costs per month. Additionally, we reduced tool change time by 15 minutes per week.

This was an occasion where a slower cycle time actually enabled me to make similar quantities of parts per month and reduce tool usage costs.

Mark Bos  
Robert Bosch Fuel Systems

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

Have a technical issue you'd like addressed? Please email [noah@todaysmachiningworld.com](mailto:noah@todaysmachiningworld.com). We'll help solve your problem, then publish both the problem and solution in the next issue of the magazine.

Dear Shop Doc,

I have recently been asked if my shop does “micro” machining. I’ve done some work on small parts recently, but I’m not exactly sure what is meant by “micro.” Any thoughts?

Small Beginnings

#### Dear Small Beginnings,

One of the problems with the term “micro” is that it is often used to define a very small portion of a wide array of categories. Maybe you’ve been to a microbrewery or have a computer that uses a microprocessor. In each case, the prefix or adjective “micro” defines a small-scale or very small feature of the original term. To date, the term is loosely used in machining to refer either to the exact measurement of the parts, such as in microns, or to a small range of work, in the neighborhood of 1 mm or less.

In May 2010, I posed a similar question to exhibitors and attendees at MM Live—the Micro and Precision Manufacturing Event for North America, in Cincinnati, Ohio. As an exhibitor myself, I thought micro meant sizes under .050”, as this was the smallest tool in our catalog and very near to the 1 mm dimension. I often referred to parts from this diameter up to .500” diameter as Swiss, so everything smaller I considered micro. A large number of attendees defined micro as being smaller than a certain dimension. Some said micro meant parts smaller than 8 mm or .250”, or 1 mm. Kyocera’s booth advertised a .250” dimension on their sign. However, when I asked them about it, they explained that although they make a wide variety of small tools, the ones they considered to be micro sized were really those .125” or smaller.

A few attendees believed the term “micro” referred to parts that were smaller than the human eye can see. The MM Live show had a wide of variety of these parts on display, and it seemed that every other booth had a microscope or magnifier of some type to help you see their wares. One of the most

intriguing answers to define micro came from an exhibitor at Makuta Technics Inc. He said they use the term micro not to refer to a part’s size, but more exclusively to the feature’s size. You may have a part not considered to be a micro machined part, but if the features and tolerances are small enough, it may require what is commonly known as micro machining. This can lead to a lengthy discussion about tolerance, and if a part with  $\pm .001$ ” variance can be classified the same as a part with  $\pm .000010$ ”.

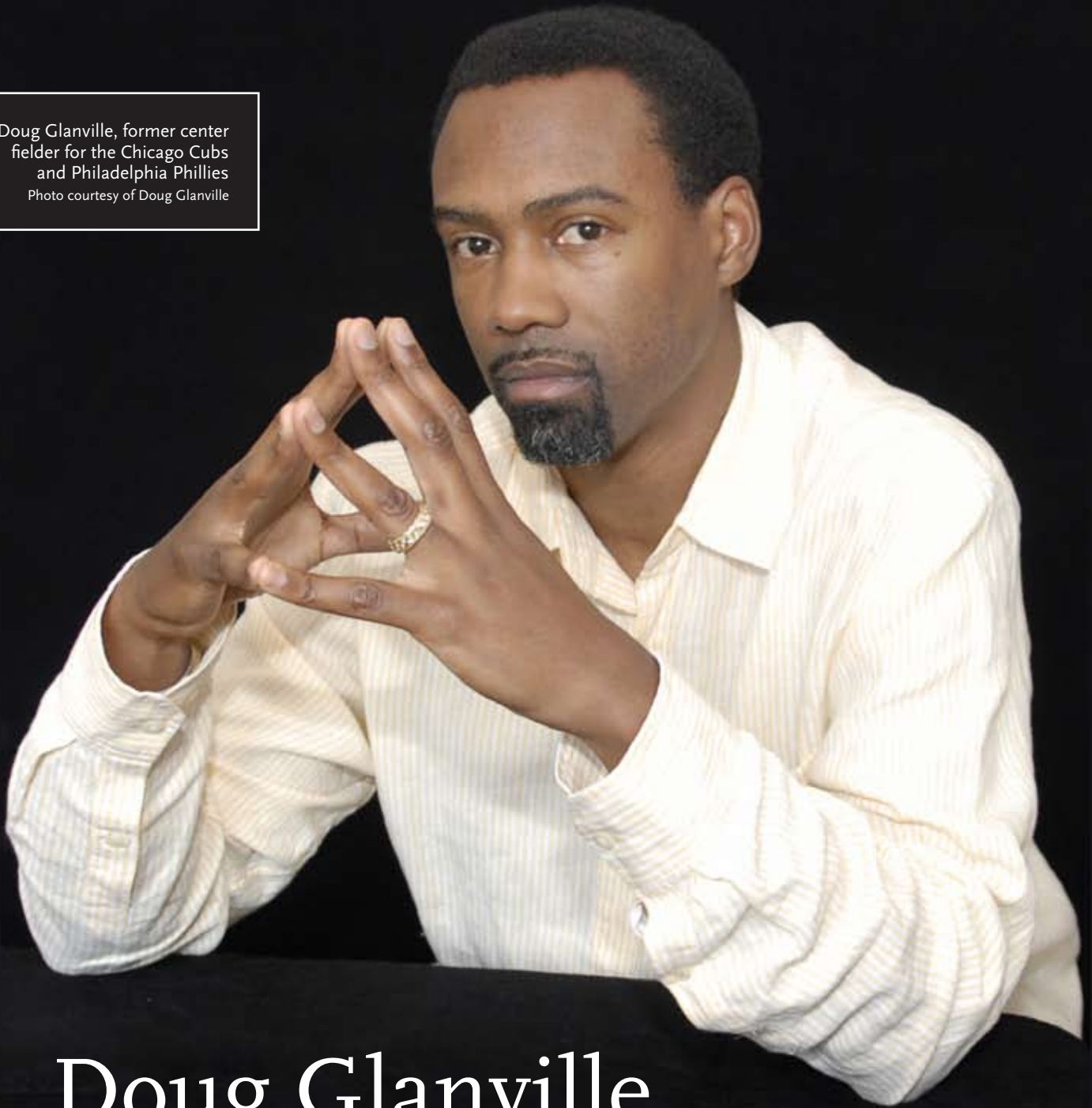
I believe micro machining refers to parts with an overall size or feature in the neighborhood of 1 mm. The features are not as large as common Swiss machined parts, nor as small as a nanometer (one billionth of a meter), but you will still need some form of glasses to make out the details. My suggestion is to not split hairs, but just state the size of the features you are comfortable making. The number of people who agree on the definition of the term “micro” is very small.

Peter Bagwell  
Slater Tools Inc.

*Peter Bagwell is an engineer at Slater Tools Inc. in Clinton Township, Mich., which specializes in rotary broaching tools.*



Doug Glanville, former center  
fielder for the Chicago Cubs  
and Philadelphia Phillies  
Photo courtesy of Doug Glanville



# Doug Glanville

After attending the University of Pennsylvania for engineering, Doug Glanville played centerfield for the Chicago Cubs and Philadelphia Phillies from 1996 to 2004, accumulating 1100 hits and a 293-game errorless streak. He is currently a baseball commentator for ESPN, has an op-ed column in the *New York Times* and just released his new book, *The Game From Where I Stand*, a personal account of day-to-day life in the Big-Leagues.

# one on one

INTERVIEWED BY NOAH GRAFF

**What was it like to be traded to the Phillies from the Cubs after being in Chicago for just a year?**

**DG:** It was two days before Christmas. I was in my basement and had recently heard that my grandfather had passed away. The phone rang and they said, "Hey, we've got news for you. We've just traded you to Philadelphia. Good luck." That was about it. Ed Lynch, the Cubs GM, called me. I was disappointed. I had come up through the minors in the Cubs system, so I felt that after all I had to go through to get there, I'd stay awhile. I knew it was a better opportunity for me to play every day in Philly, so I was fine with that, but it was hard.

**Are players constantly paranoid that they could go into a slump and lose their starting job?**

**DG:** Yeah, I think there's paranoia. It's not only about [slumps], it's the general cultural issues players face, like being replaced or sent down or traded. You're always looking over your shoulder on some level. You try to play and look forward but when you're struggling, it's a lot harder to do that. You're always worried about losing an edge, a step, a job, getting old. And change happens very quickly in Major League Baseball for sure.

**Did your teammates look at you strangely, coming from an Ivy League university?**

**DG:** The thing about baseball that I find fascinating and I enjoy is that it's a little bit of *Bull Durham*. When you're in the Minor Leagues, there are a lot of restrictions and you may be labeled or categorized. But in the Big Leagues, if you're a productive Major League player, the things that are different about you are kind of celebrated. Like, "oh, you're unique. You're Jimmy Rollins and you're the small guy who does well." Or, "you're the guy whose parents were running from Castro in Cuba." And a lot of guys know a lot about different things. Maybe they didn't study astrophysics like I did in college, but Billy Wagoner knows how to have an alpaca farm.

**Who were the craziest most superstitious players you knew?**

**DG:** Turk Wendell. That guy had all kinds of stuff going on—the licorice and the jumping over the line, pointing to the center fielder, listening to the National Anthem before he went to bed. Then the socks and the venison—he was a hunter.

And Ugueth Urbina. He had this strange ritual. He was a closer, so he could kind of linger in the locker room for a while. He would wear something, like long johns for the team and a blue turtleneck. He used to have that whole outfit on, wearing shower shoes, just sitting with his feet up, and it would be around the sixth inning. Then after the game he would shower in this outfit, in full clothes pretty much, other than his uniform.

**Did you ever see other players taking steroids, and do you have resentment for the people that did?**

**DG:** It was like a dirty little secret. I think players kind of guessed. But I never saw anybody take a needle and shoot himself up in the locker room. I'm sure it happened somewhere. I wouldn't say I have a ton of resentment, but here's the thing, it sort of affected my career, in terms of [not] having a starting job because I competed against guys that were [on steroids]. But I wouldn't trade places with them because the guys that took those drugs, they have to deal with themselves in the morning. They have these careers and they wonder who they are without it.

**Do you feel like life is slower now that you're no longer playing ball?**

**DG:** That was true for a while because there's no longer the pace of having a game every day. But then I started writing, and I had a book, and I started working for ESPN, and I have two kids. So, it's pretty fast right now. But with some flexibility because I don't have a pocket schedule telling me where to be every day. It's really a different world when you're outside of baseball. You realize how much you're in a bubble [when you're playing]. It really is a big adjustment.

*Find out more about Doug Glanville and his new book at [www.douglanville.com](http://www.douglanville.com).*



THE FOLLOWING COMPANIES HAVE PROVIDED  
INFORMATION ON CNC CONTROLS

# product focus

**R**alph Kropp of SIEB & MEYER USA says that today's CNC technology is designed to meet the ever changing, real-time needs of machine builders throughout the world. It provides faster machining, increased reliability, ease of connectivity to a factory network and improved operator efficiency. The limitations of CNC controls have been lifted with PC and open systems that provide machine hardware and software flexibility with unlimited program storage, plug-and-play factory connectivity, gauging and vision systems, data collection and more.



## ◀ FANUC CNC America

FANUC CNC America announces newly enhanced features and functionality for the 0i-D and 0i-Mate-D CNC Controls, which will be displayed at IMTS 2010, Booth #S-8919. The 0i-D features Nano CNC resolution for ultra high precision measured in nanometers and has an ultra compact design with high reliability, utilizing limited cabling and easy maintenance. This CNC control is suitable for many machining applications and is available in both Milling (0i-MD) and Turning (0i-TD) versions.

For more information, please contact FANUC CNC America at 888-326-8287 or visit [www.FanucCNC.com](http://www.FanucCNC.com).

## ▶ Mazak USA

Mazak's Mazatrol MATRIX CNC provides the high-speed processing of large amounts of data required for high-precision simultaneous five-axis machining. Mazatrol MATRIX includes a 64-bit twin-engine CPU that supports 16 million pulse encoders on each linear axis for sub-micron resolution. Advanced software capabilities make Mazatrol MATRIX easy and safe to program and operate. A voice advisor verbally informs operators of machine alarms and when settings have been changed during manual operation.

For more information, please contact Mazak USA at 859-342-1700 or visit [www.mazakusa.com](http://www.mazakusa.com).





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

## CNC Automatics Bought and Sold

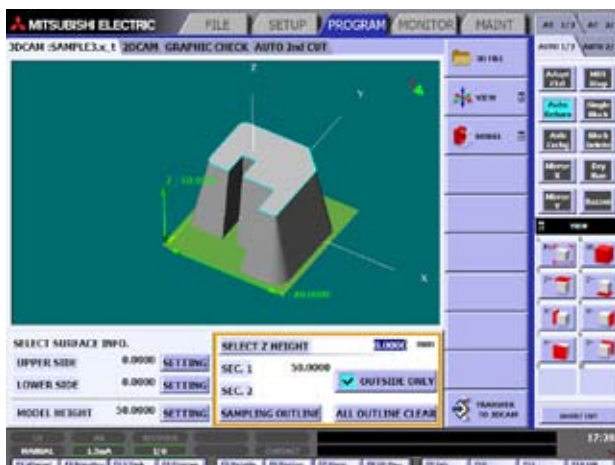
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## ▲ MC Machinery Systems, Inc.

The Mitsubishi 700 Series CNC Control delivers advanced programming capabilities for high-precision machining. The unit is controlled on a 15" LCD touch screen display, making overall operation much more comfortable for operators and allowing them to easily monitor machine operation from a distance. The control's simple menu configuration allows for easy navigation on the Windows XP operating system, and on-board manuals keep rarely needed information close at hand. Operation is further simplified with improved graphics, NC design and an 80 percent faster drawing time. The control offers a USB interface, which allows the user to effortlessly attach almost any expansion device.

For more information, please contact MC Machinery Systems, Inc. at 630-616-5920 or visit [www.mitsubishi-world.com](http://www.mitsubishi-world.com).

## Coming in the July/Aug 2010 issue of *TMW*

How it Works  
Parts Cleaning  
by Barbara Donohue

Product Focus  
Machining Centers

# product focus

## ► ProtoTRAK CNC

ProtoTRAK CNC enables skilled machinists who work in small quantities to transition freely between manual and CNC operation. It features geometry-based programming that is intuitive for machinists, making it useful for those who have limited exposure to G-code programming. The advanced user interface of the CNC differentiates it from production-oriented CNCs.

For more information, please contact Southwestern Industries, Inc. at 310-608-4422 or visit [www.southwesternindustries.com](http://www.southwesternindustries.com).



## ◀ SIEB & MEYER USA

SIEB & MEYER USA introduces its 8th generation CNC and motion control platform for multi-spindle automatic (MSA) machine tools. This next generation CNC provides a blend of industrial hardened technology with the advantages of a PC-based control. CNC control of the machine reduces setup time and adds single point threading and improves accuracy. Other benefits include data collection, machine network connectivity and remote diagnostic service.

For more information, please contact SIEB & MEYER USA, LLC at 513-563-0860 or visit [www.sieb-meyerusa.com](http://www.sieb-meyerusa.com)

## ► Siemens Drive Technologies

Siemens Drive Technologies recently announced the introduction of Sinumerik 828D for compact class machine tools. Designed to address the needs of complex turning and milling machines in the job shop segment, the new control combines CNC, PLC, operator panel and axis control for six CNC measurement circuits in a single operator panel. Complete with intelligent kinematic transformations, an efficient tool management system and 80-bit floating point nano precision, the new control benefits from a range of performance features previously reserved for the premium CNC control segment. The Sinumerik 828D is capable of full graphical, high-level language command and also supports ISO programming that is customary in Asia and the United States.

For more information, please contact Siemens Drive Technologies at 800-879-8079 or visit [www.usa.siemens.com/828d](http://www.usa.siemens.com/828d).



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### In Greece You Grease the Palm

*Lloyd Graff blogged about Greece's recent economic collapse. He asked readers, "Is the United States headed in the direction of a Greece-like debacle?"*

**Steven Horn** May 11, 2010 at 12:42 p.m.

Everything that has been done in the U.S. in the past 20 years is all about growing the government. The Obama administration is only advancing the whole of socialism at light speed. Think of what will happen when the rest of the world realizes that the U.S. is a giant Ponzi scheme. The people in Greece rioted because they see their government cash getting cut. What do you feel will happen when all those on the government dole get cut a little. We in manufacturing realize that you have to make something or sell something of value.

**Gordon Styles** May 13, 2010 at 12:53 p.m.

Greece's problems are not related to socialism—they are related to corruption amongst the ruling elite. Forget socialism and capitalism—the only thing we need in government around the world is good management with a social conscience. I believe that the engineers should be put in charge. Engineers tend to run things professionally, within budget and on time. We are not interested in wars, we hate debt, we have no respect for the bankers and we just want to build a better future.

### Starbucks Betrayed My Wife

*Lloyd blogged about how his wife, Risa, was crushed when Starbucks recently altered its Frappuccino recipe. He asked readers, "If you were Starbucks' CEO Howard Schultz what would you do to compete with McDonald's?"*

**Bill Popoli** May 6, 2010 at 11:20 a.m.

Starbucks has lived a good life selling a product with a high profit margin, supported by great marketing and intense brand loyalty. Along comes a recession, and McDonald's challenges

their position with a simple concept: value. What are you getting for the price? Is coffee really worth \$7? Starbucks must evaluate why they are losing customers and make some changes. Maybe lower prices, smaller serving sizes and other cost savings to reduce their store overhead. If they don't make some changes, they are gone.

**Steve Baranyk** May 7, 2010 at 7:07 a.m.

Good Lord, get a life!

**Jim Alderson** May 6, 2010 at 12:19 p.m.

You're poisoning yourself by eating at either place.

### Economic Patriotism

*In honor of Memorial Day, Lloyd reflected on the merits of buying American goods. He asked readers, "Do you consider yourself an economic patriot?"*

**Larry Clayman** May 31, 2010 at 7:57 a.m.

I think the time to "buy American" was 20 years ago when that cry first began. Back then China was not as much of a factor and we were not as entrenched in a global economy as we are today. It is virtually impossible to be an economic patriot even if you wanted to be. Try to buy anything electronic made in America or any clothes for that matter. The cat is out of the bag and he is prowling the land. Time to move on.

**Jim Flaherty** June 1, 2010 at 4:55 p.m.

The Asian mercantilists don't have any such qualms about being economic nationalists. How many U.S. robots and machine tools do you see in a Hyundai plant? I'll bet you can't even find an American Crescent® wrench. The Koreans placed a 300 percent duty on American cars while they were building up their domestic industry. Do you really think there is a Ford factory in South Korea? Just 28,000 U.S. soldiers covering their butts. The trade wars are over—and we lost.



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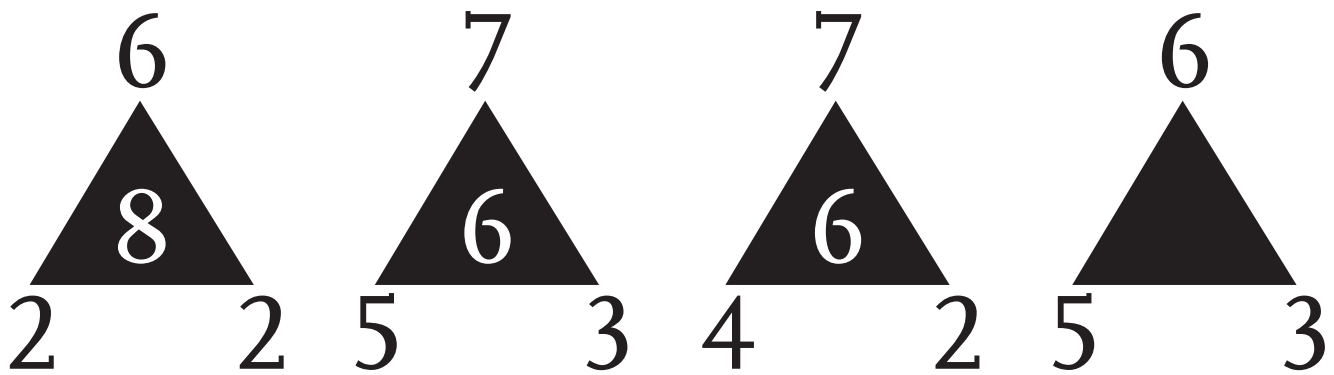
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# The Empty Triangle

Question: What number should be placed in the empty triangle?



## Who's not just number smart?

**Jerry Levine** of Chicago, Ill.; **Rob Klancnik** of Universal-Automatic Corp. in Des Plaines, Ill.; **Steve Richards** of Yamazen Inc. in Schaumburg, Ill.; **Michael Merrill** of Swiss Automation in Barrington, Ill.; **Janet C. Querido** of G. H. Berlin Lubricants in East Hartford, Conn.; **Adam C. Doughty** of Worthington Armstrong Venture; **Bryan Crouner** of Screw Tech; **Dean Kent** of Techniques, Inc. in Louisville, Col.; **Karl Reuther** of Reuther Mold and Mfg. Co. in Cuyahoga Falls, Ohio; **John & Cathy Mandell** of Point Technologies in Austin, Texas; **Kaken & Mark** of Mikro Industrial Finishing in Vernon, Conn.; **Joey Spencer** of A1 Machine Works Inc. in Bristow, Okla.; **Cathy McDaniel** of A1 Machine Works, Inc.; **Sheryl McNally** of AAA Technology & Specialties Co., Inc. in Houston, Texas; **Philip D. Shaffer** of Milacron, LLC and Cimcool Global Industrial Fluids; **Bill Freeman** of Stadco Inc. in Fairborn, Ohio; **Jack Steuby** of John J. Steuby Co. in St. Louis, Mo.; **Eric J. Rueb** of Northrock Industries, Inc. in Medford, N.Y.; **Jeff Riley** of Rawco Precision Man. in Califon, N.J.; **Chuck McMullen**; **Linda Knoth** of QEM Inc. in Largo, Flor.

Puzzle found in the May 2010 issue.

1. They have lobes
2. Crabs
3. Swimming strokes
4. They have trunks
5. They have claws
6. Lines
7. Detectors
8. Lights
9. Doors
10. Taxes



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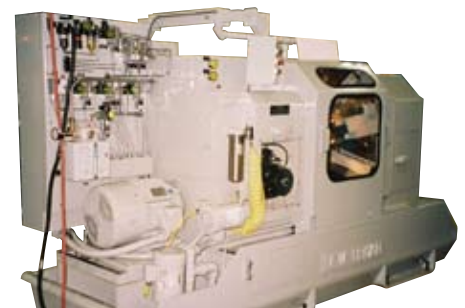
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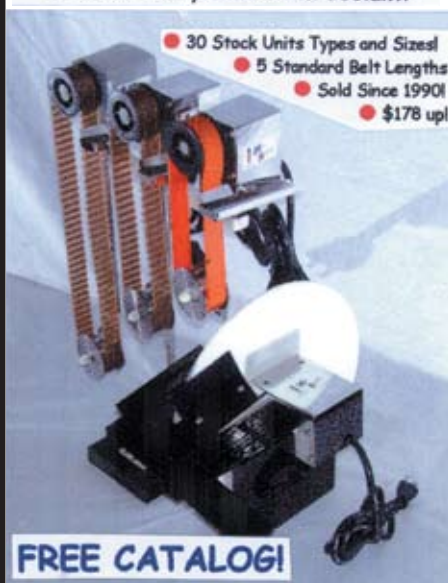
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# afterthought

## She Had Me at Hello

As I write this column, my wife Risa and I are preparing to celebrate our 40th wedding anniversary. In the winter of 1968 we were two students at the University of Michigan who met at a big mixer that I didn't even know was happening 'til I heard the music at the Michigan Union where I had gone to play ping-pong.

I walked into the "meet market" event with my pimple rubber paddle in my corduroy jacket pocket, surveyed the girls and saw Risa, smiling and beautiful in the wonderfully short skirt she wore on a very cold night. I went over, asked her name and convinced her to leave the loud music so we could talk.

I met Risa at a perfect moment in my life. I was 24 years old and a graduate student. When I was an undergrad I had lived in dread of being drafted and killed in Vietnam. I had friends who had died there. By the time I met Risa I had already volunteered for the National Guard, endured basic training and been activated for the Democratic Convention in Chicago. I felt liberated from the war and ready to live my life as a civilian. I was free and I was in a position to "receive."

I believe we get windows in life when circumstances place us in a position to be open to people and possibilities. I was in that window when I met Risa. I was looking for love and I was in an emotional place to both give love and receive it without reservation.

I suspected I was falling in love with Risa the first night we met. We had a bite to eat and I asked her to come to my apartment to watch TV. Risa was a 17-year-old freshman and her dormitory had a curfew. I promised her that I would drive her back before curfew. Unfortunately that plan failed because my Chevy Biscayne wouldn't start on a deliciously cold night. We laughed about it. I called a taxi that thankfully took two hours to come—more time to connect. Finally, I rode the taxi with her to Cousins Hall, kissed her goodnight and floated back to my apartment at two in the morning.

I think Renee Zellweger's wonderful line from the movie *Jerry McGuire* summed up how I felt, "You had me at hello."

I started talking about marriage after six weeks, which freaked Risa out because at 17 she had never dated anybody, was starting pre-med and was just getting used to living away from home.

Two months after we met, her parents Sol and Shirley Levine came up to Ann Arbor from Charlotte, North Carolina, to check me out. They were alarmed that Risa was out every night until midnight and they wanted to meet the mystery

guy. They really liked me.

I had short hair, which scored some points, and in the course of conversation I divulged that I performed the traditional Jewish prayer ritual of wrapping leather bindings on my arm before praying every morning. Risa told me later that she felt her parents "gave her away" after that first encounter with me.

Early in our relationship I wanted Risa to know something about baseball. I informed her that Ted Williams was the last .400 hitter and it was important to me that she always remember that fact. It was a subconscious attempt to pull her into my world. To this day Risa can tell you Williams batted .406, even if she now ignores the Cubs.

After her freshman year I went back to Chicago to work with my father. I sent her love letters and tapes and we connected on weekends. I was nudging her to get married. She was hesitating. During a trip back home to Charlotte Shirley asked her what she was going to do. Risa told her she just wasn't ready for marriage. Her Mom asked her the question that changed her life, "Can you imagine living your life without Lloyd?" Risa said she could not and her mother said, "then you should marry him," and that sealed the deal.

Now it's 40 years of marriage—three kids, our portion of death and sorrow shared and a love that gets deeper every week.

“I believe we get windows in life when circumstances place us in a position to be open to people and possibilities.”

 Lloyd Graff



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