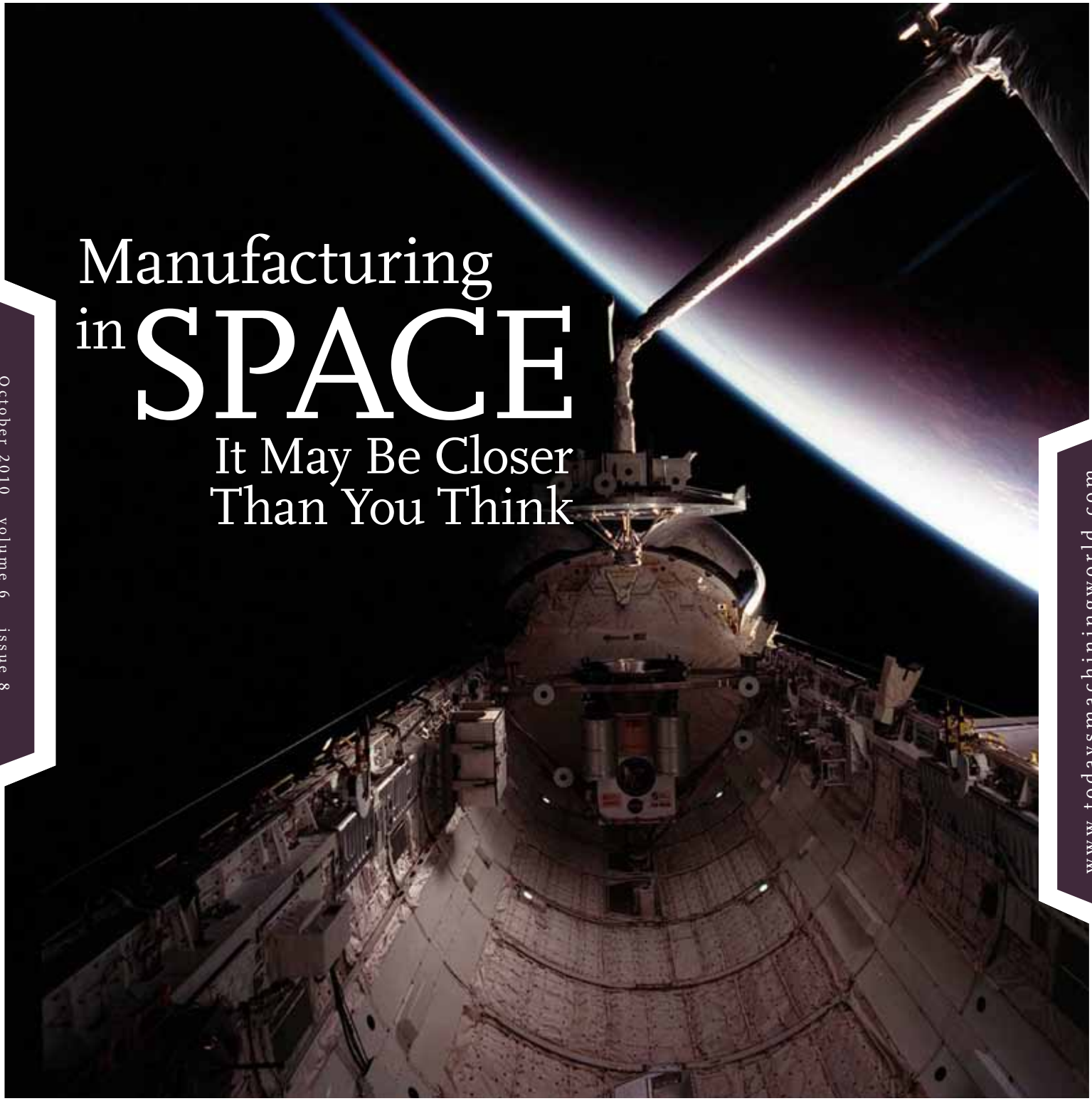
IMTS 2010 Review | Wire EDM | Coolant & Lubricating Systems

Today's Machining World

THE MAGAZINE FOR THE PRECISION PARTS INDUSTRY



Manufacturing in SPACE

It May Be Closer Than You Think

October 2010 volume 6 issue 8

www.todaysmachiningworld.com

F A S T C O M P A N Y.

TRUSTY-COOK INCORPORATED

WHEN IT COMES TO SPEED AND PERFORMANCE, EDDIE TROTTA AND THUNDER CYCLE DESIGNS RULE THE ROAD. For Eddie, the results speak for themselves. "Our customers expect only the highest quality, most intricately designed parts on our custom bikes. Trusty-Cook liners allow us to machine these complex parts to meet my standards at speeds that keep up with part demand."

Eddie Trotta

When you need speed and performance in the shop, remember Trusty-Cook Urethane CNC Spindle Liners.

TRUSTY COOK'S PATENTED URETHANE CNC SPINDLE LINERS

Full length round, hex, square, or other irregular shaped inner diameter bores are available for maximum

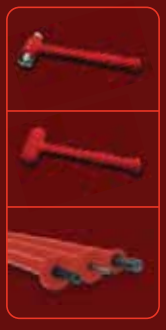
MAXIMIZE MACHINING CONTROL

OUT PERFORMS METAL, NYLON, DELRIN AND OTHER SPINDLE LINER MATERIALS COMMONLY USED

- Increase control
- Increase machining speeds by as much as 30% or more
- Increase profits
- Protect bar stock from marring and scratching
- Minimize machine vibration
- Custom made to fit ANY CNC lathe

SATISFACTION GUARANTEED

For more information on any of our products, or to place an order call or e-mail Jeff.



1.877.240.2462

www.trustycook.com

End user and dealer distributor inquiry welcome.

10530 E. 59th Street Indianapolis, IN 46236 Ph-317.823.6821 fax-317.823.6822

"The new Standard in Swiss Turning"

Affordable Maier Power

- Hybrid Swiss with removable guide bushing
- 32mm Bar Capacity up to 38mm without the guide bushing
- 7.5 HP/10HP (100%/60%) Integrated Main and Sub spindle
- 23 standard tool stations with 8 live tools
- Live tool power rating 2.2 HP
- Rigid 9000lbs granite polymer base casting
- 30 Series Fanuc controller
- FANUC HD-ALPHA series drives and motors
- 1,260 ipm Rapids with .75G's Acceleration/Deceleration
- C Axis with Main and Sub Spindle
- 7-Axis with simultaneous sub spindle
- Part chute with parts bin
- MPG hand wheel with program check
- Synchronous revolving guide bushing
- Pneumatic parts ejector (100mm)
- Centralized lubrication system with fluid level supervision
- German made quality with unmatched capability at this price!

MLK-32 Hybrid

MAIER USA, LLC
24 Town Forest Road, Unit 3 Webster, MA. 01570
Ph: 508.671.0055 • Fax: 508.671.0056
sales@maierusa.us • www.maierusa.us

MAIER USA
SWISS TURNING

Delcam
PartMaker

"PartMaker is very powerful CAM software for whatever your programming application and whatever CNC machine you want to use it for. I would recommend it to anyone, not just for Swiss machines, but milling, turning and multi-tasking machines. You can make PartMaker do whatever you want to make it do."

Ron Wilson,
Magnus Precision Manufacturing
Phelps, New York

PartMaker is the Leading Global CAM Software Solution for Automating the Programming of Multi-Axis Turn-Mill Centers and Swiss-Type Lathes

PartMaker helps companies like Magnus get ahead in today's ultra-competitive manufacturing environment.

Is inefficient CNC programming keeping your shop from reaching its potential?

Contact us today to see how PartMaker can help make your shop more productive.

PartMaker Inc.
A Division of Delcam Plc
Ph: **888-270-6878**
web: **www.partmaker.com**
email: **info@partmaker.com**

Upcoming Events

JIMTOF | October 28, 2010
Tokyo, Japan | Booth TBA

Tutorials
Testimonials and more on
www.delcam.tv

in this issue

Today's Machining World
October 2010 volume 6 issue 8

COVER: "The Wake Shield Facility (WSF) was designed and built by the Space Vacuum Epitaxy Center (SVEC), a NASA Commercial Space Center at the University of Houston, for the development of space-based manufacturing of thin film materials. The WSF is a 12-foot diameter stainless disk-shaped platform launched from the Space Shuttle that creates a unique ultra vacuum environment in its wake, with a combination of pumping speeds and vacuum levels thousands of times better than the best vacuum chambers on earth. Built for eventual long-term autonomous operation, the WSF supports all of the processing and characterization instrumentation required for advanced molecular and chemical beam epitaxy (MBE/CBE) materials processing." - *www.svec.uh.edu. Photo by NASA*

Departments

in this issue

contributors

Lloyd Graff started *Today's Machining World* in 2000 to serve the precision parts community. His love of good journalism started with reading the work of great sports-writers like Jim Murray and Jimmy Breslin. He honed his interest in writing as a sports editor and columnist for University of Michigan's *Michigan Daily*. His love for the machining business started with being regaled by his father Leonard Graff and uncle Aaron Pinkert with stories about deals and characters out of their business careers. Lloyd's view of magazine writing is that its core should be important ideas illuminated by real human stories.

D. Douglas Graham is a full-time freelance writer who lives and works in St. Louis, Missouri. He attended University of Missouri School of Journalism in the 1970s, and since that time has written more than a thousand articles on subjects ranging from manufacturing to unknown animals and natural mysteries. These pieces have appeared in a wide variety of consumer, regional and professional publications Graham has also been featured on television and radio talk shows throughout the U.S. and Canada as an expert on folklore and paranormal phenomenon.

Todd Toborg, *TMW's* creative director is starting to appreciate the smaller things in life more and more everyday. It's these little things that make his life's events go from exciting to memorable. Being able to witness the Chicago Blackhawks' Stanley Cup championship banner being raised was exciting, but having his son put his arm around him and say "I love you daddy," turned it into a truly great memory that he will get to relive everytime he sees that banner hanging from the United Center's ceiling.

Noah Graff, over the last year, has come to rely heavily on outsourcing to the Philippines to maintain the *Today's Machining World* Web site. One fascinating part of the workflow is that he has never actually spoken on the phone with his employees, communicating entirely with Yahoo! Chat. He has quickly learned from his outsourcees that emoticons (i.e. yellow smiley faces, sad faces, etc.) are vital for communicating online because voice inflection and facial expressions are inaccessible. When he's not chained to his computer it's a good bet that Noah's salsa dancing in Chicago.

Today's Machining World

www.todaysmachiningworld.com

A Screw Machine World Inc. Publication
4235 W. 166th Street
Oak Forest, IL 60452
(708) 535-2237

Student Editor
Lloyd Graff
lloydgrafftmw@yahoo.com
(708) 535-2237

Managing Editor
Emily Aniakou
emily@todaysmachiningworld.com

Features Editor/Web Site
Noah Graff
noah@todaysmachiningworld.com

Creative Director
Todd Toborg / todd t designs, inc.
tmwmagart@gmail.com

Circulation Director
Sue Ravenscraft / RS Media Services
smravenscraft@comcast.net

Sales Associates
Bob West (southeastern region) / Bayonet Media
tmw_bobwest@msn.com
Tel: 678-377-5749

Dan Hummell (all other regions)
dan@todaysmachiningworld.com
Tel: 630-715-4318

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: cpcreturns@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: cpcreturns@wdsmail.com

BPA WORLDWIDE

editor's note

Life's Little Instructions

I am reminded of the power of words every time I read snippets of the little masterpiece H. Jackson Brown Jr. wrote two decades ago called *Life's Little Instruction Book.*

I keep a 12" x 36" poster of an excerpt on a bathroom wall in my home to contemplate when the urge hits me. My wife's students and visitors may also benefit from the humble wisdom.

Sing in the Shower. Treat everyone you meet like you want to be treated. Watch a sunrise at least once a year. Leave the toilet seat in the down position. Never refuse homemade brownies. Strive for excellence, not perfection. Plant a tree on your birthday. Learn three clean jokes. Return borrowed vehicles with the gas tank full. Compliment three people every day. Never waste an opportunity to tell someone you love them. Leave everything a little better than you found it. Keep it simple. Think big thoughts but relish small pleasures. Become the most positive and enthusiastic person you know. Floss your teeth. Ask for a raise when you feel you've earned it. Be forgiving of yourself and others. Overtip breakfast waitresses. Say "thank you" a lot. Say "please" a lot. Avoid negative people. Buy whatever kids are selling on card tables in their front yards. Wear polished shoes. Remember other people's birthdays. Commit yourself to constant improvement. Carry jumper cables in your trunk. Have a firm handshake. Send lots of Valentine cards and sign them "Someone who thinks you're terrific." Look people in the eye. Be the first to say, "Hello." Use the good silver. Return all things you borrow. Make new friends but cherish the old ones. Keep secrets. Sing in a choir. Plant flowers every spring. Have a dog. Always accept an outstretched hand. Stop blaming others. Take responsibility for every area of your life. Wave at kids on school buses. Be there when people need you. Feed a stranger's expired parking meter. Don't expect life to be fair. Never underestimate the power of love. Drink champagne for no reason at all. Live your life as an exclamation, not an explanation. Don't be afraid to say, "I made a mistake." Don't be afraid to say, "I don't know." Compliment even small improvements. Keep your promises (no matter what). Marry only for love. Rekindle old friendships. Count your blessings. Call your mother.

I love the way Brown makes a big profound statement like "strive for excellence, not perfection" and then follows it with "plant a tree on your birthday" or "carry jumper cables in your trunk."

The ending is always worthy of a wistful exhalation for me. "Call your mother." I wish I could.

Lloyd Graff
Editor/Owner

Machining for the Derby

Your June story about the Soap Box Derby brought back many memories. After graduating from Ohio Wesleyan University in 1949 with a degree in both math and physics, I was recruited by Cutco cutlery (a division of Wearever Aluminum) to sell their product (knives) door to door. I was to hire 10 salesmen who would be paid by commission on their sales. I would also receive a five percent commission on all their sales plus the commissions I generated by my own sales. It sounded great. I would have been earning about $25,000 per year. This was huge money for a young man in 1949.

However, with my math degree, I soon discovered that a five percent commission of zero is zero.

I then joined Kerr Lakeside Inc., September 1,1949, to be their accountant (experience—two semesters of an accounting course) and also as the company buyer (experience—none). At that time Kerr Lakeside had just finished making their second order of Soap Box Derby axles. On the first order, they lost their shirt because they had no knowledge of how to machine with carbide. Because business was so bad they decided to try to make them again. This time, they were successful. A third order was received in 1949, and I was to buy the steel. The axles were made out of 5/8" square c1045 hot rolled steel bars. I placed the order for about 80,000 pounds with Youngstown Steel. When the invoice arrived their sales terms were .5 percent 10 days, net 11 days. The axles were about three feet long. We made them by cutting off the steel on a punch press, machining and threading two identical ends on Warner and Swasey turret lathes, and cross drilling a hole in each end through the threads. We special packed them in bundles of 25 to ship and sold them in Akron, Ohio, to Firestone Steel Products and another company called City Machine and Wheel. The latter company was Goodyear's outlet. The axles were ordered once a year. We also sold special slotted hex nuts and cotter pins to both companies, which we purchased from other manufactures to go along with the axles. We supplied these for many years. At some point in time the business faded away. I don't remember why.

Dick Kerr
Kerr Lakeside Inc.
Euclid, Ohio

Puzzle Obsession

These darn puzzles and riddles in your "Think Tank" have now become a full-blown obsession for me. The new issue arrived yesterday and all useful work was immediately suspended so that I could devote my full attention to the riddle. It's important to keep one's priorities in order! So, without further ado, my answer is "m".

Bill Hopcraft
Precision Design Craft
Millington, N.J.

Celebrating 10 Years of *Today's Machining World*

Today's Machining World celebrated its 10th anniversary during IMTS with a banquet dinner at Harry Caray's restaurant in downtown Chicago. In next month's combined Nov/Dec issue, we will continue the celebration with special articles and features in a commemorative edition.

Please send an email to emily@todaysmachiningworld.com with any memories, requests, favorite past articles, or comments about *TMW*. They may be printed!

From left to right: Todd Toborg, Emily Aniakou, Noah Graff, Lloyd Graff

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

Send your comments to: *TMW Magazine*

Or email us at: emily@todaysmachiningworld.com or lloydgrafftmw@yahoo.com

Machining without Coolant!

INTELLIGENT COMPRESSED AIR® Products

Replace messy mist systems & improve dry machining with clean, cold air!

Extend CNC Tool Life

The Model 5315 Cold Gun cools a two flute 3/8" carbide cutter on a CNC, increasing tool life by 50%. Ideal for diamond tooling.

Milling & Drilling

Fly cutters up to 460mm in diameter have been cooled with the Cold Gun. Dissipating heat with cold air extends tool life, increases speeds and feeds, and improves finishes.

Chill Roll

Cooling a roll with 20°F (-7°C) air keeps the material on the surface from bunching up, jamming or tearing. The metal surface transfers the cold temperature to the product.

Tool Grinding

Cold air eliminates heat cracking of carbide and tool edge burning during grinding and sharpening operations. Increased tool life between regrinds is the result.

www.exair.com/106/499106.htm

Increase tool life and machining rates!

The Cold Gun increases tool life, tolerances and production rates by eliminating heat build up. It produces 20°F air from ordinary compressed air. The Cold Gun is ideal for dry machining or to replace messy mist systems. It eliminates the costly coolant purchase and disposal.

- **Low cost, portable, quiet**
- **Won't freeze up during continuous use**
- **No health problems from airborne coolant**
- **Improves surface finish**
- **No moving parts - maintenance free**

Plant Engineering PRODUCT of the YEAR Finalist 2007

NOW MORE COOLING!

High Power Cold Gun

Twice the cooling power of standard Cold Guns.

EXAIR®

www.exair.com/106/499.htm

Manufacturing Intelligent Compressed Air® Products Since 1983

11510 Goldcoast Drive • Cincinnati, Ohio • 45249-1621 • (800) 903-9247 • fax: (513) 671-3363
E-mail: techelp@exair.com • www.exair.com

@EXAIR

By Lloyd Graff

book review

The Walk

The Walk by Richard Paul Evans is a story of great emotional loss and one man's step back from the ledge of suicide to the beginning of a new life.

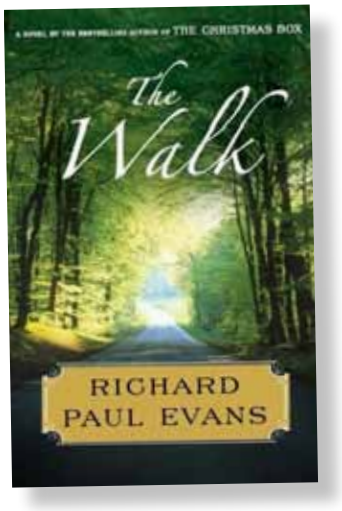
I picked up the book at my local library in audio format. Evans, a noted storyteller, spoke the book on four discs. I think the verbal approach gave it a power that reading it in print would not have reached.

I have become a devotee of audio books, but not just because my eyes have been damaged by several retina detachments. I really think that a superb reader can lift a book's connection to a listener far higher than the visual act of reading from the page.

My enjoyment of books is considerably greater today than at any other time in my life. I have always been a slow visual reader, so the advent of the audio book has transformed the book reading process into a wonderful form of entertainment for me and my wife, who also has vision issues.

The Walk is a good introduction to the audio book genre. Evans tells the story in the first person, and I bought into the story as if it was his own true rendition of what happened to him.

We follow as the narrator, Alan Christoffersen, tells his sad tale. It begins when he marries McKale, the beautiful over-arching love of his life from grade school. He starts an advertising agency in Seattle and becomes extremely successful. He builds an expensive new home and furnishes it elegantly—the world is his oyster. Then in six weeks, everything falls apart.



His wife is critically injured in a horse-riding fall. As he becomes distracted caring for her, his crooked partner undermines his agency and steals his clients. McKale leaves the hospital in a wheelchair and then contracts a urinary infection and dies. Alan loses his business and their house falls into foreclosure.

The story is grim, and frankly I skipped some of the saddest parts. I knew what was going to happen, so why wallow in it?

Alan Christoffersen comes very close to ending his life but pulls back when he connects with his wife's admonition that he continue his life without her until they meet again in the afterlife.

> "My name is Alan Christoffersen. You don't know me. "Just another book in the library," my father would say. "Unopened and unread." You have no idea how far I've come or what I've lost. More important, you have no idea what I've found."
>
> *-The Walk*

Alan decides he will pull himself out of despair by walking from Seattle to the farthest place he can go, Key West, Florida.

I bought the premise. The vision of embarking on an incredibly difficult journey was attractive in a quixotic way.

The story gets more interesting and upbeat as he starts his trek through Washington State towards Spokane.

The Walk is a good listen, but it isn't much fun or uplifting. But it is a short book with a surprise ending and for me the epilogue of the book is the highlight. I will not reveal it in this review, but it is worth enduring the sadness of *The Walk* to reach the inspiration of the end.

Comments? You can email Lloyd Graff at lloydgrafftmw@yahoo.com

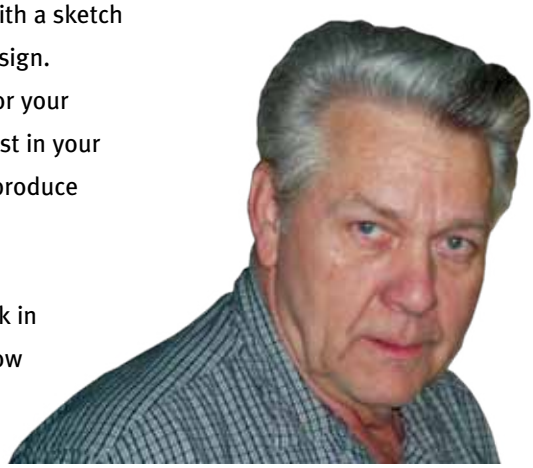
The TRAK Advantage:

You're a Machinist

You're Valuable

Experienced machinists are craftsmen. They can start with a sketch and make a part that is often better than the original design. Machinists are valuable because of the things they do for your company. If you are lucky enough to have a real machinist in your shop, you should give him the tools that enable him to produce at the top of his craft.

TRAK products are made for skilled machinists who work in small lot sizes. Visit our web site or call us to find out how they can make your skilled machinists more productive.



Neal Ellksen, *Folsom Tool*

SOUTHWESTERN INDUSTRIES

TRAK
ProtoTRAK

www.southwesternindustries.com
2615 Homestead Place
Rancho Dominguez, CA 90220

Telephone: 310-608-4422
Call toll free: 866-870-2061

By Lloyd Graff

swarf

Post IMTS 2010

It's fall of 2010 and IMTS is behind us. Baseball, football, basketball and hockey are all going on at the same time. Elections loom and the economy cha-chas along—three steps forward and three steps back, following its own rhythm.

The earthquake of 2008 is behind us, but we're still jumpy because the shock was so violent. The landscape is still damaged, with big unemployment, bankers living in bunkers, and homes, offices and factories waiting for occupants or lookers. But the unemployment statistics don't tell you that four million folks get new jobs and approximately the same number leave jobs, some voluntarily, every month. Stores and restaurants (fast food) are busy and zillions of smart phones are selling every month.

The pundits will tell you that almost everybody is "angry and won't take it anymore," but I personally don't feel that visceral anger that supposedly suffuses the American populous. Obama is unpopular because he is the President of a lackluster economy that he campaigned to lead. If we have gridlock after the elections Obama will stand to gain like Bill Clinton did in 1994, and might even be re-elected if the Republicans nominate a Palinesque candidate who scares America into four more years of Barack.

The impression I got at IMTS is that the machine tool builders and buyers have emerged from the cave, but still have six months of food cached away. The memory of 2009 still affects every major decision machinery buyers make, which means a lot of tooing and fraying before orders are placed. But people are buying—just what they perceive they must—because God forbid they should make a mistake.

The stock and bond markets reflect the post cataclysm mood. Cha-cha-cha, back and forth, small investors hiding under their beds, two year bonds paying .4 percent, and speculators buying gold bullion and sterling silver platters because—other people are. Excuse me, the stats show deflation yet the "smart money" likes jewelry? Something is goofy about that picture.

I see an economy that values skills and smarts. The success of educational institutions during the post catastrophe period tells me that investments in things like houses and cars will take a backseat to spending for knowledge and productivity. You may think you sell machines and machined components, but what you are really selling is your unique ability to help somebody else make money. The message I got from IMTS was that "cool" machines are nice but customers want ideas, a comfort level of success, backup and exquisite hardware. Nice machines are just fancy iron without the ideas and the service. And the value of ideas does not depreciate. Service people still rent out for $150 per hour—plus travel.

Fall 2010—buy brains, sell gold.

The "Jobs Bill" that

President Obama signed September 27, may have sounded like another "stimulus" boondoggle, but it really has a lot of important goodies for the machining world.

The section of the bill that has immediate impact for the machine tool business is the expensing provision. The current rule was scheduled to expire by the end of 2010, which would have reduced the expensing write-off from $250,000 to $25,000. The new law pushes up the expensing provision to $500,000. For smaller companies making profits, this provision, which extends through 2011, will mean better cash flow and less money for Uncle.

Other provisions in the bill backstop the Small Business Administration with major new resources to lend to small business. With banks too frightened to fund loans and credit lines, this major infusion of guarantees by the Feds should help get the bank examiners off the backs of the loan officers.

The ability to use losses for five years to offset profits should also start to lubricate the economy.

The Administration and Congress finally appear to be starting to "get it" as far as small business is concerned. Funny, how an election can focus people's minds and even gather a consensus across party lines.

It was nice to see Brad Ohlemacher, president of EMC Precision of Elyria, Ohio, a third generation screw machine guy of all things—attending the signing ceremony. To quote the illustrious Rodney King, "Can't we all just get along?"

In September, Loeb Winternitz

Industrial Auctioneers auctioned off Roseland Metal Products of Dolton, Illinois. I think an event like the Roseland sale tells us quite a bit about what is going on in the small contract shops—the core of precision machining.

Roseland was a casualty of the recession but also of a management that made scant investment over the last 10 years. The most significant capital investment was the retrofit of six out of 15 Brown and Sharpe screw machines with an early incarnation of AMT's ServoCam upgrade technology.

Roseland bought a SNM clone of the New Britain model 52 in 1998. The past decade has been a cruel one for shops like Roseland, which kept playing the old game without expanding its customer base.

I talked to auctioneer Charlie Winternitz, who skillfully orchestrated the sale for the seller of the Roseland assets. He told me that 160 bidders signed up for what he had viewed as a tough sale. More than 100 bidders bought items. That was surprising breadth for a smaller auction that brought approximately $300,000 gross with no equipment newer than 12 years old.

The SNM multi sold for $19,500 plus buyers fee, while the ServoCam Brownies brought $7,500 to $15,000. A 2" standard cam B&S brought $8,000. The sale tells us that a lot of folks are interested in buying old school equipment but they are unwilling to go to the bank to pay for it. If they can pay for it out of cash flow or from the piggy bank they are interested, but if they have to check with their banker it's often a "no go."

The sale also indicated that old CNC equipment has little value. Four nice Traub TNM lathes from the mid 90's with magazine loaders couldn't crack $4,000 each, and a Brother drill and tap 1993 vintage brought $8,000 plus BP.

Buyers scouted the tooling for sexy nuggets, which indicated that business in the hustings has some life. For example, two B-13 Reed thread rollers with New Britain bases brought $650 each on average—cheap for a user, but a strong price at a Web auction.

Roseland tells me that bargain hunting buyers are plentiful now, even in shop depleted screw machine land. Buyers are frugal, but willing to spend if there is an attractive deal.

Thoughts on IMTS 2010

- The DMG/Mori Seiki combined exhibit space at IMTS was aircraft carrier big. They spent over $8 million on the show with the goal of selling 200 machines. They made a statement, even if they sold half that.

- Doosan took Haas's spot on the floor from 2008, while Haas took a smaller less strategic location. Both had a lot of action. This IMTS decision may reflect the big Haas push into China, India and Eastern Europe, and Doosan's rising stature in North America.

- IMTS's crowd looked old, overweight, male and white—except for the Asians who were young, thin and wore ties. Amidst the thousands of people at the show there were very few smokers, even outside in the permitted area. McCormick Place never looked better and the food was significantly improved. Also, I didn't hear one complaint from exhibitors about the notoriously difficult union workers at McCormick Place.

- On the second day of the show, *Today's Machining World* had a wonderful 10-year anniversary party at Harry Caray's restaurant. Celebrating with friends, family, colleagues and machining folk was a great gift. Barack sent his regrets.

swarf

I believe 2010 will go down as the year the wage discrepancy between public and private employees began to narrow.

According to a recent article in *USA Today*, the average yearly pay including benefits for a federal government worker is $81,000 compared to $51,000 for a private business employee. Cadillac health plans and defined benefit pension programs have bloated federal payrolls. State and municipal payouts have kept up with or sometimes surpassed those of the federal.

The tide is changing. The dike of unchallenged government pay and benefits is showing leaks. California is broke and politically stalemated, but furloughs are now common in the school systems and layoffs and hiring freezes are the norm. In Illinois, it appears that 10 percent of the teacher's pension plan portfolio will be sold to pay current pension obligations. In Washington DC, 241 teachers were not rehired by the gutsy new school superintendent.

The rationing of jobs we have witnessed in private business for the last 10 years is taking root in government. The latest monthly employment figures showed 131,000 lost government jobs. Some of these were temporary census jobs, but others were in schools, bureaucracy, police, sewer, etc.

I feel somewhat ambivalent about the new trend. I see an erosion of middle-class America, which is regrettable, but I also see the beginning of the cleansing of government excess that has been gumming up the engine of American capitalism for 50 years.

The lead story in the August 22nd *New York Times* discussed the "striking" drop in the investment in common stocks. The article went on to talk about the widespread disillusionment with equities since the dot-com crash and the subprime

demolition. The Dow Jones average is actually down over 1000 points since 2001.

Personally, I think the widespread disgust with the stock market performance by individual investors derives from the "gaming" of the market by professional computer jockeys for whom long-term investing is holding a stock or an index for a week. The Quants, for whom the stock market is a video game, use huge leverage and a lightning fast computer thumb to play for pennies on a $50 stock.

I was thinking about this as I watched both the Little League World Series and Major League baseball games this past weekend. The kids are allowed to use metal and graphite bats but in Pro ball only wood bats are used, because it would be unsafe for the big boys to use metal sticks at the plate. Pitchers would literally get killed by batted balls.

We have speed limits on our highways and hold the maximum speed of showroom cars well below what is possible. But for trading stocks we have allowed the "gamers" to turn the markets for the most important business enterprises in the world into a casino.

This is nuts.

Major League baseball finally shut down the steroid tap, but stock trading is so out of control it is poisoning the public markets. Just because a Ford can theoretically go 200 mph on the interstate does not mean it should be legal.

Until the equities market or government regulators hold back the velocity of trading, long-term investors will take their marbles and go home.

The Honey Crisp apple season

began with the Labor Day weekend. Honey Crisp is the apple that has overwhelmed the Golden Delicious, Macintosh, Pippin and Gala varieties in the hearts and palate of the applistas who frequent farmers' markets in search of the perfect pomme.

Count me as an apple knocker with credentials.

I have traveled to the orchards of Wenatchee, Washington; Logan, Utah; Laporte, Indiana; and Honeoye Falls, New York, searching for apple succulence, but in the mountains of North Carolina I found my best Apple anecdote if not the tastiest fruit.

I stopped at a roadside stand near Asheville where a young woman was selling Winesaps—not my favorite variety but a presentable late season species. I always like to talk to apple sellers for tidbits about their growing approaches. The Winesap lady told me her story gladly. She said her husband was a minister and they knew they never would make a lot of money. When their children were born they planted apple trees on their homestead. They tended to trees with great care, and after five years began to get apples.

swarf

Their plan was to let God's bounty pay for their children's college education. She said they took a portion of the proceeds of each year's crop to buy more trees, and the Apple reinvestment plan was working just as she had hoped.

I hope they planted Honey Crisps before they caught fire in the market. If they did they probably could afford Harvard.

Every column, article or "Swarf" piece I have written for *Today's Machining World* over the last 10 years started as handwriting on a legal pad.

I may have graduated to an iPad for email and the *New York Times*, but to write creatively I find handwriting connects me to my juices more fluidly than keyboard stroking.

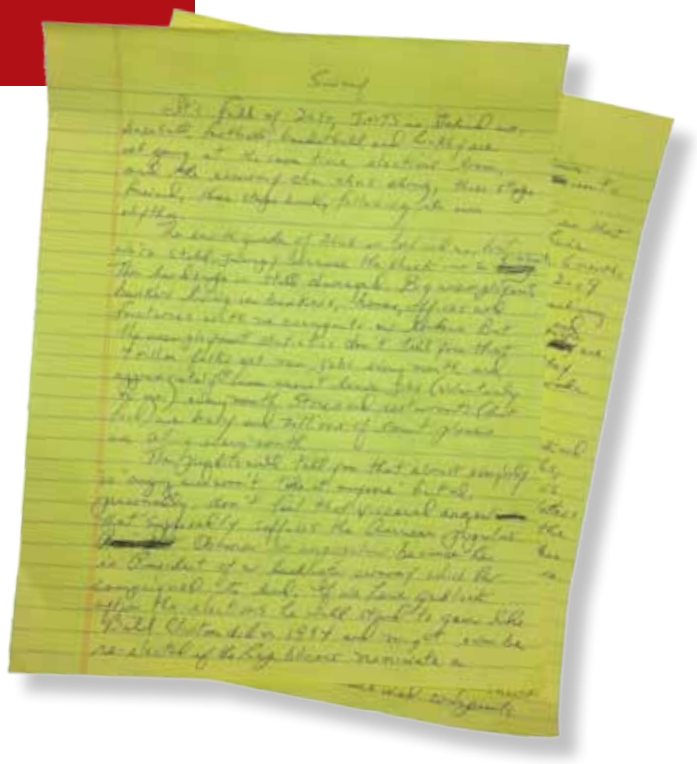
The virtues of handwriting are now clearly visible on an MRI, according to an article in the *Wall Street Journal* on October 5th. Brain activity is enhanced in young children who learn to connect letters into words on a page. For baby boomers, handwriting could be a useful exercise to keep us sharp as we age.

Virginia Berninger, Ph.D., a professor of educational psychology at the University of Washington showed that significant differences in brain function occurs with handwriting activating "massive regions involved in thinking, language and working memory—the system for temporarily storing and managing information."

For me, writing material for *TMW* by hand connects me with language in a beautiful way. I hear the words in my mind as I write them. Handwriting allows me to get in the flow of the words. I can "hear" a discordant word when I write it by hand, which makes for an ugly page to transcribe because I do a lot of crossing-out and writing in the margins. But the process works for me.

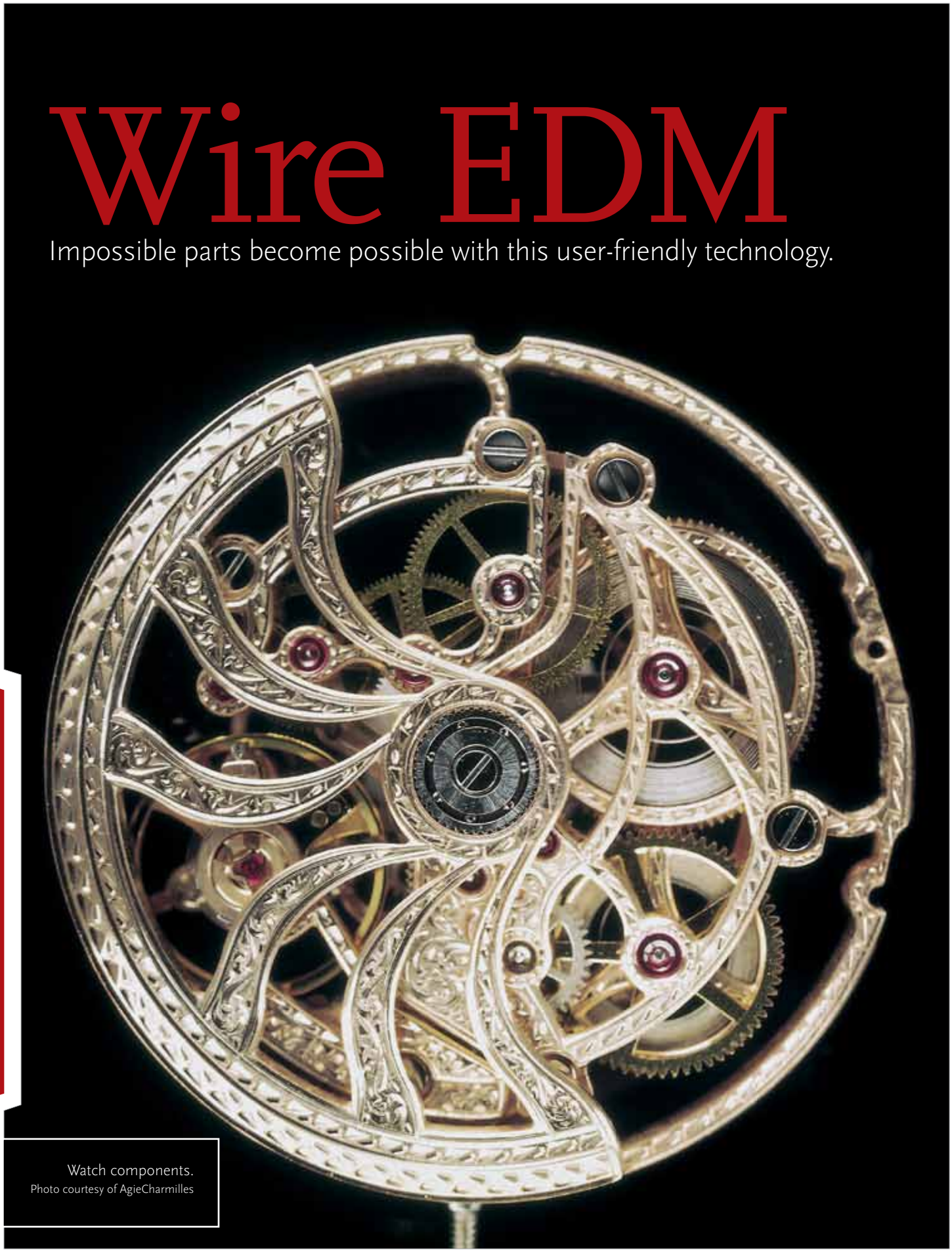
I think there is an analogy to machining. The artisans of the craft can take a drawing and transform it into a perfect part in their heads before it goes into a machine for machining, but the initial machined component is rarely perfect. The skilled machinist can feel the imperfections in the finish and takes that information to the toolmaker for adjustment.

Perhaps the more advanced we move in technology the more we can still value the building blocks of creativity housed in our hands and brains.



Wire EDM

Impossible parts become possible with this user-friendly technology.



Watch components.
Photo courtesy of AgieCharmilles

how it works

By Barbara Donohue

Picture a band saw, but instead of a saw blade there is a thin wire, positioned vertically or at an angle, with which you can cut in any x-y direction. This is wire EDM (electric discharge machining), a process that can cut any electrically conductive material, hard or soft, even carbide or diamond. Wire EDM cuts without contact, burr free. Because the wire is so fine, you can cut small-radius inside corners or even narrow slots. Because the wire never touches the workpiece, there are no cutting forces, so you can cut thin stock, fine ribs, or very delicate forms.

Wire EDM has been used in industry for about 50 years. Modern wire EDM machines incorporate CNC controls and built-in sensing and intelligence, making them increasingly capable and easy to use.

Zapping material to remove it

Back in the 1700s, English scientist Joseph Priestly discovered that he could erode away metal with electric discharges. However, it wasn't until World War II that the process became useful when two Russian scientists, a married couple by the name of Lazarenko, developed a controlled method for using electricity to remove metal. In the early days, EDM was used mainly to remove broken taps and drills by feeding an electrode into the center of the broken tool. In addition to wire EDM, the same principle is used today in diesinker, or vertical EDM, which makes a cavity in the workpiece using a copper or graphite electrode in the desired shape. An EDM drill uses a tubular electrode to "burn" a hole through conductive material.

Wire EDM, which came into commercial use in the 1960s, uses a wire, stretched taut, as the electrode. Usually the workpiece and wire are submerged in deionized water. The water acts as a dielectric (electrical insulator) until the electrical discharge happens. As the wire approaches the workpiece, at some point the distance becomes small enough and the voltage great enough that the dielectric breaks down and allows discharge of electricity—a spark—between the wire and the workpiece.

The electric discharge heats a small portion of the workpiece to thousands of degrees. The dielectric becomes an ionized gas, or plasma, ballooning out at high pressure. The plasma bubble collapses, forcing the melted material to scatter into the dielectric fluid, leaving a small crater in the workpiece. At the same time, a little bit of the wire erodes. This discharge process repeats rapidly, up to 250,000 times per second. Thus, the metal near the wire is removed and a cut forms along the wire. A flushing flow of water cools the wire and removes the particles produced.

Because the wire is also eroded somewhat in this process, a wire EDM machine constantly feeds fresh wire from a spool. The machine chops up the used wire and leaves it in a bin for recycling.

To cut an internal form, you have to provide a pilot hole. This can be done with a conventional drill or with an EDM drilling machine. The wire is threaded through the hole to start.

Modern wire EDM machines provide automatic threading. A water jet or air jet guides the wire through the workpiece. The machine automatically makes the necessary mechanical and electrical connections. If the wire breaks while cutting a part, the machine senses the break, re-threads the wire, and resumes the cut where the wire broke.

The wire

Critical components of the EDM process are the wire and the dielectric water. Wire comes in several materials and a range of diameters, with 0.010" or 0.012" most commonly used, said Alicia Smith, territory sales manager at Belmont Equipment & Technologies, Madison Heights, Ill.

The wire used for most applications is made of brass, said Brent Pasquantonio, territory sales manager at Belmont. If you need higher performance, you might choose a zinc-coated wire for increased speed and improved surface finish. The zinc coating allows the wire to tolerate higher heat and helps keep the spark more consistent.

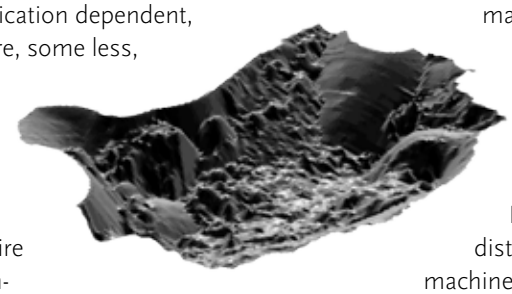
Heat-diffused, annealed wire—brass wire enriched with zinc—can tolerate more heat in the cut. To wire EDM a thick part, which would not get much flushing water to the wire at the center of the workpiece, you would use a high-

Above: Wire, filters and other consumables used on wire EDM machines.
Photo courtesy of Belmont Equipment & Technologies, Inc.

performance wire, Pasquantonio said. It could withstand the heat, maintain consistency throughout the cut and resist breakage.

Today's EDM machines sense the wire and cutting conditions and adjust the cutting speed accordingly, Pasquantonio said. "Just changing the wire can give you speed improvement," he said, without making any other adjustments. In one application, for example, brass wire made a cut in 10 hours. But diffused, annealed wire reduced that to seven hours, without changing any settings. The process could be optimized by adjusting settings on the machine, he said.

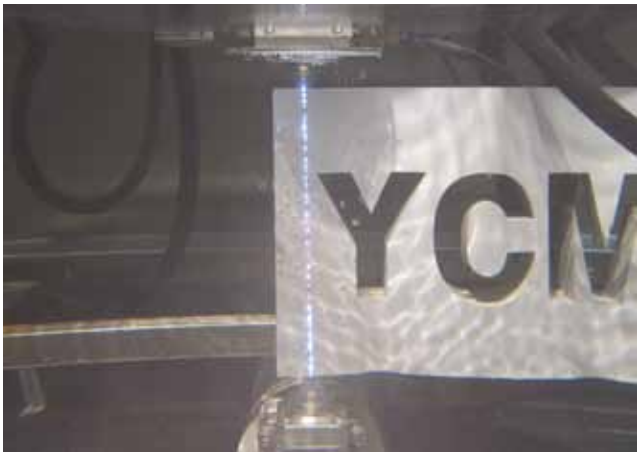
The improvement is very application dependent, Smith said. "Some improve more, some less, but there's always a dramatic shift. Even 5 percent improvement can make it worthwhile." Any type of wire will cost only a few dollars per hour, and a high-performance wire can more than pay for itself in increased production, said Pasquantonio.



Other types of EDM wire are available for specific applications. Implantable medical devices, for example, must not encounter copper, so molybdenum wire is used. Break-resistant steel-core brass wire is used for applications where the wire is under high tension.

The water

To get the best performance from a wire EDM machine, you need to maintain the water's cleanliness and correct conductivity. In the EDM process some of the metal goes into the water as small particles and some gets dissolved in the water. The water recirculates through a two-part water treatment—a filter to remove particles, and a deionizing resin to remove metal atoms from solution. Good maintenance practice includes periodically replacing the filter cartridges and sending the deionizing resin out for regeneration.



Applications

Ideal candidates for wire EDM pose one or more specific challenges—"Small-radius inside corners, tight slots, or difficult-to-machine material, whether hardened parts or a high performance alloy," said Steve Bond, national sales manager, EDM group, Methods Machine Tools, Inc., Sudbury, Mass. "Sometimes you'll have a part that absolutely can't have any burrs on it, or you may want a superior surface finish, said Greg Langenhorst, technical marketing manager at MC Machinery Systems, Inc., Wood Dale, Ill., distributor of Mitsubishi EDM machines. "Some machines can produce fine surfaces—2.5 to 3 microinches [RMS]."

Wire EDM is moving into applications that were previously broached, said Bond, such as the "fir tree" slots, where turbine blades attach to the hub for power generating applications.

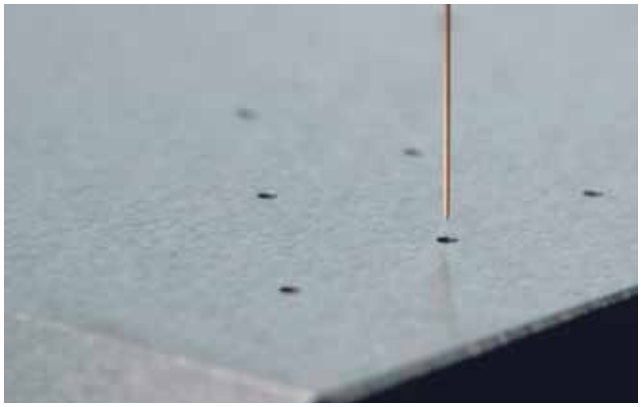
Subcontracting wire EDM

You may already send parts out to shops that specialize in wire EDM work. "Most of our work is subcontracting—commercial, aerospace, medical, tooling, anything that uses a machine shop," said Richard DeRosa, production manager at EDM Xpress, Inc., Placentia, Cal. "If a shop can machine a part, they do that. EDM is often the finishing touch. If a customer designs a part with one last cut they can't get to, we'll EDM it."

An experienced EDM shop can help you do what needs to be done, even seemingly impossible parts, DeRosa said. "A customer may say, 'I need it made, but I don't know how it's going to be made.'" Sometimes DeRosa works with an engineer and says, "It will be cheaper if you do it like this," changing features that are hard to achieve. "You can make slight changes and save money."

Above: The crater formed by an EDM discharge, 30 micrometers wide x 10 micrometers deep.
Photo courtesy of AgieCharmilles

Left: Sparks along the wire in a YCM wire EDM machine.
Photo by Barbara Donohue



Left: Automatic wire threading of a 0.25 mm diameter wire into a 0.7 mm hole.
Photo courtesy of AgieCharmilles

Below: Deionizing (left) and filtration columns on an Ebbco accessory filter system.
Photo courtesy of Belmont Equipment & Technologies, Inc.

Bringing wire EDM in house

Most shops that spend $30,00 to $40,000 annually jobbing out wire EDM work can justify getting their own machine, said MC Machinery System's Langenhorst.

When shop management discovers it costs only five or six dollars an hour to run wire EDM, they often quit outsourcing, said MC Machinery System's Bond.

They may get an EDM machine for one particular project—an inside corner they couldn't cut, or parts in a high-nickel alloy. The new EDM machine might be running only one-third of the time, Bond said, and then someone realizes it could run overnight for $25 or $50 and get a part made. You can load up the EDM machine's table with a punch and die set on one side and a carbide piece on the other and run it unattended all night, he said.

Your own wire for higher quality, predictable scheduling

A shop that does its own wire EDM can control the process, said Bond. "If you have the machine in house, you can take more passes to get a better finish or higher precision. Sometimes you have the opportunity to make products for a customer better than you've delivered in the past. For example, a punch or die that will last longer."

With in-house wire EDM you can get control of scheduling and don't have to deal with the EDM shop's lead time, so you can quote shorter delivery times.

Wire EDM opens up possibilities

"Whatever you think you can use wire EDM for, there's much more," Bond said.

One shop bought a wire EDM machine because they needed to cut tubes with no burrs, said Gisbert Ledvon, business development manager at Agie Charmilles LLC, Lincolnshire, Ill. As soon as employees returned from the training class they were sending emails with "Can we do this? Can we do that?" It opened up the engineering department's mind to do different things, he said. For example, a tool and die shop buys a wire EDM machine to make punches and dies, and then they see they can cut pressure pads and strippers, too, said Langenhorst. Another shop designed its own tool holders for turning tools and produced them on wire EDM machines.

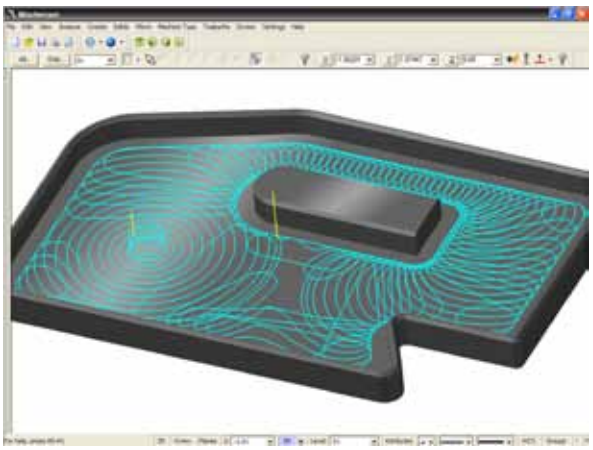
Today's wire EDM machines are expert systems, said Ledvon. The machine makes the rough cut and skim cuts—one, two, three. It even knows to slow down in the corners. All this know-how is in the machine. You can come back six months later, put in the same program, and get the same part. If you want a very reliable and automatable process, wire EDM is perfect, Ledvon said. "It may be slower than [conventional] machining, but who cares as long as you can run it over the weekend?"

The wire EDM process is clean, there are no expensive end mills to wear out, and you always have a fresh cutting tool. Also, Bond pointed out, "There is no fire hazard—it's done under water."

Wire EDM means a different way of doing things. It requires a change in perspective—you have to think of wire and water instead of feeds and speeds—but it can make cuts not possible on a machining center. Adding wire to your repertoire can increase your capabilities and help improve your competitiveness in today's challenging markets.

For more information:

Agie Charmilles: www.gfac.com/us
Belmont Equipment & Technologies: www.belmont4edm.com
EDM Xpress, Inc.: www.edmxp.com
MC Machinery Systems, Inc.: www.mcmachinery.com
Methods Machine Tools, Inc.: www.methodsmachine.com



◀ CNC Software, Inc.

At the IMTS show CNC Software introduced Mastercam X5, which includes new dynamic milling techniques, multi-axis machining, Smart Hybrid Finishing, and more. Dynamic milling constantly adjusts the toolpath to ensure the most efficient cut possible and allows use of the entire tool flute length, often eliminating the need for multiple depth cuts. New dynamic milling techniques include Dynamic Rest Mill and Dynamic Contour. Dynamic Rest Mill behaves in a manner similar to the current toolpath, but uses dynamic milling motion instead of a core mill or area mill motion for the rest operations.

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

▶ Hardinge

At IMTS 2010 Hardinge introduced their new GD-5AX-160 tilting, dual-axis trunnion rotary table. When used on a 3-axis VMC this 2-axis positioning system eliminates the need for sine plates and other expensive fixtures for angular milling. The trunnion has a total 360 degree tilt. Optional adjustable hardware limit switches, and programmable software limits are available to limit travel for protection when larger workholding fixtures and parts are being machined.

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

◀ Mitsui Seiki

Mitsui Seiki's "Vertex" line of Vertical Machining Centers has a new addition, the large Vertex 750-5X. The new Vertex 750 offers a work envelope of X-axis 750 mm, Y-axis 800 mm, Z-axis 700 mm, a weight capacity 500 kg (1100 lbs), a small footprint 2200 mm x 3740 mm, a hand-scraped casting for ultra-high geometrical accuracy, a rapid traverse rate of 48 m/min. (1890 ipm), feed rate of 20 m/min. (787 ipm). An integrated trunnion offers fourth and fifth axes with maximum work size of 950 mm dia. and 650 mm high; 15,000 or 25,000 high stiffness spindles with 40 taper or HSK63 tool types; ergonomic access for loading and operation; and Fanuc 31i CNC with the latest Fanuc features for multi-axis contouring.

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

fresh stuff

▶ Motoman Robotics

The Motoman® 7-axis VA1400 "Versatile Arc" welding robot dramatically increases freedom of movement and maintains proper welding posture at all times. Located in the lower arm, the seventh axis (E-axis) acts as an elbow, providing improved torch access into tight places and allowing the robot to easily reach both sides of a part. Available in floor-, wall- or ceiling-mounted configurations and ideal for high-density layouts, the space-saving VA1400 robot increases productivity and provides the ultimate in welding performance.

For more information, please contact Yaskawa America at 937-847-6200 or visit www.motoman.com.

◀ Okuma

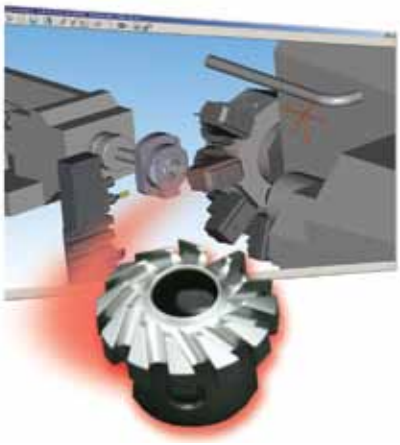
Okuma unveiled six new machines at IMTS 2010, as well as new technology, including the new Machining Navi software, Constant CARE remote service, a new expandable tool matrix and a newly developed coolant monitoring system. The new Multus B750 is a large multi-tasking machine with a 4-meter bed and a maximum turning diameter in excess of 1 meter (41.34", 1,050 mm). The Multus B750 is equipped with a big bore spindle, W sub-spindle, and long boring bar option.

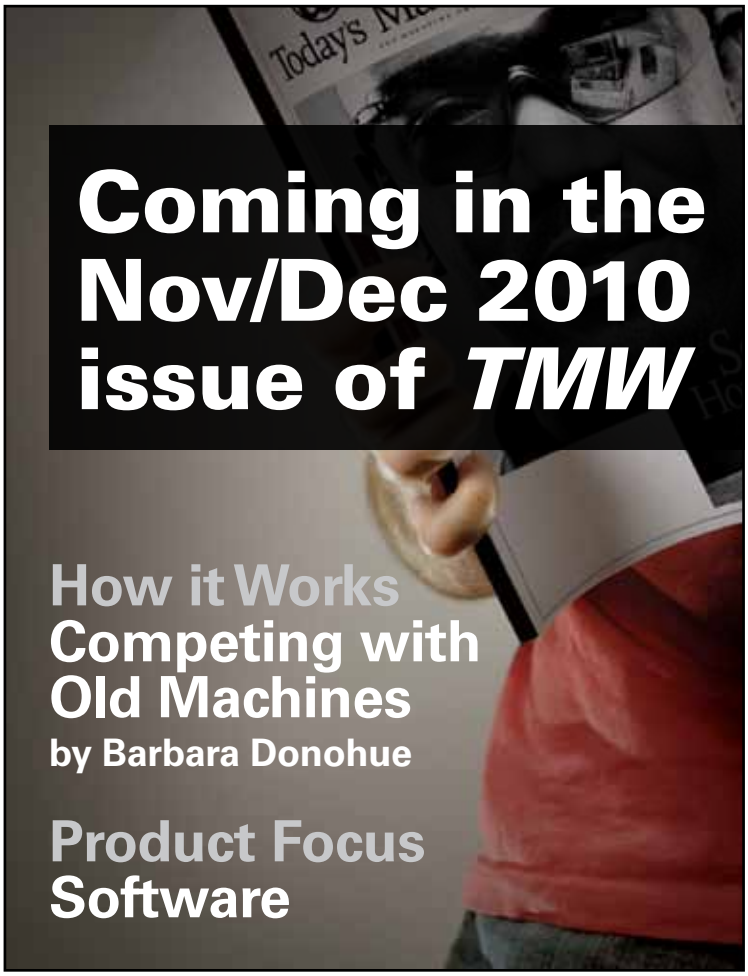
For more information, please contact Okuma America at 704-588-7000 or visit www.okuma.com.

▶ PartMaker

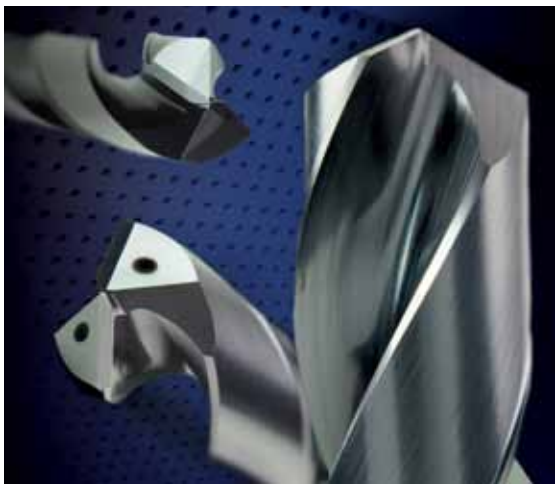
PartMaker Inc., a division of Delcam Plc., unveiled its latest version of PartMaker Software for programming CNC Mills, Lathes, WireEDM, Turn-Mill Centers and Swiss-type lathes at IMTS 2010. Major highlights of PartMaker Version 2011 include a more powerful milling functionality, new specialist turning routines, a more flexible tooling library, improved simulation of unique machine tool architectures, and a host of additional productivity enhancements.

For more information, please contact PartMaker Inc. at 888-270-6878 or visit www.partmaker.com.





fresh stuff



▲ Quality Carbide Tool

QCT has released two new solid and coolant-through carbide drills designed for a multitude of different materials. The brand-new 3D and 5D Carbide Drills are an ideal compromise between performance and cost-efficiency. The new design boasts a new point and flute geometry that reduces thrust forces and chip size, thereby enabling higher feeds and metal removal rates. The applied multi-layered TiAlN coating resists thermo-cracking from heat, thus improving wear resistance over conventional coatings. Lastly, the common DIN shank sizes not only improve rigidity, but also reduce the number of tool holders needed to accommodate them.

For more information, please contact Quality Carbide Tool Inc. at 630-274-2100 or visit www.qctc.com.

▲ Siemens Industry

At IMTS 2010, Siemens Industry, Inc. debuted its new Sinumerik 828D for the U.S. market. 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 robust operator panel. 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. With these options, Sinumerik 828D is capable of working with every type of CNC programming method used around the world. This allows machine manufacturers to have global marketing of their products with just a single CNC equipment option.

For more information, please call Siemens Industry, Inc. at 800-879-8079 or visit www.usa.siemens.com/828d.

◀ Sunnen Products Extrusions

The new SV-500 Series vertical CNC honing system features custom bore profiles for diesel cylinder liners. The SV-500 Series has patented technology that allows creation of whole-bore, constant crosshatch, as well as custom profiled or tapered bores. The patented machine is ideal for profile machining of diesel cylinder-liner bores to manufacturer's specs, while eliminating the "flattening" of the crosshatch angle at stroke-reversal points, sometimes required for MilSpec parts. Bore profile display and tool-control technology allow the operator to easily achieve the desired bore shape, surface crosshatch angle, or near-elimination of crosshatch.

For more information, please call Sunnen Products Co. at 314-781-2100 or visit www.sunnen.com.

▶ WIDIA

The WIDIA Victory TN7100™ series is a new range of coated-carbide inserts specifically engineered for finishing, medium-duty, and rough machining of all types of alloyed and unalloyed steels. The TN7100 series delivers exceptional value on key productivity metrics such as higher metal-removal rate, surface finish, longer tool life, consistent performance, and lower manufacturing costs. It also has a combination of wear resistance and toughness with a coating that is micro-engineered in both composition and post-coat treatment to emphasize outstanding coating adhesion and resistance to built-up edge/workpiece sticking.

For more information, please contact WIDIA at 800-323-7259 or visit www.widia.com.

To Survive In The Medical Device Marketplace You Must...

EVOLVE OR ELSE!

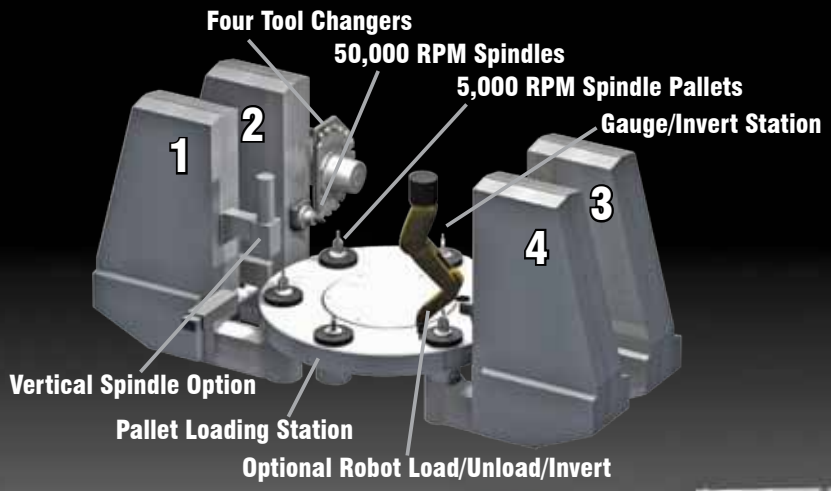
More Parts. Less Time. Less Space. More Profits. Send A RFQ And We'll Prove It.

Hydromat introduces the next step in the evolution of high precision medical component manufacturing.

The new Hydromat AT (Advanced Technology) 6-100, a design that can be best described as four high-speed mini VTL's all cutting simultaneously on one platform producing parts fast, complete and totally de-burred. Nice!

It incorporates four 5,000 RPM spindle pallets that work in tandem at each station with high-speed horizontal and vertical spindles. Each station sports its own "Direct Connection" tool changer that greatly increases flexibility. These advancements make for a very powerful productivity center in a small footprint. With the AT 6-100 you will be measuring your cycle times in seconds rather than minutes.

- **In-Process De-Burring**
- **No Secondary Operations**
- **Integrated Six Station Pallet System**
- **Four Cutting Stations**
- **One Tool Changer Per Spindle -12 Tools ea.**
- **Four Horizontal Spindles**
- **Vertical Spindle Options**
- **Small Footprint - 15.4 ft. x 6.25 ft.**
- **Five-Sided Full Interpolation Cutting**
- **Milling, Drilling, Boring & Reaming**
- **In-process Gauging**
- **Second Loading Station For Inverting or A/B Load Processes**

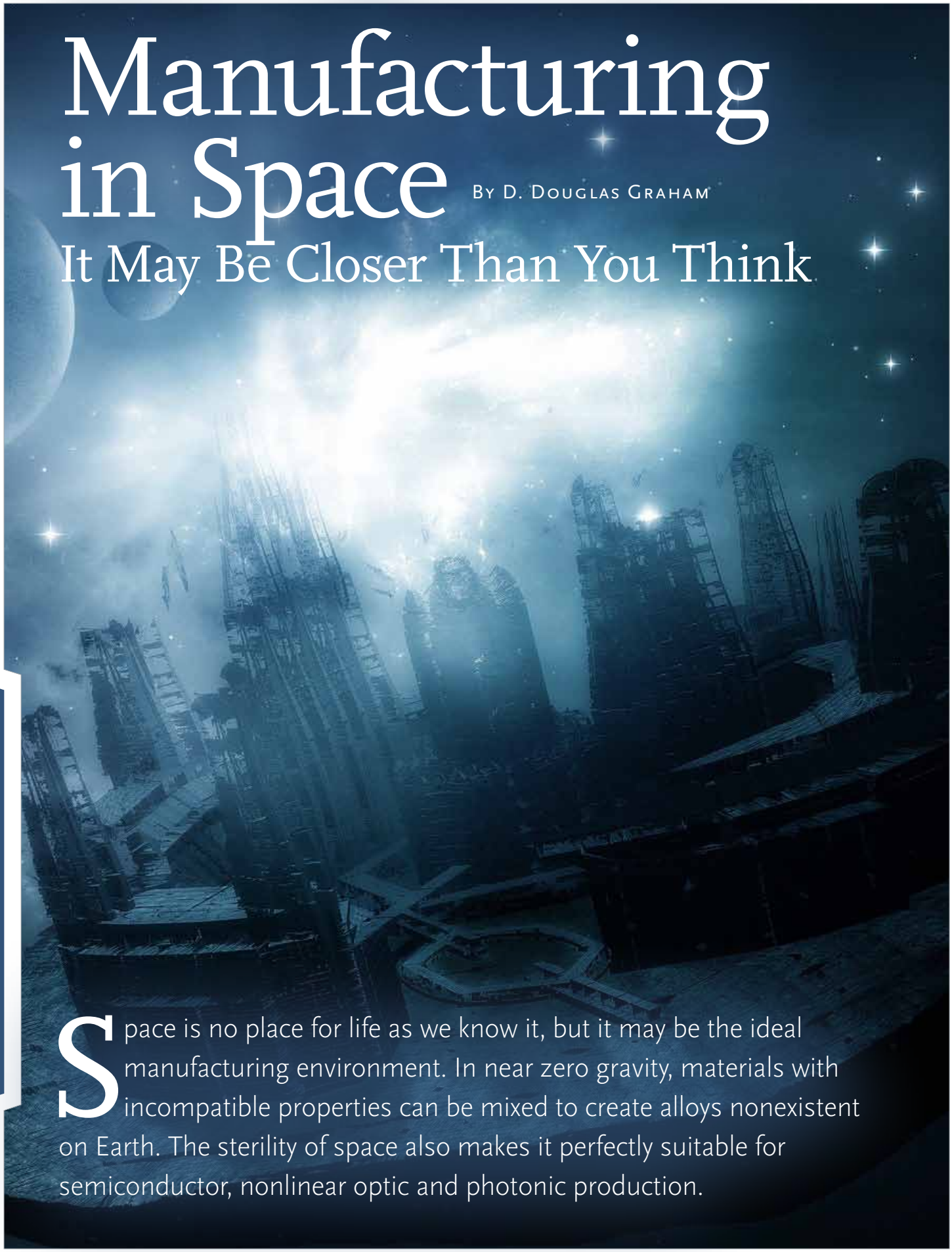


See The Fly-Through Animation At:

www.hydromat.com

11600 Adie Road • St. Louis, MO 63043
p 314.432.4644 • f 314.432.7552

HYDROMAT®



Manufacturing in Space

It May Be Closer Than You Think

By D. Douglas Graham

Space is no place for life as we know it, but it may be the ideal manufacturing environment. In near zero gravity, materials with incompatible properties can be mixed to create alloys nonexistent on Earth. The sterility of space also makes it perfectly suitable for semiconductor, nonlinear optic and photonic production.

The Space Race

Any American alive mid-century remembers the Space Race—that parenthesis in time between the broken postwar world and a new far better one most believed was just around the corner. U.S. popular culture of the late 1950s and early 1960s was so space-oriented, a person magically transported to that time from an earlier one might have thought people were already living and working among the stars. In our imaginations we were doing just that, we brave pioneers were homesteading the Great Beyond.

Television was Space Age iconic ("Lost in Space," "Space Ghost," "The Jetsons"). Then there was "Googie," a futurist architectural style that celebrated the soon-to-dawn, "Rocket Summer." Christened after an eccentrically-designed Southern California coffee shop, the Googie style flaunted up-swept roofs, weird angles, shiny metal surfaces, and saucer shapes reminiscent of UFOs. It survives in a thousand abandoned restaurants and gas stations rotting along the Route 66's of America.

"A real Space Age couldn't have happened in the Cold War era," says Jeff Greason, CEO, XCOR Aerospace Inc., a California-based developer of reusable rocket vehicles and the systems that go into them. "The period was mired in propaganda. We had to show the Russians that we could beat them to the Moon, and the Russians had the same objective where we were concerned. Not considered to any great extent was the question of what might be done with the Moon once humans were tramping around on its surface."

Turning Practical

Today we're thinking out of the rocket about space and are looking for practical uses for it. Off-world manufacturing ranks high on the roster, as it could possibly solve problems related to material availability and workability, and the negative impact of industrialism on the earth's environment.

Environmental factors were non-issues early in the Space Age. While there were some murmurings about the long-term effects of unbridled industrial development on the Earth's ecosystems, they were largely dismissed as gibberish from fringe-dwelling eggheads. "There was no resource supply problem back then. As the Free World's leading player, the U.S. easily extended its influence to mineral and oil-rich regions throughout the world, except for those controlled by the Soviet Union and China." In fact, it could be argued that the Soviet problem was the only problem vexing happy America in those days—at least the only problem many Americans seemed willing to acknowledge.

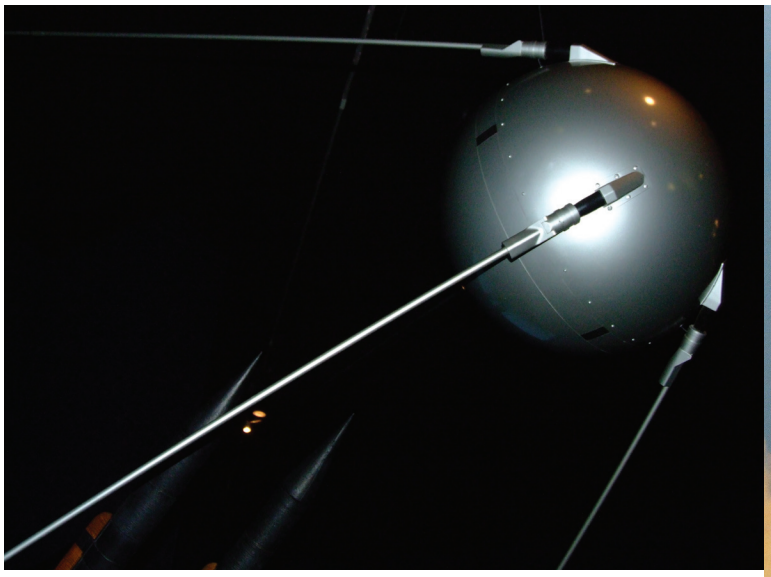
Everything changed when Mother Russia launched Sputnik 1 in 1957, raising in the collective U.S. awareness of the frightening threat of a Russian nuclear strike from above the stratosphere. It was Nikita Khrushchev, not Dwight D. Eisenhower, who launched the Space Race, and it took America several years to catch up. That period waned after the Apollo 10 astronauts left their footprints on the moon. Googie succumbed not long after.

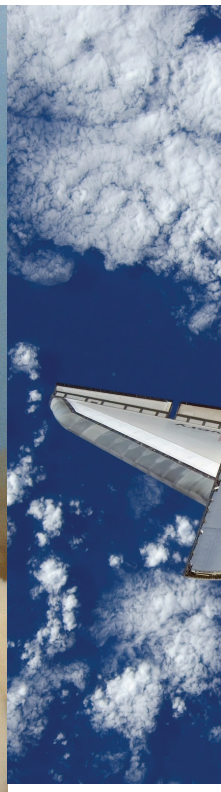
Troubleshooting

Now we're headed back to the Cosmos—this time for more practical reasons than the real or imaginary threat of Soviet military adventurism in space. The Moon, in particular, offers an almost limitless cache of natural assets—including minerals, ores and other natural assets amenable to manufacturing. Moon dust can even be used to make silicon chips. A space-based, solar array could potentially provide a lot of our planet's energy needs.

The list of compelling reasons to go to the moon and stay is long. It's a mineral repository with an abundance of calcium, titanium, iron and magnesium. It's also a source of oxygen, and possibly hydrogen and helium-3 (He-3). Processing will be required to extract such elements from the compounds in which they are imprisoned, but once accomplished it could lead the construction of an off-world mining or mineral processing facility. Moon-based processing could benefit the earth's ecosystems, but pollution of the lunar surface would be a real problem. The release of processing gasses would compromise the moon's most attractive industrial asset—its perfect vacuum. For this reason, the majority of processing/industrial activity based

Below: Classic Googie style of the LAX Airport restaurant complex.
Photo courtesy of Robert Breed





Above: Sputnik 1
Photo courtesy of Jerzy Kociatkiewicz

Right: Launch of Apollo 15
Photo courtesy of NASA

Opposite Left: Backdropped by a blue and white Earth, Space Shuttle Discovery approaches the International Space Station during STS-120 rendezvous and docking operations.
Photo courtesy of Tech-Seals International

Opposite Right: Atlas V Rocket on Launch Pad.
Illustration courtesy of Department of Defense

on the Moon would need to be done in enclosed facilities.

A pertinent issue never seriously addressed by the decision-makers of the Space Race is how to economically transport the materials required to construct and support space-based manufacturing centers. "At the moment, getting people and objects off-planet is preposterously expensive," says Dr. Lee Valentine, executive vice president, Space Studies Institute, an organization that develops technology for space exploration and economic development, in Mojave, Calif. "Transport cost is the real reason we're still earthbound. It's been the single biggest roadblock to arriving at the future that preteen-Baby Boomers read about in comic books. Once we push that stone out of the way, you'll see a transition much bigger than the one that followed the invention of the Internet—a sea change with the power to permanently and positively effect the way we live."

Right now it costs roughly $20,000 per pound to get stuff into space, a sum not solely attributable to the weight of materials transported. Spacecraft are not reused, nor are missions deployed often enough to be cost effective. In fact, the throwaway nature of space vehicles is probably the single biggest cost-builder in transport. Materials launched into space at the moment include everything currently hauled by truck, jet, car or train, including water, oxygen, electronics, metal, plastics and people.

While the high price tag is largely attributable to the current state of aerospace technology, it's also an effect of ownership. With the exception of the Boeing Delta IV and the Boeing-Lockheed Martin joint venture, United Launch Alliance Atlas V (both traditional Apollo-style, expendable launch vehicles), most American spacecraft are federal property. The lack of private competition, coupled with notorious government management problems have helped keep the price of off-world material transport uneconomic.

Then there's the matter of scheduling. The Space Shuttle has run launches about seven times annually, a reality embarrassingly short of the weekly goal originally set by NASA. The agency also hopes at some future time to push down the per-pound price of material transport off-world to a mere hundred bucks, an objective that seems out of reach at the moment.

Real Possibilities

Despite the obstacles, baby steps in the direction of off-world manufacturing were recently achieved. Back in the 1990s, a U.S. space shuttle placed a 2,000-pound disk on a 12-foot diameter platform that robotically produced thin, film crystalline semiconductors in low orbit around the Earth. This Wake Shield facility produced chips that were beyond top quality because they had been created in the airless vault of space.

"Space is hundreds of times better for creating semiconductors, solar cells, coatings and thin films because there are

> “Space is hundreds of times better for creating semiconductors, solar cells, coatings and thin films because there are far fewer impurities up there than in the best clean rooms on Earth”

far fewer impurities up there than in the best clean rooms on Earth,” says Dr. Alex Ignatiev, director, Center for Advanced Materials, University of Houston. Although the Wakeshield facility was launched as an eight or nine year program only three flights were put into orbit, all funded to the tune of about $35 million by the Space Vacuum-Epitaxy Center (SVEC), a NASA commercial space center hosted by the University of Houston, as well as private investors.

The major obstacle encountered in the project was cleanliness, as vacuum contamination would neutralize the whole project. The Shield had to be transported from Houston to Cape Canaveral, and along the way it was at constant risk of contamination. The cleanliness issue was not resolved in space. The Shuttle was dirty, so the Shield had to be distanced from it in order for its manufacturing vacuum to not be compromised.

The long-term goal was to produce 1,000 semiconductors per month, but the 2003 Space Shuttle Columbia disaster put the brakes on the project. The Wake Shield project did achieve its objective by producing the highest quality aluminum gallium arsenide semiconducting thin films created to that date.

The project is still running but in a different configuration. SVEC is now working with the Russian Academy of Sciences on a project currently known as “The Shield Program.” The goal is to place the Shield on permanent duty on the International Space Station. The Russians have fully-funded the program. NASA funds have yet to materialize.

More Possibilities

The advantages of manufacturing and machining in space could far outweigh the challenges. You could, for example, build up parts by vapor deposition. Such a process might begin by heating an aluminum ingot in a solar furnace to the point of vaporization. Condensing the vapor on a mold will make it possible to form complex parts and/or very l arge structures such as mirrors or girders with highly uniform metallurgical properties. Lunar microgravity facilitates the build-up of super-sized constructions, and because the moon’s oxygen-free environment comes with no threat of oxidation, they could be silvered with high-reflectivity aluminum.

The lunar surface itself presents a range of manufacturing opportunities. Fibrous glass can be drawn from moon dust with heat, and used to make glass or ceramic reinforcing fibers. The material would prove exceptionally high grade since there is no water on the moon to dilute its properties. Welding too would work well in space, especially on materials like titanium, which in a conventional shop scenario quickly develop surface oxide. Welding in space is not only feasible. It's fact. Experiments using electron beam welding were successfully conducted on Skylab, and when manufacturing in space is a reality it will likely be the preferred method.

What other manufacturing applications might be done "up there"? According to Ignatiev, space offers the opportunity to create defect-free, high performance products using elements available off-world. Solar cells, for example, can be produced using moon dust collected and processed by a solar powered robotic vehicle. No vacuum chambers are required to pull this off. The lunar surface is the ultimate clean room. The materials required to build manufacturing centers can also be harvested right on the Moon, and because it has icecaps, the moon can provide the hydrogen and oxygen needed to support human habitation.

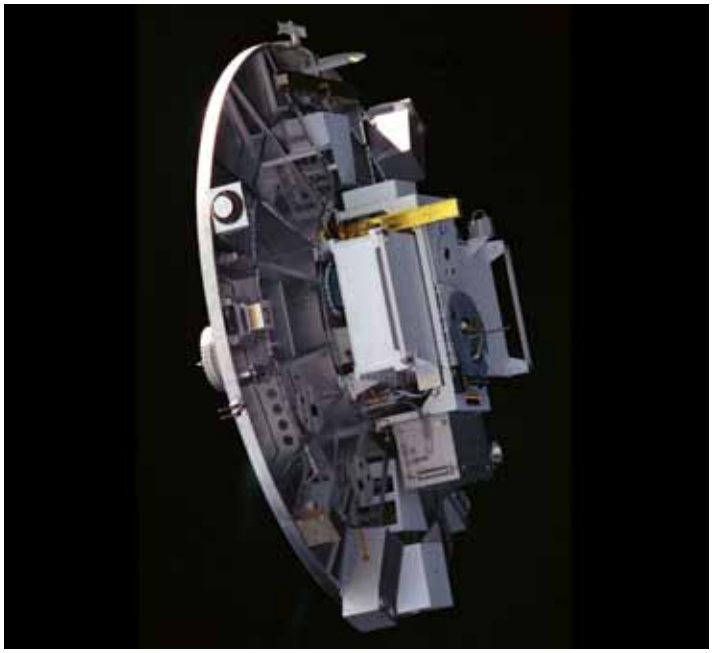
The two components needed to make solar cells are silicon and aluminum, and both can be extracted from lunar dust. Using solar heat, the dust can be melted into glass upon which thin film silicon cells can be "grown," and aluminum can be formed into a wire mesh to tie them together. No vacuum environment would be required to create the cells, as the moon is a planet-sized vacuum chamber.

> "A machine shop on the Moon or in orbit would very likely be a short sleeve, pressurized environment reminiscent of a typical job shop."

According to Ignatiev, lab experiments have demonstrated this technique using solar-powered robotic vehicles that function as mobile manufacturing centers. Once deployed on the moon, the robots would move over the lunar surface, melting moon dust into glass and aluminum and forming networks of solar cells as they go. With this self-perpetuating process, a solar network sufficient of supporting a lunar base could be built over five years at a total cost of $250 million. The staggering sum needed to transport the components of the same solar network from Earth falls somewhere on the plus side of $3 billion.

If the necessities for sustaining life were met, a manufacturing infrastructure could be constructed on the lunar surface or an artificial biosphere in orbit around Earth, upon which any machining task done down here could conceivably be duplicated.

"A machine shop on the Moon or in orbit would very likely be a short sleeve, pressurized environment reminiscent of a typical job shop," Valentine explains. "Lunar dust is a nasty



Left: Wake Shield
Photo courtesy of NASA

Below: A 12-inch parabolic moondust mirror made by spincasting. The mirror consists of a bottom layer of lunar soil simulant JSC-1A Coarse mixed with a small quantity of carbon nanotubes and bonded with thinned epoxy
Photo courtesy of Peter C. Chen, NASA/GSFC

abrasive, so you'd need safeguards in place to keep it out. Artificial gravity would be an absolute necessity as well. But the advantages of manufacturing and machining in space could outweigh the challenges. You could, for example, heat a metal like aluminum in a solar furnace until it gets so hot it vaporizes. The vapor could then be condensed on a mold and used to form complex parts or very large structures with uniform metallurgical properties."

A Glimpse at the Future

The journey that will end with space-based manufacturing is poised to take a giant step forward. New aerospace technologies and a philosophical approach to space travel more in tune with the attitude of the 21st Century will soon overcome the launch cost issue. Several private companies are hard at work designing and building winged, reusable space vehicles that run on common liquid fuels. At least one, The XCOR Aerospace suborbital vehicle, Lynx, is scheduled to be airborne for commercial and engineering research applications within the next two years. Airplane-like vehicles are a practical alternative to a conventional spacecraft because they can take off from the ground, land on an airstrip, and be used over and over again. The Lynx's ignition system also activates and deactivates as easily as any automobile—no big blast required.

A reusable spacecraft is a major departure from business as usual. Conventional space vehicles shed pieces of themselves in flight, and trash their engines via the use of solid or hybrid fuels that neutralize motor casings. Old school spacecraft are disposable, which from the perspective of cost-effectiveness is no different than dumping every Jumbo Jet that rolls off the assembly line upon completion of its maiden voyage. "Performance trumped everything in the first Space Age, and to a great extent, still does," observes XCOR Aerospace Media Imaging and Graphics Director, Mike Massee. "It's the sledgehammer approach, and it's economically problematic. Solid fuels burn up engines, and the use of toxic propellants like hydrazine make everything even more expensive because of the costs associated with hazardous materials training, testing, handling and storage. Hydrazine is used today. That's why a shuttle landing zone looks like a HAZMAT site."

When sustainability is achieved, the real Space Age will begin. Launch prices will drop as off-world travel is privatized and more consumers opt for suborbital flight over old-fashioned jet travel. Then the orbital market will open up, and the time and money investments made by people with a stake in the future will finally pay out. When will that golden age dawn? According to some aeronautic experts, the bright and shiny world foreshadowed by Googie could be fact much sooner than anticipated by even the most starry-eyed, Sixties optimist.

"Humans and industries will begin homesteading space in about 15 years," Valentine predicts. "Off-world manufacturing and power generation will be routine a decade after that, just like the Internet is now. Ten years ago, most people were still thinking of the Web as a way to buy dog food without leaving the house. Now it's a utility—that's the way the future works. Every major scientific development through history was thought wildly improbable until it became a component of our daily lives. Space travel, space-living and space-based manufacturing will be the same, and for our grandchildren, a fact of life taken totally for granted."

Right: XCOR's Lynx
Illustration courtesy of XCOR Aerospace

We don't make machines. We make them better.

From years of working closely with customers, we've learned what it takes to turn a new machine into a winner. Our specialists can supply you with customized tool packages and will stand by your side right from the start, from tooling to full production, all to guarantee peak performance fast.

What's more, our consulting services are free! Why? Because there's nothing sadder than a machine that isn't reaching its full potential.

Get in touch with your Sandvik Coromant representative at 1-800-SANDVIK and we'll tell you more.

Think smart | Work smart | Earn smart.

SANDVIK Coromant

Your success in focus

shop doc

With Noah Graff

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.

Dear Shop Doc,

I've been struggling with part length issues on one of my Brown & Sharpe #2 Ultramatics. The variance does not appear to be related to tool movement or collet tension as the length varies, sometimes it's long and sometimes it's short. The tolerance is reasonable (+/- .005). I've checked the regular stuff; rolls, pins, feed finger tension. Do I need to design every job to feed long and face off?

Coming up short (and long)

Dear Short and Long,

The Brown & Sharpe Ultramatic should be able to hold +/- .0025 when working properly. So no, you should not need to face every part to hold .010 total. Length variance can be particularly difficult to troubleshoot. Check one item at a time. Let's start with the most obvious but common problems.

The feed stroke should be set to over travel by .250 maximum. If not set correctly, it cannot only exacerbate other problems, it can cause variance as the bar weight changes from a full bar to two feet of bar.

Check your trip dogs next. Make sure the feed is finished before the stop is moving. This sounds basic, but if the stop indexes away just as the collet is closing there can be variation, and it can look like the feed operation is done when it's not.

Next, check the items involved in the lead cam actuating mechanism for the turret. First, check the lead cam shaft. If there's any perceptible movement when you take the weight off the lead cam shaft you may have worn bearings or a bad shaft. This can cause variation because the weight of the bar changes over time as the bar gets shorter. Next, check the linkage in the lead lever mechanism. There are several fulcrum points to this lever and wear here can cause variation. Finally, check the turret rack and lever. These teeth can become worn and cause length variation. This area can also become full of chips (brass and aluminum are especially pervasive), and the chip movement can cause variation. The abrasive nature of the chips can wear the teeth away and cause huge variations. Keeping this area clear of chips should be a regular maintenance item. I have seen machines where the rack teeth look like needle points.

The withdrawal cam on the adjustment plate in the back of the machine must be kept adjusted. The proper adjustment is .002 max clearance. Brown & Sharpe recommends .001. I've seen machines at .015 and have often wondered how they made any good parts on them.

The last thing to check is the spindle. The only thing you need to look at here are the thrust bearings. There should be little or no endplay on the spindle. Check this with an indicator on the spindle end and then manipulate the clutches back and forth (you might as well check and adjust the clutch tension while you're at it). There should be little or no movement in the spindle. The thrust bearings can be adjusted with the nut near the back end of the spindle.

There are several models of upgrades for Brownies available commercially, all of which eliminate any variance issues resulting from the lead cam shaft, the lever and rack, or the withdrawal cam. The withdrawal cam adjustment should be a maintenance item checked regularly along with keeping chips from the rack area.

Greg Knight and George Morris
AMT Machine Systems

Greg Knight is the Vice President of Machine Tool Automation and George Morris is an Application Engineering Manager with AMT Machine Systems in Columbus, Ohio.

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

NASA astronaut Michael T. Good smiles for the camera during one his spacewalks during the STS-125 mission.
Photo courtesy of NASA

Interviewed by Noah Graff

Astronaut Mike Good was

a mission specialist on the fifth and final space shuttle servicing mission for the Hubble Telescope May 11-24, 2009. He and his crewmates from the STS-125 Atlantis Shuttle refurbished the telescope, which now has four new or rejuvenated scientific instruments, batteries, gyroscopes, outer blankets, and a new computer.

Mike, what did your job entail as a mission specialist servicing the Hubble Telescope?

MG: I had flight engineer duties on the flight deck and did spacewalks. I was basically like a repairman or a construction worker. You've got power tools and you're out in the vacuum of space floating around the outside of the ship.

How were you able to work on the telescope floating in space?

MG: We grabbed the telescope and brought it into the shuttle's payload bay, which became our garage. Then we'd go out into the "garage" in our spacesuits and crawl inside the telescope, which was about the size of a bus. We would pull out and replace boxes and sometimes actually repair some of the scientific instruments inside, like the cameras that take all those cool pictures and the spectrographs that do scientific measurements. One of the advantages of being in space is that everything is weightless, so you can handle 800 pound cameras with one hand, floating them in and out so you can tighten up the bolts.

Do you think it would be easy to do car maintenance space? You could pick up the car yourself to change the oil.

MG: Yeah, and you could just drop an engine in. But how would you empty the oil? You count on gravity for a lot of things. If you drop something in space, it doesn't just end up on the garage floor. It might float away on you. Obviously you have to be tethered to everything. When you're using power tools, if you put your tool on a bolt and squeeze the trigger while untethered, you will fly around in circles.

Tell me about the robotic arms used in space?

MG: A robotic arm is attached to the space shuttle that we can use in the payload bay. It's operated from inside the shuttle, and we can actually put one of the spacewalkers on the arm. There's a foot plate on it and you wear boots similar to ski boots so you can snap your feet into it. I was the guy outside on the arm.

Do the extreme temperatures in space make your work more difficult?

MG: The environment is very harsh. In the vacuum of space, there are extreme temperature differences. Depending on if you're in the sun or not, it can go plus or minus 200 degrees. You're going around the earth once every 90 minutes, so there's a sunrise and a sunset every 90 minutes, meaning you're in and out of the sun and darkness a lot. Things expand and contract depending on whether they're hot or cold, and a lot of times parts have tight tolerances you have to deal with.

When you're in space for a long period of time, what does it do to you physically?

MG: Being up there is great, but coming back is hard. As you get back into gravity, everything's heavy and it takes a little while to get used to 1G again. If you're up there for long enough, your bone density and muscle mass deteriorates. Your bones pretty quickly realize that they aren't needed to support you, so they just start deteriorating

What is one of the coolest things for you about going into space?

MG: The coolest thing for me is being able to go outside on a spacewalk. To put on that suit and go outside with just the visor on your helmet to look through. There's nothing between you and the earth 300 miles away, and it's going by at 5 miles a second below you. It's just a cool feeling to be able to be out there working in space. Once you've flown and you've had that experience, it's hard to look at the earth or the universe in the same way.

The following companies have provided information on coolant and lubricating systems

product focus

Coolant and lubricating systems are developing rapidly to increase productivity and decrease cost and waste. A good cutting fluid aids the cutting process by lubricating the interface between the tool's cutting edge and the chip.

▶ Abanaki

Abanaki offers the EconoMini™ oil skimmer as part of its line of coolant skimmers and coolant maintenance equipment. Coolant skimmers save costs by extending coolant life and reducing tool wear. The portable EconoMini is ultra-compact at approximately 4" x 3" x 4" and weighs in at 6 pounds. This is the perfect skimmer to use in tight spaces, such as on parts-washer tanks and coolant sumps. It can even be used to skim oil through the 2" opening of a 55-gallon drum.

For more information, please contact Abanaki Corp. at 440-543-7400 or visit www.abanaki.com/046.

◀ Keller Products

The Keller TKO-6 pump/skimmer for individual machine tool sumps can be instantly mounted on the machine tool using the CLO-l magnetic frame. TKO pump/skimmers rapidly remove tramp oil and suspended solids from the coolant. The high flow rate continuously aerates the coolant. All the Keller TKO units utilize a rugged Y:1" air operated diaphragm pump.The TKO separator contains the patented Keller permanent coalescing oil separator for removing tramp oil and includes a compact floating inlet device which aggressively sweeps oil from the surface of the coolant at 180 gallons per hour.

For more information, please contact Keller Products, Inc. at 800-352-8422 or visit www.kellerfilters.com.

▶ Okuma America

Okuma America worked with Shell Lubricants to develop an automatic Coolant Monitor System that uses the THINC® OSP control to monitor coolant pH and concentration. This system alerts manufacturers when their coolant concentrations have fallen or risen beyond ideal parameters, helping to protect their machine tool investment. Proper coolant maintenance is important to obtaining peak performance from a machine tool because improper coolant concentration and/or pH levels can damage cutting inserts, tools, parts and machine components. This easy-to-use system takes the guesswork out of coolant monitoring by measuring concentration and pH levels and displaying them on the THINC control in an easy-to-understand dashboard.

For more information, please contact Okuma America Corp. at 704-906-3511 or visit www.okuma.com.

Coolant Concentration and pH Level Status

▶ Sanborn Technologies

The T14-3 P is a complete coolant purification centrifuge system designed for high-solids, metalworking and ceramic applications. Operating sump-to-sump, the T14-3 P separates tramp oils and solids while continuously returning cleaned coolant to the machine tool's sump. The heart of the T14-3 P is the high efficiency Turbo-Separator. With a rotational speed of 3,000 rpm, the T14-3P couples high G forces with a large 22-pound rotor capacity to remove solids down to 2 microns and tramp oils to 0.5 percent.

For more information, please contact Sanborn Technologies at 508-660-9150 or visit www. www.sanborntechnologies.com.

◀ Shell Lubricants

Shell offers a comprehensive line of neat oils that helps to extend tool life for applications ranging from light-duty cutting to heavy-duty broaching. Select grades offer high performance in both high-speed grinding operations as well as for special applications such as the manufacturing of cemented carbide tools. Shell Macron and Shell Garia Oils address common operational demands such as high lubricity, longer tool life, light color, low odor, and reduced oil mist, while maintaining an excellent HSSE profile.

For more information, please contact Shell Lubricants at 800-840-5737 or visit www.shell.com/us/lubricants.

▶ Valenite

Valenite's ValCOOL product line of specialty cutting fluids and coolants, include synthetic, semi-synthetic and soluble oil cutting fluids. The ValCOOL products feature benefits such as improved bio-stability, strong corrosion prevention, chlorine free options, vapor phase corrosion inhibitors, and cobalt leaching inhibitors (for carbide grinding applications). ValCOOL products can reduce machine maintenance requirements, improve tool life, produce better surface finishes, help lengthen sump life, and eliminate rancidity. Virtually all of the cutting fluid products meet specific regulatory requirements and can help to minimize rework needs and lower overall costs. Cutting fluids are available blue or undyed.

For more information, please contact Valenite LLC at 800-544-3336 or visit www.valenite.com.

Graff-Pinkert & Co., Inc.

4235 West 166th Street, Oak Forest, IL 60452 www.graffpinkert.com

Over $1,000,000 of spare parts in stock on our floor

Wickman and Index Tooling Specialists

Tooling: Complete assortment of new and used spare parts and attachments.
In stock: Threading, pickoff, pusher tubes, cross slides, holders, conveyors, etc.
New and used: pickoff collets, feed collets, high speed drilling, chasing attachments, thread rolls, dieheads, air cleaners and more

Cathy Heller Wickman and Index Parts manager
Phone 708.535.2200 **Fax** 708.535.0670
parts@graffpinkert.com.

Shop Graff-Pinkert online

for web exclusive listings and prices

ebay gpc

http://stores.ebay.com/graff-pinkert-screw-machines

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), rebuilt
1" 8-spindle, 1980
1-3/8" 6-spindle, 1978
1-3/4" 6-spindle, 1965, 1984 (4)
1-3/4" 6-spindle 1984
2-1/4" 6-spindle, 1962, 1973-79 (3)

ACME
3/4" RA8, 1974
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)
2-3/8" HSC chucker, gov't surplus
8" RPA8 chucker-as new
3-1/2" RB6, 1970
2 5/8" RB8, CNC slide, 1980

HYDROMATS & ROTARY TRANSFER
HW 25-12, 1994, 2001
HB45-16, 1997
Pro-20, 1998
HB 45-12, 1991

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

SCHUTTE & GILDEMEISTER
SF51, 1985-79 (3)

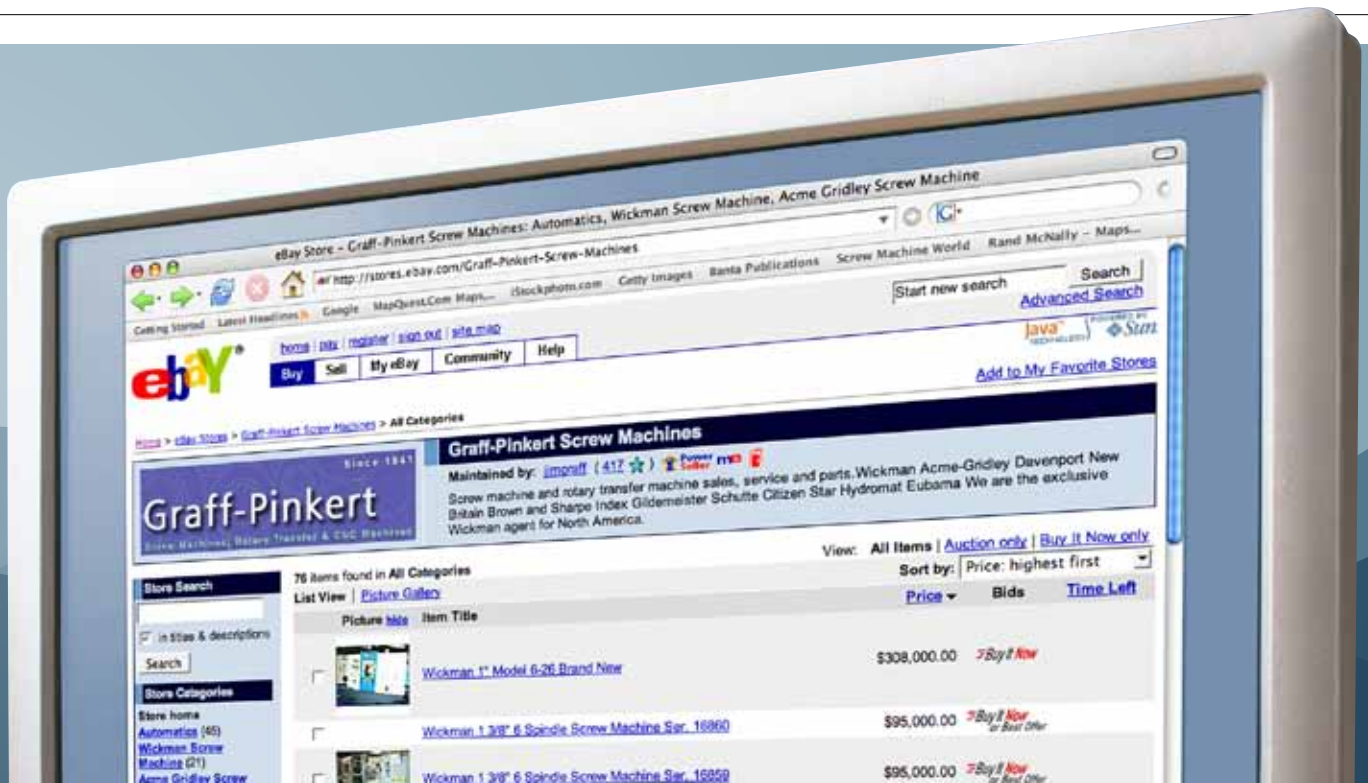
SWISS
Hanwha ML26H
Star SV32 J-2001

NEW BRITAIN
Model 627, 2 5/8" 1980
Model 630, 3" 1980

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

MISCELLANEOUS
Strausak CNC Tool & Cutter Spindle 1999
Cincinnati 107-4 centerless
5 1/4" RAC Nat. Acme 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
New Britain, Model 60 bearings

WICKMAN AND INDEX ASK FOR OUR IN-HOUSE PARTS EXPERT



swarfblog.com

If you're only reading "Swarf" in the magazine you're missing out! Every week, thousands of people log on to our Web site to read and comment on new articles on current thought-provoking topics. Below are some recent comments from our "Swarfblog" readers at www.todaysmachiningworld.com.

Survival of the Screw Machine Shop

Lloyd Graff blogged about a recent auction sale of screw machine shop, Roseland Metal Products in Dolton, Illinois. He asked readers, "Can an old shop like Roseland still be viable today?"

Matt Corcoran September 28, 2010 at 11:48 a.m.
What do you mean by old? We have been in business since 1938, operating B&S, Davenports, ACMES, and an assortment of secondary equipment ... We are running 24 hours a day, and have seen business explode. Also, did the owners go over their business plan with you? How can you state that they put scant investment into it? I guess putting money into our relics is idiotic? I guess I'll just turn this place into a strip joint or something. But first I'm going to the PMPA Presidents roundtable in the Naugatuck Valley tonight, and run a tab at the bar on the company credit card! A fool and his money are soon partying!

Impressions of IMTS in Particular Order

On the fourth day of IMTS Lloyd reflected quite positively on his experiences at IMTS 2010. He asked for thoughts from other attendees.

Robert Sarna Sr. September 21, 2010 at 9:18 pm
Congratulations Chicago, what a great show. Here is a great story. I lost my camera on the large bus that brings us from the hotel, the drivers were very helpful. Within minutes my driver turned it in and a lady inspector brought it to South hall. A wonderful side note; the driver would not take a reward, he patted me on the back and wished me a great time in Chicago.

P.S. We also sold machines at the show.

Government Meets the Real World

Lloyd commented that he thinks the inflated wages of government employees may soon be cut. He then asked readers whether they thought American teachers were overpaid.

Bruce Renwick September 7, 2010 at 12:24 p.m.
School teachers are not overpaid, but should no longer expect huge pensions and public funded retirement. They should contribute to their own future just like the rest of us. There are thousands of other government jobs that should be scrutinized that do not involve education, especially the so-called "public servants" that we vote into office. Look at the benefits these people are getting.

Jon Falk September 8, 2010 at 7:29 a.m.
Teachers are grossly overpaid, with unions at the root of the cause. And here is a thought that has only recently occurred to me—do teachers purposely slow the learning process in order to perpetuate the school system? By keeping learners back, they automatically extend the educational process. This may be the reason that so many young people are still in "school" at ages beyond the former norms of 17-18 for high school and 21-22 for undergrad college.

Jerry Johnson September 7, 2010 at 2:15 p.m.
Overpaid, over tenured, over unionized, under worked and terribly UNDERQUALIFIED.

The smallest part you make... can be a step into the future.

Advances in medical care often set more demanding requirements for the machining and finishing of critical parts and devices. Increasing miniaturization, more precise tolerances and unfailing repeatability are closely aligned to achieve better outcomes. At the same time, productivity and affordability are critical cost considerations.

Whether you need Precision, Productivity, or Versatility, the winning choice is STAR.

These seemingly contradictory requirements are the basis on which our two newest Swiss Type automatic lathes are designed. The Star SR-20RIII's rigid construction and extreme stability allow for extremely close tolerances at twice the speed of previous machines. For situations where increased precision, accuracy and simultaneous machining is required for exceptionally high productivity, the Star ECAS-20T is the ideal machine.

We understand it's not just a part, it's a part of life.

www.PerfectionInMotion.com

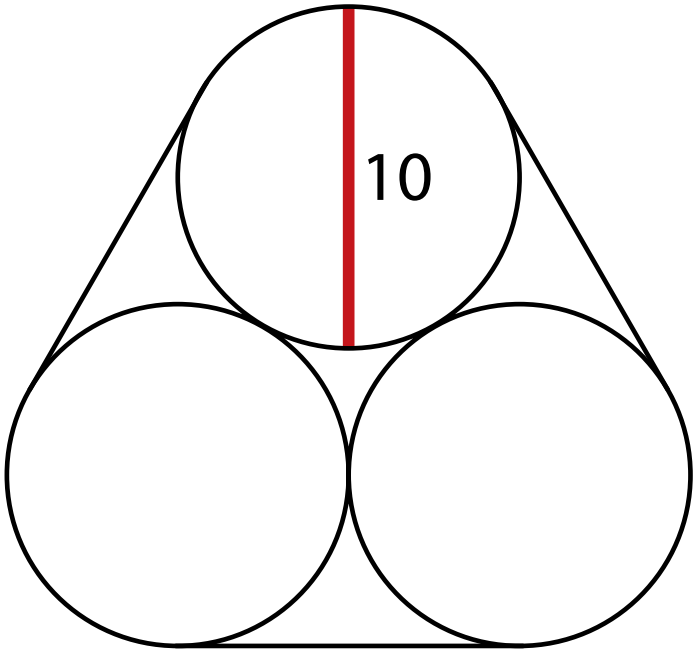
star®
PERFECTION IN MOTION

HEADQUARTERS 123 Powerhouse Road • P.O. Box 9 • Roslyn Heights, NY 11577 • Tel: 516 484-0500
MIDWEST 375 Bennett Road • Elk Grove Village, IL 60007 • Tel: 847 437-8300
WEST COAST 22609 La Palma Avenue • Suite 204 • Yorba Linda, CA 92887 • Tel: 714 694-1255
TECH CENTER c/o Numberequip • 4810 Briar Road • Cleveland, OH 44135 • Tel: 216 433-9290
TECH CENTER 161 Sanrico Drive • Manchester, CT 06042 • Tel: 860 783-5555

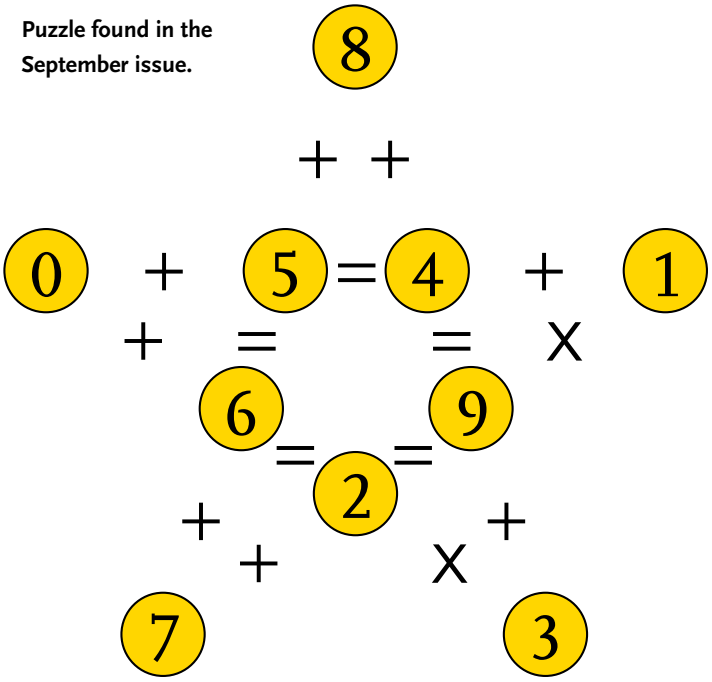
Send in your answer—quick!
Fax Emily at 708-850-1334, or email
emily@todaysmachiningworld.com

How long is the rubber band?

Three circles are bound together by a rubber band as shown in the figure. Assuming the diameter of each circle is 10 cm, how long is the rubber band if it is stretched as shown?



Puzzle found in the September issue.



Who's a Real Star?

Robert Haley of Stainless and Aluminum in Troy, Mich.; **Thomas Rowe** of Pointe Precision, Inc. in Plover, Wis.; **Alexandra Dankert** of Global Shop Solutions in The Woodlands, Texas; **Randy Grezenski** of Pointe Precision in Plover, Wis.; **Tanner Mayhew** of Vektek, Inc. in Emporia, Kan.; **Tom Aitchison** of Enoch Manufacturing Company in Clackamas, Ore.; **Monique Foster** of All Pins Mfg. in Wilseyville, Cal.; **Roger Stillman** of Metric & Multistandard in Hawthorne, N.Y.; **Philip D. Shaffer** of Cimcool Global Industrial Fluids in Cincinnati, Ohio.; **Jack Steuby** of John J. Steuby Co.

ad index

Today's Machining World

advertisers

BPA WORLDWIDE

US Postal Service Statement of Ownership Management and Circulation

TITLE: *Today's Machining World* — DATE OF FILING
PUBLICATION # 024-909 — August 30, 2010
FREQUENCY OF ISSUE/8x (Sept/Oct, Nov/Dec, Jan/Feb, March, April, May, June, July/Aug.) — ANNUAL
NO. OF ISSUES PUB. AN./8x — SUBSCRIP. PRICE
MAILING ADDRESS — $40.00
Today's Machining World, 4235 West 166th Street, Oak Forest, IL 60452
PUBLISHER: Lloyd Graff, 4235 West 166th Street, Oak Forest, IL 60452
EDITOR: Lloyd Graff, 4235 West 166th Street, Oak Forest, IL 60452
MANAGING EDITOR: Emily Aniakou, 4235 West 166th Street, Oak Forest, IL 60452
OWNER: Screw Machine World Inc., 4235 West 166th Street, Oak Forest, IL 60452
BONDHOLDERS, MORTGAGES OR OTHER SECURITIES HOLDERS — NONE

EXTENT AND NATURE OF CIRCULATION	AVERAGE FOR 12 MONTHS	AVERAGE FOR JULY/AUG. 2010
Total Number of Copies	17,098	17,550
Individual Paid/Requested Mail Subscriptions	9,841	9,978
Paid and/or Requested Circulation Sales through Dealers, Carriers, Street Vendors, and Counter Sales	0	0
Requested Copies Distributed by Other Mail Classes through USPS	0	0
Total Paid and/or Requested Circulation	9,841	9978
Free Distribution by Mail (Samples, Complimentary And Other Free)	6,215	9,978
Free Distribution Outside the Mail (Carrier or Other Means)	187	0
Total Free Distribution	6,402	6,289
Total Distribution	16,243	16,267
Copies Not Distributed (Office Use, Left over, Spoiled	855	1,283
Total	17,098	17,550
Percent Paid and/or Requested	57.60%	56.90%

Date of Publication: 10/18/2010
I certify that the statements made by me are correct and complete.

Publisher

help wanted

sales & service

sales & service

sales & service

At Less Than $1000 Complete, Why Wouldn't You Put A Stop To Your Losses Today?

The Best Return on Investment in Metal Cutting!

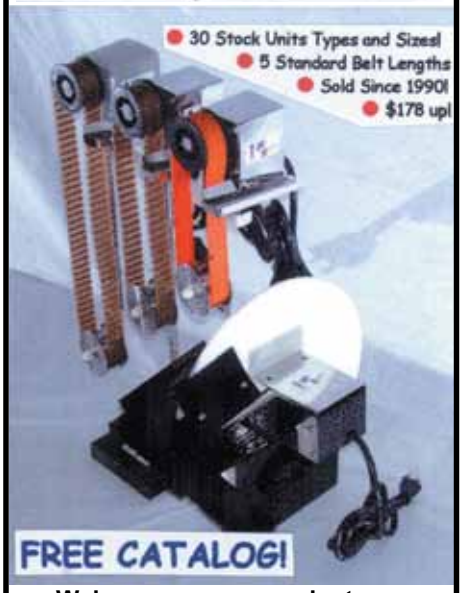
Tough times call for smart moves. Tools can break at any time. Be prepared. Positive Contact Sensors can detect broken drills, taps, end mills or reamers before the costs of chain reaction broken tools, machine damage, downtime and scrap breaks you. Make the call to save your profits.

Made in the USA

PO Box 143, Sussex, WI 53089
www.tpsintl.com
e-mail: info@tpsintl.com
800-423-4031

TPS INTERNATIONAL

Mini-Skimmer™
Oil Skimmers
Remove Tramp Oils From Coolant!



Web: www.wayneproducts.com
Email: info@wayneproducts.com

SOUTHWESTERN INDUSTRIES

TRAK ProtoTRAK

Toolroom Machines & CNCs

2615 Homestead Place
Rancho Dominguez, CA 90220
T | 310.608.4422
F | 310.764.2668
Service | 800.367.3165

Visit us online at
www.southwesternindustries.com

Workholding Solutions for Metal, Composites, Ceramic and Glass.

NORTHFIELD
Precision Instrument Corporation
800-810-2482 • www.northfield.com

NEW BRITAIN SPECIALISTS

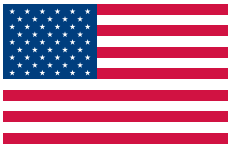
LEADER N REMANUFACTURING

CALL 800-234-7191

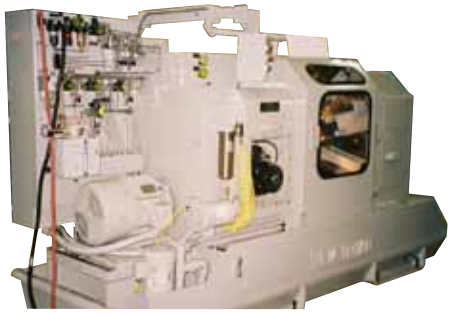
FAX: 704-853-3297
E-MAIL: sales@LNRrebuilders.com
WEBSITE: www.LNRrebuilders.com

L & R SPECIALTIES
LOCATED JUST 20 MINUTES FROM
CHARLOTTE-DOUGLAS
INTERNATIONAL AIRPORT
CHARLOTTE, NC

MasterCard VISA



DISASSEMBLED COMPLETELY



THE NEW BRITAIN SOURCE!

WE HAVE ABEC 7 PRECISION SPINDLE BEARINGS
(INCLUDING HARD TO FIND ONES LIKE MODEL 816 AND 817)

THE ULTIMATE SOURCE FOR:

- Total Remanufacturing
- Bumper to Bumper Warranty
- Turn Key Service
- Trade-In Program
- Many New Britains in Stock
- Complete Parts Inventory
- Technical Support - Telephone or On-Site
- Rebuild Cross Slides

WE BUY SURPLUS MACHINERY, PARTS & COMPLETE NEW BRITAIN DEPARTMENTS.

sales & service

AUTOTURN
MACHINERY & TOOLING

ATTACHMENTS FOR MULTISPINDLE MACHINES

-ACME GRIDLEY -NEW BRITAIN
-GILDEMEISTER -SCHUTTE -EUROTURN -INDEX
-TORNOS -WICKMAN

We also have spare/ware parts, tooling & machines in stock!

TOOLHOLDERS

Modular turrets and toolholders TS type; dovetail toolholders, flat dovetail holders, square tool bit holders and part off toolholders.

RECESSING

Ramp type recessing and rotary recessing attachments with through coolant.

ACME GRIDLEY

The unit is intended for multi-sided turning, thread milling and taper turning/milling on rotating workpieces.
(Also available for main slide applications)

HIGH SPEED DRILLING

Counterotating spindle assembly with inner coolant system.

TOOLHOLDERS

Tool posts, tool holders for dovetail and flat form tools, with radial and axial adjustment.

New Britain

The unit is intended for multi-sided turning, thread milling and taper turning/milling on rotating workpieces.
(Also available for main slide applications)

VISIT OUR WEBSITE FOR A COMPLETE ONLINE CATALOG!

AUTOTURN MACHINERY & TOOLING
1615 91ST COURT VERO BEACH, FLORIDA 32966
TEL. 772-569-9663 FAX. 772-778-3481
WEB SITE: WWW.AUTOTURN.BIZ | E-MAIL: AUTOTURN@GMAIL.COM

afterthought

The Family Business

It was a throwaway line in the *Chicago Tribune* "Sports" section, but it caught my eye. Nate Montana, Joe Montana's son, will not be the Notre Dame backup quarterback for 2010. He lost out to freshman Tommy Rees for the number two spot on the Irish depth chart.

Nate Montana was a third string quarterback at DeLaSalle High School in the Bay Area—which has one of the top high school programs in the country. He was a walk-on at Notre Dame but was hardly a Rudy in South Bend. He left after his freshman year, knowing that he was overmatched, and went to Pasadena Junior College for seasoning. Now he's back in Indiana, but still third string.

I feel for Nate. College football is a tough family business, especially if it involves the Fighting Irish. But I can tell you, there's no easy jump into the family business.

My brother Jim and I joined my dad and uncle in the machine tool business at Graff-Pinkert in the 1970s. I felt welcomed by my father and trained by traveling the Midwest in search of screw machines. I had a rudimentary knowledge of the equipment and a naïve view of the simplicity of the business—buy low, sell high, and jump through hoops for your customers.

> "I had no understanding of how hard I would find it to adjust to my role as the "son of the boss."

What I had no understanding of was how much my Dad worried about the business and how hard I would find it to adjust to my role as the "son of the boss."

My father was not a demanding taskmaster like Lee J. Cobb in the movies. My issue was that my berth was too soft. It was not that he set the bar too high, I just never knew where the bar was, so I could jump over it or limbo underneath. I always felt valued, I just didn't know if I'd earned it.

It probably took five years of devising a role for myself to feel good about my position. I joined a group called the SOBs (Sons of Bosses), which was of little value. Later, I joined a men's group that I kept up with for 10 years. I got real insights from my peers there, and even though they were not in family businesses, they all had fathers.

I have come to the conclusion that there is no easy entrance to a family business. Add siblings and marriage partners to the mix and it gets even more complicated.

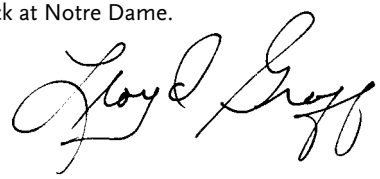
For me, a major issue was receiving public recognition from my dad. How I hated going to a function and being lauded by my father. His praise made me feel like a little boy being taken to a Cubs game. It infantilized me and I didn't know what to do with his authentic pride. I felt like an ungrateful child if I recoiled from it.

The irony was that I felt his love and caring, but in the business setting it eroded my manhood.

As time rolled on, my dad's partner, Aaron Pinkert, retired and Jim and I bought his interest in Graff-Pinkert. Business was generally good and the money lubricated family friction. I established a consulting arrangement with a sage outsider named Bel Small, who knew the machinery business from A to Z and had an intuitive understanding of the dynamics of our company and family. I talked to Bel two or three times a week. He questioned and confirmed my ideas, and enabled me to develop a constructive consensus in the business. If it wasn't for my talks with Bel I doubt I could have tolerated my dad's huge mood swings as his health gradually deteriorated following heart bypass surgery when he was 57. Despite a myriad of health setbacks, my father worked 20 more years, until he was 77.

And now I get to work with my son, Noah, on *Today's Machining World*. We have our issues as much as we love each other. He has told me many times that *TMW* is my dream, not his. Each year we work out a fresh new contract.

So, Nate Montana discovers that it isn't easy to follow dad to South Bend. The kid might have been better off at another school. Then again, Joe Montana also began as a third string quarterback at Notre Dame.



Lloyd Graff

We've Engineered Profit Into Your Products.

SMQ™ *Screw Machine Quality*
Stainless Steel Bar

At SCHMOLZ+BICKENBACH we pride ourselves on providing precision products that improve productivity while increasing profitability for our customers. Our Screw Machine Quality SMQ™ provides precision ground qualities at cold drawn prices.

Our products feature precision tolerances for straightness, out-of-round, surface finish, diameter tolerances, and overall consistency. Combined with our latest generation of Ugima® high machinability grades—we are able to offer you a product that will allow for excellent performance across a wider range of operations and cutting conditions. Additional benefits include improved chip breakability, superior surface finish, and increased tool life.

SCHMOLZ+BICKENBACH is the world's leading producer of stainless and tool steel long products offering directly integrated service from the mill to your door. Our owned production facilities include such names as Ugitech (France), DEW (Germany), SteelTec (Switzerland), and A. Finkl & Sons Co (USA)—offering over 100 years of experience serving innovation.

In North America, we are able to service your needs from one of our 8 service facilities—including our Chicago production facility which offers a full line of stainless bars manufactured in America. Because we own our own distribution as well, you are dealing directly from the source. Our services include immediate product availability, custom orders, customer-dedicated inventory programs, and strong technical support with both in house metallurgical and mechanical engineering support.

Please inquire about our entire range of products, sizes and grade capabilities. SCHMOLZ+BICKENBACH Bar Mills are DFARS compliant. SCHMOLZ+BICKENBACH meets all North America and European compliance standards.

SCHMOLZ+BICKENBACH
Stainless Steel Materials Division

SCHMOLZ+BICKENBACH

Providing special steel solutions

www.schmolz-bickenbach.us • Carol Stream, IL (800) 232-5569 • Streetsboro, OH (800) 232-5569
Greer, SC (800) 232-5569 • Brea, CA (800) 255-6975 • Mahwah, NJ (800) 528-5801

Supported by MCC's legendary, full service, distributor network.

Experience the difference.

Cincom 80th Miyano
ANNIVERSARY

www.marucit.com

BNA-42S

Miyano CNC Turning Center

CNC Turning Center with 2 Spindles and 1 Turret

Citizen Productivity, Miyano Precision

Machine specifications	
Maximum machining diameter	Ø42 mm (1.65")
Standard machining length	100 mm (3.94")
Main spindle speed	50 to 5,000 rpm
Sub spindle speed	50 to 5,000 rpm

Marubeni Citizen-Cincom Inc.

The World Leader in CNC Swiss Turning

Allendale, NJ
(201) 818-0100

Elk Grove Village, IL
(847) 364-9060

Fountain Valley, CA
(714) 434-6224

Certified System
ISO 9001
QMI-SAI Global