

CNC WEST

Volume 41 - Issue 1

THE MAGAZINE FOR WESTERN METAL WORKING MANUFACTURING

WORKHOLDING TOOLING & ISSUE

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“It’s almost 11pm...
but the dragon will
feed the machine till
morning.”

Brian Kippen, KAD Models

Trinity AX5

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Specifications:

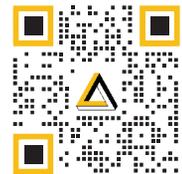
- Max Part Size: Ø18" x 12"H
- Pallet Storage Locations: 40
- Max Payload: 75 lbs.

KAD Models is

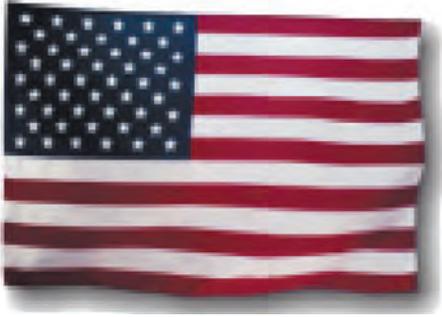
a passionate prototype manufacturing design & engineering house. With two locations, they produce around 3,500 unique parts per year. Running unmanned production with their two AX Systems creates less downtime for their machines, allowing for more programming, process optimization, & creativity. See their latest work at KADModels.com.



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CNC West

October/November 2022 • Volume 41 No 1

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OMIC R&D in Scappoose, Oregon is a world-class applied research and development facility..Page 22



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Third generation machinist Evan Jones of 3rd Gen Machine. Page 38

Coming in Dec 2022/Jan 2023

QA & Fabrication —

Look for some really great stories and features covering the latest techniques, in quality assurance and metal fabrication, plus the latest news from the world of metalworking

Editorial: Nov 19, 2022

Ad Space: Nov 26 2022

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VOL. 41 NO. 1
Oct/November. 2022

The oldest regional industrial publication serving the Western States manufacturing managers, owners and engineers from 1 employee to those larger plants of 5,000 or more. Its editorials feature numerical control applications in all size machine shops, tooling, programming, robotics and shop operations, training personnel, financing of new equipment, cutting tools and all related manufacturing requirements. Coverage extends to all of Arizona, California, Oregon, Washington, Nevada, Utah, Idaho, Colorado, New Mexico and Texas.

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ADVERTISING SALES:

(714) 840-1300

CNC WEST (0747-3362) is published bi-monthly by ARNOLD PUBLICATIONS, INC., 16835 Algonquin St., No. 158, Huntington Beach, CA 92649. Periodical Rate postage paid at Huntington Beach, CA. and additional mailing offices. Postmaster: Send address changes to CNC WEST, P.O. Box 2029, Huntington Beach, CA, 92647. SUBSCRIPTIONS: Available without cost in U.S. only to company officials and managers of production, manufacturing engineering and purchasing agents. MUST be requested. All others may subscribe at \$10.00 per year. Single copy \$2.00. Please send paid subscription order to Circulation Manager, CNC West, P.O. Box 2029, Huntington Beach, CA 92647

Publisher's notice: We assume no responsibility for the validity of claims in connection with items appearing in CNC West Magazine. Addresses are given to facilitate further inquiry.

ISSUANCE AND CLOSING DATES: Published every other month, October, December, February, April, June and August. Issued second week of the publication month.

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Providing the Best Western Metalworking Information to Our Readers for 41 Years

Forty-one years ago, my father started CNC WEST. That is a long time ago. The funny thing is at the recent IMTS show in Chicago I had over 20 people reminisce with me about my dad. Most people appreciated his corny jokes. I appreciate the fact he started this magazine and brought me on board. I worked for Hitachi Seiki for a couple of years before I came to work with him. I have been in this industry for 44 years and I am still so glad to be part of it.

It is fascinating to see all the new technology and meet so many wonderful innovative people. Pretty sure I won't be doing this for 44 more years, but I will for as long as I can.

I am not sure why my dad picked tooling and workholding as the theme for that first issue, but he did, and we have rolled with it for 41 years. This issue is chock full of great articles applying to tooling and workholding along with some excellent stories on western shops in general. Our cover story is about OMIC which stands for Oregon Manufacturing Innovation Center. Their vision is "to provide solutions to metals and other manufacturing challenges while preparing the industry's workforce through on-the-job learning and serving as a catalyst for regional economic prosperity". They have machines on loan from some of the best companies in the industry and tooling is a huge part of what they teach.

Another story we have is about a shop in a remote area of Northern California. The owner contacted me and asked if we could do a profile on his shop. Since we are always looking for shops to do stories on, we eagerly agreed. Kinner

Manufacturing of Olivehurst, CA. offers a variety of turbo machining services, including CAD programming, balancing, wire EDM, lathe and 5-Axis mill work. They specialize in work on blades.

We have a story on a shop in Utah who has learned over the years to get what they feel is the best equipment even it that means spending a little bit more. Also, they went with cells which increased productivity. Allied Machine & Engineering provided us with a piece that tries to answer that age old question, 'How can you proactively plan for predictable tool failure?' They give readers much insight into this. Also, BIG DAISHOWA offers advice for Milling Holders which slides perfectly into the Tooling & Workholding them. Well known author and speaker Michelle Nash Hoff provides information about how ToolingU-SME Works to Close the Skills Gap.

Of course, there is much much more but you are going to have to turn the pages to find out. Hope you enjoy and learn something and thanks for reading CNC WEST.

Sincerely,

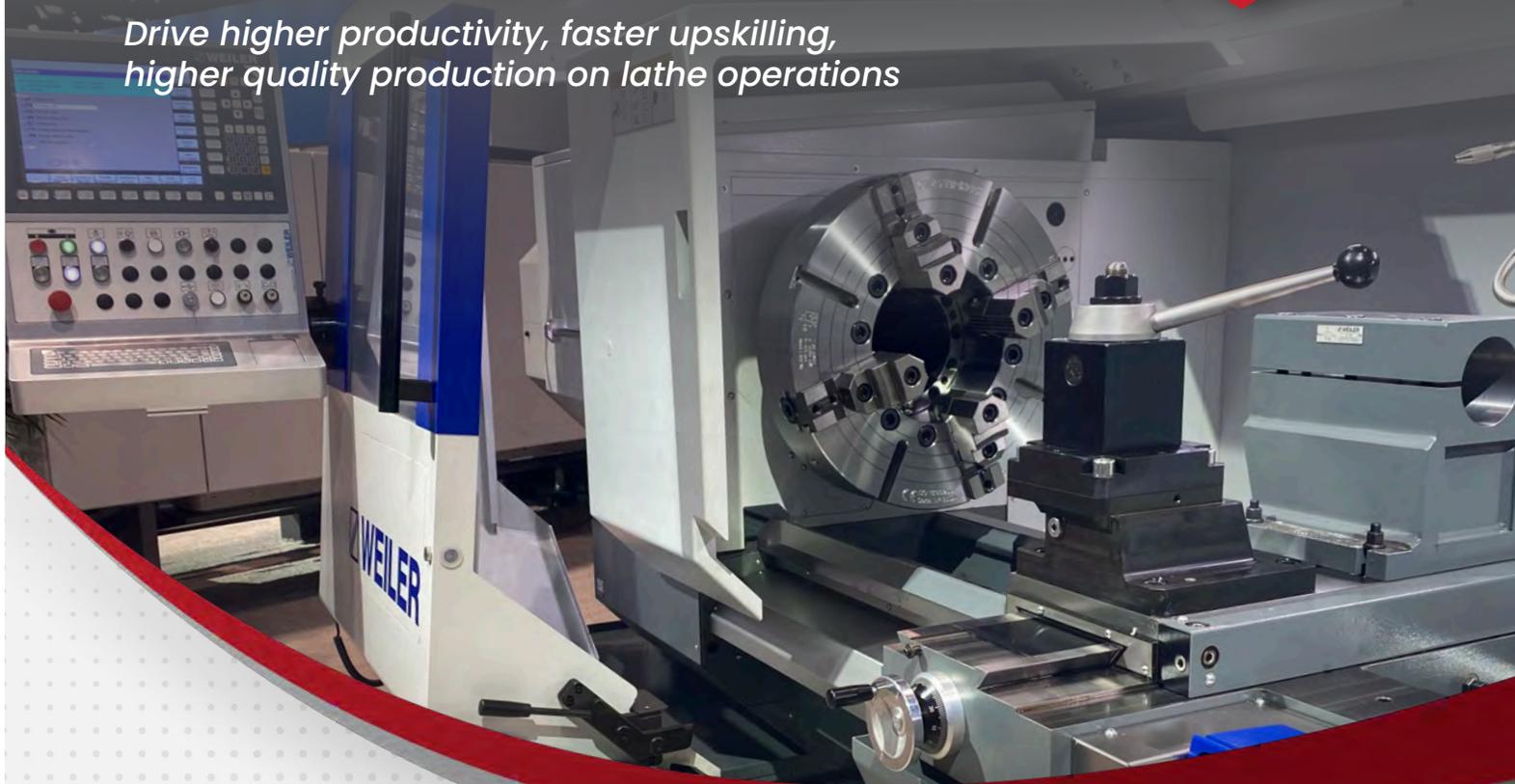
Shawn Arnold

Shawn Arnold
 Publisher

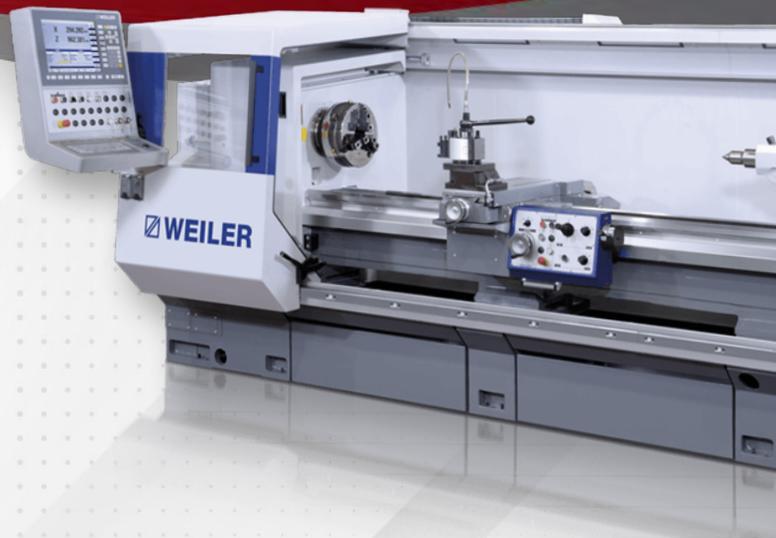
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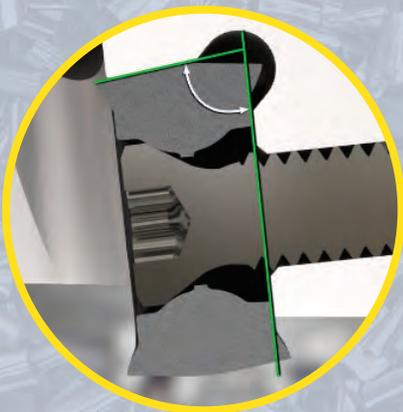
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EXEC HOTLINE

Romeo Power Opens New Manufacturing Center in Cypress, CA.

Romeo Power Inc. said it has relocated its manufacturing operations to a 215,000-square-foot center in Cypress.

The battery maker for electric vehicles is in its final phase of relocating to Cypress from Vernon.

The move will allow the company to accommodate its "growth trajectory, leverage the diverse Orange County tech talent pool and enhance the quality and cost-effectiveness" of its products, company officials said.

The new facility provides "a critical foundation as we enhance our products and technology, as well as scale to meet the needs of current and prospective customers. This is especially critical for Romeo as we focus on growing our existing customer base in commercial fleets, while targeting new customers in the Industrial/Off-Highway and Marine markets," Romeo Power CEO Susan Brennan said in a statement.

Faraday Plant Nears Opening Date

Gardena, CA.-based Faraday Future Intelligent Electric Inc. unveiled the official name of its manufacturing plant located in Hanford: the FF ieFactory California.

The FF ieFactory facility will produce Faraday's FF 91 luxury electric vehicles for the North America and China markets. The vehicle is expected to roll off the assembly line later this year. As of the end of the second quarter, there were 399 preorders.

Carsten Breitfeld, global chief executive of Faraday Future, said that the company continues to make progress on construction and development at the Hanford manufacturing plant as it gets close to the start of production, slated to begin in the late third quarter or fourth quarter.

Faraday is close to accomplishing what it calls its sixth milestone, the completion of construction and equipment installation in the final vehicle manufacturing areas. Robots in the body shop are undergoing final commissioning and validation to support production activity, a release said.

The first electric vehicle to be made at the factory, the FF 91 EV, was designed in the company's Los Angeles headquarters and engineered

in Los Angeles, Silicon Valley, and China.

Faraday Future will hire upwards of 350 new employees at this facility as the company ramps up production.

GrayMatter Robotics Raises \$20M in Series A Funding

GrayMatter Robotics, an artificial intelligence robotics solutions company, announced it raised \$20 million in series A investment.

GrayMatter Robotics products are designed to help manufacturing industries increase productivity, enhance quality consistency and save costs.

With the new capital, the company wants to expand its team to meet growing customer demands.

Brual Shah, co-founder and chief technology officer of GrayMatter Robotics, said in a statement that automating surface finishing and treatment applications for mission-critical production environments poses some extremely challenging engineering problems in AI and robotics.

He added that his team's work is immediately impacting a wide range of industries from recreational equipment to aerospace.

WestJet Orders Up to 64 Fuel-efficient Boeing Airplanes

Boeing and WestJet announced the airline is strengthening its commitment to the 737 MAX family with an order for 42 737-10s and options for an additional 22 jets.

Since launching its business with three 737s in 1996, WestJet has grown its Boeing fleet to more than 100 airplanes including the 737-8 and 787 Dreamliner. Including the 737-10, the Calgary-based carrier has more than 60 firm orders for the 737 MAX family.

"The 737-10 will provide WestJet with additional capacity and unrivalled efficiency as the airline expands its network of destinations across Canada and around the world," said Stan Deal, president and CEO of Boeing Commercial Airplanes.

Continued on page 74.....



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5 Sets or More Soft Jaws!
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Chuck Size	Groove Width	Screw Size	Hole Space	Pie Dia	Height	ALUMINUM Part Number	Price SET OF 3
1.5mm x 60° Serrations							
6"	0.472	10mm	0.787	6"	2.00"	RKT-6200A	\$ 87.07
	0.472	10mm	0.787	6"	4.00"	RKT-6400A	\$ 142.54
8"	0.551	12mm	0.984	8"	2.00"	RKT-8200A	\$ 102.36
	0.551	12mm	0.984	8"	4.00"	RKT-8400A	\$ 196.91
10"	0.630	12mm	1.181	10"	2.00"	RKT-10200A	\$ 151.40
	0.630	12mm	1.181	10"	3.00"	RKT-10300A	\$ 195.31
12"	0.709	14mm	1.181	12"	3.00"	RKT-12250A	\$ 234.40
	0.709	14mm	1.181	12"	4.00"	RKT-12400A	\$ 381.55
	0.827	16mm	1.181	12"	3.00"	RKT-12208A	\$ 213.35
	0.827	16mm	1.181	15"	4.00"	RKT-12408A	\$ 381.55
15"	0.866	20mm	1.690	15"	2.50"	RKT-15250A	\$ 570.70
	1.005	20mm	1.690	15"	2.50"	RKT-15251A	\$ 570.70
3.0mm x 60° Serrations							
18-21"	0.984	20mm	2.362	21"	4.00"	RK3-21400A	\$1,275.46
	0.984	20mm	2.362	24"	4.00"	RK3-24400A	\$1,775.07

Additional diameters & heights available! Please Call!

Chuck Size	Groove Width	Screw Size	Hole Space	Height	Length	ALUMINUM Part #	Price SET OF 3	STEEL Part #	Price SET OF 3
1.5mm x 60° Serrations									
6"	0.472	M10	0.787	1.50	3.00	KT-6150AF	\$ 32.11	KT-6150F	\$ 27.52
	0.472	M10	0.787	3.00	3.00	KT-6300AF	\$ 49.74	KT-6300F	\$ 53.94
8"	0.551	M12	0.984	2.00	3.75	KT-8200AF	\$ 46.64	KT-8200F	\$ 48.80
	0.551	M12	0.984	2.00	4.00	KT-8201AF	\$ 56.40	KT-8201F	\$ 56.19
10"	0.630	M12	1.181	2.00	4.50	KT-10200AF	\$ 54.35	KT-10200F	\$ 54.96
	0.630	M12	1.181	3.50	5.00	KT-10300AF	\$ 71.14	KT-10300F	\$ 79.49
	0.709	M14	1.181	2.00	5.50	KT-12200AF	\$ 89.57	KT-12200F	\$ 86.33
	0.709	M14	1.181	3.00	5.50	KT-12300AF	\$ 115.05	KT-12300F	\$ 129.45
12"	0.827	M16	1.181	2.00	5.50	KT-12208AF	\$ 89.57	KT-12208F	\$ 86.33
	0.827	M16	1.181	4.00	5.50	KT-12408AF	\$ 128.86	KT-12408F	\$ 156.37
	0.866	M20	1.690	2.50	6.50	KT-15300AF	\$ 155.87	KT-15300F	\$ 182.68
15"	1.005	M20	1.690	2.50	6.50	KT-15301AF	\$ 166.68	KT-15301F	\$ 182.68
	3.0mm x 60° Serrations								
18-21"	0.984	M20	2.360	2.50	7.00	K3-21250AF	\$ 166.14	K3-21250F	\$ 207.54
	0.984	M20	2.360	6.00	7.00	K3-21600AF	\$ 412.81	K3-21600F	\$ 540.17

*For Pointed Soft Jaws, replace the "F" with "P" & add \$4.00 (6"-10")/\$7.00 (12" & above) per set

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Chuck Size	Groove Width	Tongue Width	Screw Size	Hole Space	Hgt Inch	STEEL SOFT JAWS		ALUMINUM ROUND JAWS		
						Part Number	Set Price	Pie Dia	Part Number	Set Price
6"	.312	.499	3/8	1.500	2.00	TG-6200F	\$ 50.39	6"	RTG-6200A	\$ 91.92
					4.00	TG-6400F	\$ 86.71	8"	8-RTG-6400A	\$ 190.43
8"	.312	.499	3/8	1.750	2.00	TG-8200F	\$ 26.81	8"	RTG-8200A	\$ 124.47
					3.00	TG-8300F	\$ 77.97	10"	10-RTG-8300A	\$ 288.16
10"	.501	.749	1/2	2.125	2.00	TG-10200F	\$ 40.93	12"	12-RTG-10200A	\$ 221.74
					4.00	TG-10400F	\$ 91.15	15"	15-RTG-10400A	\$ 727.86
12"	.501	.749	1/2	2.500	2.50	TG-12250F	\$ 87.38	15"	15-RTG-12250A	\$ 592.44
					4.00	TG-12400F	\$ 123.85	18"	18-RTG-12400A	\$ 975.01
					2.50	TG-15250F	\$ 105.55	21"	21-RTG-15250A	\$1,039.59
					4.00	TG-15400F	\$ 137.62	24"	24-RTG-15400A	\$1,775.07
15"	.501	.749	5/8	3.000						

*For Pointed Soft Jaws, replace the "F" with "P" & add \$4.00 (6"-10")/\$7.00 (12" & above) per set.

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Chuck Model	Chuck Dia	GRIP-RITE OEM STYLE		XTRA BITE	
		Part Number	Price Per Set	Part Number	Price Per Set
B206, HS06	6"	KT-60HJ2-U	\$289.25	KT-60HJ2-X	\$301.96
B208, HS08	8"	KT-80HJ2-U	\$346.67	KT-80HJ2-X	\$368.06
B210, HS10	10"	KT-100HJ2-U	\$396.18	KT-100HJ2-X	\$436.01
B-12	12"	KT-120HJ2-U	\$461.37	KT-120HJ2-X	\$488.95
B-212, HS12	12"	KT-128HJ2-U	\$460.11	KT-128HJ2-X	\$489.97
B-15	15"	KT-150HJ2-U	\$594.26	KT-150HJ2-X	\$653.06



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Chuck Dia	Chuck Reference	Part Number	Set Price
6"	140/165/175/170	GBK-160-A	\$ 310.00
8"	200/210/215/225	GBK-200-A	\$ 340.00
10"	250/265/275	GBK-250-A	\$ 380.00
12"	315/340	GBK-315-A	\$ 470.00
15"	400	GBK-400-A	\$ 500.00
20"	500	GBK-500-A	\$ 970.00

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Size	Thru-Hole	Max RPM	Part Number	Mfg List	Our Price
6"	1.654	3000	GT-1151-0600	\$ 719.00	\$ 683.05
8"	2.165	2500	GT-1151-0800	\$ 916.00	\$ 870.20
10"	2.992	2000	GT-1151-1000	\$ 1,197.00	\$ 1,137.15
12"	4.055	1500	GT-1151-1200	\$ 1,819.00	\$ 1,728.05
15"	5.354	1000	GT-1151-1600	\$ 2,680.00	\$ 2,546.00

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TYPE J

Starting At:

\$49.59 each

Part # TBJ-07-0250-B

TYPE C

Starting At:

\$64.68 each

Part # TBC-07-0250-B

TYPE B

Starting At:

\$52.52 each

Part # TBB-07-0375-B

USST

JAW BORING RING

A Faster, Easier & Accurate Way To Bore Soft Jaws!

- Ideal for machining soft jaws
- Attaches quickly without tools
- Bore jaws in a single operation
- Reduces set-up time
- Allows for through boring of jaws

Chuck Dia	Part Number	Price
4"	JBR-04	\$194.24
5"	JBR-05	\$194.24
6"	JBR-06	\$220.91
8"	JBR-08	\$271.55
10"	JBR-10	\$306.55
12"	JBR-12	\$340.79
15"	JBR-15	\$512.05

Fits Kitagawa, Samchully, Strong, TMX, MMK, Howa, SMW, Seoam, Autoblock and other CNC chucks!

COLLET PADS & TOP JAWS



"S" Style • Warner & Swasey • Emergency Pads
Serrated, Squares & Hexes • Top Jaws • Made in the USA!

Warner & Swasey Collet Pads
Prices Starting At: **\$78.04** Set
Part # CP-WS3RM02500-G

"S" Style Collet Pads
Prices Starting At: **\$76.73** Set
Part # CP-S12RM02500-Y

Top Jaws For 8" CNC Chucks
Prices Starting At: **\$635.25** Set
Part # CPJ-KT0800WS4-U

EDGE TECHNOLOGY

CHUCK STOP SET



- 10 sets of hardened parallel bars
- 0.0002" parallelism accuracy
- Parallel heights: 1/2" to 1-5/8" x 1/8" inc.
- Magnets secure the stop to chuck face
- Centering plug fits ID of the chuck and keeps the Chuck Stop centered
- Included centering plug diameters are 1.4", 2.0", 2.5", 3.0", 3.5", and 4.0"
- The Chuck Stop is 6.0" in diameter
- Designed for 3 jaw chucks only
- For use on 6" diameter chucks and larger

CHUCK STOP SET

Part # EDGE-30000
Mfg's List: \$199.99

\$171.41 ea

PH WORKHOLDING
• Precision Collets •

5C, 16C & 3J COLLETS



With Internal Threads

- Crafted to exacting standards from alloy steel
- Heat treated threads and spring tempered body for accuracy and long life
- Internal threads for use with threaded collet stops
- Large variety of round, hex and square sizes
- **EMERGENCY COLLETS** also available in 5C, 3J & 16C

16C ROUND

Prices Starting At:

\$72.00 ea

5C SQUARE

Prices Starting At:

\$34.20 ea

3J HEX

Prices Starting At:

\$96.30 ea

TMX

PART-OFF TOOL SETS



- Compatible with industry standard brands and sizes
- Sets include tool block, part off blade and (10) CVD coated general purpose carbide inserts, suitable for steels/stainless with 0° lead angle

NEW ITEM!

Blade Size	Blade Ref #	Insert Size	Block Ref #	Part Number	SET Price
1.02"	26-3	GTN-3	19-5	BI-6895-903	\$216.56
26mm	26-4	GTN-4	3/4" shank	BI-6895-904	\$219.45
	26-5	GTN-5		BI-6895-905	\$226.96
1.26"	32-3	GTN-3	25-6	BI-6895-923	\$228.69
32mm	32-4	GTN-4	1" shank	BI-6895-924	\$231.58
	32-5	GTN-5		BI-6895-925	\$239.66

EDGE TECHNOLOGY

5C COLLET STOP



- Fits standard 5C collets with internal threads
- 6 hardened steel stop rods included-1/16", 1/8", 3/16", 1/4", 3/8", 3/4"
- 3/4" stop rod keeps parts square to spindle axis
- Proprietary locking system prevents the possibility of the stop rod slipping in the body
- Body is red anodized 6061-T6 aluminum
- Body fits a 7/8" wrench

5C COLLET STOP

Part # EDGE-45000
Mfg's List: \$49.99

\$34.27 ea



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CARBIDE TURNING INSERTS



- **AH120**-The "Super Grade" for steels, stainless and super alloys!
- **TM** Chipbreaker-Medium cutting of steels and hi-temp alloys
- **SM** Chipbreaker- Medium cutting of mild steels and stainless

COMPLETE LINE AVAILABLE!

Insert No.	Rad.	Grade	Chip-Breaker	Application/ Material	Part Number	BOX QTY EACH
CNMG431	.015	AH120	TM	Super Alloys	TO-1285	\$9.14
CNMG432	.031	AH120	TM	Super Alloys	TO-1364	\$9.14
DNMG431	.015	AH120	TN28	Super Alloys	TO-1727	\$12.47
DNMG432	.031	T6130	SM	Stainless	TO-6805431	\$12.47
VNMG331	.015	AH905	HMM	Super Alloys	TO-6859407	\$11.78
VNMG332	.031	AH120	TM	Super Alloys	TO-3194	\$11.78
WNMG431	.015	AH120	TM	Super Alloys	TO-3277	\$9.14
WNMG432	.031	AH120	TM	Super Alloys	TO-3338	\$9.14



COOLANT-THRU INDEXABLE DRILLS

VG HI-PERFORMANCE ENDMILLS

Using 80° WCMT/WCMX Inserts

- 2xD, 2.5xD and 4xD indexable drills
- Spiral flutes to improve chip evacuation
- Coolant-thru access located on both shank and side of drill body
- Insert pockets precisely positioned to keep cutting forces low and evenly distributed
- 80° trigon inserts offer 3 cutting edges
- Made in USA



4 Flute • Variable Helix • Made From C10 Micrograin Carbide



Ideal For Stainless, Mild Steels, Cast Iron & Low/Medium Hard Steels up to 40Hrc

Dia	LOC	Shank	OAL	Part Number	Price EA
1/8	3/8	1/8	1-1/2	YG-EMUGMF68901	\$ 16.66
1/4	3/4	1/4	2-1/2	YG-EMUGMF68905	\$ 28.45
3/8	7/8	3/8	2-1/2	YG-EMUGMF68907	\$ 46.87
1/2	1	1/2	3	YG-EMUGMF68909	\$ 72.02
5/8	1-1/4	5/8	3-1/2	YG-EMUGMF68911	\$ 145.44
3/4	3/4	3/4	3	YG-EMUGMF68048	\$ 188.60
1	1-1/2	1	4	YG-EMUGMF68913	\$ 326.67

INSERTS AVAILABLE!

Call For Grade Information!



Insert	Prices Starting At:
WCMT 1.211	\$16.63 ea
WCMX 1.81.52	\$10.58 ea
WCMX 21.52	\$10.58 ea
WCMX 2.522	\$10.58 ea

Dia	Shank	LOC	Part Number	Price EA	Uses Insert
0.500	0.625	1.340	UD-0500-2D-063	\$163.94	WCMT 1.211
0.625	0.625	2.815	UD-0625-4D-063	\$236.41	WCMX 1.81.52
0.750	0.750	1.748	UD-0750-2D-075	\$181.76	WCMX 21.52
0.750	0.750	3.698	UD-0750-4D-075	\$261.36	WCMX 21.52
1.000	1.000	2.345	UD-1000-2D-100	\$199.58	WCMX 2.522
1.000	1.000	4.635	UD-1000-4D-100	\$288.68	WCMX 2.522
1.125	1.000	4.760	UD-1125-4D-100	\$288.68	WCMX 2.522

SOLID CARBIDE ENDMILLS



- 4 flute, single end
- TiAIN Coated
- Center cutting
- 30° helix, right hand



Dia	LOC	Shank Dia	OAL	4 Flute TiAIN Coated	Price Each
1/8"	1/2	1/8	1-1/2	MO-EM001067-4	\$ 8.62
3/16	5/8	3/16	2	MO-EM001107-4	\$ 12.67
1/4	3/4	1/4	2-1/2	MO-EM001137-4	\$ 17.00
5/16	13/16	5/16	2-1/2	MO-EM001153-4	\$ 22.23
3/8	1	3/8	2-1/2	MO-EM001177-4	\$ 24.42
1/2	1	1/2	3	MO-EM001207-4	\$ 43.37
5/8	1-1/4	5/8	3-1/2	MO-EM001226-4	\$ 77.16
3/4	1-1/2	3/4	4	MO-EM001244-4	\$ 111.31

CARBIDE DRILLS

STUB LENGTH • TiAIN Coated

- 135° drill point
- Right hand cut
- Made from premium submicron carbide with 10% cobalt
- For steels, stainless, titanium & nickel alloys



Size	LOC	OAL	Part Number	Price
3/64	1/2	1-1/2	SRTA-3/64-MO	\$15.09
1/16	5/8	1-5/8	SRTA-1/16-MO	\$12.41
5/64	11/16	1-11/16	SRTA-5/64-MO	\$12.41
7/64	13/16	1-13/16	SRTA-7/64-MO	\$13.34
1/8	7/8	1-7/8	SRTA-1/8-MO	\$13.35
5/32	1	2-1/16	SRTA-5/32-MO	\$16.55
3/16	1-1/8	2-3/16	SRTA-3/16-MO	\$18.64
1/4	1-3/8	2-1/2	SRTA-1/4-MO	\$26.36

COMBINED DRILL & COUNTERSINKS



- Plain type
- 60° angle
- HSS or M42 cobalt
- Additional sizes available

Size	Body Dia	Point Dia	OAL	HSS M2	Price
#1	1/8"	3/64	1-1/4	MAG-1150100	\$5.85
2	3/16"	5/64	1-7/8	MAG-1150200	\$5.94
3	1/4"	7/64	2"	MAG-1150300	\$6.30
4	5/16"	1/8	2-1/8	MAG-1150400	\$6.48
5	7/16"	3/16	2-3/4	MAG-1150500	\$10.22
6	1/2"	7/32	3"	MAG-1150600	\$15.12
7	5/8"	1/4	3-3/4"	MAG-1150700	\$22.14
8	3/4"	5/16	3-1/2"	MAG-1150800	\$34.29



HAND PADS



- 6" x 9" size
- Scotch-Brite™ material never rusts and can be used with water solvents
- For cleaning, deburring or finishing by hand

7447 20/ct ONLY \$24.00!

Mfg Ref.	Description	Color	Pkg Qty	Part Number	Pkg Price
7447	Gen. Purpose Hand Pad	Maroon	20	3M-04029-5	\$ 24.00
7447B	Gen. Purpose (Bulk)	Maroon	60	3M-04229-9	\$ 84.26
6444	Extra Duty Hand Pad	Brown	20	3M-16553-0	\$ 35.60
6448	Light Duty Hand Pad	Dark Gray	20	3M-16555-4	\$ 31.50
7440	Heavy Duty Hand Pad	Tan	40	3M-65055-5	\$ 99.52
7445	Light Duty Cleansing Pad	White	20	3M-16976-7	\$ 30.75

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- The top choice for high performance and durability
- Finish, debur or polish metals and composites
- SC-Silicon carbide
- AO-Aluminum oxide
- 6,000 max RPM



OD x W x AH	Density	Mineral Type	Grade	Part Number	Price Each
6" x 1/2" x 1"	8	SC	Fine	3M-09548-6	\$ 62.31
	9	SC	Fine	3M-05790-3	\$ 62.31
	8	AO	Medium	3M-13617-2	\$ 87.22
6" x 1" x 1"	8	SC	Fine	3M-09549-3	\$ 87.22
	9	SC	Fine	3M-05132-1	\$ 87.22



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- Fits KURT DX6, D688 and other standard machine vises
- Machinable aluminum- customize jaws for your application
- Buy the 10 pack and save BIG!
- Made in USA



Prices Starting At Only \$16.05 per pair!

SAVE UP TO 15%!

Length	Height	Width	Part Number	Reg. Price	PROMO!
6"	2"	3/4"	VJ-601-10	\$187.70	\$160.52
6"	2"	1"	VJ-602-10	\$208.40	\$178.20
6"	2"	1-1/4"	VJ-603-10	\$246.50	\$210.77

KURT 6" MACHINE VISE



SAVE \$120.00!
KURT DX6

6" Vise w/ 9" Opening
Mfg's List: \$779.00

\$659.00 each

Part # KURT-DX6

- 6" vise, full 9" opening
- Narrower body style allows for more vises on the machine
- Recessed pocket for easier lifting
- Thru-body chip evacuation
- Same bed height as D688
- 4 bolt stationary design fastens from the top



CAT-40 BALANCED TOOLHOLDERS

KINGSTON: Balanced to 15,000 RPM @ g6.3
SPIN TRU: Balanced to 20,000 RPM @ g2.5

- Balanced on a HAIMER machine
- Includes certificate of balancing
- Runout 0.0002" TIR or better
- Manufactured to ISO 9002 standards
- Traverse ground taper to AT3 specs
- H5 bore tolerance
- Collet chucks, Shell mill, Jacobs/ Morse Taper holders available



Dia	Proj	KINGSTON Part Number	Price Each	SPIN TRU Part Number	Price Each
1/8"	1.75"	C40-01EM175-K	\$ 65.00	C40-01EM175-KB	\$ 85.00
3/16"	1.38"	C40-18EM138-K	\$ 65.00	C40-18EM138-KB	\$ 85.00
1/4"	1.38"	C40-25EM138-K	\$ 60.00	C40-25EM138-KB	\$ 85.00
	1.75"	C40-25EM175-K	\$ 65.00	C40-25EM175-KB	\$ 82.00
5/16"	1.38"	C40-31EM138-K	\$ 65.00	C40-31EM138-KB	\$ 85.00
	2.50"	C40-37EM250-K	\$ 65.00	C40-37EM250-KB	\$ 85.00
3/8"	1.38"	C40-37EM138-K	\$ 60.00	C40-37EM138-KB	\$ 82.00
	4.00"	C40-50EM400-K	\$ 65.00	C40-50EM400-KB	\$ 84.00
1/2"	1.75"	C40-50EM175-K	\$ 65.00	C40-50EM175-KB	\$ 82.00
	3.00"	C40-62EM300-K	\$ 65.00	C40-62EM300-KB	\$ 88.00
5/8"	1.75"	C40-75EM175-K	\$ 65.00	C40-75EM175-KB	\$ 85.00
	3.00"	C40-75EM300-K	\$ 65.00	C40-75EM300-KB	\$ 88.00
1"	1.75"	C40-10EM175-K	\$ 65.00	C40-10EM175-KB	\$ 85.00
	6.00"	C40-10EM600-K	\$ 73.00	C40-10EM600-KB	\$ 90.00
1-1/4"	2.00"	C40-12EM200-K	\$ 65.00	C40-12EM200-KB	\$ 85.00

CAT-40 BALANCED COLLET CHUCKS

KINGSTON: Balanced to 15,000 RPM @ g6.3
SPIN TRU: Balanced to 20,000 RPM @ g2.5

- Balanced on a HAIMER machine
- Includes certificate of balancing
- Runout 0.0002" TIR or better
- Manufactured to ISO 9002 quality control standards
- Traverse ground taper to AT3 specs
- H5 bore tolerance
- Collet chucks, Shell mill, Jacobs/ Morse Taper holders available



Collet Series	Proj	BALANCED TO 15,000 RPM		BALANCED TO 20,000 RPM	
		KINGSTON Part Number	Price Each	SPIN TRU Part Number	Price Each
ER 16	2.50"	C40-16ER250-K	\$ 101.00	C40-16ER250-KB	\$ 113.00
	3.12"	C40-16ER312-K	\$ 104.00	C40-16ER312-KB	\$ 113.00
ER 20	2.50"	C40-20ER250-K	\$ 100.00	C40-20ER250-KB	\$ 113.00
ER 25	4.00"	C40-25ER400-K	\$ 104.00	C40-25ER400-KB	\$ 113.00
ER 32	2.50"	C40-32ER250-K	\$ 104.00	C40-32ER250-KB	\$ 113.00
ER 32	4.00"	C40-32ER400-K	\$ 104.00	C40-32ER400-KB	\$ 113.00
ER 40	2.50"	C40-40ER250-K	\$ 104.00	C40-40ER250-KB	\$ 113.00

TOOLHOLDER TIGHTENING FIXTURES



- Change retention knobs, collets, drills and end mills quickly
- For CAT & BT taper toolholders
- Crafted from 6061 anodized aluminum
- For vertical or horizontal use

Taper	Part Number	Mfg's List	Our Price
CAT/BT 40	TF-4001-K	\$ 89.00	\$ 74.99
CAT/BT 50	TF-5001-K	\$ 110.00	\$ 93.50

RETENTION KNOBS

Your VALUABLE Machine Deserves A Premium Knob!



QUANTITY DISCOUNTS
10% OFF!
10 or more knobs

- Individually Magnetic Particle Tested
- Made in the USA!
- LARGE VARIETY Available!
- Made of 8620, Heat Treated to Rc 56/58
- Exceeds Industry Standards For Tolerance (ANSI, DIN, JMTBA)



Machine	Thread	Head Dia	Angle	Coolant	Part Number	Price EA
Fadal BT40	M16-2.0	.740	90°	No	B40-4501S	\$ 18.61
HAAS BT40	M16-2.0	.590	45°	Yes	B40-4500H	\$ 23.94
HAAS CAT40	5/8-11	.589	45°	No	C40-4501S	\$ 18.61
Fadal CAT40	5/8-11	.740	45°	No	C40-4500S	\$ 15.96
Okuma CAT40	5/8-11	.589	60°	No	C40-6000S	\$ 18.61
Mazak CAT40	5/8-11	.740	45°	Yes	C40-4500H	\$ 16.54
Mori Seiki CAT50	1-8	.905	90°	No	C50-9000S	\$ 22.94

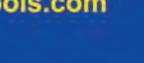
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SAVE
20% OFF
Mfg's List Prices

- Ball bearing construction to reduce friction in tightening mechanism and provide better grip
- All components hardened and ground
- One-piece gear ring and fluted sleeve eliminate tooth breakage
- Finely crafted in Spain

Jacobs Equiv	Cap.	Mount	Part Number	Mfg List	SALE!
8-1/2N	1/64-5/16"	2JT	LAM-L40070B	\$129.89	\$103.91
14N	1/32-1/2"	3JT	LAM-L40072B	\$201.82	\$161.46
16N	1/32-5/8"	3JT	LAM-L40073B	\$227.04	\$181.63
18N	1/32-3/4"	4JT	LAM-L40074B	\$340.62	\$272.50
20N	3/16-1"	5JT	LAM-L40075B	\$466.80	\$373.44
-	1/32-1/2"	6JT	LAM-L40626B	\$201.82	\$161.46



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- Aluminum half-gantry design with micro-machined guideways for accuracy and hard anodized for anti-corrosion.
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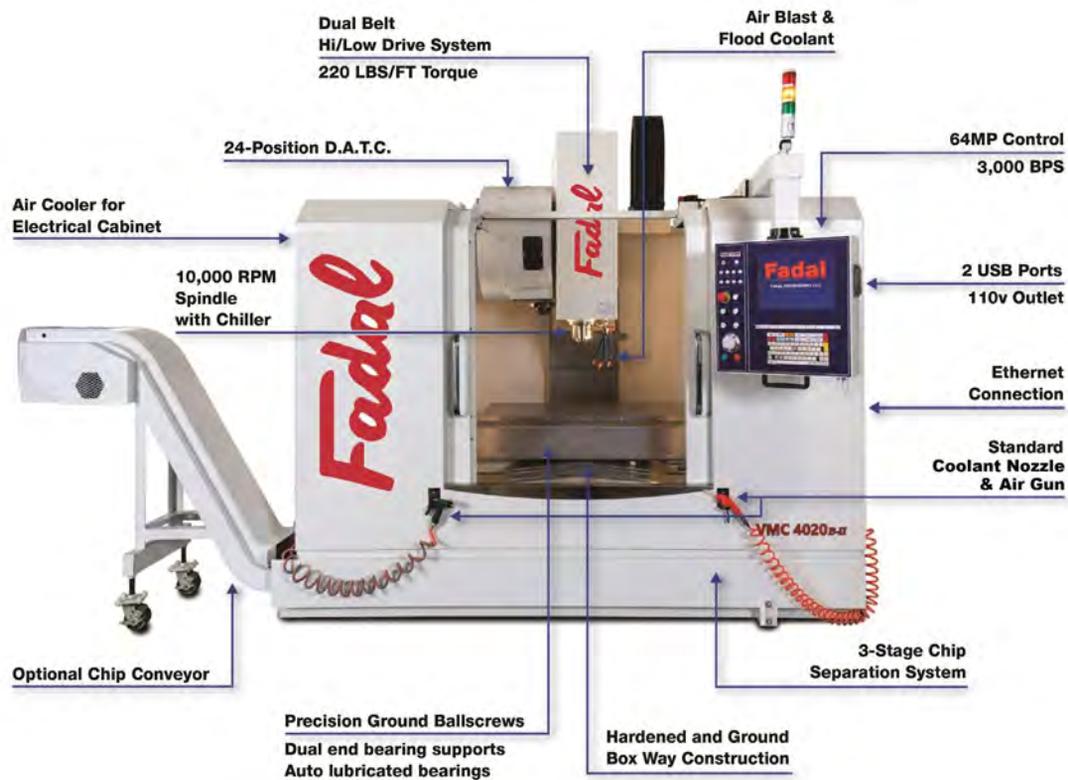
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- Dual supported & pretensioned ballscrews
- Auto lubricated ballscrew & bearings
- Monitored lubrication system
- Three stage chip separation
- Coolant nozzle & air gun
- Cooled electrical cabinet

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- 4 GB Memory
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- High speed software
- Coordinate rotation and scaling
- Custom macros
- Spare M functions
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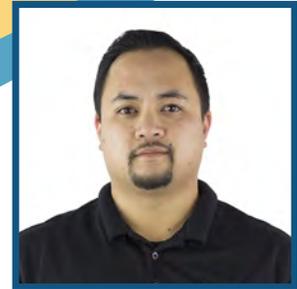
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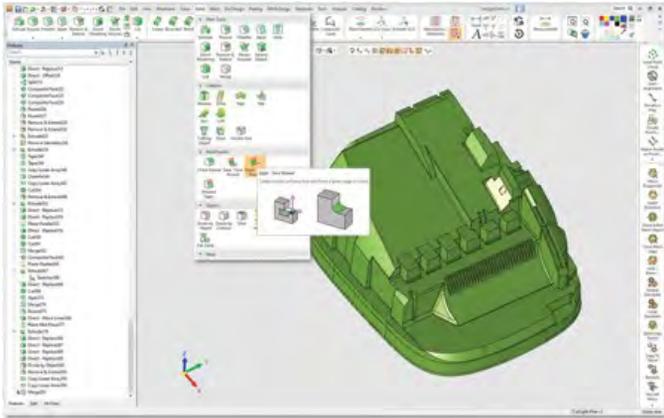
Machinists turn ideas into reality. But if you're not using the best tools, your ideas are limited. Multiaxis machining allows you to machine as big as your dreams, and this gives machinists the confidence they need to get started and challenges them to reimagine the work they're currently doing. Make it quicker. Make it easier.

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Release Offers Process Optimization and New Technology for Toolmakers



Cimatron has announced the release of Cimatron V16. After an intensive period of industrial beta testing, Cimatron V16 is now available for general distribution.

Version 16 introduces new features in all areas of the product, including a clean new user interface (UI) and increased automation. In addition, the continued emphasis on solutions for toolmakers includes powerful functionality for die addendum surfaces, mesh manipulation and drafting detailing.

CAD enhancements include the ability to create structural ribs from either a 2D or 3D contour, with draft angle and flat or rounded tops. Working with mesh models has also been improved with new capabilities for closing open areas, curvature mapping and the option to define local mesh areas where it is possible to set finer mesh tolerances to describe more intricate model details.

User efficiency continues to be a focus with the process workflow having been improved in several areas, including batch printing with support for shaded views, dynamic triad dragging, expanded BOM support for assembly structures and extended preferences control with the ability to search and reset.

For mold makers, several new mold layout types are now available, including smart mirror and array, with the set-up wizard controlling the parameters for layout sub-type, rotations and cavity distances.

A new feature for automated ejector locking has been added that detects which ejectors need to be locked and the type of lock required to prevent their rotation in the ejector plate, and then modifies the head to create the appropriate pocket in the ejector plate.

Surface extension capabilities have been enhanced for both mold and die makers with a new tangent skin extension function that provides the ability to automatically extend surface edges to aid the construction of core and cavity parting faces. The die design extend faces has also been improved to better

manage internal corner conditions that would create overlapping face extensions.

Cimatron 16 now offers more automated methods for enhanced cooling path generation. Also, a new virtual volume function lets the user limit a cooling circuit to a portion of the shape volume and avoid sections that do not require a cooling channel. Further enhancements include a new optimized curvature function that highlights areas where a cooling channel cannot be created, such as a curve radius smaller than the channel diameter.

Electrode design is a critical part of the mold production process and Cimatron 16 brings a number of major developments. These include the ability to apply surface-based templates for multilump electrodes, EDM set-up enhancements for material support with connected manufacturing attributes, and support for System 3R holders. For the production process, machining electrodes is easier to control because users can now specify the electrode burning stage from rough through to polishing directly within the NC-Setup. All relevant machining parameters will be applied automatically according to the EDM set-up with a new mechanism to automatically create the NC files.

Cimatron 16 represents another release with major CAM developments to support NC automation. Three-axis rough and volume pocketing now supports the automatic selection of multiple cutters of different lengths for the optimum cutting sequence by splitting the toolpath into multiple operations based on cutting length.

VoluMill pocketing can now be applied to multiple open and closed pockets of differing heights and depths as a one-step routine and single NC operation. Other 2.5-axis operations include a new capability in the slotting procedure that uses pre-drilled holes for safe material entry and to speed up machining with optimum toolpath movement at each level.

For 3-axis machining, the geodesic morph and geodesic 3D-step procedures are now available for all NC users.

Five-axis deburring has been extended to support extra cutter types, including end mill, sphere mill, lollipop mill, taper mill and chamfer mill. Importantly, the new multiple cuts feature enables the user to create more than one cut along a sharp edge to generate a chamfer or fillet shape either by constant width or by constant depth for a chamfer, or by constant width or constant radius for a fillet.

Other CAM developments include automatic arc for lead-in/lead-out, additional surface path options for milling, better handling of undercuts for 5-axis roughing and the ability to import cutters and holders directly from external data formats such as STEP, IGES and STL, as well as Cimatron solid files.

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OMIC R&D

OREGON MANUFACTURING INNOVATION CENTER FOR RESEARCH AND DEVELOPMENT



Photos provided by:
OMIC R&D

OMIC R&D in Scappoose, Oregon is a world-class applied research and development facility and is modeled after the Advanced Manufacturing Research Center established with Boeing at Sheffield University in England.

With new members joining monthly, a dozen or so research projects in house, and a new 32,000sq.ft. additive center coming online, the Oregon Manufacturing Innovation Center Research and Development (OMIC R&D) in Scappoose, Oregon has a lot going on as 2022 nears its end. Their vision is “to provide solutions to metals and other manufacturing challenges while preparing the industry’s workforce through on-the-job learning and serving as a catalyst for regional economic prosperity,” but October for them means holding one of the largest manufacturing day events in the country.

“In 2019 we hosted around 400 students and 50 vendors at OMIC R&D,” tells business development manager Josh Koch. “We are hoping to make this first ‘back-in-person’ Manufacturing Day a special one with at least the same number of students and 70+ exhibitors. This year we are doing something a little different, utilizing our campus

facility as well as the OMIC training center across the way at Portland Community College. We are offering two group sessions and coming together for lunch at OMIC R&D then switching facilities. Students will interact with manufacturers at both locations showing what is possible in manufacturing. We have people and companies coming from out of state and even internationally to meet and talk with students.”

“For us it isn’t about finding future employees,” adds executive director Craig Campbell. “But really inspiring the high school and middle school students by exposing them to amazing opportunities in manufacturing and opening their minds to things and ideas they’ve never imagined. We have some jaw dropping technologies here. Whether it is our robots and cobots or our massive mill-turns, it leaves an impression on people of all ages. Students watch TV and get an idea what it is like to work in a hospital or a

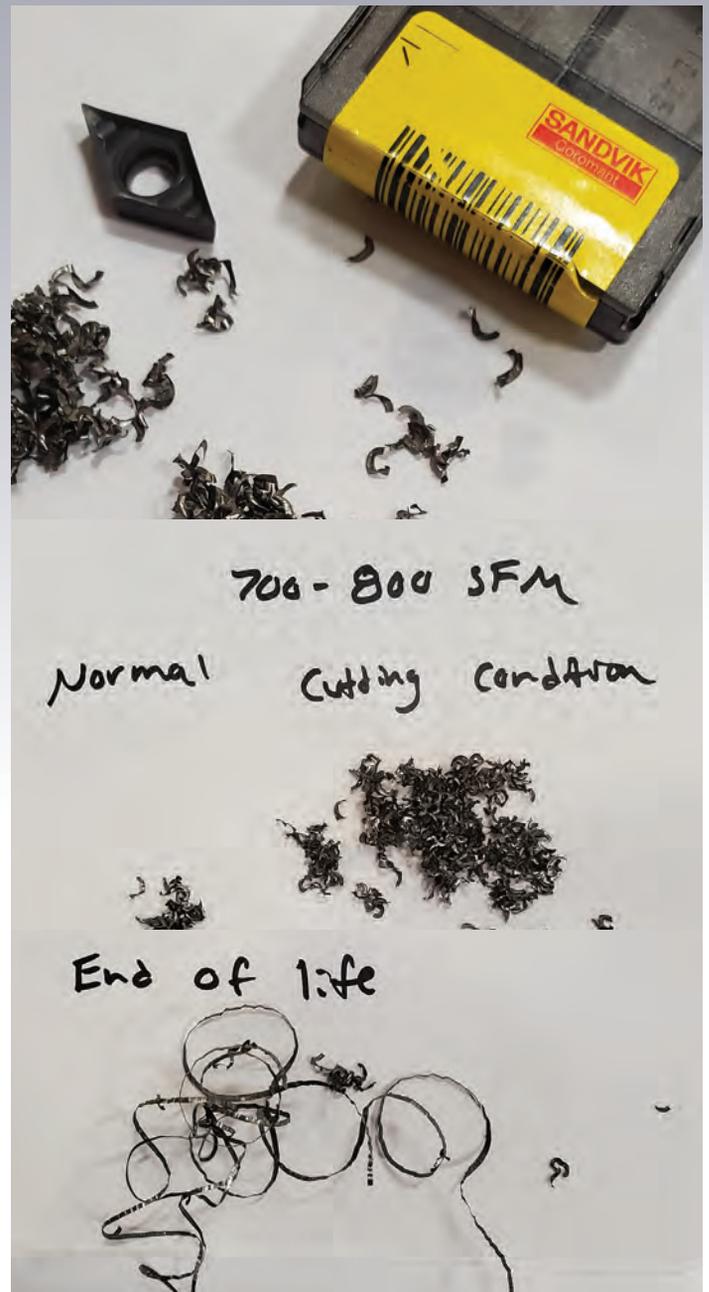


All the machines are on consignment from the various companies and manufacturers for a set time. The members want to showcase their latest and greatest, so the machines are rotated frequently.

lawyer's office, but they aren't going to see any examples of manufacturing, so they have no real idea what is possible. Unless they are predisposed by having a relative or family friend in manufacturing, they have never googled 5 axis machining, let alone seen a 3D metals printer in action. Vendors bring in these interactive displays to show off their cool stuff and give students a chance to experience how it works, while letting them know where the job opportunities are, and what kind of salary they can expect. We need to find or create an easy pathway for students to join the manufacturing industry. It can be anything from taking a course at the community college or making sure that their CTE instructor is teaching them what they need. We partner with the local schools, assess their needs and help them get resources to support their programs."

"We group students in two groups typically," continues Urmaze Naterwalla, head of research & development. "Those that have a baseline of knowledge that manufacturing things exists out in the world and the ones that have no idea at all. We are very proud of how we showcase our trade. We do it in the right way, at our state-of-the-art facilities, and not just a tour in a dingy run-down machine shop with oil on the floor and chicken wire. That isn't the way we want the industry represented, it isn't a good sales tool to draw young engineers or apprentices into the industry. The gleaming, fun, exotic, clean, and challenging aspects of manufacturing are a much better way to get them hooked on this as a career path. Once they show just the slightest interest, the lure of technology takes over. I often joke with them, but it is 100% true, that there is more technology in the edge of a cutting tool than there is in the latest cell phone in their pocket. It takes a while, but as they learn more they understand and believe me. It also doesn't hurt that we have machines and instrumentation from Zoller, Mahr, Haimer, Renishaw, Wenzel, and ATOS that back me up with data."

OMIC R&D is modeled after the Advanced Manufacturing Research Center (AMCR) established



OMIC R&D works to decrease runtime by optimizing cutter geometries and parameters. Tests are done to help companies understand their new process.



OMIC R&D host one of the largest Manufacturing Day events in the country. More than 400 students and 70 companies come together to learn and inspire.

with Boeing at Sheffield University in England. AMRC was founded to help manufacturers of any size become more competitive by introducing advanced techniques, technologies, and processes, and to carry out world-leading research into advanced machining, manufacturing, and materials that are of practical use to industry. Since OMIC R&D's inception in 2017 the goal is to mirror that and bring scientists, engineers, industry leaders and academic experts together to innovate, experiment, discover, and teach in the Pacific Northwest.

OMIC R&D is a member-based institution with three tiers depending on their annual monetary or in-kind contributions. Membership spans the entirety of metals manufacturing, design software, tooling, coolants, lubricant, product manufacturers and machine tool manufacturers, the whole gambit. "Most of our members are involved with aerospace & defense, transportation, infrastructure, metals, or machinery," tells Craig. "Associate memberships are designed to allow for smaller companies to be able to rub shoulders and shake hands with the giants of our industry with a lower cost buy in. Companies generally become members for two reasons: those who are looking for answers to their problems, and those that are looking to provide products as the solution to others' problems. We become the delta between the two."

"A good example of this is our new 32,000sq.ft. additive innovation center," continues Josh. "We are moving

everything 3D printer related out of the current building and into its own additive manufacturing lab, doubling the size of our campus, and putting Oregon on the map as a powerhouse in the world of 3D metals printing. Most of the center is geared towards printing metals, but we will also include polymers and hybrid machines as well. The goal is not for a member to come to us with a part and ask can I 3D print this? We won't sell them on OMIC R&D being for example the home of laser powder bed fusion 3D printing and tell them their part is perfect for that process. Our national uniqueness lies in us exploring multiple avenues of additive manufacturing and offering multiple possible solutions from a variety of different manufacturers. Representative machines from numerous manufacturers will be onsite allowing our teams to study how best to create the part and share our findings with our customers."

The OMIC R&D campus is impressive, and it comes as no surprise they do a lot of show and tell. You walk out onto the shop floor and see a ton of different equipment set up in neighborhoods. All the machines are on consignment from the various companies and manufactures for a set time. The members want to showcase their latest and greatest, so the machines are rotated frequently. It is a showroom, and a fully operational research space. OMIC R&D have clean white floors, space around the machines to teach groups, lighting conducive of filming. Everything you need to put



OMIC facility which focuses on subtractive technologies as well as metrology and robotics.



OMIC R&D tests new titanium alloys on its Wire Arc Additive Machine.

the machine's best foot forward and allow them to educate, innovate and collaborate.

"Our focus is on applied research which means fitting research solutions diversity into production environments, or informing production what not to do," explains Urmaze. "We try not to do research that only ends up in a library. I often say that research feels incomplete if we don't pass on the message of the research by teaching what we've learned. At the very least we are educating the customer on what to do, or what not to do. Remember, research doesn't necessarily mean a successful outcome. "Don't do this" is very valuable. You never want to hear those words, but it is still valuable knowledge." "We not only rely on our people to find solutions, but also our membership collaborative," adds Craig. "If you are having a tooling issue for example, we can reach out to our tooling members and say we have this problem, what do you advise to solve it. Josh and Urmaze know the strengths of our seven cutting tool manufacturer members and will know which to go to first. One of them might be better in certain areas than the others, and we look to them initially.

OMIC R&D have no shortage of impressive machine tools onsite and ready to jump into action at a moment's notice, but one of their most exciting neighborhoods is centered around tooling and inspection. With tools like an Anca TX7 grinder, Haimer balancer, Haimer Power Shrink, Haimer VIO LINEAR and UNO Presetters, Atos 5 3D scanner, Wenzel LH 1210 CMM, Zoller PomBASIC optical tool inspector, and the Zoller Titan automated tool inspection

and measurement machine it is no wonder OMIC R&D have published articles on everything from the progression of drill wear in surgical drilling (The Unknowns of Surgical Drilling) to Why Binderless CBN Inserts Turn Titanium Faster. "Testing criteria are dynamic and often need adjustment as data is collected. This can be tough for employees of production mindsets to accommodate," laughs Urmaze. "Our bread and butter come from a testing product, alloys, materials. Catalogs and sales pitches on how to run a tool rarely work in real world scenarios, you always must dial it into the operation. We test and submit our findings, always looking for that reliable repeatable performance."

OMIC R&D have one of most sophisticated cutting tool inspection machines in the world and are more than happy to put it into use. "We believe that Zoller is the industry leader when it comes to cutting tool inspection machines and the Titan is the best of the best," touts Josh. "The Titan is feature rich from their automation down to what you can see and inspect. We are talking 7th place decimal type of resolution. Titan has a quiver full of different scanning features with optical, lights, and lasers. You can see every aspect of the tool. For me the coolest thing is we can look at the topography. We can take a 1mm section of a honed edge and split that down 100 times and put 200 points on every slice to get 3D topography off that tool. Why would we want to do that? Couple of reasons. One of our first projects with the Titan was looking at how hones relate to cutting forces, torque, machine drawn power, and wear characteristics. We ground tools in house on our Anca grinder, putting different levels of hone on them. We tested them in a variety of different ways to see how hone affected



OMIC R&D's first investment into Additive Technologies was the GEFERTEC ARC605, a large scale 5-axis Wire Arc Additive Machine (WAAM) that can print any metal that can be pulled into a wire. OMIC R&D has worked with aluminum, titanium, Inconel, stainless, and steels.

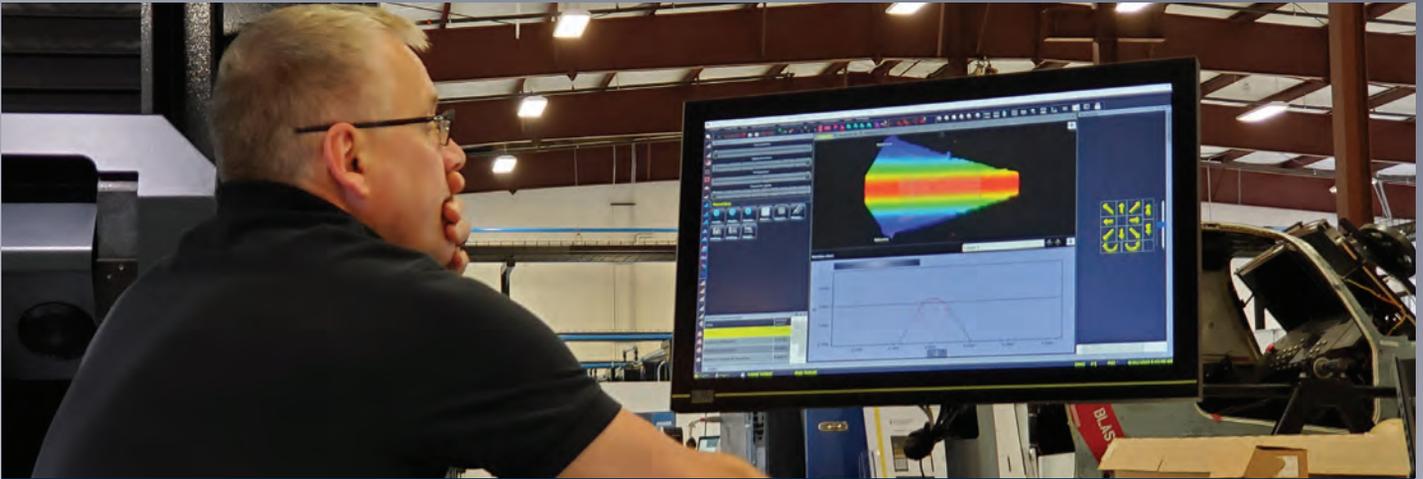


Inspecting insert geometry of a turning tool on the Zoller Titan

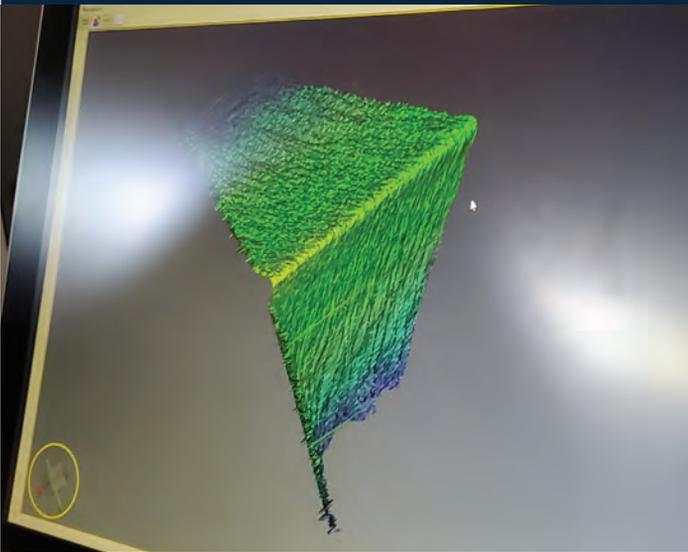
certain parameters and how hone wears over time in those parameters. We also use it for verification purposes. Customer says your tools are making my parts wrong, what have you done to your tools? The answer is nothing, but as an independent third party we can back up that statement with proof.”

“The elegance of doing independent third-party testing at OMIC R&D is that it naturally highlights the reality versus the perceptions of new product introductions,” continues Urmaze. “The reality is there have only been a handful of huge gains in the last 10-15 years. A few of the key improvements come from the material integrity of the substrate, like molecular level of purity, and consistency of the grain. We’ve seen improved processes prior to coating to get maximum adhesion to the substrate. Edge preparation and hones are vastly improved over the last decade comparable to a steak knife vs butter knife. Hones are tailor made for the process and can make or break an operation in efficiency. The big leap isn’t that you can make hones, blacksmiths can do that. The leap is that you can now make .0001 or smaller hone or a complex conjured surface like a helix, or millions of helixes and be consistent. If one isn’t consistent, it throws everything off. We can measure for that level of quality control. The buyers in these shops are not inspecting these cutting tools to the nth degree. They are trusting the quality of the incoming tools. Consistency is important, not just for a few tools, but for the life of a program. Early engagements are all fun with the best sales pitch and test data, but you find out quickly who the good tooling manufactures are. From my experience in automotive, aerospace, die and mold, the highest priority reoccurring theme is repeatable, reliable performance, not cost. When you have repeatable, reliable performance you reduce your cost. In certain industries a tool failure can be astronomical. You could have forgings worth hundreds of thousands of dollars. Most shops would rather have the tool be very consistent for 25 years and cost a little more. The companies who can deliver on that are very few. That’s where research comes in to verify that stability.”

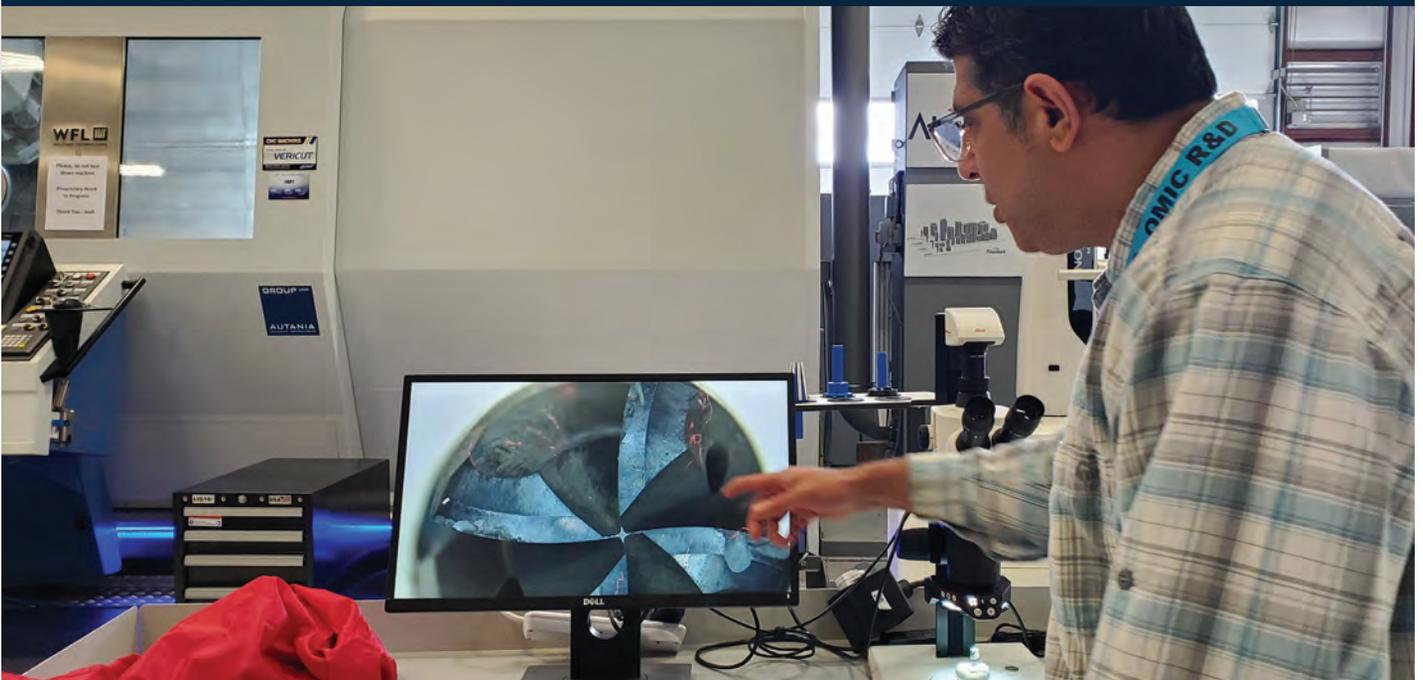
OMIC R&D’s mission is to “develop and apply advanced metals manufacturing technologies and processes for industrial competitive advantage and academic growth, while inspiring and educating the next generation’s manufacturing workforce.” “At our applied research and development facility we learn, teach, and report,” concludes Urmaze. “Sometimes the solution is right in front of us and other times you exhaust every avenue to find it. Our membership collaboration with its diversity of product solution, support of technical experts, and sharing best-practice with tribal knowledge makes us look good. When you can send out a message with the subject “help experts” and information comes in, we look good. Our members trust us because of this.”



Werner Lueken, Director of Tool Inspection Solutions for Zoller, working with OMIC R&D to inspect cutter hone on some in-house produced cutting tools.



Left - Topography of a honed edge as inspected on the Zoller Titan under the blue light edge camera.
Right - Inspecting worn cutting edges during a cutting tool test.



Urmaze Naterwalla, Head of R&D for OMIC R&D, explaining a customer edge wear after a milling cut on the WFL M50 Millturn.



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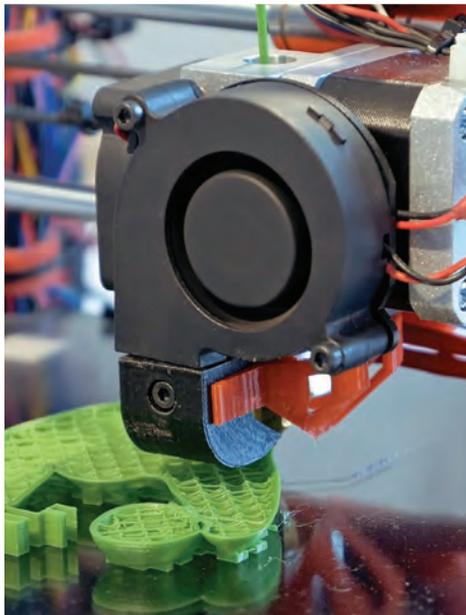




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Kinner Manufacturing is a 5 axis job shop that specializes in bladed parts and assemblies.

THE BLADE RUNNER

Serving the aerospace, power generation, rail, natural gas, cryogenics, and automotive industries, Kinner Manufacturing of Olivehurst, CA. offers a variety of turbo machining services, including CAD programming, balancing, wire EDM, lathe and 5-Axis mill work. Ray Kinner has spent a lifetime in manufacturing. His father was a machinist, he is a machinist, and now his son Ayrton is adding to the legacy. Kinner Manufacturing is an independent manufacturer / supplier of semi-finished and finished components and assemblies, including fan blades, compressor blades and vanes, BLISKs, IBRs, impellers, diffusers, turbine airfoils, turbine wheels, rotor shafts and hubs, disks, and related components.

"We serve a very niche market," details Ray Kinner, owner and president of Kinner Manufacturing. "We are a 5-axis job shop and take on all the difficult bladed work others turn away. I started the company in 2007, but turbomachinery and gas turbine components have been part of my manufacturing career since I started working for my dad as a kid. He sold his shop in the mid 70's but I never stopped machining." Ray spent time in other

industries before getting back into manufacturing. In the 90's Ray was approached by the guy who purchased the shop from his dad. He was offered a job with the deal being that he would sell the company back to Ray. "I worked there from 1998-2007 and came to the conclusion that he wasn't ever going to sell it to me," adds Ray. "So, in 2007 I opened Kinner Manufacturing with a 5 axis Haas mill and a Haas lathe. Not the best time to start a company in hindsight, we started off in debt and clawed our way out despite the recession and the upcoming crash. It was horrible for a while. One of my locomotive customers went from ordering 35 impellers monthly down to 5 every six months. For 30 years they consistently had ordered 35 a month, but we made it through by running lean and utilizing every minute of spindle time we had before buying more machines. I ended up doubling down on what I was good at and looked for more impeller and fan jobs. All we run is blades, and blade related items. Challenges we face from customers is that they require the grain to go a certain way, want certain compression, extruded or forged, or double overlap forging. Several requirements can get a little tricky,



Blades, blades, and more blades at Kinner Manufacturing. Sizes and materials vary from 3/8th of an inch impellers up to 30 inch fans.

precluding many of them from being 3D printed.”

Jobs that come through the door at Kinner varies by size, quantity and materials. One day Kinner Manufacturing is filling an order of 1000 3/8” impellers and the next they are running a one-off prototype 30” fan. Each day is a new adventure and it’s not uncommon to start with a 400-pound block of material and deliver a 14-pound finished piece. Average run times are in the 4+ hour range. Many parts even spend 24/7 days on the machines. Everything is custom from the software needed to program the parts to the work holding and balancing. “We have a unique setup that requires very specific set of skills and tools,” explains Ray. “The Concepts NREC software we use for programing is specifically for bladed parts and is expensive. We can’t do without it and niche comes with a cost. There are three different Concepts NREC programming modules and as a job shop, we need, and use all three. There is one for shrouded impellers, another for rolled surface impellers, and an arbitrary surface module too.” Open style impellers have the blades exposed and are considered easier to machine compared to the shrouded counterparts. “A shrouded style impeller requires you to basically tunnel through from each side with limited tool space and get everything to line up,” continues Ray. “Programming can take us several days on a complex shrouded impeller whereas I can do an open style one within an hour.”



Kinner's VF5 Haas is capable of handling larger parts with its giant trunnion.



Kinner's Agie Charmilles Cut c350 wire EDM is the latest edition to their scope of services. Ayrton Kinner is spearheading the EDM program.

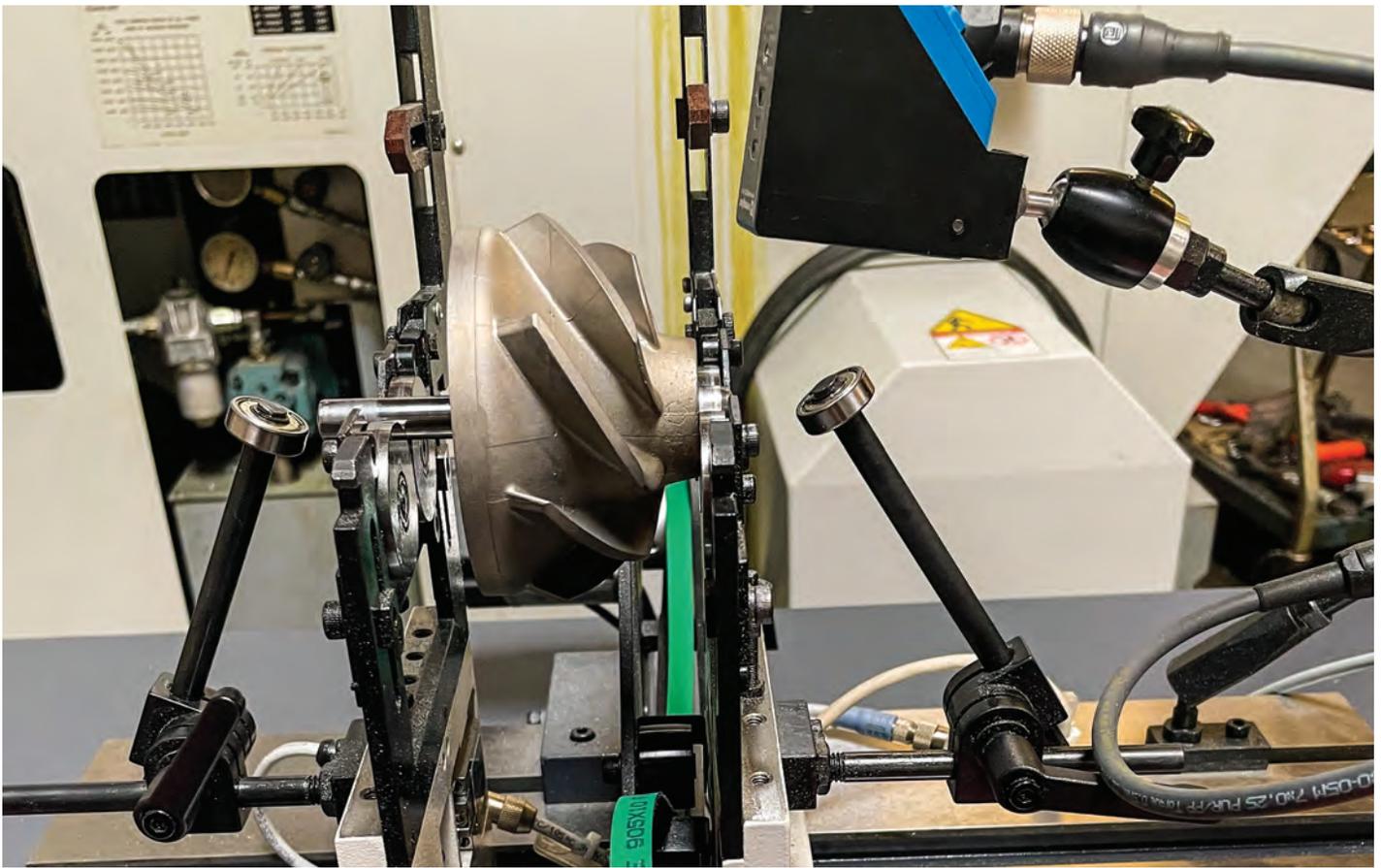
Ray knew when he went into business for himself that he didn't want a standard machine shop competing with everyone else doing traditional 3 axis work. His first machine was a Haas 5 axis mill and every mill since has come with advanced machining features from Selway Machine Tool. The 6000sq.ft. manufacturing center is a five-person operation running a Haas SL40 lathe, a Haas ST15Y live tooling lathe, a pair of Haas UMC 750's 5 axis machining centers, a Haas VF5, a Haas VF2 with a 5-axis trunnion, four Schenck balancing machines and a new Agie Charmilles 5 axis Cut c350 wire EDM. "We got into balancing and EDM as a way to bring outside processes in house," tells Ayrton Kinner. "We were losing time sending out parts to other vendors and having more internal control was important to us. Turns out other local shops were having issues finding reliable balancing and EDM sources as well. Both have turned into unexpected and welcomed revenue streams."

Balancing is a large part of the QC process at Kinner Manufacturing. As you expect all the bladed parts spin. Some spin like crazy and others just lumber along at slower speeds, but all need to run true. "We have shank balancers and spin test machines," explains Ray. "The basic rule of thumb is if the part is more than .002 out in concentricity then it is not balanceable. We spin test parts at 10% over highest operating speed. Parts typically grow

so depending on if it is elastic or plastic movement, we do a finish machine on the parts after the spin test. It isn't a lot of movement, but enough that we must finish machine it. Word got out we were doing our own balancing and people started calling. We have enough balancing work to have a full-time balancer."

With no prior EDM experience Ayrton is spearheading the relatively new EDM program. Kinner Manufacturing were sending 40+ keyways out a month for EDM processing. That alone was enough of a bottleneck to warrant the purchase of their Agie Charmilles Cut c350 wire EDM. "We got the EDM as a support machine for our impellers," details Ayrton. "But we quickly discovered that there isn't a whole lot of EDM where we are and like with the balancing, we are now taking on EDM only work." Mike Costello of GF Machine sold the Kinnners their machine and got them set up with the necessary training. "I knew nothing before James came in and trained us on the Agie," continues Ayrton. "James got us cutting right away and showed me how to automate some of the processes. After a week of training, I could program with confidence. Best experience I've had with training, and I just love what we can do with that machine."

You can see the pride right away at Kinner Manufacturing. The kind of pride that comes from a job well done, and the kind of pride that only comes from a family business.



With four balancing machines and a full time balancer, Kinner Manufacturing not only balance all their internal parts, but are now offering balancing as an outside service to other local area shops.

Outsourcing products to cheaper regions are the bane of this industry, but at Kinner Manufacturing they are getting some of that back. It brings a big smile to Ray's face. "We have customers based out of Asia," touts Ray. "We machine the materials and send them back to China for assembly. Most of the parts we run for the Chinese companies are difficult, tight tolerance, complex, shrouded impellers. Seems like they don't have the specialization needed to do it themselves and it isn't worth them trying to do it when they can just buy them from us. It is a big feather in our cap having other countries known for taking our work need to send us parts because it must be precise."

As a son who was taught the business by his father Ray, is quick to tout Ayrton's contributions to the company. "I opened the company when Ayrton was only ten years old," adds Ray. "I had him here with me as forced labor, same as my dad did to/for me. He's 26 now and been full time for a few years. He takes a lot of weight off my shoulders and is the hardest worker we have. He is doing great stuff with the EDM, and I appreciate him being here." Ayrton thinks about the parallels between sons working for fathers and how things are completely different, but the same. "My dad's experience as a kid working for his dad in the shop is crazy to think about," explains Ayrton. "My dad was mentored by these guys who learned to machine as apprentices in WW2. The industry has changed, but the

knowledge my dad shares with me came from these people who knew so much and made amazing parts without the aid of CNC." "I noticed through the 80s the trend of offshoring and fewer and fewer people in the pipeline to feed this industry," concludes Ray. "So, for me it is great to see younger people like Ayrton get involved, find their place in US manufacturing, and keep the legacies going for generations to come."



Donavon Henderson, Darren Henderson, Matthew Esquivel, Ayrton Kinner and Ray Kinner of Kinner Manufacturing.

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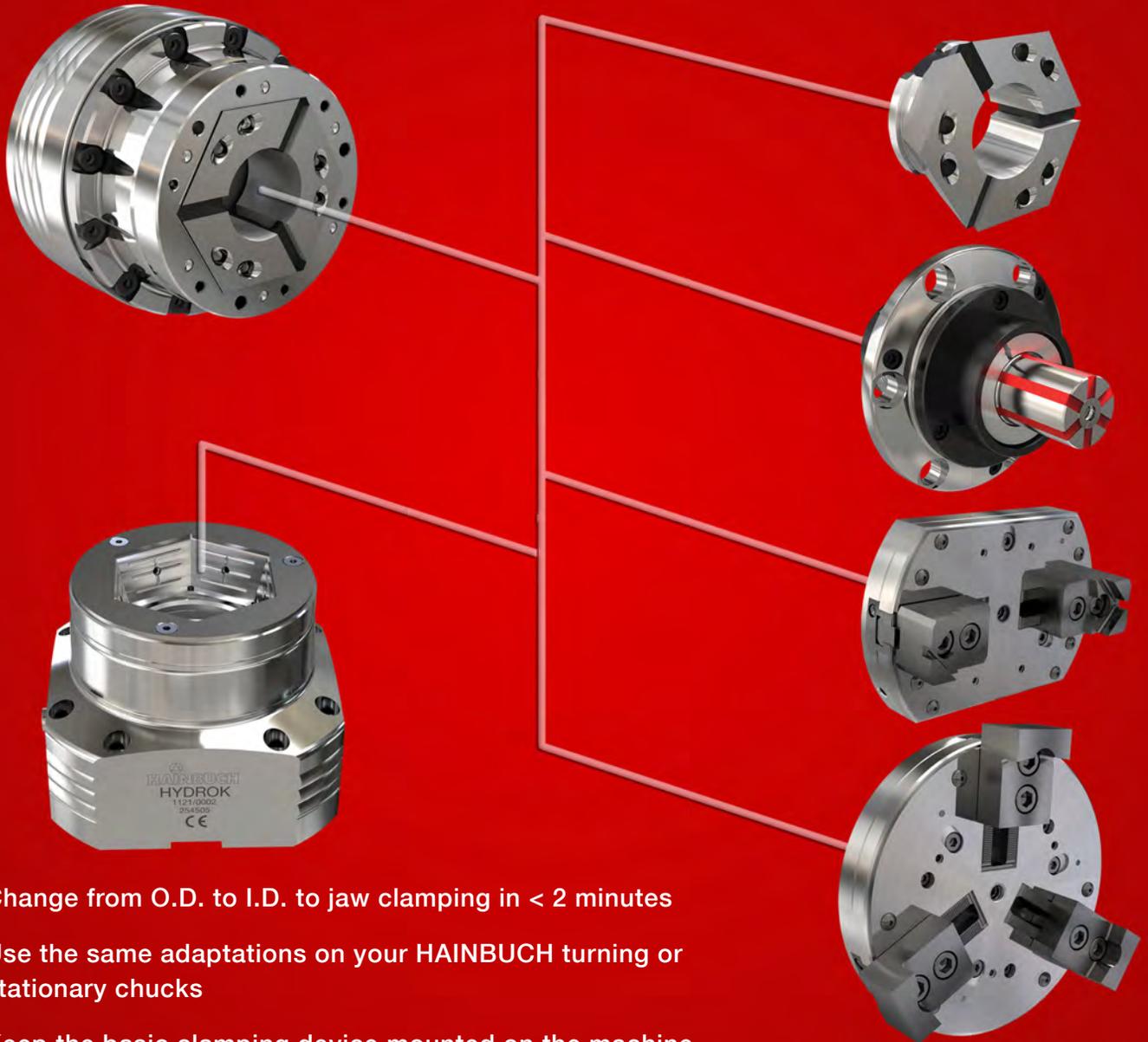
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Third generation machinist Evan Jones of 3rd Gen Machine

Evan Jones has a passion for machining. So much so, he practically has coolant coursing through his veins. His grandfather started Humboldt Instrument with a partner in San Leandro, Calif., and Jones spent his teenage years at his father’s “mom and pop” machine shop, Humboldt Northwest, in Oregon. By his early 20s, Jones realized machining was more than just a job or career path. “Machining became a lifetime endeavor,” he said. Jones built up an immense knowledge base, racking of hours upon hours of spindle time. He learned the best machining practices, managed customer relationships, and gained tremendous insight into running a successful CNC shop.

By the time he opened up his shop, 3rd Gen Machine of Logan, Utah, he was spending every waking minute mulling over cutting theories, tools, and the most efficient way to tackle a job. One of the critical ingredients in that recipe is high-quality CNC machines. “Being a machine shop owner, my passion is equipment,” he said. “So that’s what gets us excited, looking into possibilities with how you can serve customers better, it’s all about quality, runtime,

and productivity.” Jones is a forward-thinking machine shop owner. So, when 3rd Gen Machine was running into production issues, he took action. Chip imprint scratches were causing his scrap rate to rise. His throughput wasn’t where he wanted it to be. The constant loading and unloading of raw materials and finished goods were taking a toll. The final straw came in the form of a spindle crash.

“That day, we sent a purchase order to Methods for the automation system,” Jones said, cracking a smile.

Jones worked with Methods on a turnkey automation cell utilizing the JobShop Cell, which comprises two FANUC RoboDrills and an articulating FANUC LR Mate 200iD robot. Jones first encountered RoboDrills in 2020. A colleague recommended the vertical machining center for its reliability and repeatability. Soon enough, Jones reached out to Methods’ sales engineer David Snow. The two set up a tour of another CNC machine shop outfitted wall-to-wall with RoboDrills. After seeing the RoboDrills in action, Jones worked with Methods to develop a time study on the JobShop Cell. “I’ve had interest in automation for more than a decade,” he said. “The approach was a little



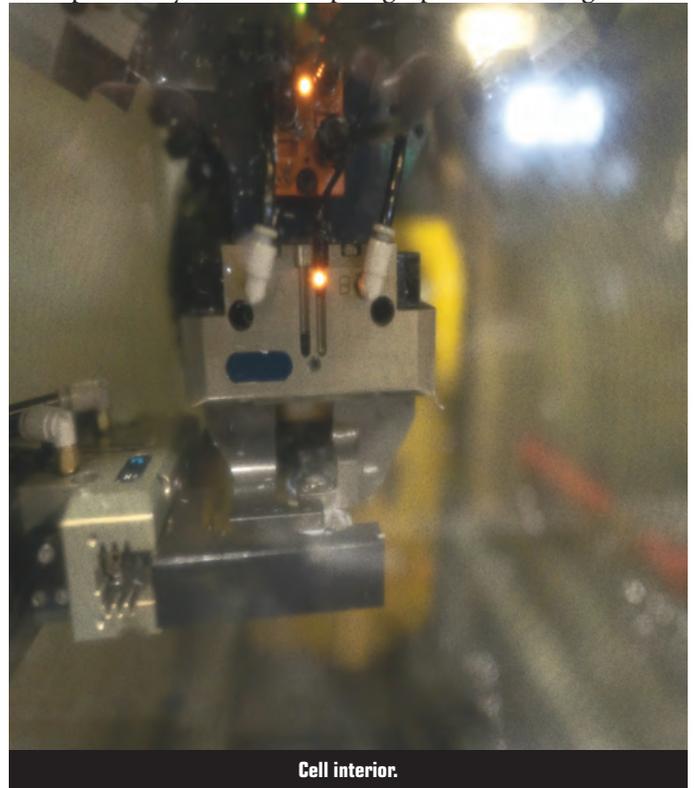
Jones worked with Methods on a turnkey automation cell utilizing the JobShop Cell, comprised of two FANUC RoboDrills and an articulating FANUC LR Mate 200iD robot.

bit different than what I imagined, but it was the right approach, really.” Before implementing the automation system, 3rd Gen Machine would try to make multiple parts simultaneously. While that process made good use of fast tool-to-tool change times, the shop’s throughput plateaued; it could only produce components as fast as people could manually load and unload parts. That cumbersome process is partly what led to the spindle crash.

Methods’ applications engineering team designed the cell for single-piece runs. That method retained the RoboDrill’s lightning-like 1.3-second chip-to-chip change time and removed the possibility of errors in the loading/unloading process. Moreover, the shop was free to run unattended. The results were better than anyone predicted. “You’re working with the limits of a robot, which are nearly limitless,” Jones said. “After we got in there and optimized the programs to the equipment, we were able to surpass the cycle time on the time study. That definitely showed us that the RoboDrill cell was the way to go.”

The JobShop Cell improved nearly every workflow on the shop floor; it unshackled skilled laborers so they can tend to other equipment rather than loading/unloading machines. And, the cell came online just in time for a high-production project for the outdoor goods industry. “We had a big ask for Methods, we wanted to make nine different parts from the twin cell,” Jones said. “Customer demands increased at the same time we brought that in,

it would have been challenging to get their products on more and more equipment.” Not only did Methods deliver on that big ask, Jones said, but experts also helped him work out some kinks. At first, chips were getting near the cell’s proximity sensor and piling up in the wrong area. “I



Cell interior.



The cell ended up working so well, 3rd Gen Machine installed a second unit and has a third JobShop Cell on order.

requested additional air ports for the robots to help me manage chips, and Methods came in and solved that for me," Jones explained. The cell ended up working so well, 3rd Gen Machine installed a second unit and has a third JobShop Cell on order. The JobShop Cell puts out twice the output compared to other solutions while only taking up half the floor space; Jones said, a valuable commodity. The shop's throughput increased to the extent employees had to stage finished goods in rented shipping containers. However, those are temporary solutions. The JobShop Cell has helped 3rd Gen Machine's growth, and in turn, Jones is utilizing that capacity to expand his business with a new building.

But 3rd Gen Machine is doing much more than expanding its capacity and adding new machines. They're further developing departments and capabilities, planning for long-term, consistent growth, and cementing their position as a full-service machine shop. Jones said he'll always keep Methods in mind when he needs more machines. "They're just down to earth, real people interested in helping you with creating solutions and solving issues of today."

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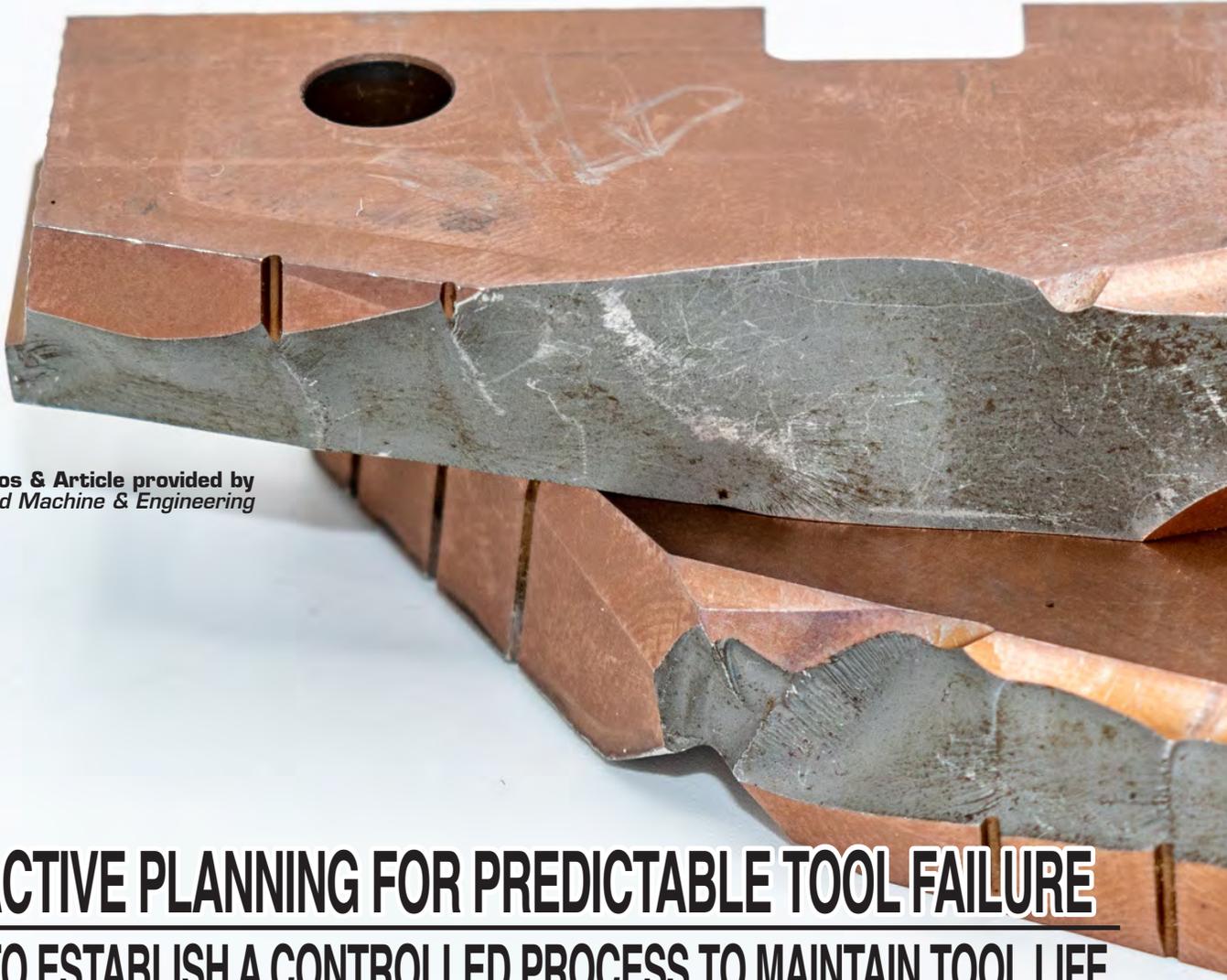


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PROACTIVE PLANNING FOR PREDICTABLE TOOL FAILURE

HOW TO ESTABLISH A CONTROLLED PROCESS TO MAINTAIN TOOL LIFE

Tool life is often a top priority when working in a high production environment. To some degree, it does not matter if you have the fastest or the best tool; it is more important to have a tool that fails consistently in the exact same way, but the question then becomes how do you achieve this? How can you proactively plan for predictable tool failure?

There are many factors that contribute to failing consistently from the tools themselves to outside factors like coolant, machine maintenance, material hardness, etc. While it is unrealistic to hit 100% repeatability, it is key to keep as many factors as you can the same from job to job and part to part. Establishing repeatability makes it easier to prevent catastrophic failure that will damage the workpiece and tooling, which becomes much more expensive than just taking the tool out early even if that is before it is completely worn out. Therefore, cost savings is one of the biggest benefits of consistent tool life. It is better to change an insert out ahead of time instead of pushing it to max life and potentially damaging components of the tool or components of the machine—causing more setup time and more machine downtime.

Given the benefits that establishing a controlled process can provide, below are some tips to help you better achieve this.

- ◆ **Proper coolant maintenance and filtration.** From bacteria and machine lubricants to acidity and cutting debris, coolant contaminants can hinder the protective layer coolant provides for both the material and the cutting edge of the tools. Whether using a refractometer to evaluate concentration levels or water test strips to measure pH levels, it is always cheaper to maintain coolant than replace the entire system or risk damaging tools.

- ◆ **Perform preventive maintenance.** To achieve consistent tool life, it is necessary to perform preventive maintenance of the machine tool components and fixtures. Vibrations and lack of rigidity due to worn out components can be detrimental to new carbide tooling that shops are encountering in modern manufacturing. Overall, it is important to schedule and maintain records to save in tooling and machine downtime.



♦ **Source materials from consistent vendors.** While it is difficult to buy materials from the same vendors because of COVID and supply chain issues, it is important to try to buy from the same vendors because differences in materials cause tools to work differently. When sourcing from different vendors, it is important to monitor incoming Mill Turn Reports (MTR) to ensure chemical compositions are comparable and make the necessary changes to programs to prolong tool life.

♦ **Focus on tool holders.** With general purpose machining, tool holders are typically not the driving factor leading to a reduction in tool life. Nevertheless, for consistent results at higher spindle speeds, it is necessary to have a balanced tool holder and assure that the tool is assembled with minimal total indicator runout (TIR) in order to yield positive results. The cleaning of tool holders as well as the actual spindle of the machine are also important aspects of tool holding components as a layer of oil drying on these surfaces can

induce TIR to the assembly, which creates additional radial loads to the tools and can cause failures and inconsistent results.

♦ **Consistent tooling means consistent results.** In order to do this, it is key to source tools from manufacturers that have good quality systems to produce parts of the same quality every time. If there is a switch in manufacturers, processes will be affected even if the tools are dimensionally the same because quality and performance standards will vary depending on manufacturer.

Aside from these top factors to consider when planning for predictive tool failure, you can also work to baseline your tools. Whenever you are running off a project for the first time, the first couple of tools you are putting into the part need to be monitored to ensure that speeds and feeds are optimized and that repeatability is established. If it repeats after a couple of tools, that is your baseline; you can reach “x” amount of parts per tool.

Other things to consider are load limiters and part counters. For predictive tool failure in job shops, use load limiters. If one tool is consistently running at 80% load, when load begins to steadily climb to the upper end, you will know when inserts are dull and need to be changed. Part counters can be integrated into the programs. By establishing a baseline as discussed above, you will know what the tool can do and then program that into the machine. Because the actual program is counting as parts are processed, there is no error like if an operator is counting the parts; the program will stop, and no additional parts can be run unless the tool is changed.

Ultimately, not all shops are using or are capable of using predictive tool failure in their processes, but collecting data and tracking tools is a good starting point. If you are not tracking tool life or keeping a log, it is challenging to determine how long tools last or how to make them last longer. Structural steel shops in particular could benefit from collecting data; oftentimes, they are running large components in the same material at the same speeds and feeds, but because there is little tracking, tools end up breaking. Simply tracking data and running spot checks on tools could save shops money and time in addition to establishing a method for predictive tool failure.

Knowing your limitations in addition to simply being prepared are key in predictive tool failure. It may sound simple, but exceeding the limits of the machine, operator, process, tools or application will result in a less than satisfied result. Being more knowledgeable about an application—whether that is through data collection or proper training—allows you to better establish the desired repeatability.

ToolingU-SME Works to Close the Skills Gap

By: Michelle Nash Hoff

The Deloitte and The Manufacturing Institute 2022 Manufacturing Perception Study reports that “significantly more respondents believe that manufacturing jobs are innovative and more respondents are likely to encourage their child to pursue a career in the industry” [compared to the 2017 study]...“Further, the pandemic has led to a new awareness of the critical nature of manufacturing in the United States and beyond.”

This corroborates the eBook released last year by American Machinist and IndustryWeek titled, “Closing the Skills Gap – How manufacturers are leveraging new technologies and energizing a new generation to finally close the labor gap,” that was sponsored by Epicor Software Corporation.

The Executive Summary stated: “We are on the cusp of a full-scale digital revolution in the manufacturing industry...[and] on the cusp of an enormous wave of retirements as Baby Boomers exit the job market...we have a perfect storm.” The result could be that the “500,000 unfilled manufacturing jobs today...[could] balloon to 2.5 million over the next decade.”

The eBook outlined the application of the new tactics that manufacturers are applying across industries: “Over the last few years, manufacturers across the industry have begun systematically attacking the skills gap head-on...”

However, now is the time to be prepared to take advantage of the increased interest in returning manufacturing to America and strengthen our manufacturing base as a result of the weaknesses in the domestic supply chain revealed by the COVID-19 pandemic.

Since 1979, the SME Education Foundation has been inspiring, preparing and supporting the next generation of manufacturing and engineering talent through their Student Summit event series, the SME PRIME® (Partnership Response In Manufacturing Education) initiative, and Student Scholarship program. The Foundation “works directly with the manufacturing community to educate the next-generation workforce through SME PRIME. The partnership

provides industry-driven and learner-centered curriculum to high school students at SME PRIME schools across the country.

Online learning is a significant component to the tailored curriculum developed for each SME PRIME school.”

I had the pleasure of being connected to Chad Schron, who is the senior director for Tooling U-SME and the Co-founder of Tooling U. I learned that Chad grew up in manufacturing. He started his career working in his grandfather’s machine shop and attended his first IMTS show before he graduated from high school. Chad developed the idea for an online manufacturing training school while working at the shop to combat the manufacturing skills shortage.

I told Chad that I started working as an engineering secretary at age 18 for a small defense contractor that was essentially a machine shop making components such as accelerometers, rate gyros, potentiometers before going to college later.

Chad told me that ToolingU-SME has developed curricula that “one in five community colleges and over half of the Fortune 500 manufacturing companies use to train their workforce and their students.” He added, “During COVID we saw significant growth in our education business as schools needed online programs because students were participating online for virtual classes at home.”

On the SME website, I saw that some of the industry-leading companies that work with Tooling-U are: Aerojet General Corporation, B/E Aerospace, BMW Manufacturing Co, Caterpillar, Chrysler Group, Deere & Company, General Dynamics, General Electric Company, Harley-Davidson, Mazak Corporation, Medtronic, Meggitt Aircraft, Raytheon, Senior Aerospace, Siemens, and United Technologies Corporation.

The website states, “Tooling U-SME’s industry-leading online classes and assessments are developed with input from manufacturers and employ the latest methods in instructional



design. “Turnkey Training is a series of predefined online curriculum packages for core manufacturing job roles” that combines classes for targeted learning with on-the-job training (OJT). “Turnkey Training quickly creates a learning road map and career path for everyone from new hires to tenured employees. Most job roles can be completed in one year with less than four hours a month spent online.”

In addition, “Turnkey Training is ready for immediate use and delivers instruction in the areas needed most by today’s manufacturers. Unlike many other training programs, Turnkey Training requires minimal preparation. It is efficient, effective training that will deliver ROI quickly.”

I asked Chad about the impact of the COVID pandemic, and he said, “COVID impacted a lot of our onsite Instructor led training programs as companies did not allow for in person/onsite training. Most customers have significantly reduced or removed all of their COVID restrictions, and we are back to pre-COVID training programs.”

Chad told me that the COVID pandemic had no real effect on their Apprenticeship and Certification programs. The SME website describes Tooling U-SME’s Apprenticeship Frameworks as “a series of predefined curriculum for common apprenticeship job functions, that provide related training instruction (RTI) using Tooling U-SME online classes... that support common apprenticeship job functions, and provide a flexible model allowing organizations and educators to offer easily accessible solutions in alignment with business needs.”

He explained, “By pairing Tooling U-SME online classes with on-the-job training, trainees can complete their apprenticeships at their own pace from anywhere. Our online classes also provide trainees with the education and theory to help them increase their success. Our Apprenticeship Frameworks are aligned with nationally recognized Department of Labor apprenticeship programs and easily incorporated into a company’s existing programs or used as a foundation for a new apprenticeship program.”

Chad said that ToolingU-SME also offers Certification programs that “are built by professionals within the manufacturing industry who guide the development and continuous improvement of the bodies of knowledge and competency models upon which the certifications are based.” Current Certification programs listed on the website are:

- Certified Manufacturing Associate
- Certified Manufacturing Technologist
- Certified Manufacturing Engineer
- Lean Certification (Bronze, Silver and Gold)
- Additive Manufacturing
- Electrical Electronics Technology

Chad said, “We are seeing significant growth in our Industry 4.0 curricula as more companies are adopting SMART/

Industry 4.0 technologies. This is particularly important as more companies are reshoring and changing their supply chains. They are leveraging these new technologies.”

Chad added, “We have a new Virtual Reality product that we just launched, and there is a video overview to view at <https://www.youtube.com/watch?v=g-2MhC3beBY&t=10s> and press release to read at <https://www.toolingu.com/About/Press-News/Tooling-U-SME-Debuts-Immersive-Virtual-Labs>.

He concluded saying, “ToolingU is constantly adding new and updated classes to our online catalog and our upcoming class release schedule can be viewed here.

I told Chad that the training ToolingU-SME provides is crucial to achieving one of the goals of Industry Reimagined 2030; that is, adding 5 million to the manufacturing-related, middle-income workforce by 2030 (a 40% increase.) I told him that I hoped that the ToolingU curricula will expand to being used by four out of five community colleges instead of one out of five to accelerate that rate of training for manufacturing jobs in the U.S. to fill the over 500,000 manufacturing jobs currently open and prevent us from having an unfilled gap of over two million by 2030.

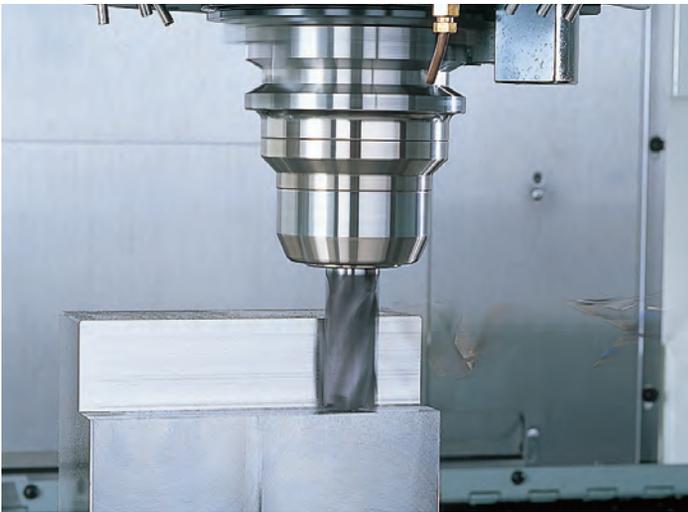
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OUR MOST IMPORTANT ADVICE FOR MILLING HOLDERS

Photos & Article provided by *BIG Daishowa*



MILLING CHUCKS

Let's start with the jack of all trades in the world of milling holders. Milling chucks' high retention force combined with a simple twist-to-lock operation makes them ideal for general purpose operations. These chucks grip a tool shank by means of mechanical deformation of rows of needle bearings. These holders provide substantially more gripping force than a collet. Runout, however, is reduced compared to collet chucks, but is still better than double the performance of side lock systems. Their large bodies help dampen vibration and chatter. The option for high-pressure coolant delivery through the tool is also useful.

TOP TIP

The bigger the milling chuck, the more the clamping force. Larger size chucks have a higher starting potential clamping force. When paired with a reduction collet the final gripping force is higher than a direct clamping size chuck.



HYDRAULIC CHUCK

Hydraulic chucks are often more specialized because of their slim body shape, higher cost and moderate gripping strength—about half that of a milling chuck and about double that of collet chucks. The main differences between the holders, in terms of performance, are the superior vibration damping and simpler handling of hydraulic chucks. They are most often used for finish milling, reaming and drilling. They are extremely easy to handle. A simple clamping screw activates hydraulic chambers that allow the holder to clamp down on the tool.

TOP TIP

Never exceed a hydraulic chuck's rated rpm; fluid is pulled away from the holder's internal gripping gland, causing loss of clamping force.



SHRINK-FIT HOLDERS

Often compared to hydraulic chucks because they can also have very slim bodies, shrink-fit holders share similar gripping force as well. Handling is much more involved, but from an engineering perspective, shrink-fit holders are, fundamentally, the perfect tool holder. There are no moving parts, they are naturally symmetrically round and they use the properties of the holder itself—with the help of heat—to grip the tool. But as we know, a manufacturing floor is not a perfect environment. Variables must be considered when choosing equipment.

Best for moderate to heavy milling, shrink-fit holders are excellent at high speeds and are especially useful in low clearance, tight work envelopes because of their relatively slim design. Gripping power varies based on the tolerance of the cutting tool shank and outside body diameter: the heavier the wall, the higher the gripping force.

TOP TIP

Shrink-fit holders have very tight-tolerance bores. They should be cleaned and dried between each tool change. If you're considering shrink-fit holders or already own them, check out these tooling and spindle cleaners.

the toughest metals. They are most effective when heavy roughing at low speeds. What side-lock end mill holders achieve in security, they often lack in precision. Avoid high speeds and cuts with higher risks of vibration unless you're using high-performance tooling like the MEGA Perfect Grip.

TOP TIP

Never use tools with homemade, hand-ground flats in a side lock end mill holder.



COLLET CHUCKS

From a low-speed specialist to high, collet chucks work best at elevated rpm. This makes them excellent for delicate and precise work like drilling, reaming and finish milling. The collar-like gripping is tightened by way of wrenching a collet nut. This allows for more points of contact for the tool when compared to other chucks. Collets are most useful in repetitive work where the clamping requirement does not vary significantly.

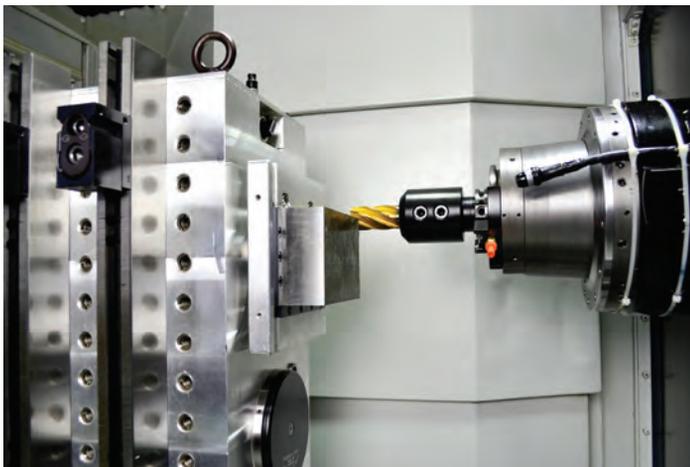
They also are versatile because the number of segmentations on a collet can vary. More segments mean greater flexibility and a larger gripping range at the cost of some of the concentricity and stability of more rigid collets.

TOP TIP

High-performance bearing race nuts offer the highest gripping strength combined with stable runout accuracy. The bearing keeps the race from sliding against the surface of the collet. The friction of a solid nut sliding across the collet face twists the collet and increases runout as well as increases the clamping torque required.

SIDE-LOCK END MILL HOLDERS

These may be a bit simpler in terms of how they clamp than hydraulic and shrink fit, but these rugged holders definitely have their place. A flat in the tool engages with a Weldon screw on the holder that locks the assembly in place, all but eliminating the risk of pullout, even in



Cost-Optimized Horizontal Arm CMM'S From LK Metrology

To supplement its high-accuracy HC-90 ceramic horizontal arm coordinate measuring machines (CMMs), LK Metrology offers three additional models that provide dimensional inspection of large components typically found in the automotive, land transport and heavy industries.

The horizontal arm CMMs are supplied in three ranges: the LY-90T table version; LY-90R rail version with single or twin arms; and the shop floor ready HD-90 rail version with single or twin arms, which has been developed specifically for quality control of vehicle bodies and sub-assemblies in car plants.

The HD-90R single-rail and HD-90TR twin-rail models, which offer enhanced dynamics and accuracy, are designed for use in production areas. They are encapsulated in protective covers to provide thermal insulation against environmental changes and to protect the system from airborne contaminants typically found in a workshop environment.

The CMM rails can be installed on the floor without the need for a special foundation or may be recessed with heavy duty walk-on covers protecting the X-axis slideways. The open structure provides maximum accessibility to the measurement area, simplifying manual or automated component loading and unloading in a production area, including those employing roll-on/roll-off pallet transfer and in-line/line-side automation.

Air bearings mounted on the Y-axis and Z-axis are the key element of this high-performance measurement solution. For the twin-arm version, the measurement volumes of the two horizontal arms overlap each other by 100 mm to allow access to all component features. Ten sizes of HD-90 are available with axis travels from 4,000 mm x 1,600 mm x 2,000 mm to 8,000 mm x 1,600 mm x 3,000 mm.

Typically used in line-side metrology applications, the LY-90T table CMM has the horizontal arm installed on guideways side-mounted onto a cast iron surface plate for the measurement of small, medium and large sheet metal and plastic components, for example. The table and three-point support system eliminate the need for expensive dedicated foundations. The LY-90T is available in 21 standard models with axis travels ranging from 2,000 mm x 1,200 mm x 1,000 mm to 6,000 mm x 1,600 mm x 2,500 mm.

The LY-90R single-rail and LY-90TR twin-rail CMMs offer a similarly technically advanced, typically in-line metrology solution for the dimensional control of large, heavy components found in vehicle manufacture and heavy engineering. The rails can be installed flush at floor level, with heavy duty walk-on covers protecting the X-axis slideways. The open design provides full access for part loading/unloading, in-

cluding within in-line/line-side automated inspection cells with roll-on/roll-off transfer systems. The LY-90R is available in 17 standard models with axis travels ranging from 2,500 mm x 1,500 mm x 1,500 mm to 6,000 mm x 1,600 mm x 2,500 mm.

LY-90 machines are modular in construction and easy to configure, with Y- and Z-axis air bearings, double recirculating

X-axis bearing guideways (LY-90R/TR) or X-axis air bearings (LY-90T), counterbalance with safety brake, high resolution linear encoders and DC servo motor drives. "This design combines the flexibility and automation of a CMM with the speed and intuitive use of traditional measurement gauges," said a company spokesperson.

A full range of probing options is offered to suit all types of metrology applications, including motorized indexing probe heads and touch trigger probes, infinite positioning servo wrist heads with long reach probe builds, scanning probes and single- or triple-stripe laser scanners.

Also available is an advanced array of software, including LK CAMIO measurement, programming, analysis and reporting software and ArcoCAD metrology software from Metrostaff. The Industry 4.0 Metrology Gate portal provides remote access to quality data and CMM status from any internet connected device anywhere in the world. Automation options are also available.



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Industry News

Terry Wear Joins Verisurf Software

Verisurf Software, Inc. names Terry Wear, director of CMM Business Development in support of the company's commitment to universal CMM compatibility and process control. Wear brings with him 45 years of



cross-platform CMM, metrology, and aerospace experience, including Wenzel, Perceptron, COORD3, Mitutoyo, LK, and IMS.

"Terry is extremely familiar with our software; this combined with his deep knowledge of new and legacy CMM platforms, and reputation for customer service, make him the perfect choice to manage CMM integration for Verisurf. We are very pleased to have Terry as part of our team," said Ernie Husted, president, and CEO of Verisurf Software, Inc.

Verisurf has maintained a long-standing commitment to open platform compatibility as it relates to metrology software and hardware.

"We are excited to have Terry on-board as part of our compatibility commitment to our customers. The key to compatibility across all metrology applications and devices falls on the measurement software, and its ability to communicate with the design authority, typically a 3D CAD model, and CMMs used to collect measured points. Verisurf software does an excellent job at this, but every customer has special needs, and this is where Terry and his team shine," said Nick Merrell, executive vice president of

Verisurf Software, Inc.

"I am very happy and motivated to be part of the Verisurf team. This opportunity is a culmination of my career to date in which I have seen first-hand the development and in many cases the frustrations of customers working under proprietary operating systems," said Terry Wear.

Ceratizit Appoints New Head of Business Development for Solid Round Tools

Ceratizit has announced that Scott P. Walrath is the company's new head of business development for the solid round tools division. Walrath brings 39 years of management, sales and product development experience to the position.

Walrath has acquired a deep understanding of customer needs and challenges through a career that touches on virtually all aspects of the metalworking and machining industry. His work includes

C N C programming and operating through product development and deployment with a

focus on progressive and proprietary tool design. He has also directed research and testing of the latest tool coating technologies, substrates and macro and micro geometries. As a solid round tool milling specialist, Walrath supervised the design and development of advanced-engineered end mill and shank tooling solutions for key manufacturers throughout North America.



Jergens Inc. Completes Sale of Subsidiary JIS to PT Solutions

Jergens Inc. is announcing the sale of subsidiary JIS Distribution, LLC to diversified holding company PT Solutions is formally complete.

"This announcement is a bittersweet one, but marks an exciting turning point in the story of our family business," said Jack Schron, president of Jergens Inc. "As we look to the future of this company, it is clear that our greatest opportunities lie in manufacturing - the original roots of our business."

This transfer of ownership comes as the result of the strategic vision that seeks to align the company's focus on its core manufacturing business. Founded in 1942, Jergens' innovative pioneering of lean manufacturing served to quickly expand the company into a multifaceted integrated service line complete with its own distribution division in the form of JIS. In 2020, family shareholders reached a decision to divest from their distribution business and concentrate on growing the company's already strong position in the manufacturing market.

Schroen reinforces that the family-owned company and its 400 employees remain committed to the collective mission of helping customers achieve leaner, more profitable manufacturing efficiency.

Caron Engineering Systems Integrator Expands Territory to the West Coast

Wolfram Manufacturing, an integrator of Caron Engineering products, located in Austin, TX, has recently gained new distribution territory. Wolfram's territory now covers both the western and southwestern United States.

Industry News

Established in 2011, Wolfram Manufacturing is a versatile machine shop that specializes in medium to high volume production of metal parts. “Wolfram focuses on using the best technology manufacturing has to offer and appealing to the next generation of makers,” said a Caron Engineering spokesperson. “In 2015, Wolfram became a systems integrator of Caron Engineering products after realizing the benefits of the technology integrated in their own production.”

In 2022, Wolfram Manufacturing opened its doors as a Production Technology Center to show Caron Engineering technology applied in real-world production. This provides a southern U.S. hub for customers to access the latest technologies for automation, cycle time reduction, unmanned operation and total process monitoring and control for tool loading, offset adjustment and more. Most notably customers can see how the implementation of digital technologies has resulted in 24/7 production with little to no machine operator intervention or attendance.

Ceratizit Moves U.S. Headquarters

To centralize operations and continue to better serve its customers, tooling supplier Ceratizit USA, Inc. has shifted its official U.S. Headquarters from Warren, Michigan, to the company’s Schaumburg, Illinois, facility location. Ceratizit acquired the Schaumburg facility when it absorbed the Komet tooling brand name and product line under the Ceratizit Group umbrella.

Ceratizit USA offers a full-range product portfolio that spans 65,000 tooling products specifically focused on the needs of U.S. manufacturers. Under the name Team Cutting Tools, the portfolio includes solutions from Ceratizit as well as tooling under the

Komet, WNT and Klenk brand names. Ceratizit USA engineers and manufactures highly specialized, precision cut-

ting tools for drilling, boring, reaming, milling and turning.

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Ceratizit USA maintains two other facilities within the United States. Ceratizit Sacramento, LP is focused on manufacturing solid carbide round

tools and micro tools located in Rancho Cordova, California, and the other facility is the company's main logistics center in Towanda, Pennsylvania.

Mastercam Retains Top Ranking Worldwide

According to CIMdata, Inc., an independent research firm specializing in the NC industry, Mastercam is the number one CAM software used worldwide for 28 years in a row, with more than 300,000 seats installed. In the latest report, Mastercam retained the top spot for CAM software in three categories: industry, education, and support network.

Mastercam topped the list in both the educational and industrial categories, with nearly twice as many installed seats as the nearest competitor*.

"Mastercam having such widespread global use offers a lot of benefits for shops," says Meghan West, president and CEO of CNC Software, LLC. "The community of users is exceptionally strong, the support network has unmatched experience and expertise, and industrial shops are reducing the skills gap because more students are graduating with Mastercam experience."

If you run a shop, using the most widely used CAD/CAM software is important. You want reliable code to run your machines at maximum performance for precision and efficiency, and you want access to training and support to keep your shop optimized and business growing.

If you work in education, you want to prepare students with skills they can transfer to further education and gainful employment. You appreciate access to extensive training, curriculum, and projects from Mastercam and authorized partner providers

If you are an individual, using the top CAD/CAM software is important because there is a high demand for skilled workers in manufacturing companies. You can find training and education opportunities to learn Mastercam since it is also the most widely taught, and you can find a job easier with Mastercam skills.

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Industry News

Student Summit Featured 'Manufacturing Technology Classroom of the Future' at IMTS 2022

The Smartforce Student Summit that was held at IMTS showed future workers the classroom of the future. Produced by the Smartforce Development team of AMT - The Association For Manufacturing Technology, which owns and operates IMTS, the Student Summit brought together students from elementary school through college, scout troops, robotics and STEM clubs, home-schooled students and educators of all levels to explore the latest Industry 4.0 digital technologies

driving manufacturing today.

Students found interactive and engaging exhibits from leading manufacturers demonstrating breakthrough technologies, such as artificial intelligence, augmented reality, virtual reality, generative design, digital twin and more.

New in 2022, attendees learned about manufacturing technologies to better understand how advanced machinery and software synchronize to build the equipment and infrastructure necessary for cutting-edge products and programs across industries. Examples of the possibilities these technologies produce appeared in inspiring

exhibits: from NASA Artemis, which relies on advanced manufacturing for long-term space exploration and the agency's upcoming return to the moon; and Boston Dynamics, featuring Spot the Robot Dog, a revolutionary robot that combines automation, robotics, and artificial intelligence for terrain navigation, safety, inspection and manufacturing.

This year, for the first time, to support the Student Summit's commitment toward career connections, industry job openings for students will be just a few clicks away.

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Industry News

Methods Machine Tools Now Covers All of North America for OKK Machining Centers

Methods Machine Tools and OKK have reached an agreement that formalizes Methods as OKK's single partner to represent their CNC machines throughout North America. Methods, which began selling OKK in the U.S. in 2019, recently expanded its coverage of OKK into the U.S. Southeast and Wisconsin, which grants the company direct and indirect coverage for sales, services, and support throughout its North America network.

OKK features a comprehensive portfolio of industry-leading 5-axis, horizontal, and vertical machining centers designed with superior levels

of rigidity for heavy-duty cutting and large workpiece capacity that deliver the most precise results across industry-vertical applications.

"When we first added OKK to our portfolio back in 2019, we knew we gained a world-class product that stands up against any machining center in the industry," said Dale Hedberg, COO of Methods Machine Tools. "By expanding to nationwide coverage, we can now scale the product line to new and repeat customers in automotive, agriculture, aerospace, die/mold and beyond who turn to OKK for the power, precision, and reliability to achieve their desired production results."

Size and scope of OKK run from smaller footprint machines like the vertical machining center VM series which Methods' customers have de-

ployed for die/mold production, to the larger HM Series commonly found in Tier 1 aerospace production.

FABTECH to be Held November 8-10, 2022

FABTECH, North America's largest metalforming, fabricating, welding and finishing event, heads to Georgia World Congress Center on November 8-10, 2022.

"FABTECH provides a convenient one-stop shop venue where attendees can meet with suppliers, see the latest industry products and developments, and find the tools to improve productivity, increase profits and discover new solutions to their metalforming, fabricating, welding and finishing needs,"



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Industry News

said a spokesperson.

In addition to exhibits, FABTECH will feature technical, operational, economic and managerial sessions to help attendees learn how to further improve their productivity and increase profits. Technology topics will cover additive manufacturing, robotics, automation, metalforming/fabricating, smart manufacturing and more. All sessions are 90 minutes in length. Sessions with Tech Tours combine classroom instruction with expert-led guided tours on the show floor to see technology operating in designated booths.

For more information and to register go to fabtechexpo.com.

CAPTURE 3D, a ZEISS Company, Joins OMIC R&D

The Oregon Manufacturing Innovation Center Research and Development (OMIC R&D) recently welcomed CAPTURE 3D, a ZEISS company, as a member of the collaboration, now at 41 members. Headquartered in Santa Ana, CA, CAPTURE 3D is a provider of innovative optical 3D metrology solutions, including accurate blue light 3D scanners, precision photogrammetry systems, comprehensive inspection software and high-tech automated inspection systems.

Craig Campbell, Executive Director of OMIC R&D, said, "We are excited to have CAPTURE 3D as a member. CAPTURE 3D has provided us with access to a highly flexible and accurate inspection machine with the capability to handle large part inspection. CAPTURE 3D brings a well-deserved 'wow' factor and solid inspection delivery."

"CAPTURE 3D is proud to support OMIC R&D by enhancing its collection of innovative solutions with our 3D metrology technologies," said Staton Apple, western regional sales manager at CAPTURE 3D. "We immediately knew that implementing

automated 3D scanning with an ATOS 5 and a ScanBox would improve the speed and accuracy of post-production inspection. Because it is so easy to use and program, OMIC R&D staff

members are already experiencing the digitalization benefits this solution provides. We are driven by successes like this and are honored to be part of OMIC R&D's digital transformation journey."

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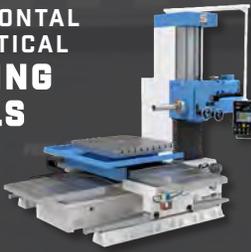


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New Products

5-Axis Machining Center —Mitsui Seiki

Mitsui Seiki's PJ 303X 5-axis machining center provides maximum precision and versatility in processing

of workpieces up to 9" x 11" in diameter and 44 lbs. in weight.

The PJ303X is designed to accurately machine smaller parts. Its X-, Y-, and Z-axis travels are 11.8", 12.8",

7.9" respectively. A-axis rotation is +40° to -100°, and the C-axis rotates a full 360°. High-speed linear motors move the X-, Y- and Z-axes, while the rotary axes employ direct-drive motors. Rapid traverse speed for the X-, Y-, and Z-axes is 20 m/min.

A 50,000-rpm, HSK-E25 taper spindle offers high-speed machining capability. An automatic tool changer engineered to store up to 24 tools as large as 1.57" in diameter and 3.9" in length provides tooling versatility.

To maximize precision, the attachment surfaces of the ways as well as other critical areas of the PJ 303X are hand-scraped. Advanced spindle thermal displacement technology is standard, including a symmetrical gantry column structure that accommodates thermal deformation fluctuations and a thermal compensation mechanism for the machine spindle/head.

Operator-friendly features further enhance precision, including a 15" display with touch panel capability

than can be moved to the most convenient position relative to the work envelope. The control is the new Fanuc F31i-B5 with the i-H Pro control panel. The machine's double-stage rotary door provides wide access for visibility and setup.

The PJ 303X consumes a compact 5.75' x 7.79' x 9.48' (W x L x H) of floor space, and weighs approximately 12,000 lbs.



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Quick Change Tooling Line Designed for Swiss Type Machines —ISCAR

There are two critical points when considering quick change tooling systems for machines, rigidity and accuracy according to ISCAR. The company's NEO SWISS Modular Quick Change Tooling Line for Swiss-type machines has a robust rotary

New Products

wedge mechanical design for clamping rigidity.

Due to the processes on Swiss machines and the difficult materials being machined, the depths of cuts can be deep, compounding the need for an extremely rigid system. Accuracy is essential when changing tools for part requirements and achieving seamless change-over from job to job. The repeatability of Iscar's NEO Swiss tools is $\pm 0.0008''$.

The materials cut in Swiss shops make holders that are coolant-thorough a critical factor in part quality, tool life and chip control, according to ISCAR. Because of this, ISCAR incorporates coolant-thorough technology when designing its products. NEO Swiss heads

have coolant holes strategically placed for efficient coolant introduction. The NEO Swiss was designed so there is no need for a bulky tool head, reducing the possibility of chips getting caught on heads or coolant nozzles.

A Y-axis option is also available for the ISO Turn NEO Swiss head. Iscar says this component can add rigidity to turning operations by inverting the insert from X-axis to Y-axis orientation changing the cut forces from radial (perpendicular to the shank) to axial (parallel to the shank). This orientation also is also said to improve chip evacuation. By positioning the insert inverted, it is possible to take advantage of gravity to project chips into the conveyor.

Vertical Lathe Offers High Productivity —Okuma America

Okuma America Corporation has announced a new addition to its vertical lathe product line—the VT1000EX.

The VT1000EX weighs in at 41,800 lbs. and features rigid construction and structural reinforcement, all of which enable it to execute stable operations for long operating periods. This vertical lathe includes wide guideway spacing, rigid and precise ball screws for the X and Z axes and a heavily cross-ribbed casting, which provides greater stability during ultra-heavy cutting of large workpieces.

The VT1000EX spindle is capable of a maximum power output of 55 kW, maximum torque of 5,310 Nm and thrust of 30 kN on the X and Z axes.



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New Products



Expanded Family of Five-Axis Workholding-Kurt Workholding

Kurt Workholding is augmenting its PF Series five-axis Workholding lineup with an 8-inch vise, quick-release pallets and a wide-base vise option for 96-mm docking. All the new models feature three jaw options, easy adjustment and pull-stud compatibility for automation-ready mounting and zero-point systems.

The PF840 vise features an 8-inch jaw width and a four-inch maximum opening, offering customers an off-the-shelf vise capable of handling much larger parts than most five-axis vises are designed to hold. Dovetail, serrated and machinable jaw options are to be made available.

Kurt Workholding says the PF840 was originally designed to hold several different aerospace parts, but the vise saved time on custom fixturing and worked well in the five-axis milling centers. With this experience with its own product, Kurt Workholding decided to move it into its consumer workholding lineup.

Kurt Workholding is also introducing wide-base models of their smaller vise sizes, including the PFW420, PFW440 and PFW460. Like their narrower siblings, the wider models can quick-change mount with either 52 mm or 96 mm pull studs. The three new models feature a four-inch jaw width and jaw openings ranging from 2.625 inches to 6.625 inches.

In addition to the new three-axis vise models, Kurt's new five-axis MP Pallets are designed to further streamline automation and allow an operator or a robot to position a PF vise quickly and securely with just a single motion. Vises attach with pull studs and can be robotically or manually released with the press of a button. Designed for use with five-axis vises with 52 mm or 96 mm pull-stud patterns, Kurt's MP-Series manual quick-release pallets come in three sizes to fit the PFW420, the PFW440 and the PFW460 five-axis vises.

Jergens Improved Security for Line of Toggle Clamps —Jergens

Jergens Inc. expands its range of True-Lok toggle clamps with additional locking mechanisms, which the company says add security over a range of applications. Four types of clamps are available with the locking mechanism, including vertical handle, horizontal handle, pull (latch) style and push (straight line) style toggle clamps. In total, twenty-five new line items are offered.

According to Jergens, the locking mechanism ensures that the toggle clamp will remain in the closed/hold down position for maximum security in workholding applications. Additionally, it also ensures that the clamps remain in the unclamped/open position to facilitate part change and operator convenience.

True-Lok toggle clamps are available with flanged-base in either steel or stainless steel. Jergens says the secondary lever has been designed for thousands of cycles and easy access and engagement by the operator. Holding capacities range up to 7,700 lbs.

STATEMENT OF OWNERSHIP MANAGEMENT, AND CIRCULATION (Required by 39 U.S.C. 3685)

- Title of Publication: CNC-West
- Publication Number: 0747-3362
- Date of Filing: October 2022
- Frequency of Issue: Bi-Monthly
- No. of issue published annually: 6
- Annual Subscription price \$10.00
- Complete Mailing Address of know office of Publication: 16835 Algonquin Street # 158, Huntington Beach, CA 92649-3810
- Complete Mailing Address of the Headquarters or General Business Offices of the Publishers: 16835 Algonquin Street # 158, Huntington Beach, CA 92649-3810
- Full Names and Complete Mailing Address of Publisher, Editor and Managing Editor. Publisher: Shawn F. Arnold, 16835 Algonquin Street # 158, Huntington Beach, CA 92649-3810
Editor: 16835 Algonquin Street # 158, Huntington Beach, CA 92649-3810
- Owner: Arnold Publications, Inc., (a corporation), 16835 Algonquin Street # 158, Huntington Beach, CA 92649 Shawn F. Arnold, President, 16835 Algonquin Street # 158, Huntington Beach, CA 92649-3810
Linda M. Arnold, Sec'y, Treasurer, 16835 Algonquin Street # 158, Huntington Beach, CA 92649-3810
- Known bondholders, Mortgages and other Securities holders owning or holding 1 percent or more of total amount of bonds mortgages, or other securities: (None)
- Not applicable.
- Publication Name: CNC-WEST
- Issue Date of Circulation Data Below: August/Sept. 2022
- Extent and nature of circulation:
 - Total number copies (Net Press Run). Average number copies each issue during the preceding 12 months, (17,400) actual number copies of single issue published nearest to the filing date, (17,200)
 - Paid and/or requested Circulation —
 - Mail Subscription. Average number copies each issue during the preceding 12 months, (14,246), actual number copies of single issue published nearest to the filing date, (14,353).
 - Total paid/and or requested circulation: Average number copies each issue during the preceding 12 months, (14,246); actual number copies of single issue published nearest to filing date, (14,353).
 - Outside County Nonrequested Copies: Average number copies each issue during the preceding 12 months (2,412) actual number of copies of single issue nearest to filing date, (2,211).
 - Total Nonrequested Distribution: Average number copies each issue during the preceding 12 months, (2,412) actual number copies of single issue published nearest to filing date, (2,211).
 - Total distribution: Average number copies each issue during the preceding 12 months, (16,658). Actual number copies of single issue published nearest to filing date, (16,564).
 - Copies Not Distributed Average no copies each issue during the preceding 12 months, (742). Actual number copies of single issue published nearest to filing date, (636).
 - Total: Average number copies each issue during the preceding 12 months, (17,400), actual number copies of single issue published nearest of filing date, (17,200).

I Perect Paid and/or Requested Circulation Percent Average(85%,) Actual (86%)
- This statement of ownership will be printed in the October/November 2022 issue of this publication.
- I certify that the statements made by me above are correct and complete.

Shawn Arnold
Publisher
October 1, 2022

New Products



Enhanced VMC with More Automation Options —Mazak

Mazak offers the enhanced VARIAXIS i-800 NEO Vertical Machining Center (VMC) featuring a powerful

CNC, faster machining cycle times, expanded workpiece capacities and more automation options.

Among the primary enhancements on the VARIAXIS i-800 NEO is the Mazatrol SmoothAi CNC. It features functions including Smooth Machining Configuration (SMC) for process optimization with real-time operator control of a wide range of cutting parameters and Ai Thermal Shield for stable machining accuracy through smart compensation for heat displacement.

The VARIAXIS i-800 NEO now achieves rapid traverse rates of 1,890 IPM in the X, Y and Z axes. To accommodate larger workpieces, axis strokes increased to 29.52" in X, 35.03" in Y and 23.62" in Z. Maximum workpiece

weight capacities are 2,204.62 lbs. on the single-table version of the machine, and up to 1,543.24 lbs. with a two-pallet changer.

The machine now handles maximum tool lengths up to 16.33" in available magazine capacities of 30, 40, 80 and 120 tools. It offers a new servo drive and a 4.3 second chip-to-chip tool change time.

For additional flexibility, automation options now include a two-pallet changer, along with the Mazak Multi-Pallet Pool (MPP) compact multiple pallet stocker system and the modular Mazak PALLETECH System. The VARIAXIS i-800 NEO can work within the same Palletech cell alongside other Mazak machines, including the HCN-5000 and HCN-5000/50.



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BIG DAISHOWA Unveils EWA, a Fully Automatic Boring Head — BIG DAISHOWA

The BIG KAISER EWA automatic fine boring system from BIG DAISHOWA performs closed-loop boring operations without a human operator. This breakthrough eliminates the need to stop the spindle to manually adjust the boring tool. The adjustment range allows for the handling of multiple bore sizes with the same tool and ensures a repeatable boring process.

The EWA fine boring head is available in two sizes, one with a boring range of $\text{\O}2.677''\text{-}5.276''$ and the other with a range of $\text{\O}.394''\text{-}2.126''$.



The EWA can be used on machines with BT/BBT30-40-50, CV/BCV(SK)40-50, BIG CAPTO 5-6-8 and HSK-A63-80-100-125 spindles. It can be integrated in three primary configurations: fully integrated, PC control, or tablet control.

A fully integrated system has the EWA control software running directly

on the machine tool control via an app or technology cycle, requiring no external control device. The fully integrated system can only be integrated on new machine tools.

For legacy machines, a PC interface between the machine tool and the EWA can provide a fully automated, closed-loop control cycle. Commands are sent from the machine tool to the EWA, automatically adjusting the tool in synchronization with the machining process.

The PC acts as a synchronization interface between the machine tool and the EWA. It stops the machining cycle after the touch probe makes a measurement, reads the result and sends the corresponding adjustment value to the EWA. After the EWA has been adjusted, the PC notifies the machine tool to continue the process.

The EWA can also be operated as a standalone tool, controlled manually with the BIG KAISER app on a tablet or smartphone.

Turn-Assist 200i and 270i for Nakamura-Tome —Methods Machine Tools

Methods Machine Tools, has released the Turn-Assist 200i and 270i from RoboJob as its first, end-to-end standard automation system for Nakamura-Tome turning centers.

A semi-collaborative system engineered for lathe automation, Turn-Assist is designed to be implemented and run by operators of any skill level. With a simple tablet-style HMI and standard Ethernet IP interface, shops can successfully change over from one part to another within minutes.

“By pairing the Turn-Assist from RoboJob with Nakamura-Tome, we have created a unique automation solution for high-mix/low-volume and/or mid-volume with frequent changeovers on round workpieces often as-



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New Products



sociated with Nakamura lathes,” said Zach Spencer, Methods’ automation manager.

Turn-Assist features an open-floor setup and area sensors to maximize operator safety and accessibility, while a pre-programmable Fanuc robot loads blanks and unloads finished parts from the stocking table.

New Pulse R™ Electronic Control For MQL System Adjustment —Unist

Unist’s new Pulse R™ electronic control is backwards compatible with new and existing 24VDC Coolubricator™, saw blade lube™, and serv-O-spray™ minimum quantity lubrication (MQL) systems. The Pulse R™ ties into the system control solenoid valve and takes the place of a pneumatic pulse generator timer or logic block. Pulse R’s™ simple, two-button interface makes adjustment easy and an easy-to-read display helps operators maintain accuracy and consistency between jobs.

The Pulse R™ control is equipped



with fault monitoring and visual feedback of output and input status. Four operating modes allow the Pulse R™ to deliver either continuous output or intermittent output with one or multiple ‘shots’ of fluid and allow for actuation on either power-up or from an input trigger signal. Pulse R™ also includes a locking feature to prevent tampering.

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New Products

Automatic Rotary Four-Pallet Changer

—Midaco

Midaco Corporation continues to

expand its automatic pallet changer line with the introduction of a four-pallet system on one shuttle.

“Whether running high volume production of the same part or pro-



gramming several different set-ups, the Automatic Rotary 4-Pallet Changer can be loaded and scheduled to feed your new or existing VMC for multiple hours of unattended machining, extending operator walk-away time and maximizing productivity,” said a company spokesperson.

This shuttle’s pallet carousel provides a full 360° rotation, allowing all four pallets to be conveniently accessed from flip-panel stations located on two sides of the pallet changer. Easily load and unload heavy parts (up to 2,000 lbs. capacity per pallet on largest model) with a crane or robot without any overhead obstruction.

Once a job cycle is complete, pallets will rotate automatically on the shuttle carousel, and the pallet changer’s servo drive transfers the next pallet onto the cast-iron receiver mounted directly onto the machining center table. Durable precision ground steel rails and hardened locating pins/bushings provide +/- 0.0001” repeatability.

The system is equipped with a two-sided light-curtain guarding system via light emitters, mirrors and sensors. A pallet change will not occur if the invisible light beams surrounding the shuttle system are breached, meeting CE compliance.

Specifications for the machine include: one servo drive shuttle system with automatic door and light curtain, four cast aluminum or cast-iron pallets in XY sizes up to 50” x 24”, one cast iron receiver with up to 2,000 lbs. weight capacity per pallet on largest



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model (with weight evenly distributed) and the control panel is fully integrated with the VMC via M-codes.

New ACU-RITE Metrology DRO —HEIDENHAIN

The new metrology-focused digital readout by ACU-RITE was introduced in the HEIDENHAIN booth at the IMTS show in Chicago. The new ACU-RITE-brand DRO203Q known as “the Q” utilizes the power of the established ACU-RITE DRO203 hardware to integrate geometric me-



trology functions from the past iconic QUADRA-CHEK series.

Users of optical comparators and measuring microscopes and more will find this of particular interest as it meets the need for basic 2D metrology

functions. The Q functions as an entry-level readout, providing the user with geometric feature construction, basic part view detail and data output via USB-C connection. This enables users to quickly gather the needed points, construct desired features, and export them easily over a modern interface.

The ACU-RITE DRO203Q is plug-and-play, walking the user through initial set up parameters and display options on first power-up.

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Automatic Pallet Changer with Mount for Robot/Cobot
shown on VMC. (robot not included)





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New Products

Dual Force Precision Multi-Function Vises — Palmgren

The new vise from Palmgren are lighter than many other machine vises. Highly versatile, they can be mounted on their base, bottom, either side or upright. “They also can be mounted back-to-back to create a fast, easy and economical vise tombstone,” said a Palmgren spokesperson.

As part of Palmgren’s Dual Force line of precision vises, the multi-function models are designed for precision part clamping. “They are ideal for use in running production parts where datums, flatness and parallelism is important,” said the spokesperson.



5C Collet Chucks —Global Tooling Solutions

Global Tooling Solutions has added adjustable chucks to the Gator line.

“They are designed for all 5C collets and are a great addition to any shop performing facing, turning, milling and boring operations,” said a company spokesperson. These chucks are typically used on grinding machines and lathes.

Gator chucks are produced with a two-pinion design, and high-quality forged steel bodies providing high rigidity and accurate clamping of a workpiece or a cutting tool. This simple key operated process allows for quick 5C collet changeover times. Scrolls, pinions and chuck bodies are fully hardened and ground for high accuracy and long life. All chucks are precisely balanced allowing these chucks to be run up to 6,000 RPM.

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New Products

Gator chucks are designed to work with fully finished adapter plates. Micro adjustable screws that engage with these special adapter plates provide fine adjustment capabilities and allow the user to 'zero in' the accuracy of the chuck, providing 0.0004-inch T.I.R. repeatability. Adapter plates covering the most popular A & D spindle types are available from stock.

Gator Chucks are produced in Global Tooling Solutions' ISO & CE certified factory.

High Performance Bridge Type Machining Center

—Awea

Yama Seiki and Awea have introduced the SP and LP series bridge-type vertical machining centers (VMCs) with advanced machining abilities and progressive technology capabilities. "The SP and LP series bridge type VMCs combine strong spindle power and a super rigid machine structure with high quality automation equipment," said a Yama Seiki spokesperson. "The full product line provides high efficiency, high productivity

machining capabilities."

"Using advanced development techniques, including finite element analysis (FEA), and strict assembly processes, the SP series ultra-performance bridge type machining center provides optimum rigidity, accuracy and efficiency," said the spokesperson. Designed with a modular spindle offering cutting flexibility, and rigid roller type linear guideways on the X and Y axes supported by a Precision Feedback system the SP series can handle cutting at high speeds.

"Further providing a solid foundation, the SP series comes with a

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Z-axis equipped with hardened, rigid box guideways; the bridge and base of the machine are cast as individual pieces, providing maximum structural integrity and all contact surfaces are hand scraped to ensure optimum assembly precision, strong mechanical integrity and perfect load distribution,” continued the spokesperson.

The LP series provides the same construction features as the SP machine, including the modular spindle design, rigid box way on the Z-axis, and using the same building techniques, while also offering a larger range of travel lengths.

Compact Tool Grinding Machine —United Grinding

United Grinding offers the compact Helitronic G 200 tool grinding machine.

Featuring a floor space of less than 24.8 sq. ft., the Helitronic G 200 offers grinding and sharpening of rotationally symmetrical cutting tools ranging from 0.039” to 4.92” in diameter, with a grinding wheel up to 5.91” possible. The Helitronic G 200 can accommodate a maximum tool length of 9.25” and a tool weight of up to 26.45 lbs.

The ergonomic design integrates a swiveling multifunction touch panel with a 21.5” monitor, facilitating easy operation and accessibility to the working area. A low-vibration solid mineral

cast bed and C-frame construction offers high damping capabilities and thermal stability resulting in enhanced grinding precision.

“The linear axes X, Y, Z are built according to the high Walter quality standard,” said a company spokesperson. “The rotating A and C axes are equipped with torque motors and provide long life with minimum service effort.”



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New Products

The Helitronic G 200 uses Helitronic Tool Studio grinding software from Walter.

New End Mill Coating —Gorilla Mill

Gorilla Mill introduces their WTF end mill coating, which they report offers superior oxidation resistance, high thermal stability, and exceptional wear resistance for difficult-to-machine materials such as titanium, nickel-based alloys, and stainless and hardened steels.

“If a shop is running an end mill at 2,200 degrees, it’s going to glow red, so everyone should probably leave

the building,” says Kevin Cranker, president at Gorilla Mill. “The WTF coating holds up against temperature and abrasion, even when working with titanium and Inconels.”

New Shrink Fit Machine —Haimer USA

Haimer USA introduces the new i4.0 machine series of shrink fit machines with Industry 4.0 connectivity. The i4.0 machines series is adjustable for all types of tool holders and suitable for solid carbide and high-speed steel tools. The wireless communication exchange helps optimize and customize shrinking parameters for machining

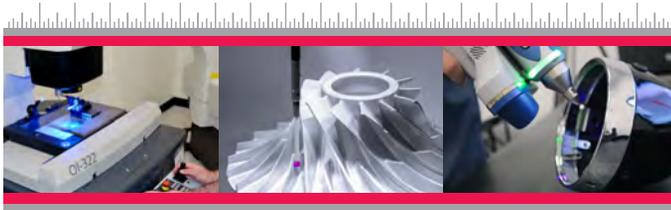
processes in an error-free-data setting, as well as track tooling.

“Through Wi-Fi communication, i4.0 shrinking, presetting, and balancing, machines from HAIMER can interface with the job shop’s CAD/CAM system or tool management system to track the flow of those tool assemblies from the design stage, through the assembly stage of the tool assembly in the tool crib, and then out to the machine tool,” says Robert Bied, vice president of product management North America at Haimer USA.

With a 7-inch touch display and new intuitive software, the i4.0 shrink fit machines provide a simple, user-friendly interface that allows for outstanding results with less experienced

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operators. HAIMER shrink fit technology provides time savings per shrink operation, reducing the tool-changing time to less than five seconds due to the precisely metered low-energy-consumption and contact-cooling systems.

You Ji VMT Series Vertical Mill/Turn Center —Absolute Machine Tools

Absolute Machine Tools has added the You Ji VMT Vertical Mill/Turn Center series to its extensive line of large Vertical Turning Lathes by You Ji (Kaohsiung City, Taiwan). Combining vertical and horizontal 5-face milling with vertical turning capabilities,

the You Ji VMT provides 5-sided or 4+1-axis milling and turning of medium-sized workpieces in a single setup. Standard turning diameter and maximum turning height are 39.4”.

The 30-hp double-wound Fanuc P Series main spindle motor delivers more torque at a lower RPM than a 50-hp single-wound motor. It’s powered by a 2-speed ZF planetary gearbox spindle drive. The 20-hp 50 taper milling spindle produces high torque. The vertical column and base are made from heavily ribbed Meehanite castings. Smooth operation is virtually guaranteed complements of enclosed X-, Y- and Z-axis box guideways featuring hand-scraped mating

surfaces, Turcite-B coatings and forced lubrication. The VMT’s simple design eliminates belts and gears in all three axes instead relying on servo motors to drive large 2”-diameter Class-3 precision ballscrews during operation. A fixed turning spindle and 3-axis moving column provide optimal chip removal and simplified operation.

“The You Ji VMT-1000+Y features a large 29.5”, Y-axis travel,” said chief marketing officer Nicole Conrad. “A standard 24 tool arm-type ATC with 55 lb. tool weight capacity makes this machine a perfect offering for our aerospace and energy industry customers.”

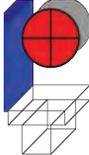


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New Puma 3100LSY —DN Solutions

The PUMA 3100LSY has a 3,000 r/min, 40 hp main spindle and a 30 hp 4,000 r/min sub-spindle, with the distance between the two being 63.58". The sub-spindle enables transfer of the part for backside machining, thus mak-

ing it possible to complete a part in one setup. The programmable C-axis on the main and sub-spindle is paired with a BMT-65 live tooling turret that houses 12 tools and runs 5,000 r/min with a 10 hp motor. This design allows milling, drilling and tapping on the back side of parts. Both spindles are temperature controlled for better thermal control.

High speed turret indexing and ultra-fast rapid traverse rates on the PUMA 3100LSY minimize non-cutting time. Mill-drill capability and Y-axis with a full C-axis sub-spindle reduce the need for secondary operations.

The PUMA 3100LSY has a maximum turning diameter of 16.53" and

a maximum length of 50.6" with a maximum main spindle chuck size 15" and sub-spindle chuck size of 12.0". Parts can be automatically ejected into the standard parts catcher and onto the parts conveyor.

The beltless integral sub-spindle delivers smooth vibration-free operation. Maximum spindle torque is 441 ft-lbs. The spindle is supported by angular contact bearings in the front and cylindrical roller bearings in the rear.

The PUMA 3100LSY comes standard with the latest version of the FANUC 0i Plus control with an iHMI touchscreen.

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New Products



Complex Milling Capability on Hybrid Mill/Turn Center

—Absolute Machine Tools

The QuickTECH T8 HYBRID features nine total axes, two turning spindles, two live milling spindles and a minimum capacity of 38 tools for complete part machining, including complex milling functions. The main spindle features a 4,000 RPM, 15 HP high-torque integral spindle motor with either a three-jaw chuck or collet chuck as standard. The sub-spindle has a 4,000 RPM 7.5 HP high-torque integral spindle motor for back working. Its bar capacity is 2.55" with the 8" three-jaw chuck or 2.36" with the DIN-185E-60B collet chuck. Sub-spindle bar capacity is 1.259" with its standard DIN-173E-42B collet chuck. Maximum turning length is 13.8". Both spindles feature a full continuous C-axis with braking system and employ P4 high precision bearings for stability and heavy cutting ability.

The high-production CNC milling and turning center features a rigid 12-station BMT-55 live tooling turret with a 5 HP spindle motor and 80 mm of true linear Y-axis travel. The turret has fast servo motor indexing and rigid hydraulic clamping; all 12 stations can be live. The sub-spindle features a 4-axis gang tooling system consisting

of linear X-, Y- and Z-axes plus a rotary 360° B-axis. The sub tool post features 5 OD turning tools, 9 ID turning tools and 12 live tools, the latter of which are

mounted in a continuous 360° B-axis and are powered by a 2 HP spindle motor. Rigid tapping is standard in both the turret and the B-axis.

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...Hotline Continued From Page 8

Canadian Company Xnrgy Chooses Mesa for \$145M, AZ. High-Tech Plant

Xnrgy Climate Systems, a Canadian company that manufactures climate systems for data centers, has submitted plans to the city of Mesa to build its U.S. headquarters and a manufacturing facility.

The company said it will add 800 jobs and manufacture cooling and heating systems to benefit the growing high-tech manufacturing industries in the Southeast Valley.

Blue Canyon Opens Boulder, Colorado Factory Dedicated to Manufacturing CubeSats

Small satellite manufacturer and mission services provider Blue Canyon Technologies, a wholly owned subsidiary of Raytheon Technologies, celebrated the grand opening of its new CubeSat Factory in Boulder, Colorado, with members of the Boulder Chamber of Commerce at a ribbon-cutting ceremony.

The expanded 31,000-square-foot facility consolidates manufacturing efforts with dedicated CubeSat employees to build large spacecraft constellations and increase production from 50 to 85 CubeSats a year. Blue Canyon's CubeSat performance is industry leading with sub-arcsecond pointing accuracy and optimization for payload size, weight and power. Currently, the company has 38 CubeSats in various stages of design, assembly and test.

Aerospace Unveils \$100M Space Warfighting Center in Colorado Springs

The Aerospace Corporation unveiled its new Space Warfighting Center (SWC) at a ribbon-cutting celebration in Colorado Springs, Colo. "Developing advanced space warfighting concepts that enhance the resiliency and agility of our systems is critical to outpacing the threats we face in space," said Steve Isakowitz, Aerospace's president and CEO. "Aerospace's Space Warfighting Center provides a unique environment that leverages cutting-edge digital tools to aid our government partners as they design and support the development, training, and testing of the nation's future space enterprise."

The SWC is a \$100 million, 90,000-square-foot building designed to provide laboratory space to further Aerospace's technical work. The facility will support virtual design activities across company locations nationwide.

Currently, the Aerospace location in Colorado Springs employs 250 engineers, scientists, and analysts. The new SWC will accommodate an additional 250 employees at this location, boosting the local economic impact to a total of \$100 million by the end of 2023.

UPS Orders 8 More Boeing 767s Built in Everett, WA.

Boeing announced an order from UPS for eight more 767 freighters. The incremental order will increase UPS's 767 Freighter fleet to 108 airplanes, enabling the global carrier to further modernize and sustainably grow its fleet.

UPS will begin taking delivery of these new airplanes in 2025, with an additional 767-300 Boeing Converted Freighter (BCF) entering service in late 2023. This purchase builds on UPS's order for 19 767 Freighters in December 2021.

Defense Company Expands to New Mexico, Opens New Facility

BlueHalo is purpose-built to provide industry-leading capabilities across several domains, including space superiority, space technology, directed energy/counter-unmanned aerial systems, artificial intelligence and more.

Their recent expansion to New Mexico reflects their commitment to push industry norms, too. "New Mexico is a hub of cutting-edge R&D and technological advancement," says Dan Gillings, sector president and general manager of BlueHalo Labs. "As BlueHalo looked to expand its state-of-the-art manufacturing facilities, Albuquerque became a clear choice for its spirit of innovation and wealth of resources along with the strong support from local, regional, state and federal officials."

BlueHalo's new facility is up and running and another is in the works. They are excited to engage with local partners on new projects such as the Air Force Research Laboratory's innovations in laser communications and in modeling, simulation, analysis and wargaming (MSA&W). They are also focused on rapid transition to manufacturing for BlueHalo products.

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