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Jennifer Hicks (top, cover)

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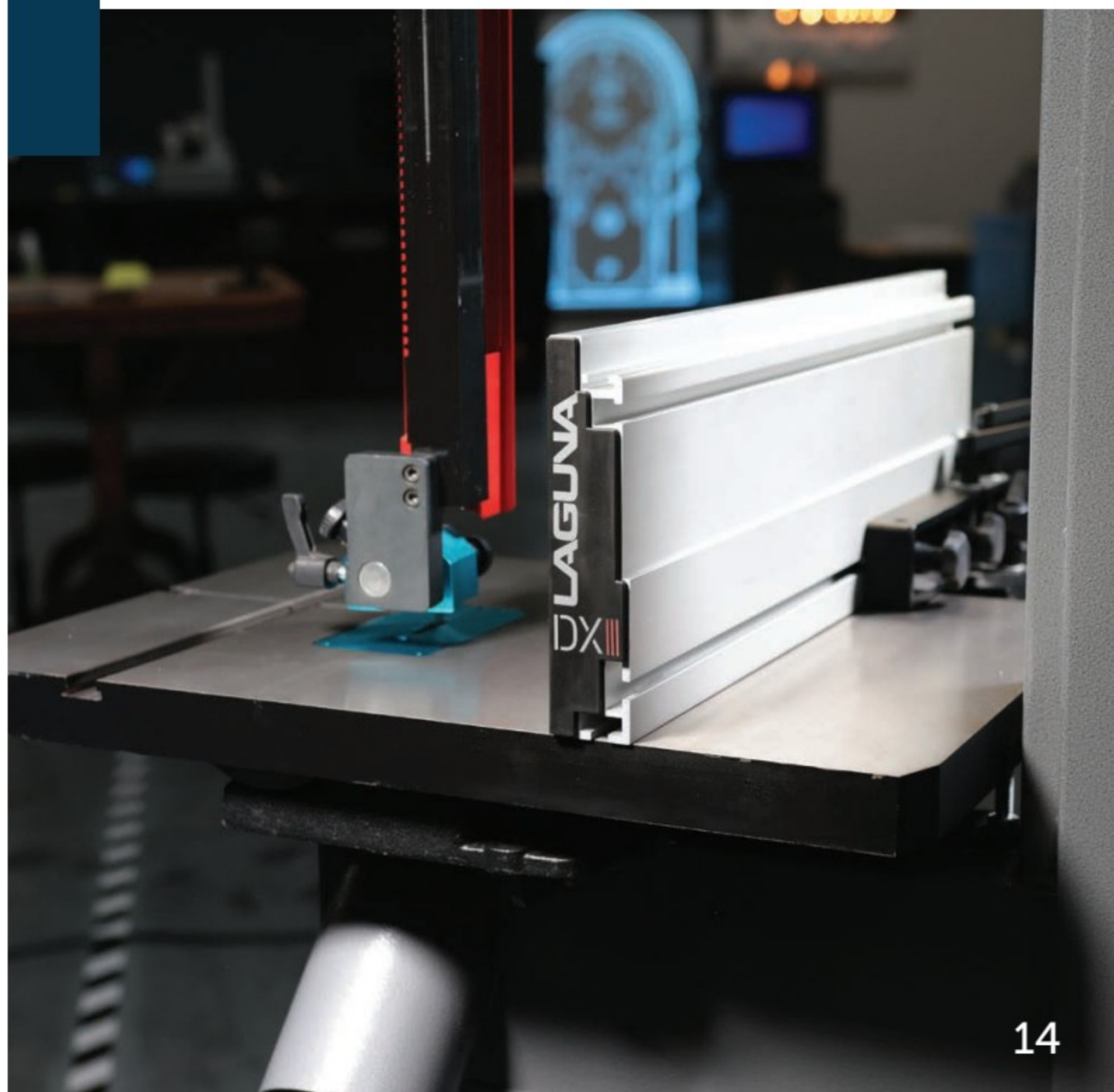


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BLOGS



Over the Workbench

Talkin' shop with former editor A.J. Hamler

2024 Online Resource Guide
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SANDPAPER IS THE MOST IMPORTANT

Many wood shops have made the decision to outsource various parts of their projects. This creates more time for casework, specialty pieces, and enhanced quality. This can also increase production output to a great degree.

But one thing remains constant throughout the entire process: There will always be a need for sandpaper!

Even if your cabinet doors and drawer boxes arrive at your shop sanded to 180 grit and ready for finishing, there is still the need to sand between coats as the finishing process is completed.

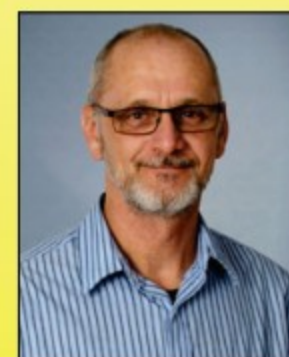
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DeWalt gives grants to grow the trades

By Tod Riggio

DeWalt a brand of **Stanley Black & Decker**, has announced the recipients of its Grow the Trades Grant program, a \$30 million commitment over five years to support organizations that are skilling, reskilling and upskilling tradespeople.

"In the U.S., the construction industry alone faces a gap of 500,000 workers," according to Frank Manarino, president of the Power Tools Group for Stanley Black & Decker. "We congratulate and thank our grant recipients who are helping to fill critical roles in the industry and closing the trades gap. Together, we are providing a pathway for tradespeople to build a long-term and fulfilling career in the trades."

This year, 70 organizations will receive a combined \$3.3 million to fund training in concrete, mechanical, finishing and pipe trades, among others. Winners span 19 states, the District of Columbia, and Europe with funds supporting those seeking careers in the trades including transitioning military, women, and those in underserved communities. Recipients were selected via a competitive application process based on their trades-focused initiatives providing certifications and credentials to skill tradespeople, according to the company.

The Manufacturing Solutions Seminar, hosted by **Stiles Machinery** at its showroom in High Point, N.C., on Apr. 24-25, brought together woodworking manufacturers, business owners, and industry professionals across North America. Each day, attendees engaged in live machinery demonstrations, presentations, and interactive breakout sessions.

"The educational event, held at

Stiles' world-class showroom, provided participants with a unique opportunity to explore the latest trends, technologies, and strategies shaping the woodworking industry today. With a focus on innovation and automated technologies, the seminar offered a diverse range of sessions covering topics such as compact manufacturing, workforce development, flexibility of nested machining, scalable automation solutions, sanding application capabilities, and the advantages of automated finishing," the company reported.

"As the woodworking industry continues to evolve, events like the Stiles Manufacturing Solutions Seminar are crucial in empowering manufacturers with the knowledge, tools, and resources they need to succeed. By fostering innovation and collaboration, Stiles Machinery remains committed to driving the industry forward and supporting the growth and success of woodworking professionals."

The Cabinet Makers Association (CMA) announces a partnership with Print Releaf, to produce its quarterly magazine, PROfiles.

"This strategic collaboration reflects CMA's commitment to environmental stewardship and marks a significant milestone in its ongoing efforts to adopt eco-friendly practices," the trade group said.

"Print Releaf provides innovative solutions to offset paper consumption by reforesting areas affected by deforestation. By partnering with Print Releaf, CMA ensures that the production of PROfiles magazine aligns with the principles of sustainability and conservation that are important to the woodworking industry." **W**

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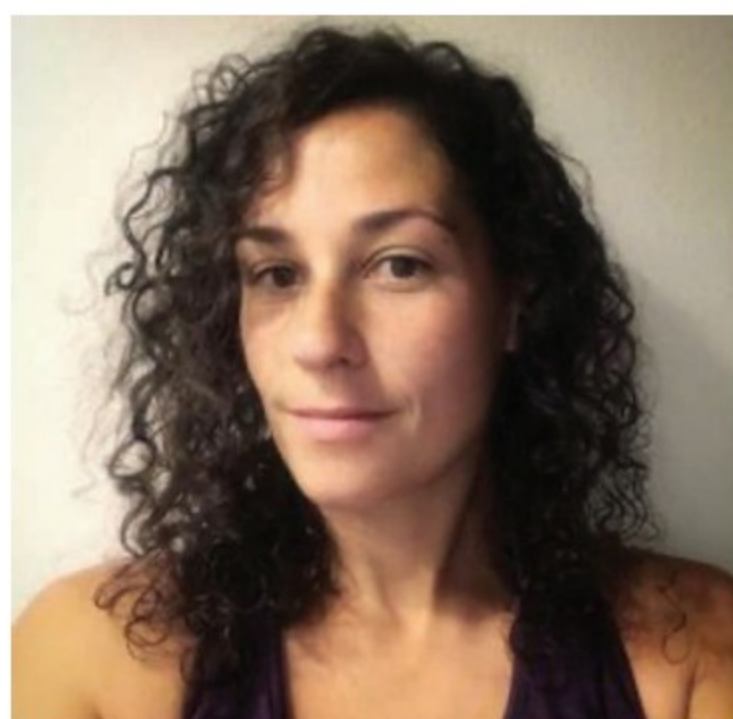


A wenge and brass altar by Penina Bernstein, winner of Best of Show in the professional division.

Innovation+Design picks winners

By Jennifer Hicks

The International Society of Furniture Designers (ISFD), has announced the winners of its 2024 Innovation+Design contest, a juried competition for professional designer/makers and students who anticipate a career in the custom wood and related home furnishings industries. The winners had their work displayed during the Spring Market in High Point, N.C.



Penina Bernstein

"In celebration of our fifth anniversary, we were happy to see a record number of designer/makers sharing their creative work with us this year," said David Blair, executive director of the ISFD.

"Once again, the entries showed a high level of imagination and superior craftsmanship, making it a challenge for the expert panel of industry judges to narrow the list down to just eighteen professional and student finalists. From that list, the judges selected nine winning projects of which two received the distinction of being named Best of Show."

Best of Show went to professional Penina Bernstein and student Aidan Gough.

Bernstein won the Occasional Storage and Seating categories. Other professional winners were John Brogan (Accessories), Stephen Thrasher (Occasional Tables), and Hasan Zaidi of Stabb Designs (Lighting).

Student winners were Gough (Lighting), Sirvats Srinivasan (Seating) Ruihan (North) Sun (Occasional Tables), and Jinquan Zhu (Occasional Storage).

Learn more at isfd.org. [W](#)

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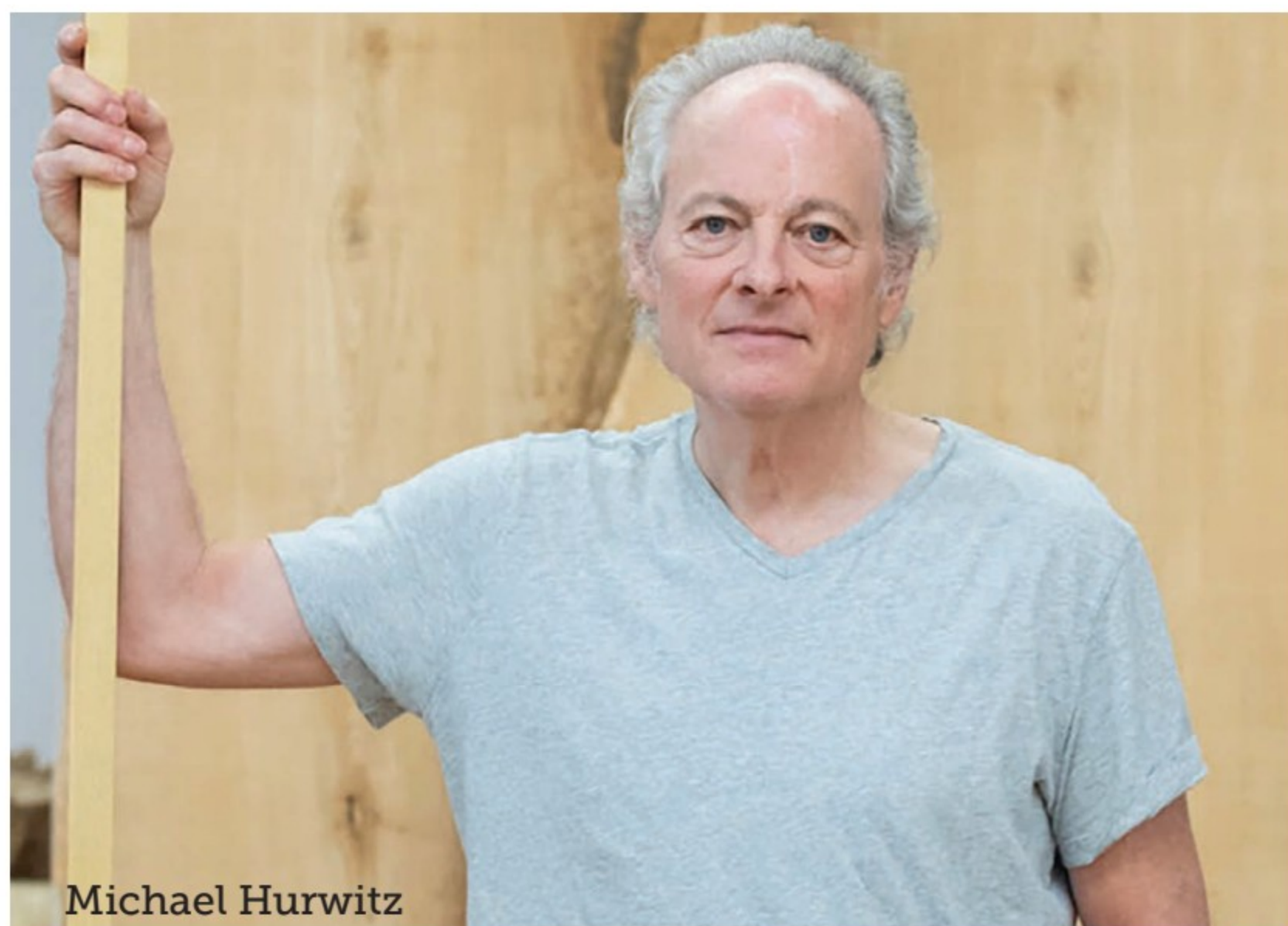
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Michael Hurwitz



John Kelsey

Furniture Society picks two for its Award of Distinction

By Jennifer Hicks

The Furniture Society, an organization dedicated to the advancement of furniture making, will present its 2024-2025 Award of Distinction to Michael Hurwitz and John Kelsey.

The award recognizes an individual or institution as having had a profound impact on the studio furniture field.

"For more than 25 years now, the organization has exemplified the

union of ideas and objects, the 'why' as well as the 'how' of furniture making. We feel that John Kelsey and Michael Hurwitz, both separately and together, perfectly exemplify these values," according to a jurors' statement.

Kelsey has been editor of *Fine Woodworking* magazine, editor and publisher at Cambium Press, and editorial director at Fox Chapel publishing.

Hurwitz is a Philadelphia-based maker whom the jurors say is unsurpassed in quality, invention, and range.

"Everything he makes, seemingly, is a masterwork, while also being entirely unique, an investigation of some new form, technique, material, or idea. It is especially inspiring to see how he synthesizes influences — notably from Japan — without ever indulging in appropriation; this resolution of cultural complexity serves as a model for aesthetic practice, not just in furniture, but any creative field."

The awards will be presented at The Furniture Society's next conference. The site and dates have yet to be determined. Learn more at furnituresociety.org. **W**

AHFA initiates Furniture Safety Week

By Jennifer Hicks

The American Home Furnishings Alliance (AHFA) will hold its first Furniture Safety Week on Oct. 7-11. The event is designed to engage all segments of the home furnishings industry in public conversation about furniture and home safety.

"Under the leadership of AHFA, our industry advocates for product regulations that provide the greatest degree of safety for the greatest number of American consumers," Andy Counts, the trade group's CEO, said in a statement. "AHFA conducts research, recruits member company executives for important task group activity, and builds collaboration with outside stakeholders. All of these

efforts help drive continual improvements in product safety and declining incidents involving our industry's products."

Furniture Safety Week has three key objectives. The first is to improve consumer awareness of home safety issues that involve industry products, including furniture tip-over hazards, recliner safety, and bunk bed risks. The second is to elevate the home furnishings industry's role in developing and maintaining effective product safety standards. The final effort seeks to embrace cooperative relationships with consumer safety organizations, particularly those dedicated to protecting children.

A newly formed task group includes retailer, manufacturer and importer members of AHFA and is working to develop details for the inaugural 2024 event. Tool kits with social media graphics and messages are planned, along with press releases and ideas for online and store events.

Resources for consumers and industry participants will be available on AHFA's Alliance4Safety website, alliance4safety.org. **W**



AKHURST PARTNERS WITH MBA

Akhurst Machinery Group announces a strategic partnership with Modular Building Automation (MBA), a Dutch company specializing in machinery for prefabricated homes, modular buildings, and offsite construction solutions.

"With our newly formed partnership, we aim to set new industry standards by offering customized solutions from stand-alone machines to production lines, to complete modular factory installations, all while providing [customers] with the service and support [they] can always count on," added Graham Akhurst, vice president of the Akhurst Machinery Group. "Given the present-day challenges associated with housing construction expenses across the world, we believe this is the perfect time to help provide a cost-effective solution."

Akhurst is one of North America's largest independent machinery distributors and includes the operations of Cantek America Inc. and Leadermac USA. Learn more at akhurst.com.

WOODCRAFT ADDS THE SHAPER ORIGIN

Shaper Origin, a hand-held CNC router, is making its debut at select Woodcraft retail stores across the nation this month.

"This machine is a real powerhouse that brings CNC capabilities to the craft of woodworking without taking up a lot of space," said Beth Coffey, Woodcraft's vice president of sales and marketing.

"The realm of creative possibilities with the Shaper Origin makes it a small-business dream. There is no CNC experience required to operate it – just scan, design and cut."

Learn more at woodcraft.com.

REMODEL SPENDING EXPECTED TO BE SLIGHTLY LOWER IN 2025

Annual expenditures for improvements and repairs to owner-occupied homes are projected to decrease this year and into the first quarter of 2025, but at a moderating rate, according to the Leading Indicator of Remodeling Activity (LIRA) from the Remodeling Futures Program at the Joint Center for Housing Studies of Harvard University.

The LIRA projects that annual owner spending for home renovations and maintenance will decline by over 7 percent in the third quarter of this year before easing to just -2.6 percent through the first quarter of 2025.

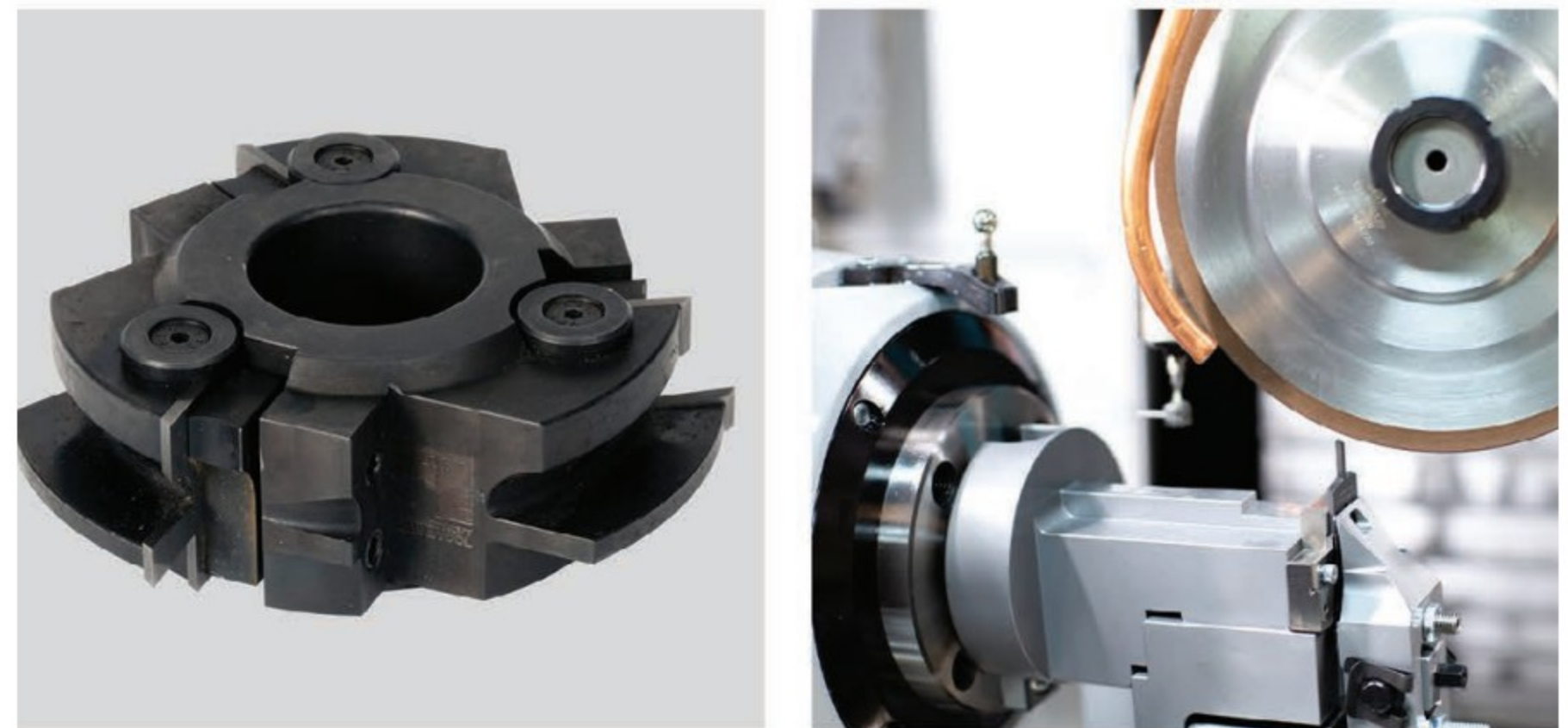
"Residential remodeling is expected to benefit from the rebounding housing market and stabilizing material costs as we move into next year," Carlos Martín, the program's project director, said in a statement. "While home improvement and repair spending is down from pandemic-induced highs, the nation's aging homes continue to need investment in critical replacements, home performance deficiencies, as well as modernization."

"At \$451 billion, spending on homeowner improvements and repairs over the coming year is anticipated to be slightly lower than the \$463 billion spent over the last year," added associate project director Abbe Will. "Yet, the remodeling downturn is poised to be fairly modest and short-lived with market expenditures steadying at near-record levels."

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Led by RJ Pranski, a woodworker with over 20 years of industry experience and more than a decade of Microvellum software expertise, the MVU eLearning resources include training plans, videos, downloadable projects, and more.

"These training plans are designed to help users get up to speed quickly and build foundational knowledge for specific workflows," the company explained. "Whether you are a designer, drafter, or engineer, you will have an online learning resource to support you in your journey to becoming a successful user of Microvellum software."

Learn more at microvellum.com.

KNAACK EXTENDS PARTNERSHIP WITH WORLD'S STRONGEST MAN EVENT

Knaack announced it will continue as the "Official Security and Tool Storage" partner of the World's Strongest Man event, scheduled for May 1-5 in Myrtle Beach, S.C.

The event will feature Knaack's products in the competition, including the Super Yoke, where finalists will carry two Datavault Mobile Field Stations, weighing 925 lbs., and two Jobsite Boxes, weighing about 840 lbs.

"We are committed to this partnership, and we love seeing our products being tested by the grueling demands of these athletes," said Stacy Gardella, Head of Global Marketing Technology and Operations at Werner Co., Knaack's parent company. "We enjoy watching these incredibly strong contestants use our strongest products and it's an honor for Knaack to be a sponsor for a fourth year in a row."

Learn more at theworldsstrongest-man.com and knaack.com.

SOUTHERN CYPRESS MANUFACTURERS ASSOC. ELECTS OFFICERS

Members of the Southern Cypress Manufacturers Association (SCMA) elected officers for 2024 at their annual meeting on March 25 in Charleston, S.C.

Truss Beasley of Beasley Forest Products (BFP) in Hazlehurst, Ga., was elected SCMA president. He joined BFP in 2014 and is currently serving as vice president of business development for the Beasley Group sawmills and flooring plants, according to the SCMA.


Mike Shook of Norcross Supply Co. in Peachtree Corners, Ga., was elected vice president. Shook joined Norcross Supply in 1991, and currently serves as president and chairman of the board.

For more information about the SCMA, visit cypressinfo.org.

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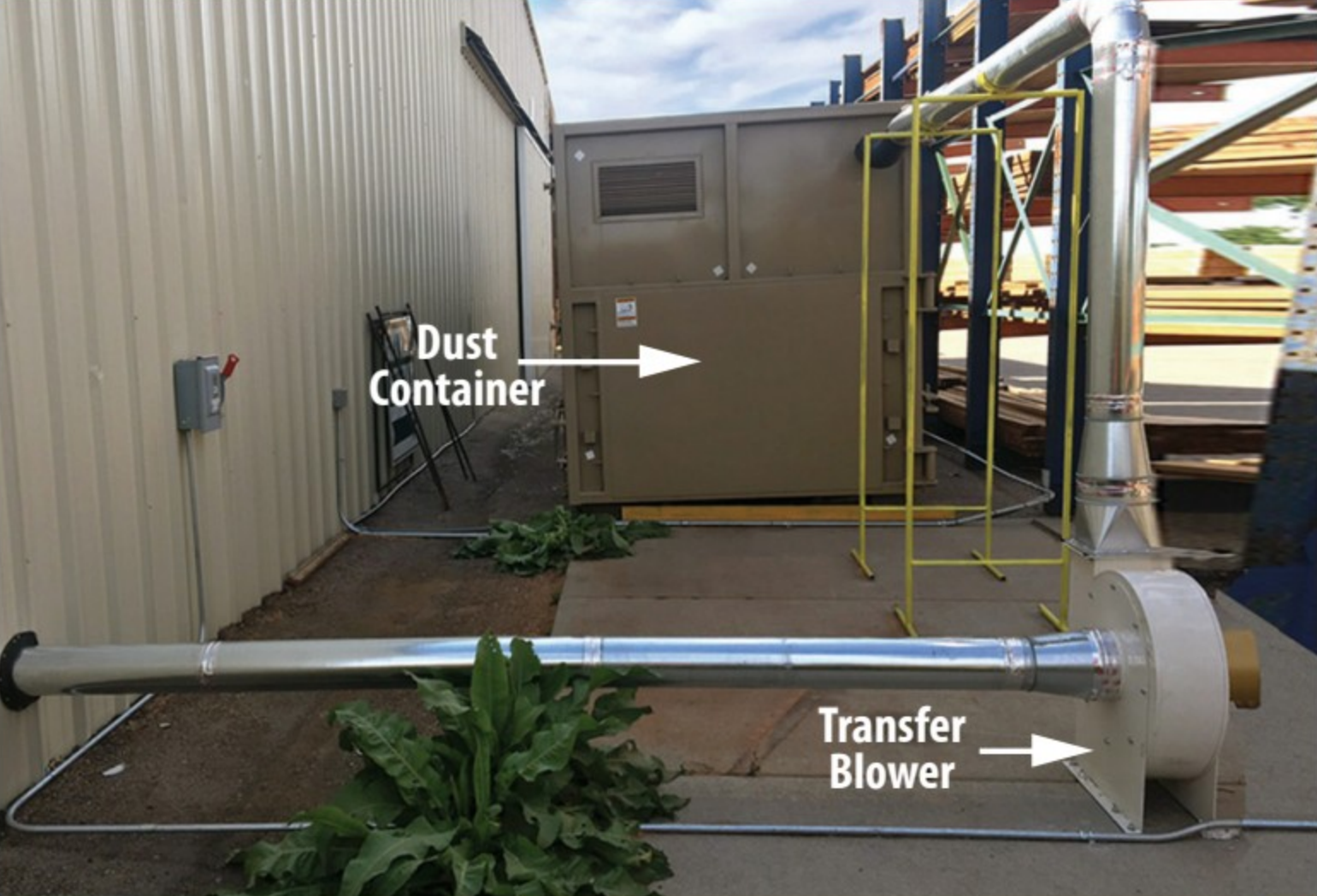


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Tight supplies, low demand for mahogany

By Jennifer Hicks

Top quality 'genuine' mahogany (*Sweitenia macrophyll*) is getting more difficult to find. Suppliers interviewed by Woodshop News say the species can still be sourced, but the very dense, dark grades from older trees are scarce.

"The genuine is basically coming out of South America and it's gotten expensive and there's import problems and things like that," says Louis Irion of Irion Lumber Co. in Wellsboro, Pa.

"But the demand for mahogany is way down. It's just amazing how a wood like that can go out of style. Most of the people we're selling it to are furniture makers, whereas with walnut we might sell a whole room of it for architectural millwork, and we don't seem to get that with mahogany. The good mahogany is really hard to get. A number of mills stopped offering it or have a limited supply."

"I wish there was more of it around," says Carl Mahlstedt of Goosebay Sawmill & Lumber in Chichester, N.H. "It seems like there was kind of a big fall off over the past few years. It's been a little more accessible, but as far as the sizes of the boards and the quality are concerned, it's definitely not the same as it was before."

Mahlstedt adds that he's noticed a narrowing of the gap between genuine mahogany and its substitute species, which include African mahogany and sapele.

"As for the actual physical properties and durability, I don't think they're as far off as they used to be," he says "If we could still get you the old growth mahogany like we did in the past, there would be a bigger difference between the substitutes.

"We still get in some pretty good batches of it, though. Once in a while, I still see some that is pretty impressive, or I might get lucky and find someone that had a stash they



been holding onto for a number of years."

On the veneer side, Matt Gilland of Superior Veneer & Plywood in New Albany, Ind., says supply meets demand.

"Customers call and say they want genuine mahogany, which usually means they want what would classically be called Honduras, and the colors are a little bit different, and they want something that's matching what they've been able to get in the past.

"Some people don't mind if they go with genuine or African, but we do have those that are very specific and want the genuine and we know what that color is that they're looking for. Getting it has not been an issue. There've been some difference in prices over the years, but I would say nothing drastic in the last couple." **W**

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New 24" band saw from South Bend Tools

By Jennifer Hicks

South Bend Tools presents a new 24" band saw, model SB1123, with a 16" resaw capacity and the power of a 7.5-hp motor.

It is now the largest band saw in the brand's wood-cutting line and built to stand the rigors of a production shop, according to Shiraz Balolia, president of South Bend and the founder and CEO of Grizzly Industrial.

"This is a very versatile saw that can be used for small, precise work as well as massive, heavy jobs that require a large capacity," says Balolia. "The blade range on this saw is from 1/4" wide to 1-1/2" wide. So, for fine work, the user can switch to either a 1/4" or a 3/8" blade using the quick-release blade change

mechanism on the saw.

"Additionally, the tall fence that comes with the saw can be switched to be flat, so it can accommodate small, low-profile parts and give the user the room required to maneuver around the blade."

The saw also features a foot-operated brake system, cast-iron table and trunnion, rack-and-pinion table tilt mechanism, two 4" dust ports, and cast-iron wheels.

The table measures 23-5/8" x 33-1/2" and tilts to 45 degrees.

Other features include dual ball-bearing blade guides and a maximum cutting width of 24-38" to the left of the blade.

The 24" band saw sells for \$4,495. Learn more at southbendtools.com. **W**



Courtesy of South Bend Tools

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Apollo launches Precision-6 Pro

By Jennifer Hicks

Apollo Sprayers introduces the Precision-6 Pro, a six-stage HVLP turbo spray system.

The system delivers 11.5 psi of sealed air pressure for handling thicker viscosity coatings such as solvent and water-based, and specialized materials such as paints and gelcoat, according to the company.

"The launch of the Precision-6 Pro has been revolutionary for industry and the new industrial/waterborne coatings being sprayed," says company president and CEO John Darroch.



"This powerful six-stage turbine system allows professionals to spray industrial water-based coatings with no thinning. Until the release of the Precision-6 Pro, many thick industrial coatings were not able to be sprayed without requiring thinning of the coatings and paints."

Other features include the Precision Pressure Control System, which automatically adjusts motor speed, voltage, and amperage to maintain precise atomizing pressure for efficiency with coatings.

Additionally, the system incorpo-

rates a patented auto-idle mode, PowerPause, to preserve motor life while maximizing flow pressure, as well as a QuadraClean filtration

system that enhances air filtration and motor longevity, according to the company.

The Precision-6 Pro System starts at \$2,499. A system kit, including a two-quart pressure pot package, starts at \$3,451.

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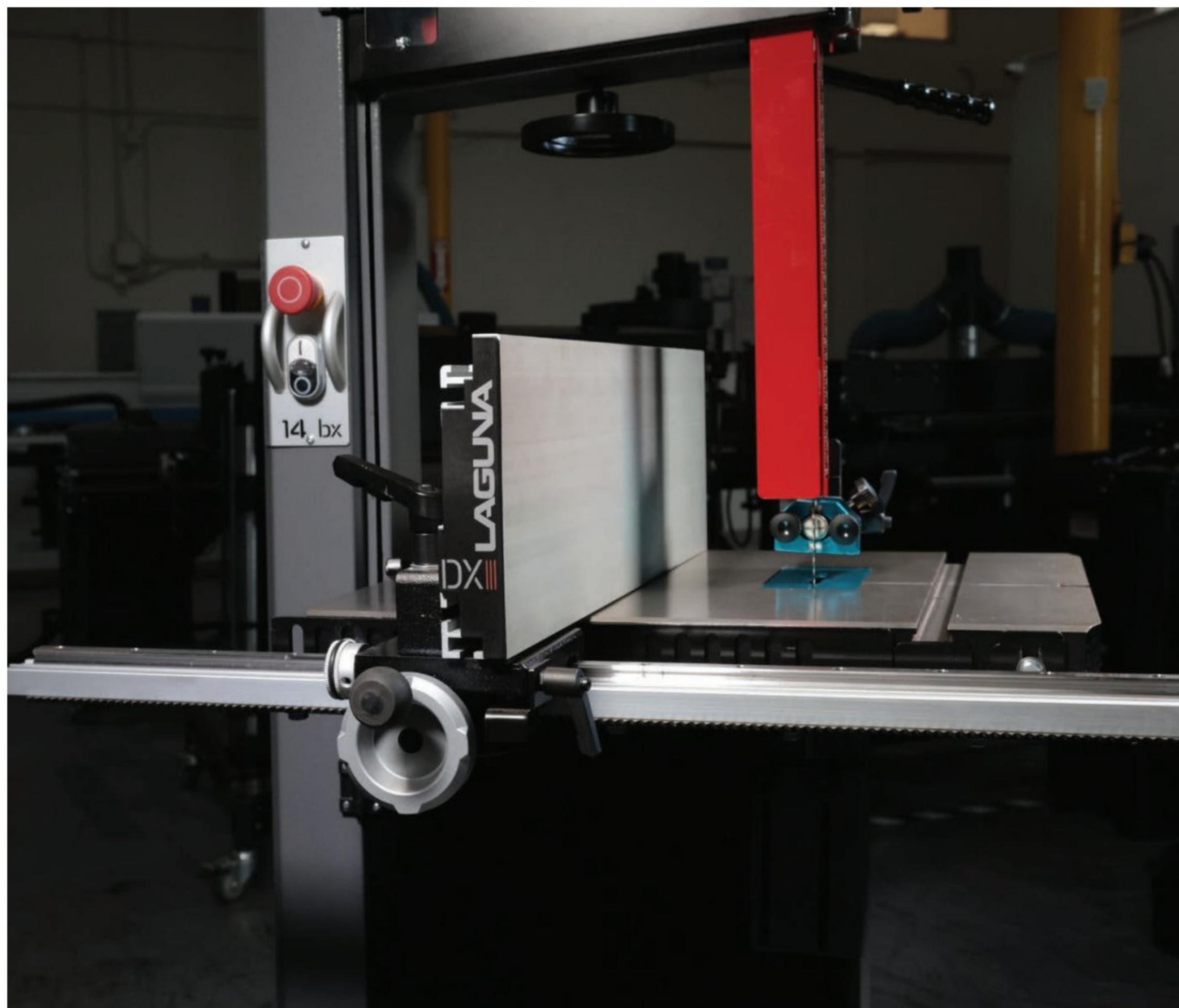
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TOOLS & TECHNIQUES



New DX3 DriftMaster fence from Laguna

By Jennifer Hicks

Laguna Tools presents the new DX3 DriftMaster fence system for band saws.

"We're thrilled to introduce the Laguna DX3 DriftMaster fence to the woodworking community," Benjamin Helshoj, wholesale business director at Laguna, said in a statement. "With its advanced features and unparalleled precision, the DX3 represents a game-changing innovation that will empower woodworkers to unleash their creativity like never before."

An upgrade to the original DriftMaster, the DX3 fits an array of band saws, ranging from 12" to 24", and can be retrofitted to many older saws, according to the company.

The fence measures 7-1/4" high, 11/16" wide, and 22-3/4" long.

Key features include tool-free drift adjustment for exacting cuts; man-

ual and precision modes for precise fence positioning; a two-part universal mounting bracket; a heavy gauge high/low fence, and a linear guide rail for smooth operation.

"With its wide range of adjustment options and universal mounting bracket, the DX3 seamlessly adapts to a diverse array of band saws, making it the ideal solution for any woodworking environment," the company says.

"By streamlining the setup process and offering intuitive controls, the DX3 enables woodworkers to maximize efficiency and productivity, ultimately saving time and resources."

The DX3 DriftMaster sells for \$349. An optional flip stop is available for repeat cuts on tenons and other joinery.

Learn more at lagunatools.com. **W**

TigerStop adds TigerSaw 1000 Compact

By Jennifer Hicks

TigerStop introduces the TigerSaw 1000 Compact, a fully automatic optimizing and push feeding saw station that offers a smaller footprint than the company's TigerSaw 1000.

"The TigerSaw 1000 Compact can process thousands of different dimensions quickly and accurately, which makes it perfect for custom woodworkers who produce anything but cookie cutter end products," says Mike Anderson, TigerStop's director of saw systems.

"It's perfect for small- to large-sized shops that need a durable, fully automatic, optimizing saw system that doesn't take up too much shop floor space and that costs a fraction of the price of other saw systems."

The station features extensive guarding and a fully enclosed blade; 10-degree tilted tables (14.4" deep) to help



keep material positioned, and a 4.8-hp motor.

It operates on 3-phase power, runs 14" or 16" saw blades, and has a footprint of 67" wide x 35-3/4", according to the company.

Options include cut list and optimization software, label printer, and reporting functions. Learn more at tigerstop.com. **W**

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Lummiia cabinet doors, available from Richelieu Hardware.

Making the case

The pros and cons of outsourcing, and tips for choosing a supplier

By John English

For most businesses, outsourcing means contracting out functions such as accounting or CRM (customer relations management). In the woodworking sector, it refers to buying custom parts from a large supplier. Those can include cases, drawers, doors, counters, moldings, even peripherals such as cabinet organizers and vent hoods — all of which are value-added products that shops have traditionally made in-house.

There are advantages and disadvantages to the practice. The bottom line is that the woodworker is buying something that could have been made, so its cost must leave enough margin to still be profitable. Time is money, and the number one reason that shops choose to outsource is to save time.

THE ADVANTAGES

Employee hours are expensive, and outsourcing lets the shop focus those

hours on what it does best. If a shop's production is centered around a CNC and building boxes, it makes sense to think about outsourcing the doors and drawers. A small shop with limited staff can only make a finite number of items, so those should be the most profitable. Often, that also means the largest items, because shipping costs are directly related to volume and weight. It's less expensive to haul flat-packed drawers than fully assembled cabinets, so if the shop is going to retain some manufacturing in-house, it is most logical to build big assemblies such as kitchen islands.

Outsourcing is, by its very nature, a risk-sharing activity. Having experts in the field complete some tasks will reduce the risk in-house, both in terms of rejects and scheduling.

Sometimes we get stretched a little thin, and a shop that is making everything in-house can lose focus when it comes to quality. Buying parts from a company that makes

nothing but drawer boxes can improve the quality of the drawers that the shop sells. Outsourcing lets a woodworker take advantage of the supplier's expertise and specialization, without having to reproduce those values on the shop floor.

Purchasing is part of the equation, too. A 200-employee factory doesn't pay the same for a sheet of Baltic birch as a two-man shop. Volume purchasing earns discounts.

Optimization isn't as efficient in a small shop, as the volume of jobs doesn't create as much opportunity to use up all those scraps and cut-offs. Even if the cost per drawer is a little higher, the small shop that outsources its boxes no longer needs to maintain an inventory of sheet stock or hardwood for drawer construction. That can free up cash, which is the engine of growth in a small business. Those savings might help finance a faster CNC or pay for robotics that in turn help reduce even more man-hours.

Outsourcing also directly reduces the cabinet shop's payroll, and the need to train and recruit, or spend time on personnel issues (because there are fewer employees). Payroll is reduced every time a dovetail jig stays on the shelf, or tooling doesn't need to be sharpened, or someone doesn't take a paid vacation.

From a marketing point of view, outsourcing expands the shop's catalog, shortens turnaround times, and makes the business more competitive in the local market. It can also add new skills and products that cater to evolving trends in design and technology. It makes a woodshop more flexible, adaptable, and responsive to trends.

THE DISADVANTAGES

The biggest downside is a relative loss of control. The shop owner is now depending on a third party to perform on schedule and budget, and do so with no loss in quality. But nobody in the shop knows how the outsourced job is going until it has been delivered. There's a lot of trust involved.

Most shop owners value reliable delivery even more than price, and once they find an outsourcing supplier they trust, they are reluctant to shop around. That can be a little disadvantageous because market forces



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are then subserved to performance anxiety. Price is no longer the premier concern. It's subtle, but it gives the supplier a small advantage.

There are risks involved in trusting a third party. Scheduling is probably the most apparent. Local subs such as electricians, plumbers or decorators can be flexible and may reschedule if the factory is late on a delivery, but their patience will wear thin if it becomes a habit. And the shop owner is helpless when it comes to manipulating the factory's schedule, unless

there is a rush option that comes with a surcharge.

Everything in the outsourcing relationship needs to be in writing, especially change orders. Phone conversations should always be followed by a paper trail. The woodshop is relying on somebody else's employees, so accountability is paramount. Nothing should be done on a handshake. Once the decision to outsource is taken, those days are gone.

Another concern is that some of the largest outsourcing suppliers either



Cabinotch has recently added some slab door and drawer front options for its full access cabinets.



Legrabox bottom mount waste containers from Rev-A-Shelf.

produce offshore in their own factories, or else purchase products from an even larger overseas third-party supplier. And while the post-Covid supply chain debacle has been largely resolved, many of the shipping lanes still pass through politically unstable waters. Weather and weapons can cause shipping delays. Sometimes, overseas shipments are delayed while container space is waiting to be sold and filled.

There can be issues with differences in language, business practices and even time zones with offshore purchasing, so many woodshops prefer to rely on outsourcing suppliers who manufacture exclusively in North America and use natively manufactured materials.

If there is an overseas component to the relationship, one should always ask whether exchange rates will affect pricing. If possible, the currency should be U.S. dollars which fluctuate in the short term less than most other currencies, and the pricing should be locked in and guaranteed.

Other potential disadvantages are hidden costs related to packaging and shipping. If the woodshop isn't located near a large business hub, transporting large and bulky items can generate its own set of challenges. Those can be as simple as trying to locate a suitable loading dock near the jobsite, or having truckers navigate residential or rural areas that don't have adequate cell service or lack up-to-date mapping for apps.

These are just cautionary considerations. Most of the potential problems involved in outsourcing can be avoided by adequate planning and caution.

CHOOSING A SUPPLIER

Because of the custom nature of the transactions involved, any relationship between a shop and a supplier needs to be more of a partnership than the normal buyer and seller arrangement. The shop isn't purchasing stock items off the shelf, so they usually can't be returned for a refund. The shop's reputation rides on the quality of products and service supplied by the factory, so diligent research in choosing a supplier is essential.

Thankfully, the online environment that lets us search for partners also



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Examples of the Premier (top) and Essentials cabinetry lines, available from Hardware Resources.

helps us vet them. Search engines usually offer a set of parameters that include a rating system and a review process. Many companies provide customer reviews on their own websites, but independent opinions from the likes of Google and Yelp users are generally more reliable and uncensored.

Websites can also provide other valuable guidance. In the About Us section of a potential supplier's site, a woodworker can usually find out how long the company has been in business and get a sense of whether it is growing or stagnant. One good clue is the number and frequency of new product offerings. If there's something new every few months in the News section, that speaks to a business that is listening to its market. If the supplier's website hasn't been updated in a few years, that can be a red flag.

Part of due diligence is to ask every supplier for a list of current clients, along with permission to contact them. And then make those phone calls. It's important to know how well your potential partner deals with bumps in the process such as special requests, shipping problems and change orders. If any of the customers exhibit an air of hesitancy on the phone, that can be

a flag. And if a customer consistently excuses problems and blames them on outside factors (maybe the mill ran out of walnut), that may suggest a personal relationship that supersedes the business one. That customer may like the salesperson enough to ignore deficiencies, or at least not talk honestly about them.

If possible, visit the factory. That can be a challenge, because buying online opens a huge geographic market. So, the facility may be some distance away. But this is a crucial long-term relationship, and a walk through the plant will not only answer many questions, but it may also reveal some potential that wasn't immediately obvious. For example, there might be a contour edge bander or a large vacuum press in use that offer capabilities beyond those listed in the marketing literature.

Things to watch for in a walk-through are the level of automation, robotics, capacities (how many CNCs or edge banders are up and running), and tooling levels, especially in terms of volume. For example, is there true 5-axis capability, or an over-reliance on aggregates?

To assess longevity and reliability, one might casually ask a few employees how long they've been with the company. If almost everyone is a



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Outsourcing lets a woodshop explore options such as the Cadro aluminum frame system from Hettich.

new hire, that can be a flag.

A walk-through may also offer the opportunity to spend some time evaluating the supplier's quality control processes. These will include both inspection and touch-up or repair procedures, and it's important to get a good feel for what the people on the shop floor feel is acceptable, or rejectable. It may not coincide with the shop owner's values.

It's also important to run a credit check on a major supplier to see if there are any flags about its financial stability. Asking for bank references is a good idea too, and a call to the Better Business Bureau might be in order. (The BBB accredits more than 400,000 companies in North America.) If the supplier is a traded company, one might ask a stock analyst to have a quick look at its record.

The salient norm in choosing a vendor is to remember that you are now a customer. The outsourcer serves many shops, and while their primary

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interest is their own hide, their biggest customers run a strong second. Where does your shop line up? If there's a shortage of plywood or solid wood or PUR, who gets priority? Will it be first come, first served, or will it be whomever has been buying the longest or the most?

PERIPHERAL WAVES

It's crucial to evaluate the effect of outsourcing on your shop's internal culture before embarking on or expanding upon this option.

Will long-term employees be threatened because they feel their contribution is being undervalued, or on the other hand will they be relieved because the stress of deadlines will decline? Will they feel that they are being replaced? Will they resent being relieved of performing high-level tasks that have contributed to their sense of self-worth?

The key here is to share information with the team in real time and make the transition to outsourcing as transparent as possible. Employees are far more likely to support change that they understand than change that they question.

If some or all of the production is going to be handled by a 1099 subcontractor, where else might the shop owner look to save W-2 costs? Is there a line in the sand somewhere? In theory, a shop owner could outsource every single function except possibly sales and revert to what is essentially a sole proprietor retail business. Is the lead cabinetmaker now going to become a subcontractor for installs? With flat pack shipping, there's no need for a delivery driver. With pre-coating, the doors on the finishing booth may never swing again.

Over time, will the custom cabinet shop become little more than a sales office for the factory? Outsourcing can augment or undermine the sense of teamwork, depending on how it is approached. Culture is important in any business, and employees often feel like a family, especially in small businesses where they have a shared history. Does a woodshop owner have a moral obligation to respect that aesthete?


On the flip side, hiring a larger shop to build components means that the shop's crew now has access to a much

larger pool of experts and professional support. That can open doors to new work, a more creative catalog, and more challenges that might keep talented employees interested and engaged. Straight lines may begin to curve, and new technologies and processes might replace mundane functions that are now being performed elsewhere. A shop might branch out from Shaker kitchens to sculpted parts for RVs and boats or delve into the

world of architectural elements. A 5-axis CNC can be used to make a lot more than just nested doors.


Business owners themselves are part of the company's culture. As such, they can craft outsourcing as a solution, a challenge, an opportunity, or even a predestined strategy.

Yes, the bottom line here is about time and money. But it can also be about growth, and new beginnings, and giving a business a makeover. **W**



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Laguna's Bandit 4 handles banding from 0.4 to 3mm and has top/bottom and front/rear edge scraping and buffing.

Banded together

Exploring the options, capabilities and materials used in the edge bander category

By John English

It seems like it should be a simple process — sticking tape to the edge of a board. So, why are there so many options? For a start, there's the machinery: everything from job-site tools to a fully automated, high production unit that can apply banding, trim for perfect edges, scrape the glue excess, and keep up with the flow of production. For smaller shops, there's also a choice between pre-applied adhesive with heat guns or using glue pots. And as the machines get more sophisticated, there are plenty of optional add-ons. Then there are different types of banding, with varying degrees of durability and flexibility, and different machines to apply them.

But volume is the primary factor in deciding which type of edge bander to buy.

If a one-man shop occasionally bands the edges of a few shelves, the

owner is probably going to use a heat source with pre-glued tape, a scalpel, some fine sandpaper, and lots of time. But woodshops that are building kitchens or baths will generally opt for a stationary machine, so step one is figuring out how much work will be done, both now and down the road. When that's known, the next parameters to explore include processing speed (how many doors per hour?), the size of parts (does the shop sometimes make countertops, or large and cumbersome panels?), and both the width and thickness restrictions for the banding.

Two other important considerations are the ability of the machine to handle surfaces other than a straight edge (contours and corners), and the kinds of tape it will handle.

CAPABILITIES COUNT

Let's take a quick look at options,

starting with pre-milling. This is a process that smooths out the surface of the substrate (plywood, MDF etc.) so that the banding lies flat, and a better bond is achieved. Both carbide and diamond pre-mill cutters are options, and both can be serviced. Without pre-milling, the reject rate in production runs can be higher because gaps, bumps and troughs might exceed the ability of the adhesive to fill and correct problems.

While there are edge banders that only work with pre-glued tape, and others that only coat one surface (tape or substrate) from a glue pot, some machines will apply an even amount of adhesive to both faces and this averts the possibility of gaps or small areas with less, or even no adhesion.

While most banders can trim, it's important to understand that process and know whether there are restrictions about the thickness of the

banding. For example, some knives find thin material challenging, while others can chip hard or brittle tape. The ideal solution is computer driven servo motors that control both top and bottom knife positions for trimming. These can adjust as the finished thickness of panels varies.

Not all machines will work with all types of banding, so the shop needs to establish whether its material of choice is going to be PVC, ABS, melamine, HP laminate, PMMA, real wood veneer, or some combination of these. That decision is based on cost, availability, traditional construction methods in the region, and the need for various properties such as hardness and color or pattern retention. It's a choice best made with the help of experts in the supply chain.

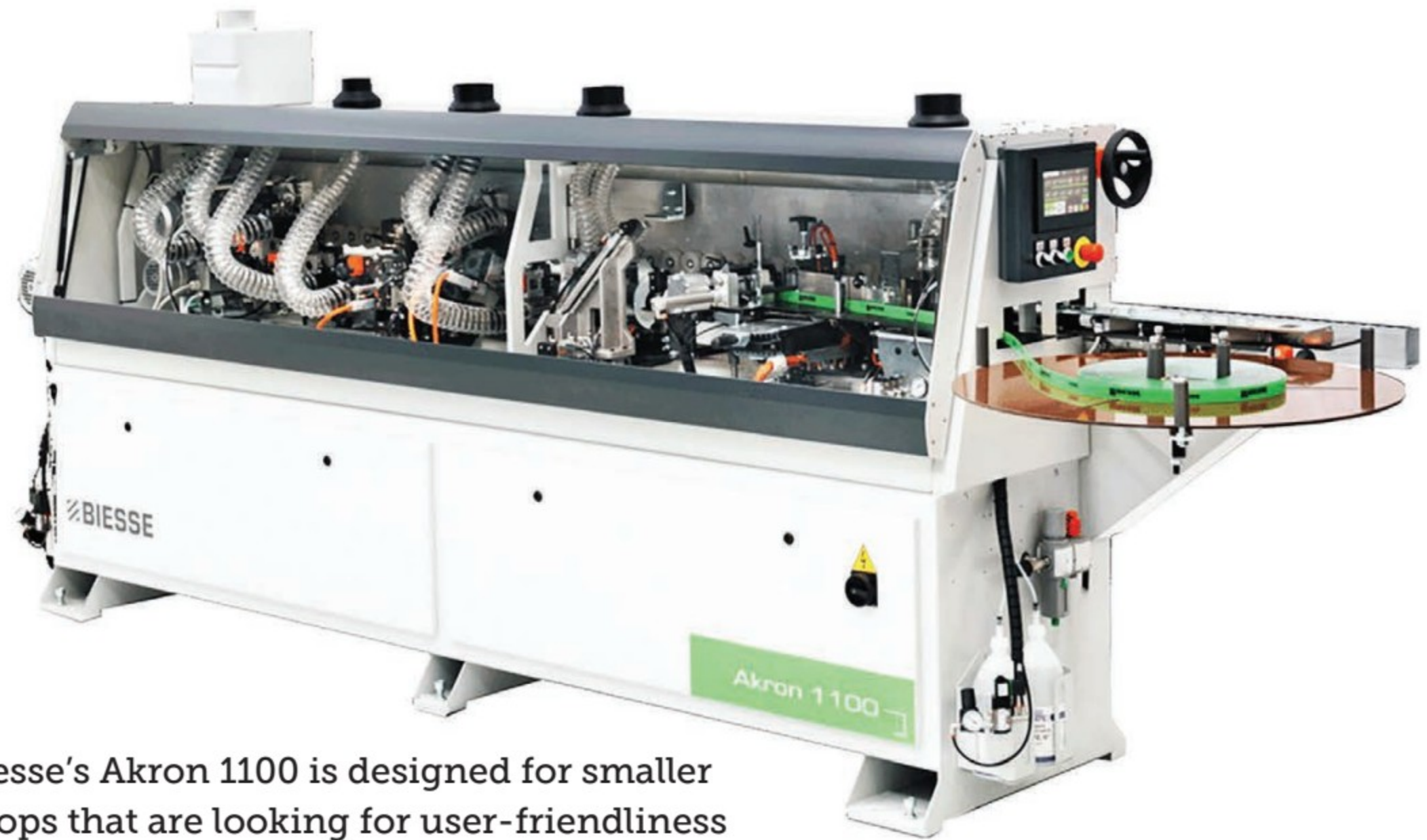
PVC (polyvinyl chloride) is a synthetic thermoplastic polymer. It's essentially made by adding color to resin and spiking the mix with addi-

tives that balance properties such as hardness and bendability. This is the least expensive and most popular option for edge banding, but it's not very 'green'. PVC is valued for its durability, flexibility and easy maintenance.

ABS (acrylonitrile butadiene styrene) is more environmentally apt, and the waste product can even be burned. Because of its resistant na-

ture, this is a thermoplastic polymer that is most often used where impact is possible.

Melamine is a polymer (a synthetic substance made up of very large molecules) that is most often applied to a rigid backer such as plywood, but it is also available as an edge band. The process of making it begins with urea, which is broken down



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to become cyanuric acid, and that in turn becomes the melamine resin. It can be susceptible to chipping, but it's cost-effective and durable.

HPL (high pressure laminate) is plastic that is bonded to a backer such as a woven fabric, and it is made up of several layers that are melded together during a process that uses high heat and pressure. It is dense, hard, and once formed can retain a shape.

PMMA (polymethyl methacrylate, also known as acrylic) is another plastic that can have a transparent appearance, and that can blend seamlessly with the neighboring surface material. In fact, PMMA and ABS bands are often used to make laser joints. Larger shops that do a

lot of edge banding are increasingly turning to lasers to make seamless joints, or at least ones that are not immediately visible to the naked eye. The technology is more expensive, so volume is key. High volume means a lower price per panel over the life of the machine. A lasered joint is generally more moisture resistant than hot melt or hot air banding.

Solid wood veneer lets shops make stable, flat panels with man-made substrates, and some tapes even come with grain running across their width, so the tops and bottoms of doors look like end-grain. Most natural edge banding comes with a heat-sensitive adhesive already applied, so that will determine what machine can be used to process it. Veneer comes

in many species, widths, thicknesses, cuts and grain patterns. That thickness spec is very important, as very thin banding prohibits sanding before coatings are applied, while too much glue can leave a small, discolored reveal along the edges.

Another potential issue with pre-applied heat-sensitive adhesive on veneer is that it can be reactivated by new sources of heat, so it's not the best choice around fireplaces, direct sunlight, radiators and the like. Aliphatic resin (yellow wood glue) is a better choice there, so a hybrid solution might be appropriate where most of the veneer is hot-melt glued and pieces in sensitive areas are hand-glued with resin.

Edge banding is also available in



Grizzly's G0774 handles ABS, PVC, laminates, wood tape and strips from 0.5 to 3.0mm thick and 1/2" to 1-3/4" wide.

various types of metal tape, including aluminum and stainless steel.

AUTOMATION ISSUES

Other functions to ask about are scraping, polishing, and slot cutting. Any option that reduces the hands-on clean-up time required of employees will directly contribute to reducing the cost per unit of edge banded products. As employees are increas-

ingly expensive to train and retain, woodshop owners are turning to automation to pick up the slack.

While CNC routing is the most automated process, edge banding is a close second. These machines can be fully manual, partially automated, or fully computer controlled. Trends in the market seem to suggest that cabinet design will continue to lean more toward minimal maintenance,



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man-made, colorful materials (as opposed to natural wood), so edge banding seems to have a bright future. That's a factor to consider when weighing the cost of a machine against its potential payback. And when shops lean toward edge-banded over natural wood doors there are other cost savings involved, such as the fact that plastic panels don't re-

quire employee time to be stained and coated.

Automation options include add-ons such as feeding and unloading, robotic picking and inventory management, alignment and fixturing, and waste management. But the edge banders themselves can also harbor on-board functions such as heavy-duty roller feeding for thicker

panels, or perhaps servo-grooving. This latter means that the machine can cut slots, rather than the shop owner having to take a stack of banded parts to another machine such as a CNC router to plow grooves for hardware or assembly connectors. Servo-grooving avoids those additional set-ups, which can include having to install and program an aggregate head.

Tilting tables and platens on edge banders can accommodate angled edges, but this is not always an option on less expensive machines.

Interchangeable trays let an operator switch colors and glue types quickly. Machines so equipped can also cater to the different temperatures and warm-up times required.

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it shuts down the line.

Some manufacturers offer a kit for banding really tight inside corners. For hardwood banding and other difficult materials, ask if there is a more powerful guillotine and tougher blades. For shops that make large panels, enquire about vacuum pods and other fixturing options. And that brings up another option: sometimes a small portable edge bander might be a better option for very large parts, where the tool moves so that the part doesn't need to.

Some machines have adjustable pressure which can be used to snug up the edges of joints. Adjustable trim knives are offered on many models, and some use separate feelers to automatically make perfect end cuts. End trimming can usually be adjusted manually, pneumatically using the control panel, or fully automatically using robotics and AI.

Many of these options are avail-



For higher production, the Hebrock k36 from Altendorf can have a second milling unit and a multi-radius scraper.

able through edge bander aggregates, such as a polishing unit that has cotton pads or brushes and is often paired with a liquid sprayer that emits a cleaning and buffing solution. A surface scraping aggregate can clean up bigger glue residue spots. Some machines come with a heat lamp that runs on quartz infrared energy and pre-heats the substrate before the glue is applied, for better adhesion and a slightly longer open time.

These are just some of the questions to ask when beginning the search for a new edge bander. That quest can begin with visits to other woodshops to see what they're doing, or checking in with a supplier that carries more than one model or line. Trade shows such as AWFS and IWF are invaluable resources when it comes to investing in edge banders because a shop owner can physically see all the latest models and question the factory reps in person. **W**

Images: Courtesy of manufacturers

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Slow & Steady

Nathan Goldston is taking a debt-free approach to running a cabinet shop

By Jennifer Hicks





One of two big kitchen jobs from last summer.

N

athan Goldston started Acacia Grove, a small cabinet shop in Lancaster, Pa., in 2021 with a plan to grow without accumulating debt, hire subs instead of employees, and outsource to keep up with the work schedule. So far, so good.

"I'm debt free as a business," he says. "It's what I've always done. I'm not borrowing money to buy equipment because it's important for me to be debt-free. That's not to say people who take a \$100,000 loan out for their CNC can't be successful, it's just how I approach things. At the beginning I was outsourcing everything, but I've slowly incorporated more equipment and been able to do more things in-house."

"I've got a network of subs that will come here and do work with me. From 2016 to 2019, I have had anywhere from two to six subs at any given time working for me. From 2019 on, it's been one to three guys working for me."

While Goldston aspires to have a bigger shop with several full-time employees, slow and steady is his motto. He has eight young children with his wife Amy, which makes a work/life balance a major priority.

While Goldston aspires to have a bigger shop with several full-time employees, slow and steady is his motto. He has eight young children with his wife Amy, which makes a work/life balance a major priority.

GETTING STARTED

Goldston grew up in Stevenson, Tenn. and attended Cedarville University in Cedarville, Ohio, a private Baptist university where he received an undergraduate degree in bible and pastoral studies. There, he met Amy, who was studying for her nursing degree. They married in 2004 and moved to her hometown of Lancaster.

"My first goal was to council missionaries overseas and be a therapist/counselor. I went to seminary right after we got married and eventually transferred to Chestnut Hill College in Philadelphia for a master's degree in clinical psychology."

Goldston graduated in 2009, the same year he and Amy welcomed their first child, and instead pursued vocational opportunities that would keep him close to home and provide a decent paycheck. He quickly became hooked on woodworking.

"The first year was rough figuring out what I wanted to do," he says. "I worked with a friend at a before/after school program with elementary school kids and started working with wood. After that, a contractor friend at our church asked for help with some flooding up in Allentown. It paid \$35/hour and I thought I'd hit the jackpot. One thing led to another, and he asked me to stay."

The contractor friend had plenty of work to keep Goldston busy, provided he got his HIC license. In 2011, he was officially Goldston Contracting.

"I started roofing and doing general carpentry, then started getting my own jobs doing porches, decks, and additions," says Goldston, who gained his skills by learning on the jobsite.

"I can figure things out. I'm not that efficient when I first do something. So, the first cabinet I built probably took me 20 hours and somebody else would take them two, so there's a learning curve there. But I talked to people and learned on the jobs."

REFINING HIS GOALS

After several years, he began to specialize in trim and started marketing to builders and designers.

"In 2016, I changed from general construction/remodeling to supplying and installing trim for builders and designers in Philly and Baltimore. I hired trim subs and learned from them."

"My first big trim job I did in Philly I lost like \$10,000 to \$15,000. But I made sure I learned from it and paid all my guys. It took me a few months to catch up with that, but now I know what I'm doing and have much better direction."

By 2019, Goldston got his first big cabinetry job from a Baltimore builder with whom he'd worked previously. From there, he made high-end residential cabinetry his primary market.

"That was the push I'd been wanting," says Goldston. "I researched designers and architects in the areas I wanted to work at and reached out to them and tried to set up appointments and meetings. It took a year or two sometimes

to get in. I'd look online, make cold calls, and try to stop by places and introduce myself."

His jobs are generally within an hour-and-a-half drive, mostly within the metropolitan areas of Philadelphia and Baltimore.

Some out-of-state work has come in as well, including a job in Knoxville, Tenn.

In May 2021, he changed the company name to Acacia Grove and invested in a website (*acaciagrovecabinetry.com*) and new logo. The name Acacia is special to him, as it has biblical ties and is also the name of his second daughter.

Goldston operates out of a 1,200-sq-ft. shop space annexed to the basement and garage of his home. He has basic machinery and equipment to do general cutting, sanding, assembly and finishing, and outsources CNC work and components.

"I will outsource as much as I need to. Last summer I got two big kitchen jobs that were about \$250,000 worth



A recent entryway project featuring mahogany doors.

of work and there's no way I could have made either one of them completely in a reasonable timeframe with outsourcing."

Goldston says he's eyeing a panel saw or SawStop table saw for his next purchase.

"I have a shop that does CNC cutting in Elizabethtown, a couple of shops to make all the drawer boxes, another for all doors and drawer fronts. There's another shop that can help with some of the fabrication or finishing, if I need it."

FUTURE PLANS

Goldston, 43, has a three- to four-month backlog and is looking for more subs to keep up with the workflow. He has hired a part-time office manager and is seeking an offsite draftsman as well as a finisher. He's looking into a larger shop.

"My goal is to grow in volume, and when I have the funds, get a shop space and have five or six employees. I would love to have a shop space as soon as I can, but even to move what I have now to an outside space would be around \$30,000 to run ductwork and electrical and set up a spray booth, so

I'll stay here until I can do that."

Goldston's children range in age from two months to 14 years and include six girls and two boys. Naturally, the large family requires a lot of attention and helps him keep time management in check.

"It can be overwhelming. It's not easy. It's something [Amy and I] felt called to though, and it's a good thing. It's helped me limit the hours I work. I averaged 48 hours a week last year over 50 weeks, rarely on Saturdays, hardly every on Sundays."

Goldston joined the Cabinet Makers Association three years ago and says he enjoys bouncing ideas off colleagues who want to help.

He adds that navigating the woodworking business is not an easy feat, but his faith, his progress, and help from mentors have all given him confidence moving forward.

"If there's anything good that comes about with my company, it doesn't go to my credit, it's God — he's blessing me with anything good going on. It's not like I went to trade school and have this perfect resume. This is a great fit. I love it. I enjoy it and look forward to growing." **W**

WHAT'S IN THE SHOP

- Oliver 6" jointer with a helical head • Jet 650 dust collector • Milwaukee 12" miter saw • Graco Merkur and FinishPro spray guns • Castle TSM-12 pocket cutter • DeWalt table saw • Festool TS 55 track saw; Domino, 1400 router & CT26 vacuum with a Dust Deputy Cyclone • Mirka vacuum with 5" & 3" x 4" sanders • Cutech planer with a helical head



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Marking knives, such as this new one from Woodpeckers, leave a thinner line than a pencil while creating a register for the edge of a chisel.

Measuring methods

Tip and tricks for getting fast, accurate results

By John English

There's a tiresome old shop mantra about measuring twice and cutting once. But woodworkers know that when accuracy is essential, we're going to sneak up on that line by cutting several times.

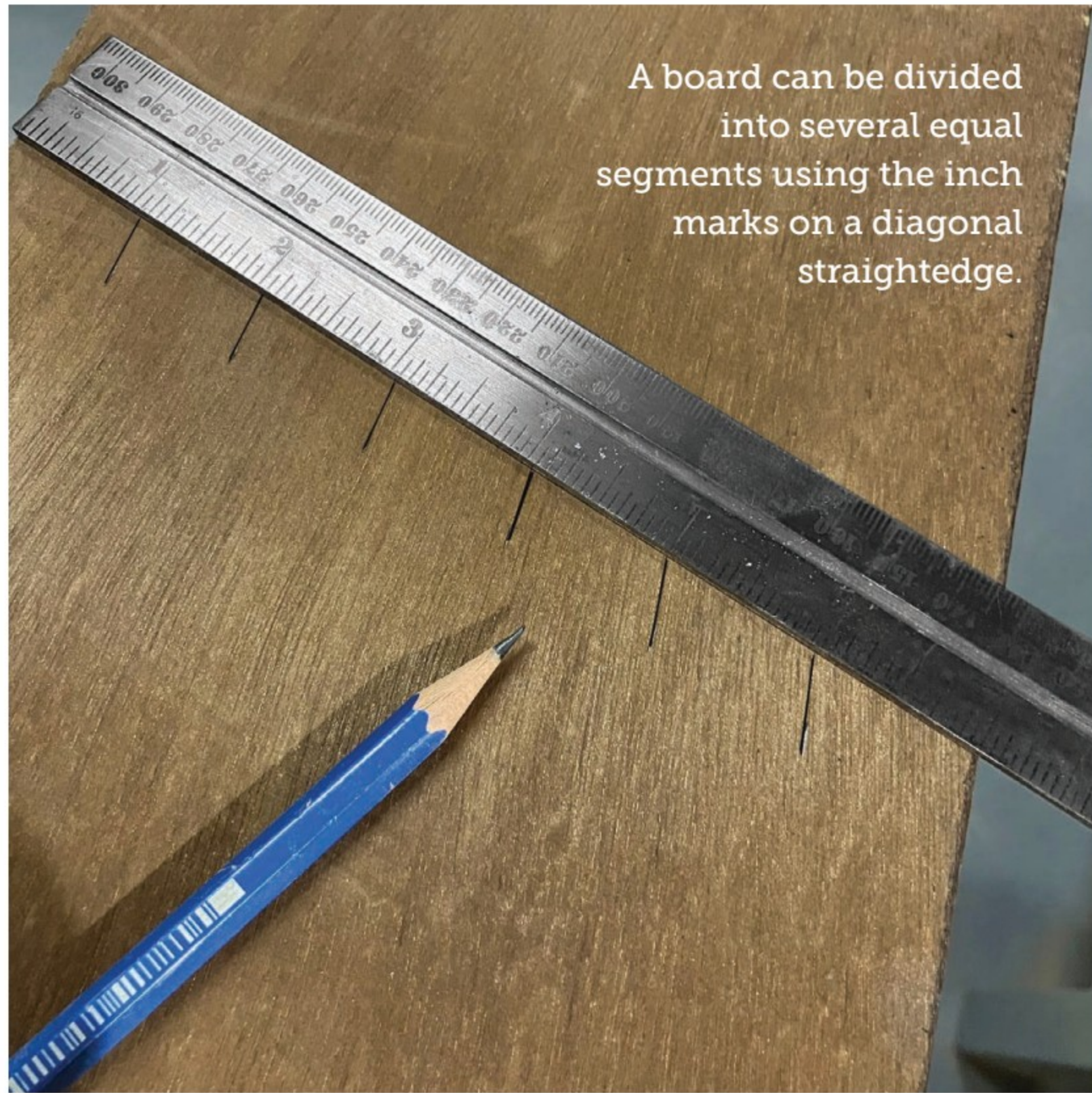
There are some things we can do to reduce the number of those cuts and add refinement to the marking process. The first step is to check the accuracy of the shop's measuring tools.

Over time, the moveable hook on a tape measure can elongate the holes that house its rivets, so the tape will add a small fraction of an inch to outside measurements or reduce inside ones. It's a good idea to periodically drag out all the tapes, squares and rulers in the shop and check them against each other. Plastic measuring tools tend to be less accurate than engraved metal ones, so it might be best to use metal rulers as a baseline. The same is usually true of engraved increments (squares) as opposed to printed ones (tapes). It's important to decide which measuring devices you trust and have the courage to throw away any

that don't deliver accurate results. It's a lot less expensive to dispose of an underperforming plastic square than it is to build a set of drawers that are catawampus.

Woodworkers often attach a sticky note to their tape measure to record dimensions. Today, the voice memo app on a cellphone is a handier tool. It will record dimensions hands-free, which lets the woodworker use both hands to guide the tape, ruler or square. It also allows for editorial comments such as "make three of these", or perhaps "cut on the left of the line".

Speaking of that, it's important to establish a protocol on the miter, band and table saws where the pencil line is always on the same side of the kerf. The keeper part should always be to the left. That way, the discards are always to the right of the blade, and some cuts don't end up being a blade thickness shy. And that brings up another well-worn tip: when drawing a line on a board, always mark a small X on the waste side. It's frustrating to get to the saw and not remember.



A board can be divided into several equal segments using the inch marks on a diagonal straightedge.

Woodworkers have always measured the diagonals of drawers or face-frame openings to check for square. If the diagonal measurements are the same, the corners of the opening are square and the sides are parallel (as long as the matching pairs were cut accurately). But making that

measurement with a pull-out tape can be questionable. Again, it's the hook. It moves. A better idea is to use two metal rules on edge, with a spring clamp to hold them together. The thin metal ends of the rulers will sit comfortably in the inside corners, and there's no need to read and add the dimensions together because you're just checking diagonals. There's no math required. Just switch the assembly around and see if it's the same in the other diagonal.

A ruler with a hook on one end gives a perfect reading for outside dimensions, and it's a whole lot easier to use than trying to line up the 1" or 10" mark on a questionable tape measure with the edge of a board.

Story sticks have been around since the ancient Egyptians, and they can be used in two ways. The first is to lay out all the dimensions along the stick and then use it to place or locate joinery, door openings, moldings and other features. That's the traditional use. The other and less formal one is to create the story after a part has been made. For example, one might use a scrap of wood to mark the overhang of a tabletop, or the height of a chair seat. It's simpler than taking measurements and writing them down, and then transferring them to a second or subsequent piece. And there's less chance of a mistake because no numbers are involved. One can also cut the scrap to length to make an ideal pattern for legs or drawer sides that are all the same.

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A habit of always cutting on the same side of the line avoids cuts that end up a blade width too short.

leave will welcome the business end of a chisel and help make more accurate cuts. But the caveat is that it takes a little practice to restrict those grooves to places where they will be hidden, so one needs to learn how to stop the cut before it travels across exposed surfaces. Some fine furniture builders use marking knives to lay out dovetails and then leave the visible marks as a sign of craft, while other masters insist on removing them. Marking knives can also slice across the top fibers on a board and reduce the amount of tear-out when a machine makes cuts.

Making a small V mark with a pencil can be more accurate and less invasive than drawing pencil lines that can wobble or wander a bit. The tip of the V is the location of the mark, and sometimes this helps with alignment. For example, if one part is being moved across another, one half of the V gradually disappears. For cuts, it's important to remember that the saw kerf will always be to the right of the point on the V, so the letter needs

MAKING MARKS

The trusty old 2B pencil is a perennial favorite on workbenches but it can be a bit soft for some hardwoods, and that means constant sharpening or thick lines. A slightly harder 2H might be a better choice. Mechanical pencils draw a thinner and more accurate line, but they're brittle and snap easily. By holding a 2H pencil at about a 45-degree angle to the work and pulling it across the surface, it will leave a good line but won't dig such a deep trough across the grain as it would were it being held at 90 degrees.

When erasing, denatured alcohol can remove many types of pencil lines without sanding.

Blue painter's masking tape is handy, too. Apply it where a line or mark needs to be placed, write on the tape rather than the wood, make your cuts, and then peel and discard the tape. Your marks just go in the bin, so there's no need to sand.

For parts labeling, when fine lines are not needed, chalk is a good alternative. It cleans up easily without sanding: just use a slightly damp cloth and rub along the grain. It's also good for remembering how boards should lie when they are being edge-glued. Simply lay out the boards and draw a few chalk hatch-lines across the joints. Then it's easy to replace the boards in order and maintain their orientation during the gluing and clamping stage.

Marking knives are an elegant solution, but they come with a caveat. These are thin knives with one flat face and one angled or sharpened face. The flat surface lets the woodworker hold the knife tight to a metal straightedge. The small groove these knives

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The holes for rivets in the hook on the end of a tape measure can elongate over time, and cause the tape to deliver inaccurate readings.

to always be written in the same orientation. An upside-down V switches the blade kerf to the other side.

BEING UNRULY

Sometimes a straightedge with gradations can be used in more imaginative ways than intended. For example, if a woodworker needed to add $3\text{-}3/8"$ and $7\text{-}3/16"$, there's an easy way to do that using two rulers and no calculator. Just line up the zero on the second rule with the $3\text{-}3/8"$ mark on the first one, and then read the measurement on the first rule that coincides with $7\text{-}3/16"$ on the second rule ($10\text{-}9/16"$). It's a handy way to add fractions without having to do the math.

If a board or panel needs to be divided into several equal segments, a long straightedge with gradations can make quick work of that. Let's say one needs seven equal marks across a wide board. Place one end of a long rule so that the zero lies on one edge of the board, and then swivel the rule until the $14"$ or $21"$ (any multiple of seven) mark aligns with the second edge. Our rule is now lying at an angle across the board, so it helps if a couple of spring clamps are used to keep it in place. If the woodworker went with $14"$, then he can make marks at 2, 4, 6, 8, 10 and $12"$ to divide the board into seven equal segments across its width.

If one is using a thick rule such as an aluminum sheetrock square, it's important to look straight down when making a mark. Because of the thickness, looking at an angle can move the mark slightly, but still enough to cause problems. It's called a parallax error.

Another common error in measuring is made when a woodworker cuts a part and then uses that to mark the next piece. It's a much better idea to use a single original part to make all markings. If one uses the freshly cut part as a template each time, there can be a cumulative error where all those pencil lines eventually add up and cause the parts to grow a little, or 'creep'.

Avoiding calculations is always a good idea, so experienced woodworkers don't usually measure a board and then do the math to find center. They just round up the number (for example, a board that is $73\text{-}9/16"$ would become $74"$), divide that whole number quickly in their head, and then mark $37"$ in from each end of the board. Now there are two pencil lines that are quite close together (in this case just $7/16"$ apart), so the cabinetmaker can just eyeball the center and mark it. There will be times when that's not close enough but in most cases it is, and it will save time.

Yes, we should measure twice and cut once. It's a nice, logical, sensible, black and white rule. But real life is a series of grays. **W**



A voice memo app is handy for recording dimensions and notes.

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SUPPLEMENT TO WOODSHOP NEWS

CNCs for growing shops

Woodshops that are expanding into higher levels of panel processing have a number of options to consider

BY JOHN ENGLISH

38 JUNE 2024 CNC

A large industrial CNC can be quite a jump up from a standard 4' x 8' router with manual fixturing and loading. The initial investment is significantly higher, but money isn't always the biggest concern. That would be getting the right machine.

The sales team at **Stiles Machinery** (stilesmachinery.com) knows a thing or two about volume processing. The company offers a range of Homag CNCs that are designed in Germany and assembled in the U.S., and its website notes that "there are a few common considerations when purchasing a CNC machine, such as the size and capabilities of the machine, the type of processing tools it is equipped with, and how reliable and user-friendly the software is."

The first of those parameters, evaluating size and capabilities, begins with identifying the full range of parts that a machine will be asked to manufacture, not just now but over its lifetime. The CNC doesn't just need to be able to mill curves and corners, cut to dimensions, or work well in the materials being used. It must also be up to handling projected volume and speed rates, and be ready for a new era of technology.

So, choosing a larger CNC begins with understanding what the shop's needs are, rather than immediately trying to search through all the high-tech options available. Those are the fun part, and that comes later. First, let's look at the basics.

WHAT'S ESSENTIAL

Manufacturers have numerous ways of describing larger equipment. A 'CNC router' is usually just that, a

basic flat panel machine with a moving gantry. A 'CNC wood processing center' will have more options available such as the ability to turn, saw, mill, drill, sand or even glue. A 'machining center' can mean the same thing as a processing center, but the word machining is more often reserved for mills than routers. Mills are slower but highly accurate CNCs that generally move the part rather than the tool. They're more often used to machine metals but can be employed to work in wood and similar materials when a high degree of definition or intricacy is required.

The ability to nest is pretty much a prerequisite on larger CNCs. Nesting means that the machine can cut in patterns and arrangements that reduce the amount of waste being produced. The goal is to use material in the most efficient manner, and the math for that can all be done by software. There are two ways to nest. Static nesting is employed when

the shop needs to make lots of copies of a few parts, so it would be a good choice for a shop that's building IKEA type cabinetry. Dynamic nesting is a little more complex and is used when the shop is doing lots of shorter, very custom runs. Both take advantage of simple geometry, such as being able to use one tool-path to create an edge for two separate parts. Nesting saves on material waste, tool edges and sharpening cost, power requirements, and employee time spent restacking, moving and clamping parts. If a woodshop is looking at CNCs to handle a higher volume of panels, nesting is an essential part of the picture.

Labeling is almost as critical. A larger CNC must be able to identify parts so that the assembly process goes without a hitch. Labeling can be done with printed stickers, direct ink printing, ink/dye stamps or laser engraving. The more automated the better. The machine software should

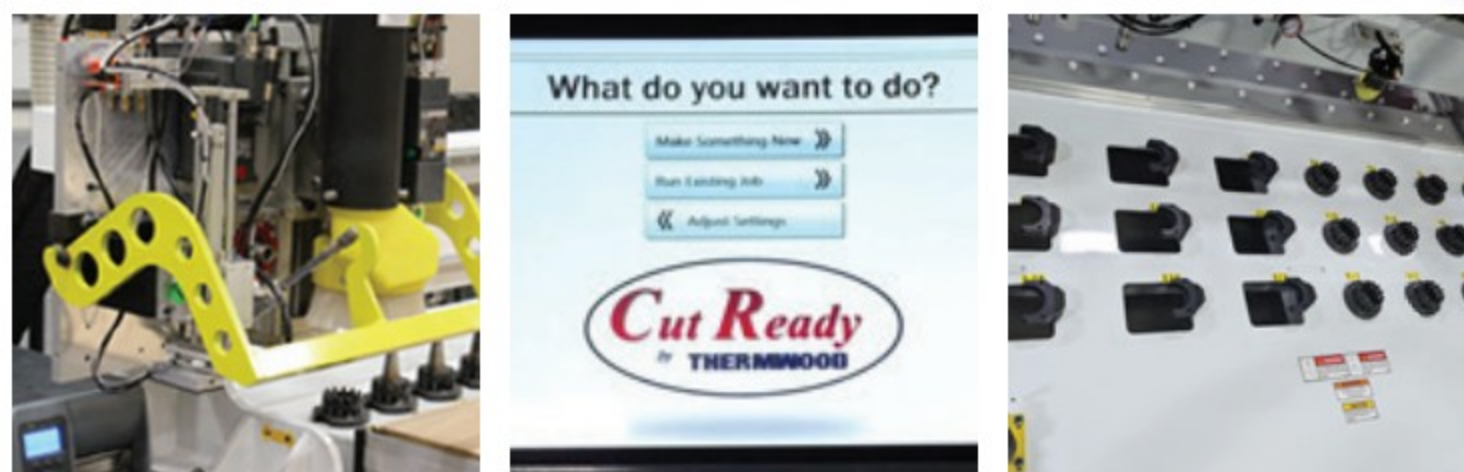
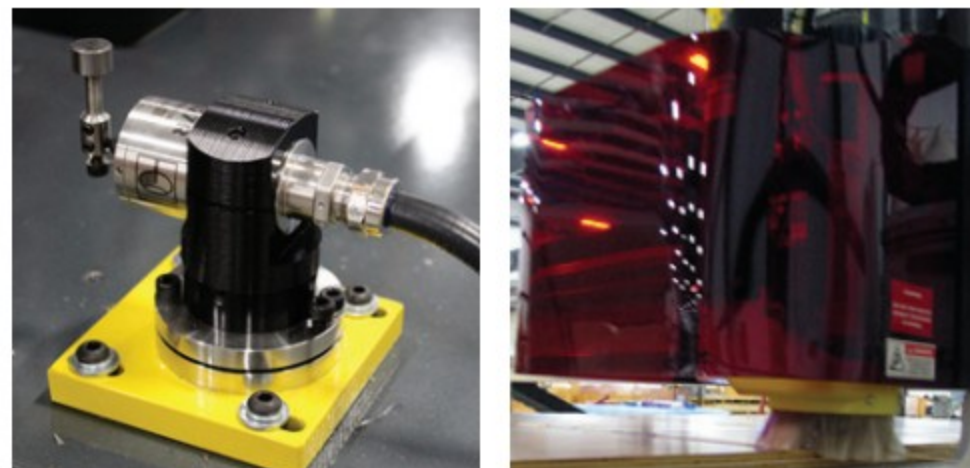


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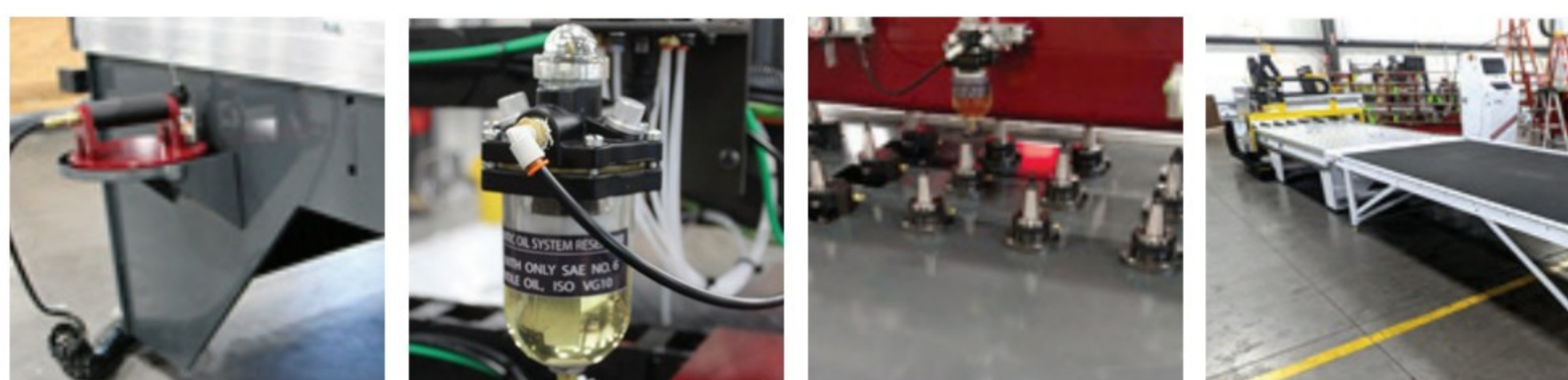
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be able to place labels in non-critical locations, such as the edge of a panel that will eventually be banded or buried in a groove or dado. Some smaller machines can't reach sideways and can only label from the top. It can take a lot longer to remove a label than to place it.

Nesting software usually includes the ability to label automatically, and also to group parts either in sequence or affinity. The latter refers to keeping identical parts together as much as possible, and the former makes parts as they will be used (for example, an entire cabinet at a time so the assembler doesn't need to wait for a specific part to be cut at the end of the day before the casework can be completed). Nesting software on larger machines often gives the operator the option to manually tweak a pattern and optimize so that, for example, a small part for the next job can be cut from the waste on the current job. Nesting software can also be integrated with inventory programs, so that whole sheets aren't the only option. The software can determine that a previously labeled cut-off from another project can deliver a part, rather than using a full sheet.

Sometimes the introduction of a new machine can change the way the shop optimizes. If the bed is a different size or shape, the new machine can probably handle differently dimensioned sheet goods. That can open opportunities such as slightly redesigning established parts to take advantage of the new sizing. For example, a 5' x 5' sheet can deliver differently sized parts than a 4' x 8', so slightly changing a drawer opening or a door size might deliver more parts and less waste. If there are options for differing sheet good dimensions from the woodshop's supplier, the bed shape and size might be a factor in choosing a new machine.

Integrating software becomes more important as the machines get larger. The woodshop owner or manager needs to discuss this with any potential CNC salesperson. If



The Laguna SmartShop 5-axis with an HSD 2-axis articulating head and Fanuc 31i-B5 controller.

the shop is locked into a specific CAD design program, it's critical that there is a streamlined relationship between that software and the CAM machining software for the new machine. Upgrading to a larger CNC may require changing the cabinet design package in the office computer. That can mean training downtime, or workflow challenges with other software such as project management, or even complicated transfers of libraries from parts and hardware vendors. It's worth having the discussion up front.

Many of the larger machine manufacturers have created their own software bundles for monitoring performance, maintenance, safety and heat issues. Some of these new packages include programs that tie machines together from the same manufacturer (and in some cases from other factories) in a web that becomes systemic across the woodshop. This is intended to take advantage of options such as automatic loading and unloading, tool changes and fixturing (holding parts in place). An operator can use a tablet or even a phone to monitor several machines at once, and spot glitches before they become downtime.

As AI (artificial intelligence) advances in the woodshop, machines

are learning to handle the monitoring, too. The impact of AI will be massive in all aspects of industry and production over the next decade, as more shops and factories switch to robots and cobots to replace humans. With larger CNCs, AI is going to be more of an issue with peripherals than basic programs (loading, monitoring, aggregates and so on), so it's another area for discussion with the machine supplier. Ask about what's in the pipeline, what's available now, and how the machine will be compatible with advances in technology.

AXES, TABLES AND MORE

Nesting machines are the perfect option for routing and drilling. That lets them cut parts to size that are ready to edge band, and to mill edges and faces for connectors and other assembly devices. They can also mortise and drill for functional hardware such as slides, pulls and hinges. As more and more connection systems evolve, the ability of a machine to work in more than one plane comes into focus. Even though a CNC that can only mill in Z can't easily place a slot in a 45-degree miter, aggregate heads and pods that raise parts for edge work have come to the rescue. Because of innovative solutions like those, most standard casework shops can get by admirably with a 3-axis machine.

And your basic 3-axis isn't so basic anymore. For example, the Talent T5D is a 3-axis, high-performance nesting machine from NewCNC (newcnc.com) that has 1.5 KW servo motors, a 16-hp spindle and Delta CNC controls. Good travel speed and a standard 12-position carousel tool changer cut processing times, but the T5 also offers a 10-position boring block, a panel sweep, automatic panel alignment, and pre-configuration for auto-load and unload as standard features. It comes with 10-hp vacuum pumps and CNC controlled vacuum gates. In fact, all NewCNC routers are pre-

configured with automatic load and unload devices, automatic panel alignment, a table sweep, and optional label printing, so a single operator can keep the machine in continuous production.

Grizzly Industrial (grizzly.com) has recently added two large-shop models to its line-up – a 4' x 8' table with 4-axis capability (G0933), and a 5' x 10' model (G0934) with a vacuum table and an eight-position ATC. The smaller model is a unique machine with a spindle that turns 90 degrees left or right, which gives it the ability to cut in 3D. The larger CNC has six independently controlled vacuum zones and a two-stage air vacuum pump.

While these kinds of versatile 3-axis machines can meet most needs, sometimes a shop needs to do work in more than X, Y and Z. For

example, among the offerings from **SCM** (scmgroup.com) are machining centers that are specifically touted for the manufacture of chair and desk components. The company's new 5-axis Balestrini Power machining centers use Smart Pro software for CAD/CAM that lets a woodworker draw parts on the computer and automatically optimize them. Then it visually simulates the machine's operations on the screen before any cuts are performed, which helps avoid collisions with fixturing or the gantry when a shop is making complex, shaped parts. The Balestrini also has some very innovative parts-holding options, and it can operate with a single spindle or a 5-axis revolving toolholder.

Versatility is key when ordering a machine, and most of the big toys can be ordered to fit a shop's basic needs and budget. **Anderson Amer-**

ica (andersonamerica.com) says it offers "the most comprehensive CNC router line up in the industry from 5-axis to 3-axis, fixed bridge moving table to moving gantry, pod & rail or flat table". The line-up includes sixteen machines including the Stratos Pro XL, which is a large format 3-axis machine. When it comes to options, the table sizes on this machine range from 7' x 12' to 10' x 30', and a couple of different spindle sizes can be ordered with optional water cooling. The shop can opt for 10-, 12- or 16-unit tool changers, and a Z travel (up and down) anywhere from 350 mm (13.7") to 600 mm (23.6"). Anderson offers vac pumps in 10-, 25- or 40-hp versions for this machine, and a list of other options that includes bar code reading, a touchscreen, a C-axis for turning, reverse airflow for the vacuum table, a mister for cutting tools, and automated materials

For every budget and application, prototyping to production, there's a ShopBot CNC.



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Thermwood's MultiPurpose 67, a 5-axis available with either single or dual moving aluminum tables.

handling.

Speaking of the C-axis, some machines have evolved with specific woodshop tasks in mind, such as the Maverick CNCs from Legacy Woodworking (lwmcnc.com) that pays special attention to turning. Built in Springville, Utah, the top-of-the-line Maverick comes with a 4'x 8' horizontal table plus a 7" x 20" vertical table and a 79" 4-axis turning center. Its three workstations are designed to handle standard panel flatwork, solid wood joinery, and turning. It's an interesting combination of rotating the part and cutting with a router that is difficult to replicate even on a manual wood lathe.

Thermwood (thermwood.com) also offers several machines with an optional rotary axis, including the Multipurpose 45. This is a heavy-duty 3-axis base model with either single or dual spindles that was designed for wood and nested based panels among other materials. The table sizes run up to 7x12, and the standard ATC is a 4-tool holder but a seven-position unit is available. The optional rotary axis will work parts up to 8" in diameter and 56" long. The table is set up for an optional pod system, and that's something that woodshops moving

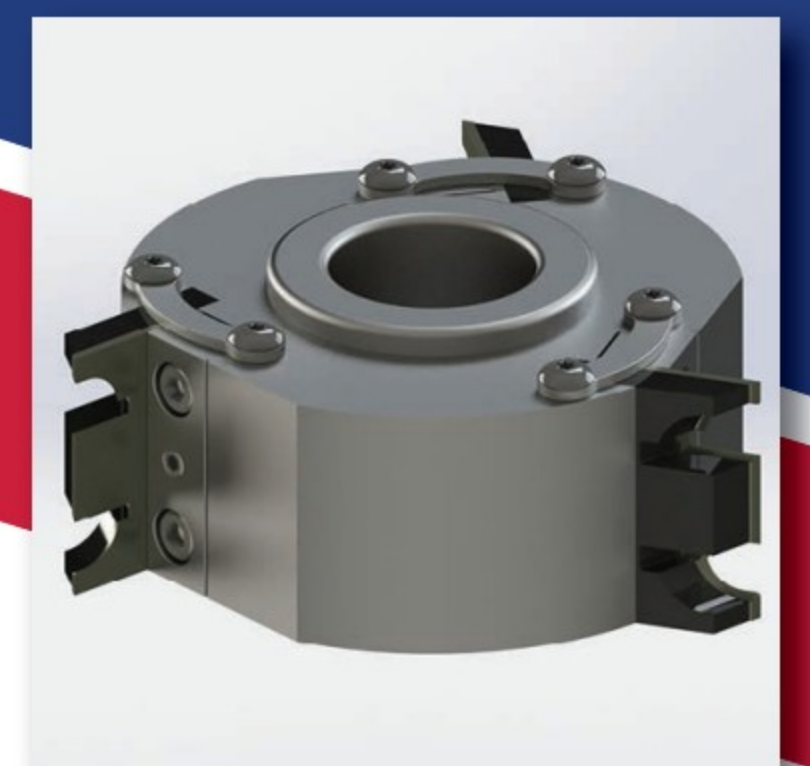
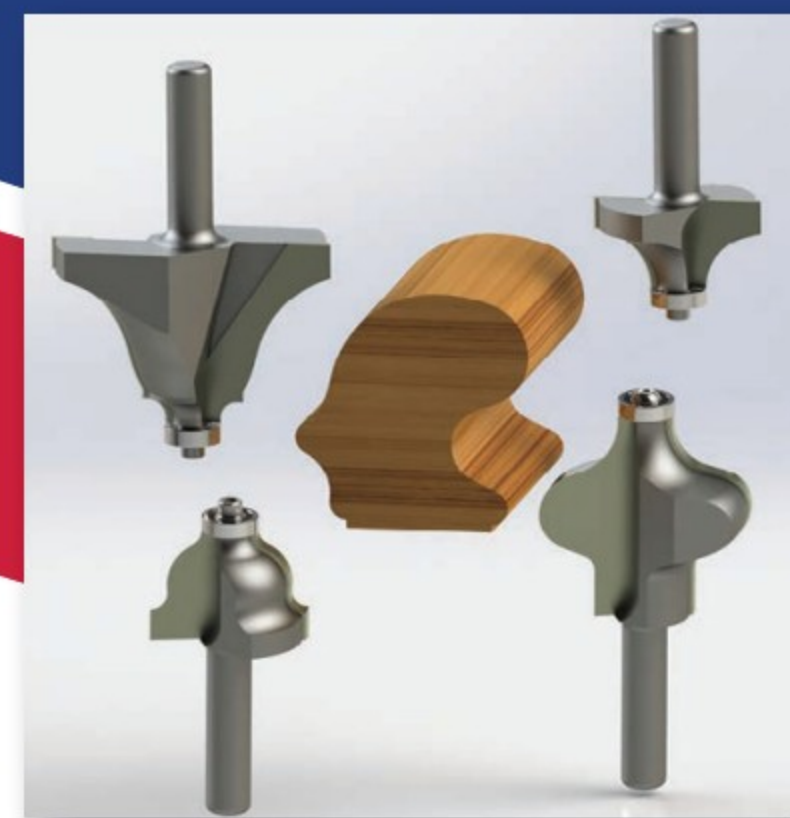
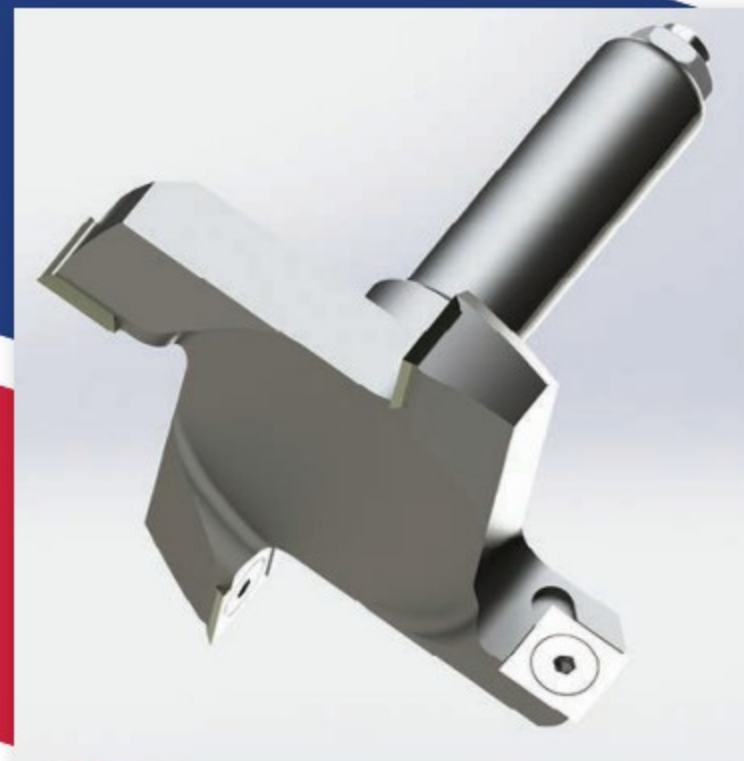
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up to larger machines will want to ask about (see below).

Castaly (castaly-cncmachine.com) makes a rotary axis lathe for CNCs that will look quite familiar to anyone who has turned on a standard wood lathe. The relatively inexpensive upgrade offers quick and easy set-up for the standard 8" diameter and 48" long unit, and custom sizes are avail-

able. For larger shops doing more than occasional turning, the company offers an automated free-standing wood lathe and several 5-axis CNC options.

PODS, RAILS AND FIXED BRIDGES

Even though it can be a little slower, a pod and rail fixturing system offers one huge advantage over a flat table:

it elevates parts so the edges can be worked either by a horizontal tool or aggregate heads. Instead of a large flat table with mechanical clamping, or holes for vacuum holding, it is a series of bars (consoles) that clamp across the table and can be moved from side to side. On top of the bars are pods, which are small manifolds or suction cups that can slide back and forth along the bars. The net effect is that the pods can be placed almost anywhere in X or Y and suck the part down using vacuum power. Sometimes the vacuum pods are replaced with mechanical clamps that can be moved around and swiveled to grip the edges of irregularly shaped parts. For repeat manual set-ups the pod systems can use LEDs or laser guides to mark locations, and some systems are robotic: software will move the pods into position automatically. The downside is that sometimes the pods get in the way of an aggregate head like an angled trim saw, plus there might not be much support for a large flat workpiece, especially where cut-outs that fall through (like sinks) are involved. Pods can be a challenge with narrow parts, too.

The **Felder Group** (felder-group.com) has advanced pod positioning to an artform with its lightPos system. This elegant solution lets a shop quickly and very precisely position pods in a larger production environment. On the company's Format 4 CNCs, more than 6000 LEDs can indicate the suction cup size, position and orientation as the console positions the placement within a millimeter's tolerance. A sophisticated management system means that each vacuum type and its orientation is displayed in well-defined and specific colors. LEDs on the X-axis give information about the processing status, while lights along the X and Y axes indicate both the position and the dimensions of the workpiece. The net effect is remarkably fast set-ups and accurate repeatability.

Flat vacuum tables are more numerous than pod & rail arrangements, but some of those use their bridge and table in a similar way.



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Their spindle moves left and right along the bridge for X, while the table moves back and forth to simulate the Y axis. One advantage of a fixed bridge in larger machines is that there can be two tables and multiple spindles. That layout can really speed up flat panel production.

A good example is the LIME series from Machine Tool Camp (machinetoolcamp.com). The standard 01 unit delivers 5,700 inches per minute (ipm) of travel, and 1,600 ipm for cutting. There's 14" of clearance for Z under the bridge, and two higher bridge options offer 31" and 48". But what's impressive is that the machine can be equipped with two tables, dual cutting heads, ATCs, drilling units, 5-axis machining, multiple table sizes, and either left/right or forward/back orientation for better

access, depending on the type of work being done.

Sometimes an existing 3-axis CNC is more than adequate for a woodshop's flat panel volume, but the shop is seeing a need for more advanced machining on some jobs. The answer may not be to upgrade to a full 5-axis machine, but rather to look at solutions such as the ELEV8 from ProEdge Technology (proedgetechnology.com). This is a boring and doweling CNC that creates all kinds of solid wood and composite joinery, and offers glue and dowl insertion. It has both horizontal and vertical routing capabilities and uses three electro-spindles and 3-axis CNC control. That means it can handle joinery and connector milling for Rafx, Minifix, Maxifix, Confirmat, dog bones, Domino slots, rear panel notching

for undermount drawer slides, Soss hinges, and more. The parametric programming can deliver machined louvered doors and Shaker door stiles and rails, plus dadoes and blind dadoes can be programmed to automatically change size and length as the panel sizes change.

Along with the investment in a larger CNC, a woodshop will need to deal with traffic flow, power requirements, vacuum issues, and of course software updates.

Changing out or installing a new CNC also means downtime, so the whole process needs to be treated like any other project and managed as well as possible to avoid glitches. But once the right machine is in place, a new state-of-the-art CNC can revolutionize product levels and the quality of work. **W**





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Somewhere in the middle

Small-format CNCs strike a balance between desktop and full-sheet machines

BY JOHN ENGLISH

What exactly is a 'small-format' CNC? The industry has a little leeway in its definition, but a good rule of thumb is that it's larger than a desktop unit and smaller than a full-sheet (4' x 8') processor.

While desktop or benchtop units are well suited to carving and artisan work, a small-format CNC is a better entry-level machine for a cabinet shop. It's big enough to make doors and panels, and rugged enough to do short production runs. The spindle can be liquid or air-cooled, and some can handle an aggregate head or a rotary axis for more complex machining. Automatic tool changers (ATCs) can be optional or included, and that's also true of upgrades such as vacuum tables and automated positioning systems.

As an entry-level CNC, the right small-format model can deliver professional results but there are some limitations. The most obvious one is that full sheets need to be broken down into smaller panels before being processed. That means the shop needs either a panel saw or a sliding table saw, so that's something that might have to be factored into budget and space calculations. It's also a good idea to add an optimizing module with an inventory function to the shop's CAD software, to get the most out of cut sheets. That software keeps track of partial sheets and lets the operator know what's in stock.

A good place to start the search for a small-format machine is in the woodshop's accounting software. Looking at sales over the past couple

of years will tell an owner how much production the shop is doing, the patterns of any cycles, and also what kinds of projects are being built. Assuming the CNC will boost production, a sales report will eliminate any machine that can't handle more than the existing workload.

THE BIG PICTURE

Woodworkers who are getting into CNCs for the first time are trying to solve either an employment issue (can't find anyone to hire), a physical space restriction (too many traditional machines eating up floorspace), and/or a volume issue, where the shop simply can't keep up with de-



Tormach's 24R, a 2x4 CNC router with a gantry clearance of 6".

mand. If the wait time for delivery on jobs is closing in on a year, it's definitely time to change the way that things are being done. Even the nicest customers have deadlines.

The instinctive choice for an entry-level machine is a very basic full-sheet platform without the bells and whistles to keep the cost down. The appeal is that such a workhorse won't be overly confusing and will also be reliable. The problem is that it takes up a lot of space and also consumes a lot of power, especially if it's equipped with a full-sized vacuum table. Plus, it will probably cost a lot more than a small-format machine.

Beyond affordability, a less than full-size CNC offers a lot of other advantages. There is, of course, the smaller footprint and the fact that many of these routers run on standard household current. But there's also the lack of intimidation. They are easy to learn and use, which contributes to their popularity among serious hobbyists and busy one-man shops. Plus, individual users and groups of brand enthusiasts have created a wealth of support data online, from workarounds to inventive solutions and routine problem solving.

After a potentially overwhelming few days (as there is with any new machine), most owners become comfortable very quickly with smaller CNCs because the controls are intuitive and quite familiar. That's because we're all so used to cellphones and laptops, and the CNC controls generally parrot that methodology. Making the leap from router tables to CNCs is like riding a bike. At first it's a bit scary, but the learning curve is short and once mastered, there really isn't a whole lot more to absorb. Yes, there will always be tweaks, but a shop can be up and running (and potentially profitable) far sooner than one might suspect.


The downside to a small-format machine is that it may become underpowered and undersized quite quickly if the transition to automation increases passthrough. That is, if the CNC helps production so much that the shop's volume significantly increases, the machine's lack of size might ironically make it obsolete.

Choosing the right small-format CNC can be challenging because a lot of the units look alike but come loaded with different features, and many offer basically the same machine with a range of table sizes or spindles. Plus, each woodshop has a separate agenda. Cabinet and furniture makers produce custom work, and the CNC must be able to support their variety of needs. One size

won't fit all.

The easiest way to cover options available in this sector is to take a look at machines offered by a couple of dozen of the main manufacturers:


Axiom Precision (axiompprecision.com) is now part of JPW Industries, which is also the owner of familiar brands such as Powermatic and Baileigh Industrial. There are three families of Axiom CNCs: the entry-




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CAMaster makes the 4x4 Panther which comes with a 4.2-hp spindle and WinCNC controls.

level 1-hp desktop Iconic, and the 3-hp, liquid-cooled Pro V5 and Elite machines. The Pro V5 is the company's most popular series, and comes in 24" x 24", 24" x 36" and 24" x 48" table models that sit on an optional rolling stand and have 6.5" of vertical Z clearance. Among the available add-ons here are mechanical and vacuum clamping, a rotary kit for a fourth axis (it turns the CNC into a small-format automated wood lathe), and a laser kit for engraving. Axiom sells Aspire and VCarve CAD software for drawing, and the files can be delivered to the machine on a USB storage stick. The latest Pro has 48-volt stepper motors, an improved cooling system, and higher spindle performance thanks to an upgraded

variable frequency drive. For shops needing a little more machining space, Axiom's Elite CNC offers 2' x 4' and 4' x 4' open-ended worktables that allow tiling. The larger size can handle pretty much any door or panel requirements.

The Innovator 4' x 4' from **AXYZ** (axyz.com) offers a work area of 53" wide, 49" long and 6" high. This Canadian-built industrial machine has a compact footprint, a welded steel frame, integrated servo motors, helical rack and pinion drive, and an optional 3-position ATC. It's guided by an A2MC controller and integrates with most popular CAM software. Other options include dust extraction and vacuum hold-down. AXWY also makes a 5' x 8' Innovator model.

The smallest of three U.S.-made Panther CNCs from **CAMaster** (cam-aster.com) has a 4' x 4' table, a 4.2-hp HSD spindle, helical rack and pinion movement, servo motors with planetary gearboxes, a T-slot table, and a laser for positioning. It can be upgraded to include an automatic tool changer, comes with a WinCNC controller, runs Windows 10 PRO and has a 19" LED monitor. VCarve Pro comes as standard, as does free lifetime tech support.

Shops creating carved panels will be interested in both the 3- and 4-axis versions of the DWC2440 from **Digital Wood Carver** (digitalwood-carver.com). Made in the U.S., both come with an open-ended 2' x 4' table and an optional laser engraver. The fourth axis is used for making 360-degree carvings. These machines are advertised as plug-and-play ready. The 2-hp soft-start variable speed router moves at up to 250 IPM, and the table has T-slots. Controller software (PlanetCNC TNG) is included, and VCarve and Aspire design packages are optional.

Diversified Machine Systems (dmscncrouters.com) notes that its Freedom 4' x 4' small-format CNC "is ideal for small, specialty manufacturing... and for shops requiring a very small footprint. With a starting price of \$40,000, this is an industrial-duty machine that comes with a Fagor controller and a 17" monitor. It has Ethernet, USB and serial port connectivity, Fagor servo motors all round, a ball screw on each axis, and a phenolic or aluminum table. The spindle runs on 3-phase 220-volt power and both 10- and 15-hp Becker vacuum pumps are options. The standard spindle is 10 hp, with other options available.

The c-express 920 is a Format 4 CNC machining center from **Felder Group** (felder-group.com) that only takes up 36.5 sq. ft. of shop space. This is a dedicated machine for case-work panels, which are cut slightly oversize elsewhere and trimmed to size and machined here. It drills holes for hardware, shelves, connectors and doweled drawer assembly. A 17-spindle drilling head and a

grooving saw unit are standard. It's equipped with laser technology for high precision, and an optional milling aggregate that can be manually interested into an ER32 chuck. This aggregate is used for routing design features such as cutouts, pockets, grooves and rabbets.

Grizzly International (grizzly.com) offers two small-format CNCs for woodshops, the 24" x 36" model G0894 and the 47" x 47" model G0931. The smaller machine has a 3-hp, water-cooled spindle, stepper motor driven ball screws, cutting speeds close to 400 IPM, and the ability to load from a flash drive or connect directly to a PC. It uses an ER20 collet, and a one-shot oiler. It's a 3-phase motor with a built-in inverter so it runs on 220-Volt single phase. The larger G0931 offers 7-7/8" of Z, a RichAuto DSP A11 handheld controller with a USB port and keypad, tool touch-off and an aluminum table with T-slots and PVC padding.

Hermance Machine Co. (hermance.com) carries a range of new and used small-format CNCs from various manufacturers.

JPW's Powermatic division (powermatic.com) makes the PM-2X4SPK, which is a 3-hp 2' x 4' router with 6" of vertical travel. There's an extruded aluminum table with integrated T-slots, a handheld controller that attaches to the DSP control box via an 8' cable, a touch-off puck to zero the Z-axis with the push of a button, and high-torque stepper motors. There are also a few small details that Powermatic's fans would expect, such as the heavy-duty welded steel cabinet, an included dust shoe, casters, and leveling feet.

The WR-32 is a 2' x 3' CNC router from another JPW division, **Baileigh Industrial** (baileigh.com). This unit comes with a dust shroud, cast iron base, T-slots, and BobCAD design and programming software. The 18,000 rpm, variable speed, 4.75-hp, air-cooled spindle runs on 220-volt single-phase power, and there are four ER25 collet choices (1/8", 4mm, 6mm, and 1/2"). Baileigh notes that the machine takes about an hour or so to uncrate and get started with the software.

The 4' x 4' Smartshop M from **Laguna Tools** (lagunatools.com) is an industrial machine with a 6-hp spindle, an 8-position ISO 30 tool changer, and a multi-zone vacuum table. This smallest member of the Smartshop family offers 12" of Z clearance and 13" of Z travel. The vacuum hold-down table has six zones, and the machine comes with a Syntec control system and a heavy-duty, one-piece, all-steel frame. For shops with a tighter budget, Laguna's family of Swift CNCs may be the answer. The Swift 4' x 4' standard has a 3-hp, liquid cooled spindle, 7-1/2" of gantry clearance, a T-slot table, a handheld DSP controller, helical rack and pinion movement and an all-steel frame. The 4' x 4' Swift Vacuum model table adds four vacuum zones, and the Swift MT is de-



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The Freedom 4 from Diversified Machine Systems with a standard 10-hp spindle.

signed for sign-making and vinyl cutting. Both the SmartShop and Swift machines are available with larger tables.

Legacy Woodworking Machinery (lwmcnc.com) builds two versions of

its 3' x 5' small-format machine, the standard Maverick and the Pro. The basic machine comes with manual tool changes but has turning, joinery, surfacing and machining capabilities. This is a 4-axis machine with an

optional vacuum system and a 3' x 5' table. It includes a 48" fourth turning axis, a 7" x 20" vertical table, an all-steel frame and a user-friendly controller. The new Pro version has much faster speeds and better cut quality, achieved through new motion control algorithms.

The Startech CN K is a compact 3-axis drilling and machining center from SCM (scmgroup.com) that the company describes as "ideal for all types of milling, decorations, engraving, signboard creation and 3D models prototyping". The worktable is roughly 46" x 30", with 6-1/4" of Z travel. It features an integral cabin with internal LED lighting to protect the operator and keep the surrounding environment clean.

ShopBot (shopbottools.com) is one of the most familiar names in desktop CNCs, but the company builds machines for all market seg-

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ments including full-size and small-format units. Among the latter are the Buddy, PRSstandard, PRSalpha, PRSalpha ATC, plus the ShopBot 5-axis. The Buddy has a very small footprint and comes with optional casters, so it can be moved around the shop. It has a stationary gantry over a moving table. The PRSstandard is a moving gantry machine that comes in a 4' x 4' option and comes with a 2.25-hp DeWalt router, or options that include a 2.2 or 4-hp HSD spindle, or a 5-hp Colombo. The PRSalpha ATC has an automatic nine-tool changer and is available with spindles up to 10 hp.

The RC4 from ShopSabre (shop-sabre.com) has a 51" x 49" cutting area, 8" of Z clearance, and a 3.5-hp, 110-volt router as the spindle. The company's Pro 404 bumps that up to 60" x 50" with 12" of Z and HSD fan-cooled spindles.

TechnoCNC (technocnc.com) makes an unusual machine called the HD-II, which is more than a desktop but may not technically be a small-format machine as it's described as 'tabletop'. It has a 2-hp, HSD high frequency collet spindle and a vacuum T-slot table, which allows for either mechanical clamping or vacuum holding. The processing area is 20" x 30" with 7-1/2" of Z, and the drive motors are Nema 34 high-powered brushless, steppers. The controller features pre-programmed buttons to perform certain machine instructions.

A family of 24R CNC routers from Tormach (tormach.com) can handle any CAD/CAM software and is built on a basic platform that adds various features as needed. Features include a PathPilot controller, an integrated vacuum table, a 24" x 48" work envelope, and options all the way up to a 10-position ATC.

Vision Engravers (visionengravers.com) offers 16" x 24", a 25" x 25" and 25" x 50" small-format CNC routers. The 2550 S5 comes with the company's Series 5 controller with a touch pendant and proprietary software. It's intended for a variety of applications including milling, drilling, contouring, and routing. It has an aluminum T-slot table to accommodate

various work-holding fixtures, a red laser for easy set-ups, and an optional Raster Braille inserter.

Other less traditional options for woodshops to consider when looking at small-format CNCs are the Shaper Origin and Yeti Smartbench. The Origin (shapertools.com), when paired with the company's Workstation, is a superb prototyping machine and a pret-

ty handy joinery tool, too. The Yeti (yetismartbench.com) is a portable CNC that can process full sheets but can be packed small enough to fit in a pickup or van. While neither of these innovative machines might strictly qualify as a small-format CNC, either one can handle most of the tasks such a machine would be required to perform, and quite a few others besides. **W**

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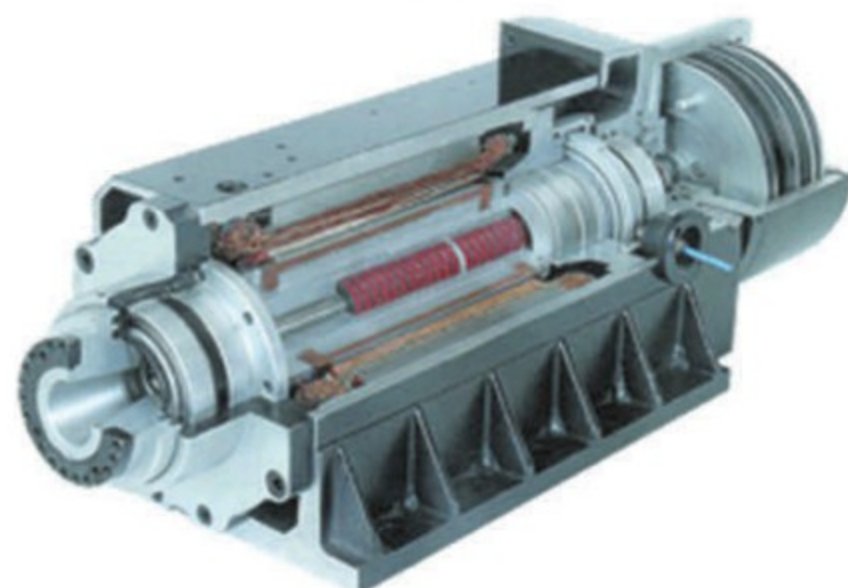
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Include name, dates, location, description of event and a contact address or telephone number. Calendar items must be received a minimum of 60 days before the event.

Please note that fees, as listed, might not include materials or shop fees. Check with a specific class for further details.

— *Compiled by Jennifer Hicks*

ARIZONA

June 3-July 11 — Fundamentals of Traditional Woodworking III. Learn advanced joinery and other skills to build a solid wood Shaker table. Fee: \$1,198. Location: Southwest School of Woodworking in Phoenix. sw-sw.org.

CALIFORNIA

Monthly — Society of Wood Manufacturing, a chapter of AWFS consisting of educators, manufacturers, hardware and industrial suppliers, and machinery dealers, meets during the second week of each month. For location and dates, visit awfs.org.

FLORIDA

Ongoing — The Dunedin Fine Art Center offers six-week woodturning classes at its Cottage Campus taught by AAW professional member Tony Marsh for beginners and intermediate-level participants. Full-day classes are held on Thursdays. Call 727-298-3322 or e-mail education@dfac.org.

Sept. 22-24 — Architectural Woodwork Institute's annual convention, featuring networking opportunities, guest speakers and more. Location: Amelia Island. Learn more at awinet.org.

GEORGIA

Aug. 6-9 — International Woodworking Fair, North America's largest woodworking technology and design trade show. Loca-

tion: Georgia World Congress Center in Atlanta. Register at iwfatlanta.com.

MAINE

Ongoing — The Center for Furniture Craftsmanship offers year-round classes, including one- and two-week workshops from June through Oct., 12-week Furniture Intensives, nine-month Comprehensive, eight-week Turning Intensive, and Fellowships. woodschoo.org

MASSACHUSETTS

Sept. 19 — Open Shop Tour at Premier Builders in Georgetown, sponsored by the Cabinet Makers Association. cabinetmakers.org

MINNESOTA

Monthly — The Minnesota Woodworkers Guild meets on the second Tuesday of each month at various locations. mnwwg.org

NEW JERSEY

Monthly — The North Jersey Woodworkers Association meets the third Monday of every month in. Learn more at njwawoodworkers.org.

Monthly — The Professional Woodworkers Guild of Upper New Jersey meets the third Wednesday of every month. Learn more at njwoodguild.com.

NEW YORK

Monthly — The Woodworkers of Central New York hold meetings on the first Thursday of each

month at 6:30 p.m. at the Belgium Cold Springs Fire Department in Baldwinsville. woodcny.org

Monthly — Northeast Woodworkers Association meetings held on the second Thursday of the month at various locations in the Albany area. woodworker.org

Monthly — The Long Island Woodworkers meet on the first Wednesday of each month at 7 p.m. at the Frank Brush Barn of the Smithtown Historical Society in Smithtown. liwoodworkers.org

NORTH CAROLINA

Monthly — Triangle Woodworkers Association meetings held on the third Tuesday of each month at 7 p.m. at Klingspor's Woodworking Shop in MacGregor Village in Cary. trianglewoodworkers.com
Monthly — Charlotte Woodworkers Association meets the third Tuesday of

each month at 6:00 p.m. at MakerSpace Charlotte. Learn more at charlotte-woodworkers.org.

PENNSYLVANIA

June 28-July 1 — Society of American Period Furniture Makers' Mid-Year Conference, featuring educational presentations, guest speakers, tours of private collections, and more. Location: Ursinus College in Colledgeville. Learn more and register at sapfm.org.

TENNESSEE

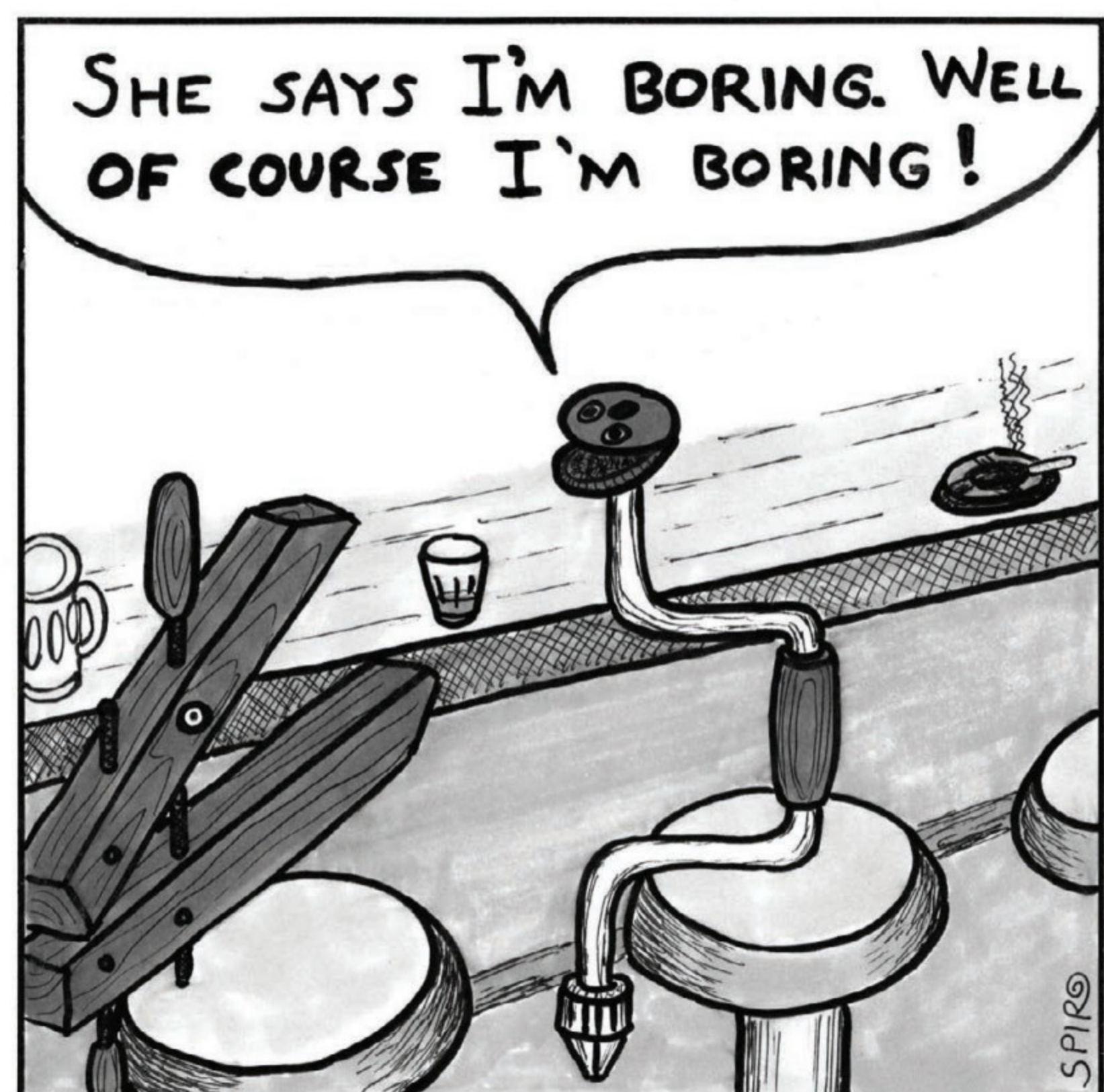
Nov. 10-12 — STAFDA Convention, an industry event that includes educational programs, seminars, networking opportunities, and more, at Music City Center in Nashville.

TEXAS

Oct. 6-9 — World Millwork Alliance 2024 Millwork Convention & Tradeshow at the Henry B. Gonzalez Convention Center. world-millworkalliance.com **W**

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