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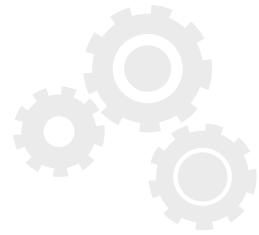


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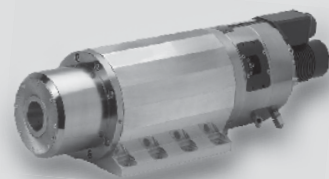
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Talkin' shop with former editor A.J. Hamler



#### This Business about Woodworking

Share an opinion with David DeCristoforo but don't expect to be right

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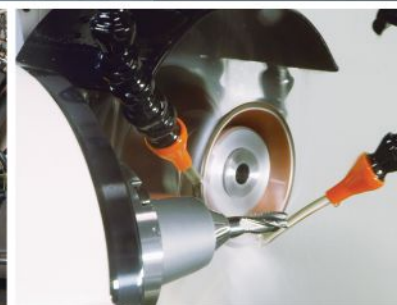
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# TAKING STOCK

with TOD RIGGIO

## Calendar is crowded with industry events

**T**he year hasn't gotten away from us yet. There's still time to plan for a number of upcoming events important to the woodworking industry.

The big one is the AWFS fair, which is scheduled for July 22-25 in Las Vegas. Online registration is available at [www.awfsfair.org](http://www.awfsfair.org). Register before June 30 for savings. Discount hotel rates can also be booked through the site.

By March, there were more than 400 confirmed exhibitors, including machinery manufacturers and distributors, providers of design and manufacturing software, CNC specialists, hardwood dealers, hardware suppliers and wood component manufacturers. The AWFS fair is easily the year's best opportunity to purchase or kick the tires of woodworking equipment, supplies and materials at one location.

The AWFS fair also presents an extensive educational program called the College of Woodworking Knowledge. There will be approximately 50 expert-led sessions in eight tracks, including classroom-style seminars and panels, workshops and technology-oriented SMART (Special Machinery and Relevant Technology) seminars. Content is designed around current market trends and attendee-requested topics with an emphasis on giving attendees the latest information and strategies to improve productivity and stay competitive in the marketplace.

My bags will be packed for the Woodworking Industry Conference, which runs April 21-24 in San Antonio. This annual conference, produced by the Wood Machinery Manufacturers of America and Wood Machinery Industry Association, is mostly a networking and educational event. There are association board meetings, presentations on manufacturing trends and economic forecasts, a contact table session for face-to-face business meetings and various social events.

The National Hardware Show will mark its 70th anniversary May 5-7 in Las Vegas.

This is an opportunity to see new products for the home improvement market, attend educational seminars and network with a large contingent of retailers.

The Furniture Society scheduled its annual symposium for June 25-27 at the American Tobacco Historic District in Durham, N.C. The program details are still in the planning stages, so visit [www.furnituresociety.org](http://www.furnituresociety.org) for updates.

The next Kitchen & Bath Industry Show isn't until Jan. 19-21, 2016. It's a combined event with the International Builders Show in Las Vegas, showcasing the latest industry products, trends and technologies. It's also held during "Design & Construction Week," which involves other partner events related to the building trades.

Las Vegas will also host the Stairbuilders and Manufacturers Association Conference on April 9-12. The event offers seminars, workshop and updates on code compliance.

LIGNA, the world's largest trade event for woodworking machinery and technology, will take place May 11-15 in Hanover, Germany.

The Cabinets & Closets Conference & Expo is scheduled for April 15-18 in Schaumburg, Ill.

Finally, the Spring High Point Market will be held Apr. 18-23, followed by a fall event Oct. 17-22 in High Point, N.C.

### Correction

From the virtual mailbag, a lumber producer pointed out an incorrect definition for gross tally and net tally in "Lumber lessons: Understand the rules and save big" (Page 19, March 2015).

"Net tally or net measure indicates a tally after the material has been dried. Before drying is generally referred to as green tally, but may be called gross tally by some mills," he wrote in an email.

Thanks for the insight. **W**



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# NEWS DESK

## Longtime Vermont woodworker receives top honor

By Jennifer Hicks

**T**he Vermont Wood Manufacturers Association recently honored Mike Rainville, owner of Maple Landmark Woodcraft in Middlebury, Vt., with its Woodworker of the Year award.

Rainville has served on the trade association's board for 16 years. He's a past president and current treasurer.

"I've been on the board since the organization was formed in 1996. I was stepping down as president last year and they wanted to recognize me in some fashion," Rainville says.

"Usually the Woodworker of the Year is somebody who's done something in their business that's innovative or motivating and somewhere along the way they thought I qualified for that. I think it's more about my service to the organization than it is to my

business specifically. Certainly it's an honor. I've worked really hard for the industry in Vermont all of these years and will continue to do so."

Rainville's business, established in 1979, makes eco-friendly, educational wooden toys, games and gifts. It has about 40 employees.

The VWMA represents primary and secondary processors and related businesses statewide. Along with supporting the wood industry in Vermont, the association strives to ensure a sustainable supply of raw materials, help increase workforce skills and guide business to act as responsible employers and community members.

"We like to recognize new and innovative things that are happening in the industry," Rainville says. "Woodworking is pretty impor-



Mike Rainville

tant to Vermont. Use of our natural resources is a very Vermont kind of thing and often people in the public don't realize the impact of the industry so we like to get the word out about who's doing what sometimes."

For information, visit [www.maplelandmark.com](http://www.maplelandmark.com) and [www.vermontwood.com](http://www.vermontwood.com). 

## Deadline set for Craftsman's Challenge entries

By Jennifer Hicks

**E**ntries are now being accepted for the 2015 Veneer Tech Craftsman's Challenge. The 11th annual contest highlights achievements by woodworkers through the use of natural wood veneer in furniture and casework products.

Veneer Tech, a sheet veneer supplier and the contest sponsor, is requesting all entries by the May 25 deadline. There is no entry fee and cash prizes will be awarded in July at the AWFS fair in Las Vegas. Competition categories include architectural woodworking, cabinetry, furniture, marquetry, specialty products and student design.

The contest judges are Mavis Morgan, Paul Schürch and Gene Wengert.

Schürch, a past grand-prize winner, owns a custom studio in Santa Barbara, Calif., known for fine inlaid marquetry furniture and art projects. He also teaches veneering and furniture-making workshops across the country.

This is his second time judging the contest.

"The economy's rebounding and I expect we'll have more entries. The quality is probably going to be a lot higher. It's always been improving since I've been part of the show," Schürch says.

"This year we've established a dedicated marquetry category, given the strength of past entries featuring this veneer work. And who better to judge this craft than Paul Schürch?" Veneer Tech sales manager Alan Hubbard says.

Mavis Morgan has been with Timber Products Co. for 28 years, beginning in California and relocating to the company's hardwood/plywood plant in Corinth, Miss., in 1996. She manages the grading room and is in charge of procurement of hardwood veneer.

Gene Wengert is professor emeritus at the University of Wisconsin in Madison and president of The Wood Doctor's Rx LLC. A former



Paul Schürch

professor and extension specialist at Virginia Tech and researcher at the U.S. Forest Products Lab, Wengert teaches many on-site practical wood processing classes and seminars each year.

"It is fitting that a competition recognizing the entire supply chain, from material source to distributor to designer/craftsperson, will be juried by a wood scientist, a veneer quality control specialist and a master craftsman," Hubbard says.

For contest details, visit [www.veneertech.com](http://www.veneertech.com). 



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# WOOD MARKETS



Honduran mahogany

## Price and availability boost African mahogany

By Jennifer Hicks

For the last 10 to 20 years, price and availability have turned woodworkers on to various African species for their mahogany needs. Genuine or Honduran mahogany is still available, but the high cost limits its purchase to very high-end and unique projects, according to hardwood dealers interviewed by Woodshop News.

"It's very interesting," says Lou Irion, owner of Irion Lumber, a retailer in Wellsboro, Pa. "It seems fewer and fewer people are even carrying the genuine Honduras or South American mahogany species. The market has really dropped. Almost everybody's gone to African and it's a combination of regulations and the fact that [genuine] has gotten so pricey. They gone to African because it's more available and more reasonably priced."

Despite export restrictions, Honduran mahogany (*Swietenia macrophylla*) continues to be available in lumber or veneer form, possibly from plantations. The species is listed (CITES Appendix II, IUCN Red List) as vulnerable because of a population reduction of more than 20 percent in the last three generations, caused by a decline in its natural range and exploitation, according to The Wood Database website.

African mahogany (*Khaya*) is a genus of seven species of trees in the Meliaceae family. The color and working properties can vary greatly, depending on where it is harvested.

"When you're building something very special, particularly furniture, but even very good architectural millwork, Honduran mahogany is critical to the success of the project," Irion says. "You really just can't use African because it just doesn't have the same qualities. It doesn't carve as well and the look is just off."

"There's a low supply of the Honduras and it's not like the true Honduras that we used to see," adds Dennis Guethal of Compton Lumber, a retailer in Seattle. "It has a decent variance in color."

Compton also sells African mahogany, mostly for casework, doors and millwork projects. Guethal says he sells a smaller amount of Honduran mahogany to boat builders.

"What we buy is quartersawn, so it's the ribbon grain. [Woodworkers] buy it more for the look. It has a color variance to it, but the ribbon grain is kind of what our customers are after," Guethal says.

Honduran mahogany is selling for more than \$10/bf with a premium for longer lengths and widths. African mahogany retails for \$5 to \$6/bf. [W](#)



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# TOOLS & TECHNIQUES



## KCD Software rolls out new design program

By Jennifer Hicks

**K**CD Software released Version 10 of its closet and cabinet design program, offering new features to help shops boost production and efficiency.

"We've made things faster and we've made them easier," product manager John Murphy says. "We've made it so the program can easily be hooked up to CNC equipment and all of the machinery that is rapidly showing up in smaller shops. Now that the prices of that equipment are more affordable and business is picking back up again for woodworkers, we've really tried to make KCD so it would

run all of that equipment."

The program's custom-design and build features now offer more details and opportunities for users. For example, in addition to perusing more than 100 new door styles in Version 10, details like stile and rail dimensions can be incorporated for a truly custom look.

Version 10 also generates job nests using the CNC Manager function. Multiple jobs can be joined together, down to the grain rotation and quantity for each piece.

"The CNC Manager gives cabinet shops the control to achieve a better yield every time," Murphy says.

Unit menus have expanded with new additions to the included frame and frameless libraries and the Osborne Wood Products library.

Version 10 was also optimized for the company's KCD Touch tablet software. "Our tablet interface for KCD is aimed at the sales aspect, but can also run all of the equipment in the shop, too," Murphy says. "We've done a lot of work so our customers have the ability to go out and make presentations to their customers. Before, if you were going to have a new kitchen or a bunch of bookcases or something like that done in your house you call the cabinetmaker and they will get back to you in a week with some drawings and that really doesn't cut it any longer."

Version 10 starts at \$1,995 and more for running CNC equipment. The software can also be rented by the month.

For information, call 508-760-1140 or visit [www.kcdsoftware.com](http://www.kcdsoftware.com). 





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- Sound level: 84–88 dB
- Collection drums: Steel, 55 gallon x 2
- Overall dimensions: 76¾" W x 60" D x 139⅞" H
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- Cyclone body: 16-gauge steel
- Blower housing: 11-gauge steel
- Approx. shipping weight: 1145 lbs.



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- Intake hole size: 12"
- Impeller: 18½" steel radial fin
- Air suction capacity: 4029 CFM @ 4.3" SP
- Maximum static pressure (inches of water): 16.8"
- Sound level: 87–90 dB
- Collection drums: Steel, 55 gallon x 2
- Overall dimensions: 76¾" W x 60" D x 139⅞" H
- Stand: 13-gauge steel
- Cyclone body: 16-gauge steel
- Blower housing: 11-gauge steel
- Approx. shipping weight: 1264 lbs.



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# Felder debuts new table saw

By Jennifer Hicks

Felder introduced the K 540 S table saw with a quick-change scoring unit. The production machine offers a 5" cutting height and the company's X-roll sliding table system.

"The quick-remove scoring system used on the K540S not only allows you to remove the scoring blade, but also the scoring shaft," product manager Ruan du Toit says. "The benefit with this system is that when cutting hard woods or other material that might not need a scoring unit it can be completely removed. The scoring blade and shaft does not get compacted with resin and dust from other materials that drastically affect the life expectancy of the scoring blade system."

"The Felder X-roll sliding table system is something completely unique when talking about sliding table saws. Most machines offer a ball-bearing sliding table system that is wearing on the hardened rails due to the small



surface area a ball bearing would touch the rail. The X-roll system uses roller bearings that have a wide contact area and does not create this wearing line allowing customers to expect a much more accurate and higher quality cut for much longer."

The saw has 7-1/2-hp main motor and uses

a 15-1/2" blade.

Felder announced an introductory price of \$10,515, which includes a 51" outrigger table and 102" crosscut fence. Optional accessories are also available.

For information, call 866-792-5288 or visit [www.feldergroupusa.com](http://www.feldergroupusa.com). 

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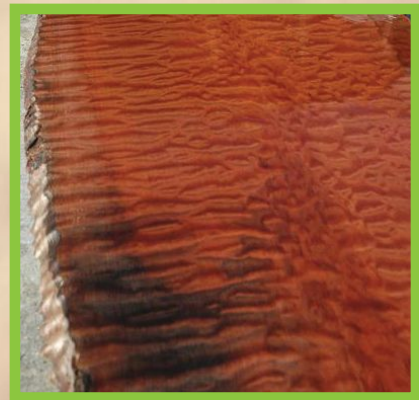
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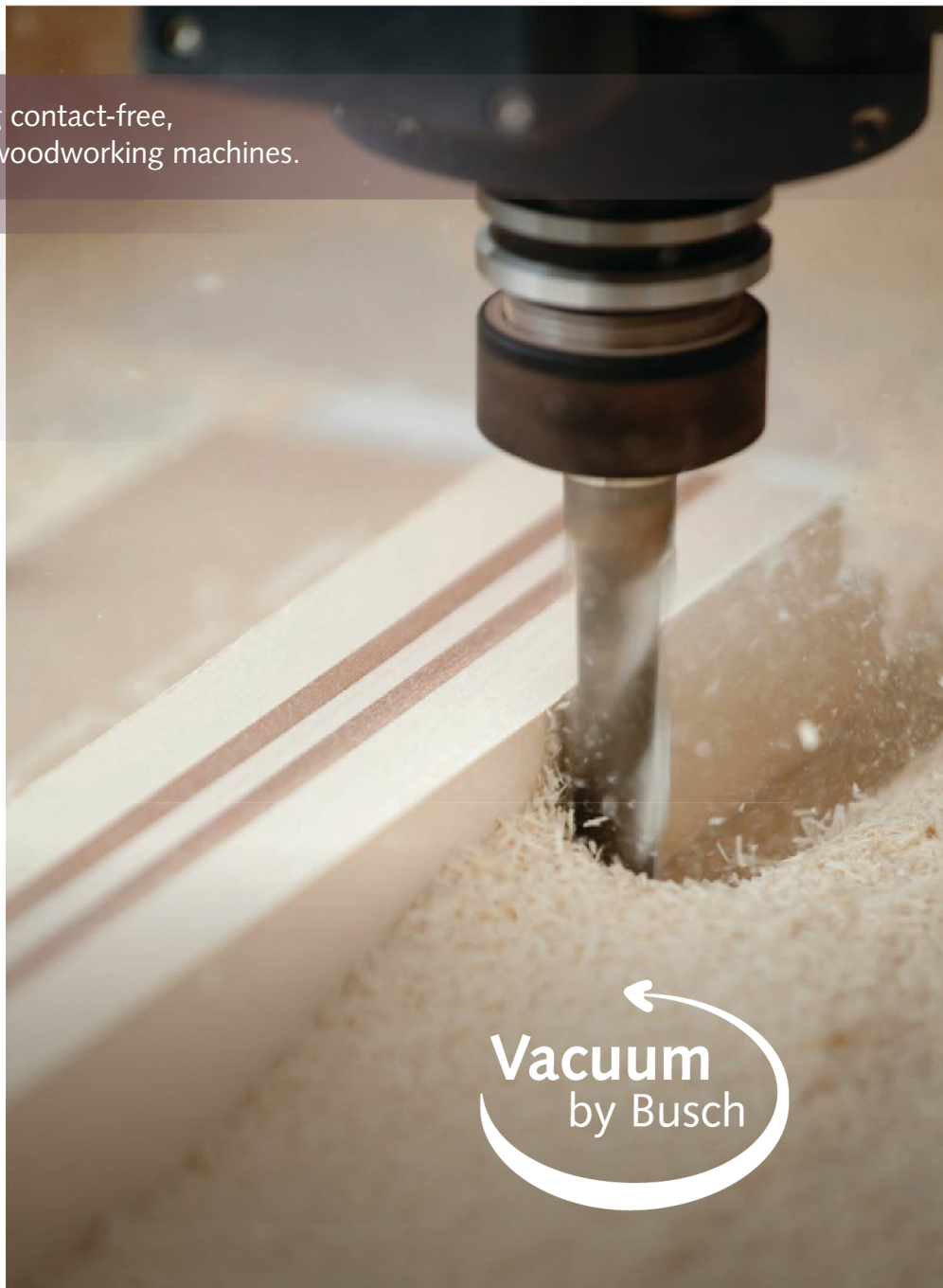
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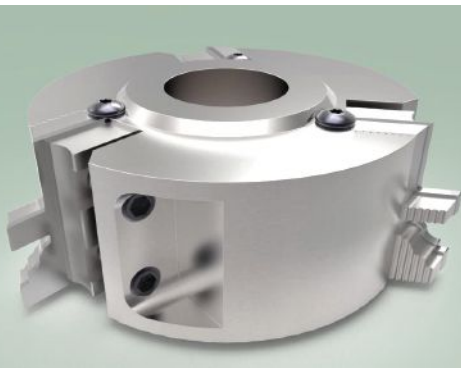
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## Rockler offers upgrades with new CNC line

**By Jennifer Hicks**

**R**ockler Tools and Hardware expanded its offerings of CNC machines to include four AutoRoute models manufactured by Axiom Precision.

These machines are considered an upgrade over benchtop, entry-level CNC machines, according to the company. Rockler also sells a series of CNC Shark machines.

"We introduced the really first consumer-based CNC into the woodworking market and it's been enormously successful over the years and this is just an expansion of that product line," Rockler vice president of product marketing Steve Krohmer says. "The Axiom is a perfect extension of that baseline CNC we have and we're looking at technology as a broad category that is making its way into the workshop these days."

The AutoRoute models include the 4 Basic, 4 Pro, 6 Pro and 8 Pro that have different table sizes. They are capable of producing signs, reproducing images and fabricating parts, according to Rockler.

Product manager Doug Wright says customers who purchased the CNC Shark in the past and now want to invest more money and do

larger projects with their business will see the Axiom machines as an upgrade from their original one.

"With these machines, as you go up the chain of models you increase your table size," product manager Doug Wright says. "The line starts with a 2'x2' table size (4 Basic) and expands up to a 2'x4' table size (8 Pro) so you're ultimately quadrupling the workspace you have available to you. So, obviously, larger projects would be in the scope of a larger machine."

"Also, the new models operate with a liquid-cooled, Electro Spindle router, which runs at much cooler temperatures for much longer times and a much quieter decibel level, which makes it a little more tolerable to be around."

The AutoRoute models also feature rigid steel frames and interlocking aluminum tables compatible with T-track accessories. An onboard USB port allows users to input operating programs with a flash drive.

The models range in price from \$3,999 to \$6,499. The operating software and drivers are sold separately.

For information, visit [www.rockler.com](http://www.rockler.com). **W**





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# W. Moore Profiles debuts new tool line

By Jennifer Hicks

**W** Moore Profiles, manufacturer of cutter heads and inserts, recently launched the MultiTasker line of tooling designed for creating joints and other applications for small- to medium-sized production cabinet shops.

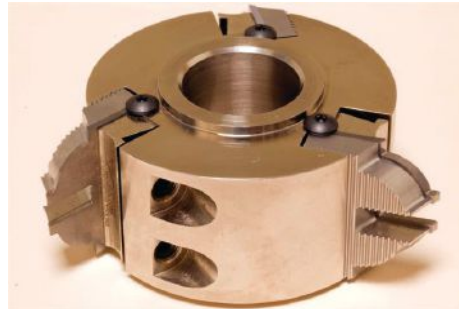
The tooling serves dual production purposes. For small production runs, the tooling can be fitted with precision ground HSS knives for a low cost to complete a woodworking project. For larger runs, the tooling can be fitted with carbide inserts for longer tool life and steel backer support, according to the company.

"The advantage of this type of tooling is that the heads are fixed diameters and you don't have any change in the profile when you sharpen them like you do with other types of tooling," W. Moore Profiles co-owner Steve Schermerhorn says.

Customers can specify the type of knife they will be using when they order the head. The company also supplies gibbs to accommodate solid carbide inserts and backer plates.

The heads are available in two- and three-knife versions and range in length from 30 to 80mm. Prices range from \$405 for a two-knife, 30mm head to \$625 for a three-knife 80mm head.

For information, call 800-396-9091 or visit [www.wmooreprofiles.com](http://www.wmooreprofiles.com). 




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# Omec CNC dovetail machine undergoes redesign

By Jennifer Hicks

**T**he Omec F11TS single-spindle CNC dovetail machine, distributed by Macoser, was redesigned to run faster and features an automatic fence, USB port, file storage capability and more tooling capabilities.

The automatic fence gives the machine variable pitch sizing capability, eliminating the need to remove tooling for half-size and other odd-size boxes, according to product manager Paul Rhodes.

"The variable pitch is the key to the whole machine," Rhodes says. "If you were to buy another dovetail jig or machine, you would be limited to 1" increment drawers. So if you had a cabinet that needed a 6" drawer — perfect. But if you needed a 6-1/2" drawer, you would only get a 6" or 7" drawer, not the in-between size."

The machine has a pendulum processing feature, allowing the operator to load parts while others are already being machined. "It will do 100 drawers per hour, but nobody can feed it fast enough," Rhodes says. "When you look at cycle time, it depends on drawer size. The machine will be constantly operating pendulum processing and you've always got to be feeding it."

Male and female parts are processed simultaneously and loaded on the same side of the machine, so the operator can remain in one spot for loading.



Other features include only one mill cutter to change and touchscreen controls. The machine has a base price of about \$45,000.

For information, visit [www.macoser.com](http://www.macoser.com). 

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## Use Finish-Up and clean up a new line of business

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**H**ow many times have you had to pass up a potentially lucrative on-site job because of problems associated with odor, fumes or overspray.

Ideally, on-site finishers could apply a topcoat over any existing finish without concern about lifting or any incompatibility. We could add color to this topcoat material, allowing us to shade or brighten an existing finish, or even replace lost color, either over the entire surface or just on worn edges. We could use it to grain or pattern for touch-up overfills, especially if it had no softening effect on burn-ins.

As a sales rep for Mohawk Finishing Products, I played a part in developing and testing such a product about 20 years ago. It is called Finish-Up, a water-based, wipe-on polyurethane finish that has outstanding adhesion to almost any surface, has no solvent effect on existing finishes and is non-flammable and virtually odorless. It is fast-drying, durable and easy to use.

The basic formulation originally came from the wood-flooring industry. Other manufacturers have made water-based emulsions and dispersions that are similar in many respects, but none were designed as a touch-up product.

You can force-dry Finish-Up quite easily using a hair dryer, heat gun or other source of warm, dry air. A spot repair can be dried in about 10 to 20 seconds, ready for another coat, or for rubbing out. Unlike solvent-based finishes, Finish-Up doesn't tend to bubble when heated moderately and doesn't subsequently soften when exposed to heat, such as you would experience in the back of a delivery truck on a summer day.

More importantly, subsequent coats of Finish-Up don't soften previous coats. When ap-

plying several coats of color, you don't take the chance of removing what you just put on as you will with a padding lacquer.

Although not designed for application with a brush, it will grain very well with a fine brush. Use Blendal Powder for color and clean the brush with water immediately after use. Don't let it dry on the brush.

Finish-Up also makes an excellent barrier coat or burn-in sealer over standard resin burn in sticks, which tend to re-gloss under solvent-borne lacquers.

### APPLYING THE PRODUCT

Finish-Up is best applied by wiping on a thin, wet film with a soft, smoothly textured cloth or sponge. It is important to avoid flowing it onto the surface.

Additional coats can be applied as soon as the previous coat is dry to the touch. It can be worked wet, but practice to learn the drying properties. For example, you might be able to accomplish six or seven strokes safely, but find that the eighth stroke pulls or leaves a dull streak.

As water-based coatings in general exhibit greater surface tension than solvent-borne coatings, there is a greater tendency for Finish-Up to crawl, bead or fish-eye than lacquer, especially when applied thickly. It is important that the surface is clean and free from oil, wax or silicone. In some cases slightly scuffing the surface will enhance the ability of Finish-Up to wet out the surface without crawling.

The best applying surface for Finish-Up is a finely textured, low-lint, absorbent cloth or pad. Some examples are trace cloth, fine (non-ribbed) cotton knit and microfiber chamois-type cloth such as Sham-Wow. A rounded or cylindrically shaped surface works better than a flat pad. A high-density foam paint roller

works very well if it is used with a wiping action rather than rolling. You can vary the size of the applicator according to the area to be coated.

### USING A TRACE CLOTH

Finish-Up can be applied with a finger pad, made by folding a small piece of trace cloth twice or more to form a corner. Place the index finger underneath the cloth at the corner. Wet the corner of the pad over the index finger with a few drops of Finish-Up. Apply Blendal Powder to the wet pad by touching a finger on the opposite hand to the powder and transferring that powder to the pad. Rub the powder into the pad until the powder is thoroughly wet. Use the pad to wipe on a thin film of colored Finish-Up into the area where color is needed. Feather in this color while wet and allow it to dry. Repeat these processes until the desired level of color is achieved, then apply clear Finish-Up in the appropriate sheen as a topcoat.

### Properties of Finish-Up

- Clear wipe-on coating with good mechanical adhesion to most surfaces, especially existing coatings.
- Very durable
- Water based
- Water cleanup (while wet)
- Dries water clear
- Low odor
- Non-flammable
- Subsequent applications will not remove previous applications
- No overspray
- No brushes to clean
- Will mix with Blendal powders
- Will mix with water miscible pigment stain and concentrates dye stain and dye concentrates
- Dries rapidly/can be force-dried in seconds
- Does not soften with moderate heat
- Print-free in minutes
- Non-yellowing
- Good barrier coat/burn in sealer
- Good graining liquid
- Available in three sheens: gloss, satin and flat. Can be reduced in sheen with waterborne flattening paste.
- Solids weight: Gloss 19.65, Satin 19.33, Flat 18.76
- Average build wipe on coat .0155 mil (.000155") or 13 coats = 2 mil dry
- For interior use only



For large-surface finish replacement, make an applicator with no corners or wrinkles showing, such as by wrapping a cotton-knit cloth around a medium nap paint roller or a trace cloth around a household sponge. Finish-Up is then applied by wiping on a thin film in a straight line across the surface, preferably with the grain of the wood. Make only one or two strokes over a specific area. Overlap the strokes so that the entire surface is coated and allow to dry. Apply additional coats until the desired thickness is achieved (it will typically take three coats to cover the scratch pattern left by 400-grit sandpaper). Vary the stroke overlap to produce a streak-free finish.

## TECHNIQUES

**Shading or toning:** Mix compatible pigment, dye stain or concentrate with Finish-Up to desired color intensity and allow bubbles to dissipate. Pigment provides some hiding power, while dye creates a transparent, colored coating. It is easier to apply an even color if you make a weaker mixture and apply several coats.

**Graining with applied color:** Put a drop of Finish-Up on a mixing glass. Wet a graining brush with Finish-Up and dip in Blendal Powder. Mix thoroughly on the mixing glass. Remove excess liquid from the brush with a single stroke across the edge of the mixing glass. Apply grain lines with the brush, rewetting with the mixture when necessary. Brush only where color is needed and avoid overlap. Errors can be quickly wiped off.

**Glazing:** Put a drop of Finish-Up on a mixing glass, wet a cloth, sponge or brush with Finish-Up and dip the applicator in Blendal Powder. Mix thoroughly on the mixing glass. Apply to the surface in desired pattern (cow tail, mottle, etc.) and quickly remove any excess with cloth. After the surface has dried, the pattern can be highlighted with steel wool. It's a good idea to practice to learn how much the glaze can be worked before it sets too much.

**Texturing:** Mix micro balloons, saw dust, pumice, pigment, bronzing powder or other inert solids with Finish-Up to make a paste. Apply to surface in desired pattern, quickly removing any excess. The dried pattern can also be highlighted with steel wool.

## TEST FIRST

Finish-Up is designed and formulated for wipe-on application. While under certain circumstances it can be applied by spray or brush, many of those applications are outside of the design parameters and should be tested first.

If it is necessary to spray an aerosol topcoat over Finish-Up, test first in an inconspicuous area since minor crazing can occur.

To re-use an applicator cloth, sponge or roller, thoroughly rinse and wash before the Finish-Up has dried. A wet applicator can be stored in a water- and airtight container.

Learning to use Finish-Up and other waterborne touch-up, coating and coloring products can open the door to increased business and set you ahead of many of your competitors restricted to the solvent-borne materials they've always used. Today's customers are sensitive to environmental concerns and there might be sites that are off limits to aerosol can or spray equipment. There are opportunities everywhere for the technician who takes the time to develop some skill and confidence to go after this market. **W**

## Vitap machines available from Atlantic Machinery

Vitap, an Italian manufacturer of wood-working machinery, signed an exclusive North American distribution agreement with Atlantic Machinery Corp. of New Milford, Conn.

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For information, visit [www.vitap.it](http://www.vitap.it) and [www.atlanticmach.com](http://www.atlanticmach.com).

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# THE CUTTING EDGE

with JOHN ENGLISH

## The intricate science behind CNC tooling

**CNC routers will have guidelines on choosing tools and the speeds at which to work with them**

John Parsons was born in Detroit in 1913. Thanks to Henry Ford and others like him, that was a good place to grow up if you wanted to be an inventor. After two world wars and an economic depression, Parsons was working at Wright-Patterson Air Force Base near Dayton, Ohio during the late 1940s. He and his assistant, Frank Stulen, were designing propeller blades for helicopters when Parsons conceived the notion of using nascent computer technology to control the path of a cutter.

The two men used their new process to make tapered, complex wings for military aircraft. Their partners included both engineers at IBM, who were developing the first commercially viable computers, and a group of researchers at MIT who were working on servomotors and the computer programs to control them. Those efforts eventually became G-code.

In 1958, Parsons received a patent that he had filed six years earlier for a "motor-controlled apparatus for positioning a machine tool." From 1968 until his retirement 18 years later, he was the president of the John T. Parsons Co. in Traverse City, Mich., which designed and built parts for the aeronautics industry. He was awarded numerous academic and industry honors through the years and is sometimes referred to as the "Father of the Second Industrial Revolution."

Parsons died in 2007 at the age of 93, having lived long enough to see his inventions revolutionize several industries including plastics, non-ferrous metals, foam and, of course, woodworking.

### TOOLING UP

Woodshops can thank IBM, MIT, Parsons and Stulen for the platform, mechanics, motors and code that became CNC. But the tools that

these machines move and control are a science all to themselves.

For a woodshop just getting into CNC machining, that means there's a lot to learn. For example, the tools (usually router bits) can be one piece of steel with high tungsten content, so that a cutting profile that has been ground into the shaft will hold its edge. Or a tool might be made up of a steel shaft with carbide inserts that can be changed when dull.

Tools can usually be sharpened or re-tipped. They can also be custom made for a woodshop at remarkably affordable prices considering the complex technology involved. This lets a woodworker do custom tasks such as match a profile for a historic renovation or perhaps mill an unusual molding that has been specified by a hotel or restaurant chain.

Carbide is the most common hardener used in CNC tooling and woodworkers are generally familiar with its properties because they have been using over-the-counter bits made for portable routers and table saw blades with carbide tips. However, a little knowledge can be a dangerous thing and choosing a grade of carbide for CNC tooling based only on one's experience with small, high-speed cutters is probably not the best idea. The choice is perhaps best left to an experienced tool supplier or designer. That's because a woodshop that specifies a grade might be surprised by the end result.

Carbide is complex, both in its grading and its manufacture. When iron is being turned into steel, the mill can change the nature of the finished product by adding various other metals to control certain properties. When a secondary element is added, the steel becomes an alloy. Molybdenum is used to form the carbides that bring strength and endurance to CNC tooling. Carbide is a compound that contains carbon along with one or more

elements that have a lesser electro-negative ability (these are bonding agents). When a woodshop manager asks a CNC tooling manufacturer to use something such as C2, C4 or some other grade of carbide, they are asking the indefinable.

"Cross-referencing carbide by grade is like comparing burgers from Wendy's, Burger King and McDonald's," says Tom Walz of Carbide Processors in Tacoma, Wash. "There is no comprehensive comparison of tungsten carbide between and among tungsten carbide suppliers. A big part of the problem is the huge number of suppliers, grades and trade names. There are at least 5,000 different grades of tungsten carbide sold under more than 1,500 different trade names by more than 1,500 different companies."

All that, of course, only adds to the confusion for a shop that has just purchased a brand-new CNC router and needs to know something about bits. The best advice is to speak with a reputable supplier (check out the resource guide on the Woodshop News website), and describe the task you need to perform including the material being worked, its thickness, a drawing of the profile/shape that needs to be milled and the lineal footage that will be routed. The supplier can then recommend solutions that meet your needs.

### OTHER TOOLING CHOICES

Stellite is a trademarked product belonging to Kennametal Co. of Latrobe, Pa. The company's founder, metallurgist Philip McKenna, discovered the compound in 1938. It's a tungsten-titanium carbide alloy specifically made for cutting tools. The alloy is used in a range of cobalt-chromium compounds that are designed for wear resistance. Stellite can also contain tungsten or molybdenum and a small measure of carbon.

Polycrystalline diamond (PCD) is a composite of diamond particles sintered together with a metallic binder. Not all CNC operators are sold on manmade diamonds as a tooling material. So if a tool is available in both carbide and diamond, it might be a good idea to test both on a long run and see which lasts the longest and which delivers the cleanest edges.

### CHIP LOAD FACTOR

Another way to measure performance and also to develop guidelines for the speed at which a CNC tool should be moved through the work is a concept called "chip load." This is often supplied by a CNC tooling manufacturer right on the packaging and appears as a range of numbers such as ".024-.026'."

Chip load describes the thickness of the chip that is being removed by each cutting edge of the tool. The idea is to adjust the speed at which the spindle is turning and the speed at



which the tool is being moved, so that the cutting edges do their work most efficiently. That efficiency is a balance between how fast jobs are being completed and how fast the tooling becomes dull. Overheating is an issue and it can be caused when the tool is being asked to do too much work too quickly. But slowing everything down too much can also cause problems, including burn marks on the material being cut because the bit is staying in one place too long.

Chip load can be calculated fairly easily. Start by noting the feed rate the machine is currently set to: this measures how fast the tool is being moved in "inches per minute." Then note the revolutions per minute at which the tool is being spun in the spindle. Count the number of flutes (cutting edges) on the bit and you're ready to apply this formula:

Feed rate/(RPM x number of flutes) = Chip load

For example, if the tool is traveling at 500 inches a minute and the spindle is turning a three-flute bit at 10,000 rpm, the chip load would be 0.0166.

A tool with a diameter of 3/8" that is cutting a mid-range hardwood such as oak will probably want to have a chip load in the 0.015 to 0.018 range. For MDF, the ideal number might

be closer to 0.021. To get there from our example, one might switch to a two-flute bit and up the RPMs to 12,000. Decreasing the feed rate and increasing the RPMs a little more might also deliver a better, burn-free cut.

Some experimenting is required because of variables. For example, not all MDF is made with the same grain and resin structure and not all tools are made with the same carbide structure. The manufacturer of the CNC router will have guidelines on choosing tooling and the speeds at which to work. **W**

## Cefla names finishing group sales manager

Cefla North America, a provider of finishing, decoration and digital printing solutions, promoted Roberto Bolognini to sales manager of its finishing group.

Bolognini joined Cefla in early 2014 as regional sales manager for North America, the United Kingdom and Eastern Europe. He was appointed worldwide sales manager earlier this year, according to the company.

For information, visit [www.ceflafinishinggroup.com](http://www.ceflafinishinggroup.com).

## Northwest Hardwoods buys Industrial Timber & Lumber

Northwest Hardwoods completed the acquisition of Industrial Timber & Lumber Co., based in Beachwood, Ohio.

ITL is one of the largest global suppliers of North American hardwood, according to Northwest Hardwoods. It sells more than 200 million bf of hardwood lumber annually and has approximately 400 employees. ITL owns two integrated sawmills, four concentration yards and one dedicated service center with operations in Ohio, West Virginia, North Carolina and Pennsylvania.

"We couldn't be more pleased to acquire a great company like ITL to better serve our customers," Northwest president and CEO T.J. Rosengarth said in a statement. "The highly respected ITL brand name is the perfect compliment to the NWH brand which has been recognized as the gold standard for hardwood for nearly 45 years."

For information, visit [www.northwesthardwoods.com](http://www.northwesthardwoods.com).

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# PRO SHOP

with R.W. LEE

## Capital investments need a well-planned ROI in place

**P**rior to my involvement with digital fabrication technology, I was a consultant for 25 years valuing investment-grade real estate and medium-sized businesses. Though most of this was enjoyable, the most distressing part was trying to save a business from insolvency or, worse, valuing the remains of an insolvent business.

I found that most businesses and real estate projects in financial distress were due to poorly conceived and executed business plans. Four scenarios often occurred:

- The business plan contained overly optimistic expectations. Income estimates

were too high or projected as being realized too quickly and expense estimates were too low.

- The business plan had inadequate support for the income and expense estimates; commonly known as “heroic assumptions.”
- There was under-capitalization.
- There was a lack of downside planning if expectations were not being met.

These bad business plans shared another common deficiency: choosing the wrong return-on-investment tool to analyze a capital equipment purchase, such as a CNC router

and its ancillary hardware and software, and users not clearly understanding the financial measurement tools being used.

There are several different investment tools in common use. This makes it a necessity for the shop owner and everyone involved with a capital equipment purchase to define the financial measurement tools in the same way. Further, the financial measurement tools should also be used on a pre-income tax and pre-depreciation basis. To use assumptions of income tax savings to pay for a capital tool purchase is not a prudent business practice.

Here are the most common methods to measure the financial performance of a capital-tool investment:

### RETURN ON INVESTMENT

ROI is a very simple tool that makes explicit the estimated direct gross income, direct costs and expenses of a capital tool purchase.

To calculate ROI, the benefit or net return of a capital equipment investment is divided by the cost of the investment. The result is expressed as a percentage or a ratio.

$$\text{ROI} = \frac{(\text{Gain from investment} - \text{Cost of investment})}{\text{Cost of investment}}$$

A ROI should be calculated with and without loan payments — both principal and inter-

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est — as direct expenses and must be done on a pre-income tax basis.

### PAYBACK PERIOD

Payback period is the number of years it takes for a company to recover its original investment in a capital equipment investment. In the calculation of the payback period, the estimated annual net income derived from the equipment must first be derived.

To calculate, payback period equals:

$$\text{Years for full recovery} = \frac{\text{Total cost of capital equipment as installed}}{\text{Estimated annual net income}}$$

There is another version of this method that adds in what the owner contributed to the purchase price, also known as the equity in the deal. Both methods should be used since they tell the owner how many months it will take before the estimated annual net income finally goes to the net operating income of the business, rather than to loan payoff and equity payback.

### NET PRESENT VALUE

Both of the previous financial measurement tools assume that money earned in the future has the same value as money earned today. Any woodshop owner knows when he is told,

“I will pay you in a week or so,” there is risk involved in collecting that amount. Also labor, materials and overhead costs to complete the job will have to come from another source. Banks charge interest for this service.

Calculating the net present value for capital equipment purchase is a more sophisticated method of making an investment decision. It takes into account the timing of the expenditures and receipts of income generated by the new tool. It is based on the assumption that money due in the future does not have the same value or purchasing power as money due today.

Calculations made with time-value-of-money methods use an interest rate known as the discount rate and the explicit understanding that the total amount invested provide a specified return.

Determining the return or discount rate is based on numerous factors, including the cost of borrowed money; the historic rate of return earned on similar investments; returns others have experienced on competing similar and non-similar investments; the amount of risk involved; and the period of time over which the money is to be earned, which is known as the discount period.

The result of a net present value calculation is a dollar amount representing the pres-

ent value of all direct costs and expenses and projected gross income directly attributed to the capital equipment during a given period of time. The amount should at least equal, though preferably exceed, the original cost of the capital equipment as installed and operating.

### INTERNAL RATE OF RETURN

This is related to net present value and matches the timing of cash flows, which are receipts and expenditures during a given period of time. The difference is there is no chosen discount rate. Instead, the return is calculated with a net present value of zero, indicating the present value of receipts and expenditures are equal.

There isn't a “best” financial planning and measurement tool since they all have strengths and weaknesses. And, most importantly, they all have underlying assumptions concerning the estimated income and expenses used in the calculations and for how the financial tools operate. These assumptions need to be made explicit and must be clearly understood by all involved so decisions based on the results of these financial tools can be placed in a context. Failure to do so can have unexpected and catastrophic results. **W**



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- Floor-to-table height: 37 1/2"
- Cutting capacity/throat: 18 1/4" • Max. cutting height: 12"
- Blade size: 143" long • Blade sizes available: 1/8" - 1 1/4"
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- Table height: 35 1/2"
- Footprint: 21" L x 19 1/2" W
- Arbor: 3/8" • Arbor speed: 3450 RPM
- Capacity: 3 1/4" @ 90°, 2 1/4" @ 45°
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- Overall size: 57 1/4" W x 35 1/2" H x 37 1/2" D
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• Scoring blade size: 3 1/8" • Scoring blade arbor: 22mm
- Depth of cut: 3 1/8" @ 90°, 2 1/4" @ 45°
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- Motor: 5 HP, 220V, single-phase, 18A or 7 1/2 HP, 220V/440V\*, 3-phase, 19.5A/10A
- Precision-ground cast iron table size with extension: 69 1/2" x 78 3/4"
- Arbor: 1" • Arbor speed: 3600 RPM
- Max. dado width: 3/4"
- Max. rip capacity: 52"
- Max. depth of cut: 4" @ 90°, 2 3/4" @ 45°
- Approx. shipping weight: 854 lbs.



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- Main blade arbor: 1" • Main blade speed: 3000, 4000, 5000, 6000 RPM
- Scoring blade motor: 1 HP, 3A/1.5A
- Scoring blade size: 4 3/4" • Scoring blade arbor: 22mm
- Scoring blade speed: 8000 RPM
- Scoring blade tilt: 0-45°
- Depth of cut: 4 1/8" @ 90°, 2 1/4" @ 45°
- Max. rip capacity: 52 1/2"
- Max. sheet capacity: 126" x 126"
- Overall size: 132" W x 55" H x 130" D
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- Min. panel dimensions: 4 3/4" W x 9 1/2" L
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- Max. width of cut: 12"
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## 15" PLANERS

- Motor: 3 HP, 240V, single-phase, 15A
- Precision-ground cast iron table size: 15" x 20"
- Min. stock thickness: 3/16"
- Min. stock length: 8"
- Max. cutting depth: 1/8"
- Feed rate: 16 & 30 FPM
- Cutterhead speed: 4800 RPM
- Approx. shipping weight: 666 lbs.



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## 20" PLANER with SPIRAL CUTTERHEAD

- Motor: 5 HP, 240V, single-phase
- Max. cutting width: 20" • Min. stock length: 8"
- Max. cutting depth: 1/8"
- Feed rate: 16 FPM & 20 FPM
- Cutterhead diameter: 3 1/8"
- Cutterhead speed: 4800 RPM
- Number of cutter spirals: 4
- Table size: 20" x 25 1/4"
- Table size with extension: 20" x 55 1/2"
- Overall dimensions: 55 1/2" L x 39" W x 45 1/2" H
- Approx. shipping weight: 932 lbs.



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- Spindle sizes: 1/2" and 3/4" (included)
- Spindle speeds: 7000 and 10,000 RPM
- Miter gauge slot: T-slotted
- Stand: cabinet style, powder-coated finish
- Cord length: 10' x 14 Gauge
- Maximum cutter diameter: 5"
- Approx. shipping weight: 290 lbs.



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- Min. board length: 6"
- Min. board thickness: 1/8"
- Sanding drum size: 4"
- Dust collection port: 2 1/2"
- Overall size: 35" wide x 50" high x 24" deep
- Approx. shipping weight: 300 lbs.



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## 15" WIDE-BELT SANDER (OPEN END)

- Sanding motor: 5 HP, 220V, single-phase, 1725 RPM, 30A
- Conveyor motor: 1/4 HP, 220V, single-phase, 1.8A
- Air requirement: 57-75 PSI, 2 CFM
- Sanding belt size: 16" x 48"
- Surface speed of sanding belt: 2050 FPM
- Max. board width: 15" single pass, 30" double pass
- Max. board thickness: 5 1/2"
- Min. board length: 12"
- Conveyor speed: 13.1 & 16.4 FPM
- Overall size: 32 1/2" wide x 61 1/4" high x 35" deep
- Approx. shipping weight: 908 lbs.



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# MEN OF



PHOTO: MARC SORACCO/REDUX PLUS



# STEEL

BY JENNIFER HICKS



## Pittsburgh duo joined forces only three years ago and have turned their shop into a regional power

**T**ake one craftsman with an established shop, add a businessman who owns another shop and mix thoroughly. It's been a recipe for success at National Woodwork in Pittsburgh.

Craftsman Joel Palmer and businessman Russell Rice formed a partnership in 2012, three years after Rice purchased National Woodwork. Palmer had been operating JSP Woodworking in Pittsburgh since 1991.

"I brought my clientele, experience and an established shop, which was better than the one Russell purchased. He brought equipment and employees," Palmer says.

Rice also brought a background in sales and finance. Both say melding their diverse skills was a great decision as the company has experienced a 500-percent growth in assets since Rice's purchase in 2009. While they still experience uncharted territory from time to time, they know they are better together.

### IMMEDIATE GROWTH

After the merger, the shop has more than doubled in size to about 27,000 sq. ft. There are 17 employees with plans to hire a couple more.

"Our turnover is pretty low," Palmer says. "Most of our guys are here because they want to do this for a living. We've managed to hire a couple of younger guys in their 30s and that's very encouraging that they want to learn the business. It's hard to find skilled and motivated younger guys."

The shop produces furniture, millwork, kitchen cabinets, closets and more for residential and commercial customers. It completes 70 to 100 jobs per year, ranging from whole homes to one-off pieces such as a conference table.

Part of the company's success comes from being very selective when sourcing work, according to Rice.

"We limit the number of general contractors we work with and it's a pretty simple criteria," Rice says. "The first time we do business with somebody, there are three outcomes: We'll either do business with them again, make an effort to do business with them again or decide to never do business with them again."





PHOTOS: MARC SORACCO/REDUX PLUS

The shop completes about 70 to 100 jobs per year for an even mix of residential and commercial clients.



"If they're unorganized and they're running their job poorly, we're done. But if they are organized, run their job well and finish promptly, we'll do anything for them. We'll cover an error or mistake and establish a relationship with them."

## REGIONAL FOCUS

Despite the implication of "national" in its name, the bulk of the company's work comes from a roughly 200-mile radius, stretching northwest to Cleveland and east toward Philadelphia. There's about a 50-50 split between the residential and commercial markets, with which Rice is more comfortable. Before the last recession, residential work accounted for about 70 percent.

"We've got a better balance now," Rice says. "I think it's a nice mix for our employees as well because the commercial (work) tends to be more production-oriented and they can be more creative in detail with the residential."

Commercial clients have included the University of Pittsburgh and PNC Park (home of the Pittsburgh Pirates), banks, country clubs, hospitals and hotels.

Residential jobs lean towards frameless or inset traditional-style cabinetry, while most of the commercial work requests are contemporary, according to Rice. Wood preferences tend to include a fair amount of soft maple, walnut, cherry and white oak. White paint is currently the most popular finish.

## CHALLENGES AND DEMANDS

Rice and Palmer say they are in a competitive market, but aren't too worried because there's plenty of work to go around. Plus, National Woodwork has the advantages of being a high-tech shop with skilled employees.

Their biggest challenge continues to be managing growth.

"When you're a three-man shop, you know when things are shipped and parts are coming in," Rice says. "When you're bigger and running





10 jobs through the shop, the complexity of keeping track of everything becomes more difficult. There's just a lot more going on, so you have to really grow and pay attention to your process.

"If you fail — and everybody does this from time to time — then that's because you generally didn't follow the process. We try to follow our process, but we get busy and say we'll just do this and it comes back to bite you every time. You've got to follow the process and you can't take shortcuts or you're going to experience a problem."

Palmer is also a believer in process.



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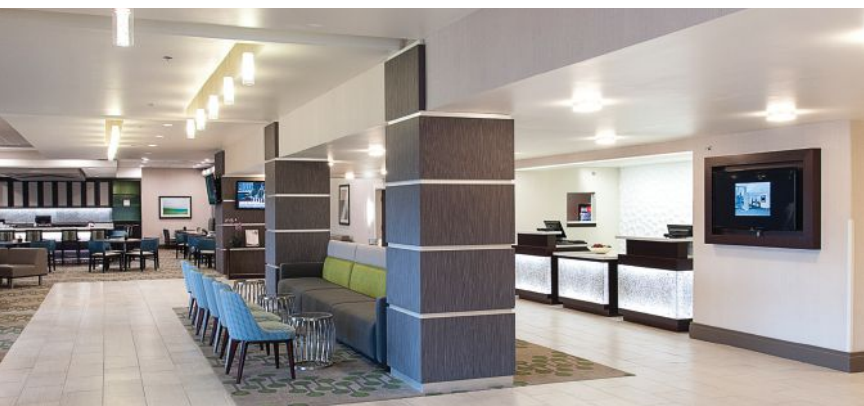
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Recently completed jobs from the shop's extensive portfolio.



"I had never been in a business this big before," Palmer says. "I started out as a little one-man shop and took on some business roles as I needed to. I didn't come at it from a business standpoint, I came at it from a craftsman standpoint. So I was just looking to make some things and make a living and now it's a full-fledged business."

Both owners expect the company will continue to grow, especially in what they term as a "business-friendly" Pittsburgh market.

The owners have a plan to expand the business, involving the development of a product line for national distribution. They weren't ready to share the details, but given their proven track record, it's not hard to predict more success.

Contact: National Woodwork, 4075 Windgap Ave., Building 20, Pittsburgh, PA 15204. Tel: 412-331-1116. [www.nationalwoodwork.com](http://www.nationalwoodwork.com)



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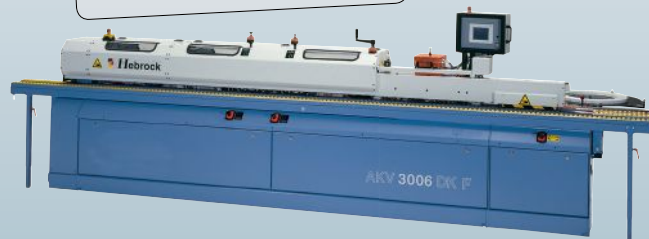
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**Work cells are a vital aspect of lean manufacturing that can cut costs and save a lot of hours in assembly**  
**By John English**

**T**he folks who teach business theory have a big challenge. They need to reduce something as incredibly diverse as the global economy to a concept that can be nicely packaged in a few textbooks. Every time somebody wins a Sveriges Riksbank Prize (the Nobel Prize in economics — and 45 of them were awarded between 1969 and 2014), boardrooms and classrooms on every continent have to adjust curriculum. Sometimes we just find new words to describe old habits, but every now and then there is a gem of originality. The strongest theory from the last 50 years is called lean manufacturing. There are a number of definitions for it, depending on which school of business or industry is speaking, but the overall concept is incredibly simple: reduce waste.

OK, that's a little simplistic. Lean manufacturing isn't just a single act. It's an entire systemic method for reducing and eliminating waste. It's a corporate philosophy that starts with the CEO and works down through every employee, where everybody is doing everything possible to identify and eliminate wasteful practices.

One definition is that lean manufacturing focuses on getting the highest throughput with the least inventory. An example of that would be a woodshop that orders its hardware, sheet goods and hardwoods so efficiently that the materials arrive just before the job starts and at the

end of the project there are no leftovers.

Disciples of lean philosophy have spent several decades both formalizing and formalizing it. They have given distinct names to various elements and these are often based on the concept's Japanese roots — words such as Kaizen (continually improving), Gemba (the physical location of an activity) and KanBan (a signal, such as a card placed in a stack of parts that tells somebody when to reorder).

One element of lean manufacturing that has a somewhat familiar ring to it is the work cell, which is also referred to as cellular manufacturing. Even without reading a textbook, most of us can guess that this describes a group of people working together.

Or does it?

### **WORK CELLS DEFINED**

Actually, no it doesn't. A work cell describes the way that the workplace has been designed, so that people using it are doing so in the most efficient manner. In manufacturing situations such as woodshops, the cell often takes the form of a horseshoe, which the academics have decided to call a U-Shaped Cell. The idea is that machines or assembly stations are set up in a U-shaped pattern so that employees can gain the maximum benefit with the least amount of effort. Because each element



(think perhaps workbench or table saw here) is physically close to the next element, time spent traveling from one to the other, or more importantly moving parts from one to the other, is cut to a minimum.

These cells are often created as sub-groups of the process. For example, there might be one cell for sawing, another for milling or box assembly, drawer assembly, sanding, face-frame construction and so on. Each cell is self-contained and can be quickly adapted to create a different part or handle different dimensions.

While none of this is Earth-shatteringly new, implementing the concept does force a manager or a shop owner to think about how things are done and how they might be done more efficiently. That efficiency, in lean manufacturing, is measured in terms of waste. How much employee and management time, materials, utilities (heat, light, power etc.), insurance, finance charges, training costs, machinery and other resources are being spent and is there a way to trim all, some or even one of these to reduce waste?

The shape of the cell doesn't necessarily need to be a U. Some processes work better in a linear (straight-line) configuration, where materials come in one door and finished products leave through a bay at the opposite end of the building. Other work cells are H-shaped or can be described as circles, arcs or even parallel lines. While the U-shape seems to meet the

needs of most manufacturers, even polygons or squares sometimes work best. The U just seems to consume the least amount of floor space and worker time/motion.

### TIME AND MOTION

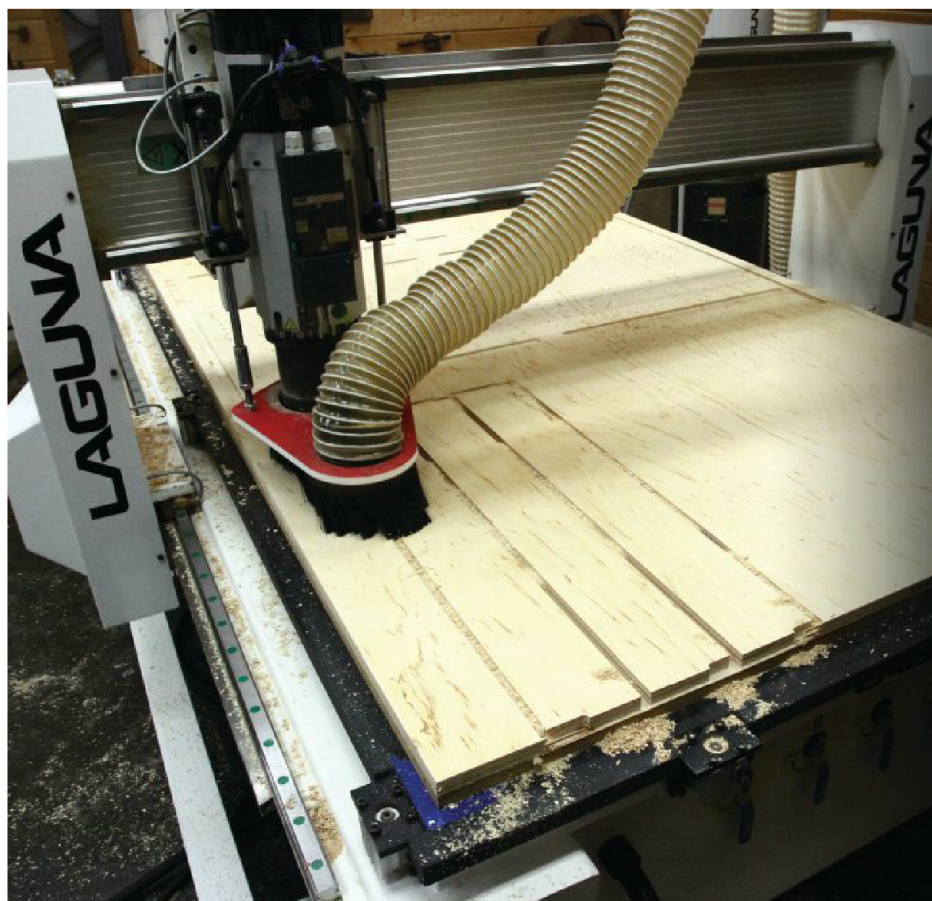
Some processes take longer than others. When a manager is designing the layout of work cells, this is an important consideration. For example, it takes less time to clamp a drawer together than it does for the glue to dry. Because lean manufacturing is a top-to-bottom philosophy, it assumes that the manager will actually use his or her team to help design the cell. People on the shop floor know how long small tasks take and how critical each one is and a manager who ignores this resource will pay for that choice by having to spend more time tweaking and adjusting the model for greater efficiency later on.

Sometimes the disparity in timing (clamping as opposed to curing) requires that the woodshop create more than one cell. The first might have somebody applying clamps, the second might have somebody else stacking clamped drawers on carts and the third might have another team member removing the clamps. If the first person gets the empty clamps from a rack and the last person puts those clamps (now empty again) back on the same rack, one can see the potential for a U-shaped process.

Timing can play a role in staffing a cell.

Perhaps it is more efficient to have two people clamping — one stacking and two removing clamps. Cells are generally created for a single worker, but can ideally be adjusted to accommodate more people for specific tasks. That is, the most popular format for a cell is Load-Load, which means a single worker moves parts through his or her U-shaped station. But a work cell can have several stations with a worker at each one and, in this case, timing is critical. Each worker's task must take the same amount of time as everyone else's or the workflow will be interrupted.

Another efficiency that can be derived from breaking the production process into work cells is the elimination of redundant equipment or the more efficient sizing of equipment. For example, if a shop has two kitchens completed and the spray booth is busy, this type of bottleneck can be caused by a piece of equipment at some stage of the process (in this case the size of the booth) not keeping up with advances in other areas (where, perhaps parts are now being made on a CNC table rather than manually). Function can play a role here. Unfortunately, if the booth isn't carrying its load, there isn't a whole lot a shop can do about that in the short term other than perhaps adding a second shift. But if the wasted time is showing up at the milling stage, then perhaps a cell that is usually making drawer sides can be switched to make cabinet sides.



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Note the part bins within the work cell.

## WORK CELLS AND WASTE MANAGEMENT

In the most basic terms, lean manufacturing recognizes seven different areas of waste. The first of these is overproduction, where a shop makes more parts than it is selling. For example, one would think it's a good idea to stock

up on cabinet sides or even drawer boxes in slow times and use available workers to build inventory for busier days. Lean proponents would suggest that paying employees who are not directly contributing to current needs is inefficient. Their answer would be to create work cells where tasks are defined in such a

way that workflow can be turned on and off, much as a spigot controls the flow of water. If employees are trained to work in more than one cell or if the function of cells can be quickly realigned to meet production needs, then management becomes in essence a function of simple arithmetic (how many do we need



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now?) rather than a matter of conjecture (how many might we sell in the future?).

Efficient work cells that can be activated or adjusted quickly can also help a shop tackle the second area of waste: delay. This is the situation where a project needs to be put on hold because the shop is waiting for something to be built or finished or even for outside parts to arrive.

Work cells can be used to help manage the third defined area of waste — transportation — which involves wasted time and effort that goes into moving parts around the shop or from cell to cell. This sometimes ties into delay (above). When a kitchen needs to be stopped while it waits for something, it also needs to be moved out of the way so that something else can be built at the various work cells and it needs to be stored somewhere and then brought back when the missing ingredient arrives or is built. All the time and effort spent in that moving around is, well, waste.

Work cells are very good at reducing or even eliminating the fourth defined area of waste — over-processing. This is when a worker is doing more work on a part than is really needed. For example, if the bottom of a cabinet has been sprayed with a sealer to create equilibrium (moisture balance), then there is no need to sand that sealer as it will only ever face the floor and will never be seen or touched. Such unnecessary tasks become very

apparent when the entire process is divided into work cells and the workers on the shop floor are responsible for keeping up with other stations or cells. While this example is blatant, more subtle savings will certainly present themselves over time.

For example, an employee might realize that a specific edge doesn't need to be broken on each unit and this saves a few seconds on every part that goes through that cell. While this seems very insignificant, the cumulative benefit during the course of a year might be a whole day of workshop time saved. When half a dozen cells eliminate a similar volume of waste, the shop has saved six work days a year — more than a week's worth of wages. If the shop is operating on a 10 percent margin, the savings are the equivalent of 10 times that in gross sales. If the employee is making \$20 an hour (\$960 over six days), the company needs to sell nine times that (\$8,640 in cabinets) just to match the benefit to the bottom line. And that doesn't take into account marginal savings such as withholding taxes, workers' compensation insurance and even the slight savings in overhead such as light bulbs that don't need to burn during that week that isn't worked.

Work cells can help a company control the fifth recognized area — inventory waste — by being flexible. This type of waste ties up both storage space and cash flow that has to be spent on materials. When a shop has too much inventory on hand, the physical results might include having to rent/heat/cool/insure a larger workshop than is necessary because the business is maintaining unnecessary storage rooms to house the excess. By being able to control the rate of work flow through the use of work cells, production can be switched to efficiently create inventory only as it is needed.

The sixth form of waste — motion — refers to physical efforts that are needed to complete parts and move them through the production process. Here, work cells shine. By reducing the square footage required to perform tasks and by creating an efficient configuration that reduces the number of steps a worker has to take within that square footage, a work cell can effectively save hours each week — and even weeks each year — on the work being done in a specific cell. Going back to the earlier example of clamps, if each bar clamp has a place to go when it is removed (perhaps a clamp rack on casters) rather than being dropped in a pile on the workbench or the floor, then that clamp only needs to be handled once. The worker doesn't need to spend so long cleaning up the station before the next cabinet arrives. That sounds incredibly basic, but it is astonishing how many tasks in the average woodshop require more "motion" than necessary.

And every single movement that an em-

ployee makes while he or she is on the clock — even just picking up the same clamp for a second time — has to be paid.

The last area of waste that lean manufacturing defines is defects. This describes the situation where a woodshop makes parts that are either beyond recovery and have to be trashed or else need to be reworked before they can be resold. In the first case, the labor and materials are lost. In the second, more labor (and possibly more material such as sandpaper and other supplies) has to be purchased. The incidence of defects is dramatically lower when a specific employee and a specific work cell are used to manufacture the same parts over and over again. When several people at different workstations are all making the same part in different areas of the shop, the chances of them all being identical are slim and the odds of them all being of high quality also decline.

## THE BOTTOM LINE

Very few business are completely aboard the lean manufacturing philosophy, but an increasing number are using elements and even large helpings of the theory to reduce waste, which reduces cost and augments profits. More and more American and Canadian businesses are taking a page from the Japanese book. They are accepting the concept that tweaking small tasks for greater efficiency can add up to large savings. During the last decade, a lot of companies adopted lean concepts to eliminate enough waste so they could survive the recession.

Woodshops that are practicing some variant or measure of lean manufacturing are almost universally using work cells to organize the manufacture of specific parts or groups of parts. The trend is more apparent in larger shops and especially those that supply other woodshops with outsourced components. These work cells are generally set up so that their function can quickly change to produce a different part using the same equipment and skill set. Cells are designed to enhance the uninterrupted flow of work through a shop and to reduce wasted effort, materials and time. They usually capitalize on proximity: keeping things close together — especially in a U-shape that is specifically designed to eliminate wasted walking — can really help with efficiency and allow parts to move from station to station with a minimum of motion.

Work cells are not stagnant. One doesn't just set them up and walk away, expecting complete efficiency. Each cell must work with the cells in the process that lie before and after it and it must be both self-regulating (switching tasks as needed) and self-improving. The latter is essential: the cell must be designed and maintained in a way that allows both workers and managers to easily see ways that processes can be constantly improved and waste can be reduced or eliminated. **W**

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# Where in the world...?

Keeping track and care of all your tools at a job site can be a mind-boggling task, so here are ways to store and protect them

By John English

**S**ometimes it seems there are more tools than cabinets on an install. Custom casework often has to work around obstacles and making things fit perfectly means having the right tools available. In a remote location, that means hauling everything to the site, from generators to glue guns. It takes a little planning to keep track of all the job-site tools, protect them from weather and sticky fingers and organize them so they can be found easily when they're needed.

## BATTERY BASICS

Cordless job-site tools have made our lives a lot simpler, but lithium-ion batteries can be a bit sensitive. For example, they don't like heat. One of the quickest ways to shorten the life of a drill's power pack is to leave it fully charged in direct summer sunlight in a vehicle. They're a lot like us: they prefer room temperature. If an install is going to take several days in a building that isn't climate-controlled, it's a good idea to bring the batteries back to the shop at night to recharge.



The C280 Super Trunk Trolley, available from Beta Tools.

Manufacturers suggest storing virtually all batteries in a cool and dry environment (surprisingly, not in the fridge unless specifically noted in the manual). Like excessive heat, moisture is bad for batteries, too. So protect them from rain, snow and long periods of high humidity such as might be found in an unvented attic.

One shouldn't leave batteries fully charged if they're not going to be used any time soon. It's best to drain them down to half power (or even

a little less) if they're going to sit around and be unemployed for a while. At full charge sitting on a shelf, they deteriorate more rapidly.

Lithium-ion batteries also have a shelf life that has more to do with the number of months they've been around than the number of hours they've been used. The day they leave the factory, they start failing. It's always a good idea to have a spare power pack on the job, but don't invest in any extra batteries beyond that until you actually need them. The fresher they are, the better. When buying, see if you can find a manufactured date on the packaging. The ones at the back of the hardware store shelf are probably the most recent, as retailers tend to stock the newest ones to the back since they learned about lithium-ion's shelf-life problems. Just like milk and bread in the grocery story, inventory is dated.

Remember when nickel-cadmium batteries came out, we were all told to completely discharge them every now and then so they could recharge fully? The word on lithium-ion cells is that it's imperative that they don't fully discharge (the practice is called "deep drain"). A substantial, but not complete, drain once every few months is a good thing, because it recalibrates the battery. But if you completely drain a lithium-ion cell, then it probably won't take another charge. There is a safety feature built into these batteries that prevents them from doing so.

If you're running nickel-cadmium batteries in your power tools, then you should run them all the way down about once a month or when they don't seem to be taking a charge well. They have a characteristic called "memory effect" that requires a deep drain to recalibrate. And both lithium-ion and nickel-cadmium last longer if they are recharged regularly when they're somewhere in the region of half- and three-quarters capacity, rather than using them until the drill gives up the

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ghost. They do best when they are fully topped off every time they're charged. That means waiting until the little light turns from red to green (or whatever system your manufacturer uses), before removing the battery from its charger. And don't leave the battery in the charger for a long time once the light changes (unless the manual says to), especially if your charger is a little older. Some of them don't automatically stop charging and this can damage the battery, shorten its useful life and, in remote cases, could even cause it to overheat.

Almost all batteries seem to last longer the more regularly they are used, so it's a good idea to use two and switch between them constantly, rather than using one all the time and having the second just sitting in a cabinet as a spare.

One thing a lot of woodworkers don't think about is the switch on the drill/driver. Most tools come with two or more speeds/torque settings. A charged battery will last longer when it's being used with lower settings and, for most tasks, we don't always need full power.

## STORING YOUR JOB-SITE TOOLS

Tools are enticing to crooks. And other subcontractors, who own something similar, can even pick them up quite innocently on a job site. I once had to drive 30 miles to reclaim a Milwaukee Sawzall from an electrician who swore it was his until his wife discovered he had two.

Equipment needs to be protected from the weather, too. Rain, snow and even sunlight can shorten the life of a tool. But often the biggest challenge isn't security or Mother Nature. It's just being organized on site and finding what you need without wasting time. That takes some planning before the truck is loaded. Cabinet installers really need two



The Craftsman mobile tool chest, model 7191709.

solutions here. They need a place to store things securely and in an ordered way and they often need some kind of worktop or portable bench, too. At times, the solution is to combine these.

Durham Manufacturing Co. ([www.durhammfg.com](http://www.durhammfg.com)) has been working on this problem since 1922. Its two-sided cart (model 662-95) can hold up to 1,000 lbs. of tools in a dozen small drawers immediately beneath the worktop, a dozen bins on one side that are ideal for cordless drills or routers and a large lockable compartment with four shelves on the



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The two-sided cart, model 662-95, available from Durham Manufacturing Co.



other side that provides security. The worktop is steel with a non-skid rubber mat, so it's handy for sanding small parts on site. There's a rim around the edge to stop stuff from falling on the floor and a shop could make a wooden insert for the top that was a hair higher than the rim so an installer could work on larger drawers and doors without marring the finish. Street price for the 662-95 is about \$725.

A much more lightweight solution is available at Wal-Mart and other big box stores. The FatMax 4-in-1 Mobile Work Station (Stanley

product 020800R) is designed for weekend woodworkers, but could be an elegant job-site solution for professionals, too. It includes a toolbox, part bins, a portable tray and an oversized lower bin for larger tools. While it's made from lightweight tubular steel and structural foam, it does allow a woodworker easy access to all four storage sections simultaneously, which makes it a lot easier to find a specific tool. The handle telescopes so one doesn't have to bend over to move the unit from the truck to the kitchen and the whole system locks with a single

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Stanley's 3-in-1 Rolling Workshop, model STST17700.

latch and a padlock you supply. When the top lid is closed, there's a V-groove in it that helps when cutting small moldings to length.

A similar solution comes from Sears. The model 7191709 mobile tool chest has a central locking mechanism and an interior that's designed to maximize space. The unit is designed for easy compartmentalization: two top bins slide apart to reveal a large bin underneath and these, when combined, provide 18-gallon capacity. A woodworker can keep the most frequently used small items up top and easily get to bigger tools below when needed. There's a retractable handle and a central locking mechanism. The 7191709 is made from a durable resin, so it's lightweight (60-lb. capacity) yet rugged enough for the job site. For information, visit [www.sears.com](http://www.sears.com) and search for item No. 00937446000.

An upright version of the Sears concept, the C41 from Beta Tools ([www.beta-tools.com](http://www.beta-tools.com)) looks a lot like luggage on steroids. It's a two-module tool trolley — a cabinet on wheels with a removable toolbox on top. The built-in casters make it easy to haul up steps and the ball-bearing drawer slides and engineered plastic make it tough enough for daily use.

If the C41 isn't big enough, Beta also offers the C280 SuperTank Trolley, which is a mobile workbench with 10 drawers (available as a special order through [www.walmart.com](http://www.walmart.com) and similar retailers). It has two fixed and two steering casters and the latter are locking. There are two centralized safety locks on the bench, so job-site security isn't a big issue. The top is multiply wood with holes for an optional vice (1599F/150).

Numerous companies such as Keter, DeWalt and Stanley offer a whole range of similar products, although many of them are only available overseas. British and European service technicians and installers have been fond of them for a long time, but demand for these clever compact and portable tool storage and workbench units is definitely on the rise here in the U.S. and Canada. As the need increases, more solutions will appear. **W**

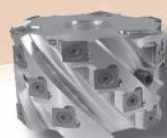
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# Pritam & Eames ready to roll out new Maine gallery exhibit

By Jennifer Hicks

**P**ritam & Eames, which closed its East Hampton, N.Y., gallery location in October, is ready to start rolling out exhibitions next month at its new location at The Gallery of Somes Sound in Somesville, Maine.

The first exhibition opens May 15 and runs through Aug. 15. The opening show, "Garry Knox Bennett: Inside," will feature Knox's work along with other artists, including Wendell Castle, Judy Kensley McKie, Kristina Madsen, Tom Hucker, Jere Osgood, Timothy Philbrick, James Schriber, William Walker and Wendy Maruyama.

Bennett's work includes furniture and decorative objects made during a career that has spanned more than 50 years.

"All of the work in this show is drawn from Bennett's home in Oakland, Calif., which we visited for the first time last June when he invited us to dinner," gallery partner Warren Johnson says. "The work that we saw that eve-

ning had an overall effect of providing valuable insight into the personality of this artist."

"One of our biggest regrets in closing the Race Lane location of Pritam & Eames last year was losing the chance to host this Garry Knox Bennett show," gallery partner Bebe Johnson says. "We are very pleased that Tyra Hanson, director of The Gallery at Somes Sound, offered us the first floor of her two-story gallery space in the beautiful village of Somesville so that we can continue to exhibit work by the celebrated group of artisans with whom we've been associated for so long."

## CALIFORNIA HANDMADE

"California Handmade: State of the Arts," an exhibit of innovative sculpture, furniture,



Bennett's hall table and chair (top); walnut and leather chair with matte silver-plated copper.

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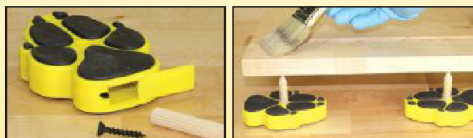
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textiles, jewelry and decorative arts by more than 80 state artists, is scheduled for June 7 through Jan. 2, 2016, at the Sam and Alfreda Maloof Foundation for Arts and Crafts in Alta Loma, Calif.

The exhibition, organized by the Maloof Foundation and Craft in America, takes inspiration from the California Design shows originated by the Pasadena Art Museum in the 1950s. The planning of the exhibition began

with the identification of 12 core artists from California who were asked to recommend six additional colleagues in their field. Each artist submitted works created in the last three years.

Featured artists include Bennett, Maruyama, John Cederquist, Reuben Foat, Matthew Hebert, Barbara Holmes, Bill Hunter, Mike Johnson, Christine Lee, Laura Mays, Yvonne Mouser, Brian Newell, Christy Oates, Darrick Rasmussen and David Wiseman.

From left, Bennett's "Stubby Chair", "Bronze Table" and pieces from his "Thonet Wall Series".

Contacts:

Sam and Alfreda Maloof Foundation for Arts and Crafts, 5131 Carnelian St., Alta Loma, CA 91701. Tel: 909-980-0412. [www.malooffoundation.org](http://www.malooffoundation.org).

The Gallery at Somes Sound, 1112 Main St., Somesville, ME 04660. Tel: 207-244-1165. [www.galleryatsomesound.com](http://www.galleryatsomesound.com). [W](#)

## Nap Gladu offers faster diamond-tool repair

Nap Gladu expanded its diamond cutting tool servicing capabilities with the installation of additional equipment at its service center in Statesville, N.C., according to the company.

"This expansion improves our ability to provide our customers fast, high-quality sharpening and repair service on their diamond cutting tools," service center manager Glenn McClain said in a statement. "Adding equipment and investing in jobs at our Statesville center reinforces our commitment to fast turnaround times and the local community."

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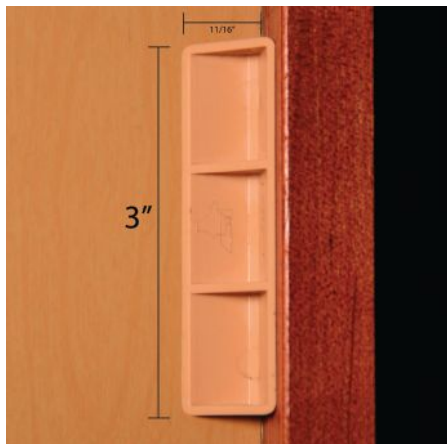
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►► **DEWALT** added the model DCF620 drywall screw gun to its line of 20-volt MAX brushless lithium-ion series for residential and commercial drywall hanging applications. Features include an adjustable driving depth nose cone that locks to the tool, a trigger lock-on switch, an LED light with 20-second delay and a belt clip. Accessories include a collated screw auto-feed magazine attachment. The bare tool sells for \$139. It's also available with a 2.0Ah (\$199) or 4.0Ah (\$269) battery. For information, visit [www.dewalt.com](http://www.dewalt.com).



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▶▶ **WOODCRAFT** has the new Clear-Cut TS Stock Guides, manufactured by Jes-Em Tool Company. The accessory helps woodworkers avoid kickback and move stock safely through the table saw. It has rollers angled at 5 degrees to steer stock toward the fence and a roller arm that works under spring pressure to keep stock firmly in place, according to the retailer. For information, visit [www.woodcraft.com](http://www.woodcraft.com).



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**Woodshop News** welcomes event notices.

Entries must be received by the 15th of the month, three months prior to the event.

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The events are also listed at no charge on the Internet: [www.woodshopnews.com](http://www.woodshopnews.com)  
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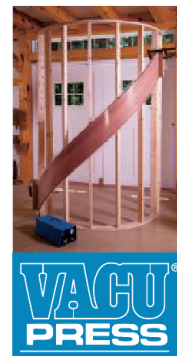


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Include name, dates, location, description of event and a contact address or telephone number. Calendar items, which should be typed or printed clearly, must be received a minimum of 60 days before the event.

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

The complete national calendar of events is continuously updated at [www.woodshopnews.com](http://www.woodshopnews.com).

— Compiled by Jennifer Hicks

## ARIZONA

**April 25-30** — Curved Front Cabinet with Paul Schurch at the Southwest School of Woodworking in Phoenix. Learn design, construction and veneering of a curved front cabinet. Fee: \$816. [www.swcfc.org](http://www.swcfc.org)

## CALIFORNIA

**Monthly** — San Fernando Valley Woodworkers meetings are held on the third Thursday of each month at 7 p.m. at the Balboa Park Sports Complex, Gym Building, at 17015 Burbank Boulevard in Encino. [www.sfvw.org](http://www.sfvw.org)

## FLORIDA

**Ongoing** — The Dunedin Fine Art Center is offering 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](mailto:education@dfac.org) for information.

**Monthly** — Woodcrafters Club of Tampa meets every third Thursday evening at 3809 W. Broad St. in Tampa. For information, visit [www.tampawoodcrafters.org](http://www.tampawoodcrafters.org).

## MASSACHUSETTS

**May 23-25** — Paradise City Spring Show. Fair of fine and functional art to be held Memorial Day Weekend at the Three County Fair grounds in Northampton. [www.paradisecityarts.com](http://www.paradisecityarts.com)

## NEVADA

**July 22-25** — AWFS biennial trade show to be held at the Las Vegas Convention Center in Las Vegas. Featuring exhibitors offering new

tools and products, educational seminars and networking opportunities. [www.awfsfair.org](http://www.awfsfair.org)

## NEW YORK

**Monthly** — Sawdust and Woodchips Woodworking Association meetings are held on the first Wednesday of each month at 6:30 p.m. at the Canton Woods Center in Baldwinsville. [www.sawdustwoodchips.org](http://www.sawdustwoodchips.org)

**Monthly** — Northeast Woodworkers Association meetings held on second Thursday of the month at various locations in Albany area. [www.woodworker.org](http://www.woodworker.org)

## NORTH CAROLINA

**Aug. 19-20; Nov. 11-12** — Stiles Machinery Manufacturing Solutions Seminars. These two-day events provide machine demonstrations, educational seminars and networking opportunities. Location: High Point. For information, visit [www.stilesmachinery.com](http://www.stilesmachinery.com).

## PENNSYLVANIA

**April 10-12** — Philadelphia Invitational Furniture Show. Annual show featuring handcrafted furniture and other woodworking items. Location: 23rd St. Armory, Philadelphia. [www.philaifs.com](http://www.philaifs.com)

**April 17-19** — Early American Art Exhibition, hosted by the Historical Society of Early

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## RHODE ISLAND

**Nov. 6-8** — The Providence Fine Furnishings Show. Annual show featuring handcrafted furniture and accessories. Location: Pawtucket Armory Arts Center, Pawtucket. [www.finefurnishingsshows.com](http://www.finefurnishingsshows.com)

## SOUTH DAKOTA

**Monthly** — The South Dakota Woodworkers Guild meets the last Thursday of every month (except August) at various members' shops. The club has hand tool and woodturning groups. [www.sdwoodworker.org](http://www.sdwoodworker.org).

## WISCONSIN

**May 14** — Solid Wood Processing seminar at Madison Area Technical College in Madison. For information, contact Patrick Molzahn at [pmolzahn@madisoncollege.edu](mailto:pmolzahn@madisoncollege.edu).

**Sept. 18-20** — Milwaukee Fine Furnishings Show. Annual show featuring handcrafted furniture and accessories will be held in a new venue this year at the Muellner Building at Hart Park in Wauwatosa. [www.finefurnishingsshows.com](http://www.finefurnishingsshows.com) 

## Judges named for AWFS student competition

Six professionals from the woodworking and furniture industry were selected as judges for the AWFS 2015 Fresh Wood student woodworking competition.

The judges are Bob Barone, sales manager at Benz Inc.; Martin Goebel, owner of Goebel & Co. Furniture; Daniel Hellman, co-owner of Hellman-Chang; Saúl Martín, shop superintendent at Architectural Woodworking Co.; Richard Schroeder, vice president of design at Stanley Furniture Co., and Davide Tonizzo, owner of Design D.

Fresh Wood is a student woodworking competition open to full-time students in an accredited high school or post-secondary woodworking or related program and part-time students in an accredited post-secondary woodworking or related program who are transitioning into a career in woodworking or design within North America.

The competition has six categories at both school levels: case goods, seating, open, design for production, tables, and musical instruments.

The AWFS fair is scheduled for July 22-25 in Las Vegas. For information, visit [www.awfsfair.org](http://www.awfsfair.org).

## Woodcraft offers Easy Wood Tools

Woodcraft added the complete line of turning tools and accessories from Easy Wood Tools.

Products include turning, hollowing and parting tools; tools for beginners; replacement carbide cutters; chucks and accessories; faceplates, and chip deflectors.

Easy Wood Tools, based in Lexington, Ky., has been manufacturing turning tools since 2008, developed by president and founder Craig Jackson.

"These popular turning tools feature carbide cutters that increase conventional turning time by 20 hours and provide a fresh edge with a simple turn," Woodcraft product development manager Ben Bice said in a statement. "Easily replaceable cutters eliminate sharpening. The Easy Wood Tool design also reduces fatigue and eliminates the need to 'find the bevel.' The turner can just advance the tool slowly into the workpiece and then begin cutting straight in or sweeping to the side."

For information, visit [www.easywoodtools.com](http://www.easywoodtools.com) and [www.woodcraft.com](http://www.woodcraft.com).

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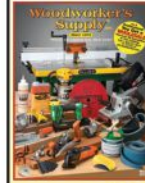
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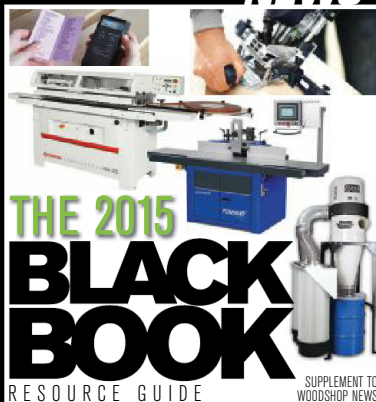
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## Deck builder wins 'Wood, Naturally' contest

Joel Harper, owner of Leisure Time Decks in Lilburn, Ga., won a nationwide contest for his company's use of softwood lumber in March. The contest, "Wood, Naturally Build and Design Sweepstakes," is funded by the Softwood Lumber Board and invites contractors from across the U.S. to submit their outdoor living and interior design projects using materials categorized as softwood lumber. This year's prize was a 2015 Ford F150 pickup truck.

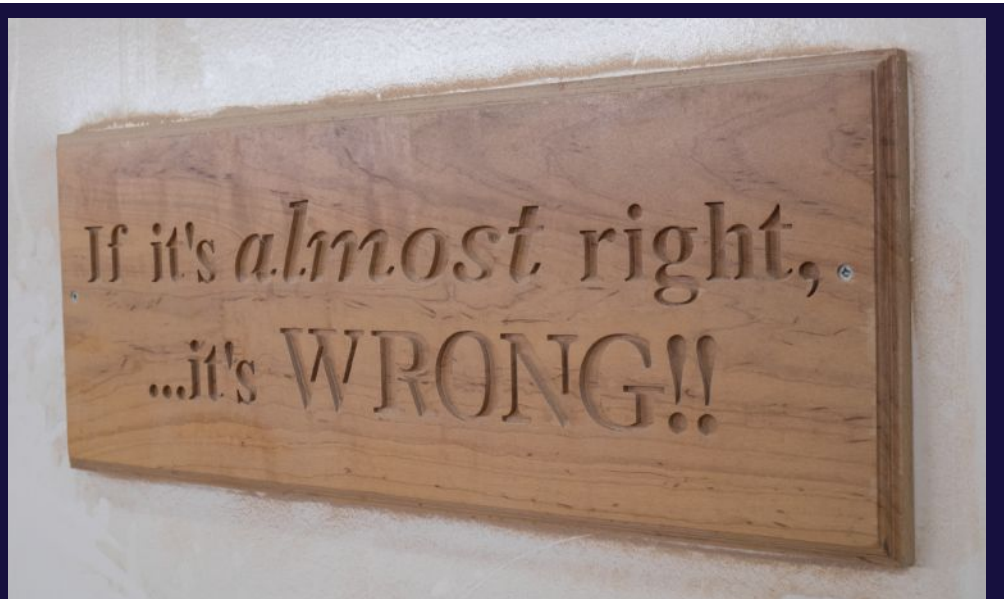
Will Telligman, of the Southern Pine Council, which represents members from both the Southeastern Lumber Manufacturers Association and the Southern Forest Products Association — both partner associations of the Softwood Lumber Board — says one of the reasons Harper's work was selected was because he uses a high concentration of Southern yellow pine, a product that is really pushed by the associations with which he is affiliated.

"Joel's a deck builder around Atlanta and he creates some really beautiful work which is mostly done with wood products and in particular he uses a lot of pressure-treated Southern yellow pine," says Telligman, who presented Harper with the keys to his new ride.

"In the competition, many people submitted different creative ideas on how to work with wood and make beautiful decks and/or indoor applications, but basically he came out on top."



Atlanta-based contractor Joel Harper won a new truck in this year's "Wood, Naturally Build and Design Sweepstakes."



### Cut-offs

We found this sign hanging inside National Woodwork's shop in Pittsburgh. It seems to be a not so subtle reminder that close isn't good enough when it comes to producing a quality product. Got a shop sign to share? Send it to [editorial@woodshopnews.com](mailto:editorial@woodshopnews.com).

The contest was created in 2013 to educate and inspire homeowners and contractors to design and build with wood. The campaign showcases wood's outdoor living applications, such as decks, siding and fences, along with interior applications like walls and ceilings.

The Softwood Lumber Board, which is in charge of selecting the winner, highlights the environmental, societal and economic benefits of using wood products for indoor and outdoor design and building projects of all types and sizes. It works to increase demand and consumption for softwood lumber by promoting its versatility, reliability and sustainability as a

building material.

Harper's website at [www.ltdecks.com](http://www.ltdecks.com) shows examples of his company's completed work on its galleries page.

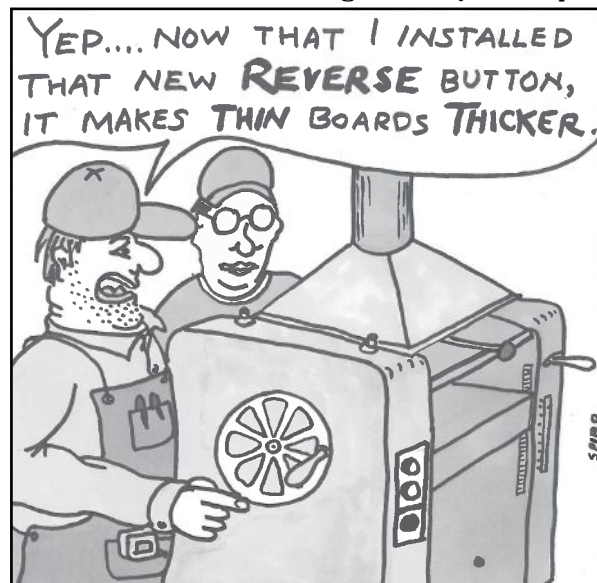
"I am thrilled to have won the Build and Design Sweepstakes. My passion is to create projects for homeowners using the natural beauty of softwood lumber and Wood, Naturally has provided a great platform to share my work," Harper said in a statement.

For contest information, visit [www.wood-naturally.com](http://www.wood-naturally.com). [W](#)

— Jennifer Hicks

### 60 Grit

Rough humor by Steve Spiro





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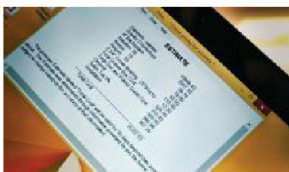
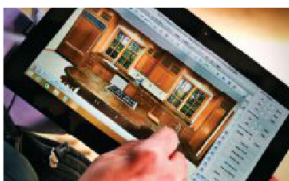
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