

Smart Garage Workshop, From the Ground Up



From foundation to shop cabinets,
how to stretch your dollars and space

BY MATTHEW TEAGUE

When I left the staff of *Fine Woodworking* and headed south a few years ago, my wife and I bought a '50s ranch just east of downtown Nashville. I set up shop in the flat-roofed, one-car garage out back while we figured out if I could make a living building furniture and writing about the craft. Two years later, both careers were going well. The workshop, however, was growing smaller every day.

I didn't need an industrial shop for a big crew, but I did want a well-equipped workshop for a single pro, with plenty of bench space, versatile storage, adequate lighting, dust collection, and enough uncramped space to allow for tools and efficient workflow—the same requirements a serious hobbyist might have. I moved into

my new shop recently, and the lessons I learned should be valuable to anyone thinking about building a small, detached shop for woodworking. Many of these tips also will work for updating an existing garage.

An architect is a good value

If you're building a shop and you're concerned about either its look or resale value, hiring an architect is worth the relatively small outlay of money (ours charged \$560). In my case, he devised construction alternatives to raise the ceiling without raising the roof; he helped convince me—against the contractor's suggestion—to keep the bumped-out roof over the entry door; and he was available for last-minute phone calls to help solve the inevitable



One year, from dream to reality

Between April 2006 and March 2007, Teague chronicled the process of building this shop in a weekly blog, "The Smart Shop." Go to FineWoodworking.com/blogs for the whole story. Here are a few milestones from the construction process:



June 23, 2006 "They used only exterior forms for the foundation walls. As they worked their way around, they'd push the rock up against the concrete."



June 28, 2006 "At the end of the day, I'm left with a handsome shop floor. Around dusk I like to stand out there and pretend I'm looking out my windows."



July 28, 2006 "No matter how many times you've seen it, everyone wants to lend a hand raising the first wall."



Aug. 9, 2006 "A little sweat and a good push slide the trusses onto the top of the framing."



Aug. 21, 2006 "After the roof went on ... I was able to get both the electrician and the plumber to do their rough-in work while the building sat idle."



Sept. 1, 2006 "After all the trim was set in place, it took two days to wrap the building in Hardiplank siding with a 5-in. reveal."

snafus that pop up during construction. Also, at least in my county, having full renderings of the building plan helped us skate past an otherwise overbearing inspection department. In short, if I had to do it again, I'd probably ask more of the architect instead of less.

For resale reasons, we designed the building to serve as a two-car garage, though we'll never park a car in it ourselves. And even if codes had allowed for a larger shop, I'd have stayed near the 700-sq.-ft. limit (we ended up at 698). Even on paper, anything larger looked like a monstrosity alongside our humble home.

The architect helped to ensure that the design complements our brick ranch house: He drew in a low-slung (4/12 pitch) hip roof like the one on the house and then,



Oct. 26, 2006 "Having recently Sheetrocked a room's worth of ceiling in my own house, I had no hesitation hiring a crew to handle the shop."



Nov. 19, 2006 "For months now, I've waited for the day to move out of my old shop and into the new one ... a short distance I must have walked a thousand times."

A well-designed workshop

Teague tapped all of his experience from past shops he owned and the articles and books he worked on as a writer and editor to build and equip a safe, comfortable, well-organized garage shop.

PLENTY OF ROOM TO WORK

Two workbenches team up with a long utility bench in the other corner to provide plenty of room for projects, and the center of the shop floor is wide open for assembly and finishing.



Shop wainscoting. To add character and impact resistance, and to leave less area for drywalling, Teague nailed simple MDF wainscoting onto the stud walls. The stiles mark the studs, making it easier to hang things like this ledger board for the long work surface in the right rear corner.

to prevent the building from looking like a box with a cap, he set the front door in a small bump-out under a cantilevered roof. Though the house is brick, we opted for Hardiplank siding on the shop and saved about \$5,000.

While the architect worried mostly about the exterior of the shop, I spent countless hours sketching the interior. I wanted plenty of natural light inside, a comfortable office space, and, for waterstones and general cleanup, the luxury of running water. I settled on a half-bath (a toilet and a mop sink), with room for later expansion, combined with a small office for books and a computer—together the two rooms take up only 96 sq. ft. of space, but they save countless trips to the house.

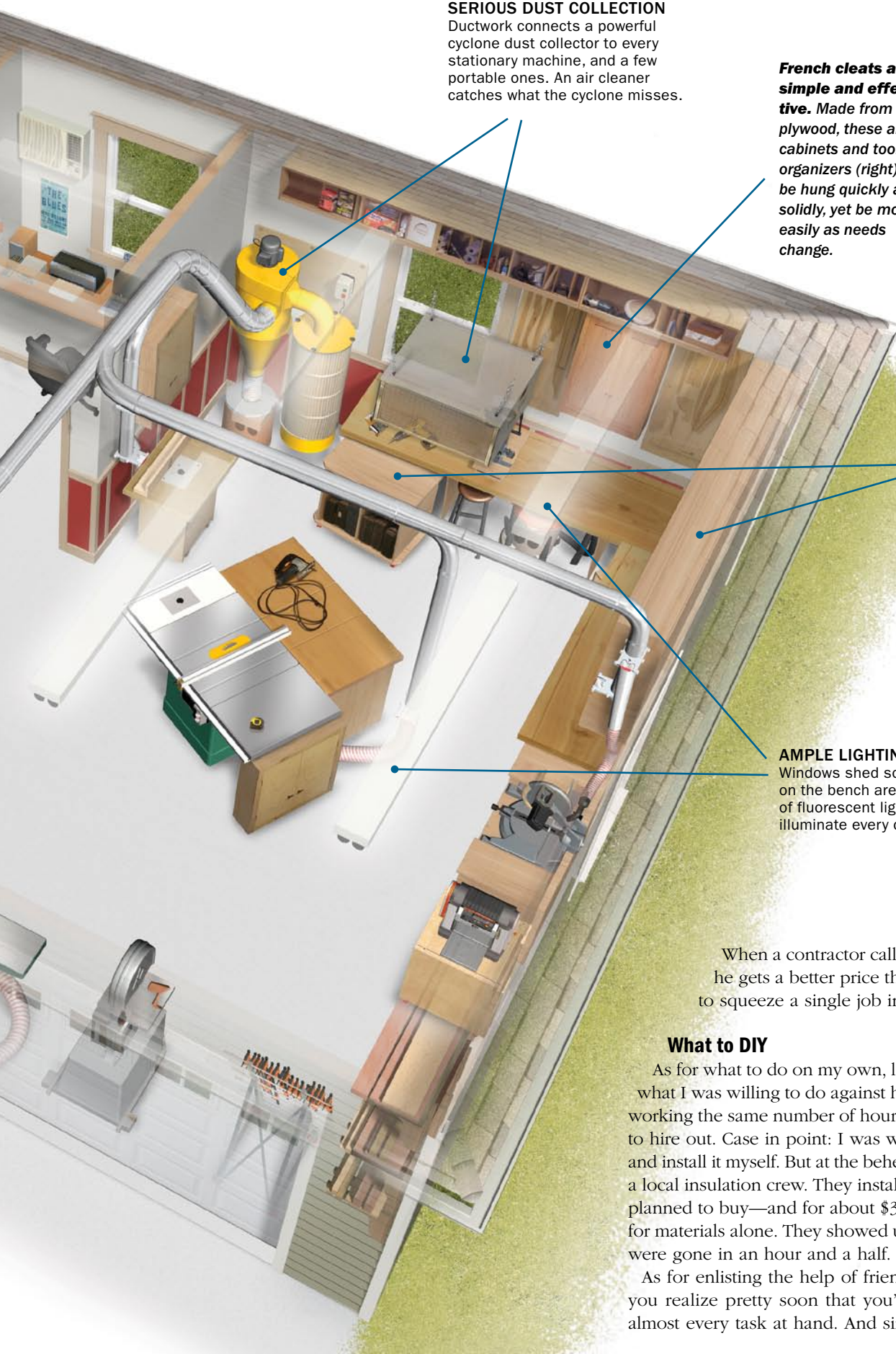
With the office and bath in the back corner of the shop, I was left with a generous 600 sq. ft. of L-shaped shop space. Once we had a working drawing, I made scaled cutouts of all my tools and set them in place. Before we broke ground, I needed to know that everything would fit.



Shop around for a builder

Construction bids from general contractors were at least \$50,000. We then called a contractor who builds garages exclusively. His bid came in at just over half that of the cheapest general contractor. I checked out some of his work, called his references, and signed on.

The builder would be responsible for pouring the foundation, framing, roofing, and installing the windows and doors. I opted to subcontract the plumbing, electrical, insulation, drywall, and exterior painting myself. Being a nice guy, the builder even helped me negotiate lower prices with a few of the subs. In retrospect, I don't think I saved much money by subbing out work myself.



SERIOUS DUST COLLECTION
Ductwork connects a powerful cyclone dust collector to every stationary machine, and a few portable ones. An air cleaner catches what the cyclone misses.

French cleats are simple and effective. Made from birch plywood, these allow cabinets and tool organizers (right) to be hung quickly and solidly, yet be moved easily as needs change.



ENOUGH STORAGE TO KILL CLUTTER
Teague fit storage into every square foot of wall and floor space. The bench area has a wall cabinet, cubbyholes, and tool boards over the benches, with drawer units below. The machine area has more of the same, with rolling carts and cabinets tucked under the L-shaped work surface. The office and bathroom have shelves built in.

AMPLE LIGHTING
Windows shed soft, natural light on the bench area, while 48 feet of fluorescent light fixtures can illuminate every corner.

When a contractor calls a sub he deals with every day, he gets a better price than you do when you ask them to squeeze a single job into a busy schedule.

What to DIY

As for what to do on my own, like many of you I had to weigh what I was willing to do against how much money I could make working the same number of hours. In most cases, it was cheaper to hire out. Case in point: I was willing to buy rolls of insulation and install it myself. But at the behest of my builder I checked with a local insulation crew. They installed better insulation than I had planned to buy—and for about \$350 less than I would have paid for materials alone. They showed up a day after I called them and were gone in an hour and a half. Better yet, I didn't itch at all.

As for enlisting the help of friends, on large construction jobs, you realize pretty soon that you'll need a crew of buddies for almost every task at hand. And since you can call on them only

Let the work flow

The office/bathroom shortens one end of the shop, creating distinct areas for machine and bench work. Materials flow in the garage door, onto the lumber rack; through the nearby milling machines; onto the bandsaw, drill press, and router table; and then into the bench area for joinery, assembly, and finishing before heading out the way they came in.

Comfort and self-sufficiency. An office for computer, stereo, and books, along with a small bathroom, keeps Teague on task all day long.



Hand-tool oasis. The smaller corner of the shop houses two real workbenches with storage for hand tools and hardware, and plenty of natural light.





Power central. The larger portion of the shop consolidates the machines and dust-collection ducting, with plenty of lumber storage and all-purpose benchtop space around the outside.



Materials and milling. With the lumber rack built next to the garage door (left), Teague can move materials easily into the shop. The jointer and tablesaw are nearby (below) for milling, and a planer cart and lumber cart roll between them to complete an efficient array.



so often, you have to pick your battles. Consider this, too: If you can't get to a task immediately, it puts off all the subcontractors in line behind you (you can't drywall until you install insulation, etc.). Even with all I subbed out, there were plenty of construction concerns to keep me busy.

In cases where the work was relaxing or really mattered to me, I did it myself. I built the cabinetry and storage units and did all of the trim work. I also installed the dust collector and ducting.

A great option for heating and cooling

I've worked in shops that aren't climate-controlled, and neither 20°F nor 100°F is very inspiring. Installing central heating and air seemed like a no-brainer. However, for a fraction of the price, a number of HVAC guys told me, an electric 15,000-Btu packaged terminal air conditioner (PTAC) would work as well. PTACs essentially are small heat pumps and are common in hotel rooms.

The framers left an opening for the unit, and the electrician ran an extra 220v outlet on a dedicated circuit. All I had to do was set the unit in the wall and plug it in. I spent an extra \$50 to add a thermostat—a good decision. After paying the bills through a harsh winter and a Nashville summer, the PTAC seems just as efficient as the central heat-pump system we put in the house.

Electrical: More is more

My builder led me to an electrician who called back promptly, showed up when he said he would, and actually seemed to like what he does for a living. To boot, his prices were reasonable. He re-routed a 100-amp panel from the old shop and installed both 220v and 110v outlets everywhere I might want to place a tool; adding an outlet during construction costs only a few extra



ROLLING CARTS DO DOUBLE DUTY

Storage and work space. Teague prefers an open-based bench with room for rolling carts below (above). One unit has simple drawers (right) that bring the tools to the job, with a hinged top that can flip onto another storage cart (below) to create a larger surface for assembly or finishing.



bucks but doing so later is both pricey and a hassle. For convenience, we located all of the outlets 42 in. off the floor—above bench height. He also supplied and installed six 8-ft. strips of fluorescent lighting.

Walls made for woodworking

Once the shell of the building was up, I did the bulk of the interior work, beginning with the extrahigh walls. If I went with drywall from floor to ceiling, I worried that I'd punch countless holes in the walls as I moved boards around the shop. So I designed and installed medium-density fiberboard (MDF) wainscoting around the lower 40 in. of the walls—to just above bench height. I milled all of the trim pieces for windows, doors, and wainscoting from a few sheets of MDF, at a fraction of what off-the-shelf molding would have cost. I centered each wainscoting stile on a stud—when I hang cabinets on the wall, I don't need a stud finder.

Once the drywall contractors were done (I'm no fan of that job), I painted the top of the walls a light tan color; it masks dust and it's less bland than stark white. I painted the wainscoting panels red, but left the MDF trim natural with just a shellac finish.

As much as I'd prefer wood floors—they're much easier on your back and dropped tools—I had to draw the line somewhere. I sealed the concrete floor with a durable epoxy paint. In front of my workbenches and tablesaw I rolled out anti-fatigue floor mats.

Work flow: From machines to benches

In any efficient shop, work flow determines the tool layout. In my shop, raw lumber comes in the garage door and goes straight onto the lumber racks. With only slight tweaks, I used the lumber-rack design outlined by Andy Beasley in *FWW* #181. Boards slide easily off the racks and onto the chopsaw, where I cut them to rough length. I then stack them on a mobile cart near the jointer, the planer, and the tablesaw. By the time I'm toting workpieces to the workbench, router table, or one of the work areas along the back and side walls, they're already milled to a manageable size.

Big tools first—To accommodate long boards, I set the tablesaw at an angle in the center of the shop, and behind it I put my old outfeed table that doubles as a storage unit. The tablesaw is also outfitted with a router table on the left extension wing. Having two router tables comes in handy when I'm using paired router bits. My main router table is located along the short wall opposite the office. It's built to the height of the tablesaw, and rolls out to provide extra outfeed support.

I left both garage doors operable but realized that I'd only need access to one. A new 12-in. jointer (a shop-warming gift to myself) sits against the garage door I seldom use.

The bench area is an oasis—I didn't get into woodworking because I like heavy, loud machines. What I enjoy most is time at the workbench with hand tools. For that, I placed my two real workbenches in the smaller section of the shop. When I walk in the door, seeing the two walls of benches and hand tools makes me feel like I'm walking into a woodshop instead of a factory.

Storage and more storage

Whenever possible, I try to design storage into my workstations. My chopsaw stand, seen in *FWW* #160, is outfitted with shallow metal drawers available from Lee Valley (www.leevalley.com) that slide on grooves cut directly into cabinet sides. The outfeed table



Rolling, rotating planer cart

Planers require a lot of infeed and outfeed space, so I've always stored my benchtop planer on a cart under the right wing of my tablesaw, pulling it out when I needed it. But that meant either lifting the heavy planer onto a benchtop or working crouched over. In this shop I've found a better way.

A pivoting-top tool station is not a new idea, but this one works especially well and is easy to build. The planer is bolted to a top that spins on a 1/2-in. steel rod.

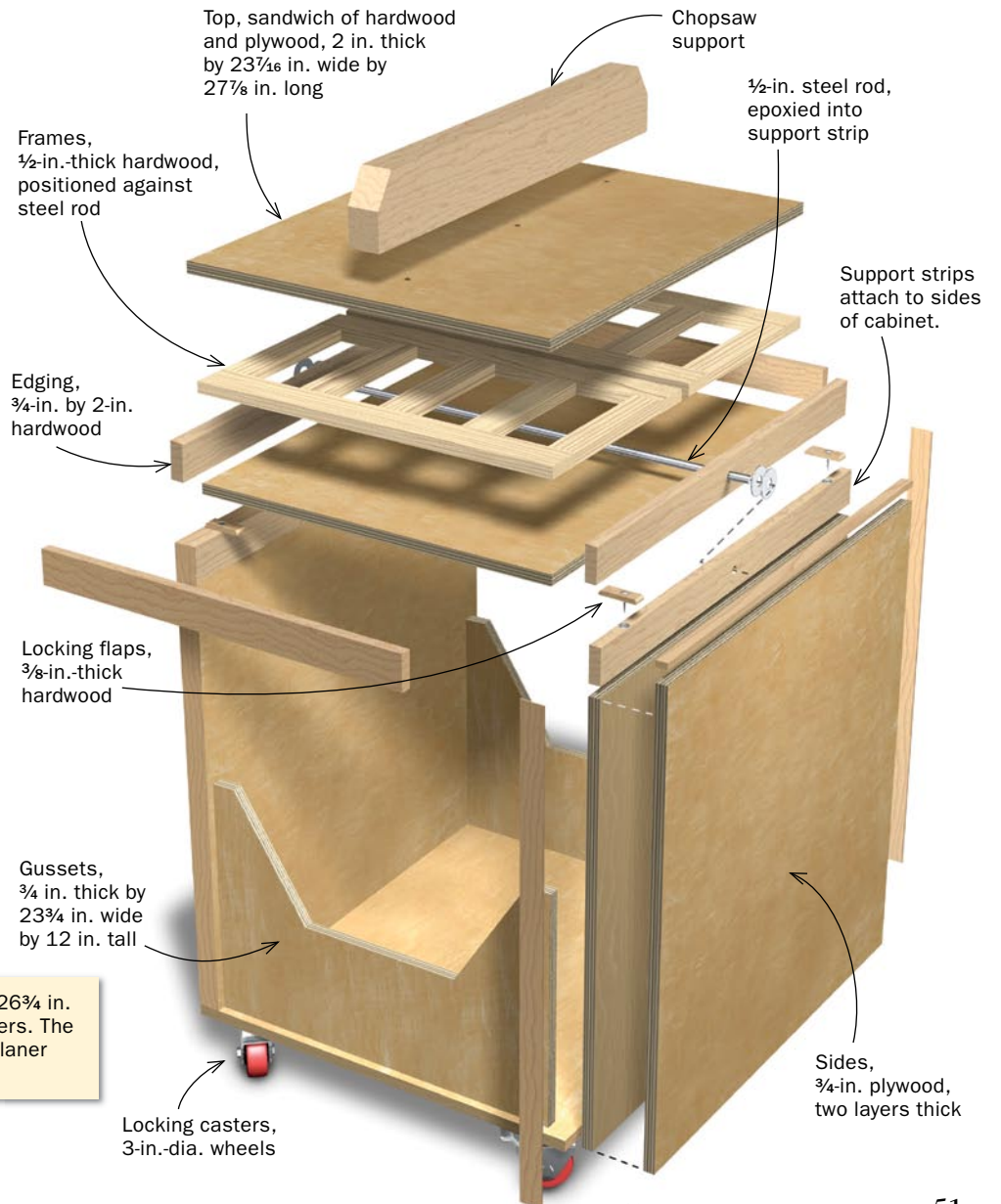
For support at the chopsaw, I simply screwed a length of hard maple to the other side of the top. A more versatile option would be to install an adjustable roller on the side of the cabinet. Then I could use the other side of the top for another tool, such as a disk/belt sander combination.

The secret is to start by building the top, and then size the cabinet parts to fit it. The top is two 3/4-in.-thick pieces of birch plywood glued onto an inner hardwood frame, creating a torsion box of sorts. The frame is the exact thickness of the steel rod, and its two halves are positioned snugly against the rod so it is supported on four sides. The pivot mechanism is deceptively simple: The top is edged with maple, and the rod passes through that edging, ending in two support strips that sit atop the cabinet sides. Before attaching the side edging to the top, drill a 1/2-in. hole through its center points. Then glue on the edging with the rod in place. Now slide two washers onto each end of the steel rod, and epoxy the rod into the outer support strips.



Another innovative cart. The pivoting-top planer cart spends most of its life as an outfeed support for the chopsaw (top), with the planer lying in wait. When needed, the planer pivots upward (center), where it uses the top of the tablesaw for outfeed support (above).

NOTE: The cabinet is 27 7/8 in. deep by 26 3/4 in. wide by 27 7/8 in. tall, not including casters. The overall height, 32 1/2 in., positions the planer bed at tablesaw height.



DIY DUCTING IN A DAY

It's a snap. Teague spent a lot more to get Nordfab ducting, which goes together in a toolless snap and can be dismantled and rearranged just as easily. Oneida, the cyclone manufacturer, eased the process further by producing a ductwork diagram and parts list, based on a drawing of the floor plan.



for the tablesaw holds my handheld power tools, and the auxiliary table sits on a cabinet for tablesaw accessories. All of the wall-storage units—including cabinets and tool boards—are hung on French cleats, making it easy to move or rearrange them later.

Long workbench accommodates roll-out carts—One of the best moves I made was to build a long work surface that starts at the chopsaw station, turns the corner at the back wall, and extends to the dust collector. The surface is simply two thicknesses of plywood glued and screwed together, and it's supported by ¾-in.-thick plywood panels instead of cabinet bases. Underneath I keep a low, rolling assembly table, as well as storage cabinets of various designs. I also keep my pancake-style compressor there, on its own rolling base.

At last, real dust collection

Because the shop shares space with my office, I wanted to keep dust to an absolute minimum. I could have gotten away with a



few smaller mobile units for dust collection, but not only do they take up more space, they also have to be wrangled around the shop constantly. After consulting numerous experts and manufacturers, I went with a 3-hp, 2-stage cyclone collector from Oneida (www.oneida-air.com). I provided them with a drawing of the shop's floor plan, and they gave me a parts list and a drawing of the ductwork layout.

For the ductwork itself, I spent about twice the price of traditional materials in favor of quick-release ducting from Nordfab (www.nordfab.com). This ducting snaps together without tools and goes up in a fraction of the time it takes to rivet and route traditional ductwork. Better still, it can be disassembled and rearranged easily should my tooling or layout change.

Even with a great dust-collection system, a little bit of dust is inevitable. To help manage airborne dust, I hung an air cleaner over the tablesaw. The cost was minimal, but it makes a noticeable difference.

Now that the shop is done and I've spent a few months building furniture there, I don't miss the few corners I cut, but I do appreciate all the extras I insisted on. The floor paint, wainscoting, half-bath, top-flight dust collection, and smart storage solutions all work together to create a comfortable and inspiring workspace. When I walk through the door each morning, I know I'm set up to build almost anything that pops into my mind. It's become my home a few feet away from home. □

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Bottom line: under \$40K



Not counting what I spent on tools and dust collection, which will move with me to my next shop, I came in under the \$40,000 budget. It's worth noting that the shop is built on a pretty steep slope, which added a few thousand to the cost of the foundation.

Builder	\$27,700
Foundation, framing, siding, roofing, windows, and doors	
Architect	\$560
Plumbing	\$4,040
Drain lines, water lines, and fixtures	
Electrical	\$3,440
100-amp panel, wiring, outlets, lighting	
Insulation	\$650
R-30 in the ceiling, R-19 in the walls	
Drywall	\$850
Exterior painting	\$1,200
Climate control	\$700
PTAC unit	
Trim and wainscoting materials	\$300
Total: \$39,440	