

12 Rules for Tool Chests

BY CHRISTOPHER SCHWARZ

Don't reinvent the wheel when storing your tools. A proper chest is still the best.

When I tell people that I've worked out of a traditional tool chest for 15 years, they look at me as if I'm someone who has not yet discovered the joys of indoor plumbing.

They say, "Haven't you tried a wall cabinet? Or built storage below your workbench? Why not a series of open shelves next to your bench?"

The truth is that I've tried all those methods yet I still return to my tool chest. It holds every hand tool a woodworker could want. It protects the tools from dust (which contains salt and encourages rust). And I can get to every tool in the chest with only one hand motion.

In other words, it's tidy, protective and efficient. What more could you want?

The objections that most woodworkers have to tool chests are generated

"One thing I strongly object to — this is the use of inlaying and such extravagances on tool chests; they should be made well, strong, and convenient, so as to last a lifetime, being for use, not for show."

— A Practical Joiner

The Woodworker Magazine, Feb. 1902



A box chock-full of tradition. This tool chest, which was designed from time-tested examples, holds every hand tool you need, protects those tools from dust, and keeps everything just one hand motion away.

by people who have never worked out of a chest or who have worked out of a modern chest.

You see, most new chests that I've encountered are all wrong. They are usually too small to be useful. Most of these mini-chests were built in woodworking classes and needed to be transported home easily — hence their squat stature.

And the interiors of these modern chests are poorly divided. Either the woodworker has French-fitted every tool into a space, which is inflexible, or

he or she has almost no way of dividing up the chest, so the tools are piled at the bottom.

For the last couple years I have studied many ancient chests. And what I found was surprising. Old chests are quite similar in size and in the way their interiors are divided. The other thing that is surprising is how plain most old chests are — inside and out.

Most of the tool chests we see in books are the fancy ones, on which some enterprising soul spent months adding veneer and inlay to the interior. These



The long of it. My 24"-long jointer plane is the biggest plane I own. So I made sure that it would fit in the bottom of my chest and could be easily removed.



Put your right hand in. Secure your body against the rim of the chest with your off-hand. Root around for the tool you need with your dominant hand. No deep-knee bends are necessary.

kinds of chests are rare in the wild. Old chests usually have three compartments in the bottom for planes and saws and three sliding trays above for the remaining tools. No inlay. No banding.

As I studied these old chests, I started developing 12 rules that describe their size and construction. While not all old chests follow all these rules, the best chests obey the majority of them.

**Rule No. 1:
As Long as Your Tool Plus Some**

The sizes of woodworking tool chests are fairly standard – between 35" and 43". This range allows the chest to hold full-size handsaws, which have a 26"-long blade, plus another 5" of wooden tote. Ripsaws can have an even longer blade, up to 30". Plus you need to get your hand in there to grab the tote of your longest saw. In addition to long saws, the chest needs to hold a jointer plane. While metal planes top out at about 24" long, wooden-bodied planes can be as much as 30" long.

Bigger isn't always better, however. A chest that is longer than 43" will make it hard to transport in a carriage or mini-van.

So when you are sketching the length of your chest, measure your longest saw, add 5" so you can get your hand in there easily, and add a couple inches for the thickness of the material. That will easily get you to 37" to 40" if you use full-size saws.

**Rule No. 2:
Tall Enough to Make a
Human Tripod**

Short tool chests are difficult to use. They are about 14" to 16" high, and when you put them on the floor, it is painful to bend over to fetch a tool. So you put them on top of your workbench or table saw. Now the toolbox is taking up valuable space.

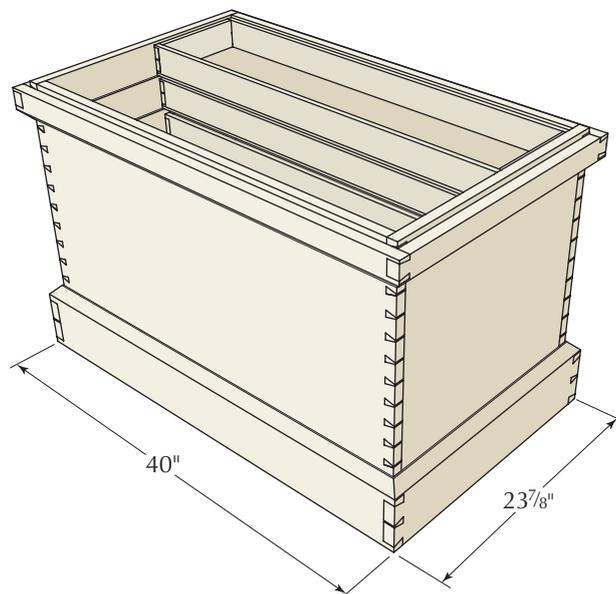
Traditional toolboxes are usually about 22" to 27" high. Those heights are ideal for the human form. The rim of the tool chest is below the pivot point of your waist. So you bend over and place

your off-hand on the rim of the chest to stabilize yourself as you use your dominant hand to shift trays around. Your off-hand becomes the third leg of a human tripod.

Naturally, the extra height gives you more room for tool trays, saw tills or chisel racks. It also makes the chest a nice height for sitting while working at the bench.

**Rule No. 3:
A Depth to Match Your Reach**

The depth of the chest is usually about the same dimension as its height. This



Not too deep. A chest that is too deep from front to back is difficult to use. I've only seen a couple in my travels. So most woodworkers get this concept. This chest is as deep as it is tall.

makes sense for a lot of reasons. For one, it looks nice. A square profile is a pleasing form. But it also makes practical sense. A shallow tool chest wouldn't be as stable, especially with its lid open. A deeper chest would be a pain to use. Imagine a 36"-deep chest. Your arms would have a heck of a time fetching tools in the back.

So now we have sketched out a shell that's about 38" long, 24" high and 24" deep, maybe a little smaller or a little bigger depending on the material on hand. Speaking of material, what wood should we use for the chest? The natural inclination is to use something strong, such as oak or maple. But tool chests in these materials aren't common.

**Rule No. 4:
Reduce the Weight;
Increase the Joinery**

One of the guiding principles of chest construction is to make the chest both lightweight, to make it easier to move, and strong, because the chest might take a beating on a voyage.

Lightweight woods aren't typically as strong as heavy woods. So here's what you do: Use a lightweight wood such as pine. But join the corners using a bombproof joint: through-dovetails. Use this lightweight wood with dovetails for every component of the chest, except for the parts that endure friction. Soft and lightweight woods are easily worn away if they rub constantly against other parts.

So the best strategy is to use oak in certain areas of the chest. That means oak drawer runners and oak drawer bottoms – if your drawer bottoms rest on your runners. If instead your drawer bottoms are captured inside your tool trays, then make the side pieces out of oak. Use pine for the rest of the parts and dovetail every corner.

**Rule No. 5:
Make a Thick Shell**

Let's talk about the four walls of the chest. That's where material selection and construction begins. Old woodworking books are specific about the

material for the shell: the clearest pine possible, free of knots and sapwood.

This might seem odd considering that the chest will be painted, but it's good advice. One of the antique chests I owned had several knots on the back. When I bought it, a couple of the knots had fallen out, and after moving the chest to the Midwest, a couple more fell out. Those I glued back in with epoxy. Why be so fussy about knots? They expose your tools to dust, which carries salts, which will corrode your tools.

Most tool chests have shells made from pine that is between $\frac{7}{8}$ " and 1" thick. Early furniture was more likely to have thicker structural components, so a $\frac{3}{4}$ "-thick shell would be unusual.

So why not make the shell out of $1\frac{1}{2}$ " material? You could, but dovetailing those corners would be a major pain because your material is so thick – you'd probably have to use a tenon saw to cut the dovetails. And I don't think the extra-thick material would add meaningful strength. Chests made from $\frac{7}{8}$ " material stand up just fine for a couple hundred years.

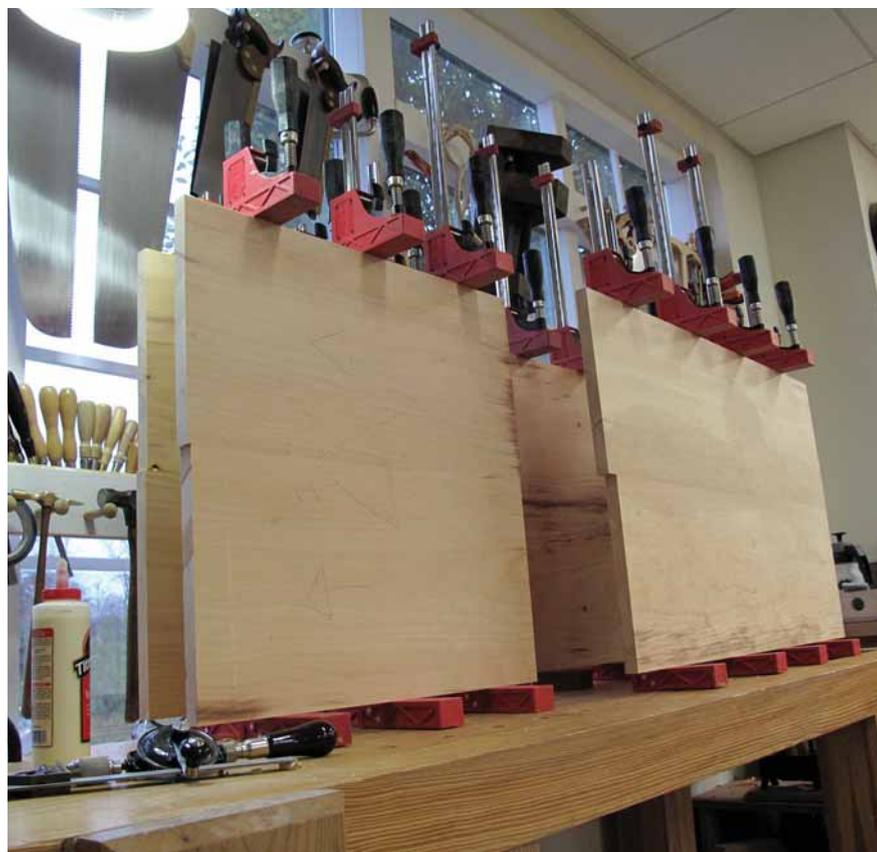
**Rule No. 6:
The Bottom Should Be Nailed.
But Why?**

So after all this talk about dovetails, it might seem odd that I recommend tonguing and grooving the chest's bottom boards and nailing them on. Why not put in a solid bottom that's captured in a groove?

A single solid-panel bottom will move a lot compared to five or six individual bottom boards, which will share the seasonal expansion and contraction. So if you use a solid-panel bottom you must leave a sizable gap for the panel to swell and shrink in the groove in the shell, which isn't ideal. You want everything to be as tight as possible.

There are other good reasons to use individual boards secured by nails. If the bottom gets damaged, replacing one cracked board is easier than replacing an entire panel, no matter how the bottom is attached. And replacing one nailed-on board is easier than replacing a board secured in a groove.

The bottom of the chest is the most susceptible to damage, but not the kind



Light but strong. If you use pine for your shell (and you should), then you should beef up the thickness a bit. I like $\frac{7}{8}$ " – some people go for the full inch.

of damage that some extra thickness will fix. The bottom boards are prone to rot, especially in a leaky basement shop.

Rule No. 7: Skirts, Dust Seals & Miters

The chest's skirt and dust seal are nearly as prone to damage as the chest's bottom. They are the first line of defense when the chest is slid onto a truck or rammed by machinery.

The skirt and dust seal (the skirt near the top rim of the shell) should be bulletproof. Simple miters will not do.

Dovetail the corners of your skirt and dust seal. Yes, it's a pain to fit everything around the shell. But a dovetailed skirt and seal will last forever. Their corners will never open. So the exterior of your chest will look as sturdy in 100 years as the day you built it.

Rule No. 8: Don't Blow it on the Lid

There are several ways to make a lid. Some work great. Some are temporary.

Some chests feature a single flat panel of wood trimmed on three edges with narrow stock that interlocks with the dust seal attached to the shell. These lids shrink, crack and break loose from their trim. Time is unkind to these chests.

Duncan Phyfe (1768-1854), one of the most celebrated 19th-century cabinetmakers, used a flat panel with bread-board ends for the lid of his chest. This lid has survived fairly well, though there is still going to be movement that can interfere with your lock hardware.

The best solution is to build the lid as a frame-and-panel assembly. This confines almost all of the wood movement to the panel, which floats harmlessly in the middle of the rails and stiles.

So you could build the lid like a raised-panel door – except for the panel part. You want the panel to be stout because it will take a beating. So the joint between the panel and the door frame is critical. You don't really want to thin down the edges of the panel like you would when making a door panel. Thin edges will weaken the panel.

The old-school solution here is to plow a groove in the four edges of the panel so the panel will interlock with the rails and stiles. This keeps the joint



Fixable. By securing the bottom with nails instead of a fancier joint, you are making the chest easier to repair in the future. Bottom boards can rot.



Not mitered. Dovetail your skirt and dust seal to the shell to ensure they stick around. Literally.



Better lid. A frame-and-panel lid with a raised panel is about as robust as you can get without adding lots of weight.

between the panel and frame as stout as possible and the panel will be raised above the frame of the lid.

There is no downside to this approach. There are no weak spots on the lid. There is no significant wood movement along the edges or ends of the lid. So the trim around it will stay put. It is a permanent lid.

Rule No. 9: Divide the Bottom Layer

With the exterior shell designed, we can now move to divvying up the inside of the chest. I am struck by how consistently early chests are laid out. And after trying out several arrangements, I've concluded that the old ways are good.

American tool chests tend to have

two things on the bottom layer of the tool chest: planes (bench, moulding and joinery planes) and saws. Some English chests put the saws in a till affixed to the underside of the chest's lid, some did not. Some American chests would put a saw or two on the lid at times, but mostly the saws went in a rack near the front of the chest.

The back of the chest is a good place for moulding planes and rabbet planes. Set them on their toes with the wedges facing the inside of the chest. A dividing wall under the wedges will hold the planes upright. The good thing is that most moulding planes are the same length and width. (Older planes are a little different, but those are fairly rare.) Storing the planes upright in your chest

is ideal. This allows you to see their profiles and sizes.

This part of the chest will take up only a small part of the bottom area – about 3½" of space plus the thickness of the wall. So there is lots of space left.

If you put the moulding planes at the back, I recommend you put the saw till

'More Valuable Than a Shipload of Gold'

Without a proper tool chest, the novel "The Life and Strange Surprising Adventures of Robinson Crusoe" by Daniel Defoe would have been a whole lot shorter.

After Crusoe was shipwrecked off the coast of the Americas in the 1719 novel, he returned to the wrecked vessel to pillage it for supplies. Food, of course, was important to Crusoe. Second on the list: tools.

"And it was after long searching that I found out the carpenter's chest, which was, indeed, a very useful prize to me, and much more valuable than a shipload of gold would have been at that time. I got it down to my raft, whole as it was, without losing time to look into it, for I knew in general what it contained."

With the tools in the chest, Crusoe is able to build a whole life for himself, including a house and many niceties. Of course, first he has to learn to become a woodworker. And first he has to learn to sharpen.

On his second trip back to ship: "... I found two or three bags full of nails and spikes, a great screw-jack, a dozen or two of hatchets, and, above all, that most useful thing called a grindstone."

Crusoe's first project? Learning to process rough stock into boards so he could build a table and chair. His own words should be encouraging to beginning woodworkers who are teaching themselves the craft.

"And here I must needs observe, that as reason is the substance and origin of the mathematics, so by stating and squaring everything by reason, and by making the most rational judgment of things, every man may be, in time, master of every mechanic art. I had never handled a tool in my life; and yet, in time, by labour, application, and contrivance, I found at last that I wanted nothing but I could have made it, especially if I had had tools."

— CS

up at the front of the chest. The size of the saw till depends on how many large saws you own. Because I have only four long saws, my rack is only 4⅝" wide, plus the width of the wall separating the rack from the rest of the chest.

The till is simple – a couple boards with kerfs sliced in them to hold the sawblades. Planning the tills is more difficult than making them. You want to consider the thickness of the totes and the size of the sawblades, both the length and the depth. And you want the till to hold your saws in a place where you can reach them without stooping too far over.

The rest of the space on the floor of the tool chest is reserved for bench planes and joinery planes. In my chest, I ended up with a space that measured more than 10" x 37". That is a lot of acreage. You should be able to fit all of the standard planes in there, plus have room for a few other things. Some woodworkers would fold their shop apron and use it to cover the bench planes.

Having the bench planes, saws and moulding planes at the bottom of the chest works well. For one thing, these tools have more mass than the smaller tools above, so this puts a lot of the weight at the bottom of the chest, lowering the center of gravity.

Also, when you work, the first task of the day is to remove the bench planes

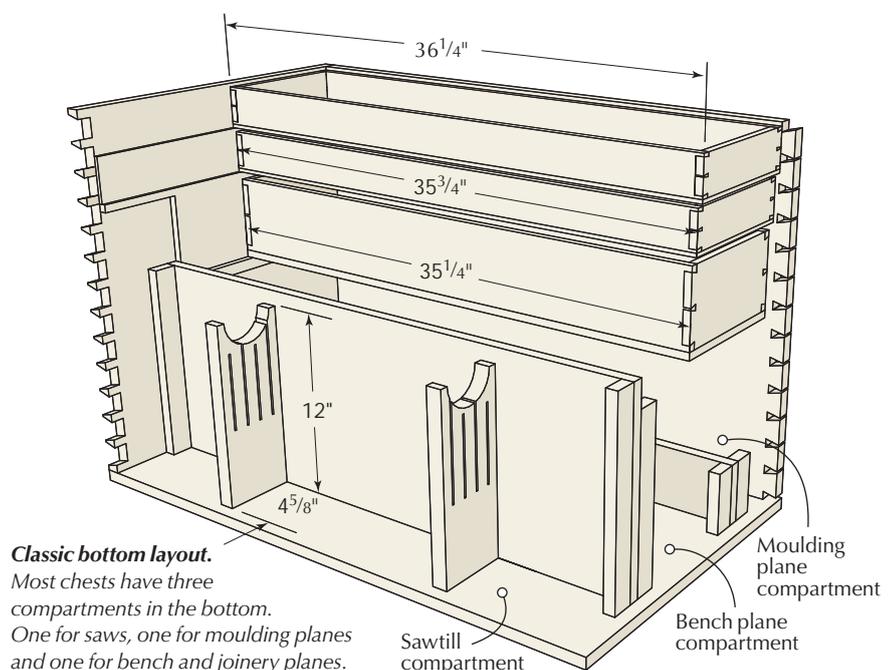
and put them under or on your bench. Then you remove the saws and hang them on the wall in front of you. So now there is a large part of the chest that you don't have to access. The moulding planes can go on the bench – some woodworkers store them in a rack on their bench. But for most woodworkers, making mouldings makes up but a small part of the time on a project. So those planes stay safely down at the bottom of the chest until needed.

Rule No. 10: Trays

The simplest and best way to divide the upper section is to build trays that slide forward and back. Two or three trays are typical. Chests that have trays that slide left and right are out there, though they are rare. Why? Probably because it makes it difficult to fetch the long tools below.

The trays slide forward and back on runners that are nailed and glued to the sides of the chest. These runners are like shallow steps up the side of the chest so that each tray can be pulled out of the chest should you need to repair it.

The joinery for your trays should be permanent. You want to minimize their weight and maximize their durability. I recommend using ½"-thick pine and dovetailing the corners. The bottoms should be thin slips of white oak that are nailed to the underside of the dovetailed





Three trays. Here you can see my three sliding trays arrayed so I can see everything in them. I'm only one hand motion away from accessing any of the three bins in the bottom of the chest.



It's clear. A painted finish is the clear choice for a tool chest. The paint protects the chest from the harsh indignities of workshop life.

trays. This makes the part that wears, the bottom, quite durable. By nailing the bottoms to the trays I save a little space compared to grooving the bottoms in, and I make it easier to repair the bottoms if they are ever wrecked.

I had room for three trays in my latest chest: one that is $4\frac{3}{4}$ " deep and two that are $2\frac{1}{2}$ " deep. You need only one deep tray. Shallow trays are better in almost all cases.

What goes in these trays, specifically? There are lots of ways to go. The point is to keep your arrangement flexible. Sometimes you will be doing a lot of boring. Other times a lot of hammering. The fewer dividers you add the more flexibility you'll have in the long run.

Rule No. 11: Sticking Stuff to the Lid & Walls

Don't forget that the front wall and the lid are good places to store flat stuff. On the lid, some people put a framing square or a few squares. I've seen a few handsaws and backsaws hanging on the lid, too. On the front wall of the tool chest you can hang try squares and joinery saws – this is the traditional approach. I simply rest my dovetail and carcass saws against the wall. Other chests have a rack on the front wall of the chest for chisels, augers and other long and narrow tools – gimlets, awls, striking knives, gouges and the like.

Rule No. 12: Paint the Outside

This is the easy part. The outside of a tool chest should be painted. The modern choice is to use milk paint, which is durable and looks better as it ages. We don't have lead-based paints available, which were the paints of choice in the pre-Industrial world.

Paint will keep your chest looking good for a long time. Anytime it gets beat up, you can renew the look with another coat of paint. A stain or clear finish cannot be renewed as easily. Plus, paint is the most weather-, UV- and abuse-resistant finish available.

On the inside of the chest, I recommend skipping a finish. If you must finish the inside, use shellac, which will cure quickly and won't leave a nasty oily smell like linseed oil will.

Don't Be a Modern Failure

Many modern efforts to improve our workshops have been unsuccessful. We tried to re-engineer our workbenches so they were portable, and they became too lightweight and spindly. We redesigned the sawbench into plastic sawhorses that are the wrong height and are flimsy. We invented iron quick-release vises, which won't hold much of anything relating to woodworking.

And we have done the same thing with tool chests.

Our woodworking ancestors may have been uneducated and illiterate, but they certainly weren't stupid. They had to make a living out of their tool chests, so the design and function of their tool storage was well-considered.

I also have found that a traditional tool chest has other lessons to teach – if you pay attention – including the fact that it holds just the right number of tools to build any piece of furniture – and no more tools than you actually need. **PWM**

Christopher is contributing editor to this magazine and a partner at Lost Art Press. His latest book is "The Anarchist's Tool Chest."

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VIDEO: See how easy it is to get to all your tools with just one hand motion.

BLOG: Follow the Lost Art Press blog for more insights into tool chests.

ARTICLE: Read the rules for workbenches.

TO BUY: "The Anarchist's Tool Chest," by Christopher Schwarz (Lost Art Press).

IN OUR STORE: "Handplane Essentials" (Popular Woodworking) by Christopher Schwarz.

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