

# Toughen Wood with Epoxy

Create durable screw threads and long-lasting jigs

BY MICHAEL C. FORTUNE



## The right epoxy sets slowly

Whether you are reinforcing holes in a drilling guide or strengthening threaded holes for screws, you need a slow-setting epoxy. Fortune prefers G2 epoxy from System Three Resins (No. 56Z72.01; \$36 for 24 oz., [leevalley.com](http://leevalley.com)), which has a working time of 60 minutes—more than enough time to get it into all of the holes of a shelf-pin jig and then clean them up before the epoxy begins to harden. Mix the epoxy and then scoop it into a syringe, so you can inject it where needed.



Any time you repeatedly install and remove a screw in wood or sheet goods like MDF, the threaded hole gets enlarged and you lose holding power.

A perfect example is when you fit a door to an opening. You hang the door on the hinges, check its fit, take the door off, take a few shavings, rehang the door, check the fit again, take the door off again, and so on until all of the gaps are just right. It's a repetitive task that can strip the screw threads. The same thing happens when you move toggle clamps from one jig to another or to different locations on the same jig.

But stripped threads don't need to be a problem. For many years, I've reinforced the hinge screw holes with epoxy before I begin fitting a door, and used it to harden threaded screw holes for clamps on my jigs. The hardened threads are like a steel insert and will never strip. I'll show you my process, and how I use epoxy to strengthen holes in shopmade drilling guides, such as shelf pin and doweling jigs. Jigs like these start out accurate but become unreliable because the guide holes get enlarged over time. However, if you saturate the walls of the holes with epoxy, they never lose their shape.

## Screw threads that won't lose their teeth

The secret to strong screw threads is to get them to absorb as much epoxy as possible, so the wood fibers



## SCREW HOLES THAT ARE TOUGH AS STEEL

It's frustrating when a stripped screw hole loses its bite. Leave that agony behind for good by strengthening the hole's threads with epoxy.



**Your jigs are instantly better.** Epoxy-hardened threaded holes can withstand years of use. You never have to worry about moving clamps or components because the threads won't wear out.



**Turn a screw into a tap.** File a groove through the first four to five threads of the screw to create a cutting edge (above). Now the screw will cut threads into the wood fibers, rather than compressing them into shape. Then, after drilling a pilot hole, drive in the screw to cut the threads (right).



**Make a screw shed glue.** Heat another screw, the same size as the filed one, with a match (top). Rub it on a block of wax (bottom) to coat the threads, shaft, and underside of the head.



**Fill the hole.** The grain will soak up the epoxy, which is exactly what you want.



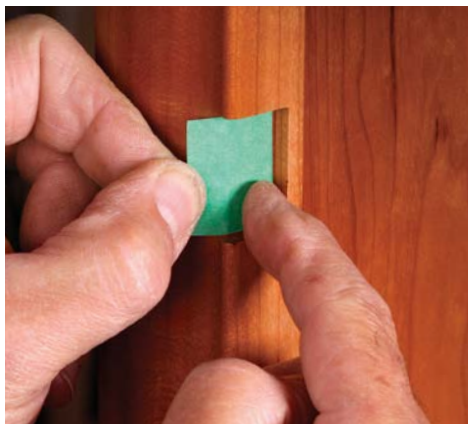
**Create the threads.** Drive in the waxed screw to form durable, reusable threads in the epoxied hole. Remove the screw after the epoxy has cured.



## GREAT FOR HINGE SCREWS, TOO

Fitting a door requires you to install and remove the hinge many times, and it's easy to strip the threads inside the screw holes. Cut the threads just like you did for the screw threads on the jig (p. 71).

**Inject epoxy.** Use a syringe to direct the glue into the hole and to keep it off the surrounding mortise.



**Cover with tape.** This prevents the wet epoxy from pouring out of the holes (left). A small hole created by an awl is enough to get the screw started through the tape (right).

**Drive in waxed screws.** Make sure they are deep enough that their heads will be flush with the hinge leaf after the epoxy dries.



are infused with hardened glue. I've found that the best way is to cut the threads with a tap. If you form the threads by driving the screw into a pilot hole, the screw simply pushes the fibers into the shape of the threads. This burnishes the wood, making it less absorbent. If you cut the threads with a tap, more epoxy can soak in.

The prospect of finding a tap to match your wood screws might seem impossible (and probably is). Luckily, you can make it instead, using an extra screw identical to the ones you'll use. File a groove in the tapered section of the screw to create a cutting edge. Drive it into the pilot hole. The screw now cuts real threads rather than pushing the wood into shape.

After the threads are cut, take another screw—no groove cut into this one—and heat it with a match for about five seconds. Hold the hot screw on the tip of a screw driver and quickly set it on a chunk of paraffin wax. Rotate the screw to melt the wax over the threads and shank, and under the head. It's important that the screw be coated in wax, not encased in it. Let the wax dry.

Now mix up the epoxy and use a thin scrap of wood or a Popsicle stick to scoop it into a syringe. Inject it into the screw hole. Wait a few minutes and inject more. Continue to add epoxy to the hole until the fibers no longer absorb it. Then drive in the wax-coated screw and leave it there until the epoxy has cured. After it has cured, you can remove the waxed screw, leaving a perfectly formed, strong threaded hole.

To remove the epoxy from the syringe, repeatedly run the plunger in and out to remove as much as you can. Let the remaining epoxy harden, and then blow it out with compressed air.

### Drilling jigs last for decades

Shopmade drilling guides, like those used for dowel joinery and shelf pins, are easy to make and accurate, at least when you first make them. But through use, the holes become larger and then you have to make a new guide. It doesn't have to be that way. I still use some doweling jigs that I made in 1979, and they are just as accurate today as when I made them.

Epoxy, of course, is the magic elixir that gives such long life. I soak the wood, MDF, or plywood around the holes with epoxy. After the glue has cured, the fibers are hard and the holes won't enlarge—not even after decades of use.



## DRILLING JIGS THAT NEVER DIE

Many woodworkers use shopmade jigs for dowel joinery and shelf-pin holes. Their big weakness is that the guide holes very quickly become too large. Reinforced with epoxy, the holes maintain their original diameter and accuracy.

**Years of service.** With holes hardened by epoxy, drilling jigs stay accurate for decades. Fortune has one doweling jig that's been in service since 1979.



**Add epoxy.** Fortune uses a small dowel to spread it over the hole's wall.



**Wax a drill bit.** The shank diameter should match the diameter of the jig's holes.

Drill the holes at the drill press with a brad-point bit. It is critical that the walls of the hole are smooth. Holes that are ragged after drilling will be even more so after you've saturated the fibers with epoxy.

Now mix up some epoxy and begin to inject it into the holes and spread it on the surrounding surface. Let the epoxy soak in and add more until the fibers can't soak up any more. (If the jig is made from solid wood, the end grain in the hole will be especially thirsty.) After the fibers in the hole walls are saturated, let the epoxy stand for five minutes. In the meantime, wax and buff the unfluted section of a drill bit's shaft—its diameter needs to match the diameter of the holes. Insert the waxed section into a hole. This cleans out any excess epoxy and ensures that the hole will be the correct diameter after the epoxy has cured. Pull out the bit and repeat until all of the jig's guide holes are clean. Let the epoxy cure completely before using the guide. □

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**Clean out the holes.** If the fit is tight, rotate the bit slowly counterclockwise as you insert it.