



# Sanding Basics

Tips for tackling big panels  
and problem parts

BY JEFF JEWITT

# Smoothing a flat surface

Even if the wood's surface appears perfect after you've run it through the tablesaw, jointer, or planer, it's not. All of these machines leave their marks, and the tricky part is that those marks often aren't visible on bare wood. Unfortunately, they'll jump out once a stain or clear finish is applied. That's why all boards coming off a machine need further leveling and smoothing.

The type of preparation you use—hand, machine, or a mix of the two—will be dictated partly by the piece you're working on. If you're making a period reproduction where nuanced tool marks are a sign of handcraftsmanship, all you may need is a final quick sanding with very fine sandpaper after using scrapers and planes. However, most woodworkers want a dead-flat and smooth surface, and the way to achieve this is with modern abrasives and sanding machines. Here I'll give you my time-tested methods for getting the best results with these tools.

To smooth a panel efficiently, combine machine and hand techniques, working from coarser to finer-grit abrasives.

## START WITH POWER



**Erase machine marks.** Use a 5- or 6-in. random-orbit sander, starting with 150-grit paper and finishing with 180-grit. Jewitt uses cushioned work gloves to dampen the sander's vibration.

## FINISH BY HAND

**The right angle.** After power-sanding to 180 grit, Jewitt starts hand-sanding with 220-grit paper wrapped around a cork sanding block. Your shop teacher may have yelled at you if you didn't sand with the grain, but sanding at a slight bias of 7° to 10° shears off the wood fibers better without leaving visible cross-grain scratches.



### VIDEO SERIES

Learn the secrets to better sanding in a three-part series, available for members only, at [FineWoodworking.com/extras](http://FineWoodworking.com/extras).



**Hand-sanding disks.** If you find it tiring to grip a sanding block for long periods, use a strap-on hand pad designed for hook-and-loop disks.



**End with the end grain.** You can usually stop sanding face grain at 220 grit, but go to 400 grit on end grain for a glass-smooth finish.

# Flatten a large panel

Panels that are too wide for a jointer and planer, like a glued-up tabletop, must be flattened before smoothing. A belt sander is the best power tool for the job.

## A FLAT GLUE-UP SPEEDS SANDING



**Clamp down, then across.** First clamp the boards between batters to bring them flush. Then apply pressure across the panel to make the joints tight (above). To prevent gumming up the sandpaper, scrape off dried glue (right) before you start sanding.



## The big challenge: Flattening wide panels

I've been answering woodworking and finishing questions for more than 20 years and one thing that causes a lot of head-scratching is how to flatten a multi-board panel. It is too wide to go through your planer, your handplane skills may not be up to the challenge, and your 5-in. random-orbit sander is inadequate. To cap it all off, this panel often becomes the most visible part of a project, whether it is a tabletop, a desktop, or the sides or top of a chest of drawers. It needs to be perfect.

My answer is to use a belt sander. But the first step in my flattening process occurs during glue-up, when I align the boards as carefully as possible. I clamp 1½-in.-square batters across the glue-up near the ends and in the middle to sandwich the boards into alignment. I use laminate-faced batters to repel glue, but packing tape will work, too. I then partially tighten the bar clamps underneath the board and try to bring the joints flush where there's any misalignment, using a non-marking mallet for extra persuasion. When the panel is as flush as possible, I apply the rest of the bar clamps and snug them all down.

Despite these precautions, unless you're very lucky, there will still be some bumps at the joints. This is where you bring in the heavy equipment. The best tool for the job is a large 4-in. by 24-in.



belt sander. A second choice, though slower, is a good-quality 6-in. random-orbit sander with either a barrel grip or a pistol grip.

When sanding panels, you level the surface by bringing the high spots down to the low ones, removing the milling marks at the same time. To do this logically and efficiently, I use a crosshatch technique just the way you would when using a scrub plane to level large panels. While it's counter-intuitive because most have been taught to sand "with the grain," this technique levels better. Start by drawing some pencil or chalk lines across the width of the panel. Load the sander with 100- or 120-grit paper and move it

## ATTACK FROM DIFFERENT DIRECTIONS FOR EVEN STOCK REMOVAL



**Crosshatch pattern.** The best way to level joints between boards is to run the sander at 45° to the grain, first to the left (left) and then to the right (right).

**Now go with the grain.** Once the joints are level, sand with the grain to flatten the whole board.



**Check your progress.** Use a straightedge that exceeds the width of the panel so that you can check for high spots. Once the panel is flat, you can start the smoothing process (see p. 49).

across the panel at a 45° angle. Make three to five passes down the whole panel, overlapping strokes by an inch or two, then switch to the opposing 45° angle and do the same. Keep switching until the lines are gone. Then sand the whole panel with strokes along the grain. As you work, check your progress with a straightedge. Once the surface is flat, you can start the smoothing process.

### Smoothing flat surfaces by machine and by hand

Now switch to a 5-in. or 6-in. random-orbit sander and continue smoothing the surface with 150-grit disks, then 180-grit disks. This

time, move the sander with the grain or at a slight angle. With random-orbit sanding you should not skip grits. One reason these machines sand more efficiently is because they put cross-grain scratches in the wood. If you skip grits, more than likely you'll see coarse scratch marks later.

One of the hardest things is to know when you've sanded enough with a particular grit. Trust your eyes and your hands. Work at a comfortable height and with a strong light source on the far side of the workpiece. If you don't have a source of good natural back-lighting, use a spotlight that you can position to rake

# Sanding challenges

Narrow sections, tight corners, and curved surfaces all require special sanding techniques.

## NARROW PARTS



**Tipping the balance.** On a narrow surface it is easy to tip the sander to one side, rounding over the crisp edge (above). Sanding multiple narrow sections at once not only creates a stable surface to sand on but speeds up the process (right).



## TIGHT CORNERS



**Custom sanding block.** To reach right into a corner without sanding across the grain, attach pressure sensitive adhesive (PSA) sandpaper to a small block, or mount regular paper to the block using spray adhesive.

the workpiece. As you sand, inspect the sandpaper periodically to make sure it's not clogging up or wearing out. Power sanders that have dust extraction are a must in today's shop, but the disks will eventually wear out, so examine the edges for worn grit, tears, or creases. Don't be frugal—worn-out sandpaper can do more harm than good.

Once you have power-sanded to at least 180 grit, you are ready to sand by hand. Tear a sheet of sandpaper into the size you want, typically quarters. I have an old hacksaw blade mounted on the edge of my workbench to do this. Back up the sandpaper with a sanding block. You can also use hook-and-loop disk sandpaper with a grip-faced hand pad. Hand-sanding is rough on the hands, so wear garden gloves or work gloves. I buy the ones with rubberized palms so I can get a better grip on the sandpaper and the part I'm working on.

Every woodworker is taught to hand-sand by pushing the paper with the grain. However, I prefer to hand-sand at a slight bias of 7° to 10° because it slices off wood fibers better. If you've done a good job sanding on the machine, you can probably begin and end the hand-sanding using 220-grit paper.

Because hand-sanding always leaves a scratch pattern that follows the grain or blends in with it, you can get away with skipping grits. For example, you can start hand-sanding at 100 grit, go to 150, and then skip to 220. If you're just starting out as a

## TIP KEEP YOUR SANDPAPER CLEAN



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When hand or machine sanding, the sandpaper can get clogged with dust (1). To clean it, swipe the sandpaper across a piece of synthetic abrasive pad (2). The result is clean sandpaper that keeps cutting longer (3).

woodworker and are not yet sure of your technique, play it safe and don't skip grits.

**How to handle curved surfaces**—On complicated areas such as moldings, carvings, routed profiles, and rounded or curved areas, a power sander can ruin the shape, so you must sand by hand. When you hand-sand curved surfaces, always try to back up the sandpaper with a rigid or semi-rigid block that matches the wood's profile. The woodworking and automotive industries both offer flexible sanding blocks designed for contour sanding. You also could use dowels or custom blocks made from

rigid foam insulation. On more intricate profiles, just use your fingers or hand.

### When to stop sanding

How far you sand is a question that's been argued and debated by woodworkers for decades. In most cases, you shouldn't have to sand past 220 grit; however, some woods reveal greater luster and figure if you sand with finer grits. In these cases, you be the judge: Look at finished samples side by side that have been sanded to different grits to see if the extra work pays off.

## TWO WAYS TO SEE IF YOU'RE DONE



**Raking light reveals hills and hollows.** Shine a low light along the panel to make sure it is dead flat.



**Wet the wood.** Use denatured alcohol, mineral spirits, or water to wet the wood and reveal any remaining sanding scratches or machine marks from the jointer or planer.

## CURVES AND MOLDINGS



**Stick it and sand it.** For shallow curves, make a flexible sanding block out of a  $\frac{1}{8}$ -in.-thick strip of wood. Attach the sandpaper to it using spray-mount adhesive (above), or use PSA paper.



**Your flexible friend.** This thin rubber sanding block can be flexed to match a variety of contours.



**Match the profile.** You can buy rubber shapes like this teardrop sander that match common convex and concave profiles, or look around your shop for suitable alternatives such as dowels.

There are times when sanding to a higher grit definitely makes a discernible and practical difference. The first is when using water-based finish, where you get a lot of grain-raising when you apply the first coat or two. Sanding to 320 or 400 grit will leave smaller “shards” of torn cellular material, which translates into less raised grain. Another example is sanding end grain: Going up to 320 or 400 grit leaves a more uniform finished appearance.

Always check your sanding before you apply a stain or finish. Examine the surface in raking light and then wipe down the wood with mineral spirits, denatured alcohol, or water. Use one of the latter two if you're using a water-based finish, but if you use water you will have to smooth away the raised grain with the last grit you used. As well as wiping away sanding “swarf” (the mix of sawdust and worn-off sandpaper grit), the liquid will highlight any low spots, milling marks, and sanding scratches.

Once the wood feels dry to the touch, you can correct any problems by sanding again with 150-grit or 180-grit paper, then progress to 220 (or the highest grit you used in that area). Try not to work a small area too much or you'll risk creating a depression that will show when finish is applied. Rather, sand away the blemish and then gradually feather outward to blend in the repair.

Sanding is a lot of work, but remember, the foundation of any fine finish is a well-sanded surface. □

*Jeff Jewitt has written several finishing books published by The Taunton Press and is the owner of Homestead Finishing Products.*