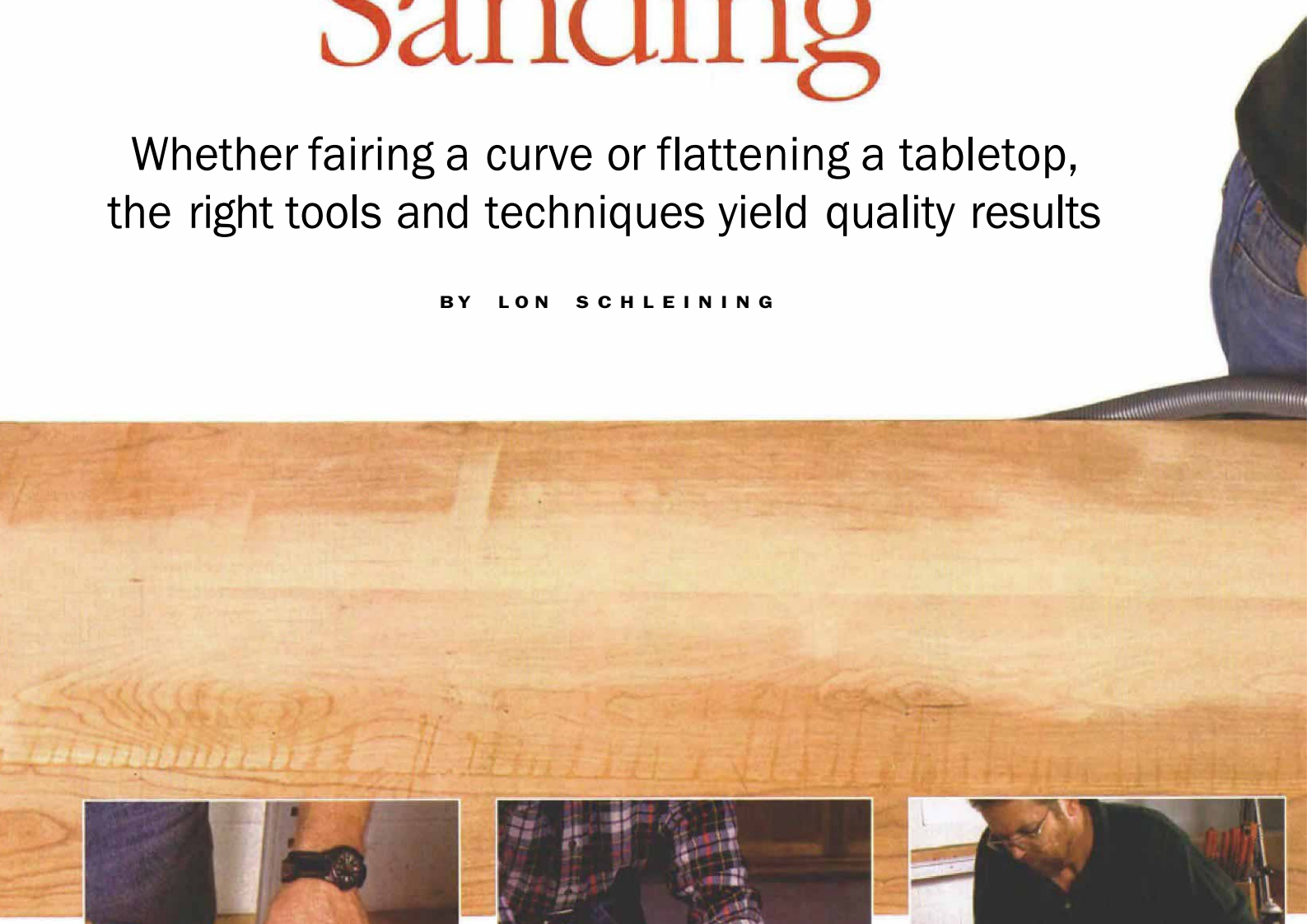
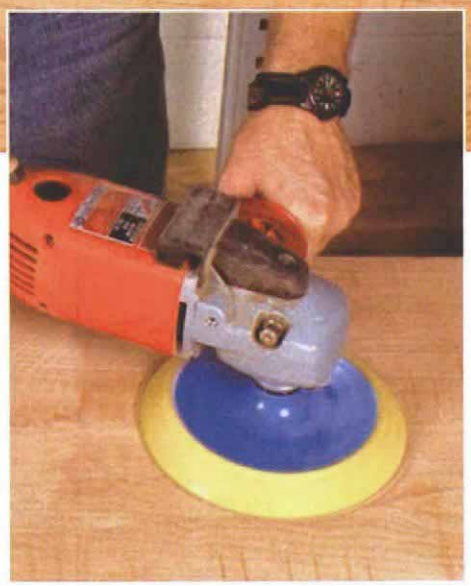
Tips for Better Sanding

Whether fairing a curve or flattening a tabletop, the right tools and techniques yield quality results

BY LON SCHLEINING





PICKING *THE RIGHT SANDING TOOL*

FLATTENING A TABLETOP

FAIRING A CURVE

When I tell students in my woodworking classes at Cerritos College that sanding is one of my favorite activities, they usually look at me like I'm a little cracked. But the truth is, I look forward to sanding—especially that last hand-sanding, which tells me I've finished another job. With thoughtful planning and the right tools, sanding doesn't have to be tedious.

I approach sanding in two stages: shaping and smoothing. If the piece still needs some work after it is cut and pared with other tools, then sanding tools can complete the shaping. If I'm working on a curved piece with changing grain direction, for example, I can shape it more easily with a sanding tool than with an edge tool. There is also less chance of tearing out the grain.

Shaping uses 80- to 120-grit sandpaper and powerful tools. I use a 4-in. by 24-in. belt sander, 5-in. and 8-in. rotary disc sanders, a right-angle random-orbit sander, an inflatable, handheld drum sander and a spindle sander—whatever best fits the job I'm up against. During shaping, I sand until I can no longer spot any machine marks, lumps, glue marks or deep scratches. If I find rough patches, I go back to shaping with 100-grit sandpaper before I begin smoothing.

Smoothing usually involves using less aggressive machines and paper grits of 120 and finer. I use an orbital sander, palm- and pistol-grip random-orbit sanders, as well as hand-sanding blocks of various shapes and sizes—both flexible and rigid. If this sounds like a lot of sanding tools, it is. It just boils down to the fact that it takes different tools to handle different jobs efficiently.

Both sanding stages are best done sooner rather than later—ideally, prior to assembly. This usually saves me from sanding for long periods of time, and it also keeps me from sanding into tight spots. A drawer is a good example. If the interior pieces of a drawer need sanding, do so before assembling the drawer. This way the sanding can be done in minutes without the difficulty of sanding into inside corners. Any miters or frame-and-panel assemblies can be handled the same way, saving countless frustrations. Then after assembly, usually only a light hand-sanding is needed before the finish is applied.

Sanding involves removing all of the machine marks and the scratches left by rougher-grit sandpaper. Then, using finer and finer grits, the scratches from the previous sandpaper are reduced until the piece is smooth. Often, grains come off the paper as the sanding takes place. And if larger sanding grains from earlier grits are left on the surface, they can be rubbed into the board and gouge the wood. You can prevent this by vacuuming dust and sanding debris before moving to finer grits.

The first step toward efficient sanding is to make sure you remove all of the scratches from the previous tool. I spend more time (80%) with the rougher

Photos: Matthew Teague

grits and less time (20%) with the finer grits. If you sand thoroughly with each grit and move from one grit to the next without skipping, no single grit takes a long time. After removing milling marks with 100 grit, don't skip 120 and 150 grits. No matter how long you sand, 180-grit paper will not remove scratches made by 100-grit paper. And when you're sanding, sand the entire project one grit at a time. Sanding only part of the project will inevitably result in a poorly sanded project, and the finish will suffer.

Use finer-grit sandpaper on rougher, more aggressive tools. I rarely use grit even as rough as 80 on my belt, orbital or disc sanders. One hundred grit is just about as fast and won't leave such deep scratches. Remember that even though the grit itself is finer on 100-grit paper than it is on 80 grit, there is more of it—so the cutting speed is often the same. The harder the wood, the harder it is to remove scratches. On woods like hard maple, it is very difficult to remove the scratches left by using rougher grits like 80 or even 100. You can alleviate this problem by starting with 120-grit or finer paper.

Most woodworkers have heard the expression, "Let the tool do the work." No where is this more applicable than with sanding. The machine should supply the power. The sandpaper should supply the cutting action. All the operator should supply is guidance, not downward pressure. If you find that you're applying so much downward pressure that you're getting tired, chances are your sandpaper is too dull or your machine is too light for the job.

The microscopic grains of sand on sandpaper are initially very sharp. They cut into the surface quite readily with little effort or pressure. They soon dull, however. The sharp points

Tuning and using a belt sander

An uneven sander won't flatten anything. *The author replaces a belt sander's metal platen with graphite-coated canvas using the old platen as a pattern. A new, flat platen can make a big difference in a machine's performance.*

On most projects, my belt sander is the first tool I reach for. I've heard countless horror stories from students and woodworkers about projects they've destroyed with belt sanders, but with a few adjustments and a little practice, it's an invaluable tool.

One big problem I've noticed is that the stock sheet-metal platens on most belt sanders are rarely flat from the beginning, much less after hours of use. As the belt rubs against and heats the platen, the metal distorts, creating a convex platen that will leave a dished-out sanding pattern. Luckily, platens are easily replaced with graphite-coated canvas (see the photo at left), the material normally used on larger sanding tools. The canvas is available from Klingspor (800-228-0000).

A belt sander must sit flat on the surface to do its job. Start with the sander resting on the work. When you pull the trigger, the machine will lurch forward a bit. But once it starts sanding, simply let it float on the surface. Keep it moving, but don't grip the handles so tightly that you tilt the machine or prevent it from floating across the surface.

Practice helps. Cover a surface with pencil marks to see whether you're actually sanding where you think you are. Then sand only a few seconds between inspections. You might be surprised to see that you didn't sand where you thought you did, and vice versa. You'll see that to sand out to the edge, the sander must hang about half its length over the edge.

If you're as frustrated with a belt sander as some of my students are, try a sanding frame. A frame helps control a portable belt sander so that it sands evenly (see the photo below). Sanding frames are now available from most sander manufacturers, and though the investment is small, the difference is tremendous, especially if you're just starting out.

A sanding frame tames a belt sander. *A sanding frame rides on the surface, suspending the sander above the work. The amount of sanding pressure actually applied to the project is more easily controlled than when using the sander alone.*

Using orbital and random-orbit machines

An orbital sander is a wonderful tool, but if used incorrectly it can ruin a nice project in seconds. A tool long relied upon in the boat-building trade, the large 8-in. disc will remove material at an amazing rate.

An orbital sander removes material as the disc spins in a circular pattern. There are soft, hard, flat and curved pads—all used with different techniques and for different jobs. Soft pads conform to curved surfaces, and curved pads will sand to a feather edge. Hard, flat pads sand surfaces flat. I use a variable-speed Milwaukee with a special pressure-sensitive adhesive (PSA) foam pad. I also have a buffing attachment for buffing out finishes.

A random-orbit sander works like an orbital sander, except the disc not only orbits but also rotates. The random action produces a sanding pattern that is almost indiscernible on the surface of the wood. On flat surfaces, this can save you from hand-sanding completely. But if you try to sand a curved surface or the edge of a project, the rotation of the sanding pad stops. Sanding anything but flat surfaces with a random-orbit sander defeats the whole purpose of using this machine.

Always hold it steady and flat. Some newer orbital sanders are as aggressive as belt sanders. As with any sander, the pad should be held flat on the surface. Any time the pad is tilted, it digs a crater in the surface of the work. Back up a grit or two to remove them.

Hand-sanding with a block

Always use a block when hand-sanding a flat surface. Without a block, hand-sanding applies pressure only where your fingers are, resulting in a surface that will never be as flat as you'd like. A block spreads the pressure evenly across the board. To apply pressure to the high spots on the board without loading up the paper, cushion the block with cork or felt. As the sandpaper cuts, the dust is deposited more evenly on the surface, not just in a few spots.

Do not use a hard wooden block for hand-sanding. The sandpaper almost immediately gets filled up in just a few spots. These spots then build up into small, volcano-shaped high points, and the result is a project that has scratches in it, even after all your hard work.

My sanding block is nothing more than a block of wood with felt glued on one side. I cut a block the right size, glue ¼-in.-thick felt on it, and that's it. I make my sanding blocks one-third the size of half of a sheet of paper and then glue on the felt. For sandpaper, I tear sheets in half, then fold this half piece into thirds (see the photo at left). The entire sheet is used with this system. Folded in thirds, there is sand exposed on two sides. One side sands, the other goes against the block, sticking to the felt. When both of these sides are worn, refold the paper to expose the last third for the final sanding. This is one time where saving labor is worth more than the material. I only apply light pressure, and I change the paper often. Once paper gets dull, I throw it away and grab another piece.

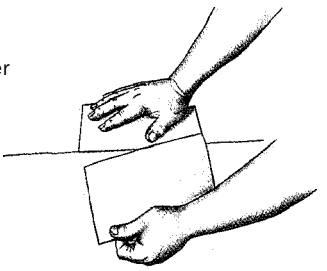
For hand-sanding contours, a larger piece of sandpaper better fits my hands. The drawings at right show an efficient way to use a whole sheet of sandpaper without waste.

Folded half sheets for a sanding block. *Tear paper in half and fold it into thirds, taking care to use every surface before you discard the sheet. Felt on the block evens out the sanding pressure and helps hold the paper in place.*

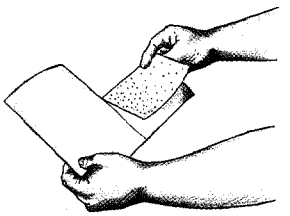
FOLDING A FULL SHEET FOR HAND-SANDING WITHOUT A BLOCK

Folding a sheet of sandpaper into quarters ensures that all surfaces get used. With this system, the cutting sides don't dull by rubbing against each other.

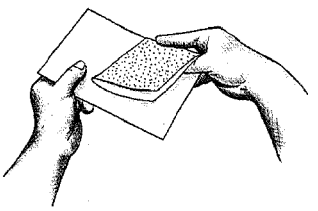
1. Sandpaper is creased but torn only halfway across its length.



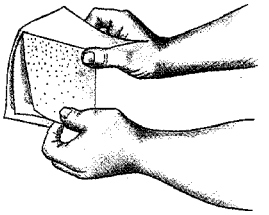
2. First quarter of paper is folded with grit facing out.



3. The two thicknesses of sandpaper are folded onto sheet's third quarter.



4. Fourth quarter of paper is folded into final shape, without ever having to fold grit onto grit.



Drawings: Mark Sant'Angelo

break off, the paper gets clogged with dust and cutting no longer takes place—only rubbing. And this rubbing has the effect of polishing or glazing the wood's surface, not smoothing it.

Sanding efficiently means going through a lot of sandpaper. It's a hard rule to get used to, but I save a great deal of time and sweat by throwing away sandpaper before it gets dull. You can feel the paper lose its cutting action when sanding gets easier. This is because the paper is sliding over the surface instead of digging in. Use the oldest belt or disc until it is dull, then throw the old one out and reach for a new one. That way you won't have 50 partially used sanding belts on the shelf.

The shadows left by glue may not be visible until the finish is applied, so around glue joints sand a bit more to ensure that the glue will be completely removed. I always try to err on the side of sanding too much rather than too little. When it looks like you're finished, sand just a little more.

If you're using a penetrating oil finish, you'll want the surface as smooth as possible, up to about 400 grit. But if you're using a water- or alcohol-based stain, the stain will raise the grain when it is applied, so stopping at 150 or 220 grit makes more sense. The first coat of finish sealer, paste filler, stain or primer will harden and stabilize the surface. Then move to the finer grits, from 180 to 400. Read and follow the instructions that come with the finishing materials before you start the sanding process. Let the tools and sandpaper do the work. In no time, your project will be perfectly sanded and ready for finish. □

Lon Schleining is a stairbuilder and woodworking instructor in Long Beach, Calif.

Flattening a tabletop

Flattening a tabletop is one of the toughest sanding jobs, especially if your glued-up boards are not quite flush with one another. But the plan of attack is quite simple: Remove the high spots and avoid sanding the low spots. Here's the easiest way I've found to bring a tabletop flat.

1 First concentrate on the glue joints because they will eventually be the low point to which you must work once they're flush. With a belt sander, I sand with 100 grit at about a 45° angle, first to the right of the grain pattern and then to the left. Sand evenly in both directions. This way there's a chevron pattern to the sanding marks.

2 & 3 Use a straight board as a batten and coat it in chalk to see where the top is not flat. Rubbing the board across the top quickly highlights the high spots where more sanding is needed.

4 Once you sand off all of the chalk, start the process over. Eventually, the piece will be flat. If this sounds oversimplified, it's not. Once the surface is flat, use the same grit to sand with the grain to remove the cross-grain scratches.

It's possible to do this flattening with a well-tuned and very sharp handplane using the same technique, but you risk digging into the work or causing tearout. On the other hand, for a few dollars, a commercial drum sander can flatten your tabletop in just a few minutes.

Rounding the gluelines. *Horizontal chalklines stripe the surface, and only the highest spots—the gluelines—are sanded in vertical stripes until the curve nears its final shape.*

Fairing a curve

Chalking high spots. *A thin batten is coated with chalk, then bent across the surface to find high spots in the curve. The chalk marks are sanded away with a sanding block.*

Pliable sanding block. *The author glues sandpaper to ¼-in. plywood, which bends and slides smoothly over the surface, keeping a curve in line.*

Fairing a curve means shaping it to eliminate any lumps or hollows. In woodworking, as in sculpture, the only means you have to make the curve fair is to remove material. This means that you must concentrate on the high spots and leave the low spots alone. This sounds simple enough, but in practice it's sometimes difficult even to tell the difference.

Sanding just to be sanding almost always makes the curve more lumpy. On edge curves, I often see students attempting to smooth or fair a curved piece on the spindle sander by running the entire curve over the sander without stopping to feel the surface. I know they are about to have a bigger problem than they already have, so I stop them, with a reminder that sanding done sparingly and selectively will give them the result they seek.

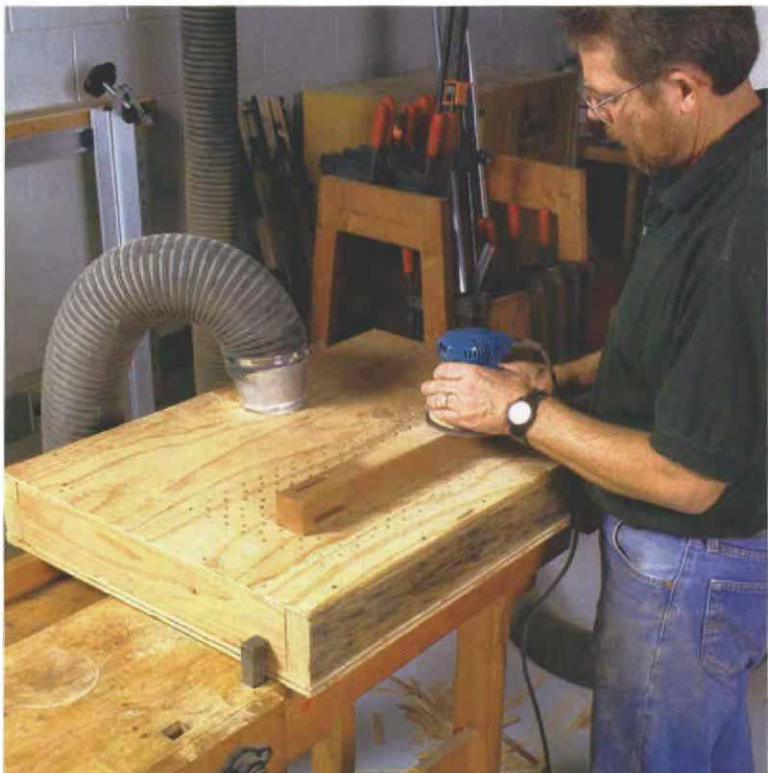
The correct process is to sand the curve for only a few seconds, just enough to remove tool marks. Then run your fingers over the surface, feeling for consistency. When you find a high spot, mark it with chalk or pencil and remove only these lumps, staying away from the hollows as much as possible. Stop and feel the surface again, marking the spots in need of sanding as before. Gradually, the surface becomes smoother and the curve more fair.

Sometimes on larger curves, the lumps are hard to feel. You can find high spots by coating a batten (a flexible piece of wood) with chalk. Bend this batten across the surface and rub it back and forth. The chalk will rub off on the high spots, leaving a clearly marked area to sand.

Virtually dust-free sanding

The dust produced by sanding is the finest and probably the most harmful. Newer sanding tools collect more of the dust generated, but there are still a few ways to get even better dust collection. With portable sanders, I don't use the dust-collection bags. Instead, I increase the effectiveness of the internal vacuum system by hooking a vacuum hose directly to the sander.

My best defense is a shopmade downdraft table. There are commercial versions available, but I made a simple 2x4 frame and covered both sides with ¾-in. plywood. On one side I cut a hole to accept hookup from a dust-collection system. I also drilled a number of small holes. Not only does the suction from the dust collection pick up stray dust through the holes, but it also helps hold the project to the table.



A downdraft table keeps it clean. *The author's sanding table is just a box drilled with holes to suck the dust away. This simple box, made of plywood and 2x4s, hooks up to a dust-collection system or shop vacuum.*