Incorporating curves into a piece of furniture can really delight the eye. The interplay between curved and straight lines can help ease transitions between sections and emphasize the overall form of a piece. Curves can also make elements appear visually lighter, more graceful, and even playful at times. Whether in the form of contoured edges, profiled moldings, or other shapely adornments, curves have a lot to offer your work.

However, they come at a cost. Curves take more time to cut than straight lines, and smoothing them demands a certain finesse. In fact, if not faired properly, curves can make a piece look worse rather than better. The last thing you want are bumps, humps, and other irregularities marring the otherwise elegant sweep of a leg or table edge. And, of course, curves must be clean and smooth as well as fair, without scratches, scorches, or machine marks calling attention to themselves.

The best approach to smoothing a curve depends on how well it was cut to begin with and whether a bandsaw, jigsaw, router, or some other tool was used for the job. In this article, I’ll show you how to do the smoothing as quickly and efficiently as possible using common tools and shop equipment as well as a few simple shop-made helpers.

Trimming with hand tools
A few particular hand tools can make short work of removing
saw marks while smoothing out any lumps and bumps to fair a curve. Traditionally, woodworkers have turned to spokeshaves to handle this task (Photo A). A spokeshave is essentially a hand plane with a very short sole (either flat or curved), and handles that extend like wings out to either side of the blade. The short sole seats solidly against both concave and convex curves, and the handles allow either pushing or pulling the tool to suit the work. For convex curves, you can also press a block plane into service as shown in Photo B. (For more on tuning and using spokeshaves, see Woodcraft Magazine, issue #38.)

The trick to using these cutting tools effectively is to pay close attention to the grain direction. If you hold your workpiece in a vise with the grain running horizontally, cutting with the grain means cutting downhill, as shown in Figure 1. As the drawing indicates, the areas at the crest of a hill or at the bottom of a valley are problematic because it’s here where the grain changes. Sometimes a card scraper will help in these areas, or you may just have to sand away any tear-out.

**Figure 1: Spokeshave cutting direction**

The cleaner and fairer a saw cut is to begin with, the less time you’ll have to spend smoothing it, so learn to saw effectively. Regardless of whether you use a bandsaw, jigsaw, or scrollsaw to make a cut, keep a few key factors in mind:

First of all, use a sharp blade that is sized for the job at hand. For long, sweeping curves, a wide blade can help you keep the cut on track, while tighter curves demand use of a narrower blade. When cutting with a bandsaw or scrollsaw, push the workpiece with a smooth, sweeping motion rather than guiding it inch by inch. As you cut, stay about \( \frac{1}{16} \) “ outside your line to leave a little material for smoothing away the saw marks. If you veer too close to your cutline, don’t suddenly veer away in correction. Instead, stop immediately, back up several inches, and then start feeding properly again.
How To Be Fair

A “fair” curve is one with a smooth sweep that’s free of visual or tactile humps and dips.

No matter what tools or techniques you use to fair your curves, make sure to continually monitor your progress as you work. Having a good layout line as a target definitely helps, but simply removing material to the line doesn’t necessarily guarantee a fair curve. To do that, you need to tune in with both sight and touch.

As you work, occasionally run your hand along the curve. You may be surprised at how receptive your fingers are to imperfections. Try using your non-dominant hand, which may be more sensitive than your dominant hand because it hasn’t been worked as hard. When irregularities start disappearing to the touch, scrutinize the curve from a low, raking angle, which will accentuate any remaining imperfections.

Power sanding

As much fun as spokeshaves are to use, they do require a certain amount of finesse and patience. A quicker, if less elegant, solution is to turn to power abrasives. If you have the resources and space, a stationary belt sander or a belt/disk combination machine can do a lot of the grunt work of truing up curves. A benchtop model will work almost as well. For convex curves, simply hold your piece flat on the table and sand to your layout line, as shown in Photo C.

For concave curves, the ideal tool to use is an oscillating spindle sander (Photo D). Whether a floor or benchtop model, a spindle sander accepts drums of different diameters to suit a variety of curves. As opposed to the type of drum sander you might use in a drill press, a spindle sander rises and falls as it rotates. This makes for a cleaner, more aggressive cut while virtually eliminating the chance of scorching or burnishing the work.

When using a spindle sander, choose the largest diameter drum that fits the curve you’re smoothing. The broader surface contact helps prevent you from sanding divots into the edge of the workpiece. As when working with any power sander, use a light touch and keep the workpiece in constant motion, feeding it against the rotation of the spindle as you work to your line.

Your stationary belt sander can also serve for sanding some concave curves. Although there are very few instances when you should use a machine without its guards in place, this is one of those times. Removing the top belt guard presents the machine’s upper drum for use as a sort of spindle sander (Photo E). The shortcoming is that you won’t have a table to help support your workpiece. All the same, the approach can be useful if you don’t have a spindle sander. Just make sure to stand off to the side of the machine to avoid a face full of dust.
If your budget and/or shop space doesn’t allow for dedicated stationary sanders, you can sometimes trick out other machines to do the work. For example, try tipping a portable belt sander on its side and clamping it to your workbench. Then use scrap plywood to make a raised platform that sits at the level of the abrasive (Photo F). The drum at the tool’s nose approximates a spindle sander for smoothing concave curves, while the flat platen section works fine for convex edges. As you sand, move your workpiece in the direction opposite the belt rotation.

You can also use your drill press as a drum sander by mounting commercially available sanding drums into the drill chuck. Add a platform with a hole in the center so you can support your work perpendicular to the drum as shown in Photo G. By raising or lowering the drill press table, you can adjust the point of sanding contact, thus maximizing the life and effectiveness of the abrasive. Because the drum doesn’t rise and fall, it’s not as effective as a spindle sander, but it’s the next best thing.

Alternatively, you can quickly throw together a shop-made mini-drum sander with nothing more than a 3” length of ¾”-diameter dowel (Photo H). Cut a 2”-long slit down the center of the dowel, fold a 4 × 5” strip of sandpaper in half lengthwise, and insert it into the slit with most of the abrasive projecting to one side. Chuck the dowel in your drill press, set the machine for a slow to medium speed, and feed your workpiece against the dowel. The abrasive will wrap around the dowel, effectively creating a sanding drum. As the paper wears, simply tear off the used section to expose fresh grit.

**Tip Alert**

Sanding end grain with power tools can create enough heat to scorch or even crack your workpiece. To avoid this, use a light touch, keep the piece moving, and make sure to use sharp, clean abrasive.
You can convert your tablesaw into a disk sander using a commercially available steel plate designed for the job (Photo I). You’ll also need PSA (pressure-sensitive adhesive) sanding disks to mount on the disk. One neat feature of these tablesaw sanding disks is that you can tilt them to sand bevels. Unfortunately, a tablesaw-mounted disk spins considerably faster than one on a typical disk sander, necessitating a very light touch to avoid burning your material.

**Hand Sanding**

Whether you’ve done the brunt of fairing and smoothing your curves with spokeshaves or power sanding equipment, eventually you’ll need to break out the sheet sandpaper to finish up with hand sanding. Whenever possible, the trick to hand sanding curves is using a backer block that’s shaped to complement the workpiece curve. This works best

**Sanding Block Stock**

A good sanding block should be firm, yet resilient. For working flat surfaces, a solid block of cork about 1" thick is ideal. You can provide this same resilience to a curved sanding block by gluing a layer of sheet cork to it. Another option for sanding block material is polystyrene, commonly available as rigid insulation for the building trade, inexpensive food coolers, and internal product packaging reinforcement. Both cork and polystyrene can be easily abraded to create sanding blocks that complement almost any curve.

To refine the shape of a complementary sanding block, line the workpiece curve with sandpaper and rub the block against it.

Even if the curve on an offcut is a bit lumpy, it will serve as a sanding block to fair the curve on the piece from which it was sawn.
when the curve you are dealing with is a true arc—a segment of a circle. Fortunately, many of the curves woodworkers deal with are true arcs or close to it.

To make a complementary sanding block, first establish the radius of the arc by using a compass or by tracing the workpiece curve directly onto the block. Then cut the block on the bandsaw, staying a bit proud of your cutline. Finally, sand away the saw marks to arrive at the line. In some cases, you can refine the sanding block by abrading it against a workpiece curve that’s lined with sandpaper, as shown in Photo J.

Another option is to use the offcut from the workpiece curve as a sanding block. As long as you are reasonably careful when making the initial cut, the waste piece should be almost a perfect match to the curve you are trying to smooth. Wrap a piece of sandpaper around this scrap and use it to refine the curve on the mother piece, as shown in Photo K.

### About Our Author

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### Sanding Profiles

Shaped profiles can be troublesome to smooth, so aim from the start to minimize the amount of cleanup they might need. When machining them, use sharp bits that cut cleanly and produce crisp edges. All the same, there will be times when you’ll need to sand a profile at least somewhat.

Shaped profiles typically don’t require fairing. In fact, as you sand, try not to deform the shape or dub over the edges. Toward that end, contour sanding pads can be a big help. Sometimes called “tadpole sanders,” these resilient backer pads are available in a variety of profiles for detail sanding of all sorts (Photo 1). Pick a shape that matches a section of your profile, wrap it with sandpaper, and you’re in business.

Another commercially available sanding accessory is a sanding mop, which is essentially a bundle of narrow strips of sandpaper attached to a mandrel for mounting in your drill press (Photo 2). As you hold your workpiece against the mop, the abrasive strips conform to the profile, smoothing it without altering the piece’s shape.

Finally, you can make a custom sanding block that conforms to the workpiece profile using a relatively soft material such as Homasote or polystyrene. Attach sandpaper to a sample of the profile using double-faced tape. Then rub your sanding block over the sample to cut the profile into the block, as shown in Photo 3. Then line the sanding block with sandpaper to smooth the workpiece.