



## Use an angle grinder to sculpt flowing joinery

BY JERE WILLIAMS



**M**y background is in sculpture, and the qualities that I most admire in modernist pieces are the organic forms and lines, the sense of peaceful repose, and the strong tactile attraction. I felt that these highly desirable qualities were lacking in my studio furniture, so I began designing with a flowing, organic style of joinery.

The shaping technique was not easy to perfect. I tried spokeshaves, drawknives, wood rasps, and carving gouges before settling on the angle grinder as the main tool for the job. Now I use these flowing surfaces and joints on both tables and chairs. Creating an organic feel in a piece also

enhances its handcrafted appeal.

The only real drawback to this approach is the amount of dust it creates, so do your grinding outdoors if you can. When I work inside, I use open windows and an exhaust fan to create good airflow, and I wear earplugs, protective glasses, and a Dustfoe 88 respirator.

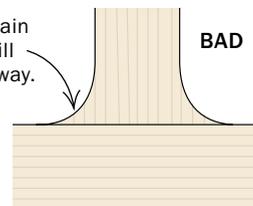
Shaping a piece of furniture with a grinder is both exhilarating and terrifying. After investing a great deal of time, money, and energy into making a perfect chair or table frame, it can be frightening to come near it with an aggressive grinder. But you'll be



### Layout is critical

*Make full-size templates and lay out the parts, keeping in mind where material will be removed. The deep, angled mortises often will come close to the outside of the finished pieces.*

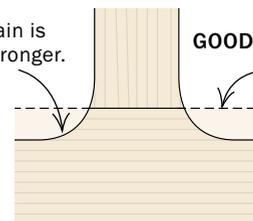
Short-grain areas will break away.



**DESIGN JOINTS TO ELIMINATE SHORT GRAIN**

Shift the locations of joints as shown to maximize the strong, long-grain areas and minimize weak, short grain.

Long grain is much stronger.



These areas are bandsawn away before assembly.

Drawings: Michael Pekovich

Fine  
WoodWorking.com

Listen to the author describe how he uses his right-angle grinder to sculpt a piece of furniture.

## Before assembly, cut joinery and rough out curves



**A simple setup for angled mortises.** Williams uses a simple shopmade horizontal mortising table, moving the heavy workpieces by hand as he eyeballs the layout lines.



**After mortising, rough out the curves.** Cut right to the layout lines; these bandsawn surfaces will guide the shaping process later.



**Some grinding is best done before assembly.** Some areas will be easier to reach now. To ensure symmetry and flowing joints, leave the bulk of the grinding for afterward.

surprised at your level of control with the right grinding attachment and a little practice.

I prefer not to use power-sculpting or -carving wheels on the grinder because they tend to bounce and are completely inflexible. Instead I use a rubber backer with abrasive-coated fiber disks. Strictly speaking, this means I am sanding, but most sculptors (and welders) still call this grinding. Combined with the raw speed and power of the grinder, these attachments allow you to remove material with unmatched speed and accuracy. Also, you can work the grain in a number of directions.

After grinding, I smooth the surfaces with a series of familiar woodworking tools.

### Lay out curves and cut joinery carefully

This type of joinery demands precision because the process of shaping the jointed areas will expose any internal gaps. To be sure that all of the tenon shoulders are perfectly flush, I use simple butt joints and floating tenons, with mating mortises made on a horizontal mortising machine (though a router could do the job).

For strength, the tenons must be as large and long as possible, which means they will penetrate 1 in. or more into each piece, often at an angle and coming close to the final outer surface. This requires careful layout of both the curves and the mortises.

First, joint and plane the stock to a thickness and width that will allow enough room for the shape of the finished piece. Cut the mortises before roughing out the curves: You'll need the straight, square reference surfaces. Draw guidelines on the square stock for tenon width, length, and angle.

Once the mortises are cut and the tenons are fit, rough out the shapes on the bandsaw. Practice and forethought will help you to know where



**Clamping requires square surfaces.** Note the stock left in strategic areas to serve as clamping pads. Be sure each joint closes completely.

## After assembly, the sculpting really begins



**No vise necessary.** The piece is large enough to lie solidly on a rubber mat. Grind slowly and methodically, using heavy cuts at first and finishing with long, light strokes as you work toward a smooth, symmetrical piece of furniture.

**Half-round rasps and files are next.** Heavy gloves allow a variety of comfortable grips.



to leave additional material for clamping. After assembly, the angle grinder will make quick work of these extra chunks of wood.

### Do most of the grinding after assembly

You will want to shape back splats (in the case of a chair) and some other hard-to-reach areas before gluing, but the bulk of the work should be done on a completed frame. Many sculptors agree that the only way to achieve uniformity, balance, and symmetry is to work on the entire piece at once, slowly shaping the entire surface down to the finished form. Working on a completed frame also allows me simply to lay the piece on a rubber mat on the floor to work it over. This eliminates clamping and orientation problems—greatly increasing my speed while allowing me plenty of leverage.

The basic technique requires that you control two factors: pressure and the speed with which the tool is moved over the surface. To get a smooth, fair surface with no unwanted undulations, begin with heavier, biting strokes and finish with very light pressure (often less than the weight of the tool itself) and many long strokes. While doing so, keep the tool in constant motion; otherwise it will burn wood quickly, especially on end grain.

### Rasps go where the grinder can't

The grinder works well in areas where you can get the wheel to come into good contact with the material, but the crook of a joint is beyond its capabilities. Once the rough shaping with the grinder is complete, I begin working with a Nicholson No. 49 patternmaker's rasp. The quality of the cut is excellent when used with or across the grain, though both rasps and files can cause some short-grain tearout. In general, follow proper wood-cutting technique: Go from high to low to work with or across the grain.

Once I have achieved fair, uniform curves with rasps and files, I work the surfaces with an orbital sander, moving from 100- through 220-grit. The orbital sander has the same drawback as the grinder when it comes to shaping the inside of a curve. To complete the corners, I use fine-cutting riffler files and adhesive-backed sandpaper that I stick to my fingers. □



**Sandpaper delivers the final surface.** Williams uses a random-orbit sander for the wide-open areas, and finishes with adhesive-backed sandpaper stuck to his fingers.