

fundamentals

Assemble a drafting tool kit

BY MIKE KORSAK



A PORTABLE DRAFTING STATION



Instead of creating a dedicated drafting space in his midsize shop, Korsak pulls out a sheet of MDF as an on-demand drafting board when needed. Its smooth surface is ideal, and it can be cut to appropriate size and stowed away easily.

All of the woodworking, carpentry, and timber-framing jobs I've held have reinforced the value of figuring something out first on paper (or with a computer) before any cutting or building took place. When I designed timber-frame structures, design work was done with a computer, using computer-aided design (CAD) software. With CAD, I built 3-D models of each frame I worked on, and these models would include every joint, fastener, connector, etc. In essence, these buildings were built twice—the first time in CAD, the second time in real life. This approach eliminated a lot of potential building mistakes at the design stage, where they could be resolved before they became a major problem at the job site.

In my work as a furniture maker, I still subscribe to building it twice, although I do it mostly on paper, not in CAD. (I talk about where CAD fits into my design process on p. 29.) I'd still much rather figure out how things should go together (or not!) before I start cutting any wood, as opposed to discovering a design mistake during the build itself. To accomplish this, I generally design furniture by drafting full-scale drawings using pencil and paper.



Size the paper to the project. For full-size drawings, Korsak prefers a roll of wide plotter paper, which he secures with blue tape (above). For joints and other small details, instead of cutting up his large rolls of paper, Korsak just grabs a sheet of printer paper (left).

STRAIGHT LINES

Grab a T-square for horizontal lines, and a drafting triangle for vertical ones. Korsak registers the T-square on only one edge of the MDF, which he ensures is straight, guaranteeing all of his horizontal lines are parallel. He uses the triangle, registered off the T-square, to draw vertical lines.



MEASURING

A tape measure works well for big measurements. For accuracy, don't use the hook. Start at the 10-in. mark instead. For shorter measurements, Korsak uses the 12-in. rule from his combination square. Its $\frac{1}{8}$ -, $\frac{1}{16}$ -, $\frac{1}{32}$ -, and $\frac{1}{64}$ -in. graduations allow for flexibility and accuracy.



ANGLES

A protractor proves useful when designing with complex geometry. Korsak uses his basic model for homing in on a design that involves multiple angles, like this sunburst veneer.



When drafting by hand I use the same tools and techniques that I was taught back in high school (many thanks, Mr. Miller). And since these drawings are full scale, I draw all of the furniture components at their final size. This means my drafting tool kit needs to accommodate workpieces, curves, and details big and small. My kit's neither large nor expensive, but it also doesn't hinder my designs no matter their complexity.

Moveable, adaptable drafting station

As much as I'd love to have a dedicated drafting table, space is limited in my shop. But full-size drawings are crucial to my process, so I found a solution: MDF laid on my workbench. I generally have it in my shop in various sizes, so I pick a piece that corresponds to the size of the drawing. MDF has a very smooth surface, so there's no chance of



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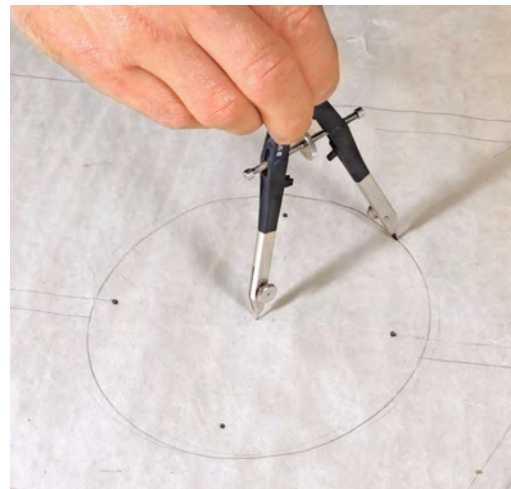
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ARCS SMALL TO LARGE

A circle template helps create a wide range of small circles and arcs, and is handy for sizing drawer pulls and small cove moldings. A compass (top right) is indispensable for general work, and a simple beam trammel (bottom) handles large arcs of any diameter. Korsak's beam trammel is simply a stick with two holes. One gets a nail to act as the pivot point. A pencil fits in the other to scribe the arc. Because the heart of this trammel is just a stick, the radius of the arc is limited only by the stick's length.



a pencil veering off course like it would in the open grain of plywood or solid wood. One edge of the MDF should be true and flat for a T-square to register against.

Since my drawings are full scale, I use plotter paper: wide, long paper that comes in rolls. I sometimes use standard printer paper when focusing on specific details, such as intricate joinery. For drawing, I like mechanical pencils that use refillable 0.5mm lead. They leave a very fine, crisp, even line, and I don't have to sharpen them.

It seems that for every pencil line, three are erased, so I use high-quality erasers, namely Staedtler Mars white erasers. Low-quality erasers will smear the lead instead of removing it. I also use an eraser shield, a piece of thin metal that has cutouts of various shapes and sizes. These cutouts let me target where I erase while protecting the lines I want to keep, leaving my final drawings clean and accurate. All of these supplies are available at office-supply stores.



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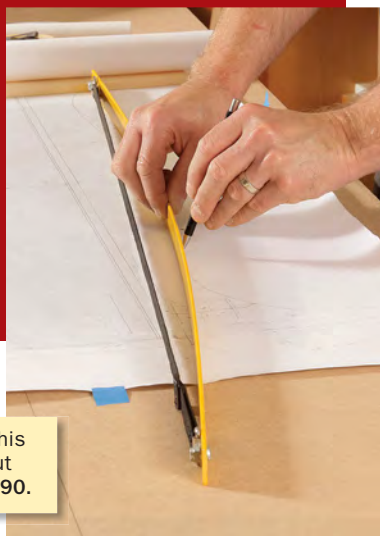
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OTHER CURVES



French curves (above) are great for irregular curves. They are available in sets, which provide a wide variety of shapes. Korsak marks the section of a curve he likes with blue tape so he can repeat it elsewhere. Drawing bows are good for larger work and come in symmetrical or asymmetrical curves. By adding or relieving tension, you can tighten or relax the curve. These bows are helpful because once you use one to dial in your desired curve on paper, you can keep the bow at the same tension and transfer the curve to a furniture part.



Online Extra

To watch Korsak explain his design process, check out [FineWoodworking.com/290](https://www.finewoodworking.com/290).

Getting it straight

My drawings start with straight lines, including the floor, the height and width of the piece, and elements such as drawer boxes and dividers.

For the floor and height, as well as any other horizontal lines, I grab a long T-square. Referencing it only off the drafting board's flat and true reference edge ensures that all of my horizontal lines will be parallel. It doesn't even matter if the T-square itself is square as long as it's rigid.

For vertical lines, I register a drafting triangle against the long leg of the T-square.

A protractor works well for laying out angles. I use one when designing, but then I put it aside. When building the actual piece, I'll consult my drawing to approximate the angles, but I let the real angles flow from the work itself.

Creating curves

My furniture is rarely 100% straight lines, so I rely on some basic tools for finding, drawing, and transferring fair curves.

For true arcs, a circle template, a compass, and a shopmade beam trammel work great, letting me draw circular elements





An adjustable curve allows for more versatility. This tool is a series of thin plastic strips that are keyed to each other and fixed on one end to allow the tool to bend to fairly intricate shapes. Korsak lays down a few short pieces of blue tape across the plastic strips to secure the shape when transferring it between a drawing and a furniture part.

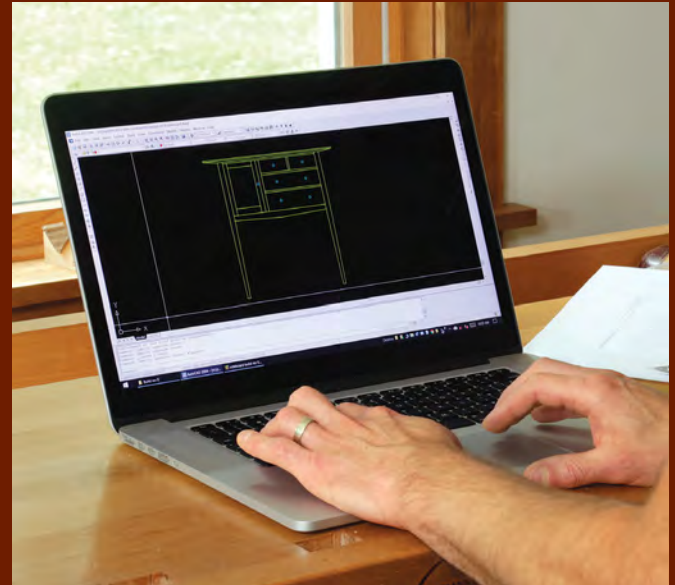


ranging from drawer pulls to tabletops. For more complex curves, I rely on French curves, an adjustable curve, and a pair of drawing bows, one for symmetrical curves and another for asymmetrical. Because I often use just a section of these tools, I mark the area with blue tape.

Many drawing tools work just as well on actual workpieces. Once I home in on the shape I like on paper, I can use the same tool on the furniture part. □

Mike Korsak is a furniture maker in Pittsburgh.

Where CAD fits in



I sometimes use CAD in my furniture design process. Even when I do, though, I start off with hand sketching. I never use CAD at this point, since I can sketch faster than I can draw in CAD. Plus, the sketch is intended to capture an idea. Hand sketching accomplishes this goal very well, while CAD at this stage would be overkill. Once I have an idea of the general form and feel of the piece, I may move to CAD to better explore the shape and work out dimensions and proportions. I like that with CAD I can draw, for example, a two-dimensional front elevation of a piece, copy that drawing several times, and modify each new drawing to explore minor tweaks.

For more complex projects, I may build a complete 3-D model in CAD. I'll do this especially if I need to figure out some aspect of joinery or construction, or if there are a lot of individual parts to keep track of.

A 3-D CAD model is also useful for presentation purposes for clients. I can apply wood textures, rotate the model to provide an interesting (and flattering) view of the piece, and then present an image that gives a fairly lifelike look.

Nevertheless, CAD doesn't always take the place of a full-size drawing. In fact, I'll sometimes do both for a piece. As useful as a 3-D CAD model can be, I find that I have to see the piece, or some representation of the piece, full-size to really have a sense of how well the design works. I just can't get this information from a CAD model, as there's no sense of scale or relationship to space when viewing something on a computer screen.

—M.K.