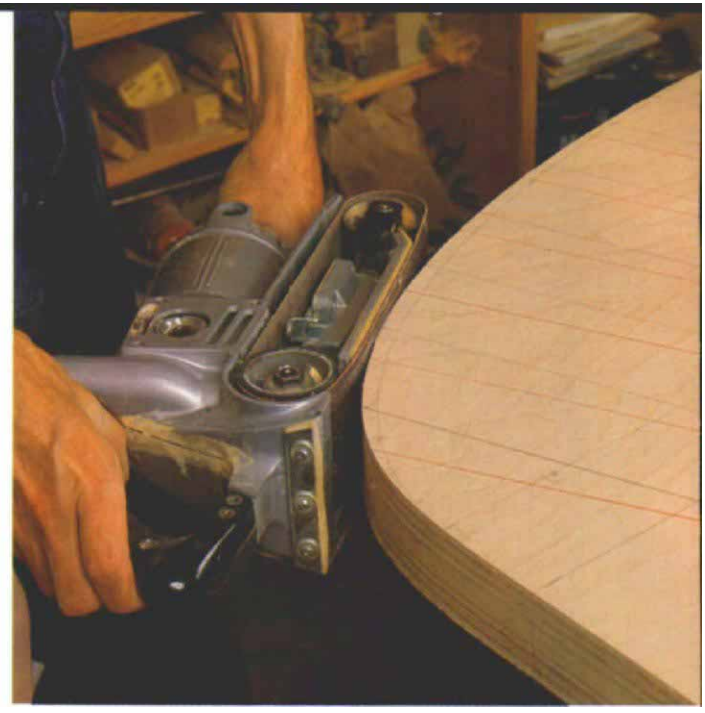
To avoid gouging the wood, the author keeps the sander's platen flat on the board at the beginning and end of each stroke. He guides the sander, but lets the machine's weight provide the sanding pressure.



Flat or curved edges can be smoothed with a belt sander. Here, Becksvoort sands a table's edge and frequently checks the edge with a try square to make sure it remains square with the top.

Using a Portable Belt Sander

An abrasive approach to flat surfaces and smooth curves

by C.H. Becksvoort

The portable belt sander is a real workhorse in my shop. It grinds down humps and bumps, levels large surfaces in a fraction of the time it would take to plane and scrape them, and it smooths even highly figured woods like bird's-eye maple. It's a versatile tool for everything from removing paint to shaping cabriole legs. But a belt sander can also be a recalcitrant tool and difficult to live with. At its worst, it refuses to track correctly, and it gouges the wood, sputters and coughs while spewing clouds of fine dust. Over the years, I've come to terms with the tool and in this article, I'll show you how to handle the most common sanding problems and get good performance from your machine.

Belt-sander anatomy—All portable belt sanders work pretty much in the same way. The sander's motor powers the rear drive roller through a gear reduction drive. Most sanders are belt driven, but the better, heavy-duty sanders are chain driven. The front roller, which rotates freely, is spring-loaded to tension the sanding belt. A lever releases the tension whenever the belt must be installed or removed. Turning an adjustment knob swivels the curved front roller slightly and coaxes the belt to track correctly and ride dead center on the rollers. A rigid platen between the two rollers provides a flat sanding area. The belt itself is backed by a replaceable steel wear plate that rests on a cork cushion that is attached to the platen. Sacrificial steel or ceramic strike bars prevent the edge of the rotating belt from damaging the sander's housing.

Using the belt sander—A belt sander is a relatively safe machine, but there are a few common-sense precautions that you should observe while operating one. Belt sanders typically weigh from 8 lbs. to 15 lbs. and most require two hands to operate safely. Although a dust bag is a valuable accessory, it won't pick up all of the dust, so wearing a mask is a must. Always wear safety glasses. Most belt sanders are noisy and high pitched; if you expect a lengthy session, it's also a good idea to use ear protection.

Before beginning to sand, unplug the machine and clean the dust intake chute of any clogged dust and chips. Then, make sure the belt is installed properly. The arrows on the belt's cloth or paper backing should point in the direction of roller rotation. This ensures that the belt's bonded seam won't catch on the work and tear the belt. After you adjust the belt to track correctly, you're ready to sand.

Sanding belts are available in grit sizes from 36 through 180, but I only use 80- through 150-grit for sanding hardwood furniture. The coarse grits, from 36 to 60, are for removing paint, gross leveling and sculpting. Because grits above 150 tend to burn the wood,

It takes practice to handle a belt sander with enough precision to smooth small-radius, curved surfaces with the front roller, as Becksvoort is doing here.

I use an orbital sander or I hand-sand with finer grits for final smoothing. I'm partial to cloth belts, even though they are more expensive than paper, because they wear longer and tear less. I've also found that alumina oxide abrasive will out-last garnet, which sands aggressively but fractures easily and wears out rapidly. Deciding when to change belts is a trade-off between the cost of a new belt and the additional time required to sand with a well-worn belt. My rule of thumb is to change the belt when its surface feels like the next higher grit. I don't throw the used belts away; they're great for hand-sanding on the lathe. If you are working with a glued-up piece, it's important to scrape off residual glue that could gum up and ruin the sanding belt.

As with hand tools, the best way to develop skill and competence with a belt sander is to practice. With time, you'll develop confidence in the tool and discover that it is a real time-saver for a wide variety of sanding tasks. But don't start off by practicing on furniture; instead, use scrapwood. Here are some techniques to practice for smoothing large, flat panels and narrow frames, leveling irregular surfaces and shaping curved surfaces.

Smoothing panels—To smooth large, flat surfaces, it's necessary to keep the sander level, move the machine at a uniform speed and apply uniform pressure. As with most sanding operations, you should avoid sanding across the grain.

Be sure the workpiece is firmly anchored on a flat, horizontal surface, and positioned at a comfortable height. I usually secure the piece to my bench with the end vise and dogs, but alternative clamping schemes could be developed for each job. Next, place the sander flat on the panel and sand along one edge, parallel with the grain. The weight of the belt sander alone provides sufficient sanding pressure, so it isn't necessary to bear down. Besides, applying pressure is tiring and makes it difficult to maintain the consistency necessary to produce a uniformly sanded surface. It's more important to concentrate on guiding the sander in long strokes at a constant speed. I drape the sander's electrical cord over my shoulder to keep it out of the way as I move with the sander along the full length of the workpiece. I let the sander run no more than half its length over the end of the work; keeping at least one half of the platen flat on the stock, as shown in the left photo on the facing page, helps prevent gouges in the wood. Then, I pull the sander back in the opposite direction, overlapping the previous pass by one half of the width of the sanding belt. The process is repeated until the surface is completely sanded. If the surface is free of U-shape tracks at each end of the workpiece, you probably have the hang of it. Avoid any tendency to move the sander more slowly at the ends of the workpiece or you'll risk gouging or beveling the surface.

Leveling surfaces—The belt sander also can be used like a jack plane to remove bumps and high spots and to level a surface. My procedure is fairly simple. I start by holding a straight edge at one end of the board so it's perpendicular to the grain. Then, I put a pencil mark wherever the straight edge touches the wood's surface. I repeat this procedure every 2 in. along the full length of the board. The sander is used in the same way as described for smoothing surfaces, except that I concentrate on removing the high spots indicated by the pencil marks. To blend smoothly, I allow the sander to overlap a short distance into the adjacent "valleys." The whole process is then repeated, usually three or four times, until the board's surface is perfectly flat.

Edges and frames—Once you've gotten the hang of handling a belt sander and mastered the technique of smoothing large, flat surfaces, you're ready to tackle edge sanding. Like jointing an edge with a plane, the trick is to keep the sander stable on the center of the edge and to sand along the full length of the board. One thing that makes a sander different from a plane is that the sander continues to remove material on the backstroke, so be careful as you pull the sander back. Check the edge with a try square frequently to make sure the sander has not tilted up or down. It's important to keep the sander level and maintain that position as you sand. Even a curved edge, like the one shown in the right photo on the facing page, can be sanded this way.

Belt sanders are also useful for smoothing frame-and-panel doors. The panels, whether flat or raised, are most easily sanded before they are assembled into the frames. The frames also require special treatment because the grain directions of the stiles and rails run perpendicular to each other. I sand the rails first, but I'm careful to let the sander travel across the joint onto the stile only enough to flatten the joint. After the rails have been smoothed, the stiles can be sanded. It's important that the belt is tracking to the extreme edge of the platen: In this way, I can smooth the stile and remove any cross-grain scratches introduced when the rails were sanded, without crossing the joint and spoiling the already-smoothed rail. Here again, sand in long, even strokes; resist the temptation to slow down in the critical corner areas. Mitered corners, of course, will have to be smoothed with a pad sander.

The sanding techniques for frames can also be used to smooth the face frame of a chest of drawers or other furniture piece. It's more difficult because the frame members are usually shorter and narrower. Lay the carcase on its back so you can sand horizontally. A steady hand and control of the belt sander are required to keep the narrow surfaces flat and not introduce cross-grain scratches where the rails join the vertical stiles. When you are confident enough to take on a challenge, like sanding the face of a walnut dresser with an 80-grit belt, or using the front roller to sand curved surfaces as shown in the photo above, left, you'll be well on your way toward taming the beast in the belt sander. □

Christian Becksvoort, a professional furnituremaker in New Gloucester, Maine, is a Contributing Editor to FWW.