Fine WoodWorking

Veneering

Preparing substrates is the first step

by Ian J. Kirby

Polished veneers: apple (top), padauk, maple burl, curly koa.

Veneering can lead to furniture designs that just aren't possible with solid wood. Lots of furniture has the shape it does because of wood's hygroscopic nature—you have to allow wood to expand and contract. Once you master veneering, however, you don't have that restriction. You can turn particleboard and fiberboard into dimensionally stable panels that are as attractive as any piece of solid wood, opening up a whole new world of design possibilities.

A veneer is simply a thin layer of wood, which can be glued on top of another material. At its best, veneering produces superb results. Done badly, it's a mess. You must plan every step before you begin. Unlike other woodworking, you don't start with a large plank and carve it down; you begin with a small piece and build it up to the size you want.

Veneering allows you to use woods that would be too expensive (rosewood or ebony) or just too unstable (burls or crotches) to be worked in solid form. Veneers have been available for centuries, of course, but what has now brought veneer into the small-shop woodworker's province is the advent of man-made substrates, the material onto which the veneer is glued. Particleboard and medium-density fiberboard have changed the whole nature of veneering.

In this article, the first in a series on veneering, I'll discuss veneers (p. 39), substrates and how to prepare them for veneering. Future articles will deal with the application of veneers, and with design considerations when using veneered boards.

• • •

Until the turn of this century, woodworkers had to make their own solid-wood substrates for veneering, and that was a real problem. If you veneer solid wood, laying the grain of the veneer at right angles to the grain of the solid wood, the veneer will come under tremendous stress as the substrate shrinks and expands, and can crack or delaminate. Even if you orient the grain of both materials in the same direction, you'll just have ordinary wood with a different wood glued onto it—with all of solid wood's moisture-related problems.

The traditional solution was to make large panels out of many small panels within frames, the assumption being that each little panel would shrink and expand less than one large panel would. It seems to have solved the problem in many cases, yet it shouldn't. Lots of little bits of wood will expand and contract collectively as much as one big piece of wood.

Today you can sidestep all of these problems by using particleboard or fiberboard as the substrate. These materials are so stable that seasonal movement is negligible. Probably the best substrate is medium-density fiberboard (MDF). It is made by breaking down wood into its fibrous form, then pressing the fibers back together again with an adhesive. All MDF is basically the same: it has no grain, is square-edged and uniform throughout, and weighs about 48 lb. per cubic foot. It's a material that is very stable, but so boring that it cries out for the application of something with a little more life. Veneering both sides of a ⅝-in. thick MDF board produces a board thick enough for most furniture designs. You may have trouble finding MDF, since it is made primarily for industrial use. Some large lumber companies do carry it, although they may require a substantial minimum order. Professional woodworkers in your area may be able to recommend a local source of supply. Allied Plywood Corp. (which has seven warehouses along the East Coast) and Paxton Lumber Co. (which is headquartered in Kansas City, Mo., but has warehouses in several states) handle both MDF and furniture-quality particleboard. These materials are also available through some Georgia-Pacific Corp. service centers.

Plywood isn't a good substrate for veneering. Since it's made by gluing together layers of wood at right angles to each other, it has decent dimensional stability, but it can warp and twist. Particleboard, which is made by gluing wood particles together, is dimensionally stable, but some people get into an awful mess because they veneer onto building boards, not furniture-quality boards, which are multilayered boards with very smooth surfaces. Surface irregularities of the coarser building boards are liable to telegraph through the veneer. You can recognize furniture-quality boards (sometimes called industrial-grade) because they are oversize—a 4x8 sheet really measures 4 ft. 1 in. by 8 ft. 1 in. Building board is always 4x8, because builders commonly work to a 16-in. module.

The edges of man-made boards are just as boring as their surfaces. If the edges are going to show, you have to cover them in some way, as shown in figure 1. The usual technique is to glue a lipping of solid wood or veneer onto the edge of the substrate, clean it off, and glue veneer on both surfaces of the entire panel, including the lipping. Veneering the edges has one disadvantage: the edges will remain square after they're veneered. The only thing you can do to improve the ap-

pearance and to help prevent chipping is to soften the veneered edges with sandpaper. You could make a softer edge by applying two or three layers of veneer so that you'd have more material to radius. One of the nice things you can do with veneer lipping, however, is to accent the edge treatment. If you wanted a five-veneer lipping, you could glue on three layers of the surface veneer and two layers of a different color veneer. This colored border picks out the edge and gives the job a lot of life.

For more shape on the edges, or what in woodworking terms is called molding, use solid-wood lipping. Other edge treatments include gluing on strips of leather, Naugahyde or even metal, such as fine copper foil.

In any case, decide what the lipping's width will be before you cut your substrate to size. The procedure is to first determine the size of the finished veneered panel, including the lipping. Then determine the width of the edge treatment, and subtract twice that from the length and width of the finished panel to get the dimensions of the substrate.

I prefer to glue the solid-wood lipping around the edge of the substrate before it's veneered. This gives enough material to mold the edges, and the surface veneer blends into the lipping, making the whole piece seem more cohesive. It's common to make the lipping of the same material as the surface veneer, but don't sacrifice a rare, exotic hardwood like ebony for lippings. Use a multilayer veneer lipping instead.

Lippings can be either mitered or butt-jointed at the corners, depending on the quality of the piece and the effect you want. With thin lippings, you can just about eliminate the visual effect of the butt joint by radiusing the corner. If you wish to miter the lipping, it's best to miter the lippings for the long edges before gluing them to the panel. If you do it this way, the lipping must be glued on very accurately, with no slippage along its length. On the short edges, when you're filling in, you have to cut the miter correctly at each end, and the length must be dead-accurate. Alternatively, you can glue the lipping on first and then cut the miters, but then you've got only one shot at getting them right.

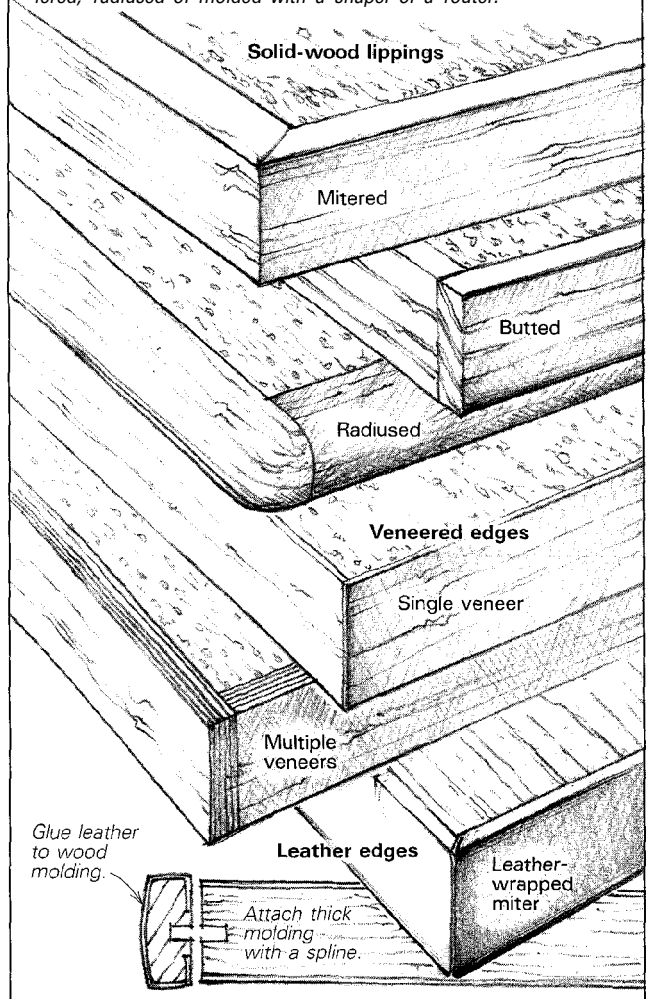
The most common fault in making lippings is to have them too wide. The lipping should be the width needed to accommodate the molding on the edge, plus a safety margin of no more than ⅛ in. So, if you want a ¾-in. thick edge rounded to a semicircle, all you need for lipping is ⅜ in. plus a little, since ⅜ in. is the radius of a ¾-in. circle.

The main reason for keeping lippings as narrow as possible is the shrinkage differential between the stable man-made substrate and the solid-wood lipping. After a few months, a wide lipping may shrink and show through the veneer, a condition known as telegraphing. Cost is also a consideration—you'd be surprised how much material goes into the lipping.

The simplest way to apply lipping is to keep the wood for the lipping wider than necessary until after it's glued onto the substrate. It will serve as its own clamping block, so you don't need a lot of clamps and battens, as you would if you

Fig. 1: Edge treatments

Choose lippings to suit your design. To minimize chipped edges, ease the arris of a veneer-lipped panel with sandpaper or a hand plane after adding surface veneers. Thicker lippings can be chamfered, radiused or molded with a shaper or a router.

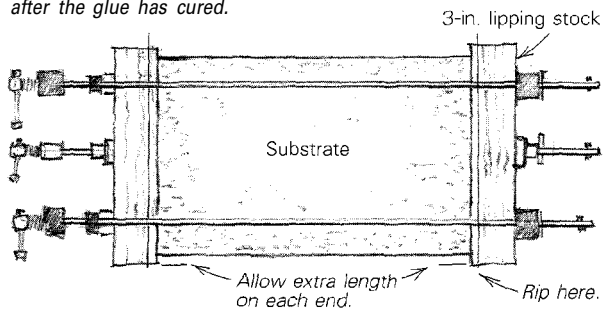


Glue leather-covered moldings to veneered substrates.

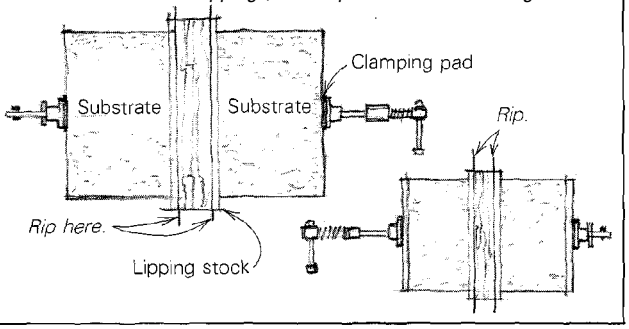
With the mitered lipping glued to the panel sides, use a marking knife to scribe the miters on the end lipping.

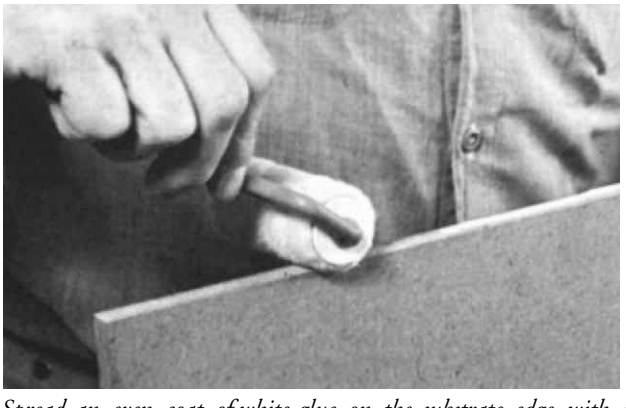
Fig. 2: Two ways to apply solid-wood lippings

A. *Wide lipping stock serves as its own clamping block. Rip to size after the glue has cured.*



B. *Put stock wide enough to make two lippings between two panels, glue, and clamp them together. When the glue has dried, rip the stock to size the lippings, and repeat for the other edges.*





Spread an even coat of white glue on the substrate edge with a small paint roller before applying the lipping.

Rest the toe of the jointer plane firmly on the substrate to prevent tapering the lipping.

tried to glue on thin lipping (figure 2). After the lipping is glued onto the panel, you can quickly cut it to width. The lipping stock should be just slightly thicker than the substrate, at most $\frac{1}{16}$ in. more on each side. You could make it the same thickness as the panel if you could position it exactly when you glue it on, but this is difficult. Leave a small amount on each face and plane it flush after glue-up. The lipping need be only $\frac{1}{16}$ in. or so overlong at each end. Don't try to buy insurance by leaving excessive amounts of wood everywhere. It's tough to remove before you glue on the veneer.

The key to spreading a thin, even coat of glue on the substrate edges and the lipping is to use a narrow paint roller (the bubble pack it comes in makes a good reusable glue tray). You don't need any exotic joinery to secure the lipping: once the lipping is glued on, it's never going to come off in conventional use. In fact, I once put lipping on without glue—I just pinned it, leaving the pins proud so that I could remove them. I veneered the top and bottom, then took the pins out. Try as I might, I couldn't break the lipping off.

White PVA glue is fine for both veneer and lipping. Don't put excessive amounts of glue on either surface. Remember, you're going to have to deal with the accrued amount from both of them coming together. All you've got to do is wet the surface with glue. If the surface has dry patches, it won't adhere. If you put on too much glue, you'll get dribbles and they'll be a problem when you trim the lipping, whether with a router or a plane. All you want visible are little beads of glue. If you trim this lipping with a router trimming bit, the bit's pilot needs to travel on an absolutely clean surface, otherwise it will hit glue bumps and won't flush the lipping. If the pilot has a clear path, you can set the bit to no tolerance and clean the lipping perfectly.

The alternative is to plane off the excess lipping by hand, using a jointer plane. Clamp the panel to the bench. Put the toe of the plane on the surface and plane in a circular motion across the grain, with the substrate acting as a register for the toe. Careful, though—once the plane gets down to the substrate, stop. Don't remove lipping by planing straight along the grain. It's too easy to tip the plane and taper the lipping. Planing across, rather than with, the grain gives you a slightly less smooth surface, but that doesn't interfere with the gluing on of veneer. The thing you've *got* to guard against is lifting the plane's toe off the substrate, else you'll lose the absolutely flat surface. Keep a straightedge handy to check your work. Clearly, it's bad practice to glue on the lipping with $\frac{1}{4}$ in. of excess on each side, or to put it on high at one point and down at another. It's easy to get it on, but you pay the price when you have to remove the excess. Nothing other than care and accuracy will do. Cleaning up the lipping is not done rapidly. You can't do it accurately with a belt sander.

Once the lipping is absolutely level with the substrate, the panel is ready for veneering. If you're not going to veneer right away, cover the panel to keep off dust and contamination. Contrary to an old popular practice, there's no need to scuff the surface with a toothing plane; glue doesn't need a rough surface to work. The surface is now as flat as it's ever going to be—scuffing will only ruin it. □

Ian J. Kirby is an educator, designer and cabinetmaker. He recently moved his woodworking school from Vermont to Cumming, Ga. Drawings by the author. For more on particleboard and fiberboard, see FWW *#29, pp. 76-81.*