SANDING AND REFINISHING WOOD FLOORS

by Howard Brickman

Whether you do it yourself or call in a floor specialist, here's what it takes to achieve professional results

Probably the most underrated part of any interior remodeling job is refinishing the floors. Too few contractors appreciate the skill required to do the job right. But transforming a grimy, seemingly damaged wood floor into a smooth, gleaming plane really puts the shine on a job.

Refinishing an existing floor is simple in concept, but difficult to execute. The basic steps fit on a business card:

- Using progressively finer grades of paper, sand until the old finish is gone and the floor is smooth and free of sanding marks.
- Remove every speck of dust.
- Apply the chosen finish.

New floors call for the same steps, except that you'll generally need a less aggressive first cut, since there will be no heavy finish buildup. You need to remove only the usual dirt and light stains.

But this bare-bones description doesn't tell you what you need to know to run out, rent the equipment, and start sanding. What do-it-yourselfers miss — both homeowners and general contractors — is that a typical wood floor refinishing contractor has more money in his sanding machines than in his truck (see Figure 1). He also possesses a wealth of experience that not only lets him do routine jobs without leaving sanding marks, but also helps him handle the difficult challenges — the mismatched wood species, the mysterious stain of unknown origin, and the new patch of wood that is the same species but won't stain to match.

Use the Right Stuff

In my experience, it is virtually impossible to rent well-maintained, professional sanding machines. Rental

Figure 1. ***Tools of the flooring trade****. You won't find a drum sander like this one (at left in photo) in a rental shop — the professional model weighs more, costs more, and produces better results. The author uses two sizes of edge sanders for greater flexibility in tight spots. Ordinary hand scrapers (bottom left in photo) go where the edgers won't. Screening with the buffer/polisher removes sanding marks and buffs between finish coats. The heavy extension cord allows the author to get 240-volt power from the home's range or dryer outlet. When weather permits, the window fan reduces dust.*

Figure 2. ***To seal halls or doorways,*** *the author builds friction-fit frames from strapping and poly. Vertical pieces cut just short of doorway height are held in place by horizontal pieces cut 1/8-inch long. The frames can be assembled or disassembled in less than a minute.*

machines have completely different design criteria from those made for professionals. Rental machines must be affordable (they generally cost about half what professional machines do), and so are usually made with cheaper materials and less demanding specs throughout. And they must be made much lighter for easy transport. Even flooring specialists would find it difficult to produce the same quality with rented equipment as with professional-grade machines.

Last winter, I was forced to use rental machines on a job in Los Angeles when my own equipment (I live in Massachusetts) got lost in transit for ten days during a major winter storm. Aside from the fact that these machines were generally underdesigned and underbuilt, every single one was out of adjustment or badly in need of repair. We had to struggle to sand the floors without leaving visible swirls, drum marks, and chatter marks.

Sizing Up the Job

The other difference between flooring specialists and the general remodeler is the ability to fully evaluate a job. Unless the floor is clearly in top shape (or you have a floor specialist on your crew), it usually pays to call in a floor sub. A specialist can help immensely with the typical problems of evaluation: species identification (for matching both patches and stains), stain removal, repairs of damaged sections, and the overall likelihood of meeting customer expectations.

Some problems are easier to handle than others. Many contractors can identify species from grain patterns and color. But if you don't know red from white oak or soft from hard maple, you'd best find someone who does, for these differences will affect any staining or patching you do. Many GCs can also evaluate and repair sections damaged by split boards, or dents and gouges too deep to sand out. And most contractors (though you'd be surprised how often I see this fundamental mistake) know better than to patch a floor with a mismatched species, such as oak patches in a maple floor — even the grain looks wrong, and if the floor is stained "to make the woods match," it usually only looks worse.

Out, out damned spot. Stains pose a particularly tough challenge, and probably cause more customer disappointment than any other flooring defect — both because they are often conspicuous, and because it's so hard to predict whether they'll sand out. The most troublesome and one of the most common stains is an animal urine stain that has been hidden beneath carpet. Animals may hit such spots repeatedly, and given little chance to evaporate, the stain soaks deeper into the wood. Such stains often go through the entire thickness of the flooring. You can't sand these out, and it's hard to tell which ones go deep. You can't bleach them out, either (more on that later).

When a customer asks me to use "a good stain remover" on some ominous-looking stain, I go to the truck and return with a circular saw, ham-

mer, and chisel. This generally makes the point that the only way to remove such stains with certainty is often to replace the floorboards in question. Of course, you might successfully sand the stains out if they are shallow, but you'd best prepare the customer for at least a "ghost" of the stain.

Let's bleach it out. This rarely works. The products developed for bleaching wood floors are said to be "self-neutralizing." But I've found that any bleach product leaves a permanent residue that is often reactivated by moisture. The bleached patches tend to develop a disconcerting greenish-yellow tint, particularly when clear water-based finishes are used. Bleaching also alters and weakens the wood fibers, and bleach or other strong cleaners will very likely remove the natural pigment in the surrounding wood, discoloring the entire area. In spite of these shortcomings, many people feel certain there must be some way to bleach or "lift out" stains they would never expect to get out of, say, a favorite shirt or blouse. But it's no easier to remove stains from wood than from cloth.

We'll stain it to match. As mentioned before, most contractors know this doesn't work with woods of different species. But staining also often doesn't work to even out differences between soiled and unsoiled areas of the same wood species, or even between an old section and a fresh patch of the same species. This is because the open pores of older wood absorb more stain. Areas that have been frequently wet may do the same.

A really good refinisher — an artist — can try to account for these differences. But in general, the only way to disguise them is to apply a layer of stain thick and dark enough to partly obscure the appearance of everything — almost a semitransparent stain. Of course, this partly covers the natural grain of the wood as well, which most customers don't want. It also requires longer drying times.

So (you tell the customer), we may not be able to get that urine stain out, if that's what it is; and we probably can't sand out those gouges, where it looks as if someone dropped barbells, so we may need to patch those; but if we patch them they might stand out from the rest of the floor.

If you don't have the ability to make these judgment calls, and don't have enough experience to educate the customer about the likely outcome, you should use a sub. Like other subs, flooring subs run from cheap to expensive, from poor to wonderful. More often than not you get what you pay for, particularly if you take the low bid. For refinishing — sanding and applying finish — I charge from $1.50 to $2.50 per square foot, depending on the size and complexity of the job, the condition of the floors, and whether we'll be staining.

Make sure the refinisher has the appropriate Material Safety Data Sheet (MSDS) and HazCom paperwork on the job in case there is an inspection or an accident. And as with any sub, insist on the full spectrum of workers comp and liability insurance, and clarify who's responsible for dust control, cleanup, and callbacks.

If You Do It Yourself Anyway

If despite the above, you decide to sand and finish your wood floors yourself anyway, here are the basic steps to doing it right.

Setting up. Sanding machines draw a lot of electricity. Be sure 240-volt power is available. Since most houses have an electric range or clothes dryer, I carry an extension cord with a plug on one end that fits those appliance receptacles. If 240-volt power is not available, hire a licensed electrician to wire a temporary receptacle for you. To contain dust (there will be plenty), put up polyethylene dust barriers using blue 3M masking tape, which can be left on up to a week without the adhesive setting up and posing removal problems. For door openings or small halls, we build little "pressure frames" to get a tight, easily removed seal (Figure 2). Dust barriers repel not only dust, but children, pets, and nosy customers who might otherwise step in wet finish. If it's not too cold, we put a fan blowing out an open window to create negative pressure so dust won't try to migrate to other rooms.

Prep work. Repair or replace all damaged and loose boards. Also set all nails at least 1/8 inch deep (any left at or above the surface will rip your sandpaper, which will then explode off the drum, scaring you to death and scattering tiny pieces of sandpaper all over the room), and fill all holes and cracks. For filler I use Imperial Wood Dough Base (Imperial Paints, 2526 Northwest Yeon, Portland, OR 97201; 503/228-0207), a clear binder mixed

Figure 3. ***The circular motion of the edger*** *cuts across the grain, and digs into the wood more easily than a drum sander. To avoid damage, move the edger in an elliptical motion with the long axis parallel to the grain.*

Figure 4. *Remove finish from out-of-the-way corners* *by holding a scraper flat against the floor, and pulling with firm pressure. Be careful not to allow the corners to dig in, and always work with the grain.*

with fine wood flour. It is toluene-based and therefore smelly and flammable — but it dries quickly. It's as close to a miracle product as you'll find. The drawback is that you must buy it in 200-gallon quantities by mail order. DAP (855 N. 3rd St., Tipp City, OH 45371; 800/634-8382), a brand commonly found in building supply stores, makes a similar acetone-based product called DAP Wood Dough, which also comes in water-based form; I've been told the acetone-based version performs similarly to the one I use.

Tools in hand. You'll need three machines: a big drum machine for the main floor, a 7-inch rotary disc edger for the edges, and a 16-inch buffer-polisher with an abrasive screen disc for the finish cut. For hand tools, you'll need a putty knife, and a standard paint scraper with an angled handle about 8 inches long and a square, two- or four-edged replaceable blade. I use a Stanley #18-617 with two-edged blade #28-290 (Stanley Tools, 600 Myrtle St., New Britain, CT 06053; 203/225-5111). You'll find one or one like it at any hardware, paint, or building supply store. You'll also need a file to sharpen the scraper, a nail set, hammer, broom, and a vacuum cleaner with a soft brush pick-up tool that won't scratch the sanded wood surface or finish.

And of course you'll need sandpaper for the sanders. As with other sanding jobs, you should move from coarse to finer grades. Special abrasives made for floor sanding come in grits ranging from 12 to 100. We generally use grits 12, 16, 20, or 24 to remove any heavy buildup of finish or paint that would gum finer papers. On floors with normal buildup (or after the coarser papers), we use grits 30, 36, 40, 50, and 60, then finish with 80 or 100.

Choosing which grit to start with requires experience and instinct. You want to start with the finest grit that will do the job. This is because you should never skip more than two grits — otherwise, you create marks with one paper that the next paper is too fine to remove. So if you start with 36, for example, you should use no grit finer than 60 for your next pass. Starting with the finest grit possible also reduces the total number of cuts you'll need as you work your way up to 80 or 100. On most old floors in decent shape, you can start with a 50 or 60 grit, then go to 80 or 100 for the final cut.

Figure 5. *A last run with a buffer/polisher* *removes the overlap between the areas you did with the drum sander and edger. Screening will not remove drum marks or deep scratches from the edger, however — they'll reappear as soon as you apply the finish.*

Ready to Roll

Here's the specific sequence of sanding we use on almost every job.

First drum cut. Use the big machine to remove the old finish and make the surface flat and smooth. Always run the machine *with* the grain of the flooring. It is crucial that you *gradually* lower the drum to the floor while moving the machine forward or backward; otherwise, you'll dig drum marks into the wood. Doing this well is not as easy as it looks; it's a good technique to practice on your own floor or on one you're doing cheap for a friend.

Edge work. Save the edge work until just before the final drum cut. That way you won't be using the edger to do anything the drum can reach, but you still have one more drum pass to hide any sins made with the edger.

It's easy to leave marks with the edger, so try to minimize the area on which you must use it. If the floor has only a light finish coat, use the edger just once, with 80 grit. Use coarser paper only if 80 won't remove the finish, then follow with 80 or 100. Be careful: As the edger spins, it cuts across the grain and thus can leave scratches much more visible than those left by the big machine. As with the drum machine, you must keep the edger constantly moving.

Work along the wall, moving the machine in an elliptical motion with the long axis parallel to the grain (Figure 3).

Scrape the corners. When you're done edging, scrape the corners and other unreachable places. Use a new scraper or one that's been freshly sharpened. Pull the scraper with the blade flat on the floor so the corners won't dig in. Move with steady pressure firmly along the grain. The old finish should come away nicely (Figure 4).

Buff it out. Do the final sanding with the 16-inch buffer/polisher (Figure 5), using a white buffing pad and 80- or 100-grit screen discs (the finest your previous grit allows). If you've done everything right, this last screening run should remove the "border" between the areas you did with the two different machines, leaving a smooth, uniform surface ready to finish. But screening, despite initial appearances, will not remove drum marks or deep scratches from the edger — they'll reappear as soon as you apply the finish.

Clean up. After screening, thoroughly sweep and then obsessively vacuum the floor. Do this just before finishing.

Figure 6. ***To apply the finish,*** *the author uses a foam paint applicator on a long handle. He holds the mop at a slight angle to both work the finish into the grain and keep the excess out in front on the bare floor.*

Finish the Job

With the floor sanded and free of dust, you're ready to apply finish. Anyone who's tried to put polyurethane — particularly the water-based kind — on even a bookcase knows how difficult it is to do it well. I can't do more than introduce the topic in this article, so if you don't feel confident, sub it out.

Another topic that can't be covered adequately here is the choice of finish, so I'll assume you have a finish you favor. I like Hydroline, a water-based polyurethane finish made by Basic Coatings (2124 Valley Dr., Des Moines, IA 50321; 800/247-5471) and available at any good paint store. I'm only now having to refinish floors we first coated with this product 8 years ago.

First, wipe the surface with a clean, lint-free tack cloth dampened with a solvent compatible with the finish to be used. This picks up any dirt and dust. For oil-modified urethane finishes, use mineral spirits; for water-based coatings, use water. Let the floor dry completely before going to the next step. If you're going to stain, do not tack the floor. Apply the stain and let it dry.

Evenly apply the finish, working with the grain of the wood. Two coats of oil-modified urethane will usually do the job, but I use four coats of water-based finishes because water-based finishes go down thinner. I've found the best way to apply finish is with a 10x3-inch foam paint pad applicator on a mop-length handle. The pads I use are made by Padco Plastics (2220 Elm St., Minneapolis, MN 55414; 612/378-3978), and hold up better than most foam paint pad applicators.

Applying water-based finish well — without thick spots, bubbles, or other defects — takes some practice. Again, this is not something to learn on the job. Do a "starter" spot first — a 3x3-foot area near the door or other exit where you'll eventually end up. Coating this area now helps later, when you won't have adjacent bare floor to walk on.

Then start at the opposite side of the room, working along the length of the room. Pour a little of the finish in front of the mop, and work the finish along in front, holding the mop at a slight angle so that it's constantly both working the finish into the grain and sluicing the excess onto bare floor (Figure 6). You should always have a little puddle in front of the mop. Watch out for bubbles, which are the big enemy. If you don't stroke out the bubbles before the finish dries, you'll have to hand sand before the next coat with 120-grit paper. Work your way back and forth across the length of the room this way until you're back on the starter strip.

Lightly buff between coats. With water-based finish, I use a 120-screen between the third and fourth coats only; with oil finishes, I buff between every coat. Keep the buffer moving to prevent heat buildup, which will mar the finish and gum up the screen. ■

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