

A Furniture-Grade Finish for Trim

Applied in layers, alcohol-based dyes and stains make for a beautiful job

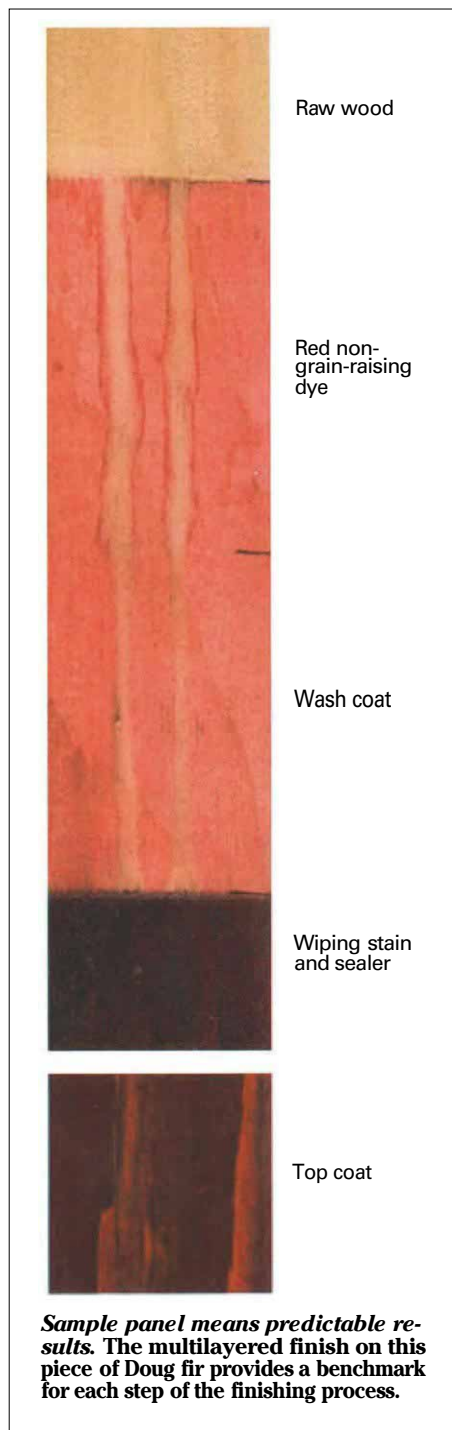
by Rick Duncan and Steve Davis

Multilayer finishing isn't new. For years the furniture industry has been making finishes look deeper and more uniform by applying colors one on top of another. But wood finishing in the construction and architectural fields is another story. It often consists of just a stain, a sealer and a top coat—what you could call a traditional cabinet-grade finish. But using multilayer finishing techniques on interior millwork, giving window and door casings and other trim the elegant appearance of fine furniture, is not as difficult as it may seem.

We recently took on a Victorian restoration, where building up the finish in layers produced exactly the result the owner was looking for. The house was built in 1870 in Berea, Ohio, by G. W. Whitney, the founder of one of the largest grist-mill stone quarries in the country. Most of the trim in the house was of Douglas fir. The staircase, also mostly in fir, included walnut spindles and handrails. Most of the woodwork, such as door and window casings, was to be uniform in color. The doors themselves and some trim on the stairs were given two-tone finishes (bottom right photo, p. 48).

We created a dozen or so color samples to narrow the possibilities, and the owner liked two of them—a red mahogany and a honey maple. But there was something missing in the appearance of these simple cabinet-grade finishes. To look really authentic, the mahogany needed more of an "ox-blood" color, and the honey maple (a color we used on doors and stairs) lacked the orange shades of aged shellac. So we produced a new set of color samples using an additional coloring step. Beginning with non-grain-raising (NGR) dye, we applied the base color, then a wash coat to seal that color into the wood and, over that, a second color of wiping stain. A sealer and two finish top coats over the stain completed the job. The additional layer of color did the trick, adding depth to what had been a routine finish. We use spray equipment, but the technique can be adapted if you finish by hand (see sidebar p. 49).

NGR dyes and wiping stains—We'll give you the exact finishing schedule we used in the house later, but first we'll tell you more about the individual materials that make up the layering sequence and how we make sure the samples we show a client are produced accurately on the job. We use a color-step panel (photo this



page) when searching for just the right color match. In this case, we started with a piece of aged Douglas-fir siding that would approximate the appearance of the old fir trim used inside the house. The board is sanded just as the project material will be sanded, and a strip of masking tape is placed across one end of the sample before any finishing begins. Then the finish is applied in steps, just as it would be on the job. After each layer of finish is dry, a new strip of tape is added to cover a portion of that layer. When the final top coat is dry, the tape is removed to reveal a step-by-step sequence, showing the exact color and appearance of the wood at each step. Color-step panels give us a benchmark to control each step of the finishing operation.

Choosing the right finishing materials also is important. NGR colors are dyes that are soluble in alcohol and/or other solvents. Unlike pigmented stains, NGR dyes penetrate deeply into wood and enhance the natural beauty of the grain without obscuring it. Dyes work this way because the color is actually dissolved in a liquid medium; a pigmented stain is really made up of tiny bits of pigment suspended in a carrier. Pigmented stains can be a little cloudier. NGR dyes dry rapidly because they're alcohol-based, and as their name suggests, they don't raise the grain of the wood like water-based aniline dyes can. NGR stains, which are available from many finishing supply houses, are usually in concentrated form when you get them, so they should be diluted with methanol before use. The amount of methanol added to the NGR concentrate determines the brilliance of the background or base color.

Wiping stains, which we used in the second coloring step, are pigmented liquids that use a petroleum-based solvent rather than alcohol. A wiping stain is applied by spraying or brushing. It is allowed to set for a short period of time so that it penetrates the wood and is then wiped off with a lint-free cotton cloth or a dry China bristle brush. The waiting period determines the strength of the color—the longer the wiping stain sits on the wood, the more color it imparts.

Wash coats, sealers and top coats—Wash coats and sealers are intermediate steps between the application of the color coats and the top coat. They help lock color into the wood and prepare the surface for final finishing. A wash coat is simply a sealer that's been reduced, or



Base coat applied. The first layer of color, a red NGR dye, is an alcohol-based dye that won't raise the grain of the wood. A dye concentrate is thinned with methanol and sprayed on with a standard air gun to match a color sample that was made up in advance.

diluted, starting at a ratio of 1:1 (parts of sealer to parts of reducer) and going as far as a concentration of 1:15. A wash coat applied over an NGR dye seals in the color, so the application of a wiping stain later won't lift out the color. Wash coats act as conditioners to alleviate wiping-stain blotches that are so common when staining softwoods. Finally, a wash coat separates the NGR dye from the wiping stain, which adds more visual depth to the final finish.

A full-strength sealer, which follows the wiping stain, comes immediately before the top coat. Sealers fill the pores of the wood and lock loose wood fibers in a raised position, making the surface feel rough. Once this roughness is removed

by sanding, each subsequent coat will be smooth. Most finishes are difficult to sand, so manufacturers provide "sanding sealers," which are regular finishes with metallic soap, usually zinc stearate, added to make sanding easier.

Whether a wood finish consists of a single coat or a half-dozen coats, its success or failure depends on the top coat. The top coat must provide good adhesion to the surface to which it is applied. It should provide complete coverage with good flow-out to create a level, smooth surface. This surface will help create a moisture barrier that resists abrasions and household chemicals. The last point to consider is the clarity and the sheen, or gloss, of the top coat. Different top



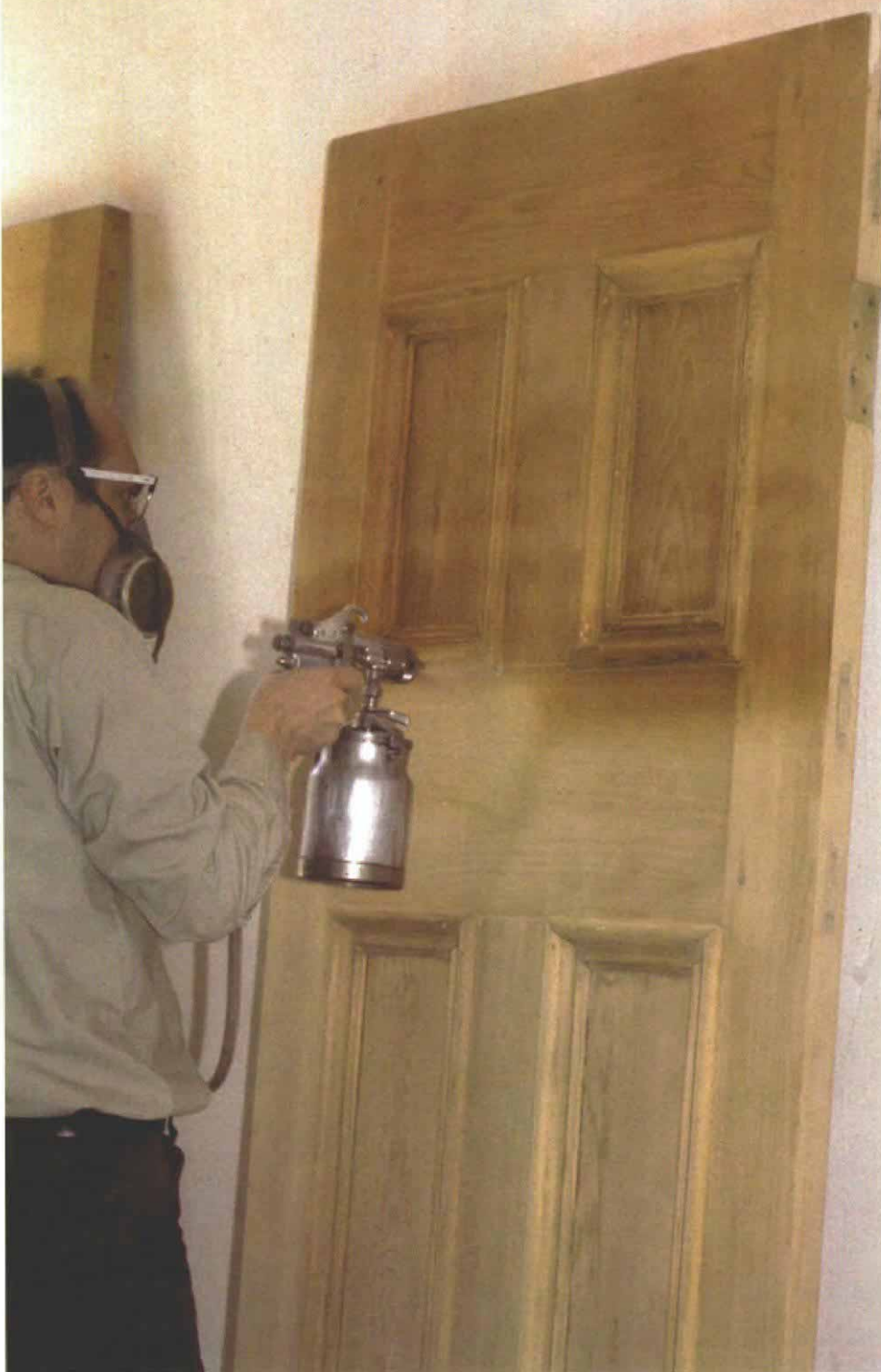
Adding a second color gives depth. After the base color has dried and a wash coat applied, a solvent-based stain is sprayed on. This second color is allowed to penetrate the wood and then is wiped off with a lint-free cloth or a dry China bristle brush.



Matching filled areas. Nail holes, cracks and other defects that have been filled must be touched up so that they match the finish.

coats have different clarities, and sheens range from flat to full gloss.

Taking it all off—The woodwork in the Victorian-era house we restored was covered with the usual accumulation of old age: three to five layers of paint that had to be removed before any new finish could be applied. Beneath the paint was either a faux finish—a paint finish made to look like marble—and/or a layer of shellac that had been used as a sealer. We began with an infrared heating iron and a scraper. Next, we used a chemical stripper to remove the remaining paint and the faux finish. Finally, the wood was washed with alcohol to remove as much of the



First coat for two-tone doors. After doors have been sanded, they are sprayed top to bottom with a light-colored NGR dye. A darker mahogany color applied to the trim surrounding the door panels is next, giving doors their Victorian flavor.

shellac as possible. We still resorted to intense sanding to clean up the last bits of finish.

Filling imperfections, then a first dye coat— During the latter stages of sanding, we used Zar latex wood putty to repair surface imperfections (United Gilsonite Laboratories, P. O. Box 70, Scranton, Pa. 18501; 800-845-5227), which stained two or three shades lighter than the wood. In general, it's easier to darken filler than it is to lighten it, so Zar was the best for this job.

With prep work out of the way, we could turn to the actual coloring process. The primary or background color was created with a red NGR dye

(Permatone #14-2009, Guardsman Products, Inc., P. O. Box 88010, Grand Rapids, Mich. 49518-0010; 616-940-2900). We used orange NGR dye on the doors (Mohawk Finishing Products, Inc., 4715 State Highway 30, Amsterdam, N. Y. 12010; 518-843-1380). The red NGR dye, the base coat on most of the woodwork, was mixed 1 part red to 3 parts methanol and sprayed on in a single application with a standard air gun (left photo, p. 47). The color appears red as a liquid and a strong pink on the raw wood. The orange NGR dye for the doors was mixed at a 1:4 ratio. Because they are methanol-based, the NGR dyes dry almost instantly. An even application of the dye is very im-



Accent color on doors. Armed with plenty of masking tape, and a steady hand with an X-acto knife, one of the authors masks off areas that don't get a second color, then applies a wiping stain to what's left.



The finish is new. The painstaking work on doors and trim results in a finish that complements the Victorian appearance of the house.

portant. When spraying this type of finish, provide adequate ventilation and observe proper fire and health safeguards. A good respirator equipped with organic-vapor cartridges and pre-filters is a must. We also carry a fire extinguisher to every job and post signs warning subcontractors not to smoke while we're spraying.

Wash coat and wiping stain—Using a wash coat is a good idea on pine, fir and maple. For these woods, a colorless wash coat helps protect the thin layer of dye that soaks in and helps prevent blotching. We used Guardsman Modified Adhesive Sealer (#14-7022) mixed at a ratio of

1 part sealer and 5 parts lacquer thinner. A 1:1 ratio will not allow the stain that's applied next to penetrate the wood and thus will produce a lighter color. A 1:15 ratio will allow a great deal of stain penetration and a darker color. We rubbed the wood with a nylon abrasive pad to remove any loose wood fibers after the wash coat had dried.

We picked wiping stains with two criteria in mind—color and open working time (the amount of time it took before the stain started to dry). Because we needed to cover large areas of wood, a longer open time helped us avoid lap marks. Window frames 7 ft. and 8 ft. tall (top right photo, p. 47), for instance, gave us a lot of wood to stain, and lap marks would have been glaringly obvious. To speed the process, we used a 2-gal. pressure pot with a Graco #1265 high-volume, low-pressure (HVLV) spray gun (Graco, Inc., P. O. Box 1441, Minneapolis, Minn. 55440; 800-3674023). With a large capacity of stain, we weren't slowed by constantly refilling the smaller cups normally used on spray guns. The mahogany stain (Guardsman #146112) was easily workable for five to 10 minutes, depending on temperature and humidity.

The stains sat for one to two minutes to allow some of the vehicle to evaporate. We then wiped the surface with a cotton rag to remove excess material and to even out the stain. In corners, which are impossible to wipe, we used a dry China bristle brush to even out the stain while it was wet. After a while, the dry brush became loaded and stiff with stain and had to be cleaned.

After the wiping stain had been applied, it was time to apply the sanding sealer in preparation for the top coats. We used Benjamin Moore sanding sealer (Benjamin Moore & Co., 51 Chestnut Ridge Road, Montvale, N. J. 07645; 800-344-0400). We thinned the sealer by about 10% with VM&P (varnish-maker and painters) naphtha so that the HVLV gun would produce adequate flow-out and a level finish. The sealer takes about two hours to dry before it can be sanded. We sanded with a steared 280-grit paper on an air sander and a hand sanding block covered with ¼-in. thick wool felt. On curved moldings, the sandpaper can be backed with a double layer of nylon abrasive pads to form a cushion. The cushion helps avoid cutting through the sealer and the stain on edges, corners and sharp curves. Later, the surfaces were wiped with a cotton rag barely damp with mineral spirits to remove any sanding dust.

Touching up surface defects—Touching up surface blemishes starts after the color has been locked in with a sanding sealer. Filled nail holes, puttied cracks and other surface defects can be recolored in several ways. The most direct method is to use the wiping stain and an artist brush (bottom right photo, p. 47). Stains contain solvents that will bite into the sealer coat, so it's a good idea to use a light touch with the brush. We have a soft rag handy in case we put on too much stain. If the stain does not want to bite hard enough into the sealer to get a strong enough color, you can try using the thicker pigments scraped from the bottom of the stain can.

You can also use touch-up felt-tipped markers or colored artist pencils. The pencils re-create grain on areas that have been repaired with wood putty. Brown, black and red-browns are our favorite colors. You just pick a color to match the grain and lightly sketch in lines over the puttied area to match the existing grain. If the lines are too hard, simply smear them with your finger to create a softer effect. The top coat will seal these colors in.

Two-tone finishes—Doors got a two-tone finish. After a wash coat had been applied on top of the NGR dye (left photo, facing page), we masked off areas that were to remain light and then sprayed on a darker mahogany wiping stain to areas that got the contrasting color (top right photo, facing page). This took a good deal of 2-in. masking tape and a steady hand with a razor blade. The mahogany stain was misted on with several applications with a touch-up spray gun to get an even color. The tape was removed as soon as possible to help prevent bleeding of the stain under the tape; any stain that did bleed through was gently removed with a rag and lacquer thinner.

The fretwork on the staircase was to remain light, with the rest of the staircase stained the darker mahogany color. To protect the fretwork we covered it with a frisket, which is plastic or paper with an adhesive backing available from graphic supply houses. We used an X-acto knife to cut around the fretwork and removed the background portion of the frisket. The background was then sprayed with the NGR, the wash coat and the mahogany stain. The frisket could then be removed.

Next was the orange NGR stain and wash coat, sprayed on with the touch-up gun. This was not a problem because the orange NGR overspray did not show up on the mahogany stain.

The handrail and the spindles were stained a third color, primarily to preserve the beauty of the walnut. The color was a 1:1 blend of Guardsman Burnt Sugar (#148411) and Cherry Tone (#148450) Graintone stains. This mixture yields a rich red-brown color. Because of the nice characteristics of the walnut, it was finished with only a stain, a sealer and two top coats.

Applying the top coats—A 1:4 mix of Benjamin Moore gloss varnish and low-luster varnish gave the desired sheen. The mix was sprayed on with the HVLV gun. The finish dries in one to two hours and hangs very well on vertical surfaces, although the varnish had to be reduced about 15% with VM&P naphtha to get a good, flat surface. This is partly a result of using the HVLV spray gun, which tends to flash off some of the solvent before it reaches the surface you're finishing. Once the finish was dry, it was evident that the surface was still a little porous. So the top coat was sanded lightly with a nylon abrasive pad and given a second coat of varnish. □

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Finishing without a sprayer

Not everyone has spray equipment, so the question is whether a multilayer finishing technique works if you're using a brush. The answer is yes, although materials and methods differ slightly.

Finishing steps are basically the same: A base color or dye is applied first, followed by an optional wash coat (a very diluted sealer), a wiping stain for the final color, a sealer and finally the top coat for protection and durability. Non-grain-raising (NGR) dyes are alcohol-based and dry too quickly to be brushed on. Instead, you can substitute a water-based aniline dye. Aniline colors, however, are very strong, so proceed cautiously.

Diluting the color with water creates some problems because water raises the grain of the wood—some species more than others. One solution to this grain-raising problem is to wet the wood with water after the finish sanding, before applying the dye. When the surface is thoroughly dry, sand it again with fine paper to take off the fuzzy wood fibers the water has left behind. When you apply the aniline, it shouldn't raise the grain again. A foam brush tends to lay out the color of aniline more evenly than a bristle brush. Water-based dyes, which come in powder form, are available from a number of woodworking supply companies.

Use of a wash coat is optional because most retail stains contain sealers that do the same thing. If you use a wash coat, reduce a varnish sealer so that the solids content is between 3% and 7% and brush it on. It's best to apply a thin coat and make sure it doesn't run.

Most local paint stores carry various lines of good-quality oil-based wiping stains, and most stores can tint stains to your specs. These stains contain sealers and binders that require 12 to 24 hours to dry. The longer drying time allows longer working time and makes the stains very user-friendly. Stain can be brushed on and then wiped to lay out the color evenly. The dry-brushing technique described in the article works well here, too.

After letting the stain dry for 24 hours, you may apply the sealer and the top coat. A standard sanding sealer and varnish combination works well for brushing. A polyurethane or acrylic latex polyurethane may be used for the sealer and the top coat. Sanding the sealer coat is basically the same as it would be if you were spraying; and quick drying times are always better because they allow less time for dust to stick to the finish. If the finish doesn't want to flow out flat when you brush it on, try adding small amounts of thinner.

Before attempting a project of this type, it would be a good idea to check with your local finish supplier to make sure that all the materials you're planning to use are compatible. —R. D. and S. D.