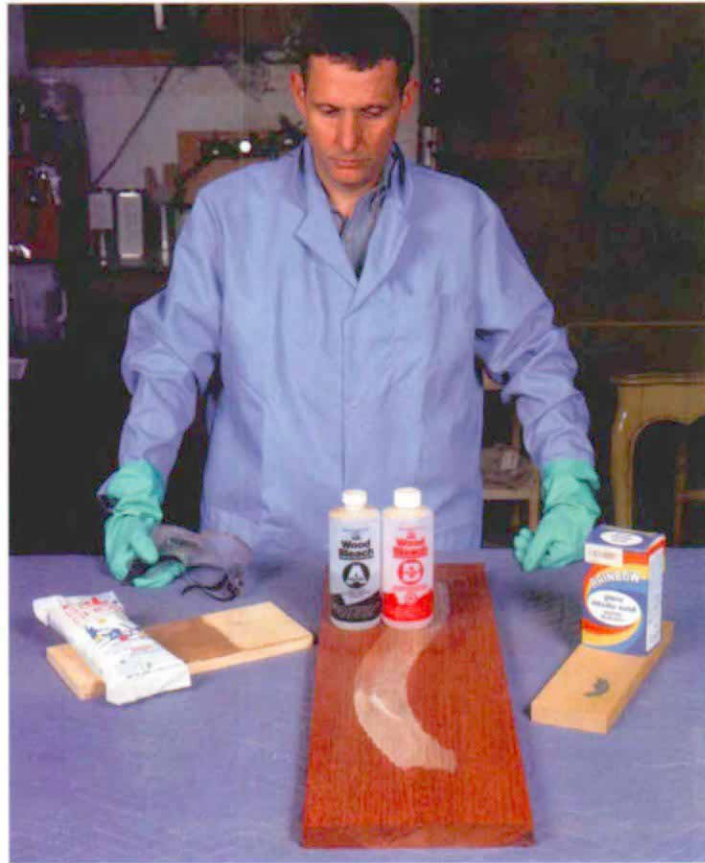


Using Wood Bleach

These chemicals remove stains and lighten wood

by Jeff Jewitt



Pick the right bleach for the job. These three types of wood bleach all have specific uses. No one bleach does it all.

My client's dining table had been damaged in a move, and two of its leaves were missing. The French-style reproduction table, about 60 years old, was veneered with a fruitwood that looked like cherry in grain and texture. But the wood had mellowed to a yellow-gold color. Cherry was the natural choice for the new leaves. But the color would be too red and would darken significantly over time.

I solved the problem with bleach. It removed the natural color of the cherry, providing me with a neutral background so I could match the original with a dye

stain. The bleach also halted the darkening process in the cherry leaves, so the color of the table would remain uniform.

Matching old wood to new is only one application for wood bleaches. Most finishers are aware that bleaches remove unwanted stains—food, black water and old dyes. But bleaches can do much more. They also even out tonal variations in dissimilar woods and produce blond or pickled finishes. The trick is knowing which bleach to use. For that, it helps to understand how wood bleach works (see the box on p. 64).

For woodworkers, there are three general types of bleaches: peroxide, chlorine and oxalic acid. All three work by altering the way wood molecules reflect light, thereby changing the color in the process. But each type of bleach is suited to particular tasks; they are not interchangeable.

Ideally, a bleach should work selectively to remove color, meaning that it should only remove the color that you want and not the color of anything around it. In most cases you'll need to experiment, especially if you don't know the composition of the stain. Because most bleaches are highly poisonous and often very corrosive to skin, you should always wear good rubber gloves, a dust mask (if you're mixing dry bleach powders) and safety glasses.

Peroxide bleaches remove natural color

These bleaches are sold as two-part solutions, commonly labeled A and B. You'll find peroxide wood bleaches in most paint and hardware stores. The two chemicals are usually sodium hydroxide and a strong hydrogen peroxide solution. When used together, a powerful oxidizing reaction takes place that is effective in removing the natural color in wood, like the mahogany shown at right. To a lesser degree, peroxide bleaches will lighten some woods that have been treated with pigment stains. They are ineffective on dye stains.

The most common way to apply this product is to wet the wood thoroughly with sodium hydroxide (part A) and immediately follow with hydrogen peroxide (part B). It's important with some tannin-rich woods like cherry and oak that part A not sit too long before part B is applied because the sodium hydroxide may darken the wood. You can also mix the two parts together and apply them at the same time, as long as you do this quickly after the parts are mixed. Usually one application is needed, but a second application may be necessary to even out the bleaching effect.

Some dark woods, like ebony, are not affected by peroxide bleaches. You can use this to your advantage if you want to bleach a tabletop with ebony inlay. On some woods, especially walnut, a greenish tinge may appear in some areas if the bleach is applied unevenly. To prevent this problem, apply the bleach sparingly; use just enough to make the wood wet. Don't flood the surface.

Neutralize the alkaline effect of peroxide bleaches after the wood has dried by ap-



Peroxide bleaches work best at removing the natural color of the wood. This piece of mahogany veneer changed from a deep red to a light blond color with one application of peroxide bleach.

plying a weak acid, like white vinegar. Use one part vinegar to two parts water. Follow that with a clean water rinse.

Peroxide bleaches will remove all the natural color variations in wood, so use them judiciously. I use them to match sun-faded wood or to provide a neutral base for a decorative finish like pickled oak. You can also use them to compensate for heartwood/sapwood variations, but I usually

prefer to bring the sapwood in line with the heartwood by hand coloring or spraying the sapwood with a dye stain.

Chlorine bleaches eliminate dye colors

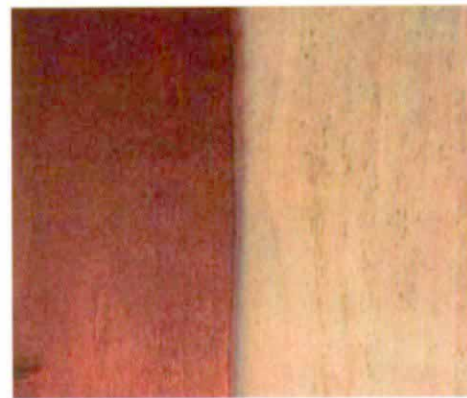
Chlorine is a strong oxidizer that will remove or lighten most dye stains (see the bottom right photo on p. 64). A weak chlorine-based laundry bleach such as Clorox

How bleach works

Color in an object is produced when the molecules selectively reflect light. These colored molecules may be organic, like those in dyes, or they can be inorganic, like those in pigments. Most bleaches, like peroxide and chlorine, work by disrupting the way that the molecules can reflect light. Other bleaches, like oxalic acid, convert the colored compound of a stain to a different, colorless one. The physics of these concepts may be difficult to understand, but the important thing to remember is that bleaches do not really remove the color of a substance. They simply change the material so it appears colorless.

As an example, tannic acid and ferrous sulfate when dissolved in water are colorless solutions. When mixed together, the two chemicals react and form a third compound, iron tannate, which is a grayish-black color. Iron tannate is the compound responsible for most of the black water spots on oak. When oxalic acid is added to this liquid, it converts the colored iron tannate molecules to iron oxalate, a colorless compound. When used in this respect, oxalic acid is a bleach.

Not every colored object can be bleached. Colors that are produced by inorganic molecules will not react to the bleach. Many pigments like carbon black (used in inks) and earth pigments (used in wood stains) will not react to bleach. These colors can only be completely removed by scraping or sanding the color off the surface of the wood. —J.J.



Chlorine bleaches remove dye stains. *The natural color of walnut (left) is virtually unchanged by an application of chlorine bleach. But most of the dye stain on the birch veneer (right) has been removed with the same solution.*

will work, but it will often take several applications to be effective. A much stronger solution can be made from swimming pool bleach—a dry chemical called calcium hypochlorite. It's inexpensive and can be purchased from a retailer of pool supplies.

The chief advantage of chlorine is that it will remove or lighten the dye without affecting the natural color of the wood. You can use laundry bleach or the stronger version—dry calcium hypochlorite powder

mixed to a saturated solution in hot water. A saturated solution is created by adding the powder to water until no more powder will dissolve. Mix only in glass or plastic containers: The chemical will attack aluminum or steel. The mixture will lose its effectiveness if stored, so I make up only what I'll use right away. Cool to room temperature before using, and filter out solids.

Apply the solution liberally to the wood and, in some cases, the dye will immedi-

ately disappear. Some dyes may take longer to bleach, and some may only lighten but not disappear. Wait overnight to determine the full bleaching effect. If the color hasn't changed after two applications, applying more bleach won't help. You'll need to try another technique. Chlorine bleaches are usually ineffective on pigment-based stains. The only way to remove these are by sanding or scraping.

Oxalic acid for iron stains and weathering

Oxalic acid is unique in that it will remove a specific type of stain formed when iron and moisture come into contact with tannic acid. Some woods, like oak, cherry and mahogany, naturally contain a high amount of tannic acid. A black stain results when the tannic acid reacts with water containing trace amounts of iron. Oxalic acid will remove this discoloration without affecting the natural color of the wood (see the photos at right).

Oxalic acid also lightens the graying effects of outdoor exposure. It is the active ingredient in some deck brighteners. If used on furniture that has been stripped for refinishing, it will lighten the color and re-establish an even tone to the wood.

Iron-based stains are fairly easy to spot. They are grayish-black and usually ring-shaped. They may also show up as a splotchy appearance on oak that has been stripped. Before applying oxalic acid, remove any finish first.

In a plastic container, mix a solution from dry crystals of oxalic acid (available from most woodworking supply stores) in hot water. Allow the solution to cool to room temperature, and apply it to the entire surface, not just to the stain. Several applications may be needed with overnight drying in between. Once the surface of the wood is dry, any residual oxalic acid must be removed before sanding or finishing because the acid will damage subsequent finishes. Several water rinses will remove most of the oxalic acid crystals left on the wood surface. Neutralize the acidic wood surface with a solution made from one quart of water and two heaping tablespoons of baking soda. Then rinse off the baking soda solution with water.

Solving special staining problems

Stains that form on wood during the drying process are varied in their composition. Sticker stain, brown stain, streaking and light "ghost" stains are all common prob-

lems. Some can be removed by bleach. The composition of the stain may be chemical or biological, so a trial-and-error approach may be needed when attempting to remove a stain. I often start with oxalic acid and then follow with chlorine. Peroxide bleaches are a last resort because the removal or acceptable lightening of the stain can result in bleaching the surrounding wood.

Stains like grape juice, tea and fruits can be removed with a chlorine bleach. Re-

member to wipe the entire surface to get an even effect. Some blue and black inks with an iron base can be eliminated with oxalic acid, but carbon-based inks, like India ink, can't be removed by any bleach.

Jeff Jewitt repairs and restores furniture in North Royalton, Ohio. He's the author of Hand-Applied Finishes. The book and its two companion videos are available from The Taunton Press.



Oxalic acid removes the stain but not the color of the wood. The author used a deck brightener, which has oxalic acid as an active ingredient, on this piece of white oak.