Bleach's main role in the shop is for lightening the natural color of wood. Here the author sponges a two-part wood bleach, which has been mixed in a glass measuring cup, onto a walnut board.

Bleaching Wood

A versatile solution for lightening wood and more

by Michael Dresdner

Most of us are familiar with wood stains and dyes, the liquids we use when we want to darken wood or change its hue. But what happens when we need to remove color and make the wood lighter? Anyone who has set a piece of dark furniture near a window knows exposure to sun is one of the more effective ways of bleaching color out of wood. But while this method is cheap and easy, it tends to be hard to control. Instead, woodworkers often rely on a few liquid bleaching materials that take a bit more effort to use, but work nicely—even on cloudy days.

Why bleach a beautiful piece of wood when nature went to all the trouble of coloring it in the first place? In addition to lightening wood, there are numerous good reasons for bleaching. You may wish to prepare the wood for a special finishing treatment, such as bleaching mahogany to make it more cream colored (known as blond mahogany), or to lighten dark oak in preparation for a limed finish. Another reason for bleaching is to even out dark and light sections of wood, say a tabletop that has faded from sunlight on only one side or pieces that have drastic color variations. This technique can also impart a warm, sun-faded glow to darker new woods, like walnut and rosewood. Bleaching can do a nice job of removing a stain or dye color from a piece of woodwork before it is refinished, and it can also remove specific types of unwanted discolorations, such as water stains or iron stains on light woods (see the bottom photo on p. 67). Bleaching can even be used to bring back some of the original color of unfinished exterior woods, like faded, silver-gray teak boat decking or cedar and redwood patio furniture.

There are three bleaches readily available to woodworkers that can be used for a variety of wood-lightening tasks: Sodium hypochlorite, available as liquid laundry bleach or swimming pool chlorine; oxalic acid (sometimes called "deck brightener"); and A/B-type bleach, which is a two-part solution usually sold as wood bleach. Later in the article I'll tell you how to use a wood bleach, and the sidebar on the next page will help you choose the best bleach for your particular application. But first let's look at what happens when bleach is applied to a wood surface.

How bleach works—Understanding how and why bleaches work will help you decide when they should be used and predict what the likely results will be. Simply put, bleaches are highly reactive chemicals that break down the molecular structure of natural colorants in the wood or of artificial colorants, such as stains and dyes applied to the wood. This chemical reaction between the bleach and the colorant usually results in the wood's color becoming lighter. It's commonly thought that a liquid's pH is responsible for its effectiveness as a bleach. A pH is a measure of a liquid's acidity or alkalinity rated on a scale of 1 to 14, with a strong acid being 1 and a strong alkali (or base) being 14. Pure water is neutral, with a pH of 7. However, while most bleaches are either moderately strong adds or bases, their pH levels are *not* germane to their bleaching actions. Further, bleach does not actually "remove" a stain, but merely changes its color, frequently making it transparent. This means that the elements of the original stain are still present in the wood *even*

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Photo this page: Sandor Nagyszalanczy

Choosing the right bleach

Each type of bleach reacts differently when applied to various natural or dyed woods. Although you can't always predict the exact effects (without a detailed chemical analysis), you can draw some general conclusions about which bleach to use for a particular application. This is because most colorants, both applied (stains, dyes) and naturally occurring pigments and extractives, fall into readily definable categories that, more often than not, will respond to a particular bleach.

The discussion of the three bleaches that follows, as well as the chart on the facing page, will help you choose the most effective bleach for your desired result. Nevertheless, a particular bleach may not always do what you expect; so try bleaching a scrap before working on a finished piece.

Oxalic acid: Although it is fairly ineffectual for color removal, oxalic acid performs two bleaching chores on wood that make it indispensable. Sold in liquid premixed form as "deck brightener," it will reverse the graying or silvering effect caused by oxidation of unsealed wood. Its other strength is as a reactant for a specific but rather common stain caused by iron and moisture coming into contact with woods containing tannin. This is most common in oak, because of its high tannin content and light color. The stain appears blue-black in color and is frequently seen on furniture with nails or iron hardware. Because the stain tends to spread, it can be an early warning that a hidden nail is lurking in a board. Scrubbing stained oak with steel wool will often leave tiny bits of the metal in the wood's pores, which will appear later as a pattern of fine black dots, especially if the humidity is fairly high.

Although premised oxalic acid solution comes ready to use, it is more cost effective to buy as a dry powder in 1-lb. packages. Both liquid and dry solutions are generally available in hardware and paint stores. Although the mixing directions usually call for 1 lb. of powder to a gallon of water, oxalic acid is effective in any amount over 4% in a solution (5 oz. per gallon of water). Handle the powder carefully, as it is toxic and irritating to mucous membranes. Mixing into hot water will help the crystals dissolve faster, and the solution can be applied either hot or cold. Make certain that any embedded or attached ferrous metal has been removed from the wood before bleaching with oxalic acid.

Flood the surface of the wood with the solution and allow it to dry overnight. One application is usually enough to remove rust or iron stains. Brush or vacuum off any dry salt residue, and then wash the surface liberally with clean water and wipe it down to remove any additional residue.

Chlorine bleach: Like oxalic acid, chlorine bleach is available in both liquid and powder forms, though not from the same sources. Sold under trade names like Clorox and Purex, you'll find liquid laundry bleach in supermarkets and food stores. Chemically, these contain a 5% solution of sodium hypochlorite in water, which is on the weak side when it comes to stain removal; several applications may be needed for complete bleaching. You can mix your own stronger solution by buying dry swimming pool chlorine (usually calcium hypochlorite) and stirring it into hot water until you have a saturated solution (when you can no longer dissolve chlorine in the water).

Although chlorine bleach is very poor at lightening the color of wood, it's a fairly good bleach for removing stains or dyes that have been applied to wood, and it is especially effective on aniline dyes. One advantage of chlorine bleach is its selective stain removing capability. For example, it will take the applied dye out of an old mahogany piece without lightening the wood itself.

As with oxalic acid, coat the wood liberally with fresh chlorine bleach, applying as many coats as needed and allowing the wood to dry in between. This bleach is moderately alkaline, and it will cause natural fibers to disintegrate; so keep the liquid off your clothes, and apply it only with *synthetic* brushes, rags or sponges. Chlorine bleach generally does not require neutralizing, but a water wash down is still a good idea after application.

A/B wood bleach: Wood bleach, or A/B bleach, is a very strong oxidizing agent and will quickly and drastically lighten the color of many woods (see the top photo on the facing page), as well as a wide range of both pigment- and dye-type stains. The bleach, sold as a two-part system that must be mixed before use, is available in hardware and paint stores and through mail-order catalogs.

Typically, the "A" part of a wood bleach is sodium hydroxide, a moderately strong alkaline solution commonly known as lye. The "B" portion is an acid-hydrogen peroxide. (Be sure to check the label on the wood bleach you purchase; some manufacturers reverse the A and B designations.) Although each of these materials is an oxidizing agent by itself, a synergistic effect is created when they are mixed together, forming an oxidizing agent far stronger than either one alone. Both components will burn skin, and so you must use extreme caution when working with them. As one is an acid and the other a base, they also neutralize each other, making their action short-lived once they mix. This explains the need for packaging them separately. Generally speaking, optimum bleaching is achieved with a 25% solution of part A and a 35% solution of part B.

You apply a two-part bleach in two stages. Using separate synthetic sponges as applicators, first coat the wood liberally with part A. Wait a few minutes, and then follow with a wash of part B while the wood is still wet. It is important that part A is still wet and active when it contacts part B, or you will not get the full effect of the mix. Which part goes on first is not particularly critical; however, most containers suggest applying the lye first, as it is slower to evaporate and will give you more time to apply the peroxide. If the components are strong and viable, the mix will foam slightly on the wood's surface: a good indication that it is working. Allow it to dry completely before deciding whether a second application is necessary. Adding a wash of chlorine bleach while the first two applications are still wet will kick the solution slightly and make it work even faster.

Some manufacturers suggest mixing the two parts together before application. If this is done, the liquid must be applied to the wood quickly, before the chemical reaction wears out. As you continue to dip the applicator into the bowl, frothing may occur, but this is normal. To minimize this problem, two-part bleaches are frequently sold as weaker, slower-acting solutions.

The two-part bleach leaves a slightly alkaline surface, especially with multiple applications; so neutralize with a mild acid, such as vinegar and water. Otherwise, simply wash the surface liberally with clear water to remove any residue. —*M.D.*

after bleaching. Since the chemical process may be reversed inadvertently, you could encounter a situation where a stain that you've previously removed reappears or, worse, a new stain develops from a reaction between the bleach and chemicals in the wood.

Even though they're most commonly used for lightening wood, certain bleaches can have an entirely opposite effect when applied in different situations. For example, muriatic acid (which is diluted hydrochloric acid) will often decolorize aniline dyes. When used on ebony, though, it will darken white mineral spots. There are times when this chemical selectivity can work to your advantage. An A/B-type wood bleach will lighten the background color of Brazilian rosewood usually without affecting its dark figure lines; precisely the effect caused by long-term exposure to the sun (see sample #5 in the top photo at right). For years, furniture refinishers and repairers have taken advantage of this happy coincidence to make new rosewood look old.

Just as some people simply can't be bought (remember Elliot Ness in *The Untouchables?*), some things just can't be bleached. Any furniture refinisher who has struggled to get rid of a stubborn ink stain on a beautiful old roll-top desk will quickly confirm this. As another example, it is virtually impossible to bleach carbon black.

How to use bleach—Before you begin bleaching, keep in mind that all of the bleaches discussed in this article can be dangerous if handled improperly. Therefore, protect yourself with goggles, a respirator and neoprene gloves, and handle all materials cautiously. Do not mix bleaches with other chemicals or cleaning agents; for example, chlorine bleach forms a toxic gas when mixed with ammonia. Always work in a well-ventilated room, and keep all bleaches out of the reach of children.

Before application, make certain that the wood's surface is clean of any finish, wax residue or sealants of any kind. If possible, sand the surface to deglaze the wood and to rough up its pores. Bleaches can only be effective if they can get into the wood, and anything that prevents water from being absorbed will block the bleach. If there is any doubt, wet the wood with water and check if any areas shed the water. These areas will resist bleaching and may leave the surface splotchy and uneven.

Once you have selected the bleach (discussed in the sidebar), use only a glass, porcelain or plastic container to hold it and mix it (if necessary) according to the directions on the bottle. Metal containers may react with certain bleaches, and so you should avoid them. Also, use fresh bleach for each job; bleaches weaken with extended shelf time. Apply the bleach evenly and liberally to the wood, giving it plenty of time to work, sometimes overnight. Each subsequent application will bleach the wood more, and a second or even third application may be necessary to achieve the effect you desire. In any case, the bleaching action stops whenever the liquid has evaporated.

Although much is said about neutralizing bleach, *removing* the residues left after bleaching is more important than chemical neutralization. If left on the wood, residues, such as dry acid crystals or salts, can be removed by sanding and vacuuming the surface, but it is safer and easier to remove them by thoroughly rinsing the wood with clean water. This diluting process is effective because all common wood bleaches are water soluble. Wetting the piece with water to remove residue is also safer than trying to remove dry residue; dry oxalic acid crystals, for example, are a toxic irritant and can easily antagonize the mucous membranes of your nose and eyes.

After bleaching is complete, any of the three bleaches discussed here can be disposed of down the sink drain, followed by lots of clear water. Sponges, applicators and containers should likewise be well rinsed before disposal. If you decide to sand the dried bleached surface to flatten any raised grain, do so with care: The effects of the bleach aren't absorbed very deeply, and it is easy to sand through the bleached area into darker wood below. This can especially be a problem on carvings and sharp edges. One way to avoid this is to use abrasive pads instead of sandpaper.

Although wood bleaches must be handled carefully, they can open up many new options for the wood finisher, and especially for the refinisher, by doing what no other finishing materials can do: take away color. At times there is just no other alternative. □

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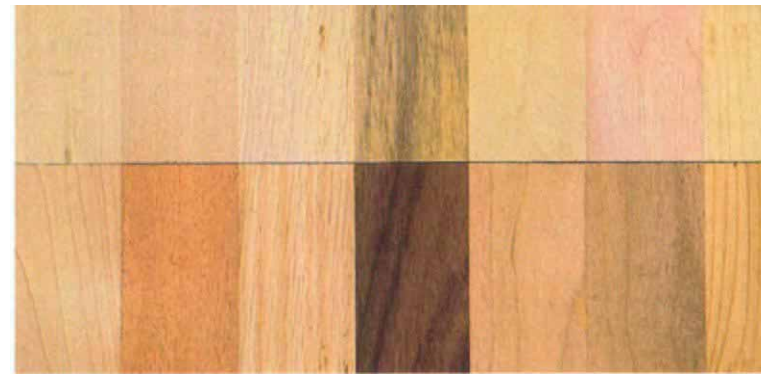

Bleaches react differently to natural chemicals in wood, and even the same bleach has widely ranging effects on different wood species. An A/B wood bleach, applied to the top half of the above samples, had little effect, on the oak and maple (#5 and #7), while it changed the cedar, walnut, cherry, rosewood and mahogany (#1, #2, #3, #4 and #6) more drastically. Although bleached rosewood is lighter, it retains its dark figure lines.

When bleaching iron stains from oak, oxalic acid virtually removes the blue-black stain from the sample (left), returning the wood to its natural color. A/B-type bleach (center sample) leaves the wood more silver, and chlorine bleach (right sample) leaves the wood gray.

Choosing a Bleach

Desired Result	Oxalic Acid	Chlorine Bleach	A/B Bleach
Lighten wood			*
Even out sun fade			*
Decolorize aniline dyes		*	*
Decolorize pigmented stains			*
Remove iron stains	*		
Remove water stains	*		
Rejuvenate aged exterior wood	*		

Photos this page: Susan Kahn