FinishLine

Forest Products Laboratory

Outdoor Furniture, Artwork, Fences, and Play Equipment

Wood exposed outdoors can last for centuries. What kind of wood you choose and how you protect it can make a big difference in how long the wood lasts. Two conditions influence the service life of outdoor wood: weathering and decay.

Weathering and Decay

Weathering is erosion from sun, wind and debris, and moisture. If wood is not protected by paint or stain, the weathering process removes about 1/4 inch (6 mm) of wood per century from softwoods (e.g., cedar) on vertical exposures; even more wood is eroded in more severe exposures.

The first step to prevent weathering is to block sunlight. Finishes differ in their ability to protect wood from the sun. Paints can block sunlight completely, but they can trap moisture and encourage decay. Semitransparent stains are the next effective in blocking sunlight, followed by water-repellent preservatives, especially those that contain ultraviolet (UV) light inhibitors.

The other major concern is decay (rot), which is the growth of fungi. Because outdoor wood is exposed to moisture, it is subject to decay. One way to reduce the likelihood of decay is to use treated wood. However, treated wood is often green or has other potentially undesirable properties, such as a tendency to warp.

Heartwood is the wood that extends from the pith (center of tree) to the sapwood (outer zone of tree, next to bark). The heartwood of some wood species is "durable" or resistant to decay.

There is general consensus that some second-growth timber, even from a decay-resistant species, is not as durable as the old-growth timber.

Decay-resistant species

- Baldcypress (old growth)
- Catalpa
- Cedar
- Cherry (black)
- Chestnut
- Cypress (Arizona)
- Juniper
- Locust (black)
- Mesquite
- Mulberry (red)
- Oak (bur, chestnut, Gambel, Oregon white, post, white)
- Osage-orange
- Redwood
- Sassafras
- Walnut (black)
- Yew (Pacific)

The durability of any wood decreases as rain or other sources of moisture remove the natural preservatives. Wood kept dry will not decay, although it may still be vulnerable to attack by insects.

Although using a decay-resistant species or treated wood will reduce the incidence of decay, the wood can still weather, as well as crack and check, if not protected with a finish.

The serviceability of various kinds of finishes is compared in Table 1 (see page 2). Penetrating finishes (stains and water-repellent preservatives) that are used for decks can also be used for all wood discussed here.

The best way to protect wood furniture or artwork (e.g., wood carvings) from weathering is to cover it with a roof. A roof also prevents decay as long as there is no other source of moisture, such as contact with the ground.

Artwork

Artwork made from logs or large pieces of wood is prone to crack and check as the wood seasons. Wood swells as it gets wet and shrinks as it dries. Because wood does not shrink evenly in all directions (some parts shrink faster than others), it cracks. Chemicals can be used to stabilize this process, but they can be both difficult to apply and expensive. The chemical stabilizer polyethylene glycol (PEG) is not appropriate for outdoor use because it washes out.

Cutting can be used to prevent or minimize drying stresses in poles. For example, totem poles are hollowed out from the back—the center is removed so that the remaining wood can shift during drying. Cutting a deep notch in the back of a pole can force most cracking to occur in one spot.

The first choice of finish for artwork is a solvent-borne semitransparent stain that also contains a water repellent and a preservative. Clean and apply stain every few years as needed. If a film or gloss develops on the wood, you are applying stain too often.

If you choose paint, pretreat the wood with a paintable water-repellent preservative (WRP) before painting. Then, you can apply additional WRP as cracks and checks form. Wipe excess WRP from previously painted areas. Use an acrylic latex paint for the prime and topcoat because it is more flexible than other paints.

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Table 1—Comparison of finishes for various uses.

Use	Latex paint	Enamel paint	Stain	Water-repellent preservative[a]
Artwork	Adequate	Adequate[b]	Very good	Adequate
Furniture	Not good[c]	Good	Adequate[d]	Adequate
Fencing	Very good	Adequate	Very good	Adequate
Play equipment	Not good	Adequate[e]	Good	Adequate

[a]Apply at least once a year.
[b]Can be used for small pieces of artwork.
[c]Provides little resistance to abrasion.
[d]Tends to wear off outdoor furniture.
[e]Only with redwood or cedar.

Furniture

Furniture requires a durable finish that doesn't wear off on clothes. Paint can serve this purpose. Enamel paint provides a hard surface that wears well. Thin the paint for the first coat to increase penetration. Light sanding may increase adhesion of the topcoat(s). If possible, paint the end grain before the furniture parts are assembled.

Fences

Fences probably have the most finishing options. Acrylic latex paints are better than oil-based paints, unless the fence is likely to be used for sitting. Highly colored woods such as redwood and cedar require a stain-blocking primer. Pretreating the wood, especially the ends, with a paintable WRP will increase the life of the paint.

Play Equipment

Choosing a finish for play equipment requires some thought. Like furniture, play equipment is subject to abrasion, so latex paint is not the first choice. Enamel paint may not be suitable if the equipment has been made from treated wood because such wood is prone to cracking. However, an enamel could be used if the wood is redwood or cedar. Stain may be the best choice, although it may show wear patterns.

Tips for Prolonging the Life of the Finish

- Subject the wood to one or two wetting/drying cycles before you apply the finish; wet the wood (with a hose, for example) and let it dry completely each time.
- Sand the wood before applying the finish.
- Apply paint to wood soon after sanding. If possible, paint in a protected area, such as a garage, to protect the wood from the sun. Even 1 week of sunlight can weather unfinished wood and shorten the life of the paint. See the FinishLine "Before You Install Exterior Wood-Based Siding" for more information about sunlight on wood.

Caution: Mildewcides in Exterior Finishes

Finishes with mildewcides prevent the growth of mildew, the primary cause of graying of exterior wood. Both mildew and mildewcides can cause allergic or toxic reactions. After the finish has dried for about a week, it is unlikely to cause an allergic reaction. However, food should not be placed in direct contact with surfaces finished with a mildewcide-containing stain or paint.

If you choose to use a finish without a mildewcide (a water repellent or stain), you can periodically clean the mildew from the wood with a bleach solution (1 quart bleach per gallon water; less bleach if you work slowly). In that case, do not use natural oils like linseed or tung unless you desire a gray or even black appearance. Natural oils are food for molds and mildew. However, on decay-resistant woods where black is acceptable, you may never need to refinish.

More Information

For more information on how to finish outdoor furniture, artwork, fences, and play equipment, see the following FinishLines: "Paint, Stain, Varnish, or Preservative? It's Your Choice" and "Finishes for Wood Decks."

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