

A SHORT COURSE ON THE WEATHERING AND MAINTENANCE REALITIES OF 'NATURAL' WOOD COATINGS AND HOW TO KEEP YOUR WOOD HOME NEW LOOKING YEAR AFTER YEAR

Structures Wood Care Inc. has a twofold responsibility to you when you choose NatureColor™.

- First, to provide you with the highest quality, most technically correct outdoor wood protection finish money can buy.
- Second, to the best of our ability, help you establish an appealing, new wood appearance to your home or other wood structure *and then keep it that way.*

The information that follows can spare your home, pride, and pocketbook the unhappy consequences of trying to maintain a lastingly attractive natural wood home without the knowledge and proper materials necessary to do it. There are certain characteristics to exterior wood coatings that may be categorized as clear, translucent, or semi-transparent which are not well understood by the public, and you need to know this information if the 'natural' wood look is your goal. You need to understand what constitutes a workable coating technique for this purpose, and the maintenance requirements common to all outdoor wood coatings.

It is equally important to gain some insight into how crucial the design, construction, siding selection, and surface preparation of your home is to successful 'natural' wood coating protection. These factors operate in concert with your coating and profoundly affect the end result you are striving for. If they are poorly conceived or ignored, the result is job site circumstances incompatible with natural wood coatings of any description.

WEATHERING: THE CHALLENGE OF NATURE'S ELEMENTS

The processes in nature that created and protected the vibrant color and texture of your new wood while it was part of a living tree were forever removed when the tree was felled. Now that the tree has been cut, you are confronted with trying to preserve those attributes of vibrant color and texture in the wood.

Nature is going to work 24 hours a day on getting that wood back. It is going to assault your wood with constant wetting and drying moisture cycles, mildew and/or decay fungi attack, ultraviolet solar radiation, abrasion from air driven dust, dirt, hail and pollutants, etc., etc. For unprotected wood, all of this spells certain new wood color loss and various forms of other degradation ranging from a creeping gray/black veil over the wood to warping and cracking, wood cell disintegration, and rot. Depending upon the degree of its exposure to these elements, nature is relentlessly working on turning your wood into something that looks like an old farm fence post.

The public displeasure with this reality translates into statements we hear from wood homeowners that sound like this:

"I've seen how homes clad in nice looking new wood siding and log work often turn into eyesores and I don't want that to happen to me. The appearance of my new natural wood home is beautiful as nature made it – I can't really improve upon it. I just want to preserve it as it is. I want a product that will not really show – something that will be absorbed by and blend into the wood itself, leaving a relatively inconspicuous appearance. I may choose to tint the existing new wood to a coloration more pleasing to me but again, I want to see the underlying grain definition and the wood is to look relatively untreated or as if only damp."

"I can accept the necessity for periodic recoating, but I expect the initial appearance I achieve to remain that way because that's the appearance I like, and what I paid for in this expensive wood."

THE ‘DEEP PENETRATION’ WOOD PROTECTION MYTH

There are numerous outdoor natural wood finishes offered in the marketplace advertising their ability to perform exactly as these homeowners want. The catchall slogan underpinning these claims is “deep penetration” wood protection.



The actual facts are that the depth to which a wood finish penetrates the surface of wood has very little to do with how effective it is as a weathering shield. The honeycomb, cellular structure of wood coupled to the inherent limits of job site brush and spray applications allows only minimum penetration of the surface cell structure of wood. Weathering, in any case, is a surface phenomena – it is there where the protection of wood succeeds or fails.

There is no research source of information on this subject more objective and unbiased than the USDA's Forest Products Laboratory located in Madison, Wisconsin. Numerous publications available from this facility make repeated reference to the fact, that the amount of durable wood protection an outdoor wood finish offers, is a function of how much of it is left as a *film* on the surface of the wood after it's been applied and fully dried.

The truth of this is self-evident. If you were to examine a wood sided home with an exterior coating of intact solid color paint, and you removed an area of this paint, in what condition would you find the now revealed underlying surface? You will find it in new and clean condition, simply because that paint has provided a continuous film that has kept the elements away from and out of the wood, and its

pigment particles have completely shielded the wood from the color changing effects of the sun.

Durable wood protection is not characteristic of wood coating formulations that rest primarily on 'deep penetration'. Here is an excerpt from the Forest Products Laboratory's Report, U.S. and European Finishes for Weather-exposed Wood – a Comparison.

“A main problem in wood finishing for outdoors lies in the fact that architects as well as homeowners often prefer to use fully transparent or semi-transparent finishes because they like the ‘natural’ color and texture of wood. Because these popular types of finishes (clear finishes, stains) have to transmit some visible sunlight, they contain only small amounts of pigment and may have a rather low moisture-excluding efficiency, *especially those with low or negligible film thickness. Both the properties of high light transmission and low moisture exclusion are opposite to the requirements for long term durable finish.*” (Italics ours)

What is being said here is that the more 'natural' an outdoor wood finish is, the less durable it is. Short-term durability has two consequences:

The first consequence is the progressive loss to the visual appeal of the wood surface regardless of the homeowner's repeated efforts to sustain it. The first sign of a durability problem is when the finish ceases to protect the wood and the onset of weathering becomes visual enough to get someone's attention.

Now What? Weathering elements have invaded the wood fibers and altered their composition compared to other areas on the wood surface where you are not yet seeing color loss, mildew growth, etc. However you now go about renovating the problem area with chemical cleaners, power washing, sanding, etc. Subsequent

recoating with the same finish will not 'take' on that wood fiber in the same appearance as it did originally or as it is presently seen on the structure. The result is to end up with one color where you renovated and recoated weathered areas and another color wherever renovation is not performed. Because the dominate visual impression is the color and grain definition of the wood itself, attempts to blend the different areas together by an overall recoat of a clear or lightly pigmented finish does not mask the growing color differences – particularly those resulting from the remnants of gray/black mildew removal.

The second consequence is a blotchy patchwork appearance develops. Depending on their directional orientation and exposure, different elements or whole walls of these structures each take on their own surface texture and color. For instance, the lower two-thirds of south and west facing walls begin to look much different than the upper one-third of the same walls directly under roof eaves. North facing walls never in direct sunlight look entirely different than either of them. Wall areas, for one reason or another, that are subjected to greater moisture loads than other areas develop a comparatively darker/dingy appearance. Dealing with specific or whole wall restoration work, that never seems to end, gets to be discouraging. Needed restoration is put off, people have more enjoyable things to do, and the situation grows ever worse.

Finally, fed up with all of this, homeowners coat their homes with heavy pigment stain or paint the entire structure to hide what has happened and bring a common appearance to all of it. This of course obliterates whatever was left of the original new wood color and grain definition. Goodbye any semblance of a 'natural' wood home. The reality of 'deep penetration' 'natural' finishes is that they are a down payment towards the conversion of natural wood motifs into everyday solid color painted structures.

The destiny of your project does not have to be as we've just described it; there is an alternative to this dreary scenario. Let's look at it against the backdrop of how in reality things work on this planet.

In time, nature will break down and destroy any exterior wood coating yet devised by man. The same weathering elements that demolish clear and lightly pigmented finishes (and ultimately, given their formulation, the wood to which they are applied) will also attack and degrade NatureColor™. Nowhere in this information do we intend to suggest that we have a miracle product – a last forever, maintenance free wood coating that represents a complete solution to the problems associated with common outdoor natural finishes.

The difference here is that NatureColor™ is based on a formulation technique where it bears the brunt of weathering in a gradual erosion process that can be cleaned and repaired with minimal loss to the original color and visibility of the wood surface itself. Rather than allow weathering to occur on the surface cell structure of wood, it is directed to a surface film that sheds water, combats fungi growth, and possesses the internal means to negate most of the color changing effects of sun's UV rays. NatureColor™ is in essence a pigmented, translucent, breathable paint.

Given our many years of experience with this coating technology, we know its premise is correct and that it is an exceptional wood protection system. But we have learned something else that must be addressed before discussing its wear and maintenance features.

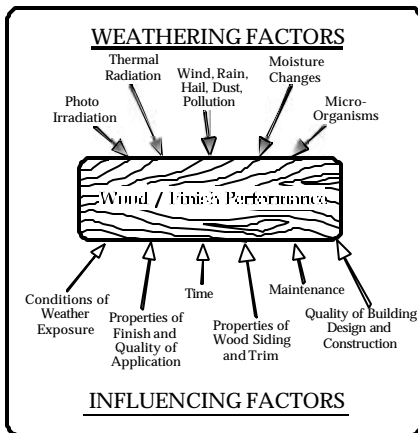
Satisfactory performance of this wood finish is contingent on favorable conditions relating to the structure being coated and the quality of application – factors that go well beyond paint chemistry alone.

TOMATO PLANTS AND YOUR OUTDOOR WOOD.

Suppose you are a vegetable gardener with a fondness for ripe healthy tomatoes on your table every summer. From a garden store, you buy seeds that are known to produce such tomatoes. Question: Can the garden storeowner assure you that after planting his seeds you will actually end up with nice tomatoes on your plate every year? No, of course not. Whether you get good tomatoes or not depends upon a host of contributing conditions over which the seed supplier has zero control.



NatureColor™ is that tomato seed – one component in what will hopefully be a favorable outcome. It is not an “end product” on it’s own. Rather, it will perform in concert with the underlying wood to which it is applied. And what this coating system and your wood is going to look like, as time goes on, will be heavily effected by factors that in schematic form look something like this:



You have no control over weathering factors, but most of the influencing factors listed are in your control and deserve close attention. Detailing these influencing factors and how to best handle them for optimum natural wood coating performance would be rather extensive, so we will merely highlight the principal performance factors contributing to good coating performance as we have

observed them in the field. These factors, if performed incorrectly would inevitably result in premature coating failure.

PERFORMANCE FACTORS

1. MINIMIZE THE MOISTURE LOAD ON YOUR WOOD SIDING AND TRIM.

High levels of moisture incursion into wood is enemy number one. No exterior wood finish exists alone is capable of “waterproofing” the wood on your home. Moisture *is* going to find its way into your wood in response to changing relative humidity and/or surface wetting - it’s only a question of how much moisture.

Wood subjected to constant high moisture wet-to-dry cycles will lead to dimensional changes and surface stresses that distort it. This causes the loss of coating adhesion often seen as peeling film, and opens the door to biological fungi attack and the unsightliness that accompanies it. Excluding construction workmanship for the moment, minimizing moisture incursion as a function of building design conducive to good rain/snow management, ample roof overhangs, and rain guttering where appropriate. You must minimize water back splash against siding and doors from abutting decks, concrete, etc. (Contemporary building designs with little or no roof overhang or that otherwise invite high moisture incursion are simply not compatible with the relative fragility of natural wood finishes and they should not be used on such buildings.)

- a. Other items commonly overlooked that promote unacceptable moisture loads on wood siding and trim (and consequent early coatings failure) are:
- b. sidings improperly installed or too close to the ground
- c. lawn sprinklers that regularly soak structures
- d. clothes dryer vents and air conditioning units that wash the siding with high moisture air
- e. close proximity landscape vegetation that regularly wipes the siding and/or prevents good air movement across the siding.

2. USE QUALITY WOOD. Whenever possible, you should seek the advice of knowledgeable builders, architects, and lumber suppliers in selecting wood siding and trim products intended for natural wood motifs. *Good choices*

here result from selecting wood species and grade specifications that best coordinate with the design of the structure itself.



A caution about smooth faced wood. Wood sidings and trim are often produced wherein at least one face of the wood is smoothly planed. This smooth surface is then being installed facing outward to weather in exposed locations such as wall siding, fascia or window trim. For various technical reasons, smooth faced wood constitutes a poor surface for outdoor coatings of any description and promotes their early failure. If any of your exposed-to-weather wood is smoothly planed, you must change its' surface texture by scuff sanding it using 60 – 80 grit sandpaper. Your purpose here is to create a rougher, Velcro-like surface that allows better coating adhesion to wood fibers that can now become an integral part of NatureColor's™ film build and anchor it in place more securely. Smooth wood surfaces inherently require more maintenance than rough surfaces.

3. **CONSTRUCTION WORKMANSHIP.** We urge you to review the appropriate “product use” brochures published by suppliers and manufacturers of the many wood sidings produced by the American wood products industry. There are right and wrong ways to install siding that play a crucial role in good wood coatings performance.

As outlined earlier, moisture incursion is your first concern here. Tight, thoroughly caulked siding joinery is important, and for translucent finish purposes, there are some siding configurations and assembly patterns that are superior to others. Proper use of flashing and vapor barriers, correct nail selection and nailing procedures, rain gutters and other construction techniques of minimizing siding moisture load – all are matters that deserve close attention.

4. APPLICATION TECHNIQUE. There is nothing about NatureColor™ that requires special application talent. However, the finest natural wood coating system money can buy, along with a perfectly suitable building, can easily be made to under perform if the finish is applied contrary to painting practices known to produce optimum results. Unfortunately, cost cutting imperatives in the U.S. building industry often require painting tradesmen to operate under the competitive pressure of “price only” considerations. This fosters certain “cost effective” coating procedures that shortcut good application requirements that natural wood homes need in order to remain enduringly attractive. Follow NatureColor™ recommended application procedures for best results.

WEAR CHARACTERISTICS AND MAINTENANCE

As specified in the NatureColor™ wood finishes brochure, the initial application is usually a three-coat system. Multiple coats are necessary to develop a sufficient film barrier and overlapping pigment screen between the atmosphere and the wood surface. Weathering processes will affect the film in reverse order from how it was applied. Most weathering occurs on the film’s outer surface, while the underlying applications maintain the integrity and color permanency of both the wood and the coating. The system is continually sacrificing itself to the elements. You should look annually for signs of wear that tell you to recoat before advanced deterioration is permitted.

Wear is evidenced by the erosion of the film to a stage where it looks lighter or faded in some areas and one or two sides of the building (south and west, normally) compared to the other sides of the building feel different to the touch. When erosion/fading becomes noticeable, you need only clean the surface and recoat that side of the building evidencing wear. (See NatureColor™ Maintenance instructions on can labels or download from our website www.structureswoodcare.com).

Reapplication at regular intervals rebuilds eroded surface film. This maintenance is important because in the absence of timely recoat, the eroding film may lose its adhesion to the wood and lift or peel in some areas. If this occurs, it will usually first appear on south and west facing walls at edges and corners of the trim and siding.

This “worst case” signal for recoat maintenance is correctable. Persons unfamiliar with the system or who ignore its erosion/fading wear cycle; tend to focus on the coating itself and its apparent failure. They overlook the fact that underneath the areas of the film detachment the exposed surface has maintained its structural integrity and still retains new wood color. After all, this is what really matters. Film detachment only indicates that you missed the first signs of wear and that recoating is required immediately. Fortunately, with the NatureColor™ system film adhesion loss does not compare to blistering or peeling of common paint or varnish and the major renovation job that this implies.

What you must do in this case is prepare the surface for recoating as described in the ‘Maintenance Section’ of the application instructions. Recoat any exposed wood surface where detachment occurred with a prime coat reapplication, and follow that up with two more coats. The second coat should be “feathered in” over the renovated area, and the last coat should be applied overall to that section of the building.

If you will follow this procedure before wood deterioration/discoloration commences on the exposed wood, you will be pleasantly surprised to discover that on textured/rough sawn woods, it is difficult to distinguish any area that had been repaired from the rest of the surface where the film had remained intact.

RESTORING WEATHERED OR PREVIOUSLY COATED WOOD

We are frequently asked if NatureColor™ can be used on aged siding and trim that has never been coated, or previously coated with a now failed clear finish, semi-transparent stain, or solid opaque stain. The answer is a qualified “yes”. If the wood is not evidencing advanced deterioration such as spongy wood cell structure, cupped split/loose siding, etc.

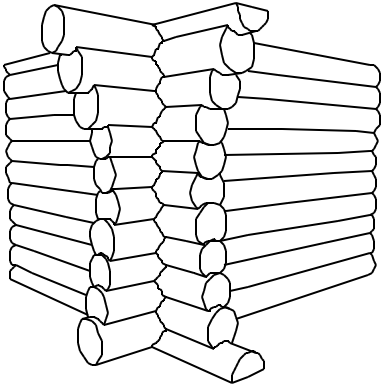


Your first and most important step is to determine if your building is suitable for a natural finish. If you're looking at a coating that failed primarily due to the design, wood quality, siding installation, moisture load, etc., then successful natural finish performance is impossible and NatureColor™ isn't going to help you.

If your building is suitable for a quality natural finish and the source of your problem is mainly a failed “penetrating” clear or semi-transparent finish (or a neglected wood structure never coated) NatureColor™ is probably your solution provided you take the following renovation step prior to coating.

You must completely remove the existing deteriorated wood cell structure at the surface of the wood, taking discoloration, grime and dirt, and the remnants of previous coatings with it. This step is mandatory prior to reapplying a coating of any description. You need to re-establish a firm, relatively new wood surface for the recoating to anchor to the wood and thus have a decent chance for good performance. (You wouldn't for instance, apply a wax polish to a dirty, unwashed car.) Information concerning an aggressive chemical resurfacing system is available from Structures Wood Care, Inc.

LOG AND SOLID TIMBER BUILDINGS

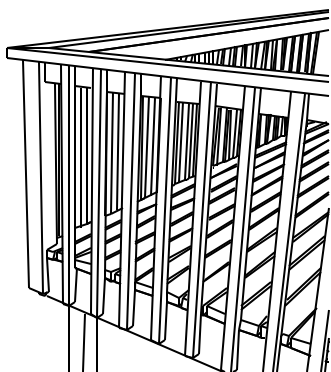


The exterior wall characteristics inherent in most log structures represent a departure from some of the conditions normally conducive to optimum wood finish performance. Best results are achieved on straight, uninterrupted, vertical surfaces as found in conventional sidings. Log home wall construction, on the other hand, can actually simulate an accelerated weathering test in the paint laboratory. The curved outside upper portion of horizontal log work often presents a more or less 45° angle to the sky. This surface undergoes more intense direct sunlight, and water stands on it longer. Couple this with moisture incursion through the natural surface checking typical of heavy timber construction, and inevitably there will be accelerated coating wear and more frequent reapplication maintenance required.

NatureColor™ is unusually durable on log walls, but log homeowners should be aware of the difference between a wood *finish* and a wood *preservative*. A wood preservative intended primarily as a pre-treatment to help prevent wood decay fungi, and mold growths. The need for such a product depends upon prior preservative treatment, present fungi contamination and the geographical area of the log home construction. Problems relating to fungi, discoloring mold growths, etc., are more prevalent in subtropical, high humidity areas of the United States, such as Florida, and other Gulf Coast southeastern states. In these areas it is particularly important for log homeowners to minimize the moisture load on wall structures by utilizing good drainage and roof overhang, rain gutters, etc.

A fungicide is present in NatureColor™, which is designed to combat the onset of decay fungi and mold/mildew/growth on clean, uncontaminated relatively dry wood. Specific application and maintenance instructions for the use of NatureColor™ on log structures are available at www.structureswoodcare.com.

EXPOSED DECKS AND RAILING SYSTEMS



An exposed wood deck and any finish applied to it is subjected to standing pools of water, continuous heavy wetting and drying cycles, fungal attack and mildew, ultra violet radiation from the sun, and dissolving water soluble dirt and grim under furniture abrasion and foot traffic.

Given this abuse and if your goal is to have a clean new wood appearance on your deck, you must accept the fact that it will unavoidably entail more cleaning and recoat maintenance than vertical walls protected by a roof overhang.

APPLY A SINGLE COAT OF NATURECOLOR™ TO A NEW OR RENOVATED DECK IN ACCORDANCE WITH NATURECOLOR™ RECOMMENDED PROCEDURES. (SEE CAN LABELS AND OR WEBSITE) THIS WILL IMPART A GIVEN COLOR TO THE WOOD AND PROVIDE A DEGREE OF WATER REPELLENCY. AS STATED IN THE APPLICATION/MAINTENANCE SPECIFICATION, CLEANING AND SINGLE COAT REAPPLICATION MAYBE ANNUALLY OR AS NEEDED IN WEAR AREAS.