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HOW TO TREAT FENCE POSTS BY DOUBLE DIFFUSION[1]

By

R. H. BAECHLER, Chemist

Preservative treatment has long been recognized as of great value in extending the average servicelife of fence posts and thereby greatly reducing the labor and other costs of fence maintenance--especially in farming areas where naturally decay-resistant species are not readily available.

Pressure-treated posts usually give excellent service and can be purchased at reasonable prices in many areas. They offer a very satisfactory answer to the question asked by many farmers: "How can I cut down on the time needed each year to keep my fences up?"

In areas where the cost of pressure-treated posts is prohibitive, for one reason or another, the farmer himself can apply preservatives that will add greatly to the life of the posts.

A number of methods may be used for treating posts on a farm. They are described in the U. S. Department of Agriculture Farmers' Bulletin No. 2049, "Preservative Treatment of Fence Posts and Farm Timbers," which may be obtained without cost by writing to the U.S. Forest Products Laboratory, Madison, Wisconsin 53705. A number of State forestry departments and forestry colleges also issue pamphlets on the preservative treatment of posts. The Forestry Division of the Tennessee Valley Authority, Norris, Tenn., is a further source of information on this subject.

One of the newer methods of treating wood by means of simple equipment is the double-diffusion process developed at the U.S. Forest Products Laboratory.

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[1] This is a slight revision of FPL Report No. 1955, originally dated October 1953 and revised July 1961.

This process consists of soaking green wood first in one chemical solution and then in a second solution. The two chemicals diffuse into the wet wood and then react with each other to form a compound that is poisonous to termites and to fungi that cause rot. Moreover, the compound formed in the wood is practically insoluble in water and therefore does not leach to any great extent from wood that is used in moist soil.

One way in which the treatment may be applied to posts, with excellent results, is to immerse them completely in solutions held in tanks. One hundred treated pine posts in a Forest Products Laboratory test plot in Mississippi have shown only five failures after about 22 years. Untreated pine posts gave an average life of about 3 years. This appears to be a practical method for commercial operations, especially with mechanical peeling and handling of the wood. The method is used at a number of small post-treating plants. Because of the initial cost of the tanks, it does not appear practical for meeting the fence post requirements of a small farm. Anyone interested in more information about this method is invited to write to the Forest Products Laboratory.

The farmer who wishes to treat a limited number of posts--say 100 to several hundred--for his own use can treat them upright in barrels, thereby limiting his equipment costs.

Field tests on posts treated in barrels by this method are not yet old enough to show the average service life that can be obtained by following some particular treating schedule. Indications are, however, that the service life of pine posts can be increased at least five times by the procedure to be described in this pamphlet. Some pine posts treated in a similar manner and installed in the Mississippi test plot have shown no failures after 12 years. In tests made so far, the results on hardwood posts have been less favorable than on pine; some hardwood species are quite receptive to this treatment, but others treat poorly.

Chemicals and Equipment Needed

Several combinations of chemicals may be used in this treatment. This report gives instructions for using two chemicals that are more commonly carried in stock by chemical dealers than are the other chemicals that have been used in experiments on this method.

About 25 pounds of technical copper sulfate and 12-1/2 pounds of technical sodium fluoride will be needed for each 100 posts, depending upon the size of the posts. Local farm or hardware stores may not have the necessary chemicals, but can order them from chemical companies. A partial list of companies handling these chemicals may be obtained from the Forest Products Laboratory.

The cost of chemicals per post treated varies with the size of the post, and depends upon shipping costs and the amount ordered. The chemicals, in powder or crystal form, come in paper bags or cartons, which minimize shipping costs. In some localities, when sufficient chemicals are purchased to treat several hundred posts, the cost of chemicals for treating 4-inch posts 6-1/2 feet long may be as low as 10 cents per post. In other areas and with smaller purchases, the cost may be three times as high. Posts of small diameter cost less to treat and are easier to handle. The treatment of posts that are just large enough for strength requirements is therefore recommended.

The chemicals can be weighed on a scale or measured with a l-pound coffee can, as explained later. A 10-quart pail is convenient for measuring water.

Two containers are needed to hold the separate solutions. A wood barrel is best for the copper sulfate solution since this solution is corrosive to iron. If a steel drum is used, such as an empty oil drum with the head removed, it should first be coated inside and out with some corrosion-resistant material, such as roofing pitch. Care must be taken to avoid damaging the coating when the posts are placed in or taken out of the drum. Either a wood barrel or an empty oil drum without a protective coating is suitable for the sodium fluoride solution.

Because a certain amount of preparation is needed and some solution is wasted, it is generally not practical to treat less than 100 posts by this method. Farmers who do not need many posts might plan to treat enough posts to take care of their needs for several years, since the treated posts can be stored without danger of decay. Another plan is to cooperate with neighbors in treating posts jointly.

Precautions

Because the solutions used in double-diffusion treatments are harmful when taken internally, they should be handled with care. Special care should be taken to see that children do not eat the chemicals or drink the solutions. Animals should be kept from solutions. Poultry may pick up crystals or particles soaked with the solutions.

The solutions, especially the copper sulfate solution, are somewhat irritating to the skin and can cause sores where the skin is broken. It is best to wear rubber gloves when working with these solutions and to wash off any solution or dry chemical that gets on the hands (fig. 2). The solutions do not give off poisonous vapors, but dust arising from handling the dry chemicals should not be inhaled. Goggles or cheap sun glasses may be worn to protect the eyes (fig. 2). If solution is splashed into the eyes, they should at once be washed

with plenty of water for several minutes. To prevent possible permanent injury to the eyes, see a doctor as soon as possible.

If the chemicals or their solutions get on clothes, they should be rinsed off with clear water. The clothes should not be washed with the regular laundry, because the chemicals may affect the color of other garments.

Preparation of Posts

Treatment should be started as soon as possible after the posts are cut--preferably within a week. Unless treatment is started within several days of cutting, the posts should be cut about 6 inches longer than needed to allow for trimming just before they are treated. They should then be hauled to the place where they will be treated and piled as close together as possible (like cordwood) to keep them from drying out.

Just before they are placed in the first solution, the posts should be peeled. Then, if the posts were cut more than several days earlier, about 6 inches of wood should be cut from the butt (large) end of each post to expose a fresh surface.

Preparation of Solutions

The sodium fluoride solution required is prepared as follows: Add approximately 26 gallons of water to the container. In a standard 55-gallon oil drum, the water will be about 15 inches deep. Then add 9 pounds (about 3-1/2 coffee cans) of sodium fluoride and stir for several minutes. A little chemical may remain undissolved and settle to the bottom, which does no harm.

The copper sulfate solution is prepared as follows: First add approximately 24 gallons of water to the container. In a standard 50-gallon wood barrel, the water will be about 16 inches deep. Next add 18 pounds (about six and one-half l-pound coffee cans) of copper sulfate crystals. Stir until the crystals dissolve. Less stirring is required if the crystals are added to the water the day before the solution is to be used.

Treatment

The posts are first treated in sodium fluoride solution; then in copper sulfate solution. Stand the peeled green posts butt end down in the sodium fluoride

solution. Add enough posts so that the solution rises nearly to the top, or at least to within 4 inches of the top of the container. In this way the ground-line area of the posts is surrounded by liquid. If crooked posts are used, fewer will go into the barrel, and the solution may not rise high enough. In that case, prepare extra solution by adding about one-third of a coffee can of dry sodium fluoride to a 10-quart pail of water and use this solution to fill the barrel.

After the posts have stood in the sodium fluoride solution for 3 days, remove them and stand them butt down in the copper sulfate solution. If the solution in this barrel does not rise to within 4 inches of the top, prepare extra solution by adding about 2/3 of a coffee can of copper sulfate crystals to a 10-quart, enamel-lined pail and fill with water. After 3 days, remove the posts and rinse them off with clear water.

Before another set of posts can be treated, more water and chemical must be added to the containers. Add enough water to bring the sodium fluoride solution to its original depth. Then add 1-1/2 pounds (a generously half-full coffee can) of sodium fluoride, and stir until the chemical is dissolved. In the same way, add water to bring the copper sulfate solution to its original depth. Then add 3 pounds (1 heaping coffee can) of copper sulfate crystals and stir.

The solutions should be added to in this way before each additional set of posts is treated. When the last three sets of posts are to be treated, it is not necessary to add more water and chemical, but the posts should be soaked longer. For the second-to-the-last set, for instance, keep the posts 4 days in each solution. For the next-to-the-last set, keep the posts 5 days in each solution. Let the last set remain in each solution for at least 7 days. In this way, most of the chemical is taken up by the posts and not much is wasted.

After Treatment Handling

It is well to rinse the posts after treatment so that they can be handled safely without gloves.

Although the posts may be used at once, it is better to close-pile them for several weeks like cordwood to keep them from drying out. This "rest" period helps to distribute the chemicals more evenly throughout the posts.

To get rid of the remaining solutions, dump them into a hole some distance from wells or livestock ponds and, after they have seeped away, fill the hole with dirt.

Figure 1. -- All of the equipment needed to treat fence posts by double diffusion is shown here.

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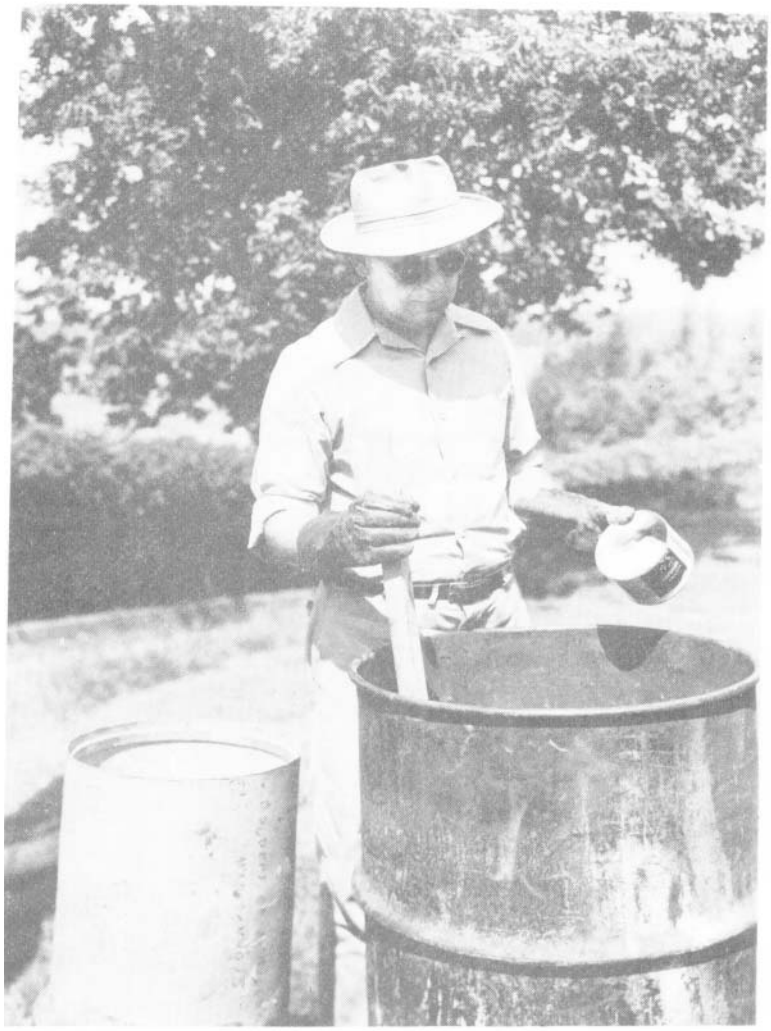

Figure 2. -- When mixing the chemical solutions it is wise to wear glasses and rubber gloves.

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