



FOREST PRODUCTS RESEARCH BRANCH

# **AN EASY WAY TO PRESERVE FENCE-POSTS**

## **BY**

### **SAP DISPLACEMENT**

by

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## S U M M A R Y

A simple method is described for the preservative treatment of green, fresh-cut fence-posts of white spruce, jack pine, aspen poplar, and white birch species, and requiring only a minimum of equipment. The posts are peeled immediately before treatment and are stood in a 10-inch depth of preservative solution for five to seven days. During treatments the post tops commence to dry out and preservative solution replaces the sap evaporated from the sapwood areas. Chromated zinc chloride and bluestone are preservatives suitable for this form of treatment. Since these solutions are coloured, the progress of the treatment can be observed from day to day.

After treatment the posts are stacked moderately close for about two weeks to promote slow drying and help "fix" the preservative. If posts dry out too quickly they may split and expose white untreated wood to decay fungi. The posts should be set about 30 inches into the ground. It is not recommended that the posts be set deeper because penetration of the preservative becomes decreasingly shallow as the distance from the butt is increased. Treatments that are carefully carried out should give a service life of 10 to 15 years in non-durable species which otherwise serve only three to six years when not treated.

## SOMMAIRE

L'ouvrage décrit une méthode simple de préservation de piquets de clôture fraîchement coupés et à l'état vert, en épinette blanche, en pin gris, en peuplier faux-tremble et en bouleau à papier, méthode qui n'exige qu'un outillage rudimentaire. Les piquets sont écorcés et traités immédiatement après; on en place le pied dans 10 pouces de solution pendant cinq à sept jours. La partie des piquets qui se trouve à l'air libre, commence à sécher et la solution préservatrice remplace la sève qui s'évapore de l'aubier des piquets. Les solutions chromiques de chlorure de zinc et de sulfate de cuivre conviennent particulièrement bien à ce genre de traitement. Vu que ces produits donnent des solutions colorées, on peut se rendre compte du progrès du traitement de jour en jour.

Après les avoir traités, on empile les piquets pas trop drus pendant une quinzaine de jours afin qu'ils puissent sécher lentement, ce qui favorise la "fixation" du préservatif. Si les piquets séchaient trop rapidement, ils pourraient se fendiller, ce qui aurait pour effet d'exposer des parties non traitées aux champignons lignicoles et à la carie. Les piquets devraient être plantés à 30 pouces de profondeur. Il convient de ne pas les planter plus profondément, car plus la solution préservatrice pénètre haut au-dessus du pied, plus elle se dilue. Les piquets bien traités d'après la méthode ci-dessus, même faits d'essences peu durables, résisteront à la pourriture pendant 10 à 15 ans, alors que sans traitement ils ne résisteraient que pendant trois à cinq ans.

## AN EASY WAY TO PRESERVE FENCE-POSTS BY SAP DISPLACEMENT

by

J. Krzyzewski

One of the easiest methods of preserving fence-posts for use around the home or farm is the sap-displacement process. This method may be conducted by the untrained individual and requires no elaborate equipment or tools.

Freshly-cut, unseasoned, or "green", peeled posts can be treated with water-soluble wood preservatives by the sap-displacement method by placing the butt ends into the solution of preservative which will then rise through and, in effect, replace the sap of the post by a "wick" action. This method of preservation is described fully in this article because of its effectiveness, economy, and ease of application.

Untreated fence-posts of species such as spruce and poplar usually have an average service life of only three to four years in eastern Canada and somewhat longer in western Canada. Properly treated by this sap-displacement process with modern water-borne preservatives, the same species are expected to remain serviceable for 10 to 15 years or longer. Service tests, conducted by the Ottawa Laboratory, which commenced 12 years ago, on spruce and poplar posts treated with bluestone, are still in progress and the posts are expected to last for several more years.

Since the ground-line region of fence-posts is most vulnerable to decay, any suitable method of preservation of fence-posts should assure an adequate treatment of this region. Satisfactory service may be expected using the sap-displacement method because the reasonably deep penetration of the preservative extends above the ground-line. The moisture conditions in a post placed in the ground are the reasons for the decay hazard being generally most severe in this area. This is why particular attention should be given to the effectiveness of the treatment in this region.

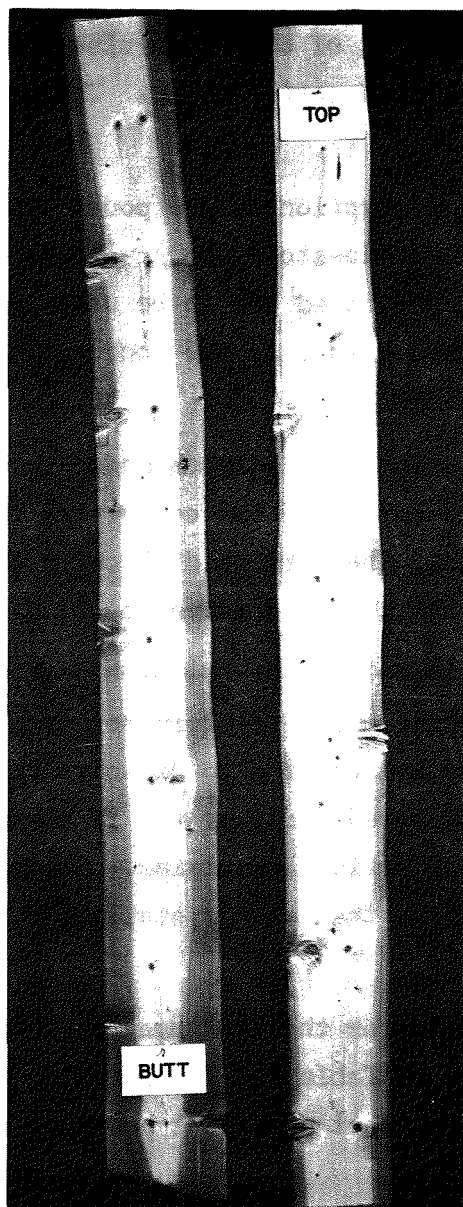
The sap-displacement method of treatment, as described here, should find wide application in the treatment of fence-posts for the following reasons:

1. No special equipment or skill is required.
2. Fence-posts are treated in a green condition; thus, no long seasoning period is required.
3. Once the process has been started only a minimum of attention is required.
4. Treatment costs are moderate.
5. White spruce, which is very difficult to treat by conventional methods, appears to take treatment well by the sap-displacement method.

A number of wood preservatives in the form of water-soluble salts are suitable for this type of treatment. The most effective preservatives are usually composed of various combinations of chromium, copper, arsenic, and zinc salts, sodium fluoride, dinitrophenol, and certain other fungicides. However, bluestone (copper sulphate) alone is used to some extent especially in parts of western Canada, for treatment by this method. Recently, salt mixtures which tend to become "fixed" in the wood, have been used to an increasing extent to avoid losses of preservative from the treated fence-posts by the leaching action of ground water. Preservatives such as chromated zinc chloride (CZC, or zinc chloride bichromated); Tanalith\*; Bolit salts\*; Celcure\*; and Osmose salts\*, are some of these water-borne salt mixtures which were found satisfactory in tests at the Ottawa Laboratory. Bluestone was also found to give satisfactory treatments and is continuing to perform well in the service tests which already have been going on for 12 years.

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\* Trade names under which the salt mixtures are marketed.



FPRB 5-27

Figure 1 - Penetration in longitudinal sections of a single spruce post treated with a water-borne preservative. Darkened areas show penetration obtained. Penetration is fairly typical of the sap-displacement method of treatment.

#### Preparations of Preservative Solutions and Amounts of Preservative Required for Treatment

Since both chromated zinc chloride and bluestone are readily available, the process will be described with particular reference to these two preservatives. The solutions are usually absorbed in such

quantities that concentrations of 7 per cent of chromated zinc chloride, or of 14 per cent bluestone, should be found satisfactory. The preparation of these is described later.

The treatment results in the absorption of one pound of chromated zinc chloride, or two pounds of bluestone, per cubic foot of wood. If the other preservative salts mentioned are to be used in preference to bluestone or chromated zinc chloride, the concentration of solution that would be required is 5 per cent.

The chromated zinc chloride solution, as recommended for treatments, is prepared by diluting one gallon of the commercial 50 per cent concentrate in  $8\frac{1}{2}$  gallons of water. There is no difficulty in diluting the concentrated solution to the required strength.

If bluestone is used, approximately 16 pounds of bluestone dissolved in 10 gallons of water will give a satisfactory solution. Considerable stirring in warm water may be required to dissolve the bluestone or, if the solution can be prepared a day or two in advance, then less attention need be devoted to stirring and mixing. Copper sulphate "snow" will dissolve more readily than the crystalline form which is known as bluestone.

The amount of solution required for the treatment of a number of posts can be determined by reference to Table 1. The quantity of solution in gallons required for the treatment of 7-foot posts of a range of diameters is tabulated.

It is recommended that posts having top diameters no larger than 5 inches be used because small posts usually take up the solutions better than large posts.

#### Preparation of Fence-Posts

The method described has been successfully applied to the treatment of white spruce, jack pine, aspen poplar, and white birch, at

the Ottawa Laboratory. If other species are to be treated, they should be tested to determine whether the absorption of solution and salt penetrations are satisfactory.

Table 1

APPROXIMATE AMOUNTS OF  
CHROMATED ZINC CHLORIDE  
AND BLUESTONE SOLUTIONS  
REQUIRED FOR POST TREATMENTS

Mid-point Diameter of Posts (inches)	Imperial Gallons of Preservative Solution Required Per Post (approximately)
3	$\frac{1}{2}$
$3\frac{1}{2}$	$\frac{3}{4}$
4	1
$4\frac{1}{2}$	$1\frac{1}{2}$
5	$1\frac{1}{2}$
$5\frac{1}{2}$	2
6	2
$6\frac{1}{2}$	$2\frac{1}{2}$

Fence-posts should be treated as soon as possible after felling. When this cannot be done, the bark should be left intact and the felled trees not sawn into fence-post lengths until required. All branches should be trimmed off to prevent rapid drying of the timber. If posts have been unavoidably left for a few days and the ends have started to dry





FPRB 5-572

Figure 2 - In peeling fence-posts, care should be taken to avoid cutting or bruising the sapwood.

out, short pieces -- 4 inches or more if necessary -- should be sawn off the ends (at an angle) to expose fresh green wood. It is also suggested that the tops be similarly cut at an angle since this will tend to shed rain-water when the posts are installed for service.

After the posts are cut to the required length they are peeled (full length). The peeling of many species is less difficult during the late spring and early summer, and this may also be a suitable period for treatment of posts outdoors.

If there is any difficulty in removing the inner bark, special care will be required to avoid cutting into the sapwood. Should the sapwood be cut or punctured, the resulting breaks in the conducting vessels will tend to have a spotty appearance when treated. The peeled posts should not be left lying around but should be put into the preservative solution at once to commence treatment.

Before treatment begins, the posts should be divided into several groups according to their diameters, e.g., small, medium, and large diameters, so that all of the posts within each group will be approximately the same size. The posts in any of these groups can be treated in a single container; and all the posts within the group should take up the preservative solution at approximately the same rate. Treatments conducted in this manner require less attention and also result in posts with better average distribution of salts.

#### Method of Treatment

1. Immediately after peeling, the posts are placed upright in a container into which several inches of preservative solution have been poured. The solutions can generally be put into pails, troughs, barrels, or drums, except that bluestone solution cannot be kept in iron containers because of corrosion. The use of plastic containers is recommended to avoid corrosion problems. After a number of posts of the same size class are stood in containers the preservative solution is added to cover the butts to a depth of 10 to 12 inches. As the solution rises in the posts, fresh preservative should be added to the container to maintain the supply.

2. Four or five days are usually required for the treatment but, occasionally, this period may extend to seven or eight days. Treatments may be conducted in a location having some air circulation, but not where the posts will be exposed to the direct sun or rain for long periods.



FPRB 5-573

Figure 3 - Fence-posts being set in preservative solution for the sap-displacement treatment.

3. When the preservative has climbed to 5 or 6 feet up in the posts, each post should be inverted in the container and the treatment continued for another day or two.

4. The posts should then be removed and close-piled away from the ground in a shaded location to promote slow drying. Some drying is desirable in order to prevent excessive movement of preservative -- which may result if posts are installed immediately after treatment. Following

several weeks of seasoning\*, when it is apparent that the surfaces are dry, the posts may be put into service. Longer or more vigorous drying is not desirable since it may open up deep seasoning checks and expose untreated wood.

5. Whenever possible, the ends — or the entire butts as well as the ends of the posts — should be coated with some kind of pitch; coal tar mastic; or roofing compound, before installation in the ground to reduce leaching of the salts into the soil. This coating is particularly recommended for bluestone-treated posts.

6. The posts should be installed to a depth of approximately 30 inches in the ground. It is not advisable to set the posts too deeply because penetration of the salts in the sapwood is usually better at a distance of 30 inches from butt end than at 36 or 42 inches.

#### Precautions

The preservatives, in order to be effective, must be toxic to decay fungi. Some are also toxic to a greater or lesser degree to man and to farm animals. There is usually little danger in handling preservative salts provided it is understood that they are potentially hazardous and are handled with the proper precautions. Preservatives must not be accessible to children or animals. If noted that the salts are dusty to handle, they should be mixed in the open air. If necessary, gloves, goggles, and respirators should be worn, although these are seldom necessary under normal circumstances.

#### Storage of Preservative Solutions

Chromated zinc chloride solutions can be stored in steel drums or other suitable containers. However, only concentrated solutions of chromated zinc chloride (such as the commercial 50 per cent solution)

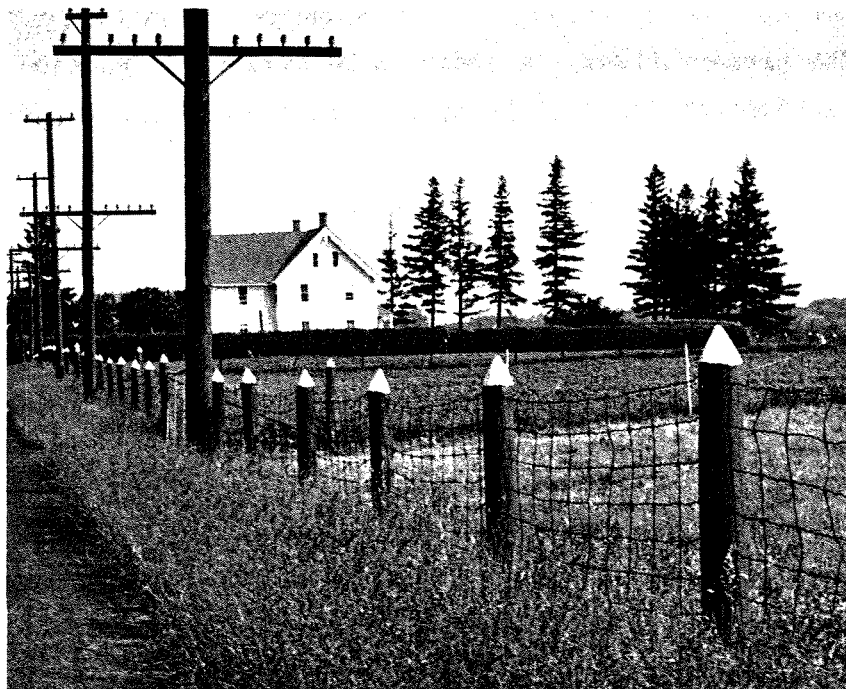
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\* Some investigators recommend seasoning for several months, keeping the posts upright with butt ends up.

remain unfrozen at low winter temperatures. If diluted solutions are stored precautions will have to be taken to prevent freezing. Bluestone should be stored preferably in the dry crystal or fine "snow" form in non-metallic containers and in a dry place.

#### Sources of Supplies of Preservatives

Preservatives for treating fence-posts may be purchased from local hardware stores, general stores, and chemical supply dealers. Additional information on sources of supply can be obtained from the Forest Products Research Branch, Department of Forestry, Montreal Road, Ottawa 7, Ontario.



FPRB 5-13

Figure 4 - Neat, well-preserved fence-posts enhance both property appearance and values.