

# TECHNICAL NOTE NUMBER 163

FOREST PRODUCTS LABORATORY - U. S. FOREST SERVICE - MADISON, WISCONSIN

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## DETERMINING PENETRATION OF WOOD PRESERVATIVES

The effectiveness of any wood preservation treatment is measured very largely by the depth to which the preservative penetrates. This can be determined by the following tests, which are used by the Forest Products Laboratory.

The presence of creosote oil is indicated by the dark discoloration, and the degree of penetration may readily be determined by taking a sample at a point free from checks and other imperfections and at a considerable distance from the end. This may be done either with an ordinary 1/2-inch bit, or with an increment borer, which brings out a core of wood that shows in cross section the depth of penetration and is easily examined. The observation should be made at once, because the oil spreads rapidly over the cut surface. In order to prevent infection, the hole in the treated piece should be tightly closed with a creosoted plug.

As zinc chloride is colorless, the depth of penetration of this preservative must be ascertained by chemical means. After cutting the stick in two or getting a sample with the increment borer, the freshly-cut surface is dipped for not to exceed 10 seconds, in a 1 per cent solution of potassium ferrocyanide, and the excess solution is removed by blotting paper. The sample is then dipped into a 1 per cent solution of uranium acetate, and dried. The treated portions will be whiter than the natural wood, and those untreated will have a dark red or a maroon color. This method does not give very sharp contrasts on wood which is reddish in color, like red oak, but otherwise is very satisfactory and affords a permanent record.

Another method (developed by Galen Wood) consists in spraying over the freshly-cut surface a mixture of equal parts of a 1 per cent potassium ferricyanide solution, a 1 per cent potassium iodide solution, and a 5 per cent solution of soluble starch. This colors the treated portion a very dark blue, but does not affect the untreated wood. Although the color fades in time, it may be brought back by spraying again.

Sodium fluoride is colorless, and no satisfactory method of showing its presence in wood has been devised.

Mercuric chloride is also colorless, but dipping the wood in a solution of hydrogen sulphide turns the treated area black.

As individual pieces may show an abnormally high or low degree of penetration, a sufficient number of tests should be made to obtain a fair average. Samples should be taken at a considerable distance from the ends of the stick, in order that they will not be affected by the heavy longitudinal penetration from the ends.