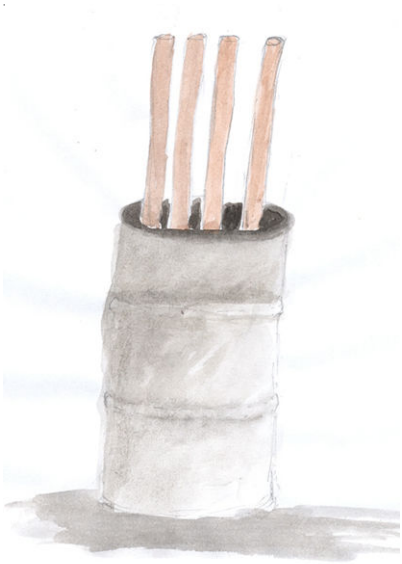
GUIDELINES FOR WOOD PRESERVATION USING SAP DISPLACEMENT METHOD

A low cost method for on-farm application



Kenya Forestry Research Institute
Forest Products Research Centre - Karura

Guideline No.3

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by

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Illustration on the cover page shows posts dipped in preservative solution

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GLOSSARY

Natural Durability:	The degree of resistance to deterioration by the whole range of biological (fungi and insects), chemical, mechanical and physical wood-destroying agents.
Heartwood:	This is the central wood of the trunk. It contains extractives (resins, oils and gums) that make it darker in colour and harder than the surrounding sapwood. It consists of dead yxlem tissues that do not conduct water or nutrients but provide mechanical support.
Sapwood:	This is the outer part of the trunk just beneath the bark, containing the living cells. It is softer and lighter in colour than the heartwood. Its main function is to conduct water and store food and provide support for the tree.
Sap:	The watery fluid that circulates through a plant, carrying food and other substances to the various tissues. Water containing dissolved minerals enters the plant through the root hairs by osmosis and is transported upward through the xylem to the parts containing chlorophyll, usually the leaves.
Butt end:	The larger or thicker end of the tree stem
Debark:	To peel the bark off the post

1.0 Introduction

Most untreated wood will be attacked by fungi and insects. Wood in its natural state has got an element of natural durability. This natural durability varies from one species to another and even within the same wood - the heartwood and sapwood.

The heartwood, due to its extractives, is more endowed with this durability than the sapwood, which has a lot of sugar/starch deposits that make it susceptible to fungal or insect attack.

In Kenya the wood from the cedar tree (*Juniperus procera*) has been previously used as fencing posts and building poles due to its natural durability. However, this species is not readily available in the market. An alternative to cedar is to use treated posts of other species. A common option in Kenya is to use eucalyptus posts. These species are fast growing; and can be harvested for posts from four-five years. Other species include *Acacia mearnsii* and *Casuarina equisetifolia*.

Wood is treated by use of preservatives whose role is to act as a barrier preventing fungi and insects reaching the starch-rich food in the sapwood. Preservatives can be applied by brushing, dipping, sap displacement or pressure impregnation. The sap displacement method is a cost effective and easily applicable method of treating poles and posts. Freshly felled posts, in their wet state are placed with their butt ends in a preservative. The sap evaporates from one end of the post as the preservative is drawn up to displace the sap, hence the term sap displacement.

Preliminary treatments have shown that *Eucalyptus* posts treat extremely easily by this process. Treated *Eucalyptus saligna* have been observed to remain serviceable beyond fifteen years while the untreated poles fail under similar conditions by the sixth year (Ng'ang'a, 1994).

This guideline has been produced to enhance the efficient utilisation of posts especially in rural areas of Kenya through preservation technologies that are effective and affordable.

2.0 Preparation of Posts

2.1 Fell the trees and crosscut them into desired lengths depending on the end use

2.2 Debark the posts to allow evaporation of the sap from the exposed wood surface. Preservative absorption is increased in posts that have been debarked.

2.3 Take care not to cut or damage the posts as this may reduce the upward movement of the preservative.

2.4 Place the debarked posts in treatment preservative preferably within 24 hours of felling. This prevents formation of air pockets in the vessels which hinders uptake of preservative in the post. However, if precautionary measures are taken to limit moisture loss from the wood (such as covering the posts with tarpaulin), treatment can be delayed up to a week.

Figure 1: Debarking the crosscut posts

3.0 Preparation of Treatment Preservative

The Copper Chrome Arsenic (CCA) formulations are water soluble preservatives that are not moisture leachable once fixed in the wood. CCA formulations are therefore suitable for wood to be used in contact with the ground. In Kenya, CCA formulations are sold under the trade names - *tanalith* and *celcure*. The retention and formulations have been set for use in this country under Kenya Bureau of Standard KS02-94 of 1985.

A solution of 6% of copper chrome arsenate salts is adequate for normal retentions. For treatment in a 200-litre drum, a 6% solution is made by adding 136.4 litres of water to 8.2 Kg of CCA salts.

Safety Precautions

The CCA preservative salts contain arsenic which is poisonous and precautions must therefore be taken in handling and using the chemicals as well as the treated posts as follows:

5.1 Cover all cuts, abrasion or wounds on the skin
5.2 Wear rubber gloves and aprons
5.3 Wear a mask to avoid inhaling the dust of the chemical salts
5.4 Wash your hands and arms after handling the salts or treated posts
5.5 Obtain first aid or medical attention if any accidents occur.

4.0 Treatment Procedure

4.1 Place a drum in a hot, sunny, and if possible windy area. Exposure to free air circulation speeds up the treatment period.
4.2 Pour the preservative into the drum
4.3 Place the debarked posts into the preservative (Figure 2) with the butt end first. Leave the posts for 4 -7 days.
4.4 Remove and dip the top end of posts (Figure 3) into the preservative for 3 days to ensure a complete spread of the preservative.

Figure 2: The debarked posts placed in a drum with preservative

Figure 3: Reversing the posts

4.5 Remove the posts from the drum and stack (Figure 4) for a week to allow fixation of the preservative in the wood.

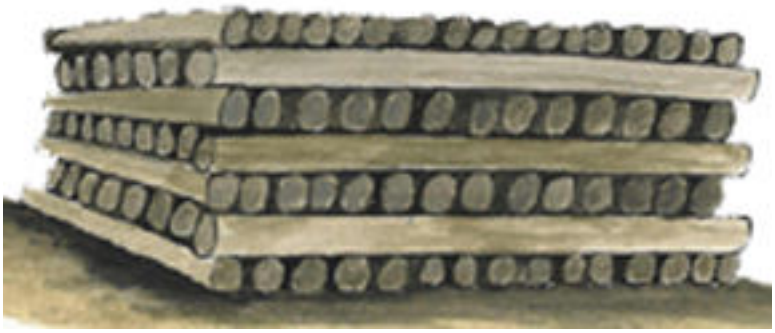

Figure 4: Stacked treated posts

6.0 References

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