GUIDELINES FOR TREATING ROUND FENCE POSTS WITH HIGH TEMPERATURE CREOSOTE

1. Timber preparation before treatment

In order to achieve proper preservation the timber must be in a suitable condition to absorb the preservative. This involves the following considerations.

a) Bark Removal

Remove all bark, cambium and any other foreign matter which might inhibit preservative uptake.

b) Moisture Content and Drying

Generally dry posts will absorb more creosote than green, particularly in the hot and cold bath method as most of the air in the wood cells is expelled. Success has been shown treating green pine by hot and cold baths.

Air drying to below fibre saturation point (f.s.p.) i.e. where all the moisture has been removed from the cell cavity takes between 5 and 7 weeks during the summer. Posts need to be stacked to achieve a good air-flow and sheltered from the weather. This can be achieved by stacking posts in alternate rows with strip sticks used to space the posts, then drying in an open ended shed. Rapid initial drying can lead to severe splitting and degrade.

c) Machining

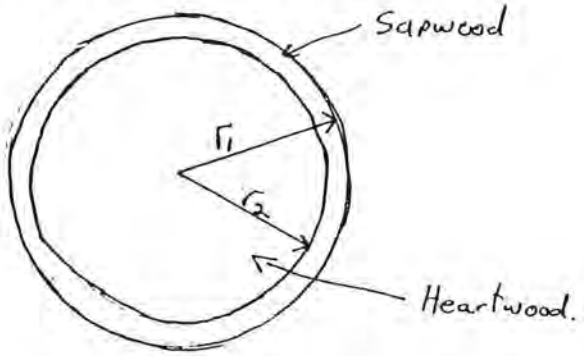
It is desirable that all machining processes, including boring, planing, docking etc. be carried out prior to treatment. I recommend all docking to be done before treatment because any untreated ends will be exposed to insect and fungal attack. Boring holes for threading fencing wire should be done before treatment. Where boring is done after preservative treatment, it is advisable to re-treat any timber exposed by machining by liberal brush application of creosote.

Marri is a durablity class 3 species. It has a life expectancy in-ground contact of 8 to 15 years, any exposed heartwood will be subjected to insect and fungal attack.

2. **Calculating the required creosote uptake**

a) Measure the volume of sapwood (butt and crown ends) that is to be immersed in creosote. Sapwood can be distinguished from heartwood by its lighter colour. For an estimated sapwood volume you need the area of sapwood and this is multiplied by the lengths to be treated.

The area of sapwood is simply estimated from the cross sectional area of the post (πr_1^2) subtracted from cross sectional area of heartwood (πr_2^2). If there is a large difference between butt and crown diameters take the average. The sapwood width should be a uniform width along the posts. Ensure the sapwood volume is in cubic metres.



b) The recommended retentions given by the CSIRO in Leaflet 12 (1961) are: butt 160 kg/m³ and crown 48 to 64 kg/m³.

c) The density of creosote is 1.095 kg/l at 20°C.

d) For liquid uptake (per m³) for the <u>butt</u> end divide 160 by 1.095 (density) = 146 l/m³.

e) For the volume (litres) of creosote required for butt treatment multiply 146 by the sapwood volume immersed.

f) Test posts can be cut to give an indication of prevention and retentions.

g) Repeat this procedure for estimating creosote uptakes for the crown using a retention of 48 to 64 kg/m³.

3. **Treatment methods**

Fence posts used in-ground contact need to be treated at the butt end to about 100 mm above the ground line position. A lighter crown treatment will reduce weathering and insect attack.

Cold soaking:

Dry round fence posts can be treated by cold soaking in creosote or other oil, until they will absorb no more preservative. This method is suitable for radiata pine and low density eucalypts. In tightly permeable timbers such as radiata pine, penetration can vary widely depending on:

(i) the nature and visosity of the preservative

(ii) differences in the timber such as density and moisture content.

(iii) whether end or side grain is exposed

(iv) temperature and other factors.

This means that time taken to achieve complete penetration can also vary widely.

Seasoned (moisture content below 25%) posts can be fully immersed in cold creosote for a period of about ten days. The required period of immersion can best be determined by cutting a treated post in half and examining it for penetration. Trials by CALM at Harvey have confirmed that the sapwood of green posts (regrowth eucalypts) immersed in creosote can be effectively treated by cold soaking.

A two-stage process involving a heavy treatment to the butt, followed by a lighter treatment to the tops is recommended.

The simplest plant consists of soaking tanks made from 200 litre drums, a draining trough made by cutting a drum in half lengthwise, and a leaning rail for the posts erected in the draining trough. A 200 litre drum will hold about 10 posts and will accommodate the 76 cm depth of preservative necessary for butt soaking. Generally for a 1.8 m post a third of the length is placed in the ground, therefore butt treatment needs to be to 76 cm. Butt soaking will require 5 to 7 days soaking, but in some cases a longer or shorter time may be necessary.

Hot and Cold Bath

This process involves heating the timber in steaming, hot water or liquid preservative to drive out most of the air, followed by cooling in preservative, when atmospheric pressure assists capillary forces in moving the liquid to replace the air driven out. Heating to just below 100°C in water, or to higher temperatures in oil or steam is most effective.

A typical treatment schedule for a dry eucalypt pole of 225 mm butt diameter with 19 mm sapwood, using creosote as the heating medium, would be:-

Raise temperature to 110°C	-	3 hours
Hold at 110°C	-	1 hour
Lower to 66°C	-	4 hours.

There is little to be gained by lowering the temperature below 66°C as most absorption takes place in the first 21°C to 27°C fall in temperature. Where time is not critical e.g. in an overnight treatment, it may be expedient to reheat the preservative next day to drive of surplus liquid and improve surface cleanliness: this is known as an "expansion bath' (Dale 1967).

Hot and cold bath treatment can be done simply in a 200 litre drum over an open fire but for effective control and safety the preservative is usually heated by steam coils or low temperature electric elements in an insulated tank. Poles and posts can be treated full length in the horizontal position or butt treated in the vertical position to save heat and preservative, where protection of the sapwood above ground is not essential. Hot and cold bath treatment is not used with the fixed CCA preservatives because their solutions are not stable at high temperatures.

Heating to temperatures of between 80 and 100°C, treating for four hours, and then allowing the post to cool is a schedule that also produced successful results (Anon 1980).

A farmer can do one or more batches of posts per day depending on the number of posts required treating and plant available. For one batch per day, posts can be left in the drum to cool overnight. To avoid absorbing too much preservative, the posts can be removed after a shorter cooling period while the preservative is still warm (CSIRO 1961). Alternatively, the posts can remain in the treating drum overnight and be removed the next day after the preservative has been partly reheated to expel the excess.

For doing three batches per day the following can be done: heat butts in the preservative for two to four hours, then transfer them as quickly as possible to a second drum containing sufficient cold preservative to rise to a depth of 76 cm when the posts are added. Allow the posts to soak in cold preservative until a sufficient absorption has been obtained (usually about two to four hours). In this way two charges can be treated between morning and late afternoon. The third charge can be heated in the evening and left to cool in the usual way overnight. Additional treatment drums and creosote will allow more batches to be treated.

The recommended creosote loadings in the sapwood are 160 kg/m^3 for the butt (76 cm) and 48 to 64 kg/m^3 for the remaining sapwood (CSIRO 1961). Butt treatment should be to about 100 mm above the ground line position.

The hot and cold bath method will achieve a better penetration and is quicker than cold soaking. Dry posts will treat better than green posts, although Barnacle (1978) successfully treated green pine. It is worth testing the hot and cold baths method for treating green marri posts.

Pressure methods

Commercial treatment plants are available in Picton (Koppers Aust.), Bridgetown (Timber Treaters) and Mundijong (Bunnings Forest Products) to vacuum/pressure treat posts with copper-chrome-arsenic or creosote. Treatment costs need to be compared to the benefits of a guaranteed service life given by the companies concerned.

Conditioning timber after treatment

Timber treated with oil-borne preservatives should be allowed to dry in a well ventilated situation to allow the volatile fractions to evaporate, and to minimise oil exudation on the timber surface.

Advantages of creosote include:

(i) It has a very long and satisfactory service record under a wide variety of conditions.

(ii) It gives some protection against surface weathering and helps to reduce splitting. Bleeding in freshly opened checks helps to prevent establishment of decay in the untreated heartwood.

(iii) Creosote is relatively non-toxic to livestock and to man but is highly effective against wood destroying fungi and termites. Because it contains a variety of toxic components, the danger of treated poles being attacked by highly tolerant fungi is minimised.

Objectionable features of creosote include:
Fire hazard of freshly treated wood, odour and unfavourable effects on cleanliness and paintability.

4. **Safety Procedures**

A Chemical Data sheet will be given by the company supplying creosote. In W.A. the agent for creosote is Country-Wide Pest Control in Rockingham (09 5279193)

Some unions are opposed to using creosote because of its strong odour (which can cause headaches to operators when used in enclosed sheds) and skin irritation from skin contact or from vapour. Provided adequate protective clothing, full length rubber gloves and goggles are used and treatment is conducted in a well ventilated environment, creosote is safe to use.

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REFERENES

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