UTILISATION OF ROUND TIMBER

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Eucalypts in their round form were widely used by our early settlers for house frames, wharves, bridges, barns and fences. The settlers quickly learned which species were resistant to decay and termites, that posts containing sapwood were rapidly destroyed by borers and therefore non-durable in the ground. With proper preservative treatment of the sapwood, even the fastest-growing, least-durable species can be used in-ground contact.

Most importantly, sapwood treatment allows the use of smaller trees because the strength of the sapwood need no longer be disregarded in design. Sapwood is as strong as heartwood, and when properly treated should last as long or longer than the heartwood.

Probably the greatest advantage of round timber is its ready availability in most parts of Australia and the ease with which it can be converted from living trees to structural elements.

Durability classes

CSIRO Division of Forest Products have developed a system of rating the natural durability of different timber species, based on the expected performance of outer heartwood when used in ground contact. The four classes devised by the CSIRO are:-

Class 1 - Timbers of the highest natural durability which may be expected to resist both decay and termite attack for at least 25 years and sometimes 50 years, e.g. wandoo.

Class 2 - Timbers of high natural durability which may be expected to have a life of about 15 to 25 years, e.g. jarrah, W.A. blackbutt and W.A. sheoak.

Class 3 - Timbers of only moderate durability which may be expected to have a life of about 8 to 15 years, eg. marri, karri and Tasmanian blue gum.

Class 4 - Timbers of low durability which may last from about 1 to 8 years. These timbers have about the same durability as untreated sapwood, which is generally regarded as Class 4, irrespective of species, e.g. radiata pine, Douglas fir and meranti.

Preservative treatment methods

Many landowners within the south-west would like to utilise small diameter trees on their properties for posts, rail, poles. The main drawback is not knowing how to treat the sapwood with a suitable wood preservative.

Provided the sapwood band is at least 12 mm thick, most hardwood timber species are suitable for preservative treatment. Several methods developed by the CSIRO, Division of Forest Products can be used to treat the sapwood with preservatives. These include hot and cold bath, cold soaking, sap-replacement and pressure impregnation methods.

Hot and cold bath involves heating the posts in steam, 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 preservative into the posts. Heating is best done close to boiling point or higher if oil or steam are used. Treatment can be done simply in a 200 litre drum over an open fire but for effective control and to prevent the preservative catching fire, the liquid is usually heated by steam coils or low temperature electric elements in an insulated tank.

Cold soaking involves soaking the butt ends of posts in creosote or other oil until they will absorb no more preservative and is suitable for dry radiata pine and low density eucalypt posts. The equipment for cold soaking need be no more than a tank with a draining platform alongside. Lifting gear will be needed for heavy posts and strainers.

Sap-replacement can be used to treat freshly felled debarked posts by immersing the butt end in a bath of preservative and allowing the post to stand vertical until the level of preservative liquid ceases to drop. As the sap evaporates from the top, the preservative is drawn up through the sapwood. Water borne preservatives are recommended for this method.

The first three methods can be used by the farmer to treat fence posts. Pressure impregnation requires expensive plant, with a cylinder capable of withstanding pressures up to 1380 kPa and is normally suitable only for commercial operation. In the south-west commercial treatment plants are located at Picton (Koppers Australia), Bridgetown (Timber Treaters) and Mundijong (Bunnings Forest Products) and are capable of treating fence posts.

Cost of preservative treatment

Farmers can do on-site non-pressure treatments or use a commercial plant to treat round fence posts. Non-pressure methods require treatment vessels (generally 200 litre drums), lifting equipment for heavy posts, heating facilities for the hot and cold bath method eg. an electric heating element and preservative, eg. creosote. High temperature creosote is available from Koppers Australia or at Countrywide pest controls in Rockingham (09 527 9193) in 200 litre drums and costs $246 or $1.23/litre (ex Perth). It is more economical to purchase a pallet of four drums as individual drums cost $234 or $1.17/litre. Based on trials at Harvey, using 2.5 year old Tasmanian blue gum an uptake of 1.91/post was recorded for treating the butt and crown ends. This costs $2.34/post based on purchasing one drum or $2.22/post if drums are purchased in bulk. A gap between the butt and crown ends was brushed with creosote. Plant and labour would be additional costs.

Koppers Australia charge $120/m³ to treat pine fence posts with CCA to a retention of 7 kg/m³ (oxide) or 12 kg/m³ (salt) which is to hazard level 4 suitable for use in ground-contact in temperate climates. Debarking and transport are additional costs. An average post of 12.5 to 15 cm small end diameter under bark and 1.8 m long and containing all sapwood (i.e. 33 post/m³) would cost $3.60/post (excluding debarking and transport). Quotes are available from all south-west treatment plants.

Round timber products

Fence posts

Fencing is a major maintenance task for farmers in the south west. Supplies of trees suitable for producing split posts are reducing and posts from small diameter trees will replace traditional split post. Non-durable sapwood will contribute significantly to the strength of posts, therefore preservation treatment is essential.

General purpose poles

Poles can be used by the farmer for constructing sheds, verandahs, car ports, landscape gardens and retaining walls. Vine trellis and hop poles are agricultural uses for treated eucalypt poles. Pole framed buildings for example barns, warehouses, aircraft hangers and other industrial buildings can be built quickly and very economically with treated poles as their main supports. Buildings erected with poles are superior to light steel-framed buildings in their resistance to fire, high winds and vehicle damage. Pole-framed houses are becoming very popular in the eastern states.

Transmission poles

The minimum requirements of form, sapwood thickness, permissible defects, preservative retention and other properties of preservative treated poles, as well as acceptable species are set out in Australian Standard 0117 (1970). Some of these requirements, such as those concerning form and species, may be relaxed by agreement between supplier and user. In W.A. the principal user of transmission poles in SECWA, who use full length preservative treated jarrah, marri, W.A. blackbutt and karri. The minimum size they use is 9.5 m long, minimum crown diameter of 150mm and 2 kN strength rating. Minimum thickness of sapwood at any point after seasoning is : jarrah - 12 mm, W.A. blackbutt - 16 mm, and marri - 20 mm. Other requirements of straightness, quality, extent of end and barrel checking are outlined in the SECWA pole specifications. Farmers aiming to produce SECWA poles should do silvicultural treatments with the objective of producing trees with wide sapwood bands.

Small round timbers

Round timber can be utilised as stumps under conventional houses or as part of the whole structure reaching from ground to roof.

Round timber can be employed in underground mining as occurs in the coal mines in Collie. If these timbers are treated with preservatives the service-life would be greatly enhanced.

Firewood

Firewood is a low value use, however some wood products e.g. first thinnings and branches will be only suitable for firewood. In the metropolitan area prices for dry jarrah firewood can reach $100/tonne, whereas in Bunbury they are approximately $70/tonne for dry jarrah blocks, $24/tonne for green mill ends and $50/tonne for dry mill ends. Farmers considering this option would need to determine transport and other overhead costs.