Performance of treated hardwood fences after five years

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Sawn hardwoods are difficult to protect with preservatives because they usually contain high proportions of refractory heartwood. Hardwood paling fences are generally untreated and of relatively low natural durability. The objective of this study was to investigate the performance of hardwood fencing timbers when treated with preservatives against decay, while at the same time producing an aesthetically pleasing coloured commodity. While treatments that would meet Australian Standard 1604 were not expected, it was thought that significant benefits might apply, especially to the thinly cut palings (which are often cut from the outer parts of the saw log, hence having a high content of sapwood). As a thin treatment envelope was expected, the study also investigated the problem of, and how to avoid, cutting timbers after treatment.

The timbers (posts, rails, palings, plinths) to be treated were *Eucalyptus regnans* and *E. obliqua*. They were treated unseasoned or only partially seasoned with PEC (pigment emulsified creosote, a brown pigment was used) or PROCCA (an emulsion of oil plus copper chromium arsenic) (Cookson et al., 1996). Model fences were constructed and compared to the performance of an untreated fence made from a combination of *E. regnans* and *E. obliqua* rails, plinths and palings with *E. camaldulensis* posts. Fence post stub trials were also installed in the AFS (decay) at Clayton and the field at Walpeup (decay and termites). The various trials were inspected after five years exposure.

Results

Model fences were assessed visually and the occurrence of biodegradation noted. The key findings were:

- Various components of the untreated model fence were decayed. Generally, decay was present in sections of timbers that were in close contact with other components, for example where a paling was fixed to a rail. The untreated E. obliqua plinth was heavily decayed where it was in ground contact and is now unserviceable.
- The above-ground components of the treated model fences were in very good condition, with no decay found. Slight decay due to soft rotting fungi was detected in the sections of plinths in ground contact.
- There was still good colouration to the fences (green or brown) after five years, although the brown PEC-treated fences were uneven in colour.
- Untreated *E. regnans* posts exposed in the AFS are heavily decayed and heavily attacked by termites at Walpeup. Untreated *E. obliqua* posts are still serviceable but have lost a considerable percentage of their cross-section to decay and termites.
- Against decay, untreated *E. camaldulensis* posts have performed better than most preservative-treated posts. Against termites, there is slight damage to *E. camaldulensis* posts, whereas, very few treated posts show signs of termite activity at all.

- The rate of decay was greatest in posts exposed in the AFS. Here, the mean decay ratings for PEC-treated posts were generally higher than for PROCCA-treated posts.
- Posts docked after treatment, thus removing the treated end grain, and exposed with the docked end in the soil were heavily decayed.
- Galvanised nails were in good condition in all fences, steel nails were also in good condition in PEC-treated fences but were corroded in both the untreated and PROCCA-treated fences, making them very difficult to dislodge from the rail during inspection.

Results from the five-year inspection of posts exposed at Walpeup, Clayton and in the AFS at Clayton are presented in Table 1. Ratings are based on a scale from 8-0 where 8 corresponds to no damage and 0 is destroyed. The decay hazard is moderate at Clayton and high in the AFS. Two ratings are given to posts at Walpeup where there is a moderate termite and decay hazard.

Table 1: Mean ratings (and mean depths of decay) for posts exposed in-ground 8 = sound.

Timber species	Treatment	AFS decay rating (decay mm)	Clayton decay rating (decay mm)	Walpeup decay rating (decay mm)	Walpeup termite rating
E. regnans	Untreated	1.2 (31.4)	–	5.2 (10.0)	1.2
	PEC, plain	5.8 (7.6)	–	8.0 (0)	8.0
	PEC, incised	6.2 (4.8)	7.3 (1.5)	7.8 (0.6)	8.0
	PEC, slotted	5.0 (8.8)	7.0 (2.0)	8.0 (0)	8.0
	PROCCA, plain	4.0 (13.2)	7.3 (2.3)	7.0 (3.0)	7.8
	PROCCA, incised	5.2 (9.4)	6.0 (5.3)	7.6 (1.0)	8.0
	PROCCA, slotted	5.6 (6.8)	6.75 (2.8)	7.0 (2.6)	7.8
E. obliqua	Untreated	5.4 (7.6)	–	6.2 (5.2)	5.2
	PEC, plain	6.8 (3.2)	–	7.8 (0.6)	8.0
	PEC, incised	5.6 (7.6)	6.5 (5.0)	8.0 (0)	8.0
	PEC, slotted	7.0 (2.0)	7.0 (1.3)	7.6 (1.2)	8.0
	PROCCA, plain	6.0 (6.0)	7.0 (2.3)	7.0 (3.0)	8.0
	PROCCA, incised	4.8 (11.8)	7.0 (2.0)	7.2 (2.4)	7.8
	PROCCA, slotted	4.0 (14.2)	6.3 (4.5)	7.0 (2.8)	8.0
E. camaldulensis	Untreated	6.4 (3.2)	7.0 (2.0)	7.6 (1.2)	7.0

This trial has demonstrated that low durability hardwoods used for above-ground fencing components (rails, palings and plinths) can be successfully treated to extend the service life and maintain appearance. Based on mean decay ratings after five year's exposure in the AFS, sawn treated timbers of *E. regnans* and *E. obliqua* appear to be unsuitable for long-term performance as posts.

References

Cookson, L.J., Watkins, J.B. and Scown, D.K. (1996). Treatment of eucalypt paling fence timbers with emulsions of creosote and CCA. 25th Forest Products Research Conference, Clayton, Article No. 1/3.

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