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# Wood Utilisation Research Centre

## SAWMILLING TRIAL OF REGROWTH MARRI

K.J. White

**May 1989**
**W.U.R.C. Technical Report**
Limited Distribution

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## SUMMARY

This report describes a sawmilling trial of regrowth marri (*Eucalyptus calophylla* R.Br) trees for the production of structural and some appearance grade timber products. Logs were stored under continuous watersprays for two years before milling was carried out using a twin edger and two-man resaw bench. Green-off-saw recovery was 35.1 per cent before docking and 29.0 per cent after docking to remove large knots and kino veins.

The boards were treated with borax to prevent *Lyctus* attack and then blockstacked until grading. Heartwood, bow and undersize pieces were the major reasons for rejecting pieces. The final recovery after further docking to increase the percentage of Structural Grade 3 timber was 26.0 per cent, which included 3.0 per cent of appearance grade timber. In general, the regrowth marri was considered more difficult to mill than regrowth of jarrah (*E. marginata* Donn ex Sm.) and karri (*E. diversicolor* F.Muell).

## INTRODUCTION

Marri (*Eucalyptus calophylla* R.Br) belongs to the bloodwood group, and is a common large tree of the south-west of Western Australia. It has a distribution extending from north of Geraldton to Cape Riche and inland slightly beyond Narrogin (Boland *et al.* 1984). In the main south-west forest areas, the species attains a height of well over 30 m.

Marri timber is straight-grained and pale in colour. It is a moderately durable timber of Durability Class 3 + (Standards Association of Australia 1988), and has potential for sleepers if treated with chemical preservatives. The high incidence of kino veins produced as a wound response after insect attack or mechanical damage has limited the use of the species, and sawmillers have not been able to mill it economically.

There is increasing interest in using marri for sawn timber, in both structural and appearance grades. This sawmilling trial was intended to obtain data on graded recoveries of regrowth marri from a forest near Pemberton.

## METHODS

The marri regrowth logs for this trial were cut from a mixed compartment in the Pimelia Plantation near Pemberton, which previously comprised radiata pine (*Pinus radiata* D. Don) planted in 1928, and marri regeneration. Because of the pine, fire had been excluded from the area, compared to most natural mixed eucalypt forest in the Southern Region where the burning rotation is every seven to ten years. The radiata pine was felled in 1980-81, leaving the marri stand.

The 61.3 $m^3$ of logs harvested for the trial had diameters ranging from 20 cm to 30 cm small end diameter under bark (s.e.d.u.b.), and lengths ranged from 2.4 m to 6.0 m (Table 1).

Table 1. Diameter class distribution of regrowth marri logs

| Diameter class s.e.d.u.b. (cm) | % |
|---|---|
| 15 - 19 | 13.9 |
| 20 - 24 | 37.6 |
| 25 - 29 | 31.4 |
| 30 - 34 | 15.3 |
| 35 - 39 | 1.8 |

After the marri logs were harvested, they were transported to the Wood Utilisation Research Centre at Harvey. They remained under continuous waterspray for two years, prior to sawmilling. This period was necessary because sawmilling of regrowth jarrah and karri were the priorities in the research program, and previous trials had indicated that stockpiling for this time was not deleterious.

All sawing was carried out using a twin edger with overhead beam feed to remove two wings at each pass through the circular saws. On the initial cut, wings removed were small, and not intended for resaw because the recovery material in them was negligible. The second pass established the finished structural member face width e.g. 100-125 or 150 mm flitch thickness. The resaw system used at the time of the study was a two-man resaw bench fitted with a circular saw and Dunstan live feed timber return. By using this manual resaw system each flitch could be cut or turned to maximise recovery.

Both wings and the centre flitch from the second pass were resawn to produce mainly backsawn appearance or structural material. By adopting the sawing pattern in Figure

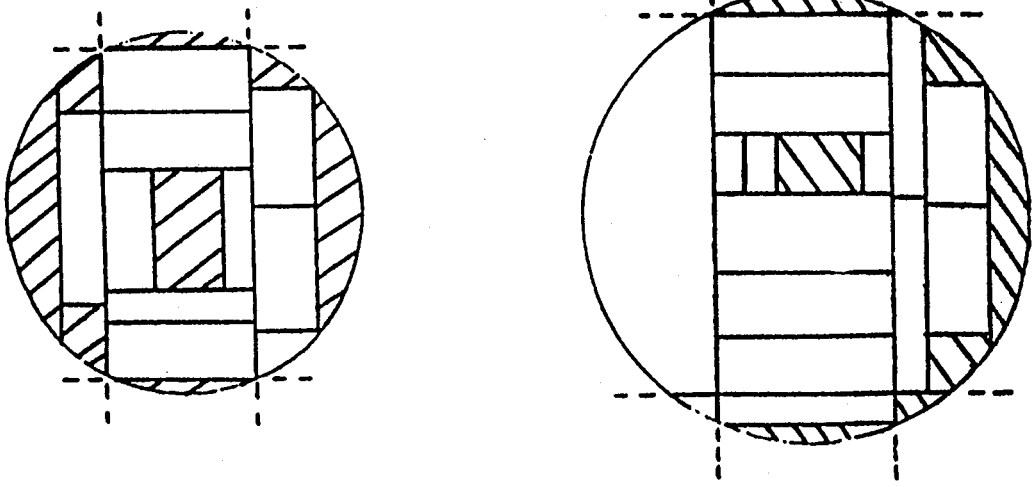
1, which is based on Machin (1981), most material produced in both structural and appearance grade was backsawn.

The range of sizes produced in structural grades in this trial was 150, 100, and 75 mm widths in 50 mm thick material, and 150, 100, 75 and 50 mm widths in 38 mm thick material. In board recovery 150, 100, 75, and 50 mm widths in 25 mm thick sizes were cut. Length classes were in multiples of 0.3 m, from 1.2 m up to and including 6.0 m.

All the material produced was dipped in borax to prevent *Lyctus* attack of sapwood, and then block-stacked. The bundles were then stored under watersprays for two months until kiln space was available, and grading was done then.

Each piece of structural timber was graded to the Australian Standard AS2082 (SAA 1979). If docking would enable pieces to make Structural Grade 3, this was undertaken. Appearance grade boards were graded to AS2796 (Standards Association of Australia 1985).

**Figure 1:** Sawing pattern used for milling regrowth marri logs, based on Machin (1981).



## RESULTS AND DISCUSSION

A green-off-saw recovery before docking of 35.1 per cent was achieved from the round log volume of 61.3 $m^3$. After docking ends, and large knots and kino veins unacceptable in Structural Grade 3 timber, the recovery was reduced to 29.0 per cent.

In the initial volume of 17.7 $m^3$ of sawn material, there were 1.8 $m^3$ of appearance grade boards and 15.9 $m^3$ of structural timber. The latter included 3.4 $m^3$ which was rejected for Structural Grade 4, and required docking or resawing to improve quality. After docking or resawing 1.6 $m^3$ was recovered and graded to Structural Grade 3 or better. The final recovery was therefore 26.0 per cent and 3.0 per cent was rejected.

The Machin (1981) sawing pattern used for conversion of regrowth marri sawlogs presented a number of problems for the sawyers, both in initial breakdown and subsequent conversion. Bumps on these regrowth marri made it difficult to centre small diameter logs in the breakdown clamp, and as a result sawn recovery from these logs was reduced. The operators considered that there were more problems experienced in sawing regrowth marri than with jarrah and karri regrowth in previous trials.

The level of growth stresses present in this log size class caused major problems in lengths exceeding 3.6 m. Consequently, after sawing to flitches there were difficulties in handling because of bow and some spring.

Few pieces had truly quartersawn material present and comments relating to bow and spring apply to backsawn or partly backsawn pieces in this report. Bow, and undersize as a direct result of sawing difficulty, accounted for most of the 3 per cent loss when grading structural material two months after sawing.

Long periods of continuous water storage apparently had little effect in reducing growth stresses in regrowth logs, and therefore reducing the amount of bow, which accounted for most of the reject volume. In addition, the excessive quantities of bow when sawn resulted in a number of pieces being undersize when graded. Other defects included knots, heart shakes, gum and heart not evident at the time of milling.

The general appearance of material stored for two months prior to grading was good for the pieces which made grade, with little or no checking evident. The sawn surface was rougher in texture than regrowth jarrah or karri and was more splintery.

The final result of 23.0 per cent structural grade recovery, and 3.0 per cent appearance grade recovery (from logs 15-36 cm s.e.d.u.b. size classes) is satisfactory, considering the larger log sizes in regrowth karri produced only 30.6 per cent green sawn recovery

(White 1989). More stringent control over log quality would improve the results from logs in the size class 15-19 cm s.e.d.u.b., because many small logs returned recoveries of only 15 to 21 per cent.

In general, marri was found more difficult to mill than jarrah or karri, and because of growth stresses more difficult to line up and hold for initial breakdown, and to cut to size. There was more heating of the saws while resawing and breaking down. It was difficult to detect heartwood, causing further problems when subsequent conversion cuts were made.

## REFERENCES


BOLAND, D.J., BROOKER, M.I.H., CHIPPENDALE, G.M., HALL, N., HYLAND, B.P.M., JOHNSTON, R.D., KLEINIG, D.A., and TURNER, J.D. (1984). Forest trees of Australia. Nelson.CSIRO. Melbourne.

MACHIN, J. (1981). The challenge of small diameter regrowth eucalypts. Australian Forest Industries Journal 47(1): 48-50.

STANDARDS ASSOCIATION OF AUSTRALIA (1979). Visually stress graded hardwood for structural purposes. AS2082-1979.

STANDARDS ASSOCIATION OF AUSTRALIA (1985). Timber - Seasoned hardwood - Milled products. AS2796-1985.

STANDARDS ASSOCIATION OF AUSTRALIA (1988). Preservative treatment for sawn timber (Revision of AS1604-1980). Draft Australian Standard DR88143.

WHITE, K.J. (1989). Sawmilling of regrowth karri logs. Department of Conservation and Land Management, Wood Utilisation Research Centre. Internal report.