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Department of Conservation
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Wood Utilisation Research Centre

SAWMILLING OF RED MAHOGANY GROWN ON A REHABILITATED MINESITE

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W.U.R.C. Technical Report No. 19

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SUMMARY

A sawmilling study of 23-year-old red mahogany (*Eucalyptus resinifera* Sm.) logs grown on a rehabilitated bauxite minesite showed that logs had a high incidence of knots, sapwood, insect attack, gum pockets and rot.

The 115 mm x 34 mm boards produced were pre-graded at the docker, and those considered suitable for drying were air-dried from green to below fibre saturation point, and then dried to final moisture content in a high temperature kiln. Grading was done to the requirements of Australian Standard AS2082-1979 or to grading rules developed by the Wood Utilisation Research Centre. The major defects affecting grade, in order of importance, were knots, sapwood, insect attack, gum pockets and rot. There was a high incidence of rot associated with branch stubs, but bow and spring were not a problem. The overall recovery of Structural Grade 3 boards was 12 per cent.

The trial indicated that red mahogany used for rehabilitation did not produce satisfactory results from sawmilling. More trials using sample logs from other areas are suggested.

INTRODUCTION

Red mahogany (*E. resinifera* Sm.) has a natural range in coastal areas from Sydney to Atherton in north Queensland (Boland *et al.* 1984) and generally grows in open to tall forests. In Western Australia, red mahogany has been extensively planted as an exotic by Alcoa for rehabilitating bauxite minesites.

As a timber it has a range of uses, such as flooring, cladding, panelling, construction, sleepers and poles. There were no data on the quality of Western Australian grown red mahogany timber.

The purpose of this pilot study was to process a sample of red mahogany grown on a rehabilitated minesite, and to assess its suitability for producing structural grade timber.

METHODS

The red mahogany logs used in this trial came from trees grown on a rehabilitated minesite in Turner Block, Dwellingup District. The trees were 23-years-old and had minimum silvicultural treatment, with no previous thinning or pruning. The logs were delivered to the Wood Utilisation Research Centre at Harvey in November 1988, and were kept under water storage for approximately 2 months before sawing.

The logs were debarked and docked to a maximum of 3.6 m length immediately prior to sawing. The small and large end diameters and lengths were measured to calculate their volumes. Forty-four logs were prepared with a mean small end diameter under bark of 190 mm (S.D. 2.4 mm) and mean length of 2.70 m (S.D. 0.82 m).

Sawing involved two passes of the logs over a twin edger with overhead beam feed to obtain a square flitch, and then subsequently resawing on a vertical bandsaw. The product cut was 115 mm x 34 mm green-off-saw boards, with the intention of making Structural Grade 3 for AS 2082-1979 (Standards Association of Australia 1979). A pre-grading was done at the docker, and boards with excessive defects which had no chance of meeting the requirements of AS2082-1979 in any structural grade were discarded. Drying these boards would be a waste of resources. Moisture content samples were taken to allow monitoring of drying rates.

The recovered boards were strip stacked using 25 mm thick strip sticks, then stored in a high humidity environment for 2 weeks curing. After this time they were air dried to fibre saturation point, and then high temperature dried to final moisture content. The drying schedule used was:

* 90°C dry bulb temperature
* Wet bulb temperature floating
* Air speed 5-7 m/s.

After drying, the boards were pre-dressed to 100 mm x 25 mm, and graded to Structural Grade 3 of AS2082-1979 as well as to regrowth hardwood grade rules developed at the W.U.R.C. (Hanks 1990). The bow and spring in each board were recorded.

RESULTS AND DISCUSSION

Log quality was poor overall, and the frequency and amount of defect present were sufficient to result in whole boards and in some cases whole logs being rejected. These defects included knots, sapwood, insect attack, gum pockets, and rot.

The high incidence of decayed wood around branch stubs was of particular concern. There was no evidence that seasoning of the boards had resulted in any degrade except for a few boards which were undersize, apparently due to collapse near the heart, and these boards were not included in the assessment. The defects found in boards of the final assessment were present in the log.

The mean bow recorded in the boards was 7.3 mm/m (S.D. 4.8 mm/m) and the mean spring 1.2 mm/m (S.D. 1.0 mm/m).

Visual grading of the boards (using AS2082-1979), which were not rejected at the docker, resulted in four out of 44 boards satisfying the requirements for Structural Grade 3. The defects preventing the boards making grade were knots, gum pockets, insect attack and rot (Table 1). Upgrading by further docking or by drying was not feasible.

Table 1
Occurrence of defects in boards assessed at the docker

Defect	Frequency (%) *
Knots	97.4
Sapwood	94.9
Insect attack	76.9
Gum pocket	59.0
Rot	28.2

* More than one defect may occur in each board

The W.U.R.C. grading rules were used to assess the full length of each board, with phantom docking used to estimate the percentage of each grade found in each board (the position where in commercial practice the boards would be cross-cut is marked, but the docking is not actually done). There were 106 linear metres graded, which resulted in the following grades (Table 2).

Table 2

Grade	(%)
Feature	5.3
Processing	16.1
Merchantable	68.5
Regrowth	10.1

The defects preventing the timber making Feature and Processing Grades were large knots, gum pockets, insect attack and rot.

The mean recovery of dried dressed Structural Grade 3 boards was 12 per cent, with a range from 0 to 34 per cent from specific logs. This recovery was considerably lower than the 25 per cent which local sawmillers achieve from milling jarrah and karri logs, due mainly to small log size and the poor quality red mahogany logs. The heart in small logs tends to wander, reducing the number of heart-free boards obtainable. The comparatively large cross sections required (115 mm x 34 mm green off-saw) obviously reduced the recoveries.

The poor results of this trial indicated that red mahogany used to rehabilitate other sites should have log quality assessed. Similar results from other sites would indicate that the species is impractical for rehabilitation and other species should be used. Silvicultural treatments such as pruning could reduce the incidence of defects to a certain extent.

Processing into 15 mm thick boards used in the VALWOOD® process could be considered as an alternative to milling structural timber. Recoveries would be higher and poorer quality boards could be used in inner laminates, where defects are not obvious in the final product. Overall, the results were not promising for production of structural sized timber.

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