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Department of Conservation
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Wood Utilisation Research Centre

VENEER PRODUCTION FROM SMALL MARRI LOGS

M.E. Tucek and L.R. Mathews

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Weir Road Harvey WA 6220 (097) 29 1913
50 Hayman Road Como WA 6152 (09) 367 0333

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SUMMARY

The suitability of marri (*Eucalyptus calophylla* R. Br. ex Lindl.) for veneer peeling, and manufacturing into laminated veneer lumber (L.V.L.), a parallel-grained plywood, was assessed in a pilot trial.

Large numbers of kino veins resulted in regular breaking of the veneer during peeling, and in billet disintegration under peeling knife pressure, resulting in recovery of 11.5 per cent of veneer suitable for manufacturing L.V.L. Slippage of the lathe chucks occurred in 46 per cent of logs, but modified chuck design or peeling methods may increase recovery from logs which experience chuck slippage. The same problems occurred in veneer thicknesses of 1.8 mm, 2.5 mm or 3.2 mm.

The kino veins resulted in a large volume of short lengths of veneer, which adversely affects the economics of manufacturing L.V.L. but there were no problems in laying up the veneers. In general, the results of this pilot trial indicated that marri is unsuitable for peeling under existing economic circumstances.

INTRODUCTION

Large areas of forest in the south-west of Western Australia are mixed stands of marri (*Eucalyptus calophylla* R. Br. ex Lindl.) and jarrah (*Eucalyptus marginata* Donn ex Sm.), or marri and karri (*E. diversicolor* F. Muell.). Jarrah and karri, when harvested for timber production, are generally converted to comparatively high value products such as structural and appearance grade timber and veneer products. However, the use of marri as sawn timber has been limited owing to the extensive occurrence of kino veins. The low durability (CSIRO durability class 3) restricts the use of timber when used in ground contact unless it has been treated with chemical preservative. Consequently, the major use of mature marri logs has been for wood chips, because the species provides high pulp yields. There are large volumes of marri available for timber production, and the Department of CALM's strategy is to convert as large a volume as possible into value-added products.

This pilot study was designed to:

(i) assess the suitability of marri logs for veneer peeling; and

(ii) evaluate the recoveries of L.V.L. in which veneer sheets are laid up (i.e. assembled) into parallel-grained plywood.

METHODS

Twenty-six marri logs, with a total volume of 34.7 m^3 and a mean mid-diameter over bark of 490 mm (standard deviation 110 mm), were obtained from near Harvey or Manjimup in the south-west of Western Australia. The logs were transported to Wesfi Pty Ltd, a commercial plywood and veneering plant located in Perth, where they were dry-stockpiled for approximately one month before peeling.

The log quality was variable, as indicated by assessment of the ends of freshly docked billets, and the batch included logs with kino veins, star shakes and ring shakes, as well as defect-free logs. Prior to peeling, the logs were held at 70°C for 4 days in a tank of water before being docked to 2.6 m billets. The heated billets were peeled with a 'Tahai' peeling lathe at different thicknesses (1.8, 2.5, and 3.2 mm) to produce veneers.

Because the logs were included in a normal production run, time constraints permitted the recording of the diameter of each log and its remaining veneer core, but not recoveries on an individual log basis. The effects of origin of the logs and log quality (based on assessment of the billet ends) on recovery could not be determined.

A continuous industrial veneer drying oven was used to reduce moisture content of the veneer to about 8 per cent. Veneer sheets were coated on both sides with tannin formaldehyde adhesive before being laid up with parallel grain and pressed into 40 mm thick 2.4 x 1.2 m panels. Panels were pressed at 1 MPa until the centre of the panel reached 140°C.

RESULTS AND DISCUSSION

Large amounts of kino present in the logs led to major difficulties in peeling veneer satisfactorily. The main problem stemmed from kino veins showing structural weakness, and segments of two to four growth rings in thickness broke away from the turning billet under pressure from the peeling blade. Shelling occurred in 43 per cent of logs at some stage during peeling. There was no apparent difference in the tendency to shell at veneer thicknesses of 3.2, 2.5, or 1.8 mm.

Peeling logs with a tendency to shell was relatively time-consuming, owing to the need for judicious control of the peeling equipment to minimize disintegration of these logs and for subsequent re-rounding of logs which shattered.

The considerable extent of kino also resulted in constant breaking of the veneer as it peeled. This factor, together with the large volume of short pieces of veneer resulting from rounding and re-rounding the billets, contributed to the poor recovery of 11.5 per cent. Only complete 2.4 x 1.2 m veneer sheets were used to produce the L.V.L., because processing of the smaller pieces for inclusion in the panels was considered uneconomical by experienced staff at the plant.

Slippage of the lathe chucks occurred in 46 per cent of logs peeled. The macerated wood associated with the slippage made further peeling impossible, and resulted in substantially lower recovery. Using modified chucks of greater surface area, peeling un-steamed logs at ambient temperature, or using a suitable spindleless lathe may ameliorate this problem.

Mean veneer core diameter after the 48 billets were peeled was 270 mm (which was equivalent to 30 per cent of the original mean billet volume). Recoveries from individual logs could not be determined from original and veneer core volumes, because of differences between logs in the waste associated with initial debarking and rounding of the log, and any re-rounding required following shelling. No significant differences were found in the diameters of billets or veneer cores which originally contained clear ends, gum rings, or star shatters/or splits ($p<0.05$).

The glue lines of the marri L.V.L. were tested to AS 1328 (Standards Association of Australia 1987), and passed the dry cleavage test. However, the glue lines failed the A-type bond wet cleavage test after 72 hours boiling as required for natural polyphenol-formaldehyde adhesive in AS 2754 (Standards Association of Australia 1985), which would make this batch of the marri L.V.L. unsuitable for applications such as structural flooring, highway signs or marine use.

The results of the trial indicated that peeling of small mature marri logs was uneconomic because of the high incidence of kino veins and the problem of slipping lathe chucks. The low recovery of 11.5 per cent of veneers suitable for manufacture into L.V.L. was considered unacceptable. However, it is suggested that further research on the species is required because of the large resource available.

REFERENCES

STANDARDS ASSOCIATION OF AUSTRALIA (1985). Adhesives for timber and timber products. Part 1 - Adhesives for plywood manufacture. AS2754.1 - 1985.

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