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REGROWTH JARRAH STOCKPILE
AND SAWING TRIAL
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August 1989
W.U.R.C. Technical Report
Limited Distribution

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SUMMARY

Regrowth jarrah (*Eucalyptus marginata* Donn ex Sm.) is similar to other regrowth eucalypts in having growth stresses that cause problems in sawmilling. This trial was designed to compare the sawn graded recoveries from logs either fresh sawn or stockpiled under water sprays, and sawn using one of three different sawing patterns, to assess their effect in reducing the effects of growth stresses. Data were collected for four length classes and five diameter classes. The effect of stockpiling on bow and spring (which result from growth stresses) was assessed in flitches and boards.

The results indicated that, in both fresh sawn and stockpiled treatments, sawn graded recoveries were not affected by log length but increased with increasing log diameter. The different sawing patterns resulted in similar levels of bow and spring in the flitches, in both fresh sawn and stockpiled logs.

INTRODUCTION

Regrowth jarrah (*Eucalyptus marginata* Donn ex Sm.) is now available in sufficient quantities from jarrah stand improvement (J.S.I.) operations by the Department of Conservation and Land Management to supply the sawmilling industry with small mill logs. The size of these logs ranges from a minimum of 15 cm small end diameter under bark (s.e.d.u.b.) to a maximum of 50 cm large end diameter.

However, logs produced from thinning eucalypt regrowth forest have inherent growth stresses, which tend to result in sawing problems or in bow or spring in sawn timber. These logs often have a wandering brittle heart and a wide sapwood band. Jacobs (1955) described the growth stresses found in eucalypts and their effect on sawmilling behaviour. In particular, the tension in the outer wood results in distortion of the wings or flitches as they leave the saw.

In Western Australia, there is a considerable risk of spreading *Phytophthora cinnamomi* Rands, which causes jarrah dieback, during the winter months. Forest management practices in the State restrict logging in susceptible areas during that time, and sawmillers are required to store logs in stockpiles until milling. There is a further possible advantage from stockpiling: experience in Victoria indicates that storing regrowth ash-type eucalypts under continuous watersprays can reduce the distortion in sawn timber resulting from the growth stresses in the log (Waugh 1986).

The present trial was established to compare the quality of sawn timber produced from regrowth jarrah logs either fresh sawn or stored under water sprays, and to compare the relative efficiency of three different sawing patterns in reducing the bow and spring due to growth stresses.

METHODS

Regrowth jarrah logs for stockpiling were selected from a stand about 50-years-old in the Banksiadale Road area, Dwellingup District. Logs for fresh sawing came from a similar stand in Kent Block, Harvey District, after being produced in a harvesting trial reported by Clark and Brennan (1988). These logs met specifications for thinning the second generation forest (Bradshaw 1987). Logs felled in spring or summer weather conditions should be sawn immediately to avoid degrade from end splitting.

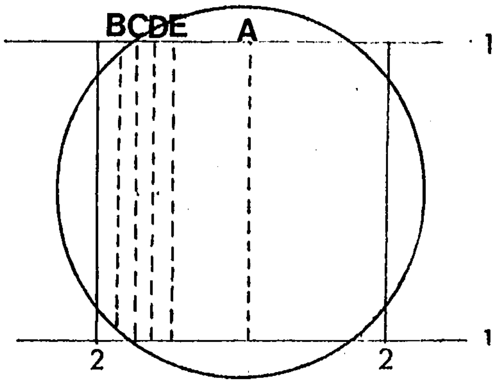
The logs were transported to the Department of Conservation and Land Management's Wood Utilisation Research Centre at Harvey. At the mill landing each log was identified and had diameter and length recorded. The Banksiadale Road logs were stockpiled with continuous water sprays, where they remained for 18 months until they were assessed for their suitability for sawmilling. The Kent Block logs were fresh sawn.

The waterspray stored logs were re-measured as the logs were being separated into four length classes (1.2, 2.4, 3.6 or 4.8 m) and five diameter classes (<15, 15-19, 20-24, 25-29 or 30-35 mm s.e.d.u.b.) before milling into sawn products.

Three sawing patterns developed for sawmilling of ash-type eucalypts in south-eastern Australia were assessed:- one by Waugh (1980) and two by Machin (1981), as shown in Figure 1. Each sawing pattern was tested on each length and diameter class to determine which was most effective in reducing bow and spring. All logs were sawn into flitches and cants using a twin edger with an overhead beam feed system as the primary breakdown method. A two man band resaw was used to convert flitches and cants into boards.

Bow and spring measurements were recorded (mm/m) for the initial sawn flitches, and all timber produced was identified by log, flitch and individual board. After resawing, bow was assessed in boards that were truly backsawn.

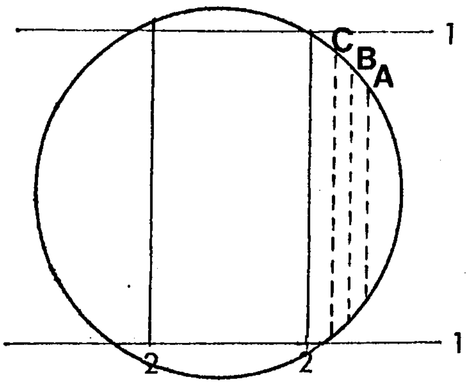
Figure 1. Sawing patterns tested in jarrah sawmilling trial.



Waugh (1980)

1 + 2 Twin Edger Cuts

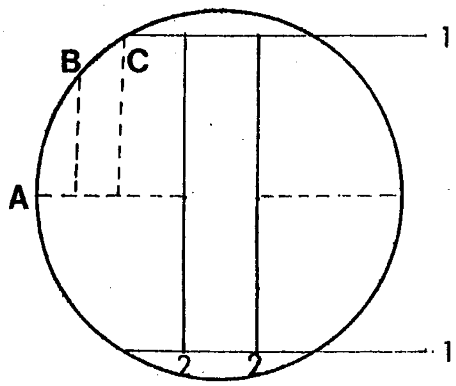
A to E Resaw Bandsaw Cuts



Machin 1 (1981)

1 + 2 Twin Edger Cuts

A to C Bandsaw Cuts



Machin 2 (1981)

1 + 2 Twin Edger Cuts

A to C Resaw Bandsaw Cuts

RESULTS AND DISCUSSION

The advantages of water spraying to provide suitable quality logs were evident in this trial. After storage for 18 months, there was negligible degrade by end splitting or insect attack in the logs stored under water sprays.

The comparison of three sawing patterns (previously used for regrowth ash-type eucalypt species from Victoria and Tasmania) to determine sawn recoveries in regrowth jarrah, a Western Australian eucalypt, has considerable commercial implications because local sawmillers will soon commence to mill regrowth jarrah. The results from this trial are the first available from sawing regrowth jarrah logs on equipment designed to mill the small diameter eucalypt resource.

The recoveries were assessed from each of the three sawing patterns from the four log length classes and five diameter classes. The data indicated that log length did not affect recoveries of 25 mm thick boards, but log diameter had a significant effect on recovery with all three sawing patterns (Tables 1 and 2).

Table 1: Effect of sawing pattern and log length class on green sawn recoveries of regrowth jarrah logs

Sawing pattern	Length class (m)	No. logs	% Recovery Mean	S.D.
Waugh	1.2-2.3	3	21.4	8.4
	2.4-3.5	51	18.1	1.2
	3.6-4.7	10	22.4	2.9
	4.8-6.0	9	29.6	1.8
		Mean	20.2	1.1
Machin 1	1.2-2.3	1	34.6	-
	2.4-3.5	15	17.1	1.3
	3.6-4.7	5	26.6	4.4
	4.8-6.0	3	32.2	5.3
		Mean	21.7	1.8
Machin 2	1.2-2.3	1	3.5	-
	2.4-3.5	12	23.4	3.5
	3.6-4.7	2	27.1	2.1
	4.8-6.0	11	21.8	3.3
		Mean	22.2	2.2

Table 2: Effect of sawing pattern and log diameter class on green sawn recoveries of regrowth jarrah logs

Sawing pattern	Diameter class (cm)	No. logs	% Recovery Mean	% Recovery S.D.
Waugh	<15	2	11.1	2.3
	15-19	28	17.4	1.6
	20-24	32	20.8	1.6
	25-29	11	27.3	2.2
	30-35	-	-	-
		Mean	20.2	1.1
Machin 1	<15	1	14.3	-
	15-19	10	18.2	2.6
	20-24	10	24.2	2.5
	25-29	2	20.0	5.2
	30-35	1	42.0	-
		Mean	21.7	1.8
Machin 2	<15	-	-	-
	15-19	11	15.3	2.7
	20-24	7	29.0	4.3
	25-29	8	25.8	3.6
	30-35	-	-	-
		Mean	22.2	2.2

Table 3: Effect of sawing pattern on bow and spring in flitches, and bow in boards, from regrowth jarrah logs either sawn fresh or stockpiled under water spray for 18 months

Sawing pattern	Fresh Sawn			Sawn after stockpiling		
	No.	Mean (mm/m)	S.D. (mm/m)	No.	Mean (mm/m)	S.D. (mm/m)
	Flitch bow (mm/m)					
Waugh	97	4.7	6.5	171	4.7	0.3
Machin 1	43	4.4	0.7	15	3.0	0.9
Machin 2	42	5.3	0.7	14	5.3	1.6
	Flitch spring (mm/m)					
Waugh	97	2.0	0.2	171	1.0	0.1
Machin 1	43	1.3	0.2	15	0.6	0.2
Machin 2	42	1.4	0.2	14	1.5	0.4
	Board bow (mm/m)					
Waugh	31	2.0	0.5	66	2.5	0.3
Machin 1	26	1.0	0.2	14	2.7	0.5
Machin 2	23	0.4	0.1	17	3.0	0.5

The results were complicated by the small sample sizes and large standard deviation in the matrix of classes, and consequently no particular trends were obvious in the length class data (Table 1). There was a trend of increasing values in the recoveries in the diameter class data (Table 2), but the variations in standard deviation indicated the need for larger sample sizes.In particular, there was a need for additional cutting in the Machin (1981) cutting patterns.

The measurements of bow and spring in the flitches indicated that sawing pattern had a minimal effect (Table 3). In general, the Machin 1 pattern (Machin 1981) resulted in less bow and spring in flitches and boards than found using the other two patterns. This was consistent in both the fresh sawn material and that sawn after stockpiling under water sprays for 18 months.

Comparing the flitch bow data from fresh sawn with those from stockpiled logs after milling, the Machin 1 (Machin 1981) pattern showed a reduction in mean values. The Waugh (1980) and Machin 2 patterns resulted in the same mean value, but in the latter the standard deviation increased considerably because of the smaller sample size. The Waugh and the Machin 1 patterns resulted in less spring in the flitches after stockpiling, although again the small sample size should be considered.

Bow measurements in boards from the fresh sawn material indicated a different trend, with smaller mean values for Machin 2 than the other two sawing patterns. However, the amount of bow increased in boards sawn using the the three sawing patterns on stockpiled logs. From the commercial viewpoint, bow is considerably easier to control than is spring during timber drying operations because the weight of the timber stack restrains the timber.

In general, small diameter eucalypts, such as those used in this trial, will make up an increasing proportion of the resource to supply future demands for hardwood timber in Western Australia. Their cost-efficient conversion is dependent on solving problems such as growth stress effects in logs and the reduced productivity associated with the handling of increased numbers of smaller dimension logs. The conversion difficulties (particularly those associated with growth stresses) probably are the greatest single problem for designers of high production, cost-efficient sawmills.

This trial confirmed the need for watering facilities on regrowth log stockpiles to reduce degrade, although reduction of growth stress effects by prolonged storage under water spray was not evident. It is possible that some balancing of stresses occurred during storage, resulting in the logs behaving more uniformly during milling.

No definite conclusion was reached about the comparative efficiency of different sawing patterns designed for regrowth eucalypt logs because of the limited numbers sawn in two of the three sawing patterns.

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