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Wood Utilisation Research Centre

COMPARISON OF LOW AND HIGH PRESSURE WATERING SYSTEMS FOR STOCKPILING REGROWTH JARRAH LOGS

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March 1990
W.U.R.C. Technical Report No 14.
Limited Distribution

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SUMMARY

Two continuous watering systems (high volume/high pressure and low volume/low pressure) for log stockpiles were evaluated to determine the volume of water used and the comparative costs.

Regrowth jarrah (*Eucalyptus marginata* Donn ex Sm.) crown and butt logs from a Collie District logging operation were stored either bark-on or debarked in the stockpile at W.U.R.C.. There was some degrade in log quality by end splitting, but no insect or fungal attack in any treatment, apart from some sapstaining on the underside of bark-on logs. If capital costs and water are limiting factors, and with a volume less than 10 000 m^3, the low volume/low pressure system is considered more suitable.

INTRODUCTION

Jarrah (*Eucalyptus marginata* Donn ex Sm.) is the major hardwood growing in the south-west corner of Western Australia in the 650 mm to 1250 mm rainfall areas and on lateritic soils (Boland *et al.* 1984). Stockpiling of sawlogs of this species is an essential strategy of the timber industry, allowing sawmills to operate continuously throughout the winter months. There is compulsory stockpiling during the severe summer weather conditions because of restricted winter logging to minimise the spread of forest diseases such as jarrah dieback (caused by the soil-borne fungus *Phytophthora cinnamomi* Rands). It is essential to stockpile under water sprays to minimise seasoning degrade by end splitting and infestation by borers.

The system of log stockpiling using low pressure/low volume water sprays discussed in this research paper can be afforded by small producers who wish to 'value-add' within their operations. The purpose of this trial was to compare degrade in jarrah logs after six months storage under continuous waterspray using two systems:

1. high pressure/high volume knocker-type sprinklers.

2. low pressure/low volume black polypipe 'Soaket' system.

Both systems were assessed using both bark-on and debarked regrowth jarrah sawlogs.

METHODS

The 50-year-old regrowth jarrah (*Eucalyptus marginata* Donn ex Sm;) sawlogs used in this trial were produced during clear-felling operations on the Harris River Dam site in Harvey District. The logs used in this trial were considered representative of regrowth thinnings available from logging operations within the Central Forest Region.

Mill logs were docked to full length sections, and pit props and fencing material collected from the residue. About 40 m^3 were harvested, and half this volume was first taken to a pole storage area for debarking before delivery to the Wood Utilisation Research Centre (W.U.R.C.) at Harvey. The other half was delivered with bark intact.

On arrival at the W.U.R.C. all logs were measured on both ends, and docked to reveal fresh sawn faces for assessment of endsplits to a photographic key rated one (no splits) to five (major splits). The bark-on and debarked logs were then randomly segregated into two equal stacks, to evaluate sprinkler systems.

The systems compared were high pressure/high volume knocker-type sprinklers, and low pressure/low volume black polypipe 'Soaket' hose. Each system included a filter and flow meter to determine the volume of water used under continuous watering, and every week the volume used and details of any maintenance were recorded. After the initial six weeks sufficient data on water usage had been accrued.

The type and capital cost of equipment to operate the two systems are significantly different as shown below.

High Pressure System	**$**	**Low Pressure System**	**$**
3 phase electric motor 50 mm intake pump	860	Single phase reticulating pump	280
Sprinklers (knocker-type at $16 each)	64	In-line serviceable filter	23
In-line serviceable filter	23	Suction hose or pickup pipe	38
Footvalve and suction hose	108	12 mm poly pipe 300 m coil	65
20 mm high pressure hose $5/m x 50 m	250		—
TOTAL	1305		406

Both systems would require a power supply outlet but these would normally be found at mill water supplies so no cost has been included.

After six months, log end splits were reassessed using the same photographic key, and a 25 mm thick disc was removed for assessing moisture content after docking 300 mm from each end of the log. Each log was assessed for sapstain, insect damage, surface checking and decay before sawing and during sawing.

RESULTS AND DISCUSSION

Water consumption recordings used by each system in the six-week period was high volume 1143 kL and low volume 296 kL (a daily consumption of 26.6 kL and 6.9 kL respectively) to cover 20 m^3 of logs on a continous watering schedule. The volume of water used is four times greater in the high pressure system than in the low pressure system, therefore water costs are also four times greater.

Both systems required filter maintenance once each week, while the high pressure/high volume system required some additional maintenance such as checking sprinkler heads to continue operating efficiently.

Cost comparisons made between the two types of equipment (see Methods) showed that the high pressure/high volume system cost $1305, and the low pressure/low volume system $406 i.e. a four-fold differential. Assessment showed increased end splitting in the butt ends of both debarked and bark-on logs in the low volume application (Table 1). These data and observations during sawing indicated no degrade from insect attack or fungi was evident in any logs, but some sapstain on the underside near the ends was evident from both sprinkler systems in unbarked logs.

Table 1
Effect of stockpiling system and debarking on end splitting in regrowth jarrah logs (by photographic key code 1 (minor) to 5 (major))

	Initial end splits		Final end splits				
Crown	**1**	**2**	**1**	**2**	**3**	**4**	**5**
Bark-on/high volume	18	2	11	5	2	2	0
Bark-on/low volume	18	1	9	9	1	0	0
Debarked/high volume	17	0	9	6	2	0	0
Debarked/low volume	17	0	3	6	6	1	1
Butt							
Bark-on/high volume	15	5	9	8	2	0	1
Bark-on/low volume	18	1	5	8	6	0	0
Debarked/high volume	17	0	9	6	2	0	0
Debarked/low volume	17	0	3	6	6	1	1

Moisture content determination from the sample discs indicated that in the sapwood there was a negligible difference between moisture content in the sapwood of logs stored under high volume and low volume systems, but removal of bark resulted in a considerable decrease in sapwood moisture content.

In the heartwood, moisture contents were limited in both high volume and low volume systems compared in bark on and debarked logs (Table 2).

Table 2
Moisture contents of regrowth jarrah logs stored under water sprays for six months

Treatment	Sapwood M.C.(%)			Heartwood MC(%)	
	No logs	Mean	S.D.	Mean	S.D.
Bark-on/high vol	20	93.6	9.6	91.6	11.0
Bark-on/low vol	19	93.7	9.5	92.5	10.7
Debarked/high vol	17	83.9	10.6	95.7	11.3
Debarked/low vol	17	86.4	14.9	91.9	9.7

Research conducted by Brennan *et al.* (1990) had confirmed that moisture contents increase while stockpiling with continuous watering.

Results from this stockpiling trial, carried out over a summer, indicated that both high pressure and low pressure systems are capable of maintaining regrowth jarrah mill logs in good condition throughout the most severe weather conditions while under continuous waterspray stockpile. Earlier research trials using various schedules of watering (Brennan *et al.* 1990) indicated that considerable reductions in water and energy (down to 15 mins on: 165 mins off) are possible using the high pressure high capital system, but more work would be required to determine whether any reduction from continuous water spray would be possible with the low volume system. If capital and water are limiting factors, and the volume to stockpile is less than 10 000 m^3, then it is considered that the low volume system would be most cost-effective in that situation.

ACKNOWLEDGEMENTS

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