

Defining the product - Log Grades in Australia

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Introduction

Forest produce may be sold as standing trees or as logs. If sold as logs they may be in long lengths or as separate logs ready to be processed. In any case the value of the produce tends to be set by the potential to yield logs of an expected quality. Although the quality assessment, or grading of logs is not particularly controversial in itself; because it is part of the process of sale, it can become controversial.

The main factor determining log specifications is their intended use. In order of highest value logs can be used for veneer, as sawlogs or as pulp logs. These categories form a hierarchy of uses where defects are increasingly tolerated and diameters are less.

The method of sale also affects the way logs are specified. For sales of standing timber the primary emphasis in applying grades may be to determine whether trees or logs are suitable for any use. Whereas grade definitions used for log sales will be designed to determine suitability for a particular use. Logs delivered to a particular mill should be suitable for the processing system and market of that mill: whether it is a veneer, saw or pulp mill.

Aside from this hierarchy, there is another category of products called "preservation logs" - usually used in the round and treated with preservative. This category largely consists of poles to support power or telephone lines. The rules which determine acceptability of poles are detailed and, because poles are used singly, are based on a strength assessment of each pole. The rules which govern this assessment are quite different from other products and they are covered by a national standard administered by Standards Australia.

Another market with a specialised set of grades is the export market. Here the major difference from domestic grades is the length specification.

First Principles of log Grades

While, in detail there are many slightly different sets of log specifications, most have common properties. Historically, log grades were used to discriminate between logs which were suitable for use and therefore must be harvested or those which could be left in the forest. This was part of the system of native forest management which sought to regulate use such that only an agreed volume of timber was taken and that had the objective of limiting the area cut to the minimum necessary to obtain that volume. Originally the major use for logs was as sawlogs to be sawn into scantling for house construction. Most log grades have that use as their basis. Length is an important parameter and the lengths most commonly specified are related to the length of the house wall stud. This is most commonly 2.4 metres and sets the minimum length for a log - to which is commonly added 0.1m as a cross-cutting allowance - a safety allowance for inaccurate measurement, inaccurate

cutting and damage in transport or processing. Logs are seldom traded at this length however as they are expensive to handle and are too short to be handled by common transport and de-barking equipment. Saleable log lengths increase above the minimum length of 2.5 metres in steps of 0.3m; but the most commonly traded lengths are 4.9 m and 6.1 m. This corresponds to two stud lengths plus 0.1 m and two and a half stud lengths plus 0.1 m. the usual minimum, commonly traded length is 3.7 m and the maximum in Australia is probably 19.0 m.

Diameter is also important. This is because the processes of peeling and slicing for veneer and sawing become more efficient if the logs are above at least minimum size. Pulpwood, which is usually reduced to chips before being pulped can tolerate wood of much smaller diameter. Veneer logs are commonly specified as greater than 30 centimetres small end diameter, sawlogs are usually larger than 15 centimetres and the small end diameter of pulp logs can be as little as 7 centimetres. In general logs higher in the hierarchy can be used for lower uses but not the reverse.

Two exceptions must be mentioned. In Western Australia, houses have traditionally been made of "double brick" construction and log lengths have never been based on the stud length in that State. Other countries have different building traditions and logs destined for export are often cut to lengths which are quite different from those destined for the Australian market. Logs from native forests are currently used much less to supply logs for house framing and log lengths are less influenced by stud lengths than formerly.

As well as their dimensions, logs are sorted into quality classes by the amount of defect they contain. Defects can include large branches (resulting in large knots when sawn), deviation from straightness "sweep" or "kinks" and other defects such as cracks, gum veins, splits, rot and spiral grain. The exact grade criteria differ from State to State and logs from native forests are treated differently from plantation grown timber.

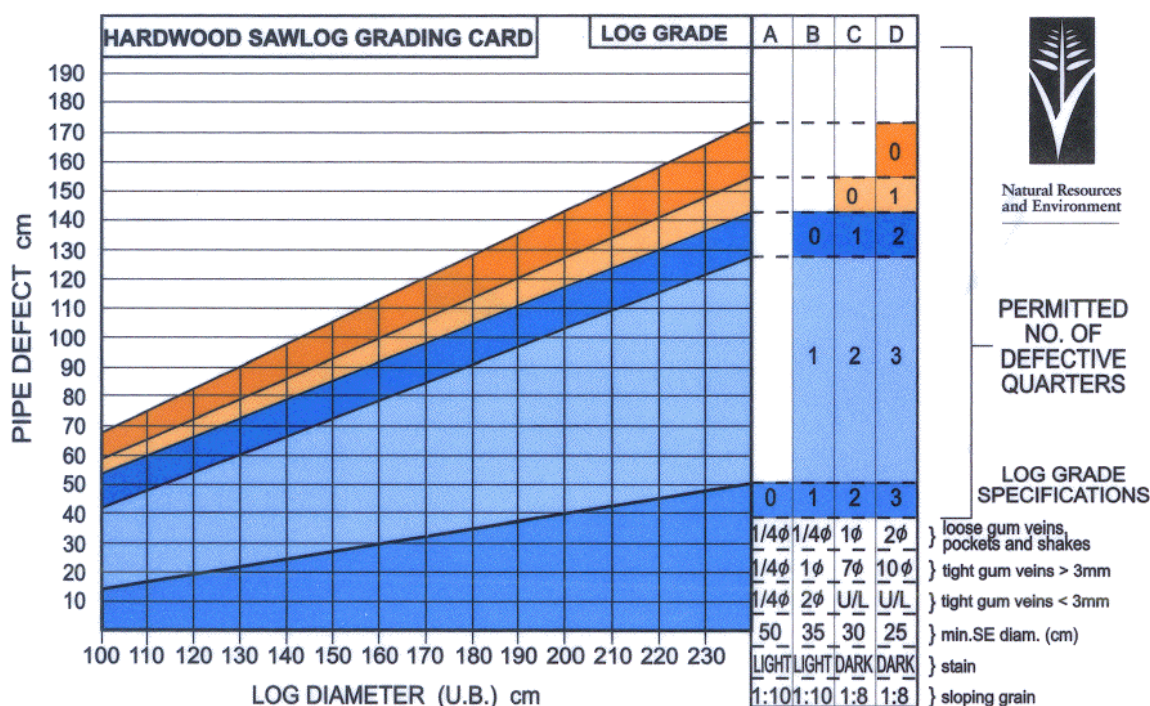
Logs from Native Forests

For Native logs, the principal defect, in all States, is that of internal defect - rot or "pipe". The original purpose of grading logs from native forests was to determine which logs were of sufficient quality that the sawmiller must take them as part of his allowance. The rules in NSW and Queensland still strongly reflect this history with such logs being called "Quota" or "Compulsory" logs in those States. However in both those States it is the practice to permit logs of lower quality to also be taken at the sawmillers' option. Such logs are called "Salvage" logs in NSW and "Optional" logs in Queensland and a lower price is paid for them.

The other States of Western Australia, Tasmania and Victoria have systems which grade logs into quality classes; but in all cases the poorest grade may be taken or rejected at the option of the purchaser.

An example of a grading system which classifies logs into quality classes is that of Victoria.

Figure 1: Hardwood Sawlog Grading Card



The figure illustrates a sliding scale of tolerable pipe size for log diameters. This determines the broad class of log which is then further graded by noting the incidence of less important defects by log quartile. While the systems adopted by other States differ in detail they consider similar defects and are similar in broad principle to the Victorian system.

Plantation Species

Trees in plantations are generally grown for a much shorter time than native forest trees - and under much greater silvicultural control. Note that although the area planted in native hardwood species has recently increased, the current production from plantation forests is mainly of radiata pine; although in Queensland, Slash pine (*Pinus elliotii*) is the main species harvested. In Western Australia, Maritime Pine (*Pinus pinaster*) is grown as well as radiata pine. For plantation forests the defect of internal rot is rare and the main defects of economic concern are: straightness and knot size. Maritime pine is treated much the same as radiata pine after felling but the grades for Slash pine have different limits to take account of the generally smaller diameters and butt swell which can be a problem with sawlogs of that species.

In all cases there are a set of general quality descriptions which apply, such as: "logs shall be cut from living, standing trees", "logs shall be of the length designated plus cutting allowance", "logs shall be cut with in five degrees of square", "branches shall be trimmed within 35 mm of log bark surface".

Logs must be more or less straight and, as with native species, sweep is more tolerable for longer logs of greater diameter. The table below gives typical limits applicable in South Australia.

Table 1. Maximum Allowable amount of Sweep in mm for Sawlogs.

Small end Diameters (mm)	Log Length (m)				
	4.0	4.3	4.9	5.5	6.1
150 - 199	60	75	75	80	80
200 - 299	65	80	85	85	90
300 - 399	70	85	90	95	100
>400	75	90	100	110	120

Source: Forestry SA

In other States the amount of tolerable sweep may be specified as a fraction of the log small end diameter. The effect is much the same, a greater degree of stem deviation is tolerated for logs of larger diameter.

Branches are the other principal defect in pine logs. The table below illustrates limits commonly employed for different products.

Table 2. Branch size limits - diameter - mm

	Plylog	Saw log	Recovery	D Class	E Class	Pulp
Live	< 75	< 75	< 100	< 200	< 300	na
Dead	< 60	< 75	< 100	< 200	< 300	na

Source: Forestry SA

Branches are important as they form the knots in sawn timber. The greater the branch diameter the greater the knot diameter and the greater the reduction in the strength of the sawn piece. Logs destined for plywood manufacture have the least tolerance and dead knots - which shrink and become loose on drying - must be smaller than green (live) knots. The tolerance increases as poorer grades are encountered and there are no branch size limits for pulp logs. "Recovery" grade is for short logs and "D" and "E" Class logs are from coarse grown trees at the stand margins. This is one of the more comprehensive systems. In other States, grades are similar. Some systems such as those in Western Australia and Victoria demarcate a number of quality classes within uses; others are designed to discriminate between uses such as veneer, sawlogs and pulp logs only. The rules applied throughout the several States follow the patterns illustrated with only variations designed to cope with the features of specific site/ species combinations in each State. There are some clear exceptions: there are about seventeen grades of export logs currently recognised. These reflect not just the differing qualities but size specifications that are applicable to each overseas country. For Cypress pine (*Callitris spp.*), grown in inland NSW and Queensland, the minimum length of 2.6m and a small end diameter of only 14 cm are acceptable. Some heart rot, up to 1/5 of diameter if logs are larger than 22 cm in diameter is tolerated. Logs of Slash pine (*Pine elliotii*) from Queensland are accepted down to 12 cm small end diameter.

Apart from power poles, there is no nationally accepted standard for log grades in Australia. The different species grown throughout the country and

the different types and severity of defects which this implies, plus the authority of States rather than Commonwealth organisations over forest resources has lead to different rules in every State. There is little pressure within the established forest industries to change this. The existing grades are well understood by both current buyers and sellers within the industry - who frequently negotiate minor variations on a sale by sale basis, to their satisfaction.

New entrants to forest growing have voiced their concern about the lack of transparency of log grades and that this tends to reduce the usefulness of even the limited publicly available information on prices. If I was to attempt to design a set of Nationally applicable log grades, the rules applied to native forest logs in by the Department of Natural Resources and Environment, Victoria and the rules applied to pine logs by Forestry SA would- in my opinion -be the best starting points.

Acknowledgments

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