

TIMBER INSPECTION AND GRADING

By A. R. Kelly

Timber grading can be defined as the art of sorting or classifying timber into grades which have definite relative values for the various uses to which timber may be put.

Grades are framed to safeguard the consumer, but they must equally serve the miller and the forest, to be effective and economic.

Clear hardwood timber forms only a small proportion of mill production, as none of our timber can be milled without producing a fairly large proportion containing defects or blemishes of some type.

Sound grading practice lies not in the selection of perfect timber, but, on the contrary, it aims at the inclusion in each grade of as many defects as possible without detracting from the value of the timber for the purpose for which it is required.

The early methods of establishing standards were more or less a matter of trial and error. Each inspector or grader had his own idiosyncrasies and uniformity was completely absent.

Without rules and standards, a great deal depended on the individuals and, as their ideas differed, there was considerable variation in the quality of timber supplied.

Not unnaturally, buyers tended to protect themselves from such inconsistencies by specifying in their order that the timber supplied be near perfect and early specifications supplied by the buyer generally read "timber shall be of the best Western Australian Jarrah, free from all defects, sawn on all four sides, rectangular in cross section, straight without winding, etc., etc."

These early specifications resulted in a great deal of waste, since timber that was quite good was rejected.

It was in an endeavour to stop this needless waste that from 1930 a major project of the utilization section of the Forests Department involved the development of grading rules for Jarrah and Karri.

The first extensive study was carried out in 1932 in co-operation with the C.S.I.R.O. and in the course of these studies draft specifications were prepared and tested and the results were published in 1933 and used as a bases for discussion.

Investigations continued and resulted in the publishing in 1935 of Bulletin 49, a series of specifications endorsed by the Standards Association of Australia as Australian Standard Grading Rules for Jarrah and Karri, and covering the major items of sawn and hewn production.

These rules were a tentative attempt to standardise grades of Karri and Jarrah and they served a very useful purpose in regulating the qualities of the various grades and maintaining the good name of our timber.

Changes in market conditions, additional research and observations from the long range tests on the behaviour of the various defects encountered in our timbers, resulted in the revision of the rules and the publishing in 1938 of Bulletin 51 and in 1948 of Bulletin 56 which is still current.

In these revisions both consuming and supplying interests were consulted, as draft specifications were prepared and submitted by a committee representing sawmillers, timber merchants, builders, architects, railway engineers, housing and forest authorities.

In the preparation of these specifications it is appreciated that the only really sound specification is one which reflects a proper balance between the material available and the use requirement of the final product.

It involves the recognition of the characteristics affecting the quality of the different timbers and the limitation of the size, type and location of the defects in the timber according to grade.

A grading specification defines the lowest limit of quality considered admissible for a certain use.

Bulletin 56, the current Standard Grading Rules for Jarrah, Karri and Wandoo, covers sleepers, crossings, structural timbers, crossarms, mine guides, flooring, lining, weather boards, piles and poles.

These rules comprise -

- (a) General provisions
- (b) Grade descriptions

The general provisions deal with scope, terms and definitions, timbers, limits of accuracy, equivalent defects, dimensions and, when applicable, moisture content and seasoning allowance.

The grade descriptions state what defects are to be excluded and then sets out the limits of size and/or location of permissible defects in the worst piece.

In sleepers and crossings durability, strength and spike holding capacity are the major factors.

In structural timbers, it is strength and stiffness.

In crossarms and mine guides the major factor is strength.

In the finish grades, such as select flooring, lining and joinery, appearance is the ruling factor.

In piles and poles, durability and strength.

In the development of grades for structural purposes, it has been necessary to consider technical data on mechanical properties of the timber and the influence of defects differing in type, size and locations, on the strength or stiffness of the section.

To understand the technical basis for structural grades it is necessary to appreciate that the inherent strength of timber is determined by mechanical testing.

It is international practice to conduct strength tests under standard conditions, on small clear specimens, which enables timber tested in Australia to be compared directly with any other timber tested by the standard method elsewhere in the world.

Before the test data can be applied, allowance has to be made for the fact that our commercial timbers are not available in this "clear" state, as defects found in log supplies are generally present in timber sawn for structural purposes.

Tests have established the influence on strength and stiffness of defects varying in type, size and their location in structural sections.

This has shown that some defects influence mechanical properties more than others and limits are defined for sloping grain, knots, holes, gum pockets, gum veins, wane and shakes.

Structural timber has been limited to two grades.

"Select" in which the worst piece is to have not less than 75% the strength of "clear" timber of the same species.

"Standard" in which the worst piece is to have not less than 60% the strength of "clear" timber of the same species.

Our Australian timbers have been classified into strength groups A, B, C, D, and the Handbook of Structural Design shows the safe loads for graded timber in each strength group with allowances for different conditions of exposure and load. (Some of these figures are shown in Appendix A of Bulletin 56.)

From the data in this handbook, designing engineers can compute the section of graded timber, in any strength group, that will be necessary to support known loads.

In the "finish" grades, as the name implies, appearance is the ruling factor and imperfections are considered in the light of their appearance on the exposed face of the piece.

Select grade limits should be consistent with the requirements of material to be used uncovered or finished with a transparent coating.

Standard grade shall be suitable for use generally beneath a covering material or finished with paint or other opaque coating.

Buyers, of course, should not demand grades and qualities in excess of the needs of the particular end use, that is, they should not order high strength grade for low strength requirements or high durability grade when not exposed to factors affecting durability nor high appearance grade when the finish is not visible.

Whatever is wasted at the sawmill must be charged back to the consumer in the price of the timber sold to him, thus the buyer by making his demands too severe merely ends up by paying more than is necessary for his timber.

It is practically impossible to draw up a series of grading rules so precisely worded that a buyer can tell exactly what he will get and it would be even more impossible to get an inspector or grader to accurately apply them economically in this State.

The question of interpretation of grading rules has always presented difficulties, not only here but in many other countries.

The main aim in inspecting or grading to any specification should be uniformity, or consistency, so that both buyer and producer know what to expect.

Uniformity is the first step in the orderly marketing of timber and the attack on competitive materials and is an essential feature in the timber producing industry and distributing trades.

Without uniformity, substitutes of a non timber nature will begin to take the lead, not because timber is unsuitable for the work, but because it may not be consistently supplied in the right form by the producers.

Under the present market conditions many buyers reserve the right of rejection at destination of any sub-specification material, with consequent monetary loss to the producer, so, particularly for export, the importance of a well applied specification can not be over-emphasised.

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