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OF THE COMMONWEALTH AND
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PROMOTION OF STANDARDISATION
AND SIMPLIFIED PRACTICE

Australian Standard Grading Rules

for

Jarrah, Karri and Wandoo

(Being also the Grading Rules of
The Forests Department of Western Australia)

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PREFACE

The grading rules embodied in these standards are those which are recognised by the Forests Department of Western Australia and the timber trade generally as being a suitable guide for the standard of timber quality to be produced for the purposes mentioned therein. They have been compiled after full consideration of the many factors involved in overseas and local trading, and supersede the former Australian standards Nos. O.10, 11 and 14 to 43—1938, which were adopted as W.A. Forests Department Bulletin 51.

An endeavour has been made to reflect in these grading rules the current standard practice of the timber trade in Western Australia. The definition of allowable defects in timber recommended for a specific purpose will enable buyers to obtain an appropriate grade of material and thereby avoid unnecessary waste.

An inspection service is maintained by the W.A. Forests Department, inspection being carried out at the request of either buyer or seller. The applicant should state, when applying for inspection, which of these specifications is to be used.

Eucalypts are not recommended for re-sawing in thickness after partial seasoning, and buyers are urged to specify the size finally required, plus any allowance which may be necessary for seasoning or machining.

In this revised edition, the numbers of the separate sets of grading rules in the 1938 edition have been retained as far as possible. Departures from the previous numbering have, however, been made in several cases where a more logical arrangement of rules covering closely allied products into parts under the same standard number has been effected.

AUSTRALIAN STANDARD GRADING RULES

For

JARRAH, KARRI AND WANDOO

GENERAL PROVISIONS

G-1. Scope. These grading rules apply to jarrah, karri and wandoo for the end-uses specified in the separate sets of grading rules. The rules do not apply to material intended for re-sawing.

The standard for each product shall comprise these general provisions, together with the separate grading rules for that product.

G-2. Interpretation. The terms used in these grading rules shall be interpreted in accordance with Australian Standard No. O.1, Terms and Definitions used in Timber Grading Rules, and with the additional definitions given in Clause G-3 below.

The trade and botanical names shall be interpreted in accordance with A.S. No. O.2, Nomenclature of Australian Timbers.

G-3. Definitions. For the purposes of these grading rules, the following definitions shall apply:

(a) *Core.* "Core" shall mean heart surrounded by loose ring.

(b) *Cubical Rot.* "Cubical rot" in wandoo shall mean a brown rot occurring in the tree before felling, usually characterised by a tendency to cross checking into an approximately cubical pattern.

(c) *Loose Ring.* "Loose ring" shall mean a lengthwise separation of the wood fibres occurring between and parallel with the growth rings.

(d) *Primary Rot.* "Primary rot" shall mean any rot occurring in the green tree before felling.

(e) *Straw Rot.* "Straw rot" in wandoo shall mean a straw-coloured rot occurring in the green tree before felling.

G-4. Timbers. The timbers permitted under these grading rules shall be those named in the title or scope clause of each set of grading rules, and shall include:

Jarrah — *Eucalyptus marginata.*

Karri — *Eucalyptus diversicolor.*

Wandoo — *Eucalyptus redunca.*

G-5. Application.

(a) *Limits of accuracy.* Only the general feature of a grade can be covered by rules, and a total variation of 5% between the grading of individual inspectors is reasonable.

Material described under these grading rules shall be graded with due consideration of its suitability for use in the shape and size in which it is ordered.

(b) *Equivalent Defects.* Permissible defects in any grade shall apply to the lowest quality piece the grade may contain.

When defects not described in these grading rules are encountered, they may be permitted if their damaging effect is equivalent to or less than that of the defects permitted in the grade under consideration.

In sections 72 sq. in. and over, the limitation of defects shall be used as a guide only, and due consideration shall be given to the general quality of the piece.

G-6. Seasoning Allowance. Except where moisture content is limited, these grading rules apply to green timber. If timber is inspected any considerable time after cutting, reasonable allowance shall be made by the inspector for shrinkage, checking and other normal changes that may occur during seasoning.

G-7. Moisture Content. Where timber is described as seasoned, and the moisture content is not specified, the moisture content shall be not more than 16% in boards for flooring and lining, 20% in sections up to 25 sq. in., or 25% in sections over 25 sq. in.

G-8. Dimensions.

(a) *General.* Unless otherwise specified, the following shall apply to all timber dimensions under these rules:

The minimum size at time of cutting shall be the nominal size.

Variations in sawing shall be allowed in lengths up to 20 ft., as follows:

<i>Dimension</i> in.	<i>Max. Allowance</i> <i>above Nominal</i> in.
Board thicknesses—up to 1½	¼
Other dimensions—up to 4	¼
" " 5 and 6	⅜
" " 7 and 8	¾
" " 9, 10 and 11	⅞
" " 12 and over	1

In longer lengths, an increase of 25% in total variation will be permitted.

(b) *Flooring and Lining.* Unless otherwise specified, milled T & G flooring and lining shall be accurately milled in the properly seasoned state to the dimensions of the standard profile, and to the following sizes :

<i>Nominal Size</i>	<i>Milled Size</i>
in.	in.
Width	Cover
6	$5\frac{1}{4}$
5	$4\frac{1}{4}$
4	$3\frac{3}{8}$
3	$2\frac{7}{16}$
Thickness	Min. Thickness
$1\frac{1}{4}$	$1\frac{1}{16}$
1	$\frac{3}{4}$
$\frac{3}{4}$	$\frac{9}{16}$
$\frac{5}{8}$	$\frac{7}{16}$

AUSTRALIAN STANDARD GRADING RULES

For

RAILWAY SLEEPERS

1. **Scope.** These rules apply to sawn or hewn railway sleepers of jarrah, karri and wandoo.

PART I. JARRAH.

1-1. **Size.** At the time of cutting sleepers shall measure from nominal up to $\frac{3}{4}$ in. over in width, and from nominal to $\frac{1}{2}$ in. over in thickness. The nominal length may vary 2 in. either way, but only occasional sleepers shall be short.

1-2. Grade Description.

(a) *General.* Sleepers shall be sound wood, free from heart and decay other than minor pockets of primary rot. They shall be cut square and straight and shall not be quarter cut.

(b) *Permissible Defects.* Provided that the strength, durability and spike-holding capacity at the rail seat of the sleepers are not unduly impaired, the following defects will be permitted :

- (i) Gum veins.
- (ii) Gum pockets up to 6 in. x $\frac{1}{2}$ in. at the rail seat and 10 in. x $\frac{1}{2}$ in. away from the rail seat.
- (iii) Falling shakes or shatter extending one-quarter, and other shakes extending one-half of the distance from the end of the sleeper to the rail seat.
- (iv) Pinholes.
- (v) Camber or twist not exceeding $\frac{1}{2}$ in.
- (vi) Sound tight knots, if clear of the rail seat, not exceeding 3 in. dia.
- (vii) Knotholes, if clear of the rail seat, not exceeding $1\frac{3}{4}$ in. dia.
- (viii) Sloping grain not exceeding 1 in 4.
- (ix) Wane or want, not exceeding at the rail seat $1\frac{1}{4}$ in. measured on the bevel of each of two edges, or 2 in. if occurring on one edge only.
- (x) Sapwood, not exceeding $\frac{1}{8}$ in. deep at the centre of the face at the rail seat ; provided also that the volume of truewood shall not be materially reduced.

PART II. KARRI.

2-1. **Size.** At the time of cutting sleepers shall measure from nominal up to $\frac{3}{4}$ in. over in width and from nominal to $\frac{1}{2}$ in. over in thickness. The nominal length may vary 2 in. either way, but only occasional sleepers shall be short.

2-2. Grade Description.

(a) *General.* Sleepers shall be sound wood, free from heart and decay other than minor pockets of primary rot. They shall be cut square and straight. Not more than 5% in any stack may be supplied quarter cut. Quartered or half-quartered sleepers shall not contain splits, ring shakes or other lines of weakness.

(b) *Permissible Defects.* Provided that the strength, durability and spike-holding capacity at the rail seat of the sleeper are not unduly impaired, the following defects will be permitted :

- (i) Gum veins.
- (ii) Gum pockets not exceeding 6 in. x $\frac{1}{2}$ in. at the rail seat or 12 in. x $\frac{1}{2}$ in. elsewhere, to be reduced if associated with loose ring.
- (iii) An end ring or split up to 12 in. long.
- (iv) Pinholes.
- (v) Wane at rail seat not exceeding 1 in. on each edge or $1\frac{1}{2}$ in. on one edge only, measured across the bevel.
- (vi) Knots on edge of sleeper or away from rail seat not exceeding 4 in. dia.
- (vii) Knot holes away from rail seat not exceeding 2 in. dia.
- (viii) Grub holes, but not in groups.

2-3. **Preservative Treatment.** When required to be preservative treated, karri sleepers shall be subjected to a treatment approved by the Forests Department of Western Australia.

PART III. WANDOO

NOTE.—Wandoo is not available for export as sleepers.

3-1. **Size.** At the time of cutting sleepers shall measure from nominal to 1 in. over in width and from nominal to $\frac{3}{4}$ in. over in thickness. The nominal length may vary 2 in. either way, but only occasional sleepers shall be short.

3-2. **Grade Description.**

(a) *General.* Sleepers shall be of sound wood free from cubical rot. They shall be cut square and straight. Not more than 5% in any one stack shall be quarter cut. Quartered or half-quartered sleepers shall not contain splits, rings, shakes or other line of weakness.

(b) *Permissible Defects.* Provided that the strength, durability and spike-holding capacity at the rail seat are not unduly impaired, the following defects will be permitted :

- (i) Gum veins.
- (ii) Gum pockets not exceeding 6 in. x $\frac{1}{2}$ in. at rail seat, or 10 in. x $\frac{1}{2}$ in. away from rail seat.
- (iii) Radial end splits not exceeding 10 in. Tangential rings or shakes, but not more than one in any rail seat.
- (iv) Pinholes.
- (v) Camber not exceeding $\frac{1}{2}$ in.
- (vi) Sound tight knots, if clear of rail seat.
- (vii) Knot holes not exceeding 2 in. dia., if clear of rail seat.
- (viii) Wane shall not reduce the flat rail seat to less than $6\frac{1}{2}$ in. If the wane is all or nearly all on one side, the flat rail seat shall measure at least 7 in. and the wane shall not extend more than $1\frac{1}{2}$ in. down the edge of the sleeper at the rail seat.
- (ix) Pipe, heart, or straw rot if not within $3\frac{1}{2}$ in. of the sap face of sleeper at rail seat.

AUSTRALIAN STANDARD GRADING RULES

For

RAILWAY CROSSING TIMBERS—JARRAH

1. **Scope.** These grading rules apply to jarrah railway crossing timbers.

2. **Size.** At the time of cutting crossing timbers shall measure from nominal to $\frac{3}{4}$ in. over in width and from nominal to $\frac{1}{2}$ in. over in thickness. The nominal length may vary 2 in. either way, but only occasional timbers shall be short.

3. Grade Description.

(a) *General.* Crossing timbers shall be sound wood, free from heart and decay other than minor pockets of primary rot. They shall be cut square and straight and shall not be quarter cut.

(b) *Permissible Defects.* Provided that the strength, durability and spike-holding capacity are not unduly impaired, the following defects will be permitted :

- (i) Gum veins.
- (ii) Gum pockets, up to 10 in. x $\frac{1}{2}$ in. but not more than two in number.
- (iii) End falling shakes or shatter not exceeding 4 in. long. Other end splits not exceeding 8 in. or shakes, if boxed in, not exceeding 24 in.
- (iv) Pinholes, but not more than 20 in one linear foot if discoloured.
- (v) Sound knots not exceeding 3 in. dia.
- (vi) Knot holes not exceeding 2 in. dia.
- (vii) Sloping grain not exceeding 1 in 5.
- (viii) Wane or want :

A. On nominal widths exceeding 8 in.: not exceeding $1\frac{1}{2}$ in. measured on the bevel on each edge, or 2 in. if occurring on one edge only, except at the extreme ends of the crossing, where these figures may be doubled.

B. On nominal widths of 8 in. or less : not exceeding 1 in. on each edge, or $1\frac{1}{2}$ in. if occurring on one edge only, provided that some truewood shall show along the full length of the face of the crossing.

- (ix) Sapwood not exceeding $\frac{1}{2}$ in. deep along the centre of back of the crossing.

AUSTRALIAN STANDARD GRADING RULES

For

STRUCTURAL TIMBER, SELECT GRADE—JARRAH

PART I. SECTIONS UP TO 25 Sq. In.

1-1. *Scope.* This grade applies to timber of the highest structural quality recommended for jarrah in smaller sections, and should be specified only for special building and construction where maximum strength is the important limiting factor. For general constructional purposes, timber complying with A.S. No. O.16 should be used. Recommended working stresses are given in Appendix A.

1-2. *Grade Description.*

(a) *General.* Timber shall be straight and suitable for structural purposes and free from heart, included sapwood, decay, shakes, knot holes and wane.

(b) *Permissible Defects.* The following defects will be permitted :

- (i) Sloping grain, in centre half, not exceeding 1 in 14.
- (ii) Sapwood.
- (iii) Tight gum veins, individual lengths not exceeding 5 ft. and combined length on any face not exceeding one-half the length of the piece. Complete gum rings running from one face to another on the end section will not be permitted.
- (iv) Sound tight knots, if clear of the centre half, not exceeding $1\frac{1}{2}$ in. dia.
- (v) Pinholes, scattered, not more than ten in any $\frac{1}{2}$ sq. ft.

PART II. SECTIONS OVER 25 Sq. In.

2-1. *Scope.* This grade applies to timber of the highest structural quality recommended for jarrah in larger sections, and should be specified only for special building and construction where maximum strength is the important limiting factor. For general constructional purposes, A.S. No. O.16 should be used. Recommended working stresses are given in Appendix A.

2-2. *Grade Description.*

(a) *General.* Timber shall be straight and suitable for structural purposes and free from heart and decay.

- (b) *Permissible Defects.* The following defects will be permitted:
- (i) Sloping grain, in centre half, not exceeding 1 in 12.
 - (ii) Sapwood.
 - (iii) Wane, not exceeding one-sixth the length of the piece or one-eighth the width of the faces on which it occurs.
 - (iv) Gum pockets, on any face not more than one in any five linear feet, varying in size from 9 in. x $\frac{3}{8}$ in. at 50 sq. in. cross section to 10 in. x $\frac{1}{2}$ in. in cross sections 120 sq. in. and over. Pockets shall be measured radially for width.
 - (v) Tight gum veins :
 - A. Sections up to 50 sq. in. : individual lengths not exceeding 6 ft. and combined length on any face not exceeding one-half the length of the piece.
 - B. Sections over 50 sq. in. : combined length on any face not exceeding three-quarters the length of the piece.In totalling the length, tight gum veins less than 1 ft. shall be ignored.
 - (vi) Sound tight knots :
 - A. Sections up to 50 sq. in. : not exceeding $1\frac{1}{2}$ in. dia. within centre half or $1\frac{3}{4}$ in. dia. clear of centre half, and not more than one such knot in either case in any five linear feet.
 - B. Sections over 50 sq. in. : not exceeding 2 in. dia. within centre half and not more than one such knot in any five linear feet.
 - (vii) Pinholes, scattered, not more than 15 in any $\frac{1}{2}$ sq. ft.
 - (viii) Shakes, in sections over 50 sq. in., longitudinal shakes, not exceeding in length the greatest cross-sectional dimension of the piece. No shake other than small seasoning cracks shall run from one face to another.

AUSTRALIAN STANDARD GRADING RULES

For

STRUCTURAL TIMBER,**STANDARD GRADE—JARRAH****PART I. SECTIONS UP TO 25 Sq. In.**

1-1. **Scope.** This grade applies to timber which combines fair appearance with reasonable strength, and is recommended as standard grade for purposes such as house framing. Recommended working stresses are given in Appendix A.

1-2. Grade Description.

(a) *General.* Timber shall be free from heart, decay, other than minor pockets of primary rot, and end shakes.

(b) *Permissible Defects.* The following defects will be permitted :

- (i) Sloping grain, in centre half, not exceeding 1 in 8.
- (ii) Sapwood.
- (iii) Wane, not exceeding one-quarter the length of the piece or one-quarter the width of the faces on which it occurs, with a maximum of 1 in.
- (iv) Gum pockets, on any face, not more than one in any five linear feet, varying from 4 in. x $\frac{3}{8}$ in. in sections under 12 sq. in. in area to 6 in. x $\frac{3}{8}$ in. in sections 25 sq. in. Gum pockets shall be measured radially for width.
- (v) Tight gum veins, combined length on any face not exceeding $1\frac{1}{2}$ times the length of the piece.
- (vi) Sound tight knots, not exceeding $1\frac{1}{2}$ in. dia. within the centre half or 2 in. dia. clear of the centre half and not more than one such knot in either case in any five linear feet. Notwithstanding the above, the width of any knot shall not exceed one-quarter the width of the piece.
- (vii) Pinholes, not more than 20 in any $\frac{1}{2}$ sq. ft.

In addition, a combination of smaller defects equivalent to one of the above will be permitted, provided the combination of defects on all faces at any section does not materially impair the utility of the piece for purposes indicated in Clause 1-1.

PART II. SECTIONS OVER 25 Sq. In.

2-1. **Scope.** This grade applies to timber recommended for all forms of heavier building construction. Recommended working stresses are given in Appendix A.

2-2. Grade Description.

(a) *General.* Timber shall be free from heart and decay, other than minor pockets of primary rot, except that sections 12 in. x 12 in. and over unless otherwise specified, may be supplied heart-in, provided heart is sound and well boxed in.

(b) *Permissible Defects.* The following defects will be permitted :

- (i) Sloping grain, in centre half, not exceeding 1 in 8.
- (ii) Curvature, not exceeding 2 in. in 12 ft.
- (iii) Sapwood.
- (iv) Wane, not exceeding one-fifth the width of the face on which it occurs.
- (v) Gum pockets, on any face, not more than one in any four linear feet, from 8 in. x $\frac{1}{2}$ in. in sections 25 sq. in. in area to 12 in. x $\frac{3}{4}$ in. in larger sections. Gum pockets shall be measured radially for width.
- (vi) Tight gum veins.
- (vii) Unsecured gum veins and shakes 3 ft. long on one face or 18 in. long if connected with a vein on another face, provided that they do not extend to an end. Such veins shall not emerge on an arris.
- (viii) Sound tight knots :
 - A. In sections up to 50 sq. in. : not exceeding 2 in. dia. within the centre half or 3 in. dia. clear of the centre half, and not more than one such knot in any four linear feet. Notwithstanding the above, the width of any knot shall not exceed one-quarter the width of the piece.
 - B. In sections over 50 sq. in. : any number.
- (ix) Knots showing flecks of bark or gum, not exceeding $1\frac{1}{2}$ in. dia.
- (x) Pinholes ; if discoloured not more than 20 in any $\frac{1}{2}$ sq. ft.
- (xi) End shakes, not exceeding in length the greatest cross dimension of the piece.

In addition, a combination of smaller defects equivalent to one of the above will be permitted, provided the combination of defects on all faces at any section does not materially impair the strength of the piece for purposes indicated in Clause 2-1.

AUSTRALIAN STANDARD GRADING RULES

For

STRUCTURAL TIMBER, SELECT GRADE—KARRI**PART I. SECTIONS UP TO 25 Sq. In.**

1-1. **Scope.** This grade applies to timber of the highest structural quality recommended for karri in smaller sections and should be specified only where exceptional strength is essential. Standard grade structural karri complying with A.S. No. O.19 is suitable for building and constructional purposes even where maximum strength is the important limiting factor. Recommended working stresses are given in Appendix A.

1-2. Grade Description.

(a) *General.* Timber shall be straight and suitable for structural purposes, free from heart, decay, shakes and wane.

(b) *Permissible Defects.* The following defects will be permitted :

(i) Sloping grain, in centre half, not exceeding 1 in 14.

(ii) Sapwood :

A. In timber treated with an approved preservative process :
no limit.

B. In untreated timber : up to one-quarter of the width of the face on which it occurs.

(iii) Tight gum veins, individual lengths not exceeding 5 ft. and combined length, on any face, not exceeding one-half the length of the piece.

(iv) Sound tight knots, not exceeding 1 in. dia. if clear of the centre half.

(v) Grub holes, not exceeding $\frac{3}{8}$ in. dia., not more than one in any two linear feet.

1-3. **Preservative Process.** Where the timber is used in damp locations or in contact with the ground, treatment with an approved preservative process is recommended.

PART II. SECTIONS OVER 25 Sq. In.

2-1. **Scope.** This grade applies to timber of the highest structural quality recommended for karri in larger sections, and should be specified only where exceptional strength is essential. Standard grade structural karri complying with A.S. No. O.19 is suitable for building and constructional purposes even where maximum strength is the important limiting factor. Recommended working stresses are given in Appendix A.

2-2. Grade Description.

(a) *General.* Timber shall be straight and suitable for structural purposes, free from heart and decay.

(b) *Permissible Defects.* The following defects will be permitted :

(i) Sloping grain, in centre half, not exceeding 1 in 12.

(ii) Sapwood.

(iii) Wane :

A. In timber treated with an approved preservative process : not exceeding one-sixth the length of the piece or one-eighth the width of the faces on which it occurs.

B. In untreated timber : not exceeding one-twelfth the width of the faces on which it occurs.

(iv) Gum pockets, on any face, not more than one in any five linear feet, varying in size from 9 in. x $\frac{3}{8}$ in. in sections 50 sq. in. to 10 in. x $\frac{1}{2}$ in. in sections 120 sq. in. and over. Gum pockets shall be measured radially for width.

(v) Tight gum veins :

A. Sections up to 50 sq. in. : individual lengths not exceeding 6 ft. and combined length on any face not exceeding one-half the length of the piece.

B. Sections over 50 sq. in. : combined length on any face not exceeding three-quarters the length of the piece.

In totalling the length, tight gum veins less than 1 ft. shall be ignored.

(vi) Sound tight knots :

A. Sections up to 50 sq. in. : not exceeding 1 in. dia. within the centre half or $1\frac{1}{2}$ in. dia. clear of the centre half and not more than one such knot in either case in any five linear feet.

B. Sections over 50 sq. in. : not exceeding 2 in. dia. within the centre half or 3 in. dia. clear of the centre half and not more than one such knot in any five linear feet.

(vii) Grub holes :

A. Sections up to 50 sq. in. : not exceeding $\frac{1}{2}$ in. dia., not more than one in any one linear feet.

B. Sections over 50 sq. in. : scattered, not exceeding $\frac{5}{8}$ in. dia.

(viii) Shakes, in sections over 50 sq. in., longitudinal shakes provided the length does not exceed the greatest cross dimension of the piece. No shake other than small seasoning cracks shall run from one face to another.

In addition, a combination of smaller defects equivalent to one of the above will be permitted, provided the combination of defects on all faces at any section does not materially impair the strength of the piece for purposes indicated in Clause 2-1.

2-3. Preservative Treatment. Where the timber is used in damp locations or in contact with the ground, treatment with an approved preservative process is recommended.

AUSTRALIAN STANDARD GRADING RULES

For

STRUCTURAL TIMBER, STANDARD GRADE—KARRI

1. **Scope.** This grade applies to all sizes of timber, and is recommended for all forms of ordinary building construction. Karri is essentially a structural timber, and in this standard quality can be recommended for most purposes where ultimate strength is a limiting factor. Recommended working stresses are given in Appendix A.

2. Grade Description.

(a) *General.* Timber shall be suitable for structural purposes, free from heart and decay other than minor pockets of primary rot.

(b) *Permissible Defects.* The following defects will be permitted :

(i) Sloping grain, in centre half, not exceeding 1 in 10.

(ii) Curvature not exceeding 1 in. in 12 ft.

(iii) Sapwood.

(iv) Wane, one-fifth the width of the face on which it occurs.

(v) Gum :

A. Tight veins.

B. Unsecured gum veins, not exceeding 2 ft. in length ; if extending to another face, shall not emerge through an arris or an end.

C. Gum pockets, from 8 in. x $\frac{1}{2}$ in. in sections under 25 sq. in. to 12 in. x $\frac{1}{2}$ in. in larger sections.

(vi) Sound knots not exceeding $2\frac{1}{2}$ in. dia., or knots showing flecks of bark or gum not exceeding $1\frac{1}{2}$ in. dia. Notwithstanding the above, the width of any knot shall not exceed one-quarter the width of the piece.

(vii) Knot holes, not exceeding $1\frac{1}{2}$ in. dia.

(viii) Pinholes.

(ix) Grub holes, scattered.

(x) Shakes not exceeding in length the greatest cross-sectional dimension. No shake other than small seasoning cracks shall run from one face to another.

In addition, a combination of smaller defects equivalent to one of the above will be permitted, provided the combination of defects on all faces at any section does not materially impair the strength of the piece for purposes indicated in Clause 1.

3. **Preservative Treatment.** Where the timber is used in damp locations or in contact with the ground, treatment with an approved preservative process is recommended.

AUSTRALIAN STANDARD GRADING RULES

For

CROSS ARMS

1. **Scope.** These rules apply to cross arms of jarrah, karri and wandoo.

2. **Size.** The size shall be as specified by the buyer, with the following tolerances :

Cross section. Minimum—Order size.

Maximum— $\frac{3}{16}$ in. above the order size
in breadth and depth.

Length. From order size to 1 in. over.

3. **Cutting.** Cross arms shall be well sawn with adjacent sides at right angles and ends docked square and to length before inspection.

4. **Grade Description.**

(a) *General.* Cross arms shall be sound wood, free from heart, decay and shakes.

(b) *Permissible Defects.* The following defects will be permitted :

- (i) Sapwood, on the intersection of two adjacent sides, provided the combined width of sapwood measured on the two faces does not exceed 3 in.
- (ii) Tight gum veins, combined length not exceeding the length of the arm on any face.
- (iii) Pinholes, but not grouped.
- (iv) Sloping grain :
 - A. Jarrah : not exceeding 1 in 15.
 - B. Karri and wandoo : not exceeding 1 in 10.
- (v) Clean-edged grub holes, on any face, not exceeding $\frac{1}{4}$ in. dia. and not more than four scattered.
- (vi) End splits, in karri and wandoo only, not exceeding 3 in. long.

AUSTRALIAN STANDARD GRADING RULES

For

MINE GUIDES

1. **Scope.** These grading rules apply to mine guides of jarrah or karri.

2. **Size.** Unless otherwise specified, the minimum size at the time of sawing shall be not less than the nominal size, but variations in sawing shall be allowed provided the maximum size does not exceed the nominal size by more than $\frac{3}{8}$ in. in width or $\frac{1}{4}$ in. in thickness.

3. Grade Description.

(a) *General.* Mine guides shall be sound wood, free from heart, decay, unsound knots, and shakes. Pieces shall have one good face and two good edges, with defects limited as specified in Sub-clause (b) below.

(b) *Permissible Defects.* The following defects will be permitted :

A. General.

- (i) Sloping grain, not exceeding 1 in 15.
- (ii) Curvature, not exceeding 1 in. in 25 ft.
- (iii) Sapwood : in jarrah only.
- (iv) Wane, at the junction of face and edge, one-sixth of the dimension of the face on which it occurs.

B. On Better Face or Either Edge.

- (i) Gum pockets, not exceeding 5 in. x $\frac{3}{8}$ in., not more than one in any five linear feet.
- (ii) Tight gum veins, combined length not exceeding one-quarter the length of the piece.
In totalling the length, tight gum veins less than 10 in. shall be ignored.
- (iii) Sound tight knots, not exceeding $1\frac{1}{2}$ in. dia., not more than one in any five linear feet.
- (iv) Pinholes, clean-edged, in jarrah only: scattered, not more than five in any $\frac{1}{2}$ sq. ft.
- (v) Grub holes, in karri only: not exceeding $\frac{3}{8}$ in. dia., well scattered; individual surface grub tracks, not exceeding 16 in. x $\frac{3}{8}$ in. and $\frac{1}{4}$ in. deep.

C. *On Worse Face.* Defects in excess of those given in B will be allowed, provided the combination of defects at any section does not seriously impair the utility of the piece for a mine guide.

AUSTRALIAN STANDARD GRADING RULES

For

FLOORING, SELECT GRADE—JARRAH

PART I. SAWN BOARDS FOR FLOORING.

1-1. **Scope.** This grade applies to sawn jarrah boards intended for the production of milled strip flooring. The aim of the grade is a face free from sapwood and practically free from other defects, but with natural variations in colour no defect: a grade suitable for all first-class floors.

1-2. Grade Description.

(a) *General.* Boards shall be sound wood, well sawn, free on the better face and adjacent half edges from sapwood.

(b) *Permissible Defects.* The following defects will be permitted:

(i) Tight gum veins, not exceeding $\frac{1}{16}$ in. wide, individual lengths not exceeding 9 in. and combined length not exceeding 3 in. per sq. ft. of face area.

(ii) Holes:

A. Clean-edged pinholes, not more than three in any 6 sq. in.

B. Other holes not exceeding $\frac{1}{8}$ in. dia., not more than one per five linear feet of face.

(iii) End splits in boards semi-dry or dry for milling, not exceeding 4 in. long on one end or its equivalent on both ends. Green boards shall be free from end splits.

The lower half of the edges and back may contain sapwood and defects which will not prevent machining of a firm tongue and groove or affect the laying or strength of the floor.

PART II. MILLED STRIP AND T. & G. FLOORING.

2-1. **Scope.** This grade applies to milled jarrah flooring for all first-class floors such as hospitals, dance floors, public buildings, exposed floors in residences, etc. In this grade the face is free from sapwood and practically free from other defects, with natural variations in colour no defect.

2-2. **Grade Description.** After dressing, boards shall be sound wood, well milled, free on the face and edges above the tongue and groove from sapwood and defects other than those allowed in Clause 1-2 above. On the rest of the edges and the back, sapwood and defects which will not affect the laying or strength of the floor will be permitted. Skip will be permitted in the middle of the back, but at the edges it shall not reduce the bearing area by more than one-fifth of any section.

AUSTRALIAN STANDARD GRADING RULES

For

FLOORING, STANDARD GRADE—JARRAH

PART I. SAWN BOARDS FOR FLOORING.

1-1. **Scope.** This grade applies to sawn jarrah boards suitable for the production of milled strip flooring to provide a class of floor suitable for all ordinary houses or factories. This is not a mixed grade, and parcels need contain no board which would be accepted as of select grade.

1-2. **Grade Description.**

(a) *General.* Boards shall be sound wood, well sawn, free on the better face and adjacent half edges from all defects other than those specified in Sub-clause (b) below.

(b) *Permissible Defects.* The following defects will be permitted :

- (i) Sapwood, not exceeding one-fifth the width of the board.
- (ii) Tight gum veins, not exceeding $\frac{1}{8}$ in. wide, individual lengths not exceeding 5 ft. and combined length not exceeding 2 ft. per sq. ft. of face area.
- (iii) Gum pockets not exceeding 6 in. x $\frac{1}{4}$ in.
- (iv) Sound tight knots, not exceeding 1 in. dia., not more than one in any five linear feet.
- (v) Holes :
 - A. Clean-edged pinholes.
 - B. Other holes not exceeding $\frac{1}{4}$ in. dia., not more than one in any five linear feet.
- (vi) End splits in boards semi-dry or dry for milling, not exceeding 6 in. long on one end or its equivalent on both ends. Green boards shall be free from end splits.

The lower half of the edges and back may contain defects which will not prevent machining of a firm tongue and groove or affect the laying or strength of the floor.

PART II. MILLED STRIP AND T. & G. FLOORING.

2-1. Scope. This grade applies to flooring which requires some docking by the buyer before laying. With this docking on the job the grade will provide a floor suitable for ordinary house construction, where the greater part of the floor is usually covered with linoleum or other covering, and for factory floors.

2-2. Grade Description.

(a) *General.* After dressing, boards shall be sound wood, well milled, and when the necessary docking has been carried out by the buyer, shall be free from defects other than those specified in Sub-clause (b) below.

(b) *Permissible Defects.* The defects permitted under Clause 1-2(b) above will be permitted, and in addition the following :

- (i) Checks on the face, not exceeding $\frac{1}{2}$ in. wide or 10 in. long.
- (ii) Raised grain or hit and miss on the face, slight.
- (iii) Torn grain on the face, not exceeding $\frac{1}{16}$ in. deep.
- (iv) Mismatch on the face, not exceeding $\frac{1}{2}$ in.

2-3. Docking. The necessary docking shall not exceed—

- (i) one foot from either end, or
- (ii) one-sixth the length of individual boards, including as waste any piece less than 20 in. long, provided that the total number of boards requiring docking shall not exceed one-third of the number in the parcel.

2-4. Marking. Any board from which more than one-sixth may be lost to the buyer shall be marked by a heavy bar and stroke in timber crayon on the face and the marked length shall not be tallied.

AUSTRALIAN STANDARD GRADING RULES

For

FLOORING, MILLED, END-MATCHED—JARRAH

1. **Scope.** These grading rules apply to end-matched short jarrah flooring in random lengths from 2 ft. to 6 ft., suitable for use in ordinary homes and factories.

2. **Size and Profile.** Unless otherwise specified, boards shall be accurately milled in the properly seasoned state to the dimensions of the standard profile specified, and to the following sizes :

<i>Nominal Size.</i>	<i>Milled Cover Size.</i>
in.	in.
4 x 1	$3\frac{3}{8} \times \frac{3}{4}$
3 x 1	$2\frac{7}{16} \times \frac{3}{4}$

Boards shall be tallied for length to the nearest foot.

3. **Moisture Content.** Unless otherwise specified, the moisture content at time of inspection, shall not exceed 16%.

4. **Grade Description.** At least 50% in volume shall be free on the face and edges above the tongue and groove from sapwood and other defects. In the remaining 50% the face and edges above the tongue and groove shall be free from defects other than the following :

- (i) Sapwood, not exceeding one-quarter the width of the board.
- (ii) Tight gum veins not exceeding $\frac{1}{8}$ in. wide, combined length not exceeding one-half the length of the board.
- (iii) One sound tight knot not exceeding 1 in. dia., or one knot flecked with bark or gum not exceeding $\frac{1}{8}$ in. dia., in any board.
- (iv) Clean-edged pinholes. Other holes not more than one, not exceeding $\frac{1}{4}$ in. dia. in any board.
- (v) Torn grain not exceeding $\frac{1}{16}$ in. deep.
- (vi) Skip on the back, provided that, if on the edges, it shall not reduce the bearing area below one-half at any section.

On the remaining edges and the back, sapwood and defects which will not affect the laying or strength of the floor will be permitted.

AUSTRALIAN STANDARD GRADING RULES

For

LINING, SELECT GRADE—JARRAH

PART I. MILLED, SINGLE FACE.

1-1. **Scope.** This grade provides for lining with one face practically free from defects other than sapwood, but with natural variations in colour no defect. It is recommended for all first-class purposes where one face only is exposed. If required free of sapwood on the better face, this shall be specially stated.

1-2. **Grade Description.**

(a) *General.* Boards shall be sound wood, well milled, free on the face and edges above the tongue and groove from any defects other than those specified in Sub-clause (b) below.

(b) *Permissible Defects.* The following defects will be permitted :

- (i) Sapwood, not exceeding one-quarter the width of the board.
- (ii) Tight gum veins, not exceeding $\frac{1}{16}$ in. wide, individual lengths not exceeding 12 in. and not more than one limiting vein in any five linear feet.
- (iii) Clean-edged pinholes.
- (iv) Curvature, 1 in. in 12 ft.
- (v) Skip, not exceeding one-quarter the area or extending more than one-half the width across the back at any section.

On the back, sapwood and other defects will be permitted which do not affect the fixing of the lining.

PART II. MILLED, DOUBLE FACE.

2-1. **Scope.** This grade provides for lining with both faces free from sapwood and practically free from other defects, but with natural variations in colour no defect. It is recommended for use only where both faces will be exposed, such as office partitions.

2-2. **Grade Description.** The grade shall be the same as in Clause 1-2, above, except that limitation of defects shall apply to both faces, and both faces shall be free from sapwood.

AUSTRALIAN STANDARD GRADING RULES

For

JOINERY STOCK—JARRAH AND KARRI

1. **Scope.** These grading rules apply to seasoned joinery stock for interior trim.

2. **Size and Profile.** Unless otherwise specified, boards shall be accurately milled in the properly seasoned state to the dimensions of the profile specified.

3. **Moisture Content.** Unless otherwise specified, the moisture content at the time of inspection, shall not exceed 16%.

4. **Grade Description.** The exposed faces shall be free from defects other than the following :

(i) Tight gum veins, not exceeding $\frac{3}{8}$ in. wide, individual length not exceeding 12 in.

(ii) Clean-edged pinholes.

(iii) Sapwood, up to one-quarter the width of the face.

The face to be covered may include all the defects listed in Clause 1-2 of A.S. No. O.16—1948, Structural Timber, Standard Grade—Jarrah.

AUSTRALIAN STANDARD GRADING RULES

For

**WEATHERBOARDS, GREEN,
STANDARD GRADE—JARRAH****PART I. SAWN.**

1-1. **Scope.** These grading rules apply to standard grade green sawn weatherboards. The grade should be specified only where boards can be used a short period after supply or can be protected, as otherwise warping may take place.

1-2. **Sizes.** Standard sizes for green weatherboards shall be 7 in. x $\frac{5}{8}$ in. for parallel and 7 in. x 1 in. to $\frac{1}{4}$ in. for feather-edged weatherboards.

1-3. Grade Description.

(a) *General.* Boards shall be sound wood, well sawn, free on the exposed area from defects other than those specified in Sub-clause (b) below.

(b) *Permissible Defects.* The following defects will be permitted :

- (i) Sapwood, not exceeding one-quarter the width of the board.
- (ii) Tight gum veins, not exceeding $\frac{1}{8}$ in. wide, individual lengths not exceeding 5 ft.
- (iii) Smooth tight knots, not exceeding 2 in. dia.
- (iv) Clean-edged pinholes.
- (v) End splits, not exceeding 6 in. long.

On the back of the board and covered strip 1 in. wide, sapwood and other defects will be allowed, provided they do not affect the fixing of the boards.

PART II. MILLED.

2-1. **Scope.** These grading rules apply to standard grade green milled weatherboards. The grade should be specified only where boards can be used a short period after supply or can be protected, as otherwise warping may take place.

2-2. **Profiles.** Milled green weatherboards may be plain dressed and chamfered or checked and chamfered, according to the profile specified.

2-3. **Grade Description.** Boards shall be sound wood, well milled, free on the exposed area from defects other than any of those permitted under Clause 1-3(b) above, and from machining defects other than torn grain not exceeding $\frac{1}{16}$ in. deep.

On the back of the board and covered strip 1 in. wide, sapwood and other defects will be allowed, provided they do not affect the fixing of the boards.

AUSTRALIAN STANDARD GRADING RULES

For

PILES—JARRAH

1. **Scope.** These grading rules apply to jarrah piles of circular cross section.

2. Dimensions.

(a) *Diameter.* The minimum and maximum diameter shall be as stipulated in the order and a maximum diameter 3 in. greater than the minimum shall be allowed. If any pile is slightly small at the crown it shall be $\frac{1}{4}$ in. over the specified minimum at 2 ft. from the crown end.

(b) *Length.* Piles shall measure the full specified length.

3. **Straightness.** Piles shall be reasonably straight from end to end, but the following deviations will be permitted :

(i) Sweep, not exceeding one-third the diameter of the pile, measured at the point of the greatest deviation.

(ii) Short bends or kinks, not exceeding $\frac{1}{3}$ in. per ft. of length of bend.

4. Grade Description.

(a) *General.* Piles shall be of well grown timber, free from bark, large shakes, core, decay other than minor pockets of primary rot, large knots, knot holes or imperfections which might seriously reduce the life of the pile or impair its driving qualities.

(b) *Permissible Defects.* The following defects will be permitted :

(i) End splits (pops) at butt not exceeding 3 ft. long.

(ii) Limbs, if neatly removed with diameter, not exceeding half the diameter of the crown of the pile, not more than one in three linear feet, provided that trimming does not weaken the pile by exposing an excessive amount of truedwood.

(iii) Pipe, at one end only, diameter not exceeding one-eighth the diameter of the pile at that end.

NOTE.—“Excessive amount of truedwood” exposed in trimming limbs means that which may be inclined to “spring” in driving. Spring is more likely to occur if the limb is growing on the outer curve of a bend.

AUSTRALIAN STANDARD GRADING RULES

For

POLES—JARRAH AND WANDOO

1. **Scope.** These grading rules apply to jarrah and wandoo poles of circular cross section for electrical supply, telegraph, telephone and similar purposes.

2. **Dimensions.** The dimensions of the poles shall be as follows :

Length. ft.	Diameter at Crown.		Diameter 5 ft. from Butt.
	in.		in.
	Min.	Max.	
25	6½	8	10
30	7	8½	11
35	7	8½	11
40	7	9	12
45	7	9	12
50	7	9	12
55	7	9	13
60	7	9	13
65	7	9	14
70	7	9	15

NOTE.—The crown dimensions are of first importance, and if these are adhered to the butt measurements may be regarded as approximate.

Poles shall measure the full specified length.

When lengths and crown diameters are required to differ from those in the table, corresponding allowances shall be permitted in other dimensions.

3. **Straightness.** Poles shall be reasonably straight from crown to within 5 ft. of the butt, but the following deviations will be permitted :

- (i) Sweep, not exceeding one-third the diameter of the pole, measured at the point of the greatest deviation.
- (ii) Short bends or kinks, not exceeding $\frac{1}{8}$ in. per ft. of length of bend.

4. **Taper.** Poles shall have a uniform taper.

5. Grade Description.

(a) *General.* Poles shall be of well grown timber, free from bark, large shakes, core, decay other than minor pockets of primary rot, large knots or imperfections other than those given in Sub-clause (b) below.

(b) *Permissible Defects.* The following defects will be permitted :

- (i) End splits (pops) at the butt not exceeding 2 ft. long.
 - (ii) Limbs, if more than 6 ft. from the crown and if neatly removed, provided that trimming has exposed truewood not exceeding half the diameter of the crown, not more than one in three linear feet.
 - (iii) Sound knots or clean-edged knot holes, if more than 6 ft. from the crown, not exceeding $1\frac{1}{4}$ in. dia.
 - (iv) Pinholes.
-

APPENDIX A.

RECOMMENDED PERMISSIBLE WORKING STRESSES FOR
JARRAH AND KARRI.

A-1. Stresses in Protected Construction. Working stresses for green jarrah and karri used in interior locations or in completely protected construction not subject to dampness or high humidity are set out in Table A-I.

TABLE A-I
WORKING STRESSES
(Pounds per Square Inch)

	JARRAH		KARRI	
	Select A.S. No. 0.14	Standard A.S. No. 0.16	Select A.S. No. 0.17	Standard A.S. No. 0.19
Bending	2100	1600	2800	2200
Modulus of Elasticity (E) ...	1,500,000	1,500,000	2,300,000	2,300,000
Shear : Beams	190	150	200	160
Joint details	280	220	300	240
Bearing perpendicular to grain ...	600	600	700	700
Bearing parallel to grain... ..	1800	1000	2000	1800

Columns. The permissible stresses for columns are given in Figs. 1 to 4. They are based on the eccentricity formula given on pages 26 and 27 of the Handbook of Structural Timber Design, by I. Langlands and A. J. Thomas, Second Edition, Melbourne, 1941 (C.S.I.R., Aust., Division of Forest Products, Technical Paper No. 32).

A-2. Condition of Use Factors. The working stresses given in Table A-I and in Figs. 1 to 4 shall be multiplied by the appropriate condition of use factors given in Table A-II. These conditions of use are:

- A. Completely protected from weather with no decay hazard, as described above.
- B. Exposed to weather or occasionally wet, that is conditions embracing the use of the greater proportion of heavy structural timber, such as bridges, trestles, grand stands and exposed framework in open sheds.

- C. Severe decay hazard or usually wet, conditions applying to timber in contact with the ground, or used in portions of buildings that would be more or less continuously wet, or used in wharf construction and exposed to wave action or tidal waters.

TABLE A-II
CONDITION OF USE FACTORS

	JARRAH			KARRI		
	A	B	C	A	B	C
Bending	1.00	0.95	0.90	1.00	0.85	0.70
Modulus of Elasticity (E)	1.00	1.00	1.00	1.00	1.00	1.00
Shear	1.00	0.95	0.90	1.00	0.85	0.70
Bearing parallel and perpendicular to grain	1.00	0.85	0.70	1.00	0.75	0.50
Columns	1.00	0.95	0.90	1.00	0.85	0.70

A-3. Factor for Dry Timber. The permissible stresses may be multiplied by 1.25 when the timber used is thoroughly dry (less than 15% moisture content).

A-4. Factor for Combined Loadings. The stresses given are for long-continued loads. For combinations of live and dead loads the values (except E) may be increased in the ratio of $\frac{L + D}{0.8 L + D}$ where L is the live load and D is the dead load.

When designing for wind loads in addition to dead and live loads the values (except E) may be multiplied by 1.50 providing the resulting size is not less than that required to carry dead and live loads only.

No allowance for impact need be made unless the impact load stress exceeds the live load stress.

A-5. Factor for Long-Term Loading. Timber beams tend to sag under dead loads and to allow for this it is recommended that the dead load, but not the live load, should be multiplied by three when calculating the average deflection, *i.e.*, the equivalent load to be used in calculating the ultimate deflection = $L + 3D$

A-6. Stress at Angle to Grain. To obtain the permissible bearing stress at an angle to the grain, the Hankinson formula is recommended :

$$n = \frac{pq}{p \cos^2 R + q \sin^2 R}$$

where n = permissible bearing stress at angle R which the loaded surface makes with the direction of the grain of wood.

p = permissible bearing stress parallel to the grain.

q = permissible bearing stress perpendicular to the grain.

The bearing perpendicular to the grain figures apply to bearings 4 in. wide. Larger stresses may be used with narrower plates and washers, but with wider plates the allowable stresses should be reduced slightly.

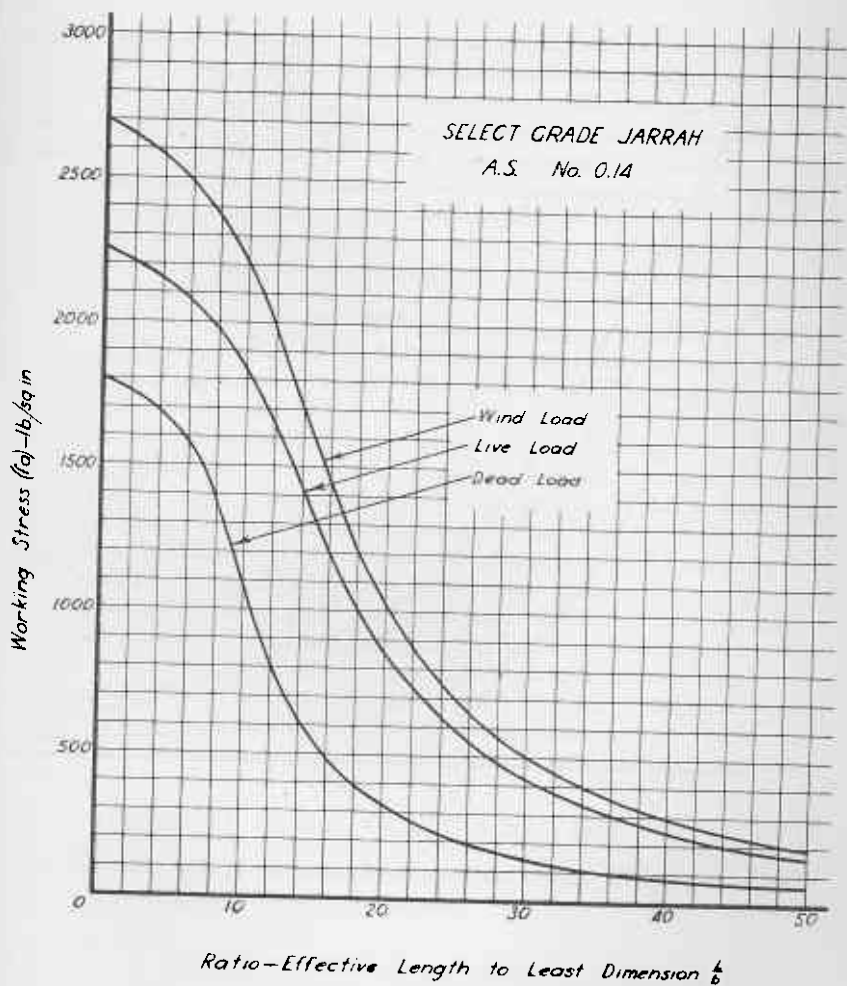


Fig. 1. Permissible Working Stresses for Timber Columns.

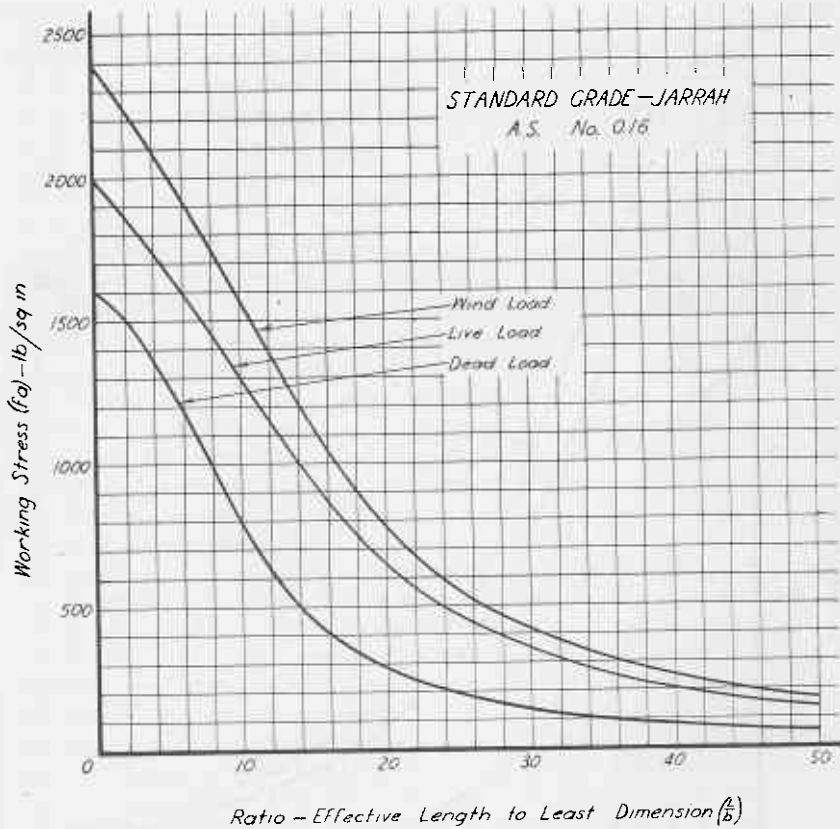


Fig. 2. Permissible Working Stresses for Timber Columns.

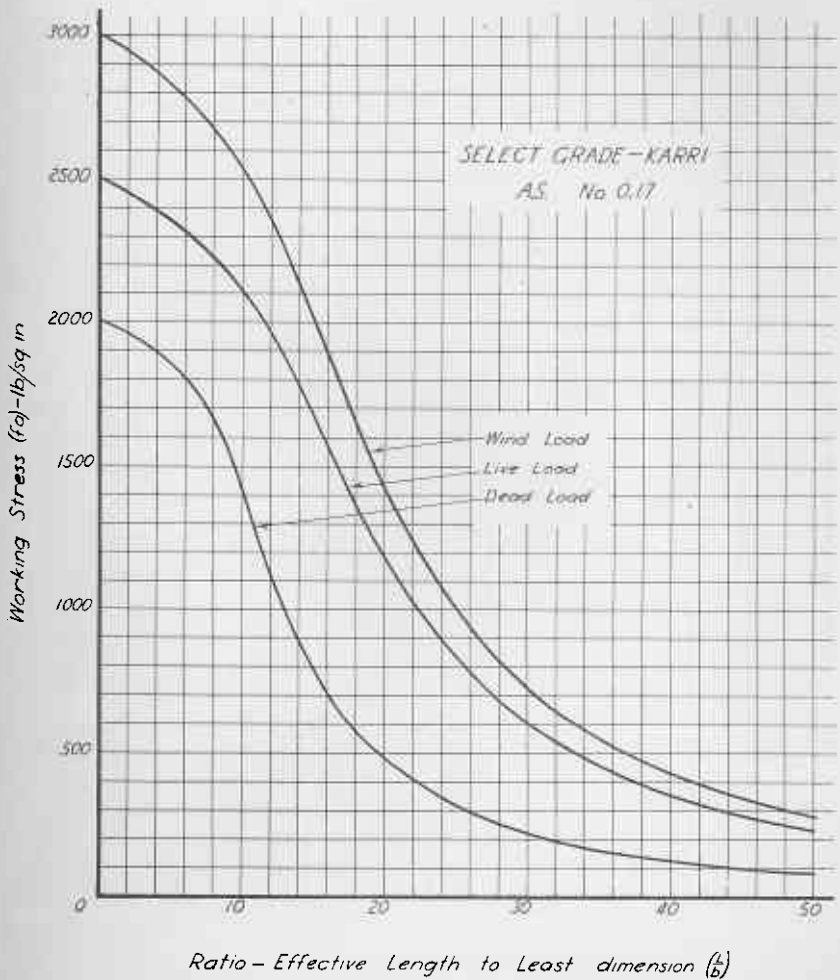


Fig. 3. Permissible Working Stresses for Timber Columns.

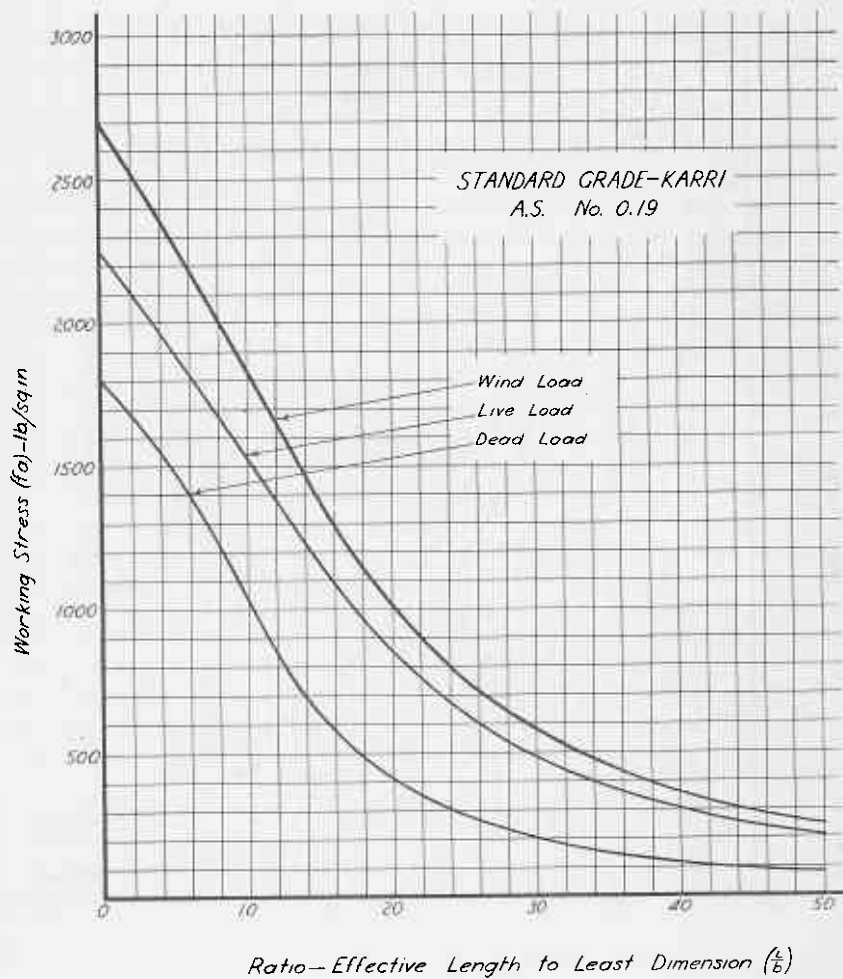


Fig. 4. Permissible Working Stresses for Timber Columns.

APPENDIX B.

METHODS OF DIFFERENTIATING BETWEEN JARRAH AND KARRI.

There are definite chemical differences between these two species, and these differences, together with the burning splinter test, are described in this appendix.

B-1. Burning Splinter Test. Match-size splinters of karri burn to a definite full ash, white in colour, while those from jarrah do not burn readily, leave little or no ash, and generally give what is termed a carbon end. Tests made indicate that the burning splinter test is effective as a means of identification provided sound truewood is used and the sample has not previously been treated with inorganic preservatives.

B-2. Alkalinity of Ash. A simple quantitative chemical test has been developed, as follows :

Weighed samples of sawdust (10 to 15 g.) are burnt in a platinum dish and the percentage ash determined (calculated on oven-dry basis). The ash is then treated in the platinum dish with a known amount of 0.1N sulphuric acid (10 to 20 ml. according to the amount of ash), the mixture gently boiled for ten minutes and stirred with a glass rod until the reaction is complete. Losses of acid by spitting, etc., are avoided by covering the dish with a watch glass. The resulting mixture is titrated with 0.1N sodium hydroxide, using phenolphthalein as indicator. From the results the amount of 0.1N acid required to neutralise the ash can be obtained. The alkalinity of the ash is recorded on the basis of 1 g. of the oven-dry wood originally used. Results of a series of tests carried out by the Division of Forest Products, Council for Scientific and Industrial Research, are as follows :

NAME	NUMBER OF INDIVIDUAL SAMPLES TESTED	% ASH BY WEIGHT			ALKALINITY OF ASH in ml 0.1N Acid per gm. O.D. Wood		
		Average	Max.	Min.	Average	Max.	Min.
Jarrah...	58	0.14	0.49	0.04	0.06	0.12	0.02
Karri ...	29	0.30	0.86	0.12	0.83	1.85	0.42

The minimum value recorded for a karri sample is over three times the maximum recorded for a jarrah sample. The results of these experiments with jarrah and karri show that the chemical methods of identification are very important, and that they are, in this instance, effective when other methods fail.

B-3. Ferric Chloride Test. Five grams of wood raspings are digested with 100 ml. of hot water at 98°C. for 1½ to 2 hours. After filtering on a Buchner funnel under suction, the residual wood is washed with a small amount of hot water, sufficient to make the final volume 100 ml. Preparatory to testing, a small portion of this extract is diluted with water to one-tenth of its strength. To 2 ml. of the diluted aqueous extract, two to three drops of a reagent consisting of a water-free 1% solution of ferric chloride in ethyl ether are added. On shaking, the mixture gives a blue colour with a jarrah extract, and a green colour with a karri extract. Sometimes it is necessary to apply the ferric chloride to the stronger aqueous extracts of jarrah and karri in order to obtain definite results.
