

Upcoming Changes for Structural Timber

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Relevant New Zealand Standards

1. **NZS3603 Timber Structures Standard**
 - Design of larger timber structures
 - Used as a basis for NZS3604.
 - Contains design stresses & procedures

2. **NZS3604 Timber Framed Buildings**
 - Design of timber houses.
 - Based on No 1Framing (MoE = 8GPa).

3. **NZS3622 Verification of Timber Properties**

NZS3603 - Timber Structures

- F - Grades deleted.
- MSG 15, 12, 10, 8 & 6 added
- Visual grade stresses for VSG10, VSG8, No1F Timber, (same as the MSG Grades).
- A Lower Bound MoE added.
- Shear & Compression Perpendicular strengths covered by note
- Strength Properties lowered in comparison to MoE
- Calls up NZS3622 – Verification

Table 2.3: Characteristic stresses for machine graded timber NZS3603 A4

Moisture Content – Dry (m/c = 16%)						
Species	Grade	Bending Strength	Compression Strength	Tension Strength	Modulus of Elasticity E, GPa	Lower bound Modulus of Elasticity Elb, GPa
		MPa	MPa	MPa		
Radiata Pine & Douglas Fir	MSG 15	41.0	35.0	23.0	15.2	11.5
	MSG 12	28.0	25.0	14.0	12.0	9.0
	MSG 10	20.0	20.0	8.0	10.0	7.5
	MSG 8	14.0	18.0	6.0	8.0	5.6
	MSG 6	10.0	16.0	4.0	6.0	4.0

Visually Graded Timber

Table 2.2 Characteristic stresses for visually graded timber NZS3603 A4

1. Moisture Content – Dry (m/c = 16%)					
Radiata pine and Douglas Fir	Bending Strength MPa	Compression Strength MPa	Tension Strength MPa	Modulus of Elasticity E, GPa	Lower bound Modulus of Elasticity Elb, GPa
VSG10	20.0	20.0	8.0	10.0	6.7
VSG8	14.0	18.0	6.0	8.0	5.4
No 1Framing	10.0	15.0	4.0	6.0	4.0
2. Moisture Content – Green (m/c = 25%)					
G10	15.0	14.0	5.0	8.0	5.4
G8	11.7	12.0	4.0	6.5	4.4
No 1Framing	7.5	11.0	3.0	4.8	3.2

NZS3603 Full Revision

1. Looking at a full revision of NZS3603

- Should it be a joint Australian standard ?
- What sections need revision ?
- What grades should be listed ?
- Who will fund the work ?

2. Project will take 18 - 36 months

Verification of Properties NZS3622

- Applies to both MSG & VSG timber, not LVL, plywood, Glulam or round timbers.
- VSG has never had this form of verification whereas MSG has had AS/NZS1748 (Similar).
- The Third Party Audit requirement is new.
- Sampling, testing, monitoring, acceptance criteria along with marking and retest provisions.
- This a move towards Performance from Appearance.
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Brings Solid Timber more into line with its competing non-wood and other wood-based products

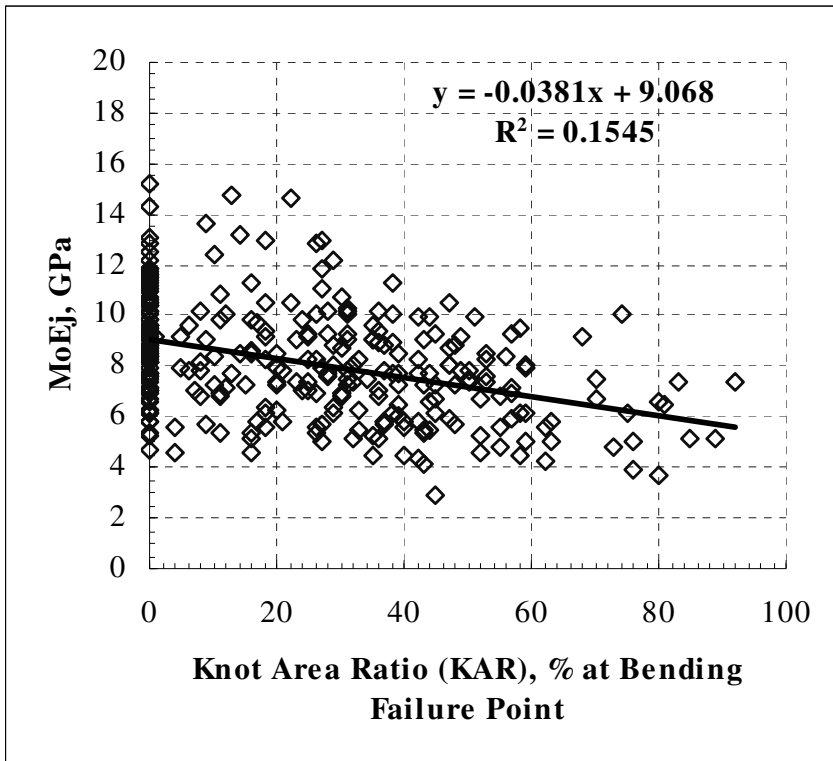
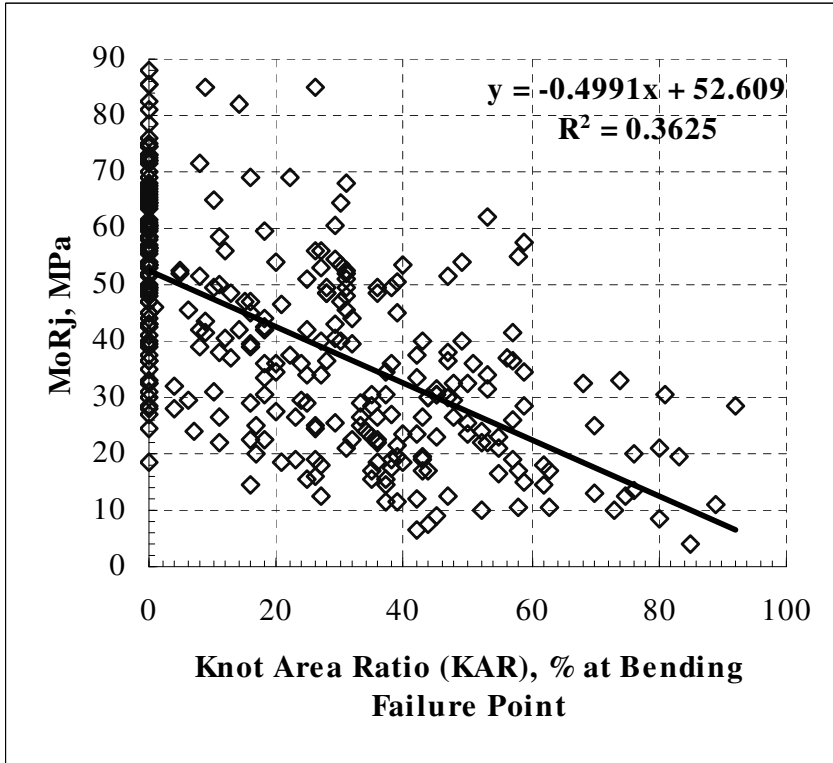
NZS3604 - Light Timber Framing

- Current span tables based on MoE = 8GPa, fb = 17.7MPa
- Has to be amended to incorporate the NZS3603 changes, both for design stresses and single member situations.
- The majority of tables will be unaffected as MoE critical
- Some Lintel, bearers, isolated beams will be affected.
- Span Tables for MoE = 6 GPa to be introduced.
- Some consideration needs to be given to fixing capacities for the lower grade

Visual Grading

- Good for grading for strength
- Poor for grading for stiffness
- Grades by visual criteria only, ie.. knot size, knot location, presence of pith, etc..
- Still a common form of structural grading
- The VSG8 & VSG10 can only be achieved by verification to NZS3622
- No 1Framing (MoE = 6 GPa) is unverified

Visual Grading - Knots



Availability & Verification of VSGVSG10

- Availability & Verification of VSGVSG10 grade will be virtually limited to Douglas fir
- Some Radiata producers will be limited to No 1F (MoE = 6 GPa)
- VSG8 will require in many cases additional effort in terms of knowledge of forests, log sorting, cutting patterns, possibly stricter limits on visual characteristics.
- It may be difficult to constantly satisfy the verification acceptance criteria. (Stiffness)
- Many VSG producers have or are considering machine stress grading as they see the long term demise of visual grading

Machine Stress Grading

- Good at grading for Stiffness
- Poor at Grading for Strength
- A visual override is required for strength. (50% KAR)
- Many different types of grading machines but all with the same verification procedures (NZS3622).
- End-users buy timber not grading machines so focus on the output of the verification procedures.
- MSG producers increasing in both North & South Is
- A well run MSG operation should have little difficulty in constantly satisfying the verification requirements

Machine Stress Grading

MSG Grade Colours standardised as:

MSG 6	Blue
MSG 8	Black
MSG 10	Green
MSG 12	Purple
MSG 15	Orange

MSG grade marks can either be:

- A series of 100mm marks along length of one or more colours with a longer tail spray denoting overall piece grade.
- A series of 100mm marks along length of the same colour
- An inkjet marking at 1500mm along length stating grade.

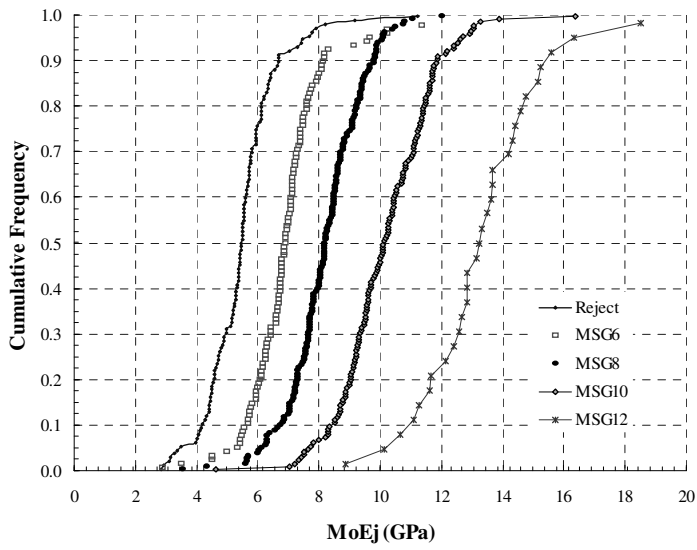
MSG timber is also marked with:

- Grading standard, Producer, Date
- Dimension, Treatment, Drying, other advisory information.

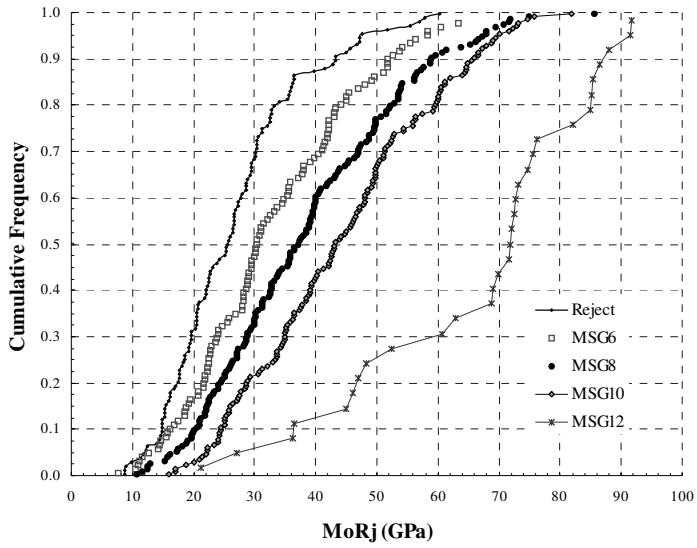
Machine Stress Grading – Availability of MSG

- MSG15 will be very rare, if available at all
Check with suppliers before specifying
- MSG12 availability will be limited in volume and by region
Check with suppliers before specifying
- MSG10 & MSG8 will be the most common grades, however availability of MGP10 maybe limited in certain regions
- MSG6 may not be that common as many producers use that grade for their re-manufactured products.
Check with suppliers before specifying

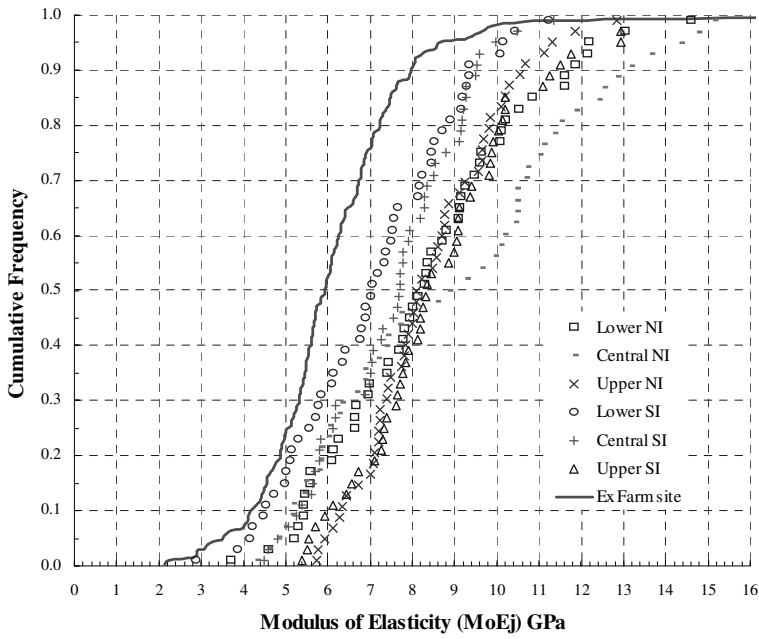
MSG - Timber Stiffness



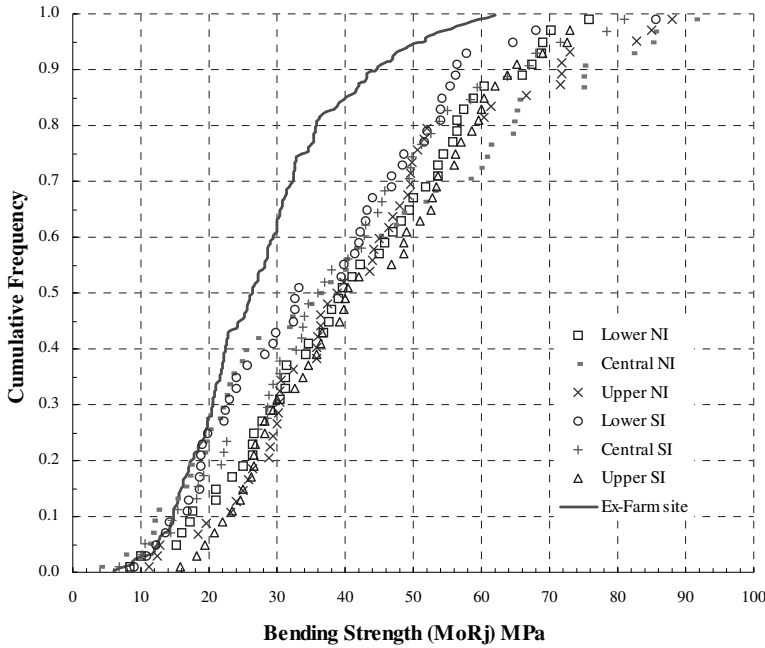
MSG - Timber Strength



NZ Radiata - Stiffness



NZ Radiata - Strength



Conclusion

- For visual graded timber:
 - Specify Verified VSG10 grade with caution (check with supplier first)
 - Specify Verified VSG8 grade
 - Specify No IFraming (MoE = 6GPa) grade (Unverified)

- For machine stress graded timber:
 - Do not specify 'F' grades
 - Specify MSG8 or MSG10
 - Specify with caution MSG6 or MSG12 (check with supplier first)

- Note the different grade stresses in particular for the single members
- Verification records should be available on request.
- Check for grade & verification marks on timber (MSG & VSG) supplied for compliance with specification.
- Continue specifying and using timber because:

“WOOD IS GOOD WOOD WORKS”