Grading Implications for New Zealand Sawmills

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NZS3622 Requirements for Sawmillers and Producers

- To evaluate, or have evaluated the stiffness and strength properties of load bearing structural grades (e.g. No. 1 Framing, MSG8) currently being produced to ensure stiffness and strength properties are acceptable.

- To monitor the stiffness and strength of load bearing grades on an on-going basis (in-mill monitoring).

- To contract a “suitably qualified organisation” to audit each site’s in-mill monitoring on at least a twice yearly basis.
Why Verification?

- Concerns about the variable, lower stiffness of timber from Radiata pine trees being harvested at a relatively young age (20 - 30 years).

- On-going concerns about the variability in visual grading and actual stiffness of some MSG’ed timber. Producers of both MSG and Visually Stress Graded or VSG timber will need to be verified.

Implications of Grade Verification

- Force a re-evaluation of log prices
- Influence the location of future plantings
- Influence growers to move to longer rotations
- Influence the future markets of sawmills
- Worst case scenario: some mills close down
- Sawmills/Producers to improve and monitor the accuracy and consistency of their grades
- Sawmills modifying cutting patterns and grading rules
Implications of Grade Verification cont.

- Some producers move to MSG
- MSG producers capitalise on higher grade recovery
- Australian MSG material being imported
- All NZS3622 grades to be branded
- All kiln dried grades to be max 16% MC forcing a re-think of kiln MC targets
- Phasing out of No. 1 Framing

Grading of Structural Timber

CAN BE DONE:

- Visually, by examining the defects (mainly pith, wane and knots) and comparing their size with a set of grading rules (NZS3631: 1988 “New Zealand Timber Grading Rules”)

- Mechanically (or Machine) Stress Grading (MSG), where timber is deflected (bent) or density and sonic tested with stiffness measured. A visual over-ride (manual/visual grading) is applied after MSG'ing.
Visual Grading

- Most timber produced in NZ is visually graded at least once and often twice
- Even MSG’ed timber is visually graded at least once (the visual over-ride applied after MSG’ing) and normally at the sawmill while green-sawn.
- Can be reliable with on-going training and monitoring of timber graders e.g. As Grade Right (NZ) Ltd has proven with some mills over the past five years.

Visual Grading cont.

- However, can be unreliable if no, little training and monitoring is done. This has been used as one justification for grade verification (e.g. Consumers Institute surveys, Forest Research survey)

- Visual grading with verification as Visually Stress Graded or VSG grades will continue for most NZ sawmills (200-300 sites).

- Small NZ sawmills will find it difficult to produce VSG timber due to initial capital and compliance (with NZS3622) costs. Either forced out of the NZ Structural market or will close down.
Mechanical (Machine) Stress Grading

- Traditional MSG’ers (Plessey, Metriguard, Dart etc) deflect or bend the timber and measure stiffness.

- The higher the stiffness, the better suited the timber is for load-bearing end-uses (bearers, joists, studs, lintels, rafters, beams, etc)

- Stiffness is measured by the traditional MSG’er. Stiffness is influenced by density and slope of grain. Knots influence strength more than stiffness.

Mechanical (Machine) Stress Grading cont.

- MSG grades are produced by Rosvalls, TDC, Carter Holt Harvey, Kiwi Lumber Ltd Masterton, Pinepac, WPI, Ahead Lumber, Moutere Timber, Hunter Hills Sawmill etc.

- A new generation of MSG’ers are in use such as the A-Grader which uses sonic testing to measure stiffness. This has been determined (by former Forest Research) to be more consistent than MSG’ing. A-Graders currently operating at Red Stag (Waipa – Rotorua), WPI Tangiwai and Rosvall’s Sawmill (Whangarei) with good results. NOTE: The A-Grader is classed as a MSG’er
Mechanical (Machine) Stress Grading cont.

- MSG’ed timber probably accounts for 50-55 percent of all NZ framing but from only about a dozen sites. The remaining sawmills (200-plus) will continue to produce visually graded timber.

- MSG’ed timber will contain larger knots overall e.g. 50% Knot Area Ratio i.e. may appear lower in appearance (which shouldn’t matter), but still incurs some market resistance.

Why use Grade Verified Timber?

- Architects, engineers, builders and home-owners will prefer timber that has had its stiffness and strength properties confirmed or verified. This timber will be viewed as superior to un-verified grades.

- After the end of the phase-in period (end of January 2007) it will be difficult if not impossible to sell un-verified timber as it may/will not be accepted by the industry (architects, engineers, builders, retailers, local authorities, frame/truss manufacturers)
The New Grades

- VSG8 replaces existing No. 1 Framing
- VSG10 is a higher grade (an E of 10 GPa)
- No VSG6 currently, but could be produced
- VSG8 and 10 to be sold KD, max 16% MC
- G8 is a “wet” grade where MC will fluctuate. Uses include decking joists etc
- Five MSG grades available (MSG6 – 15), but MSG15 not available in Radiata pine
- All MSG grades to be sold kiln dried, max 16% MC

What happens to good old No. 1 Framing?

- Unverified No. 1 Framing will have its stiffness and strength values downgraded to those of No. 2 Framing
- It can still be used but will require closer spacing when used as load bearing members i.e. a builder will need to use more timber.
- The value will drop below that of VSG8/MSG8, possibly down to a No. 2 Framing price.
- Ensis and Grade Right (NZ) Ltd believe the industry will phase this grade out, as it will be uneconomic to produce.
The Verification Process

- Scrutiny of log sources – age, location, log type
- Sonic testing of log supply
- Review current sawing patterns
- Review current grading rules
- Visual grade audit and selection of test pieces for Initial Evaluation
- Purchase/build proof tester
- Test 45 – 60 pieces in each size and grade
- Pre-Approval audit and if successful:
  - Commence producing Grade Verified timber

The In-Mill Monitoring Process

- Continuously monitor stiffness and strength
- Pieces to be randomly selected
- Recommend test at least 1 piece in 250 initially
- Store and analyse data using Ensis-developed software
- Email data to suitably qualified organisation for further analysis and results conformance

Before any timber is released from the mill, the sample pieces shall be tested and passed
Branding Requirements

- The producer’s name/brand/logo
- The verification organisation’s brand/logo (strongly recommended)
- The stress grade (e.g. VSG8 or MSG8)
- The grading standard used to produce the timber (e.g. NZS3631 for VSG grades, AS/NZS1748 for MSG grades)
- The date of production (optional)
- At not more than 1500mm centres (face or edge)
- Practical options are indent or ink (jet) branding
- Brand edge on outdoor structural products

The Auditing Process

- Required at least six monthly (strongly recommend quarterly audits)
- Examining recent and current test data and analysis
- Observing random selection and testing being carried out
- Matching up recent test data to stock and dispatch records
- Independent stiffness and strength testing of producers timber randomly selected from stock
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