Why the Changes?

• NZ radiata pine is changing with a general decline in properties. (There is actual data on this).

• End users are less tolerant of poor performance (lack of straightness and movement etc.).

• The product produced does not always have the properties required. Highlighted recently by CHH and Consumer visual grade checks.

• Timber competes with other Quality Assured products, without changes it risks loss of market share.
New Zealand Standards

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

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

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, (similar to the MSG Grades).
- A Lower Bound MoE added for designing single members
- Calls up NZS3622 - Verification
Visually Graded Timber

Table 2.2 Characteristic stresses for visually graded timber NZS3603 A4

<table>
<thead>
<tr>
<th>Moisture Content – Dry (m/c = 16%)</th>
<th>Radiata pine and Douglas Fir</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bending Strength MPa</td>
<td>Compression Strength MPa</td>
</tr>
<tr>
<td>VSG10</td>
<td>20.0</td>
</tr>
<tr>
<td>VSG8</td>
<td>14.0</td>
</tr>
<tr>
<td>No 1Framing</td>
<td>10.0</td>
</tr>
<tr>
<td>Compression Strength MPa</td>
<td>Tension Strength MPa</td>
</tr>
<tr>
<td>20.0</td>
<td>8.0</td>
</tr>
<tr>
<td>18.0</td>
<td>6.0</td>
</tr>
<tr>
<td>15.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Modulus of Elasticity E, GPa</td>
<td>Lower bound Modulus of Elasticity Elb, GPa</td>
</tr>
<tr>
<td>10.0</td>
<td>6.7</td>
</tr>
<tr>
<td>8.0</td>
<td>5.4</td>
</tr>
<tr>
<td>6.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

2. Moisture Content – Green (m/c = 25%)

<table>
<thead>
<tr>
<th>G8</th>
<th>No 1Framing</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.7</td>
<td>7.5</td>
</tr>
<tr>
<td>12.0</td>
<td>11.0</td>
</tr>
<tr>
<td>4.0</td>
<td>3.0</td>
</tr>
<tr>
<td>6.5</td>
<td>4.8</td>
</tr>
<tr>
<td>4.4</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Based on Structural Properties

<table>
<thead>
<tr>
<th>OLD GRADE</th>
<th>NEW GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>No 1F</td>
<td>If verified becomes VSG8</td>
</tr>
<tr>
<td>No 1F</td>
<td>If not verified is called No 1F</td>
</tr>
</tbody>
</table>

G8 is a verified green version of VSG8

DBH Visual Grading Proposals

- Include a VSG6 - a MSG6 equivalent.
- Include a G6 - the green version of VSG6
  - Both graded as No 2F under NZS3631

- Proposed relaxation of the size of the knots in the No 1Framing grade (brings more into line with the visual limits for MSG8)
  - If used a more extensive initial evaluation will be required.

- These proposals will be in the Building Code B1 Compliance Document (not NZS3631 or NZS3603 A4)
Availability & Verification of VSG

- VSG10 grade will be virtually limited to Douglas fir.
- Some Radiata producers will be limited to unverified No 1F or verified VSG6 (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 is proving difficult for some 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 Graded Timber

<table>
<thead>
<tr>
<th>Species &amp; Douglas Fir</th>
<th>MSG 15</th>
<th>MSG 12</th>
<th>MSG 10</th>
<th>MSG 8</th>
<th>MSG 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bending Strength MPa</td>
<td>41.0</td>
<td>28.0</td>
<td>20.0</td>
<td>14.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Compression Strength MPa</td>
<td>35.0</td>
<td>25.0</td>
<td>20.0</td>
<td>18.0</td>
<td>16.0</td>
</tr>
<tr>
<td>Tension Strength MPa</td>
<td>23.0</td>
<td>14.0</td>
<td>8.0</td>
<td>6.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Modulus of Elasticity E, GPa</td>
<td>15.2</td>
<td>12.0</td>
<td>10.0</td>
<td>8.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Lower bound Modulus of Elasticity Elb, GPa</td>
<td>11.5</td>
<td>9.0</td>
<td>7.5</td>
<td>5.6</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Comparison with Visual Grades

- MSG 10 broadly equates to the old Engineering grade & MGP10
- MSG 8 is equivalent to VSG8 (the verified No 1F)
- MSG6 is equivalent to the unverified No 1F
Availability of MSG

- MSG15 will be very rare, if available at all
  - Check with suppliers before specifying

- MSG12 availability will be limited in volume, dimension and by region
  - Check with suppliers before specifying

- MSG10 & MSG8 will be the most common grades, however availability of MSG10 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

NZS3603 Time Line

NZS3603 Timber Structures Standard.

- Amendment initiated 2002 (The two major corporates of the time played a significant role in getting the amendment started).
- All industry bodies were ultimately represented on committee.

- Published by Standards NZ in February 2005.
- Was to be cited by the DBH on the 1 December 2005.
- Currently to cited by the DBH in July 2006.

- Many design engineers are using Amendment 4 now.
- Could be a six month introductory period where the new provisions can be used as an alternative solution.
Amendment 2 takes account of the flow-on effects from Amendment No. 4 to NZS 3603 namely:

- The new grades MSG6, G8, VSG8/MSG8 and VSG10/MSG10.
- The design philosophy for Amendment No. 2 remains the same as the original. Wherever errors in the design calculations existed the opportunity has now been taken to correct these.
- Requires the use of a lower bound Modulus of Elasticity ($E_{lb}$) for members that do not act as part of a group of four or more members.

Amendment 2 also takes account of:

- The fact that framing practice has moved predominantly from green gauged framing to dry sizes.
- Amendment No. 2 consists of 104 replacement pages.

A further amendment is anticipated (2+ years away):

- To take account of the changes to the new Loading code AS/NZS1170.
- To include items raised but not included in this A2.
- To include other items as required by industry.
- The industry can make submissions to Standards NZ.
NZS3604 Future Amendments

Amendment No. 2 identifies the grade of timber in the title and also by the colour of the tables.
- No. 1 Framing/MSG6 tables are blue.
- VSG8/MSG8 tables are yellow.
- VSG10/MSG10 tables are green.

Amendment No. 2 provides:
- A complete set of tables for No. 1 Framing.
- Allows the use of No. 2 Framing for certain applications.

NZS3604 - A2

- All the structural elements in a NZS3604 structure have been designed.
- No 2F will be permitted in non-load bearing situations i.e., internal walls. Not permitted in exterior walls.
- Green framing will still be permitted with propping as required.
- It will be possible to build a house from MoE 6 GPa timber. Or from a mix of grades.
### NZS3604 Time Line

**NZS3604 Timber Framed Buildings.**

- Amendment initiated 2005 to cover changes in NZS3603.
- Amendment No. 2 was approved on 24th May 2006 by Standards NZ.
- To be cited by the DBH in July 2006.
- Could be a six month introductory period where the new provisions can be used as an alternative solution.

### Verification of Properties

**NZS3622:2004**

- 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 - but has issues).
- The (Independent!) Third Party Audit requirement is new.
- Sampling, testing, monitoring, acceptance criteria along with marking and retest provisions.

Brings Solid Timber more into line with its competing non-wood and other wood-based products.
Questions

• Grade marking of Green timber or timber that has a visual requirement?
• Can a Green MSG product be produced?
• What will happen to the small sawmills, can they afford the verification costs etc…?
• What will the retailers want to stock? Preference for MSG?
• Who checks the checkers? (The verification agencies)
• Are there more changes to come?