Segregating Structural Logs Before Processing

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The Goal

Produce VSG Lumber
The Problems

- Require an average stiffness of 8 GPa
- Require 95% of pieces to be better than 5.4 GPa
- How does stiffness in logs vary?
- How do we eliminate the low stiffness pieces at the mill to avoid failures?

How do logs vary in stiffness?

a) Variation between stands
b) Variation between trees
c) Variation along the stem
d) Variation pith to bark
Variation within the Stem and Pith to Bark

Average stiffness of lumber cut from some 60 trees. Note the low stiffness at the base of the tree, in the butt logs.

Why not cut a short, 2.5 m butt log?

Average stiffness of wood in boards up the stems

Variation between trees & stands

More variation between logs than between stands
Initial Conclusions

Picking the best stands will not eliminate low stiffness logs.

We need to sort logs by stiffness and cut them accordingly.

We need to work out how low stiffness corewood varies with log size.

Options for sorting

Offline
• In the forest or in the mill log yard

Online
• Logs on infeed deck
• Measure stiffness with acoustic tool on entry to mill
• Mark logs according to stiffness
• Pattern according to stiffness
Practicalities in the mill

- Debarker operator testing logs and marking on log infeed deck.
- Running about 50 logs per hour
- No major issues
- Hitman tool could be practical up to quite high production rates if a dedicated person assigned
- Good data on logs can be produced

Log Supply Comparison

<table>
<thead>
<tr>
<th>km/sec</th>
<th>% of Logs</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2.5</td>
<td>0%</td>
</tr>
<tr>
<td>2.7</td>
<td>5%</td>
</tr>
<tr>
<td>2.9</td>
<td>5%</td>
</tr>
<tr>
<td>3.1</td>
<td>10%</td>
</tr>
<tr>
<td>3.3</td>
<td>15%</td>
</tr>
<tr>
<td>3.5</td>
<td>20%</td>
</tr>
<tr>
<td>&gt;3.5</td>
<td>25%</td>
</tr>
</tbody>
</table>

A Average 3.3  B Average 3.3
Testing logs is only half the solution

- We need to know how the sorted logs relate to the lumber produced

Some other key parts to log sorting . . .
Some other key parts to log sorting . . .
Practicalities of management

- Time consuming testing lumber and relating results to log stiffness, size and cut pattern.
- Slow to get test results
- Found we needed to test green
- Slow testing on static tester. Faster method needed for determining individual boards.

Conclusions

- Log sorting is valuable for producing structural lumber
- Must test lumber as well as logs
- Probably essential for producing VSG
- More important to eliminate low stiffness than to get a good average stiffness