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Advanced Sonic Technology for Log Scalers and their Customers

Timber Measurements Society Meeting

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Presented by Andy Dick – MD, Logjiztix

Business Results – Sonics enabled

- Measure Wood Quality before processing:
 - In conjunction with scaling in mill yard for LVL and MSR
- Forecast actual mill LVL or MSR lumber out-turn from log supply
- Reduce waste and lower processing costs
- Reliably fulfill sales orders
- Improve profitability through process optimisation

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Portable tool for log scaling application

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HM200

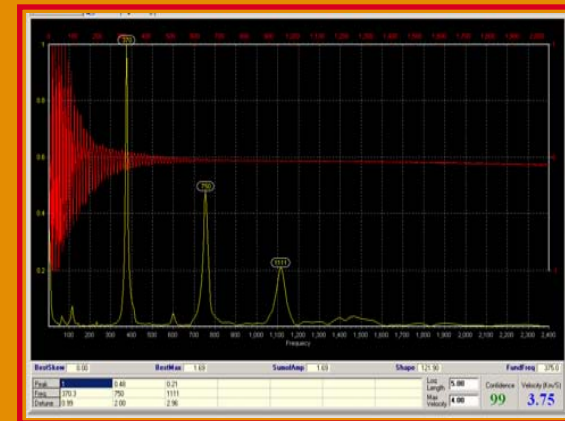
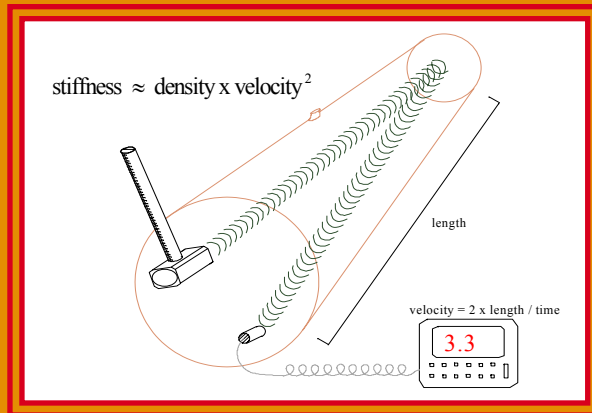


LG640 Automated tool also available for log scaling application

fibre-gen
thinking timber

HM200 & LG640 – how they work

- Stiffness = density x (velocity)²
- Velocity is derived from resonant frequency (2nd harmonic) and length
- Sensor/microphone detects frequency from hammer blow
- Green density is relatively constant



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Customer values are high - Veneer

Douglas Fir trials - sorted the log infeed at a 13,000ft/sec threshold.

Increase Yield of Veneer – 2 operational trial results:

1. 62% Yield of G1&G2 compared against 47% unsorted logs
2. 60% Yield of G1&G2 compared against 45% unsorted logs

Lodgepole pine trial results

- 0.1km/sec improvement in sonic velocity is worth US\$16/m³
- US\$3.8m for a 300,000 t mill (at US\$250/m³ for G1 veneer)

Measuring and managing stiffness will increase profit
Scaling is a key opportunity to measure and add value

Customer values are high - MSR

- MSR vs Standard or better lumber price differential
US\$15/m³
- Average log infeed velocity improvement of 0.2km/sec
will increase MSR YIELD from the mill by 10%

This equates to:

- US\$450,000 for a 300,000 m³ mill



Measuring and managing stiffness will increase profit
Scaling is a key opportunity to measure and add value

ADVANCED SONIC APPLICATIONS



Conclusions – Log Scaling

- **Sonic measures provide valuable log quality information for your customers**
- **Wood stiffness in logs is a key measure for LVL veneer and MSR lumber manufacturers**
- **Tools are available to quickly and easily measure stiffness at time of scaling**
- **Stiffness information measured at this time is key for value optimisation from subsequent processing**

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For further information

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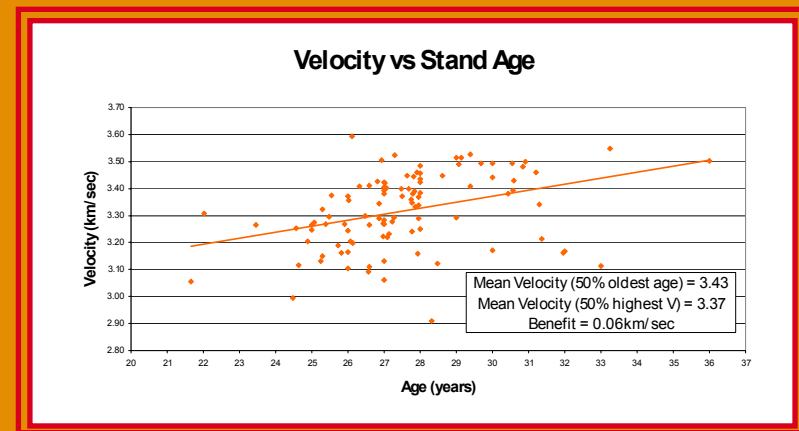
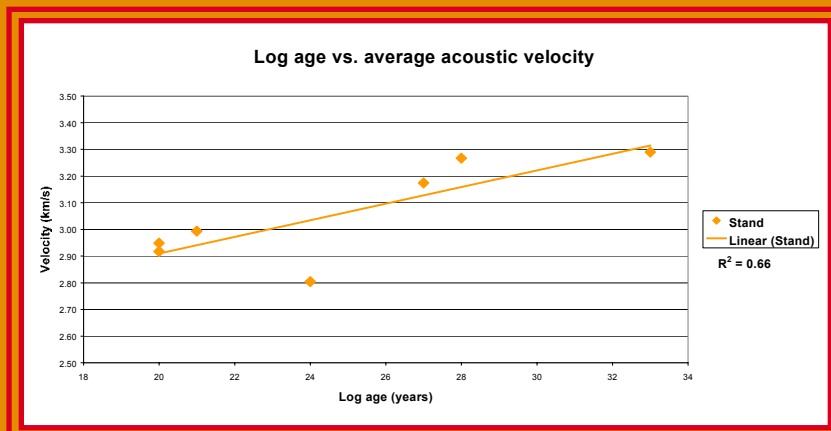
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Further detail for implementation

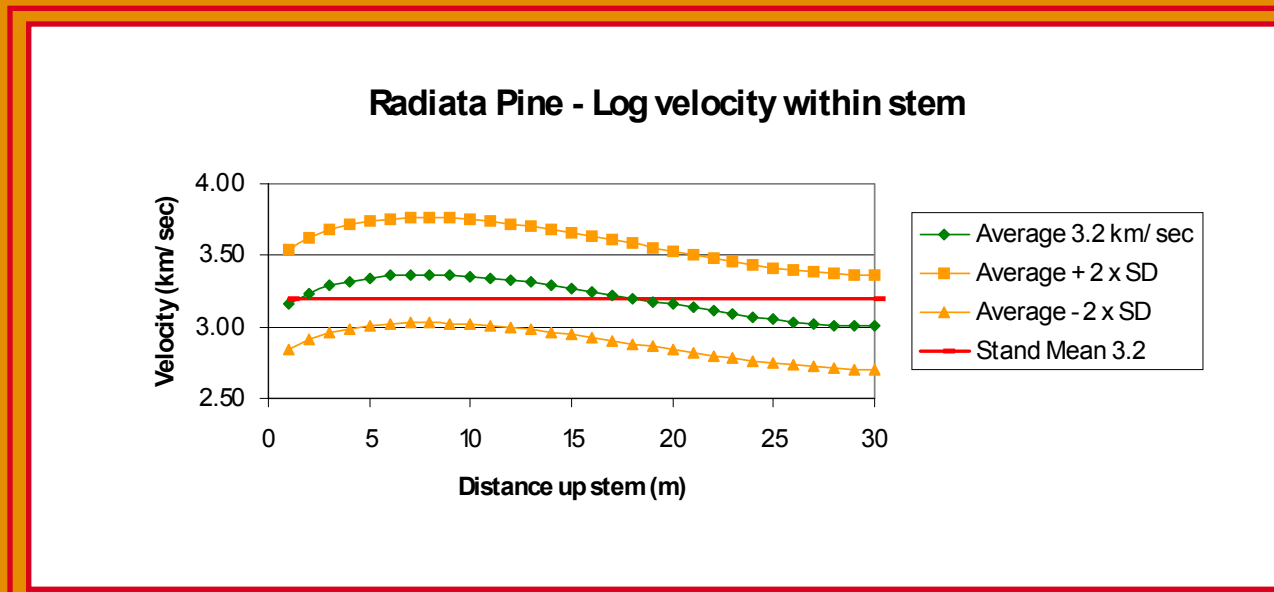
Velocity variation with Age

- Acoustic velocity generally increases with increasing age
- 0.06 Km/s increase on average per year
- Velocities do still vary widely within an single Age class
- Strategy - harvest highest Velocity rather than oldest age



Velocity variation Butt Log to Top Log

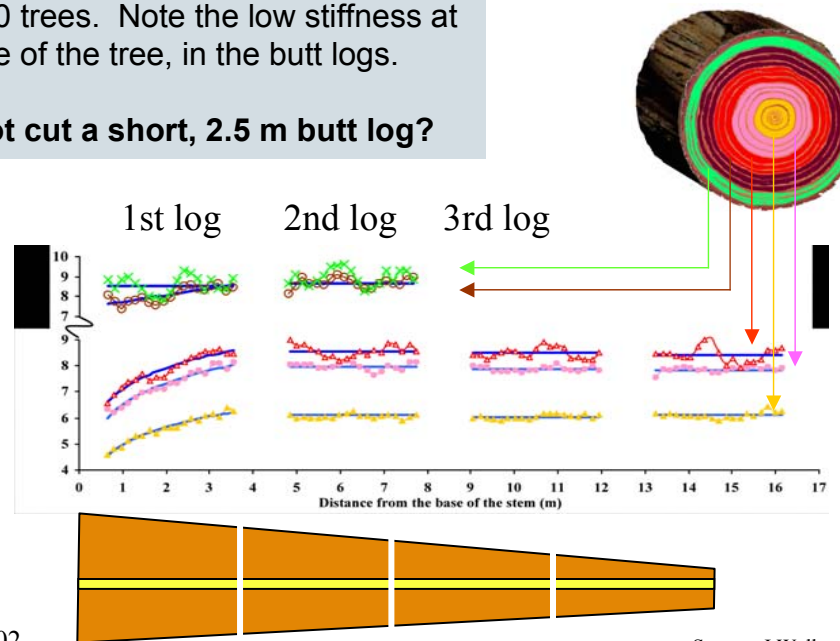
- Acoustic velocity varies from butt to top
- Highest velocity logs are in mid section of stem – log 2 & 3



Velocity variation – 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?

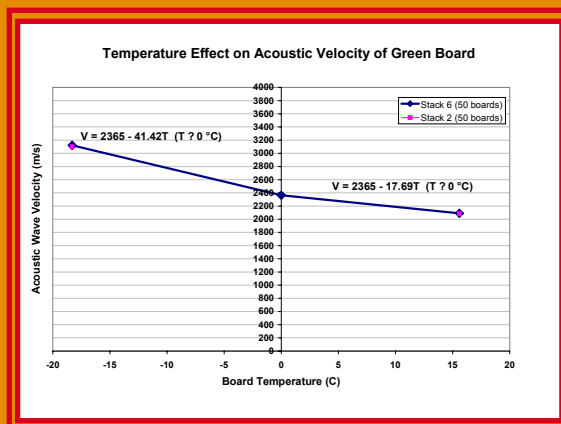


Ping Xu, 2002

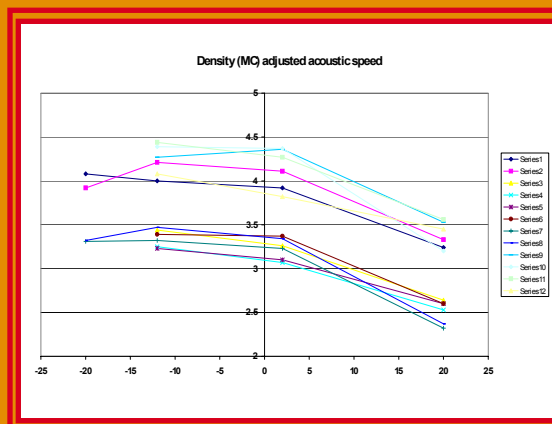
Source: J Walker, University of Canterbury

Velocity variation with Temperature

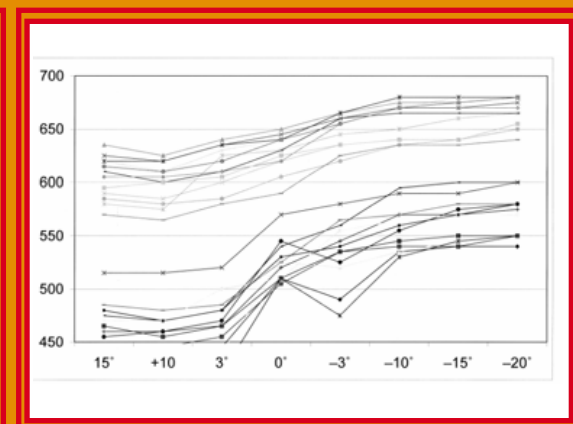
- Acoustic velocity increases with lower temperature
- Rate of change defined best in Swedish log study
- Moisture content changes may compensate on logs, but not in trees



Source: X Wang, University of Minnesota



Source: P Harris, IRL



Source: L Bjorklund, VMR, SDC

Velocity variation with Moisture Content

- Acoustic velocity varies with moisture content
- $MOE = \text{Green Density} \times \text{Velocity}^2$
- Therefore green density decrease is proportional to increase in V^2
- Potential application
 - MC of Beetle killed wood

