Specialty Wood Products Research Partnership

FOREST GROWERS RESEARCH

New wood products to improve returns for growers

Presenter: Marco Lausberg

Meeting Date: 16th October 2019

supported by forestgrowers commodity levy

New wood products to improve returns for growers

Topics

- **Processing studies –**
  - **Durable eucalypt peeling**
  - **Cypress sawing**
  - **Douglas-fir CLT**
  - ***E. nitens* flooring**
- **Thermal modification –**
  - ***E. nitens***
  - **Douglas-fir**
  - **Cypress**

Peeling project

15 year-old *E. bosistoana* and *E.* quadrangulata peeled at Nelson Pine Industries

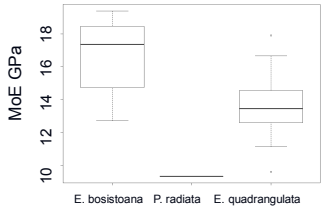
Peeling project

Peeler cores and veneers

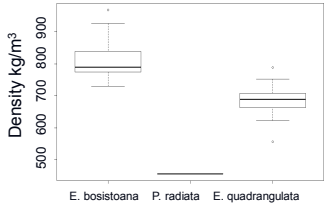
Next stage – gluing trials

Veneer properties

Stiffness



Air dry density



- ***E. bosistoana*: 813 kg/m^3; MoE 16.6 (12.7 - 19.4) GPa**
- ***E. quadrangulata*: 683 kg/m^3; MoE 13.6 (9.6 - 17.9) GPa**
- **30 year old *E. globoidea* average MoE 15.1 GPa**
- **Average radiata 470 kg/m^3; MoE 9 (4-14) GPa**

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Peeling - what next

- **Veneers have gone to Hexion for gluing tests**

400 x 400 mm samples of *E .bosistoana* and *E. quadrangulata*

- **Evaluate economic potential of *E. bosistoana* for LVL**

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Ovensii sawing study

- **Sawing study of 20 year-old unpruned and unthinned cypress (Ovensii and GH5 clone)**
- **Aim – can this be an economic regime for cypress?**

8-year old Ovens cypress, showing consistent good form.

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Ovensii sawing study

The average log properties are as follows:

	# logs per tree	Length	Sweep	Velocity	BIX*	Mid-log diameter	Canker/fluting (% logs affected)**
Ovensii	2.2	5.8	3.1	3.1	3.5	246	30.8
GH5	2.9	6.0	6.0	2.9	4.1	292	4.3

* Branching index: the average of the largest knot in each quarter of the log.
** This was assessed as any deep fluting or depression on the outside of the log. The condition of the wood below the depression was not inspected for canker.

36 logs were sawn (6 Ovensii trees and 8 GH5 trees). The green recovery was 58%, with 6.2m^3 of timber being produced from 10.6m^3 of logs (with an average log diameter of 246mm). The timber is currently air drying and the wood will then be delivered to Scion for final drying and grading.

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Douglas-fir

Cross Laminated Timber being tested at UoC

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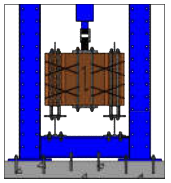
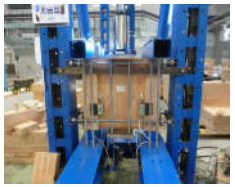
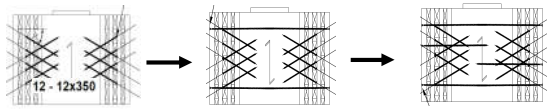
Testing of Dfir CLT screwed connections

Screwed Connections (7-ply CLT)







16 - 12x350
MON. - 3
CYC. - 5

12 - 12x350 + 4 - 12x550
MON. - 3
CYC. - 5

12 - 12x350 + 6 - 12x550
MON. - 3
CYC. - 5

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Dfir CLT full scale testing

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Dfir CLT Conclusions

The experimental testing results provided strong technical evidence that the CLT core-walls can provide efficient lateral load resisting systems for mid-rise and high-rise timber buildings under NZ seismic design conditions.

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E. nitens flooring

- 3 types of flooring made from young unpruned *E. nitens*
  - Solid wood
  - Ply-backed
  - Cross-laminated
- Produced by Specialty Timber Solutions using logs from SouthWood Exports
- Benchmark commercial laminated flooring (imported engineered oak)



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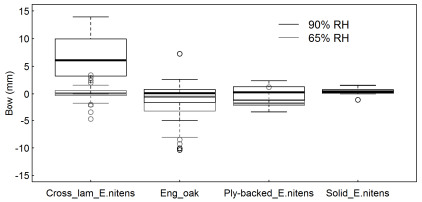
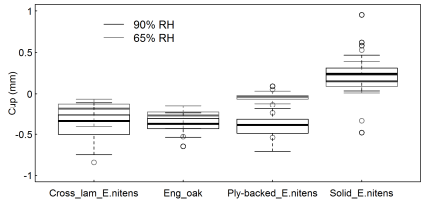
E. Nitens

Dimensional stability and distortion with changes in MC





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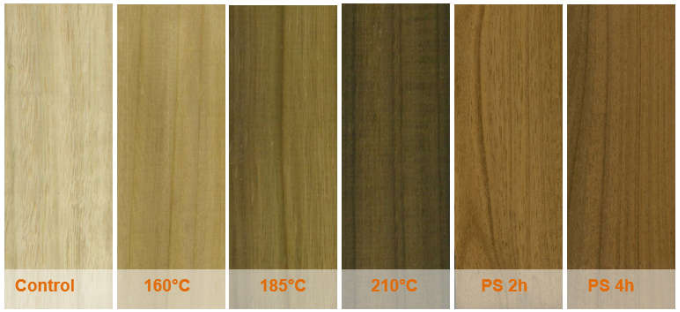
Thermal modification

- Treatment lifts both durability and stability
- Treatments alters colour (E. nitens below)



Pressure steaming at 2 and 4 hours

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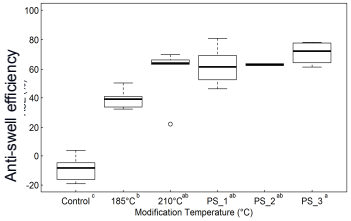
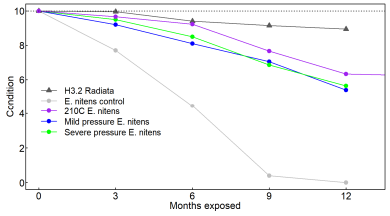
E. nitens thermal modification

- Modification under high pressure steam to reduce degrade
  - No between-ring checking seen
  - Indications that a more severe modification is required to get durability
  - Improvement in durability insufficient for outdoor applications





PS = Pressure steaming treatments

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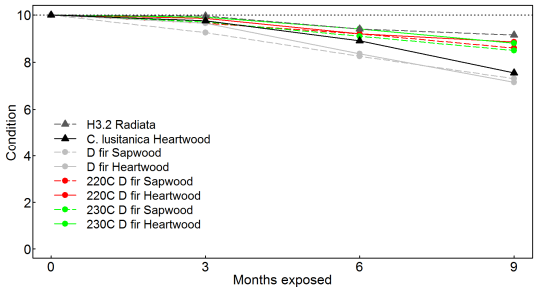
Douglas-fir thermal modification

- 9 months of fungus cellar testing complete
  - Both modifications are performing well.
  - Testing to continue for at least more 2 years



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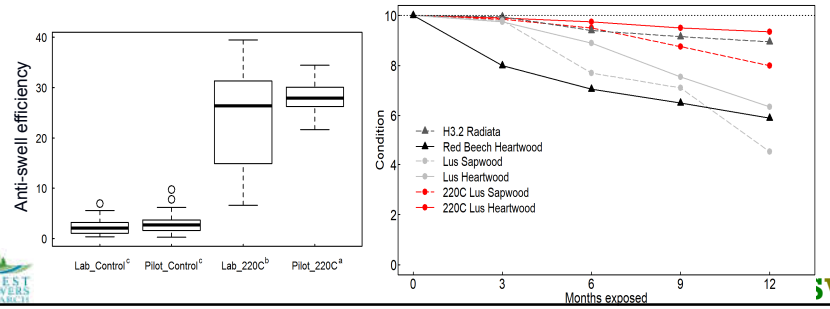
C. Lusitanica thermal modification

- Early fungus cellar results looking promising
  - Outdoor accelerated testing to be done
- Pilot scale (2.4m) modification
  - big reduction in degrade vs lab scale
  - other properties unchanged



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Wrap-up

- SWP is aiming to increase investor confidence in specialty timber species.
- Barriers to the use of these species will be reduced through tree breeding, site species matching, developing new products and communicating investment opportunities to key stakeholders.

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