CocoVeneer products

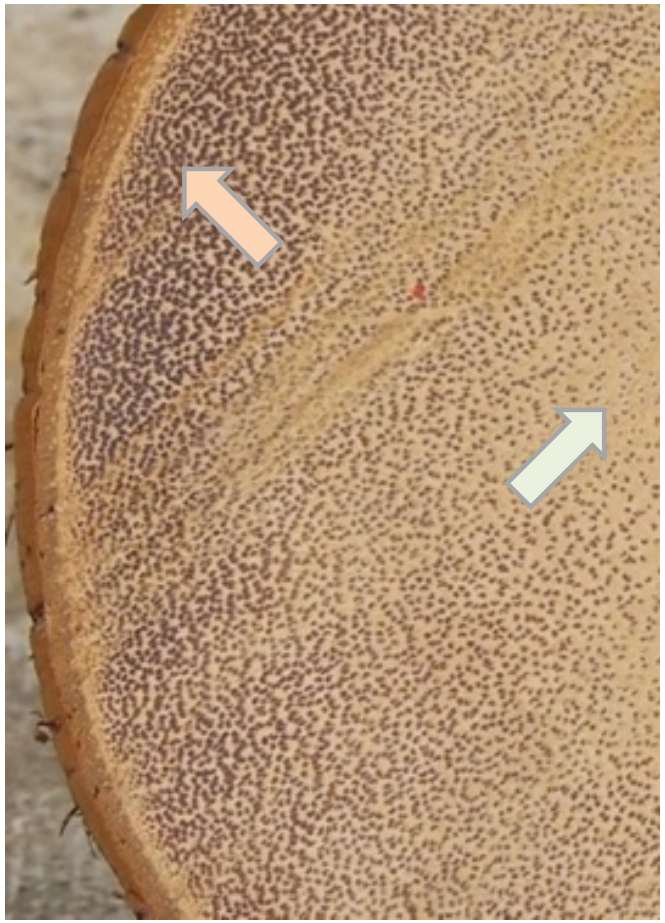
Characteristics of coconut veneer and veneer products.

Thanks to Rob McGavin and the QDAF team for veneer, product assembly and testing results.

Content

- Material characteristics of coconut veneer.
  - Density and strength
- Product assembly: architectural and structural.
- Potential market advantages and constraints.

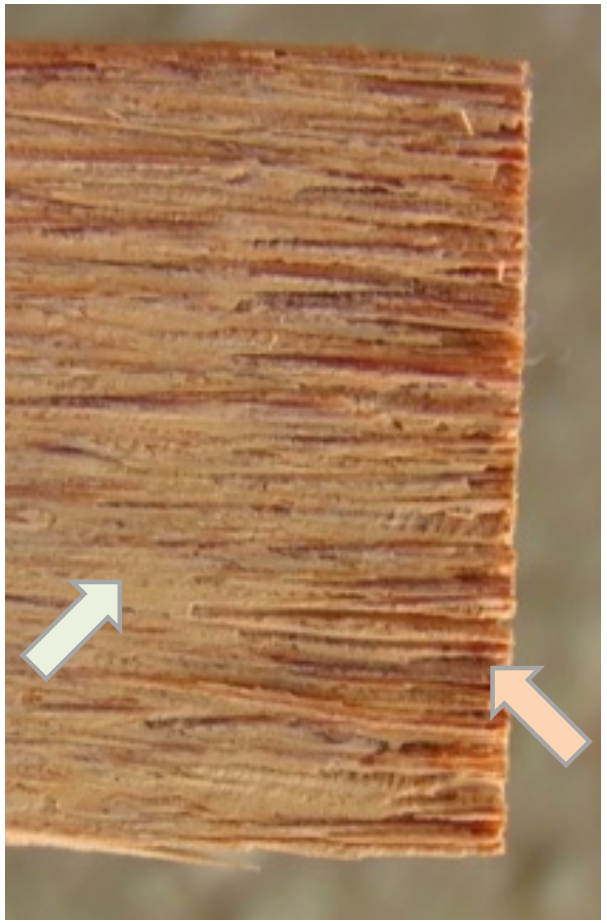
Coconut wood cell structure



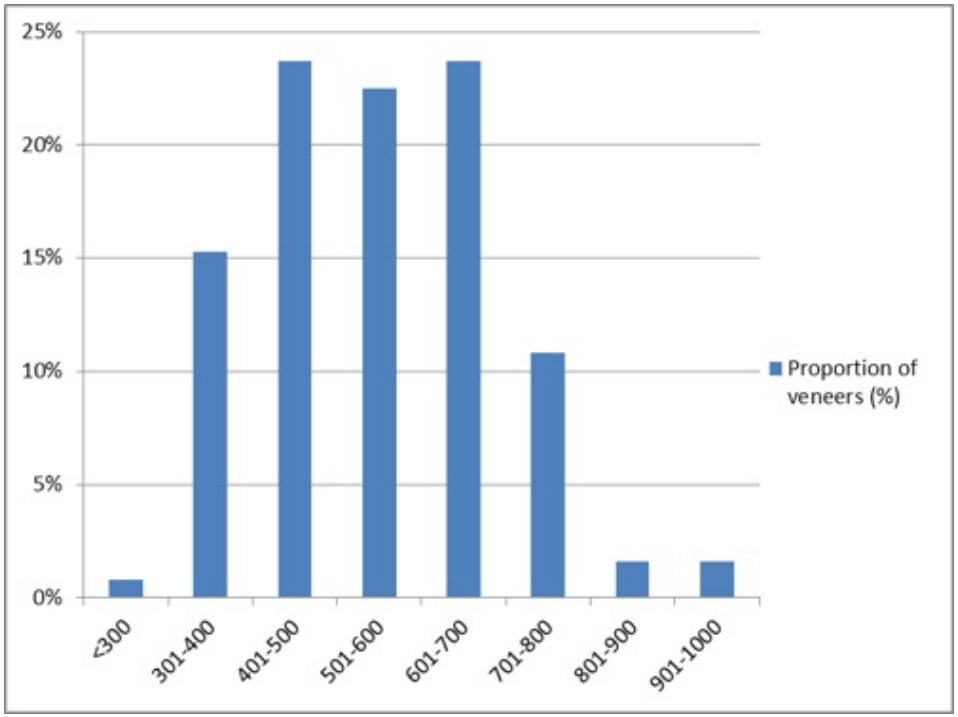
The wood consists of high density vascular bundles in a matrix of spongy, low-density, parenchyma tissue.

Low radial and tangential connection between bundles.

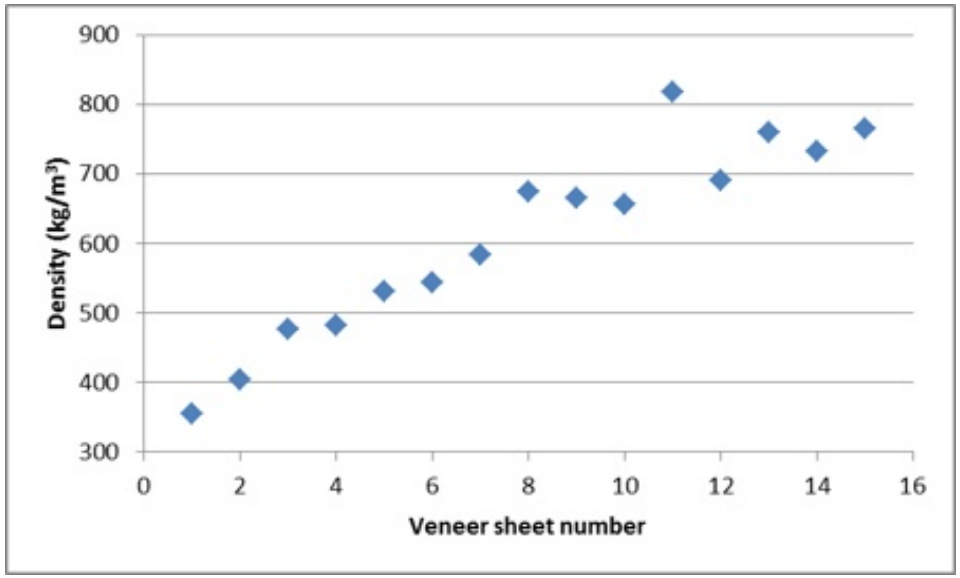
Bundles clustered at the outside of the stem.



Veneer characteristics: density

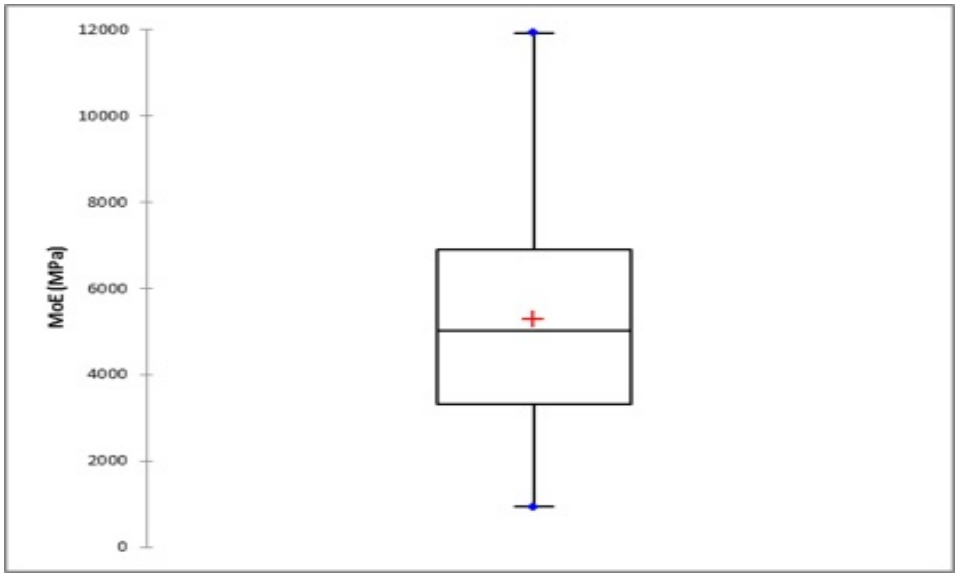


Distribution of veneer air-dry density



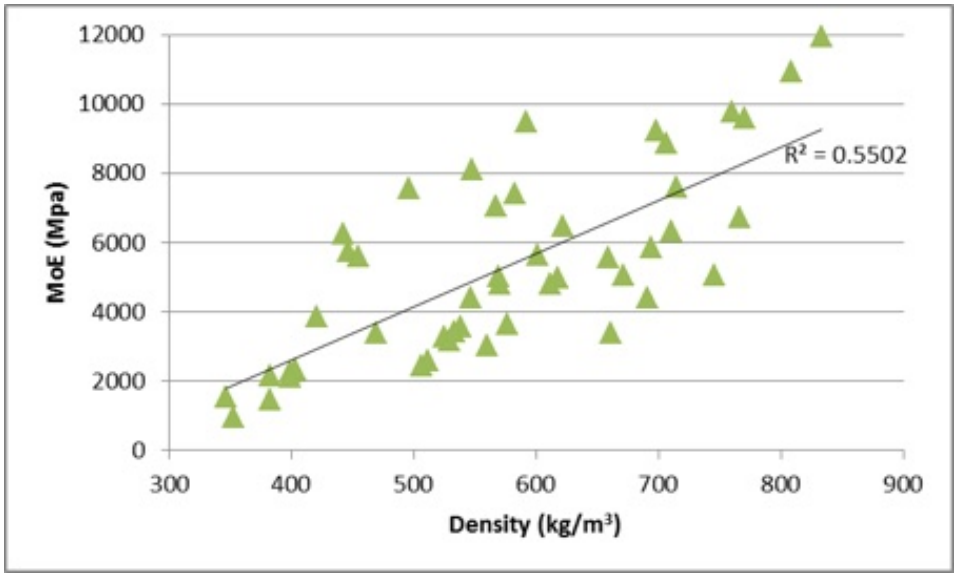
Example of density radial variation from the centre to the outside of a coconut log

Veneer characteristics: stiffness

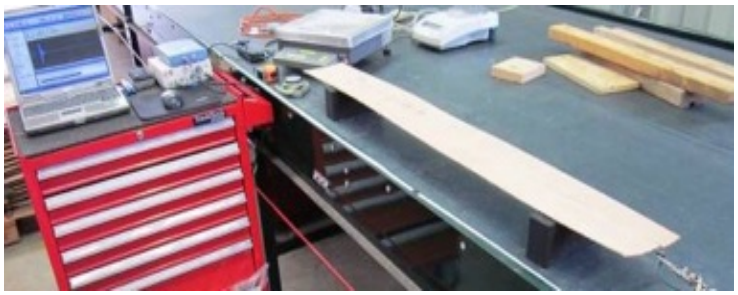


Veneer MOE

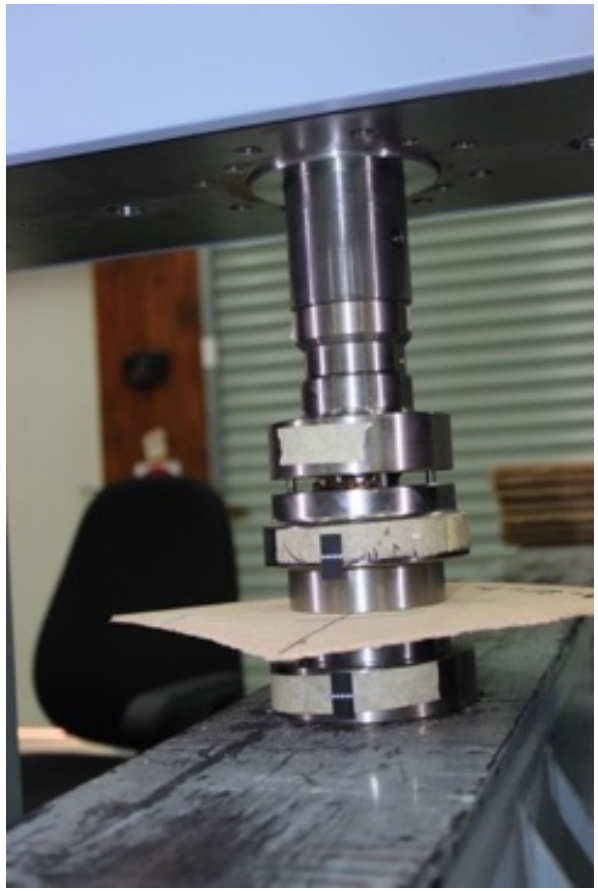
Average MOE is relatively low compared to most commercial wood species.

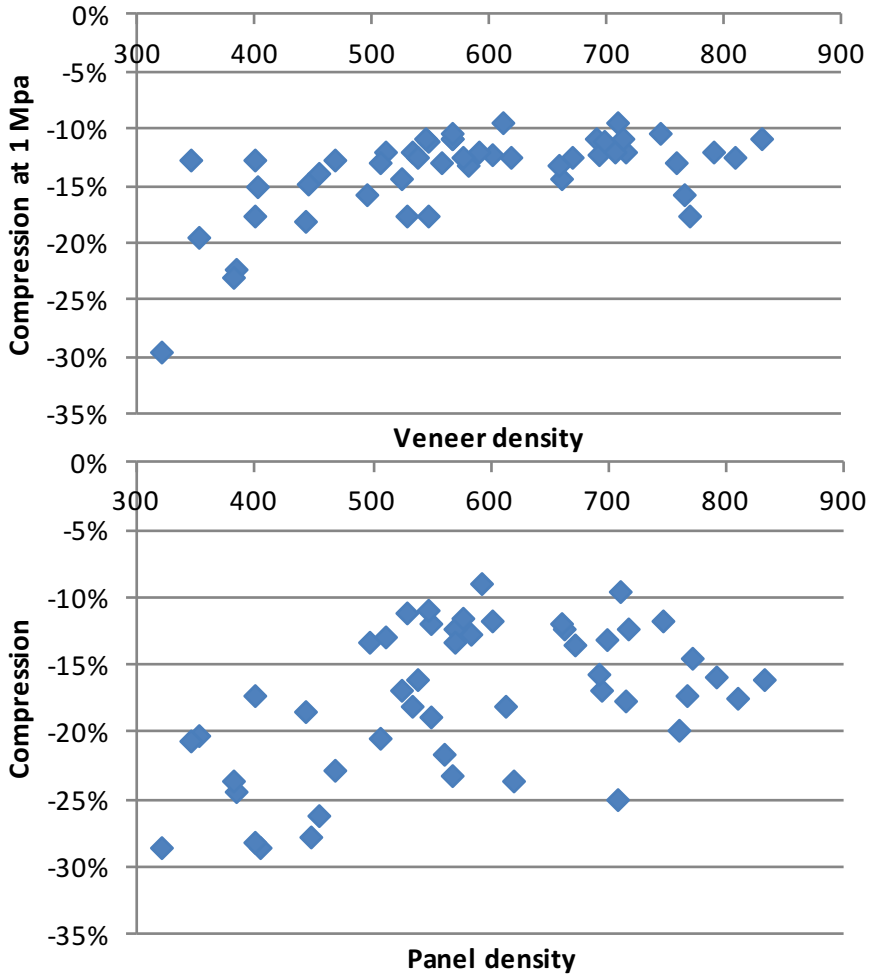


The correlation of MOE to density.

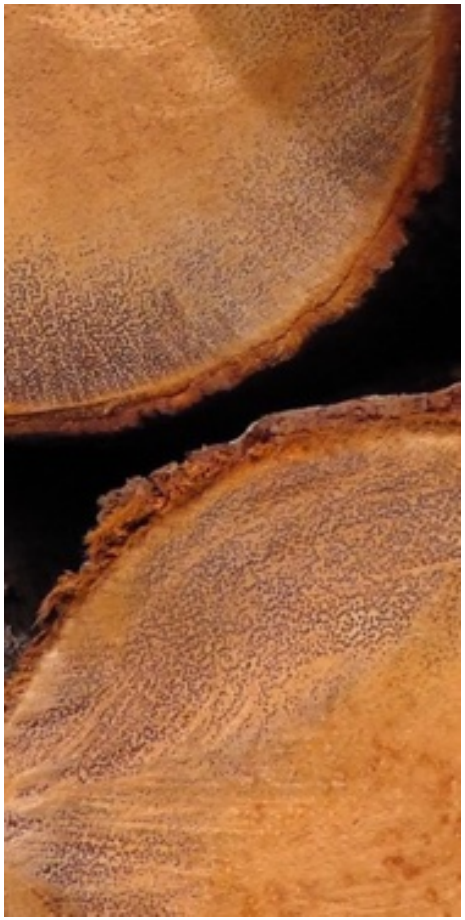


Impact of temperature and adhesion





Properties summary



- Tests confirmed the wide range of density and modulus of elasticity values expected in coconut veneer.
  - The density range is potentially two to three times more than expected in most commercial wood species.
- The veneer MOE results were generally low compared to most commercial wood species

Product options

The range for veneer-based products includes:

- Structural products:
  - plywood and laminated veneer lumber (LVL).
- Architectural products:
  - appearance veneer on board, engineered flooring, multilaminar products.

Test products of each types were assembled and are being tested.

Source veneer was sorted into density groups.

- Low density (<400 kg/m^3)
- Medium density (400-600 kg/m^3)
- Medium-high density (600-800 kg/m^3)
- High density (>800kg/m^3).

Products: plywood

Plywood: Overlay & structural

Advanced veneer and other product from coconut wood

Products: LVL

Laminated veneer lumber (LVL)

Advanced veneer and other product from coconut wood

Products: overlay

Veneer overlay on board

Products: Engineered flooring

Engineered flooring overlay

Advanced veneer and other product from coconut wood

Products: multilaminar

Multilaminar blocks for resawing

Products: multilaminar

Sawn multilaminar section:

edge grain.

Products: multilaminar

Sawn multilaminar section: end grain

Products: multilaminar

Sawn and turned multilaminar section

Further product assembly

Further product testing: plywood

Further product testing: LVL

Product summary

- A range of appearance and structural product opportunities exist for coconut veneer.
  - The project has not yet fully explored the range of possible product opportunities.
- Coconut veneer has some unique qualities that enable potentially high value niche markets to be pursued.
  - Attractive colour, even toned surface, high density, sustainability.

Product summary

- All veneer groups produced could be used with a sensible target product mix and intelligent construction strategies.
  - Several common structural adhesive systems are effective for bonding coconut veneer.
- Various products can be manufactured using:
  - only coconut veneer, or
  - coconut veneer in combined with other traditional wood feed stocks.
- These include:
  - Structural and appearance plywood, LVL, engineered flooring, wall paneling, and multi-laminar beams and panels.

Questions

Australian Government
Australian Centre for International Agricultural Research

Queensland Government

SPC Secretariat of the Pacific Community

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