Australian Government
Australian Centre for International Agricultural Research

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UTAS

Peeling Coconut

CSAW

Peeling coconut stems for high quality rotary veneer

Dr Rob McGavin

Queensland Department of Agriculture & Fisheries

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Earlier Research Project

Advanced veneer and other product from coconut wood

Processing Studies

Advanced veneer and other product from coconut wood

Wood Property Assessments

Advanced veneer and other product from coconut wood

Sawn Timber Assessments

Advanced veneer and other product from coconut wood

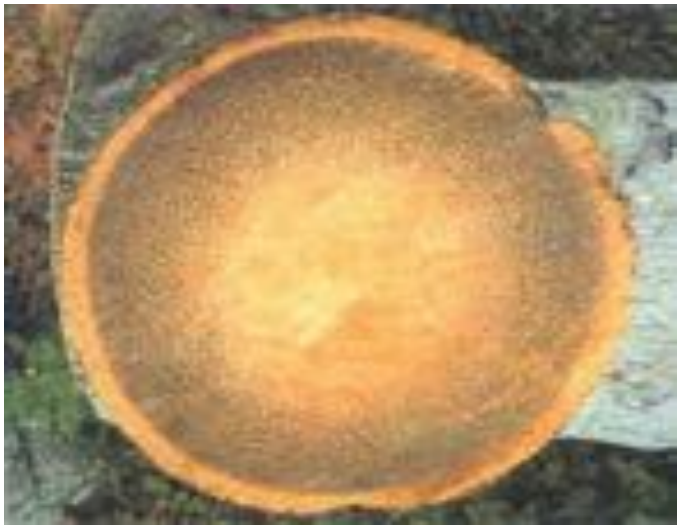
End of Project Success

Advanced veneer and other product from coconut wood

Identified Challenges

- Low volume recovery
- Low recovery from log periphery
- Variable board sizes
- Variable board qualities

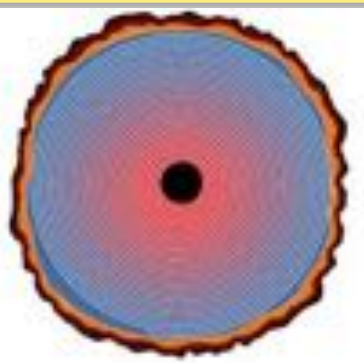
Sawing v's Peeling



Advanced veneer and other product from coconut wood

~55% WASTE
(sawdust and offcuts)

~45% PRODUCT



~25% WASTE
(rounding and core)

~75% PRODUCT

Traditional Peeling

Advanced veneer and other product from coconut wood

Spindleless veneering approaches

Current CocoVeneer Project

Key Challenges:

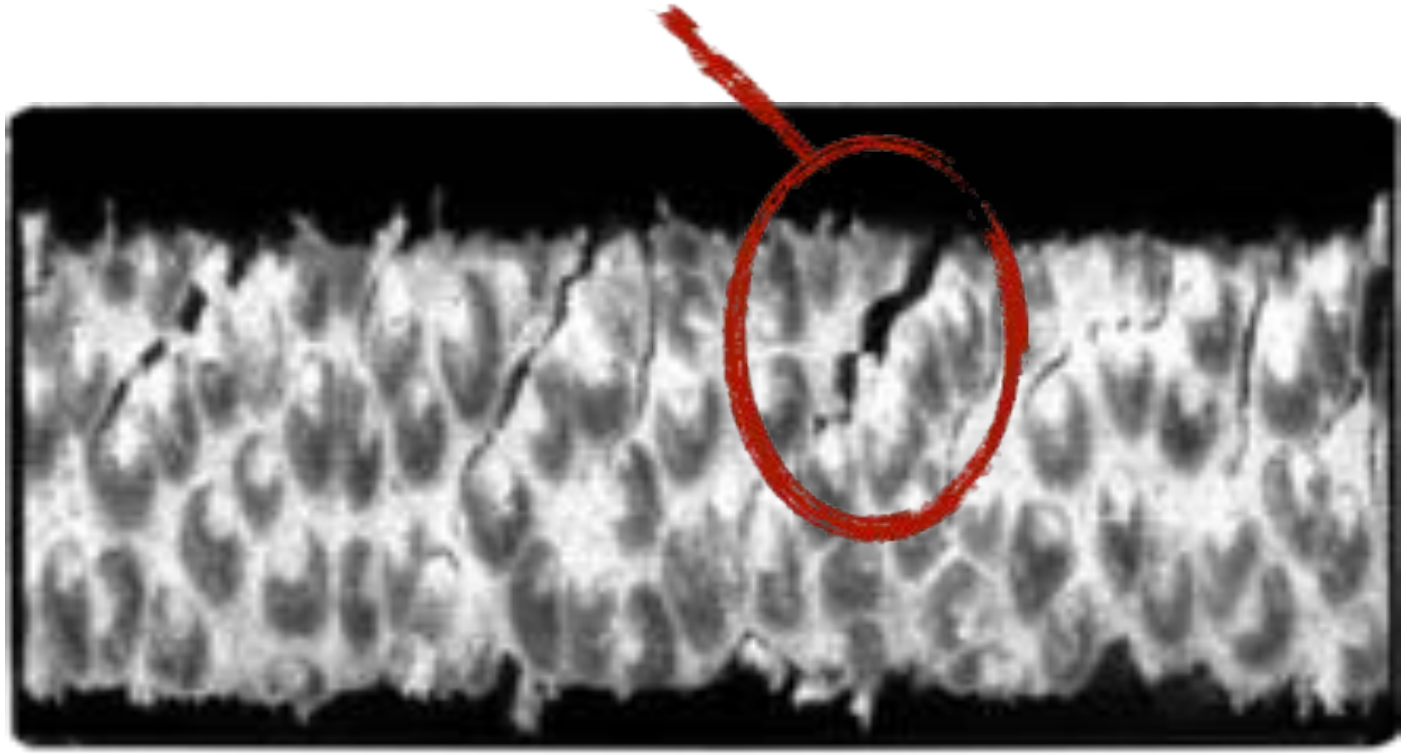
- *Recovery of useful material from the periphery of small diameter logs*
- *Accommodating varying density across the log*
- *Slicing the hard vascular bundles without undue damage to surrounding soft matrix*

Staged approach from laboratory to semi-industrial to industrial scale

Micro-lathe

Stage 1 - Range of parameters trialed

Lathe checks



Stage 2 – DAF Salisbury

New processing equipment suite

- Semi-industrial scale
- Test lathe modifications
- Validate and refine parameters
- Measure veneer properties
- Provide veneer for products

Stage 2 – DAF Salisbury

Limited quantity of Qld sourced billets available

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Stage 2 – DAF Salisbury

Options explored to source senile coconut logs.

Trial 2 – DAF Salisbury

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Trial 2

Stage 3 – TUD

- Experimental veneer processing equipment at TUD, Nasinu, Fiji
- Recovered material shipped to QDAF

Stage 3 – TUD

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Stage 3 – TUD

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Stage 3 – TUD

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Stage 3 – TUD

- Lathe performed well
- Some issues with supporting equipment
- Veneer quality negatively impacted by lack of log heating capacity
- 23 logs, 249 veneer sheets

Stage 4 – VTB commercial trial

- Scale up to industrial production environment
- VTB commercial mill at Labasa, Fiji
- Lathe settings verified

Stage 4 – VTB commercial trial

Confirmed unique lathe settings

Stage 4 – VTB commercial trial

Log heating critical

Stage 4 – VTB commercial trial

Stage 4 – VTB commercial trial

Not without challenges!

Stage 4 – VTB commercial trial

Quick and easy drying

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Stage 4 – VTB commercial trial

- 153 billets processed
- 12.5 m^3 of dry veneer recovered
- Demonstrated the challenges of peeling coconut
- No drying challenges
- Good quantity of suitable quality veneer for product development activities.

Success!!

Processing Summary

- Peeling senile coconut stems can be successfully peeled using spindleless lathe technologies
- Robust equipment necessary
- Relatively narrow range of processing protocols exist
  - Heating billets critical
  - Unique lathe settings
- Veneer recovery ~60% of log volume

Veneer assessment

Visual assessments

- Colour
- **Roughness**
- **Splits**
- Brittleness
- **Collapse**
- Decay
- Compression
- Wane
- Insects, etc

Veneer assessment

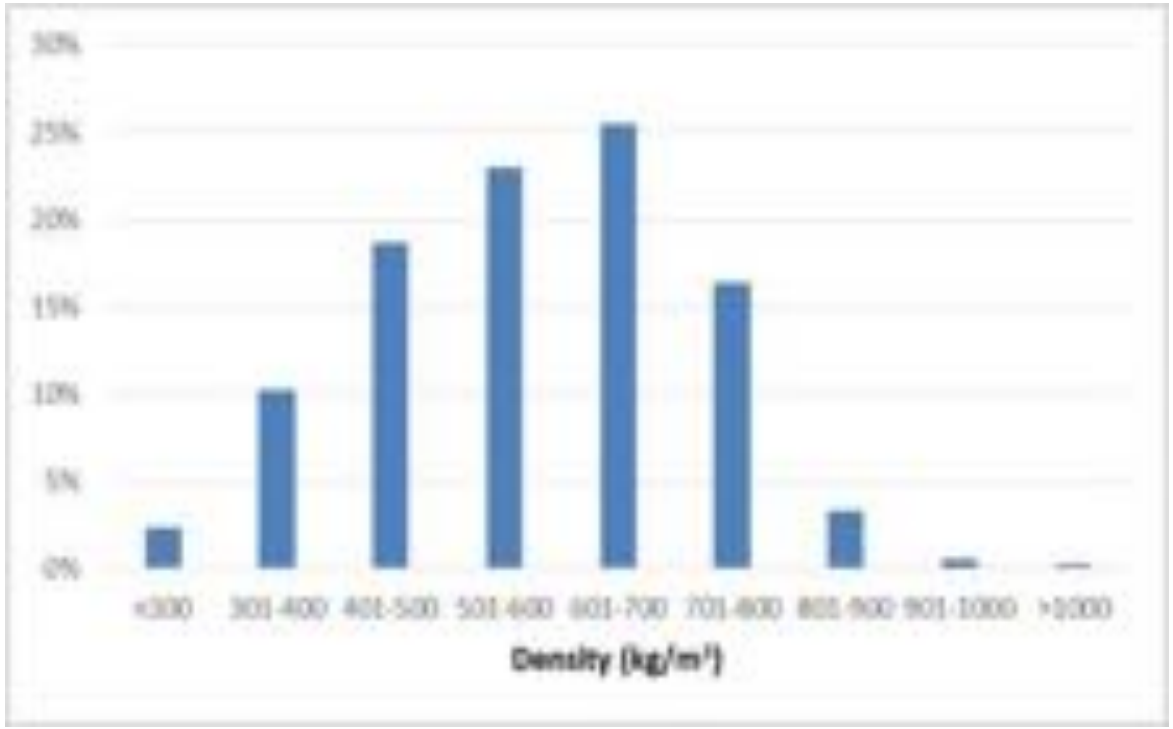
Traditional grading systems not appropriate

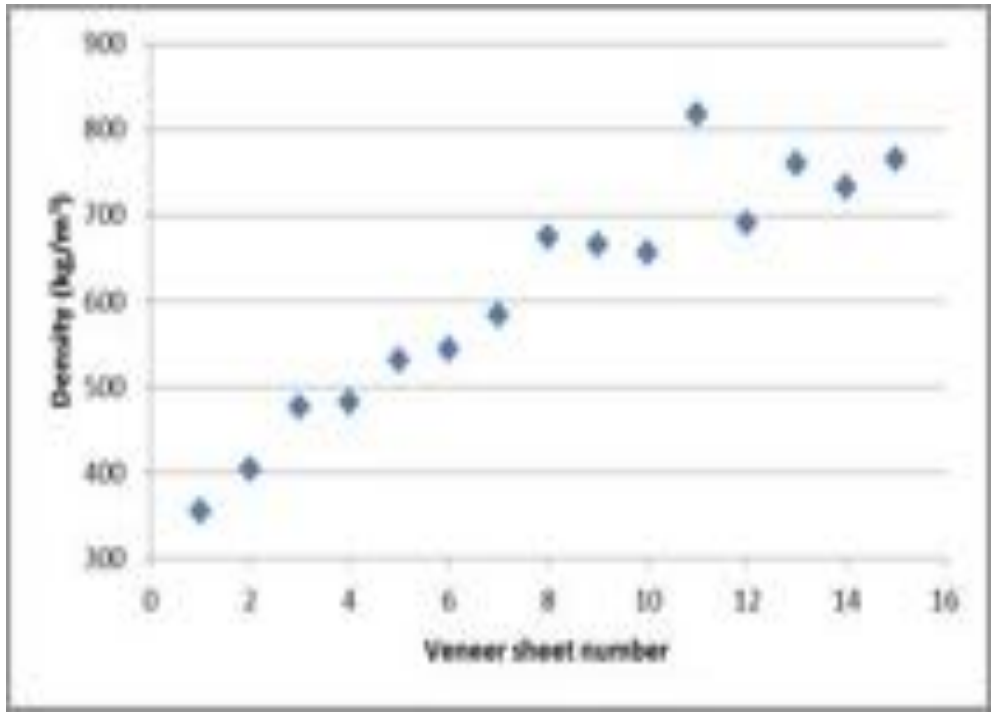
Provisional grading system proposed:

- Superior Quality (Grade 1) – 15%
- High Quality (Grade 2) – 50% (35%)
- Standard Grade (Grade 3) – 84% (34%)

Veneer assessment

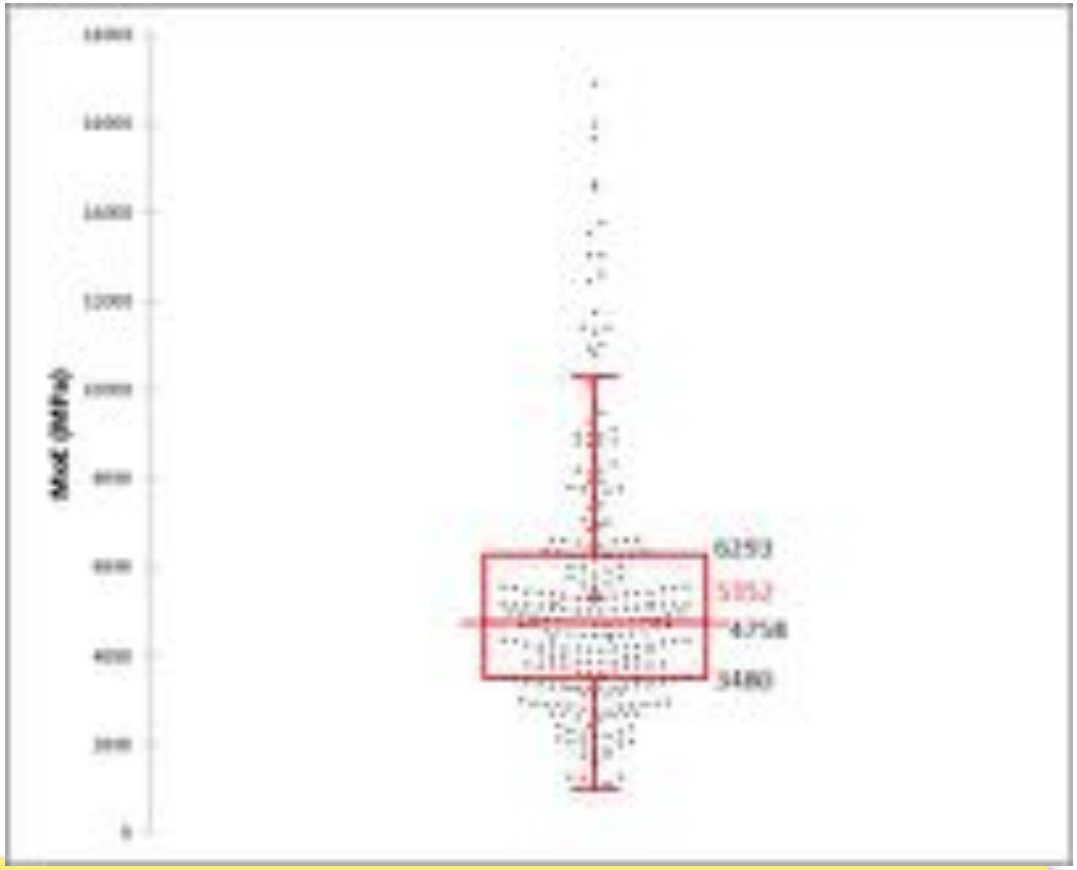
Density





Veneer assessment

Stiffness (Modulus of Elasticity)



Advanced veneer and other product from coconut wood

Summary

Key findings:

- Spindleless lathe technology can be effective in processing coconut stems with the right processing protocols
- Green recoveries ~60% is much more attractive than sawing (approx. double)
- Much higher recovery from the log periphery
- Fast drying with minimal degrade
- Recovery of usable veneer high (~40%)
- Recovered veneer has a range of qualities (mechanical, physical and appearance)
- Veneer mechanical properties were low compared to most wood species
- A grading system needs to be developed specific for coconut

Questions