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
Sawn Timber Assessments

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End of Project Success

Advanced veneer and other product from coconut wood
• Low volume recovery
• Low recovery from log periphery
• Variable board sizes
• Variable board qualities
Sawing v’s Peeling

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Traditional Peeling

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Spindleless veneering approaches

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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

Drive system

Cutting zone
Stage 1 - Range of parameters trialed

Lathe checks
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

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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

- 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

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Stage 4 – VTB commercial trial

Confirmed unique lathe settings

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Stage 4 – VTB commercial trial

Log heating critical

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Stage 4 – VTB commercial trial

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Stage 4 – VTB commercial trial

Not without challenges!

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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
- Britteness
- **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

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Veneer assessment

Stiffness (Modulus of Elasticity)

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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