Specialty Wood Products Research Partnership

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Theme: Specialty Wood Products (SWP)

WORK PLAN

Milestone Number: 1.2.2.1

Work Plan No. SWP-WP077

Assessing the Bending and Density Properties of six Eucalypt Species

Author/s:
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Research Providers:
Scion, Dean Satchell

Date: 9/5/18

TABLE OF CONTENTS

BACKGROUND

The mechanical properties of wood is known to vary between site, between trees, across the tree (radially pith to bark) and vertically up the tree, tree age etc.. This type of investigation is done using a 'small clear' approach rather than using a full in-grade (actual structural sizes) study. A small study takes 20mm x 20mm x 500mm sized specimens cut to avoid knots, sloping grain and other strength reducing defects.

This study will utilise timber from trees already felled for an earlier SWP durability study, this being from 4 trees for each of the following species

- E. bosistoana
- E. quadrangulata
- E. pilularis
- E. sphaerocarpa
- E. globoidea
- E. muelleriana

From these trees we have the ability to cut small clears from three vertical positions and three or more radial positions, each representative of wood from production-thinned trees or the inner wood in boards or veneer cut from a mature tree.

Objectives

- To determine the bending strength and stiffness along with density variation for six durable Eucalypt species in the radial and longitudinal directions. This will improve our understanding of stiffness and strength behaviour within a tree to be able to allocate material to applications appropriate to the wood properties.
- Small clear testing to be in accordance with ASTM D143 Standard Test Methods for Small Clear specimens
- Prepare a report summarising these results

Personnel

Scion - Doug Gaunt, Bruce Davy, Jamie Agnew
Dean Satchell

METHODS

The following species are proposed to be used in this study:

- E. bosistoana
- E. quadrangulata
- E. pilularis
- E. sphaerocarpa
- E. globoidea
- E. muelleriana

Currently we have timber from the four trees for each species, the work will be split into that done by Scion and that done by Dean Satchell.

Dean Satchell

1. 25mm x 25mm x 500mm specimens to be cut from each,
    a. From each tree at three vertical positons (Breast height. 5m and 10m)
    b. Also from pith to bark (this could be 3 -5 specimens)
    c. All specimens to be numbered such that they can linked back to the species, the tree, the specimen height and the radial position.
    d. Specimens to be cut with growth parallel to one face, this may not be possible with the close to pith specimens.
2. The timber will be air dried to close 12% as possible
3. After dryng, specimens to be planed to 20mm x 20mm x 500mm (maintaining reference numbers) and supplied to Scion.
4. It is estimated that there will be approximately 320 specimens covering the four species.

Scion

1. On receipt of the specimens they will be placed in fillets in our conditioning room (20^{O}C and 65% relative humidity), several specimens from each species will be weighed regularly. When the weights stop changing the timber is ready for testing, dependent on the initial moisture this conditioning can take 2-6 weeks.
2. Specimens will be cut down to 300mm long with offcuts having the reference numbers transferred to them, these will held in the conditioning room as references.
3. The specimens will be measured for length, width, depth and weight
4. The 20mm x 20mm x 300mm specimens will be tested for bending strength and stiffness in accordance with ASTM D143.
5. Following testing the specimens will be oven dried for moisture content and destiny measurement.

Scion, Dean Satchell

Reporting

PARTNER/CO-OPERATORS

Dean Satchell

- to supply the dried samples to Scion ready for our conditioning and testing.
- to contribute to the report with tree and sampling information.

ANALYSIS OF DATA

- Bending strength & stiffness, density and moisture content for each specimen
- Vertical and radial trends by species

PROJECT COSTS

Milestone 1: Specimen selection, drying and planing

Cost:	$9,000
Personnel:	Dean Satchell
Completion Date:	30 October 2018
Task Summary:	Specimen selection, sawing, drying, planing with supply to Scion
Output:	320 approx specimens supplied to Scion

Milestone 2: Testing

Cost:	$14,400
Personnel:	Bruce Davy, Jamie Agnew.
Completion Date:	February 2019
Task Summary:	Conditioning, Bending strength & stiffness, density and moisture content for 320 (approx.) specimens.
Output:	Data

Milestone 3: Reporting

Cost:	$6,000
Personnel:	Doug Gaunt, Dean Satchell.
Completion Date:	March 2019
Task Summary:	Project report
Output:	Report

MILESTONE SUMMARY

All costs exclusive of GST

Milestone		Dean Satchell $	Scion $	Total $
1	Specimen selection, drying and planing	$9000	$0	$9,000
2	Testing	$0	$14,400	$14,400
3	Reporting	$1000	$5000	$6000
Total				**$29,400**

INTELLECTUAL PROPERTY

Work plan Approval: _____

_____ (Programme Manager): Date_____

_____ (Task leader): Date_____

SPECIFIC HEALTH AND SAFETY PLAN

This work is covered by the Scion Processing Health and Safety Plan.

REFERENCES

ASTM D143 -94 Standard Test Methods for Small Clear Specimens of Timber