Innovations
with Engineered Wood Products in New Zealand

Andrea Stocchero
10-11 December 2019
FAO Headquarters in Rome, Italy

Acknowledgments: Doug Gaunt (Scion), Jeff Parker (WPMA), and as referenced on each slide
Innovative approaches and opportunities with engineered wood products

Inspire

Design R&D

Demonstrate

Products and applications

Enable

Case studies
New engineered wood product

Highly automatized manufacturing

Data-driven decision-making and real-time analytics

Structural material from low-grade wood, short rotation and thinning logs, short logs

Performing and stable product

References:

© WET, Scion
New engineered wood product

References:

Screw-laminated hardwood lamella
Product development: Christopher Kelly and Alsitair Cattenach
Architecture: Christopher Kelly, Architect, Architecture Workshop
Structure: Alsitair Cattenach, Structural Engineer, Dunning Thornton Consultants
New engineered wood product

Screw-laminated hardwood lamella

Bended Hardwood engineered wood product

Cost effective on-site assembly of complex gridshell roof structure

40% bracing achieved through roof shell design

References:

Screw-laminated hardwood lamella
Product development: Christopher Kelly and Alsitair Cattenach
Architecture: Christopher Kelly, Architect, Architecture Workshop
Structure: Alsitair Cattenach, Structural Engineer, Dunning Thornton Consultants
New biobased adhesive for EWPs

References:

- The Scion Innovation HUB

100% biobased, renewable ingredients

Formaldehyde negative emissions

Non-toxic

Compatible with existing manufacturing processes
Digital manufacturing and prefabrication

Plywood structural frame

- Reduced manufacturing waste
- Minimised metal fixings
- Light weight and fast assembling
- Designed for disassembling

References:
X-Frame
Ged Finch, PhD Candidate,
Victoria University of Wellington
www.gerardfinch.com
Digital manufacturing and prefabrication

Plywood lattice structure

Accelerated off-site production
Reduced construction timeframes
Carried in by hand to be assembled on-site
Reduced cost of construction

References:
CLICK-RAFT system
Architecture: Chris Moller Architecture + Urbanism
Structure: Dunning Thornton
Construction: Makers Fabrication

© Thomas Seear-Budd, photographer
Pre-stressed laminated timber structures

Low damage seismic performance
Suitable for high-rise construction

50% less structural bracing required

References:
Pre-stressed laminated timber structures

2016 Kaikoura earthquake
Magnitude 7.8

The building was undamaged and could be occupied by emergency response group
Folded timber shell structure

Earthquake resilient, light weight, folded-wave shell structure

Structural material minimisation through shell geometry

Structural architecture

CNC accuracy of 3mm over 30m

References:

Team: Chris Moller Architecture + Urbanism, MOTM Architects, Grant Douglas
Structure: Dunning Thornton Consultants
Services: eCubed Building Workshop
Maximised-timber design

References:
The Scion Innovation HUB
Architecture: Irving Smith Architects, RTA Studio
Structure: Dunning Thornton Consultants
Maximised-timber structural design

References:
The Scion Innovation HUB
Architecture: Irving Smith Architects, RTA Studio
Structure: Dunning Thornton Consultants
Carbon Sequestration and Storage

454 m$^3$ of structural wood

418 t CO$_2$-e stored

35 minute re-growth time in NZ Radiata Pine forests

References:
The Scion Innovation HUB

Architecture: Irving Smith Architects, RTA Studio
Structure: Dunning Thornton
Take away messages

Innovation with engineered wood is happening by:
• Optimising the production, management and use of resources
• Innovating with Design (structural, architectural and circularity)
• Innovating with Manufacturing and construction (CNC, DfM, Prefab)

Innovation with engineered wood enables:
• Improved building performance
• Improved building resilience
• Improved sustainability
Working across sectors
Supporting a circular biobased economy

GOVERNANCE

GUIDANCE/LEADERSHIP/SUPPORT

CONSUMERS

DEMAND/CHOICE

OFFER/SERVICE FROM VALUE CHAINS’ STAKEHOLDERS

CIRCULAR BIOBASED ECONOMY
Thank you

Andrea.Stocchero@scionresearch.com

www.scionresearch.com

Prosperity from trees Mai i te ngahere oranga

Scion is the trading name of the New Zealand Forest Research Institute Limited