



WOOD PRODUCTS & PROCESSING SOLUTIONS

Specialist equipment and capability to ensure the place of wood in future markets.

WOOD-BASED PRODUCTS FOR EVERY PURPOSE

Wood products compete in a diverse and demanding market. Such products, when produced from planted forests represent a renewable, energy-efficient and environmentally friendly option for consumers.

The key for industry to maintain a competitive edge is to reduce processing costs, promote new applications such as multi-residential and light commercial construction, and expand the natural appeal of wood through better stability, durability and appearance.

Scion helps manufacturers to respond to market opportunities through specialised research and development.



RESEARCH ACROSS THE VALUE CHAIN

Scion aims to maximise the value of products obtained from trees. Collaborative research and development focuses on improving recovery of targeted products from sawing and drying to remanufacturing. Scion works alongside the wood processing and products industries to improve grade recovery, productivity, energy efficiency and trade access so the promise of future markets can be fulfilled.

As an integrated research organisation that spans the entire value chain, Scion provides a feedback loop from the wood processing and forest growing sectors to ensure trees are produced with appropriate wood quality characteristics. Our expertise extends beyond radiata pine to include other forestry species.

Scion's capabilities include the following key areas:

- **Material knowledge.** Scion is working with wood processors to maximise grade recovery through identifying which wood is most suitable for specific end products. This knowledge leads to improved systems for segregating the resource both at the log yard and at the mill.
- **Timber Engineering.** Scion offers engineering services devoted to researching the use of timber products and non-wood products in structural and other engineered

applications. This research is valuable for underpinning building standards and ensuring market access.

- **Wood drying.** Wood drying plays a critical role in generating wealth from the forestry sector and transferring these advantages to industry. Scion leads the world in optimising the drying process for softwood timber from planted forests.
- **Wood protection.** A major challenge for plantation-grown softwoods and hardwoods is to ensure durability in exposed applications. Scion specialises in developing chemical and non-chemical wood protection treatments that are environmentally benign and have minimal impact at the end-of-life.
- **Wood modification.** Scion is developing new technologies to improve the durability, appearance and stability of wood. In addition, wood can be modified in ways that make it more water repellent and fire resistant.
- **Engineered Wood Products (EWPs).** Scion has a long history of research collaboration with wood composites manufacturers focused on tailoring processes and products to meet changing consumer demands. By cutting and recombining wood in various configurations, improved properties can be 'engineered' into these wood products. Scion has the capability to make, test and work with clients to optimise a wide range of engineered wood products such as laminated posts and beams, fingerjointed timber, CLT, plywood, LVL, particleboard, MDF and



CASE STUDIES: A-GRADER MAKES AN IMPACT

The ability for sawmillers to rapidly grade and segregate timber creates huge savings in wood processing costs. Grading technology developed jointly by Scion and Taranaki-based firm Falcon Engineering has proven its worth in New Zealand sawmills and is now being noticed in North America.

The A-grader is a stress grading machine that uses sound waves to measure timber stiffness at production speeds. This information allows sawmillers to sort timber prior to further processing. Its advantage is the ability to operate on green or dry, rough-sawn timber.

Currently there are over 35 installations in New Zealand, Australian, United States and Canadian sawmills, many operating at high speed. Across these sites, the A-grader is responsible for significant increases in revenue and has a payback period of only a few months.

others. The adhesive used is critical to EWP performance, processing requirements and cost structure. Scion is actively working on adhesives and is well set up to test and apply these for existing and experimental EWP's.



RESEARCH TO CREATE HIGHER MARGINS FROM RADIATA PINE

Scion's dewatering technology. The removal of water from within the wood that enables further modification to take place, lays the foundation for the production of bespoke high-value wood products from radiata pine. This may allow radiata pine to sell at prices similar to high value hardwoods.

The dewatering technology uses CO₂ to remove water from within the centre of wood cells enabling further modification to a range of exacting stability, hardness, colour and durability requirements. Successful trials conducted this year by our wood processing scientists have further optimised the technology.

Using CT and MRI scanners, scientists have also been able to gain a clearer picture of comparative moisture distribution patterns inside both dewatered and conventional kiln dried wood. These in-depth studies show the dewatering process has no negative impacts on the final wood quality.

While the technology comes with higher capital and operating costs than traditional wood processing technologies, it would complement an existing sawmilling operation.

TREATMENT SYSTEMS TAKE A GREEN TURN

Some existing wood protection chemicals now unacceptable to many consumers and restricted in certain export markets by new regulations. Scion undertakes research to identify naturally-occurring compounds that can protect wood against decay. From these compounds, we can develop bioactive wood preservatives to achieve H3 hazard protection for wood used in window and exterior door joinery, cladding, decking and indoor/outdoor furniture.

Scion researchers have screened over 100 potential wood treatment substances, including a selection of essential oils and extracts such as manuka, kanuka and eucalypt. Two of these compounds in wood so they do not leach out when exposed to water, providing resistance to wood decay. These preservatives should help New Zealand's wood exporters meet global demand for environmentally friendly high-value building products.

UNDERSTANDING CREEP IN TIMBER DRYING

During the drying or steaming process, wood undergoes rapid changes in moisture content that cause immediate

shrinkage and distortion. An additional mechanism known as "mechano-sorptive creep" has been identified as a major factor in stress development and relief within wood. Over time this will affect the behaviour of wood not only in drying, but also in storage and in service. Scion has initiated a large research programme, developing highly specialised equipment to better understand in-situ mechanical properties and effect of creep and moisture change.

POTENTIAL FOR CROSS LAMINATED TIMBER

Cross laminated timber (CLT) is a structural product suitable for loadbearing construction use in multi-storey buildings. Although more widely used overseas, it may have application in New Zealand and also opens up export markets. In early 2013, Scion investigated the market potential for CLT in New Zealand on behalf of Grow Rotorua. The Scion study reported on CLT manufacturing costs, the potential size and structure of the New Zealand market, and cost-competitiveness with alternative building materials, such as concrete.



WHAT WE PROVIDE

- **Product development services** including material and process analysis, troubleshooting and making prototypes.
- **Testing services** ensuring compliance with regulatory and non-regulatory standards, manufacturers' specifications, preservation standards, customer specifications, and codes of practice.
- **Product design capability** through partnerships with universities and design companies.
- **Networks.** Our national and international partners can help bridge gaps between ideas, research and technologies and commercial needs.
- **Funding opportunities.** Working with industry partners to pursue funding for research and development.
- **IP expertise.** offering specialised legal advice to protect intellectual property.
- **Multi-disciplinary research teams** assembling the full range of skills needed for any given project.

WORKING TOGETHER

Scion can tailor contractual relationships to meet the specific needs of each customer. These could include:

- **Service provision**, where we undertake specific projects for clients, usually involving specialised testing and problem solving.
- **One-on-one confidential research** projects targeted to maintain client competitiveness.
- **Joint technology development** partnerships with joint risk and reward.
- **Strategic multi-party alliances** to address sector-based challenges and innovation opportunities.

CONTACT

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