Adding Value to Every Board: Inside Timber Remanufacturing

How do people and technology work together to turn naturally variable wood into consistent, quality products?





At Red Stag Timber, Kye Matchitt, 20, Bennett, 22, and Sean Hayes, 23, are building careers combining practical skills, technology and teamwork.

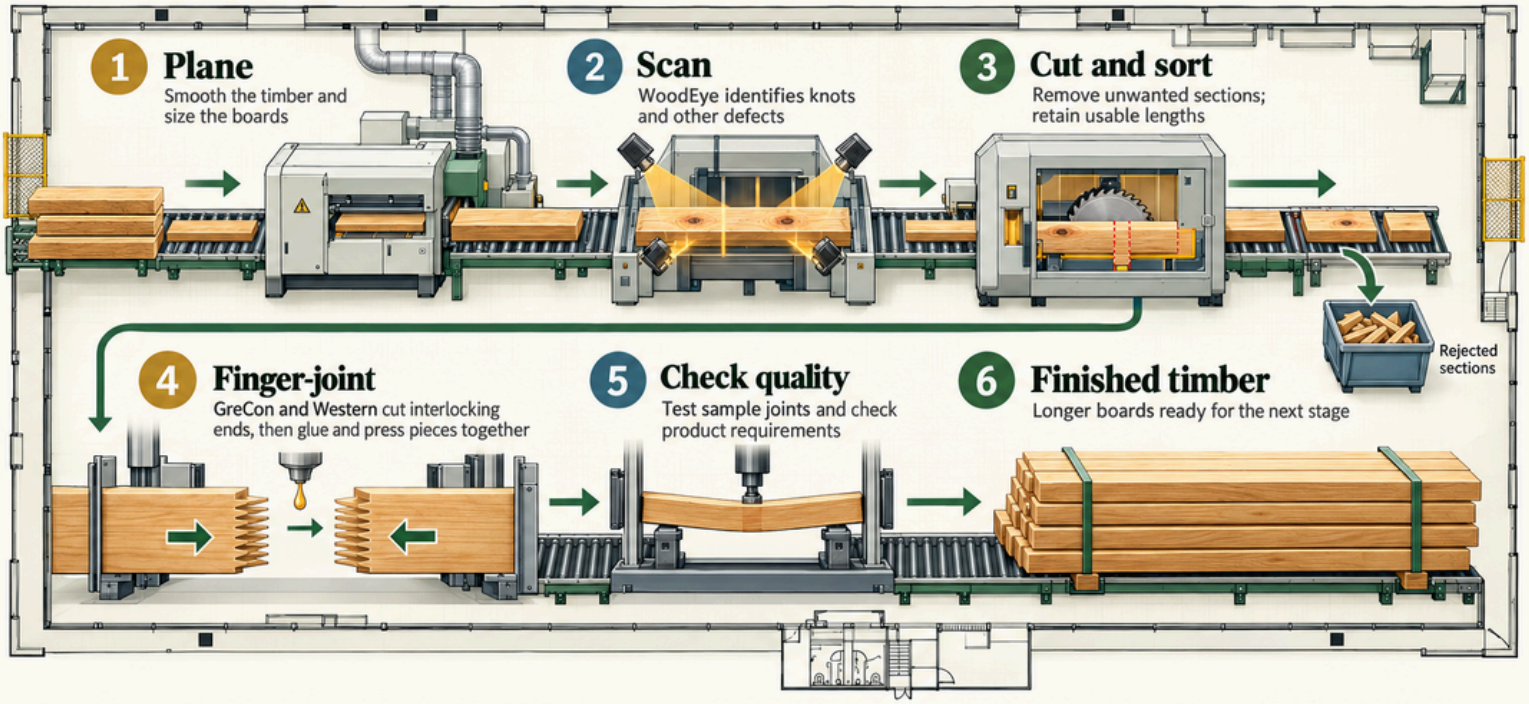
Kye is a quality-control apprentice who checks timber's appearance, moisture, strength and stiffness. Like his poppa and uncle, he worked at Kinleith before joining Red Stag nearly two years ago. He enjoys the science behind timber testing, with supportive colleagues helping build his knowledge and confidence.

Bennett moved from hospitality into remanufacturing through a connection at Red Stag. The former Rotorua Boys' High School student enjoyed art and digital technology. Alongside Sean, he helps turn shorter timber pieces into useful, finger-jointed boards.

All three men value their colleagues. Bennett particularly appreciates working with people of different ages, ethnicities and backgrounds.

Making more of every board

Inside Red Stag Timber's remanufacturing department



People and technology working together

Machine guarding

Safety light curtains

Isolation and lockout

Simplified process diagram • Not to scale

Seeing Beyond a Piece of Wood

Before working at Red Stag Timber, Kye Matchitt thought of timber as something you might simply put into a house. Becoming a quality control apprentice revealed how much knowledge, measurement and testing sits behind every board.

For Kye, one of the most interesting discoveries was how timber is tested to understand its performance. A board might look suitable, but appearance alone cannot tell the team how it will behave under load. His work involves checking timber at the G1 and G2 planer lines, monitoring moisture and helping test strength and stiffness. Each check contributes evidence that the timber is suitable for its intended use.

G1 and G2 are the names given to two planer lines. These lines machine saw timber to consistent dimensions and a smooth finish. Kye checks the timber's appearance and moisture content, helping the production team ensure it meets the required specifications.

Strength and stiffness describe different properties. Strength concerns how much force timber can withstand before failing; stiffness describes how much it bends under a load.

Kye explains that timber can be tested lying flat or standing on its narrow edge, like a joist. This connection between testing and how timber is used in a building helped him see the purpose behind the process.

Testing timber on its narrow edge is particularly meaningful because it connected the test with how a joist works in a house.

Positioned this way, the timber resists bending under a load. For him, testing brought the science back to a practical question: how will this board perform when it becomes part of a building?

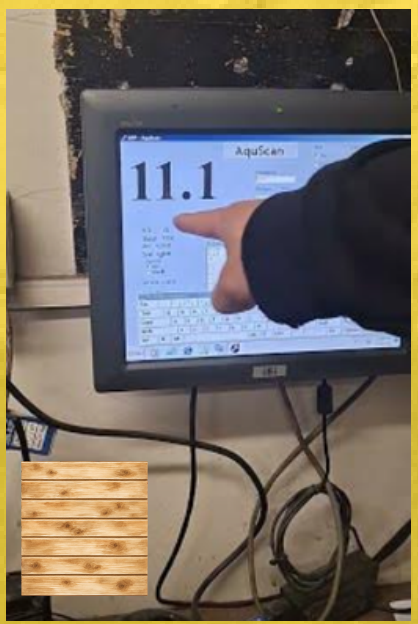
Hover over the wooden squares to view the clips.





Moisture was another steep learning curve. Kye uses a handheld Wagner moisture meter and checks readings from the in-line AquScan system.

As he explains, the scanner combines readings from different points to display an average for a board. Customers have different moisture requirements, so understanding those readings is part of maintaining quality.



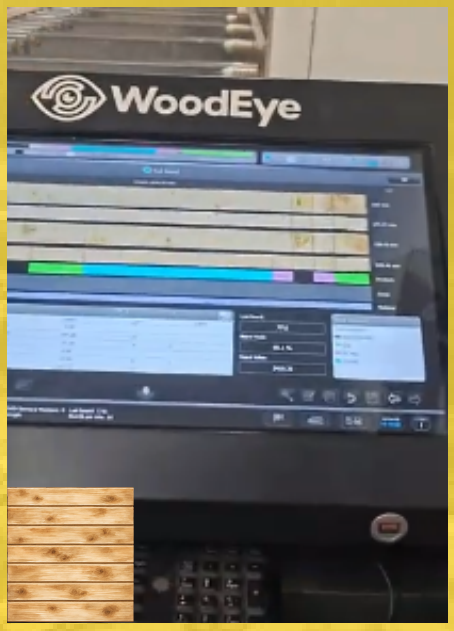
The technology provides information, but people must interpret it and respond. When Kye identifies a problem, he alerts the production team so they can investigate and adjust settings where necessary. He also records the issue in his report, helping others understand what happened and when.

What once looked like an ordinary piece of wood has become a material Kye understands through its properties, measurements and possible uses. His work involves science, mathematics and technology that are part of everyday decisions in a timber mill.

Finding and Removing Defects

Every board has a different story written into its grain. Knots show where branches once grew, while splits and other features can affect which parts are suitable for a particular product. In Red Stag Timber's remanufacturing department, Bennett and Sean work with technology that helps identify these features and recover useful timber.

After passing through a planer, boards enter the WoodEye scanner. Cameras capture information about the timber's surfaces, and computer software analyses the images to locate defects. This creates a digital picture of each board, helping the system determine where cuts should be made to meet the product requirements.



The next stage turns that information into action. The docking saw removes unwanted sections, leaving usable lengths of timber. The aim is to retain as much suitable wood as possible while achieving the required quality. Bennett explains that some products require clear timber, without knots, while others allow certain knots.
The retained pieces may now be shorter, but they still have value. They move towards finger-jointing, where their ends are precisely cut and glued together to create longer boards.



Removing one defective section allows the remaining wood to become part of a useful product.
The process connects digital technology with practical manufacturing. Cameras gather data, software interprets it, and machinery carries out the cutting decisions.



Bennett and Sean bring the knowledge and attention needed to work with that system, helping turn naturally variable wood into products with consistent requirements.

Making useful timber from shorter pieces

Removing defects leaves shorter pieces of usable timber. In Red Stag Timber's remanufacturing department, Bennett and Sean help turn these pieces into longer boards through fingerjointing.

Specialised machines, the GreCon and Western, cut a series of tapered "fingers" into the ends of each piece. These matching profiles fit together, creating a larger surface for bonding than simply joining two flat ends.

Adhesive is applied to these fingers, and the pieces are pressed together to form a tight joint. Accurate cutting, glue application and pressure all contribute to the finished product. The adhesive then cures, bonding the pieces together.

Quality checks help the team assess the results. Previously Kye demonstrated how a bending tester applies force to a sample containing a finger joint, providing evidence about its strength.

For Bennett and Sean, this process adds value to timber that might otherwise have limited uses. Short pieces become longer, useful boards through a combination of machinery, adhesive technology and skilled work.

example of a finger join



Finger joints up close







Working Safely Together

At Red Stag Timber, working safely means combining protective technology with clear communication and responsibility for others.

For Kye, who moves between production areas to carry out quality checks, being seen is essential. He makes sure forklift drivers and machine operators know he is nearby, using radios or a phone to communicate before entering their work areas.

Bennett and Sean describe the safety systems around the remanufacturing machinery. Light curtains use beams of light to detect when something crosses a protected boundary, triggering the machinery to stop. Interlocked access doors also stop machinery when opened.

When workers need to enter machinery for tasks requiring isolation, personal locks help prevent it from restarting. Each person attaches their own lock, identifying who is working in the area. The machine cannot restart while those locks remain in place. This gives each worker a direct role in protecting themselves and their colleagues.
Reporting matters too. Kye explains that near misses are recorded, even when nobody is hurt. Sharing what happened helps the team identify hazards and prevent future incidents.

These systems depend on people using them correctly. Knowing where colleagues are, communicating clearly and following agreed procedures are part of the skill involved in keeping a busy timber mill working safely.

Pathways into Timber Processing

An Invisible Safety Barrier: Light Curtains



There is more than one pathway into timber processing. Kye, Bennett and Sean describe experiences with different starting points that led them to work involving technology, practical skills and continued learning. Experienced colleagues have been central to that learning. Kye credits Anton with developing his grading knowledge and his manager, Jacob, with helping build his confidence and understanding of moisture checks. Learning alongside others means discovering how to complete a task and why it matters.
For Bennett and Sean, working with scanning, cutting and finger jointing machinery brings technical knowledge together with communication, safe working practices and teamwork.
Apprenticeships offer pathways into the engineering that keeps a mill operating.
Red Stag apprentice Caleb Hokai began a mechanical engineering apprenticeship after three months with the company and won ATNZ's inaugural Rookie of the Year award in 2023. His experience provides another example of learning while earning and taking on greater responsibility as skills develop.
All the men value working with people of different ages, ethnicities and backgrounds, and note that more women are joining the workplace.

CURRICULUM LINKS

Learning area	Connection to the case study	Possible learning focus
Technology: materials and manufacturing	Defect removal, finger-joint profiles, Purbond adhesive and quality testing.	Explain how material properties, processing and testing contribute to a product being fit for purpose.
Technology: technological systems	WoodEye cameras, software, conveyors, cutting equipment and safety sensors.	Trace how materials, energy and information move through interconnected subsystems.
Physics: forces and material behaviour	Bending tests, applied loads, timber orientation and joint performance.	Investigate how load, span or board orientation affects bending, distinguishing strength from stiffness.
Mathematics and Statistics: measurement and variation	Moisture readings, averages, sampling, dimensions and tolerances.	Interpret variation, compare groups of readings and consider what an average can conceal.
Career education	Apprenticeships, mentoring and different pathways into skilled employment.	Identify how school learning, practical experience and workplace training connect with career possibilities.



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WIDE TRUST

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FOREST GROWERS LEVY TRUST (FGLT)

The Forest Growers' Levy Trust collects the commodity levy paid on harvested wood material from forest growers and acts as the custodian of those funds. The Trust ensures the levy is invested in research, development, biosecurity, promotion and other industry-good activities that benefit New Zealand's plantation forest sector.