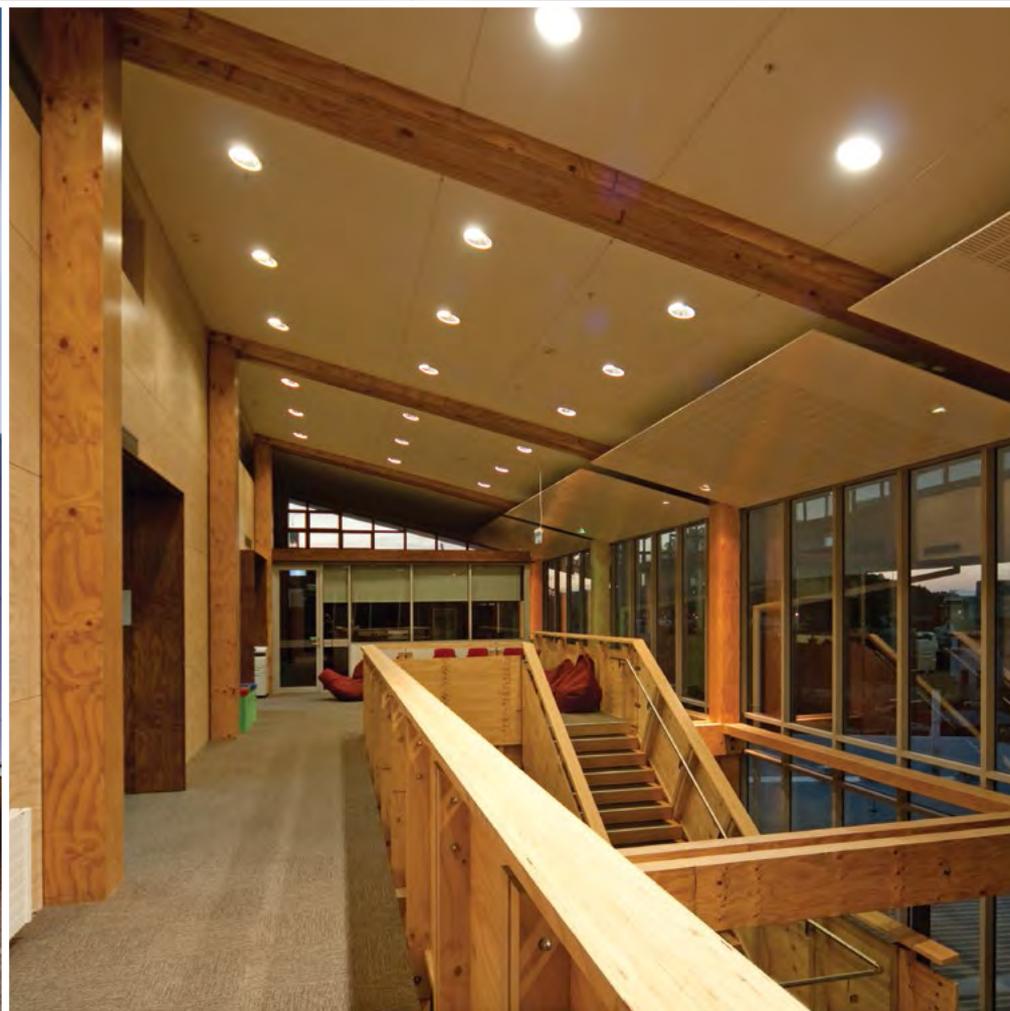




**NelsonPine**  
Laminated Veneer Lumber *LVL*

LAMINATED VENEER LUMBER  
ENGINEERED  
FOR PERFORMANCE



## THE BUILDING MATERIAL FOR OUR TIMES

Laminated Veneer Lumber (LVL) is gaining an increasing foothold in the building sector right around the world. Lessons learned from the Christchurch earthquake and the rising awareness for protecting the environment make NelsonPine LVL an attractive solution.

**“TECHNICALLY LVL IS ONE OF THE MOST SOPHISTICATED WOOD PRODUCTS EVER DEVELOPED FOR THE CONSTRUCTION SECTOR. IT IS VERSATILE, STABLE AND DURABLE. IN OUR NEW ‘POST-QUAKE’ CONSCIOUSNESS IT IS THE BUILDING MATERIAL OF CHOICE.”**

**PROFESSOR ANDY BUCHANAN  
UNIVERSITY OF CANTERBURY**



NelsonPine LVL offers the strength and precision of concrete and steel with the warm aesthetic appeal, lightness, economy and environmental benefits of wood.

With NelsonPine LVL and new engineering techniques, multi-storey buildings can be constructed of wood to survive major earthquakes.

Not only is NelsonPine LVL a beautiful

material to look at, it is easy and cost effective to work with.

NelsonPine LVL's strength, lightness and durability open up a new realm of design opportunities, whether it's for a contemporary domestic home, a high-rise commercial building, an industrial warehouse, or an indoor sports facility.

## **LVL -THE ADVANTAGES**

### **CONSTRUCTION**

**PROVEN EARTHQUAKE  
SAFETY**

**LIGHT WEIGHT**

**AESTHETIC APPEAL**

**WORKS WELL WITH OTHER  
MATERIALS**

**DOUBLE THE STRENGTH TO  
WEIGHT RATIO OF STEEL**

**COMPRESSION STRENGTH  
EQUAL TO HIGH  
PERFORMANCE CONCRETE**

**HIGH FIRE RESISTANCE**

**SOFTER ACOUSTICS**

### **COST SAVINGS**

**COST EFFECTIVE SOLUTION**

**RAPID CONSTRUCTION**

**SMALLER CRANES OR  
LARGER REACH**

**DURABLE IN ALL  
ENVIRONMENTS**

**OFF SITE FABRICATION**

**FEWER TRUCK MOVEMENTS**

### **ENVIRONMENT**

**LOCAL MATERIALS, LOCAL  
SUPPLIER**

**LOW CARBON FOOTPRINT**

**NATURAL RENEWABLE  
MATERIAL**

**SOURCED FROM  
SUSTAINABLE PLANTATION  
FORESTS**

**REDUCED ON SITE WASTE**

**QUIETER WORK SITE**

**LOW ENVIRONMENTAL  
IMPACT**

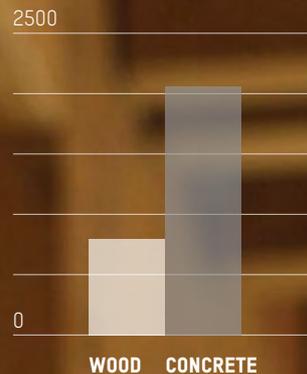
## **THE TECHNOLOGY BEHIND LVL IS SIMPLE**

Nelson Pine Industries has invested in the technology and the research to produce top quality LVL, from wood sourced from sustainable forests. The processing begins with the logs being de-barked, then heated in hot water baths before being peeled into uniform sheets of veneer. These are automatically layered up into billets, with joins 'scarfed' to maintain overall strength.

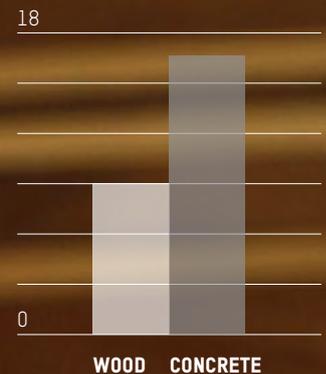
## WOOD V CONCRETE IN A MULTI-STORY BUILDING

(Gross Floor area: 1,300m<sup>2</sup>)

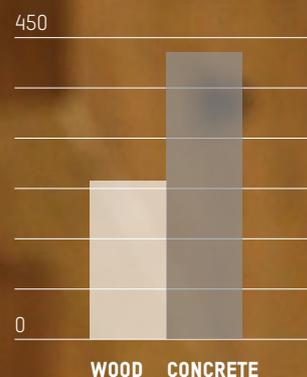
### MASSES FOR THE FRAME AND FOUNDATION (t)



### CONSTRUCTION WASTE AT THE SITE (t)



### CARBON FOOTPRINT (tCO<sub>2</sub>ekv)



**“TO PUT IT SIMPLY  
- BIG TREES ARE  
PEELED INTO THIN  
VENEERS AND THE  
VENEERS ARE GLUED  
BACK TOGETHER,  
YIELDING THREE OR  
FOUR TIMES THE  
STRENGTH FROM THE  
SAME LOG.”**

**PROFESSOR  
PIERRE QUENNEVILLE  
UNIVERSITY OF AUCKLAND**

The manufacturing process reduces the effect of natural defects such as knots, which are randomised throughout the entire LVL length. The end result is significantly enhanced strength, rigidity and structural uniformity.

LVL is produced as a stable, predictable laminated product in a range of thicknesses, up to 1.2m in width and 18m in length. It reduces warp, twist, bow, or shrink, and its strength makes it

ideal for use in commercial construction.

NelsonPine LVL offers a lightweight alternative to structural framing materials such as steel and concrete, suitable for commercial applications including:

- Ground, mid and mezzanine floor systems
- Purlins, girts and rafters
- Portal frame construction
- Post and Beam members

NelsonPine LVL offers inherent cost savings as a building material and these are enhanced through the simpler and faster construction process.

The natural beauty and warmth of NelsonPine LVL can be left exposed, or the material responds well to the range of coatings available to meet specific aesthetic requirements.

**“WE’RE VERY PROUD TO BE TEACHING OUR DESIGN IN NELSON’S FIRST MULTI-STOUREY CONTEMPORARY WOODEN BUILDING. IT’S PARTICULARLY APT THAT STUDENTS OF THE CREATIVE INDUSTRIES ARE STUDYING IN A BUILDING THAT IS CUTTING EDGE IN ITS TECHNOLOGY AND AESTHETICS.”**

**TONY GRAY. CEO, NELSON MARLBOROUGH INSTITUTE OF TECHNOLOGY**



## **ARTS & MEDIA BUILDING NELSON MARLBOROUGH INSTITUTE OF TECHNOLOGY (NMIT) NELSON**

Three storeys high and composed of three separate buildings, this new landmark on the Nelson cityscape was built to a design that met the New Zealand Government’s objective for a landmark timber structure to showcase and stimulate the use of structural timber.

The three-storey central building is spacious, airy, and built to maximize the natural light, an important consideration



for the trainee artists and designers who use its studios daily. Alongside the central building are a soundproof media room and a single storey workshop. All timber elements are exposed, giving visible expression to their functionality, and creating the warm atmosphere that comes with natural timber. The building utilises NelsonPine LVL for all structural components, with world first 'damage avoidance' seismic

engineering, incorporating post-tensioned timber shear walls. These enabled the use of straightforward post and beam gravity frames, immediately recognisable in their simplicity. Further design innovations include thermal mass, mixed mode heating and cooling, assisted ventilation and solar water heating.

#### FACT FILE

**Client:** Nelson Marlborough Institute of Technology

**Architect:** Irving Smith Jack Architects

**Engineer:** Aurecon

**Construction:** Arrow International

**Size:** 3 storeys, 3000m<sup>2</sup>

**“THINK OF LVL AS A BIG MECCANO SET – ALLOW FOR CONSIDERATION OF TOLERANCES. CLOSE AND EARLY COLLABORATION BETWEEN ARCHITECT, STRUCTURAL ENGINEER, BUILDER, MANUFACTURER AND FABRICATOR RESULTS IN SIGNIFICANT EFFICIENCIES, COST SAVINGS AND A REDUCED INSTALLATION TIME FRAME.”**

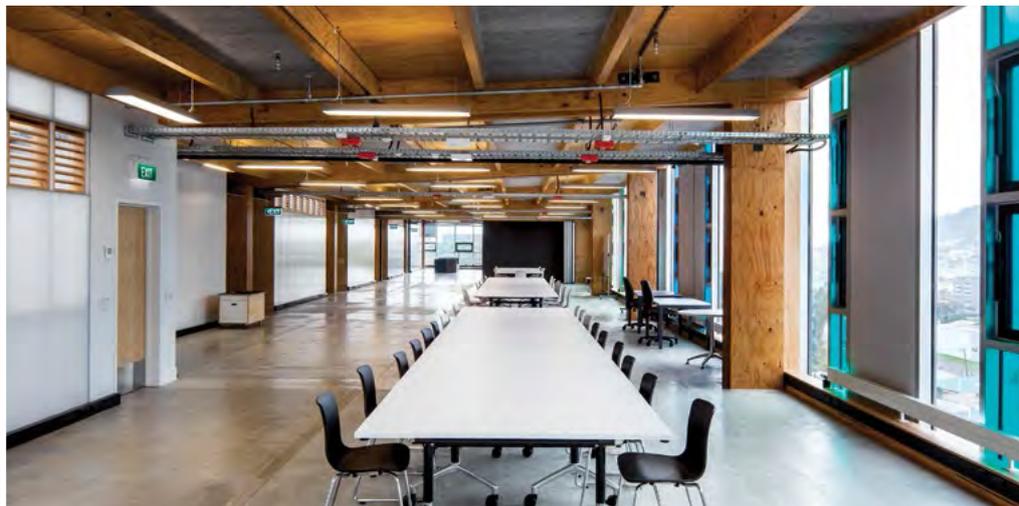
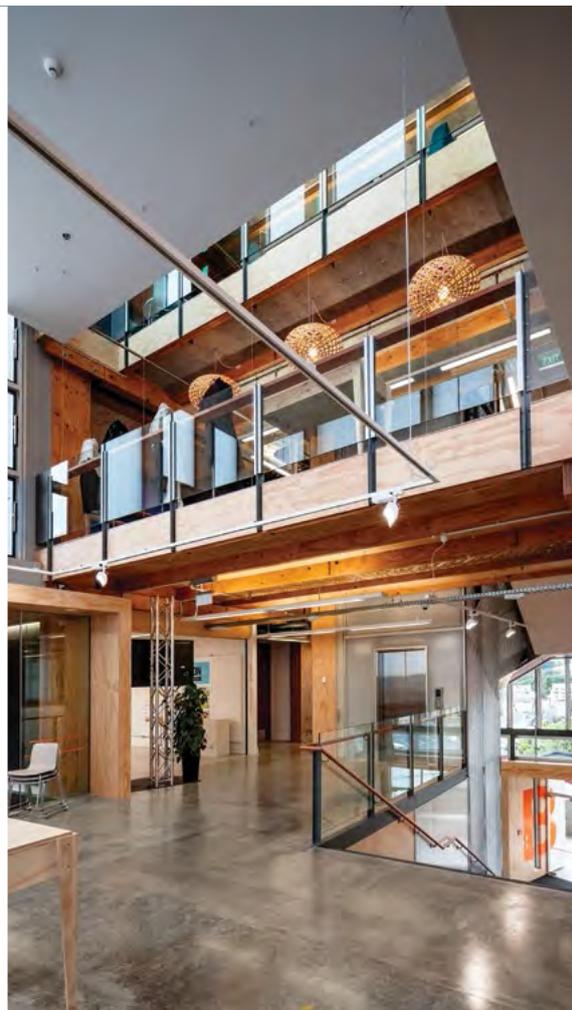
STEVEN VAN DER POL. ARROW INTERNATIONAL (NZ) LTD



## **COLLEGE OF CREATIVE ARTS (COCA) MASSEY UNIVERSITY WELLINGTON**

Massey University's new College of Creative Arts building is a leading edge commercial building, particularly in its earthquake strengthening. The structure includes the world's first multi-storey post-tensioned timber frame, resting on a conventional

reinforced concrete and in situ concrete plinth. The five-storey, 3,500m<sup>2</sup> building was designed as a series of discrete components, which allowed for prefabrication and quicker erection on the contoured site. Similar technology was used in the Southern Cross Hospital in Christchurch, which performed exceptionally well in the earthquakes.



**“NOTHING IS DESIGNED TO BREAK - THE AMOUNT OF MOVEMENT IS DESIGNED TO BE CONTROLLED FROM A COMBINATION OF THE STEEL PLATES, WHICH DAMPEN THE MOVEMENT, AND THE HIGH STRENGTH STEEL CABLES TENSIONING A TIMBER FRAME - THE CABLES CLAMP THE JOINTS CLOSED BUT ALLOW THEM TO FLEX DURING AN EARTHQUAKE.”** ALISTAIR CATTANACH. DUNNING THORNTON

Supported by the timber frame are innovative, prefabricated NelsonPine LVL and precast concrete composite floors. This combination is notably lighter than a traditional system and uses the two materials to their strengths. Concrete is very effective in compression, with useful thermal mass and acoustic properties; and timber, being fibrous, has very effective strength-to-weight ratio in tension.

Beams and columns of the NelsonPine LVL frame, visible throughout the building, are also part of the aesthetic. The use of NelsonPine LVL allows studios and other teaching spaces to be configured in many different ways.

#### FACT FILE

**Client:** Massey College of Creative Arts  
**Architect:** Athfield Architects  
**Engineer:** Dunning Thornton Consultants  
**Construction:** Arrow International  
**Size:** 5 Storeys, 3500m<sup>2</sup>

**“WITH THE WAITOMO PROJECT WE STARTED OUT TRYING TO MAKE A GRID-SHELL BY REPETITIVELY USING SMALL PIECES OF LOCALLY GROWN TIMBER TO MAKE A CANOPY THAT RESPONDED TO THE CURVE OF THE WAITOMO STREAM. LVL GAVE US A WAY OF USING RADIATA PINE IN A MUCH MORE STRUCTURALLY SOPHISTICATED FORM - LAMINATING VENEER ADDS ENORMOUS VALUE”**

**CHRISTOPHER KELLY, ARCHITECTURE WORKSHOP**



## **CAVES ENTRANCE WAITOMO VISITOR CENTRE WAITOMO**

Sheltered below an innovative woven timber canopy, new amenities for visitors to the Waitomo Caves include tourist gathering areas, a 250-seat dining room, retail space, seminar and exhibition areas as well as a café and theatre.

The design recreates a net or grid-shell, reflecting the importance to the local hapu of hinaki (eel traps). To turn the design into actuality, NelsonPine



LVL was prefabricated into dramatic curved and twisted ribs at the Hunter Laminates' factory in Nelson. The curved LVL ribs were joined, overlapped in layers, then screwed together as they were assembled on site by Hawkins Construction. The structure of the centre is internationally significant, with the geometry of the canopy described by the surface of a toroid (donut).

Although the complex geometry pushed the limits of Dunning Thornton's three-dimensional modeling tools, the resulting exceptionally light structure utilises timber members only 316mm deep, at 4.25m centres, to span almost the entire roof width, a distance of 30m.

#### FACT FILE

**Client:** Tourism Holdings Limited

**Architect:** Architecture Workshop

**Engineer:** Dunning Thornton Consultants

**Construction:** Hawkins Construction

**Size:** 55m long, 30m wide, 15m high, 1650m<sup>2</sup>



## TUMU ITM NAPIER

Napier's new Tumū ITM store is the second commercial building in the world to use a revolutionary new timber joining technology that simplifies the installation of long-span laminated veneer lumber (LVL) sections. The major design feature of the building is a roof structure of NelsonPine LVL beams that spans 60 metres, with the beams spliced together and fixed to columns

**“OUR COMPANY IS A MAJOR LOCAL FORCE IN THE TIMBER INDUSTRY AND WE WANTED TO REFLECT THAT. MORE IMPORTANTLY, THE LVL DESIGN ENABLED US TO MEET THE REQUIREMENTS OF OUR CUSTOMERS BY PROVIDING A MUCH MORE USER-FRIENDLY SPACE.”** PAUL WAITE,  
MANAGEMENT PARTNER AT TUMU ITM BUILDING CENTRE.



using an innovative steel dowel and self-drilling screw system. Known as the Quick Connect Joint, the system was developed by the Structural Timber Innovation Company (STIC). The system allows for more assembly offsite, saving time and money. The expedient installation of rafters to timber, steel or concrete columns reduces the use of a crane and labour needed during erection. In the Tumu ITM building, the Quick

Connect concept was used between the LVL rafters and the steel columns, at the LVL rafter splices and at the LVL rafter apex connections. As a result of the success of the Tumu ITM project, a second timber portal frame project using the Quick Connect is underway by the same team of consultants and builders who won the award.

**FACT FILE**

**Client:** TUMU ITM Hawkes Bay

**Engineer:** Strata Group Consulting Engineers

**Construction:** Alexander Construction

**Size:** 4200m<sup>2</sup>



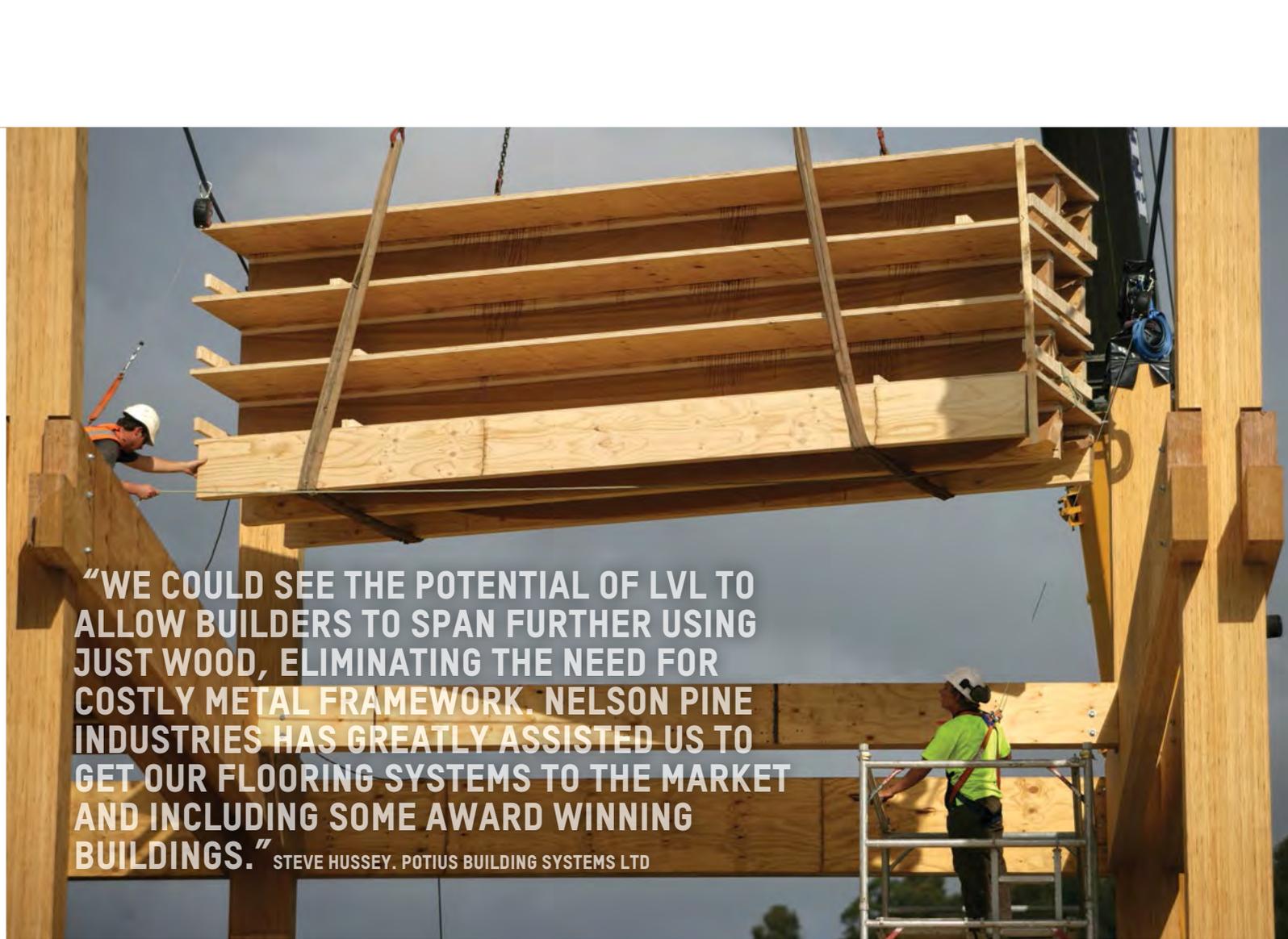
## LONG SPAN PORTAL FRAMES FOR INDUSTRIAL FACILITIES AND WAREHOUSES

All building projects are different and all present challenges. NelsonPine LVL is an innovative product for long clean span structures.

The growing track record of award-winning buildings constructed with NelsonPine LVL indicates this will benefit you and your clients, now and going forward into this century of change.

### Benefits of NelsonPine LVL

- Quick connect bolted solutions to enhance time saving
- Follow on trades can come in earlier and be on site for a shorter time
- Multiple prefabricated design solutions to meet the requirements for every project
- Consult with Nelson Pine Industries as early as possible to understand the range of solutions available



**"WE COULD SEE THE POTENTIAL OF LVL TO ALLOW BUILDERS TO SPAN FURTHER USING JUST WOOD, ELIMINATING THE NEED FOR COSTLY METAL FRAMEWORK. NELSON PINE INDUSTRIES HAS GREATLY ASSISTED US TO GET OUR FLOORING SYSTEMS TO THE MARKET AND INCLUDING SOME AWARD WINNING BUILDINGS."** STEVE HUSSEY, POTIUS BUILDING SYSTEMS LTD



## INNOVATIVE LVL FLOORING SYSTEMS

There is a range of options including Stress Skin Panels and Timber Concrete Composite solutions. As NelsonPine LVL gains more traction in the market, collaborative projects are

developing with like minded innovative companies producing flooring solutions from LVL.

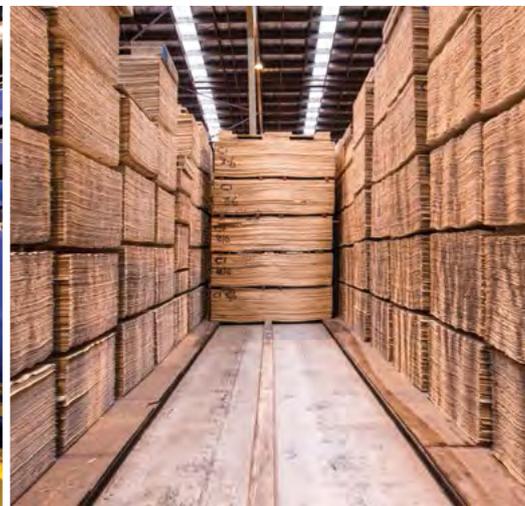
### The Design Advantages

- Light weight
- Flexible designs
- Multiple geometries
- Acoustic solutions
- Fire rating solutions
- Composite action
- Instant working platform

# A WORLD LEADER



Log Peeling.



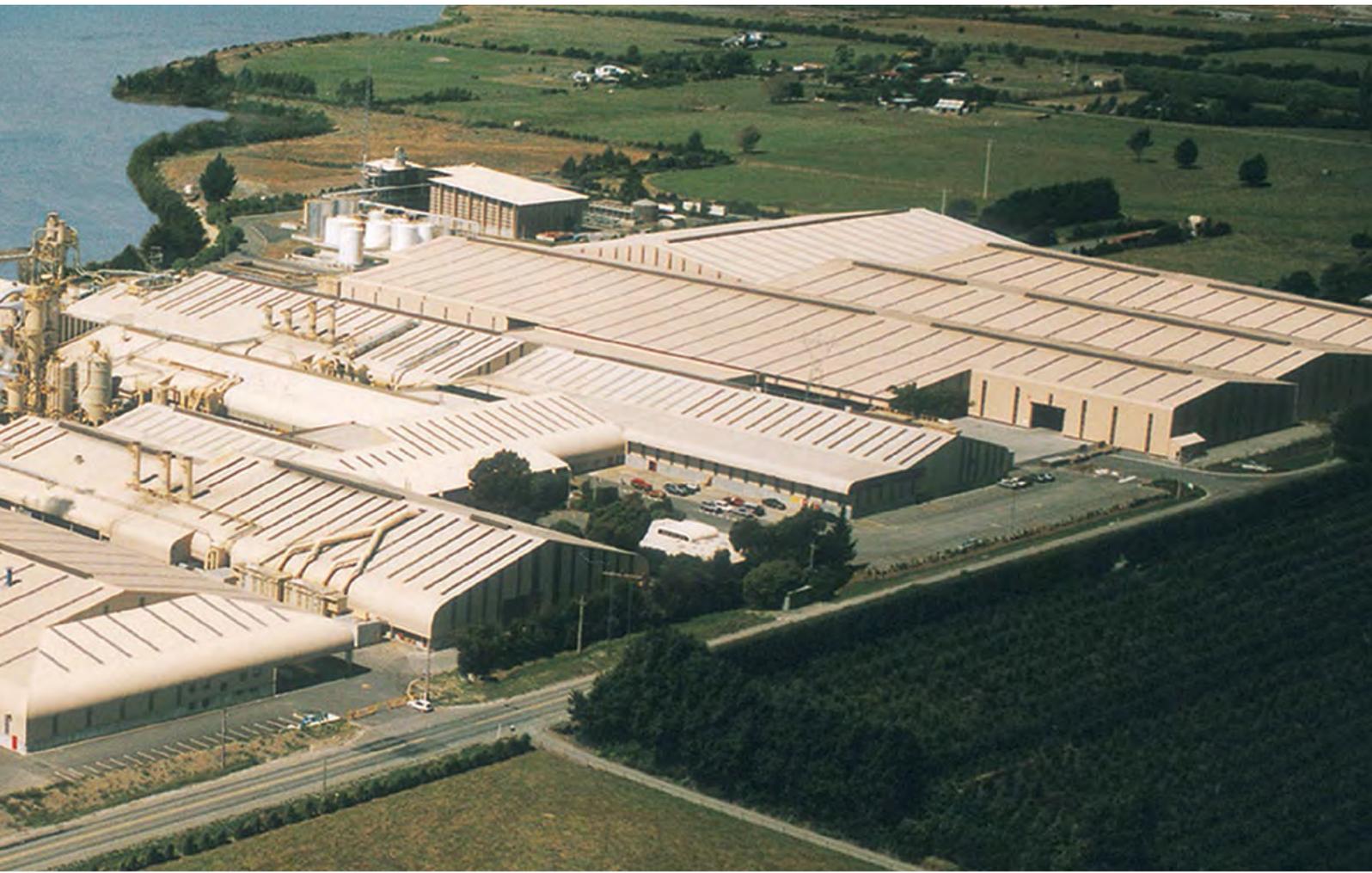
Veneer Stacks.



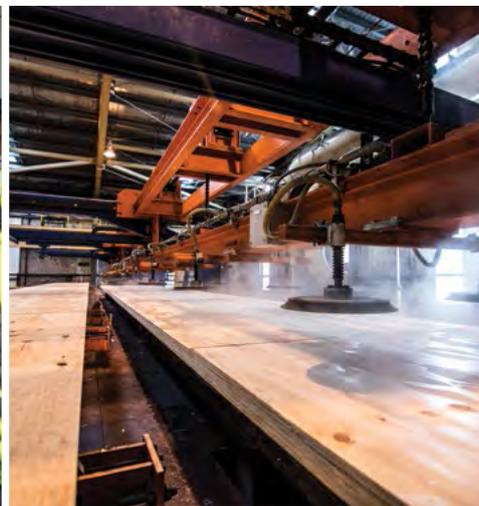
Veneer Layup.

## NELSON PINE INDUSTRIES LTD

NelsonPine LVL is produced at the Nelson Pine Industries plant in Richmond, Nelson. The company has developed a reputation as an innovator in wood production since the company's first Medium Density Fibreboard (MDF) line was installed in 1986.



Control Room.



Finished Billets.

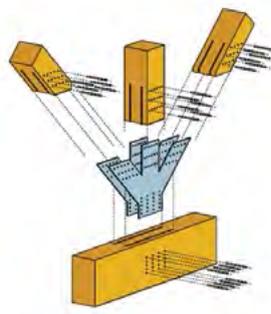


Warehouse Dispatch.

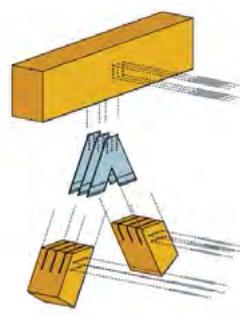
In 2002 Nelson Pine Industries began production of LVL. The investment in cutting edge technology was based on the availability of a higher quality Pinus Radiata resource than was required for MDF and on a foreseen demand for a product that would satisfy the requirements of the construction sector into the future.

The Richmond site is central to the extensive pine forests of the Nelson region. It is close to Port Nelson, which is well serviced by shipping lines to major International markets. Over the last ten years the company has advanced and refined the product in association with the Engineering Department of the University of

Canterbury. The company is now a world leader in LVL technology, with a growing reputation for a high quality, consistent product, backed up with high standards of research, support and customer service.

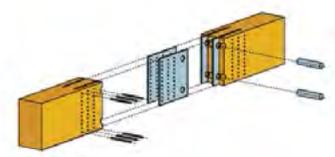


Framework joint



Framework joint

**cadwork®**



Assembly joint



## SOLUTIONS FOR TIMBER CONSTRUCTION

Nelson Pine Industries utilises the specialised Cadwork 3D timber construction software package for the design and production of NelsonPine LVL components. Cadwork integrates with common architectural and engineering software providing

transparency, detail and cost effective, faultless precision. The direct interface between Cadwork and the Hundegger K2i offer highly flexible and accurate computer controlled machining of NelsonPine LVL componentry, providing commercial construction solutions.

**“THE NELSON PINE INDUSTRIES ENERGY SAVING PROJECT SOUGHT TO WIN TO HEARTS AND MINDS – ON THE SHOPFLOOR AND IN MANAGEMENT – AND DEMONSTRATED AN UNDERSTANDING OF CULTURE, AND THE COURAGE TO DESIGN AND IMPLEMENT ENERGY EFFICIENCY WHILE MANAGING RISKS TO PRODUCT QUALITY.”**

**JUDGING PANEL. EECA ENERGY AWARDS 2012**



## **SUSTAINABLE FUTURE THINKING**

LVL is a very energy efficient product, taking only a fraction of the fuel and power required to manufacture and transport steel and concrete. Timber construction is inherently more environmentally responsible than other construction methods. Comparing

the initial embodied CO2 emissions, a structure utilising LVL is 40% lower. Not only is it lower, but the structure virtually becomes carbon neutral because the wood stores carbon. Nelson Pine Industries has an award winning energy savings plan in place, with 70% of the energy required in manufacture

generated on site from utilisation of wood residues. Sustainable radiata pine forests reach maturity in about 28 years, making NelsonPine LVL an attractive and renewable building material.



**Nelson Pine Industries Ltd**

520 Lower Queen Street  
Richmond  
Nelson  
New Zealand  
PO Box 3049  
Richmond, Nelson 7050  
T: +64 3 543 8800  
F: +64 3 543 8890  
E: [lvl@nelsonpine.co.nz](mailto:lvl@nelsonpine.co.nz)  
[www.nelsonpine.co.nz](http://www.nelsonpine.co.nz)

