

THE MANY POSSIBILITIES OF DESIGNING WITH TIMBER



ORIGINAL

TASMANIAN
TIMBER™

The global design and construction industry is enjoying a period of rapid economic growth. By 2023, the industry is expected to grow to an estimated US\$10.3 trillion driven by increased urbanisation and growing populations.¹ Increased competition and the growing demand for high performance and versatile building materials is having a direct impact on the dynamics of the fast moving construction industry. Designers and specifiers are opting for materials that offer design flexibility while also being durable, sustainable and affordable.

Timber is one such material, meeting industry performance and sustainability criteria while also being flexible, affordable and accessible. Regulatory changes have also paved the way for timber's growing popularity, with 2016 changes to the National Construction Code (NCC) alleviating heavy restrictions and implementing a light-touch approval approach to the construction of timber buildings up to 25m, or eight storeys, high.² Timber has emerged as a viable solution for contemporary construction.



Valley House by Philip M Dingemans Architecture Image by Luke Hesketh



Public Seating by Simon Ancher Studio Image by Adam Gibson

A breadth of applications

Timber can be used in non-structural ('decorative') elements and in structural applications such as beams, walls, and formwork.³

Non-structural or decorative applications

The aesthetic appeal of timber and current minimalist interior design trends have kept timber as a staple choice for wall, ceilings, joinery and furniture. The natural and material attributes of timber endows interiors with a sense of warmth and comfort.⁴ For example, the weight and tactile quality of timber has been described to evoke a sense of shelter and security, making it ideal for ceiling and wall structures.⁵

The natural colour and texture of timber allows designers to introduce subtle artistic elements, or otherwise take advantage of the subtle variations of patterns and colour in timber that can change with age or finishing treatment.

Timber can also lend an elegant, modern aesthetic to commercial spaces. A key factor in timber's growing popularity in commercial office spaces is the incorporation of biophilic concepts in modern interior design. Biophilic design concepts highlight the inherent human need to connect with nature in the modern built environment.⁶

Wood is being used as a natural element within interior spaces to establish such a connection. Studies have shown that the introduction of natural elements in interior environments improves health and well-being,⁷ and productivity.⁸

Structural applications

Timber can also be used for many structural applications. For example, the load-bearing qualities of cross-laminated timber (CLT) means it can be used for floors, walls and roofs. The cross-laminating layers of wood in CLT improves structural integrity by distributing the along-the-grain strength of wood in both directions.⁹ The arrival of CLT manufacturing technology in Australia means it is a viable option for local projects of any size and scale. The natural durability properties of timber also make it suitable for a variety of structural applications. For example, timber is resistant to high relative humidity and to many chemicals and conditions that can corrode steel and concrete including corrosive salts, acids, industrial pollutants and sea air.¹⁰

Accordingly, timber can be used for industrial applications such as chemical storage and cooling towers.¹¹ A number of mass timber products including CLT, nail-laminated timber (NLT), dowel-laminated timber (DLT) and glue-laminated timber (glulam) are also fire-resistant.¹² This quality can address safety concerns in the wake of the high profile Grenfell and Lacrosse tower fires which were linked to composite cladding and aluminium panels respectively.¹³ Timber offers a high level of machinability that allows it to be formed into a limitless number of shapes and dimensions. Timber is used in basic forms, such as panels and flooring, but it can also be machined into complex shapes. Timber products can be lightweight and flexible, allowing it to be easily molded and quickly transported. Such qualities allow timber to be used for many types of structures as seen by the growing number of wooden skyscrapers in Canada, the United States and Europe.¹⁴

For structural applications where strength is a requirement, timber is a high performing material. Especially when designed and constructed according to Australian Standards.

Versatile finishing options

Timber is a viable substrate for a wide range of finishes including paint, wallpaper, render, custom images and architectural films. The variety of finishing options each have different characteristics with regard to appearance and performance. For example, timber used for external surfaces can be treated with fire retardant coatings to meet Bushfire Attack Level requirements. If a high level of surface protection is required, paint finishing systems can be applied. Solvent borne (alkyd or oil) paint finishes are highly resistant to water vapour.¹⁵

Clear finishes, transparent timber finishes and stains can be selected if the intention is to showcase the timber's natural beauty. Clear finishes may offer limited UV protection and service life for use on external surfaces but are easily reapplied with minimal surface preparation.¹⁶

Transparent timber finishes can be applied to exterior timber that are durable enough to withstand foot traffic while still maintaining the timber's natural appearance.¹⁷ Designers and architects can choose the appropriate level of protection without compromising on aesthetic quality.

High Performance

When treated or engineered appropriately for its intended purpose, timber is highly durable, and long lasting. Timber also has superior strength qualities, and beneficial thermal and acoustic properties.

Strength

For structural applications where strength is a requirement, timber is a high performing material.

Especially when designed and constructed according to Australian Standards.¹⁸ This is evidenced by its popular use in beams, floors and formwork.

Structurally graded timber is a widely used framing material, and is often preferred due to its strength-to-weight ratio, durability and dimensional stability.¹⁹ Visual grading, the durability rating of species and mechanical grading are utilised to ensure the suitability of a wood species for a particular application.²⁰

Built using advanced technology and adhesive techniques, engineered wood products such as laminated veneer lumber (LVL), glulam and CLR, offer solutions with enhanced strength performing qualities. For example, LVI is comprised of thin wood veneers that are bonded together using heat and pressure. When compared with steel, some LVL products were found to have 20 per cent higher strength-to-weight ratio than structural steel.²¹

Thermal and acoustic insulation

Timber also provides good thermal and acoustic insulation, two key performance criteria for commercial and multi-residential spaces. Timber is a 'natural insulator'²² as air pockets in wood acts as a natural barrier to heat and cold.²³ In terms of acoustic performance, timber's ability to dampen vibrations plays a significant role in room acoustics and acoustic separation.²⁴

While exact performance varies between different materials for all the above performance indicators, timber products meet and often exceed the performance of comparable synthetic materials.

Sustainability

When properly certified and sourced, timber is a sustainable building material in that it is environmentally friendly, affordable, flexible in usage and durable.²⁵ Timber provides a number of environmental benefits. Wood is a natural, renewable material that eventually degrades at the end of its life-cycle with minimal environmental impact.²⁶ Timber, especially lightweight products, require less heavy machinery reducing energy and fossil fuel consumption. The thermal insulation properties of timber reduce reliance on electric heating and/or cooling. Finally, while timber is biodegradable, it is long lasting and easily adapted reducing its overall resource consumption over its lifetime.

Timber is also a tool for combating climate change for two key reasons. Firstly, timber releases the least and stores the highest amount of carbon dioxide during its use and manufacture. Timber releases less carbon dioxide into the atmosphere than other comparable building materials.²⁷ Studies have shown that rough sawn timber releases 30 Kg/t of carbon dioxide, whereas steel and aluminium release 700Kg/t and 8700 Kg/t respectively.²⁸

Furthermore, building with wood consumes less energy per square meter than concrete or steel.²⁹ Concrete, brick, aluminium and steel represent 16% of the world's fossil fuel production, whereas timber uses only a fraction of available forestry resources.³⁰ Utilising timber over other building materials would significantly reduce global carbon dioxide emissions and fossil fuel consumption. Secondly, timber sourced from local and sustainably managed forests and plantations can lead to a reduced

carbon footprint, and better environmental outcomes. Forests and plantations act as natural greenhouse filters, and those managed for long term production provide a steady supply of carbon storage.³¹ Managed harvesting of trees can help forests withstand wildfires, and also help preserve biodiversity.³² Sustainably managed forests and plantations are focused on conservation and responsible management, ensuring that natural resources are carefully maintained. Locally sourced timber also leads to decreased travel and freight requirements further reducing greenhouse gas emissions.

In Australia, forests and plantations are only certified as sustainably managed after an independent audit. Certification is provided by two main bodies, the Programme for the Endorsement of Forest Certification (PEFC) schemes and the Forest Stewardship Council (FSC). Forest managers in Australia can be certified under the Responsible Wood Certification Scheme which uses the Australian Forestry Standard (AFS) as certification criteria and is recognised under the PEFC.

While environmental factors and sustainable management practices are reviewed, these certification schemes also consider local community input, economic and social factors alongside local laws and regulations. In some countries where there is synergy between local community attitudes, economic growth and new government regulations, FSC certification can be more easily obtained. Chain-of-custody certification under both schemes allows wood products to be tracked through the supply chain providing additional assurance.



Supernormal Pop Up Restaurant by Peter King & Reim Furniture Image supplied by Porta



Dowel House by FMD Architects Image supplied by Porta

Affordability and Accessibility

Timber can deliver long lasting, high performing design cheaper and more efficiently than other building materials. This is due to timber's high level of durability and longevity reducing maintenance and repairs costs. Building with timber is also faster, and assembly is easier, requiring less equipment and heavy machinery. Some timber products are pre-fabricated off site, contributing to more efficient construction processes and less cluttered construction sites.³³

As noted above, timber requires less energy consumption when compared to other building materials leading to reduced energy costs. Over its lifetime, timber's thermal properties also reduce heating and cooling costs for end-users. Timber is also more readily accessible than other building materials.

Timber is a natural, renewable material that is readily available and easily sourced from local suppliers. Sustainably managed forests and plantations ensure an ongoing supply of timber of all varieties. In Australia, a strategic partnership between the Australian, state and territory governments is working towards a sustainable increase of plantations totalling 3 million hectares of commercial tree crops by 2020.³⁴

Variety in performance and aesthetic properties contribute to timber's accessibility as it is possible to find wood species to suit all types of applications. Timber is also easily transported and economically produced and recycled. As a more cost effective and high performing building material, timber can be used for all types of applications and budgets.

Tasmanian Timber

For more than a century, Tasmania has been the source of some of the most beautiful and versatile timbers in the world. Tasmania's vibrant biodiversity and fertile, verdant forests make it ideal for the growth of strong, high quality timber. A significant proportion of timber used in Australia originates from Tasmania.

A number of the most renowned species of timber can be found on the island, including Blackwood, Myrtle, Celery Top Pine and Tasmanian Oak. Tasmanian timber has been used for a wide range of applications, from interior design, to furniture and also for structural purposes in all types of construction projects.

Tasmanian Timber plays a vital role in Australia supporting sustainable local industries. The Tasmanian Timber Promotion Board seeks to educate designers, architects, furniture makers and specifiers on the broad potential of timber, its many unique characteristics and its substantial environmental benefits.

In pursuit of this, Tasmanian Timber is providing two free masterclasses:

1. *Masterclass: Tasmanian Timber for Internal Applications.*³⁵ Aimed at anyone selecting and specifying Tasmanian timber products, this seminar covers the species of Tasmanian timber and their source of supply, major characteristics and product range, followed by discussion on essential detailing and specification practice for major architectural applications.

2. *Masterclass: Working with Tasmanian Timber.*³⁶ Suitable for anyone working with or installing Tasmanian timber, this seminar covers the species of Tasmanian timber and their source of supply, major characteristics and product range as well as essential aspects of timber storage and handling practice.

These masterclasses will be held in Hobart (22 June), Brisbane (26 June), Sydney (27 June), Melbourne (28 June).



Red Hill Farm House by Carr Architecture Image supplied by Neville Smith Forest Products

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Saffire Freycinet by Circa Morris-Nunn Architects Image supplied by Britton Timbers