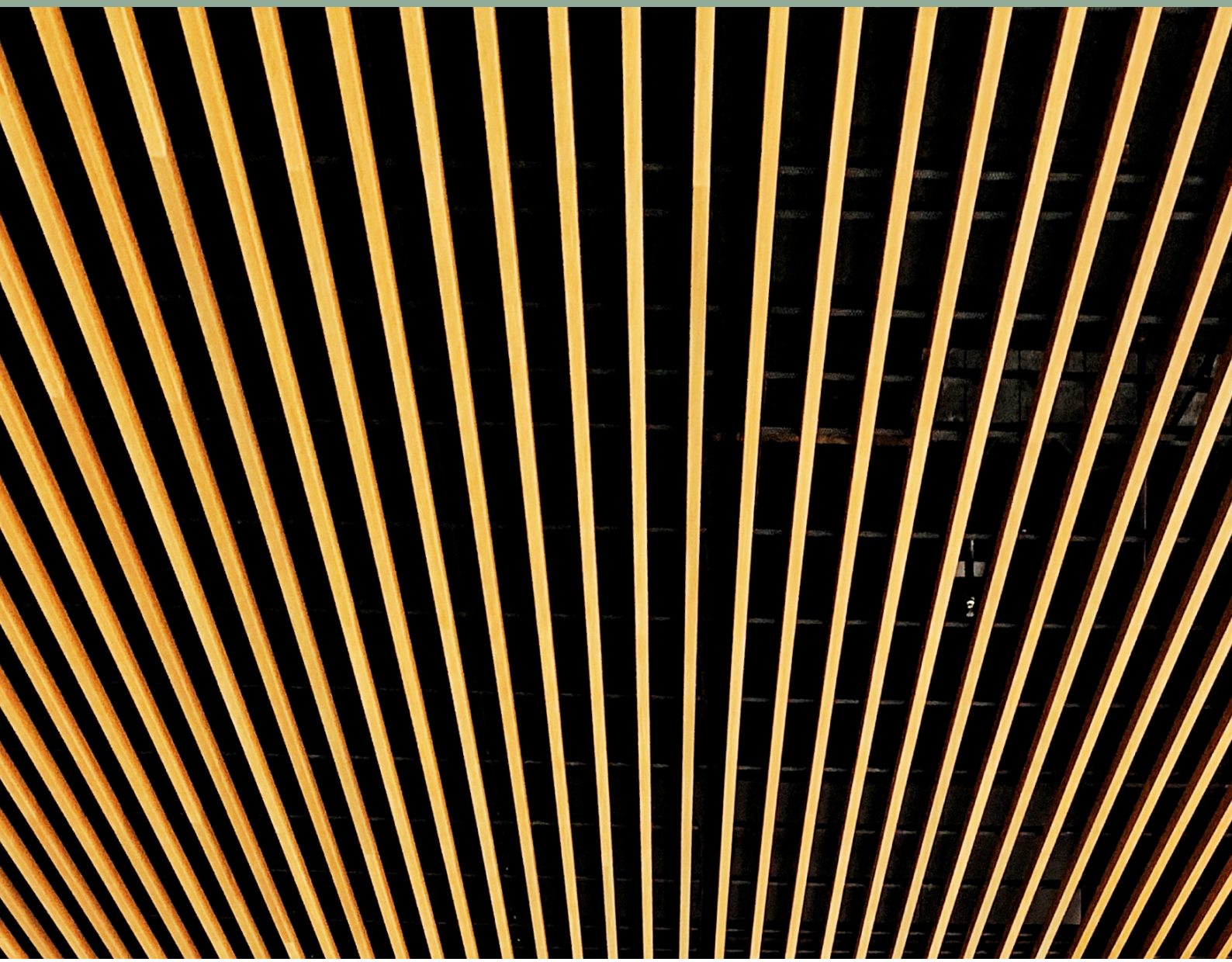
EMPLOYING WOOD PLASTIC COMPOSITE TECHNOLOGY FOR INCREASED VERSATILITY



INNOWOOD
SUSTAINABLE TIMBER ALTERNATIVE

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INTRODUCTION

Timber has long been held in high regard as a finishing material across both interiors and exteriors, and for good reason. It is easy to source, easy to install and at its best, provides a high quality aesthetic that can be difficult to match. However, timber is not infallible and like all finishing materials, can often be difficult to keep in optimal condition without a strict maintenance regime, especially in harsh climates such as Australia's.

At one extreme, depending on locale, timber can often be exposed to sustained periods of high humidity, posing significant problems to the material. Long-term exposure to water can also lead to rotting, limiting its lifespan. At the other end of the spectrum, significant dry periods found elsewhere across the country or simply at various times of the year may cause timber to split. Termites are an ever-present threat across the country, and fire, another clear hazard, is becoming more of an issue than ever before.[1]

On the other hand, the proliferation of Wood Plastic Composite (WPC) products in the last 10 years has seen a plethora of products hit the market, from plastic based compositions that have little-to-no organic matter to product compositions that utilise organic matter such as rice husks, palm fibres and recycled timber based WPCs. These WPC technologies, like those that are timber-based, have their own limitations and challenges such as movement, discolouration and ease of recoating but when understood and done properly, these limitations and challenges can be minimised.

From a design and construction perspective, timber's weight and limited options for customisation can also make it more complex to work with; timber is usually shaped into the required form by machining and cutting, making batten and board shapes the two most common standardised forms of construction-ready timber available. Thin and sharp-angled profiles are generally achieved with a metal such as aluminium with a timber look finish. While aluminium is an option, it can be difficult for a metal profile to achieve the same distinctive aesthetic and textural qualities as real timber.

Timber based WPCs are comprised of wood pulp or powder and contain either new or recycled resin material. Dependant on the amount of organic material, WPCs can maintain many of the desirable qualities of timber, such as the look and feel. With the global composite materials market expected to reach a value of $38 billion by 2023, and the global composites end product market expected to reach $107.4 billion in the same period, WPC is increasingly regarded as a viable alternative to timber.

Utilising the latest extrusion technology, WPC can be formed into a variety of unique profiles to suit a wide spectrum of applications, including cladding, screening, ceilings and decking.

In this whitepaper, we take a closer look at WPC and its benefits, including its inherent material and functional benefits, and its design flexibility.

MATERIAL AND FUNCTIONAL BENEFITS OF WPC

One of the benefits of WPC over traditional timber is its lighter weight. The outcome of this is threefold, spanning the design, transportation and construction of any project that makes use of WPC. First and foremost, a reduced load is practical in reducing structural requirements, such as those associated with supporting structures and foundations. Such a design decision also holds value in lessening the overall material costs, simplifying the structure from inception to construction. Secondly, weight reduction is beneficial in the transportation of materials to a potential site without the additional carbon footprint that would be associated with bringing comparably sized timber to site. The timing, economics and embodied energy of transportation are all critical elements of construction projects, and opting for lighter materials can help improve any or all of them. Finally, lighter materials can speed up the construction process enabling easier, faster installation, whether by hand or machine.

High quality WPC can also hold several material advantages over timber, with the inclusion of resin material reducing the timber's inherent limitations. In use, composite timber materials have increased fire resistance compared to natural timber with the addition of flame retardants[2]. High quality WPC products can also feature better water, termite, algae and fungal resistance depending on the timber and resin utilised[3,4], along with a low likelihood of developing rot even when exposed to moisture in outdoor environments.

> "In use, composite timber materials have increased fire resistance compared to natural timber with the addition of flame retardants[2]."

DESIGN FLEXIBILITY

WPC's manufacturing process allows significant freedom in architectural form. The primary material in the composition that forms the WPC can be put into an extrusion machine and dependant on the die profile, allows for the creation of virtually any shaped profile. Just as the bulk of structural elements can be reduced with perforations, WPC profiles can be produced with hollows and cavities that eliminate excess material and unnecessary weight. With the addition of other constituent materials into the mix – such as fire retardants as previously mentioned – extra functionality may be embedded into the final product without altering the production process. Furthermore, WPC can be designed into systems with integrated elements such as stiffeners and inserts, improving the strength ratios to achieve desired spans.

With WPC, designers can achieve freedom in design and enhanced installation convenience without sacrificing the unique look and feel of natural timber. WPC may be used in many applications in ways that could otherwise prove infeasible or too costly.

> "INNOWOOD utilises the latest extrusion technology and the highest content of recycled timber..."

INNOWOOD AUSTRALIA

Since its establishment in 2005, INNOWOOD has grown from a local brand to a global supplier of sustainable timber alternatives that are readily available in Australia, New Zealand, Asia, Europe, America, and Canada. They have consistently positioned themselves as market leaders in developing and improving upon tried and tested formulas to provide an ethical alternative to natural timber in the face of rapidly depleting global forests and timber resources.

Passionate in demonstrating their commitment to sustainable development, INNOWOOD has been a member of the Green Building Council since 2013, and has authorised Edge Environment to conduct independently certified Life Cycle Assessments (LCAs) of its products and prepare a complete Environmental Product Declaration (EPD). More information is available at https://innowood.com/innowood-commitment-to-environment/.

INNOWOOD utilises the latest extrusion technology and the highest content of recycled timber and combines it with resin material to form various profiles that are suitable in a variety of applications, reducing the need for new timber and deforestation in a landscape of burgeoning construction demands. Furthermore, the high-tech WPC achieves the closest match to natural wood grain texture, look and feel compared to all other products in the current market; whilst offering termite, mildew and water resistance on top of the advantage of not splitting, cracking or rotting over time.

INNOWOOD, as the pioneer and leader in WPC, holds the edge when it comes to experience and scope, offering:

Extensive profile design
INNOWOOD has over thirteen years of composite wood design experience, with their current product line covering a wide range of applications and additional choice of installation options:

- Cladding – Flat joint, secret fixed and shiplap
- Screening – Face and rear fix, concealed lock in
- Ceiling – Concealed clip, shiplap, slatted, suspended click-on
- Decking – Premium fibre deck
- Louvre – Fixed and operable

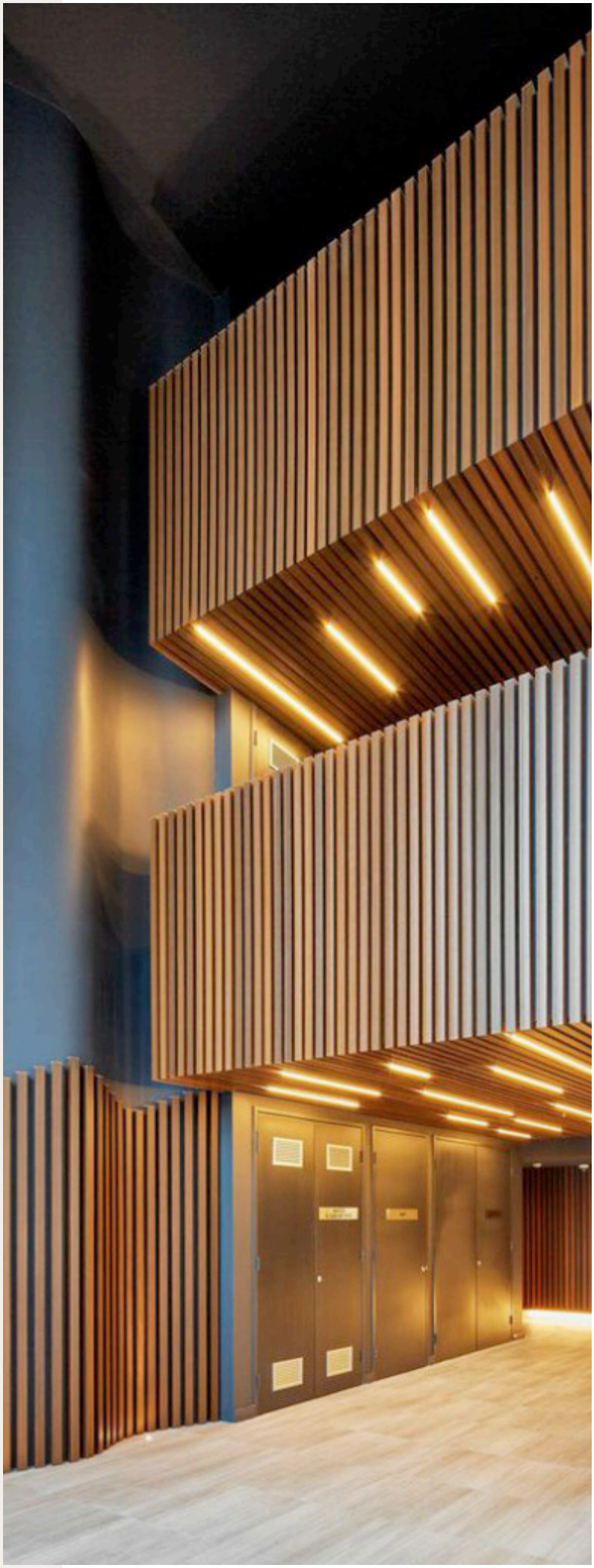
A system, not just a material
INNOWOOD products are supplied as whole system solution. The choice and properties of different parts within each system have been carefully considered in order to ensure the optimum solution is specified.

- For example, concealed lock in screening is supplied with a dedicated concealed channel clip to facilitate easy installation. More information may be found at https://innowood.com/concealed-fixing-system/.
- The Sol'art Cilium louvre shading provides a complete louvre blade design and operable window frame, viewable at https://innowood.com/solart-cilium-folding-louvre-2-2/.

Extensive test records and certificates
INNOWOOD has taken great care in ensuring their products are up to both Australian and international standards, voluntary and mandatory alike. In addition to their EPD and LCAs, INNOWOOD products have been CodeMark certified and tested against a variety of Australian, New Zealand and International Standards, for everything from environmental, durability, fire, strength, moisture, temperature and other miscellaneous features. The full list of certificates can be found at https://innowood.com/about-us-3/.

Over 13 year track record
Sydney Wildlife Zoo was INNOWOOD's first major high profile project, completed in 2006. A unique family attraction located in the heart of Sydney at Darling Harbour. The extruded WPC profiles that make up the project's façade have been in use for over ten years since its original installation, remaining structurally strong and durable without any maintenance while still maintaining a natural timber appearance. The hollow extruded profiles reduced the façade's weight by up to 70 per cent and enabled the client and architect to turn their design intent into reality, whilst delivering significant cost savings through a streamlined installation process. More information about the project may be found here, https://innowood.com/lightweight-sustainability/.

To find out more about INNOWOOD's sustainable WPC material and products, get in touch today.



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