One Forty One

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Timber construction benefits

Benefits of using timber in construction

For millennia timber has been used for construction around the world with many timber framed buildings being in service for hundreds of years or more.

Timber framing has a long history of use in Australia, evolving with new construction techniques and development of timber grading systems and innovative timber products. Timber remains the premier framing material in most areas of Australia and it is becoming an even better choice as time goes by. This brochure will touch on some of the many benefits of using timber in construction.

Advanced construction

25 YEARS TREATMENT GUARANTEE

TERMITE PROTECTION

While some timber framing is constructed using traditional techniques, most timber frames are pre-fabricated off-site and assembled on-site.

25 tonnes

Of carbon dioxide, could be saved

There are many advantages, however, the main ones are speed of construction and cost effectiveness.

In larger commercial construction, wall and floor frames can be prefabricated and assembled on site in large panels using cranes, usually resulting in large time savings.

In multi-residential construction, fire-rating of construction can be achieved by the application of plasterboard and special construction detailing. Recent changes in the National Construction Code (NCC) mean that timber framing may be used in multi-story construction up to 8 stories high.

Low embodied energy

Timber can create buildings with low embodied energy. It is often locally available and is natural, durable and recyclable. It can be designed to be easy to disassemble, recover, reuse and/or recycle, due to it's light weight and versatility.

Recent research, conducted by the Cooperative Research Centre for Greenhouse Accounting, compared the amount of greenhouse gas emissions generated by the manufacture of timber products with the amount of emissions generated by other common building materials.

The results showed that by substituting timber in the construction of a typical family home, greenhouse gas emissions, equivalent of up to 25 tonnes of carbon dioxide could be saved.

Thermal

When considering thermal performance issues, timber, a naturally insulating material, makes for an excellent choice. Air pockets within timber's cellular structure create a natural barrier to heat transfer.

Timber framed homes achieve excellent thermal performance when designed utilising passive solar principles and insulated where required. Due to its natural insulation properties, timber reduces internal heat gain in summer and loss of warmth in winter.

Strength

Backed by Australian Standards for design and construction, timber framed construction is tough and reliable. When combined with good design and detailing, it can withstand some of the most extreme weather conditions Australia has to offer.

Structurally graded plantation pine products from OneFortyOne are a popular choice for framing applications in Australia with their favourable strength-to-weight ratio, durability and dimensional stability.

Quiet

Timber frames do not expand and contract rapidly with changes in temperature and this minimises movement meaning that timber house frames are seldom heard.

Termites

Termites are a fact of life on mainland Australia and generally the risk of termite attack increases the further North you travel in the continent, and also with the age of the house.

Any construction type of house may be attacked as even if the house is constructed from termite resistant materials, termites may attack other cellulose based materials, cupboards, books and even plasterboard.

It is therefore highly recommended that any house is protected by a ground-line termite management system and backed by regular inspections by a qualified pest inspector. Blue termite resistant pine framing from OneFortyOne carries a limited 25 years warranty against termite attack.

Carbon storage

Choosing timber in design and construction can help tackle climate change in several ways. One of the most important is that wood stores carbon.

95%

Of the carbon in wood remains stored even after 30 years

46x

Less energy than a tonne of aluminium

Growing trees absorb carbon dioxide from the atmosphere, emit oxygen and store carbon. Carbon remains locked in the wood for the life of the piece of timber until it rots, decays or is burnt.

Recent research shows that more than 95% of the carbon in wood remains stored even after up to 30 years in a landfill. Australia's native forests, timber plantations and wood products are all net absorbers of greenhouse gases. Forests are a major store of carbon and when properly managed, significantly contribute to reducing carbon dioxide in the atmosphere.

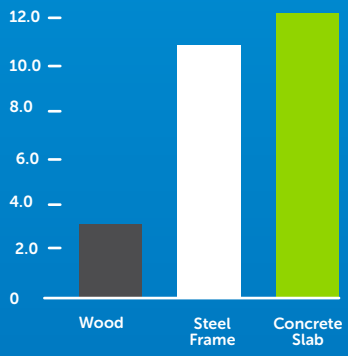
Wood is the only material to naturally store and lock away carbon and the forest and wood products industry is the only industry sector in Australia that stores more carbon dioxide than it releases into the atmosphere.

Key carbon points*

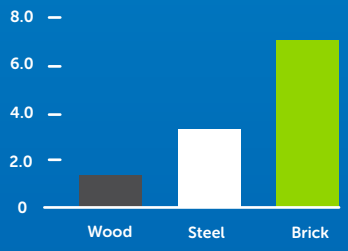
- A timber house frame for an average dwelling is storing around 10 tonnes of CO2.
- Production of wood generates far less (very few) pollutants to air, water and land compared to other building materials.
- It takes 8 times less energy to produce a tonne of timber than it does a tonne of steel and a staggering 46 times less energy than a tonne of aluminium.
- To construct an average family home, an extra 15 tonnes of CO2 is released to lay a concrete floor compared with a timber floor. The Australian Greenhouse Office estimates it would take 64 years to recover this carbon debt in energy savings.
- More than 25 tonnes of CO2 would be saved if timber products were used to build a single story house compared with constructing the same house using alternative materials.
- If half of Australia's new homes were built using mainly timber products, more than 1.3 million tonnes of CO2 emissions could be saved per annum.

*Source: Timber Queensland Fact Sheets

Embodied Carbon in Construction Material Floor structure



Wall structure



Embodied Carbon of construction Materials (Image courtesy of Edge Environment with data from Forest and Wood Products Research and Development Corporation (2006). Embodied carbon is the CO2 emitted in producing materials.

Timber building products are lightweight and strong: these properties make them suitable for prefabrication, transport and easier installation.

20%

Higher strength to weight ratio than steel

4-5 better

Than unreinforced concrete in compression

Carbon released and stored in the manufacture of building materials.

Material	Carbon released (kg/t)	Carbon released (kg/m3)	Carbon stored (kg/m3)
Sawn Timber	30	15	25
Steel	700	5300	0
Concrete	50	120	0
Aluminium	8700	22000	0

Source: Ferguson et.al.1996

Wood is very strong structurally. A comparison with steel and concrete shows that plantation pine structural timber, for example, has a strength for weight ratio 20% higher than structural steel and 4 to 5 times better than unreinforced concrete in compression.

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