Cross Laminated Timber (CLT)
Creating Sustainable Buildings
WHAT IS CROSS LAMINATED TIMBER?
Cross Laminated Timber (CLT) is an engineered wood product fabricated by bonding solid-sawn timber together in transverse and longitudinal layers with structural adhesives to produce thick timber panels.

The result is a product that when compared with steel and concrete, provides similar strength & stiffness, improved fire performance, health and economic benefits and an abundance of sustainability benefits.

LEADING SUSTAINABILITY
Timber is a beautiful, natural and 100% renewable resource. Substituting 1m³ of timber for traditional block and concrete during construction saves over 3 tonnes of carbon dioxide (CO₂) emissions. This substantial carbon off-set together with unparalleled renewability, low embodied energy and minimal operational energy make CLT the environmentally preferable choice.

“When a tree grows in the forest it gives off oxygen and soaks up carbon dioxide. When the tree dies, it falls to the forest floor and eventually gives that carbon dioxide back to the atmosphere. If it burns in a forest fire, it also gives that carbon back to the atmosphere. However, if you utilise that timber in the construction of a building, a piece of furniture or into that wooden toy, it actually has an amazing capacity to store the carbon and provide us with a sequestration. One cubic meter of wood will store one tonne of carbon dioxide” - Michael Green Architecture (TED Talk)

Did you know: Monterey Kangaroo Point is replacing 1,170m³ of traditional concrete and blockwork for Australian timber.

- Australian Forestry can regrow Monterey in under 20 minutes
- Monterey will be 3,744 tonnes of CO₂ better off, which is the equivalent of:
  - Removing over 700 petrol cars off the road for 1 year
  - The energy required to power a home for over 300 years

HEALTH & WELLBEING
Studies have suggested that timber buildings contribute to the improvement of emotional state and self expression. Timber is visually warm and engenders a socially positive experience for building occupants. Biophilic design seeks to connect our inherent need to affiliate with nature in the modern built environment. Air quality and humidity are also thought to improve under the condition of a healthy mind and a healthy heart!

Easier breathing
Lower blood pressure
Lower stress levels
Feelings of warmth & comfort

STRUCTURAL STRENGTH
Buildings using mass timber carry the same strength as concrete despite being five times lighter. With a strength-to-weight ratio 20% higher than steel and four to five times higher than concrete! As an insulator, timber is 15 x better than masonry and 400 x better than steel. Due to the precise planning of the prefabrication, CLT produces less overall site waste from building products, and is also a non-corrosive material and resistant to chemical attack.

Being a natural resource, timber is not toxic and does not break down into environmentally damaging material. At 20% of the density of concrete, timber offers more density per area than any other construction material - allowing for larger buildings on poor ground. Timber panels are much lighter than concrete, more easily worked and easier to erect - ideal for construction on locations requiring lighter materials, as it weighs less than traditional concrete and steel.

THE MAKING OF CLT

1. A machine cuts triangular joints into wood board
2. The next layer goes on at a 90-degree angle, and the previous layer
3. The boards are glued and stacked on
4. The boards are then compressed at a minimum of
5. Graphic by Sean McKeown-Young. Advance Local

IMPROVED FIRE PERFORMANCE
Timber is a combustible material, however due to the mass of CLT it does not ignite easily, therefore burning in a slow, predictable and measurable way. This means that timber actually performs strongly in fire events compared to other materials which can deform and collapse in a fire event. As the fire is fuelled and the temperature increases, the growing char layer also increases the thermal insulation, however the protected uncharred timber retains its load bearing capacity.

“If you take a match and light it and attempt to light a timber log, it doesn’t light! But to build a fire, you start with small pieces of wood and you work your way up, and eventually you can add the log to the fire, and when you do add the log to the fire, of course it burns, but it burns slowly. CLT mass timber panels are much like the log. It’s hard to start them on fire, and when they do, they actually burn extraordinarily predictably, and we can use fire science in order to predict and make these buildings as safe as concrete and as safe as steel” - Michael Green Architecture (TED Talk)

TERMITE PROTECTION
An Australian concern surrounding timber is that it can be attacked by natural processes and organisms in ways that can adversely impact its durability. Code requires timber structures to be protected from termites by incorporating a physical separation from the ground using a concrete structure in conjunction with additional barriers meaning that the building should remain pest free. Airborne termites are not an issue, as they need a moist and dark environment to both colonise and migrate in large numbers, which is generally where they do the most damage. As the facade is protected by non timber building materials, there is no greater risk to the building structure with the utilisation of timber.

ECONOMIC BENEFITS
CLT provides thermal mass for a building, which can be associated with heating and cooling energy reductions and also creating air tight compartments. Due to its prefabricated nature, CLT buildings benefit from a faster construction time, more precise build, safer working conditions, lower transportation costs, less waste and less disruption to neighbours. Studies have shown that indoor environment quality is critical to the happiness of a building’s occupants. This has been shown to translate into higher rental return and selling price.
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