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Emerging Timber Products

Timber building products continue to evolve and new products are continually entering the market. These include engineered wood products manufactured from wood based components to produce structural members. New engineered wood products are stretching the boundaries of timber design and enabling a new era in construction of timber buildings.

Engineered Wood Products

Construction practices have used timber for millennia. In recent decades there has been an increase in new engineered wood products on the market that are stronger and more versatile than traditional timber products. These new products include Glulam, Laminated Veneer Lumber (LVL) and CLT.

These engineered products typically use glued layers of timber, either as veneers or whole structural boards, which make the final product stronger than the individual components. In the case of Glulam, this allows longer and stronger timber beams than those that occur naturally by finger jointing individual layers to be longer.

Quick Facts

1. Structural timber is used in the traditional construction of light weight timber frames and supports Australia's well-established housing market.

2. Engineered wood products, also called composite wood products, or manufactured board, includes a range of derivative products which are manufactured by binding or fixing strands, particles, fibres, veneers or boards, together with adhesives, or other methods of fixation, to form composite material products.

3. Engineered wood products take advantage of the natural properties of timber to create stronger and more versatile products. For example, Cross Laminated Timber (CLT) allows timber panels to be as strong as concrete panels with less weight (Wood Solutions, 2017a).

4. Many engineered wood products are used in the production of prefabricated timber building components, such as floor cassettes, wall frames and roof trusses.

5. Prefabrication and producing modular fit-outs in factories allows more precise construction. Prefabrication produces less waste timber with more accuracy for a better build.

6. Modular construction allows for the construction of entire timber buildings or apartments ready for transportation to site.

The randomisation of the finger joints means there is no point of weakness. It also means that curved beams can be produced easily. CLT uses the same layering technique but rotates the grain of each layer by 90 degrees which prevents warping and bending along the grain and produces timber panels that are as strong as concrete panels of the same dimensions (see Figure 1).

These new products have opened new markets for timber in construction where concrete or steel would have been the only option previously, such as mid-rise buildings and wide span structures.

Figure 1. The XLAM AirStair product. Photo source: XLAM, 2018.

Case Study — Inveresk Apartments

The University of Tasmania constructed the Inveresk apartments in 2016. The apartments consist of two three-storey buildings containing 120 prefabricated modular apartments constructed from a standard timber frame design. The apartments were prefabricated in a nearby warehouse and were transported to site where cranes put them in place and secured them.

The adjoining walkways and common spaces were constructed from CLT. Each apartment took fifteen days to complete in the warehouse with a staggered construction process so that one apartment was finished every day. Ten apartments were placed on-site in one day (Assoc. Professor Gregory Nolan, pers. comm., 2018).

Figure 2 The Inveresk apartments at the University of Tasmania. Image by Thomas Ryan. Photo source: University of Tasmania.

Prefabrication

The production of building components in a factory is known as prefabrication. Factories assemble prefabricated components in a controlled environment, away from variables like weather, making their construction very accurate and well-fitting. **Timber prefabrication is easier than prefabricating concrete or steel due to timber being lighter weight,** making it easy to cut with modern computer numerical control machinery and assemble with automatic bridges and tables. The lighter weight also makes the transport of larger components more practical. Modular construction is where entire buildings or apartments are prefabricated in a factory— and this is possible when building with timber. Prefabrication reduces the complexity and cost of construction. This reduces construction time, number of on-site workers and issues with safety.

Timber Technology

There have also been many advances in the construction of timber components. These include silent timber floors, hidden timber joins for CLT panels and engineered timber bricks (Forest & Wood Products Australia, 2012). These technological improvements allow for more accessible timber construction methods and the easy deconstruction of buildings. There are also many advances in timber composite materials, such as composite products with timber and concrete or steel and carbon fibre coated timber beams to extend possible lengths.

Further Reading

Forest & Wood Products Australia . (2017). *Enabling Prefabricated Timber Building Systems For Class 2 to 9 Buildings.* Retrieved from www.fwpa.com.au/ images/marketaccess/2017/FWPA_PNA324-1314_ Enabling_Prefabricated_Timber_Building_Systems_ Final.pdf

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