

Engineered Timber Use in Multi-Storey Construction in Christchurch

The Trends over the Past Five Years and Continuing Challenges

There is a developing culture of building and designing in timber, and timber suppliers are moving to provide clients the full construction to delivery service package. While there is increasing momentum in the use of engineered timber, there are still challenges in building the knowledge and experience of building professionals and those regulating the system; and in communicating to the broader public the multiple benefits of constructing in timber and in combinations of timber and other materials.

Building owners, engineers, architects and builders in Christchurch were surveyed between July and September 2019 on the use of engineered timber construction in commercial and multi-storey residential buildings in Christchurch. This work was undertaken by Dr David Evison (from the School of Forestry), on behalf of the Ministry for Primary Industries. The work builds on an earlier survey conducted by Dr Evison in 2013 – 2014 and sought to gauge the progress in engineered timber use over the past five years. The survey examined:

- How conditions have changed and what has improved;
- Where work is still required to progress the use of engineered timber; and
- Where the government could assist in promoting engineered timber use in buildings.

What has changed since 2014?

There has been significant progress since 2013/14 in the use of timber in non-residential construction in Christchurch. There is growing confidence in the building industry that wood is a material with significant advantages, including

- lightweight buildings with good seismic properties;
- Quick to construct;
- Environmental benefits; and
- Innovative designs.



Figure 1: Multi storey rest home in Cross Laminated Timber

There are now a wider range of timber products on the market, and architects and engineers are designing with multiple materials to achieve more efficient and cost effective designs. This includes building with timber, steel and concrete elements in a design. Through the use of these materials, a growing number of engineers and builders have developed experience in the handling and construction of timber (and predominantly timber) buildings. In conjunction with this, there is significantly more industry knowledge on connections and connection design than in the early 2010s. This provides architects and engineers with a greater knowledge of design capabilities.

Principal Findings

Designers and engineers recognise that they now have a range of materials available to them for construction in engineered timber, and that timber offers a number of advantages, from design

flexibility (i.e. the ability to use unconventional shapes) through reduced construction and delivery times.

Engineers are now finding that combining different timber products, including Laminated Veneer Lumber beams and columns, a variety of prefabricated and engineered panels, and the use of stick framing (both LVL and radiata pine sawn timber) can provide more efficient and cost effective designs.

There is probably two levels of expertise in the industry, a core of highly skilled people, and a larger number with interest and enthusiasm but a lack of expertise. Specialists are still learning how to get the best out of wood as a construction material.

Significant progress has been made in product development and making greater use of different products according to engineering properties, requirements and cost.

Timber suppliers are moving to provide full service packages (from material construction to delivery), to compete more effectively with other construction materials.

Prefabrication is much improved, but more progress can be made. In particular it is not clear that this segment of the industry is yet getting the benefits of a long period of running at capacity.

The tender process doesn't necessarily provide the best outcome for timber buildings – design and build offers the best opportunity to get the best design, and design for manufacture.

Opportunities to move the sector forward

The findings from the survey identified a number of opportunities to mainstream engineered timber more fully, with a focus on the opportunities for government:

- Upskill regulators – often if the regulators don't understand wood they will require a peer review;
- Provide funding for industry led research;
- It would be helpful if the major government demand nodes specified prefabricated construction;
- Encourage the building of high quality architectural buildings in wood. This would be unique inspirational buildings that will make a branding statement about a particular city, region or even New Zealand as a whole;
- Provide information showing the benefits of wood, and promote to architects;
- Provide ways to upskill the large number of engineers who are interested in timber design, but don't yet have the skills; and
- Encourage wood processing, targeting specific products required by engineers and architects to build multi-storey buildings. Encourage a competitive processing sector which can stimulate product development and efficient process management.

Research commissioned by the Ministry for Primary Industries.

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