

The NZ Journal of Forestry celebrates

Multi-storey wooden buildings

The Nelson-Marlborough experience

Modern commercial buildings

Who's involved and how

The client's perspective

MAF's perspective



EXPANDING THE MARKET FOR SUSTAINABLY MANAGED NZ BEECH WORKSHOP



Ministry of Agriculture and Forestry
Te Manatū Ahuwhenua, Ngāherehere



The School of Forestry, University of Canterbury, is conducting an all day workshop on Wednesday, 3 November 2010, at the Copthorne Commodore Hotel, Christchurch. The workshop will draw and elaborate on research recently completed by Dr Robert Donnelly entitled Expanding the Economic Viability for Sustainably Managed Indigenous Beech Forests and Industry. The workshop will be of interest to the following or more parties:

- Forest Owners
- Millers/Processors
- Timber Merchants
- Architects
- Interior/Furniture Designers
- Furniture Manufacturers
- Forestry Advisers
- Researchers

The workshop will include presentations on the following topics from guest speakers:



New Zealand
Farm Forestry Association

- (1) Perception is everything and NZ Beeches are no exception
- (2) The natural distribution of NZ beeches and merchantable quantities
- (3) Competition in hardwood markets, domestic and international
- (4) Sustainability and the commercial implications for NZ beeches
- (5) Supply and demand and the keys to a successful marriage

Information on the venue for the workshop, how to register and to access the report can be found at:
<http://www.forestry.ac.nz>

Without the support of the Sustainable Farming Fund, Ministry of Agriculture and Forestry, and the co-sponsors, namely, the Maori Trustee and the NZ Farm Forestry Association, neither the research into Expanding the Economic Viability for Sustainably Managed Indigenous Beech Forests and Industry or this workshop would have been possible.

The NMIT Building A GLIMPSE of THE FUTURE

By Piers Maclaren

The Nelson and Marlborough Institute of Technology needed a new Arts and Media building. These are important disciplines in the polytechnic - but are currently scattered across a number of unsuitable locations.

With its spectacular and innovative design, NMIT won a \$1 million MAF grant towards construction costs. Given the huge prize, there was intense competition throughout New Zealand. The winning design team was Irving Smith Jack Architects and multi-disciplinary engineers Aurecon; the judges said that their design solution used state-of-the-art structural timber technology to meet the specific needs of NMIT as a creative learning institution. It incorporated local materials including Laminated Veneer Lumber (LVL) - often as a feature - and is unique in the world in terms of wooden building design.

The building will show wood being used in new ways, and be practical and user-friendly. The various arts and media activities are diverse and often have conflicting requirements: there needs to be quiet spaces as well as

spaces where there is a lot of noise; dust-free environments and those where dust is to be created; relatively public areas and spaces which are restricted. In addition, the building will make use of natural light and ventilation, and have many energy-saving features such as solar water heating. It should inspire the many budding artists and designers who will be working in it.

The Arts and Media Building is already attracting considerable interest from Nelson locals, and may well become a tourist Mecca for those interested in cutting-edge design and revolutionary timber construction. The CEO of NMIT, Tony Gray, said that "if we want our community to invest in learning, then we want to be able to make that as motivational, inspiring and enjoyable as possible. Having a building that is state-of-the-art for New Zealand is going to be an integral and memorable part of gaining their qualifications for our Arts and Media students."

Right: The NMIT building in Nelson.

Inset: LVL as an engineer's material.



Modern Commercial

Wooden Buildings

Can the concrete and steel traditionally used in large buildings be replaced with wood? *Piers Maclaren* looks at the advantages and disadvantages.

Timber is still widely used in domestic dwellings, especially in New Zealand. These are single or two-storey buildings where load-bearing walls support the roof. In contrast, wood has almost been entirely superseded in commercial buildings - which may be many stories tall. In such buildings there is a skeleton of large reinforced concrete or steel beams and columns with non-structural internal walls that can be shuffled around with little difficulty. Offices and carpark buildings often have a similar structure to each other. But couldn't the concrete and steel be largely replaced with wood? What would be the advantages or disadvantages in doing so?

Sustainability. We can continue to harvest trees indefinitely, whereas there may be limits or increased costs with mining. The materials in the NMIT building were obtained locally (ie less transport), and add value to the local resource rather than exporting raw logs. At the end of the building's life, reinforced concrete can create disposal problems, whereas timber can often be pulped or burnt for energy.

Carbon. There are currently no international or domestic credits for carbon in harvested wood products, although this may eventually occur. A wooden building retains carbon that the trees have extracted from the atmosphere and which would otherwise cause warming. This contrasts to steel and cement which emit carbon dioxide as an intrinsic part of their manufacture.

Earthquakes. Minimising earthquake losses used to be about saving lives, not buildings. It was once accepted that concrete would shatter and steel would buckle. More recent thinking is also about saving the structures themselves: the columns, beams and "shear walls" can remain intact, while energy is dissipated through sacrificial steel plates. These deform and heat up during a quake but are easily replaced afterwards. This technology is of international interest and the NMIT building is a pioneer.

Fire-resistance. In stark contrast to public perception, large wooden beams are surprisingly fire-resistant. A fire will tend to char the outside of beams rather than burn deeply.

Wood retains its load-bearing strength for a long time during a fire - unlike steel, which loses strength quickly with a rise in temperature. Unlike steel, the use of LVL requires no additional fire protection.

Acoustics. A wooden building may have poor acoustic properties - the sound can echo throughout and nowhere is silent. The NMIT design incorporates a concrete floor on each level mainly to absorb noise - and it will also have the effect of increasing the thermal mass.

Laminated Veneer Lumber. Due to its biological origins, wood has always suffered from its individuality and complexity: no stick of timber is exactly the same as any other. This has made it impractical for engineers and architects, and labour-intensive to use. But LVL technology has finally brought wood in the high-tech age and there is no reason why 20-storey buildings cannot be made of it. LVL is more reliable than the natural product - knots and splits are dispersed and diluted, and it is many times stiffer and stronger than traditional sawn timber. The compression strength along the grain is equal to concrete; it is dimensionally stable and resists warping and twisting.

Cost. Wooden beams - at least compared to those of concrete - are light and can be pre-assembled in advance elsewhere. But as an originator of the concepts, the builders of NMIT did not have the wealth of cost-cutting experience to call upon as would be the case with concrete or steel, so it possible that the wooden option will turn out to be somewhat more expensive than the alternative. But it should be appreciated that the main differences between the types of building lie in the structure - the skeleton as opposed to the skin or intestines - and this is only 20% of the total costs.

Naturalness. Although highly subjective, many people seem to prefer the colour and texture of wood. Wood is considered warmer to touch than steel or concrete. They believe it "breathes" in a way that balances humidity. They like the fact that their surroundings are constructed from a material that is clearly natural or biological in origin. These beliefs may not be entirely rational, but humans are partly creatures of emotion and would we have it any other way?