LOCAL TIMBER INNOVATION GATHERS MOMENTUM

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With a global push for seismic safety, sustainability and design innovation, research and commercial systems from The Structural Timber Innovation Company (STIC) have really come to the fore in the last year – here, and on the international stage.

Australasian research consortium STIC is behind the development of EXPAN – a revolutionary post-tensioned laminated veneer lumber (LVL) (or glulam) building system that makes lightweight, seismically safe multi-storey and long span single-storey buildings commercially viable. In the event of an earthquake, an EXPAN building stays structurally intact through a controlled rocking mechanism and timber components that give strength without weight to minimise acceleration loads caused by ground shaking.

STIC road shows around New Zealand and Australia in 2011 saw a huge surge of interest in the EXPAN timber building systems. More than 260 companies across Australasia have now signed up for the EXPAN design and installation and fabricator licences, with more coming on board all the time.

STIC Chief Executive Dr Robert Finch says people have always loved timber, and now designers and engineers are realising that engineered timber technology now makes it a real option for multi-storey and long clear span single storey commercial and industrial builds.

“There’s always been a real affection for timber because it’s a natural, sustainable product, with a warmth and aesthetic that you don’t get with other materials,” Dr Finch says, “Up until recently, timber in commercial settings has just been a nice idea, but thanks to LVL and glulam technology, it now stacks up against steel and concrete as a viable alternative for commercial buildings. Engineers are embracing this system it for its strength and seismic capabilities, builders love the quick, easy construction, and architects are seeing the exciting design possibilities it opens up.”

The EXPAN technology is playing its part in the Christchurch rebuild, as building owners and civic planners look to damage-resistant design, to have buildings that stand up to a large seismic event, and can be reoccupied quickly afterwards. The importance of this type of design has been clearly shown in Christchurch, as vast swathes of the commercial buildings in the CBD faced demolition, and thousands of businesses had to be relocated, or closed after the region’s earthquakes.

ALL ABOUT STIC

The Structural Timber Innovation Company (STIC) is a research consortium made up of Australasian academic and commercial partners. The group aims to develop and commercialise new technologies that will enable structural timber to compete more effectively in the commercial and industrial building and construction market.

STIC has a portfolio of pre-fabricated LVL (Laminated Veneer Lumber) and Glulam (Glue Laminated Timber) structural building systems, that enable the easy design, and rapid construction of multi-storey commercial and long-span industrial portal framed buildings using engineered timber products.

STIC partners include: The University of Canterbury, The University of Auckland, Carter Holt Harvey Woodproducts, Nelson Pine Industries, Wesbeam, Building Research Association of New Zealand (BRANZ) and The NZ Pine Manufacturers Association. Forest and Wood Products Australia (FWPA) and The Ministry of Business, Innovation and Employment (MBIE) also provide substantial funding support.
Since the Canterbury quakes, the EXPAN Demonstration Building and STIC Office at the University of Canterbury has been visited by hundreds of building designers, specifiers, property owners, and developers, all interested to see the system for themselves. As well as showcasing the post-tensioned timber engineering, the building stands as a testament to EXPAN’s superior seismic capabilities, having endured the February 22 2011 quake, and thousands of aftershocks since with no damage.

Three further commercial buildings are currently being constructed in The Garden City using the EXPAN system, with several more in the final consideration or design stages there and throughout New Zealand. The Christchurch buildings will be important examples of cutting-edge seismic design, and damage avoidance technology, Dr Finch says.

“Seismic capabilities are a significant issue for building owners, who now recognise they need to have buildings that are firstly safe, but also able to sustain seismic activity without becoming write-offs. And it’s not just Cantabrians with these concerns, we’ve had a number of queries from Wellington, and around the country, as people take a fresh look at the seismic risk associated with buildings.

“People are interested in the fact that EXPAN buildings can be constructed quickly, at an equivalent cost to steel or concrete – with the reassurance of being lightweight. This is particularly important for those looking to rebuild demolished buildings on sites that have difficult soil conditions and may be subject to liquefaction. Lightweight buildings help to control the cost of new foundations on difficult sites. EXPAN buildings can also be easily deconstructed and rebuilt somewhere else, which offers great benefits to developers and businesses that may be uncertain about where they want to be long-term.”

Seven other commercial buildings throughout the country have now been constructed using the STIC-developed engineered timber technology, including the NMIT Building in Nelson, BRANZ’s Nikau building in Porirua, The College of Creative Arts (CoCA) building at Massey University in Wellington, Carterton District Council Events Centre, Tumu ITM retail building in Napier, Waiairiki Institute Wood Technology building in Rotorua, and the EXPAN Demonstration Building and STIC Offices at the University of Canterbury. A two-storey building in Wanaka using EXPAN’s Quick-Connect technology is the first residential building utilising STIC’s research outputs.

Several of these buildings took out accolades at the 2012 Timber Design Awards. Massey’s CoCA Building won the Engineering Excellence Award, The Tumu ITM Building in Napier was named Winner of the Timber Innovation in Business category, and several other Highly Commended honours went to buildings featuring EXPAN, including The Trimble Navigation Office and Warehouse and The Merrit Office Building in The Canterbury Rebuild Innovation Category.

Momentum for building in timber grows with each of these new builds, Dr Finch says.

“These buildings are not only engineered for strength, but the natural timber – left exposed in many of these designs – is strikingly beautiful, and really gets people talking. It’s fantastic to see such wide recognition for EXPAN buildings in the Timber Design Awards, showing the design opportunities and innovation that have been unleashed with this technology. Architects are relishing the chance to think big in timber, and coming up with some amazing concepts of spaces for people to live, work and enjoy.”

STIC has also put a lot of work into making it easier for end-users to utilise its technology, and specify with confidence, with the release of several design guides - and more to follow. To add to the Portal Frames Design Guide put out in 2011,
A design guide on the EXPAN Timber-Concrete-Composite (TCC) floor systems is due for launch shortly. This guide covers the structural design, acoustic attenuation performance, dynamic performance and fire resistance determination for elevated floors in multi-storey buildings manufactured from laminated veneer lumber (LVL) and concrete. The document is the result of extensive research and laboratory testing, undertaken by a team of STIC researchers from The University of Technology Sydney.

Smaller design guidelines have been prepared on Fabrication and Finishing of EXPAN Structural Elements, Durability Performance of Engineered Timber EXPAN buildings, and Timber Rivets for Connections in LVL trusses. Timber rivets offer strength, time and cost savings on a timber build – approximately $30,000 in savings in the Carterton Events Centre Construction – and this design guide (to be launched in 2013) will make it easier to incorporate them into building design.

STIC’s work is also getting increasingly recognised internationally – evident at a global gathering of researchers, engineers and designers at the World Conference on Timber Engineering (WCTE) in Auckland in July.

STIC Researchers from the University of Canterbury, Auckland Uniservices Ltd (University of Auckland) and The University of Technology, Sydney made a significant contribution to the conference, presenting some 30 presentations and posters.

Professor Pierre Quenneville, STIC Research Objective Leader and WCTE Technical Programme Chair, says he received numerous comments at the conference that New Zealand is leading the way in timber engineering.

“The rest of the world is now waking up to New Zealand’s recent advances in low-damage seismic design of timber structures. Conventional design philosophy is based around an acceptance of some structural failure, where people get out safely in an earthquake, but the building is not able to be saved, or major repairs deem it uneconomic to fix or unusable for a long time.

“It was clear from the conference that the EXPAN building system is currently the only one in the world that offers the certainty of low-damage design using engineered timber.”

So, it’s been quite a ride for STIC in the last few months, with momentum gathering here, and around the world, on the value of its research programme and commercial developments.

“And we’re looking forward to seeing even more EXPAN buildings go up around the country in coming months,” Dr Finch says, “And perhaps even further afield, as word spreads about our timber building system that’s founded on research and development from some of the world’s foremost timber engineering experts. It’s really exciting to be part of the global push towards building in timber.”