

# Timber floor system

As the emphasis on smarter, quicker building grows, a BRANZ-led project to develop a simple lightweight suspended timber floor system is an exciting advance that also proves the value of collaborative effort.



The innovative panel floor system being lowered into place.

**THE SKILLS SHORTAGE** and the need to deliver high-quality buildings on budget present an opportunity for prefabricated buildings or components. Roof trusses are one example of prefabricated timber components that have become the norm, with traditional roof framing now the exception.

While there is plenty of interest in the use of timber systems such as cross laminated timber (CLT), pre-stressed laminated veneer lumber (LVL) or glue laminated timber (glulam) building frames, there are opportunities for other readily available engineered timber components.

## **Project to develop timber ground-floor system**

Recently, Forest and Wood Products Australia (FWPA) funded a BRANZ-led collaborative research project to develop a practical prefabricated lightweight timber ground-floor system that includes prefabricated timber floor panels and the floor support to the footings.

The objective was to develop simple approaches to deliver easy-to-install raised lightweight timber ground-floor systems - including the design, fabrication and installation of the timber floor panels, the floor support system and the footings - in one package to the builder.

Initial research identified that, while internationally there were a number of cassette systems spanning between loadbearing walls on first and subsequent floors, there weren't any systems for ground floors.

## **Keeping it simple**

The brief was to use off-the-shelf components and to keep it as simple as possible. The team developed a floor panel system with a range of joists from sawn to engineered timber that could be fabricated and installed by a frame and truss manufacturer.

Components of the concept designs were first tested in the BRANZ structures laboratory to ensure that the structural connections were adequate and, most importantly, could be achieved on site.

Subsequently, full-scale prefabricated panels were manufactured by a local frame and truss manufacturer and installed at BRANZ. This

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allowed the movement, placement and connection of the panels to be assessed in real site conditions. Importantly, the dynamic performance of the floor could be measured to ensure it was not too live.

Panel options were developed using F17 timber, engineered I-beams or parallel chord trusses, with various sheet decking options. The panels have incorporated bearers and joists and can be constructed so that bearers run either the length or width of the panel between supports.

Insulation can also be incorporated in the panel, and full-scale testing of insulated panels was also undertaken to demonstrate how high system R-values could be readily achieved.

The optimum panel width was established as 2.7 m, allowing panels up to 9 m long on a flat-bed truck and up to 12 m on a semi-trailer.

#### **Options depend on the site**

The subfloor support system used depends on the site:

- A braced, adjustable steel pier system is effective for a sloping site as the piers can be adjusted easily to make sure everything is level.
- Lightweight concrete piers may be cost-effective on a flat site.
- In New Zealand, where there are no termite problems, a timber square pile or post system would be viable.

A major advantage of a raised timber floor is that it can be easily adjusted in the future if there is ground movement.

#### **First Australian installation**

In March, and with the help of project partners TPC Solutions, Bowen Timber and Building Supplies, Mitek and Holmesglen TAFE, the system was installed into a real project - a simple rectangular 120 m<sup>2</sup> single-storey house built at Heathcote in rural Victoria.

The project incorporated nine prefabricated floor panels spanning 5.3 m and comprising parallel chord trusses with a particleboard deck supported on adjustable steel piers. The engineered joists meant that the system required only about 20% of the supports necessary with a normal suspended timber floor.

The project highlighted the importance of working with industry to develop practical solutions. The Frame and Truss Manufacturers' Association of Australia (FTMA) is now promoting prefabricated flooring through seminars in Queensland, New South Wales and Victoria.

The system will be selectively rolled out to frame and truss manufacturers in the eastern states of Australia who will fabricate the panels, deliver them to site and install them for one contract price. ◀

**For more** ▶ Visit [www.fwpa.com.au](http://www.fwpa.com.au), the website of Forest & Wood Products Australia, which manages the Australian timber industry's marketing and promotion, including standards and Building Code development.

Interested people here could contact David Sharp on (04) 237 1170.