

Better information on long span engineered wood products

Flexible, lightweight, strong and space saving, plywood box beams are another long span beam to add to your repertoire.

This research project, funded by Forest & Wood Products Australia, with key researchers TDA and in partnership with Engineered Wood Products Association of Australasia (EWPAA) aims to educate builders in how to use long span timber structures. The project identified the way builders and designers access the timber supply chain whilst avoiding the health and safety concerns and costs of steel and accompanying cranes, props and welding.

Plywood box beams are a fast, flexible, strong and lightweight alternative to steel beams and other engineered wood products. Either customised or prefabricated off-site for mass produced standard residential applications, the beams have plywood sheets on either side of a horizontal flange and vertical stiffeners to provide structural support and stability and, on a side view, an attractive finish. Their high torsional stiffness and resistance to buckling means they can be used as rafters, or as floor beams for bearers or joists, for example.

They can also double as walls to save space and avoid height restrictions, acting as the structural element as opposed to having a wall with bracing, says structural engineer Tim Gibney, who has used the beam on residential applications in Victoria.

In one project Gibney clad an existing stud wall in plywood to create a box beam to open space under an existing first floor extension, and in another he designed walls at ground floor level so they could span between pile foundations without needing stumps or concrete footing. "The exterior walls were the only load bearing elements on the system," says Gibney.

Plywood box beams particularly suit spans in the four to eight metre range most common in housing construction, their span increasing with beam depth. "Solid timber can span so far, glulam can span so far, steel can span so far. There is probably a bracket, a niche span, in between where the box beam is at its ideal," says Andrew Dunn.

Developing adhesives or even metal plate connections to deal with shear forces better than is currently achieved with nails, which are limiting the beam's span, is one area of further research, as is investigating moment joint configurations to better integrate the box beam into portal frames.

Overall though "builders willing to try something different have been surprised by how easy the beams are to construct from standard builders' tools," says Simon Dorries, General Manager, EWPAA. "No specialist equipment is required and it doesn't need a high level of skill. Not enough builders know about this method but they are happy when they use it." Especially as it means they do not have to call in extra trades on-site, a carpenter still likely to be the only subcontractor builders will need.

As part of a growing range of resources, Wood. Naturally Better.™ has developed the Plywood box beam construction for detached housing guide. The guide compares different timber beams including laminated veneer lumber (LVL), glue laminated and plywood box beams, and steel beams in housing construction, offering design strategies for fitting beams into available space.

The guide also includes new span tables, developed by the EWPAA and now in line with current calculation techniques, are designed to limit state format, wind speeds up to N3 and the latest Australian timber structure and design and wind load standards. They cover MGP 10, MGP 12, F5 and LVL 10 stress grades for flanges and stiffeners and common locations such as for lintels, bearers, hanging beams and strutting beams.

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Order your free copy of the guide at www.timber.org.au/guides (#07 Plywood box beam construction for detached housing).

