INTEGRATING CROSS-LAMINATED TIMBER PANELS TO CONSTRUCT BUILDINGS TO TWENTY LEVELS

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A worldwide interest in timber multi-storey buildings is expected due to the environmental advantages of timber construction when compared to buildings in concrete and steel. Cross-laminated Timber, or CLT, was developed in the early 1990's and glues and clamps timber planks in alternate layers to form large panels. CLT construction has been used successfully for the nine storey Murray Grove Stadhaus building in London and the ten storey Forte building in Melbourne [1]. The paper proposes a new type of structural system that utilises CLT to form an integrated panels core, or IPC, for buildings to twenty levels. The three main aspects of the structural system that makes it different to the current method of CLT construction are:

1. Connecting CLT panels to form integrated elements that are much larger, and hence stiffer and stronger, than an individual panel
2. Ensuring the column elements are placed end on end so vertical loads are only transferred parallel to grain
3. The structural members butt together in compression and do not significantly rely on fixings like nails or bolts

The floor plan with a central rectangular core and columns at the perimeter is similar to a typical RC commercial building. There are considerably more open spaces than for existing CLT multi-level buildings which rely on multiple shear walls. The central rectangular core, made up of integrated CLT panels, is located at the centre of the building and is the main element for supporting horizontal loads. The floor beams are LVL and the columns are glulam. The proposed timber floor system was developed at the University of Auckland and has timber pole floor joists and achieves acoustic insulation as well as suitable physical performance [2]. The structural analyses used the most current information on the properties of CLT and the relevant codes [3,4,5].

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