MULTI LEVEL TIMBER CONSTRUCTION.

PAOLO BEVILACQUA
12 NOVEMBER 2015
MULTI LEVEL TIMBER CONSTRUCTION – HISTORY.

- Started in 2011
- Up to 5 stories
- 300 apartments to date
WHAT IS MULTI LEVEL TIMBER CONSTRUCTION?

• Multi-residential timber frame construction
• Domestic labour force and supply chain
• Commercial approach to site management, procurement, programming, and safety
WHAT IS MULTI LEVEL TIMBER CONSTRUCTION?

- “Structure first” design approach
- Understand the parameters of “Timber”
- Attractive AND cost efficient buildings
WHY MULTI LEVEL TIMBER CONSTRUCTION?

- Cost savings per apartment in the order of 25%
- Brings more medium rise apartment buildings to the suburbs
- Program advantages - 11 day floor cycles, with partition walls in place
- Builds industry skills and jobs
- Encourages innovation within supply chain

Cost comparison is based on projects managed by Frasers Property and built by external builders around Australia
PARKVILLE “THE GREEN” INTRODUCTION.

Completed in April 2014

57 apartments

5 levels plus 1 car park

Frasers Property’s first 5 storey timber framed apartment building

First of its kind in Australia

Winner “Judge’s Innovation” at the Australian Timber Award
PARKVILLE “THE GREEN” DESIGN.

- Pre-fabricated wall frames, roof trusses & cassette floor panels
- Clear span of structure from party walls to party walls
- Combination of rendered phenolic board, aluminium & brickwork cladding
- 10.38mm laminated glass to satisfy acoustic requirements
- External walls are wrapped with 16mm fire-rated plasterboard to achieve fire & acoustic rating
- Fire & acoustic requirements internally achieved through plasterboard
- Sprinkling allowed for a 60/60/60 rated structure, in lieu of 90/90/90
PARKVILLE “THE GREEN” DELIVERY.

Deconstructed our construction techniques & sequencing & identified the challenges:

- Long task durations to install floor joists & sheet flooring at each level
- Realisation this could not be improved with simply increasing labour
- Safety concerns with floor joist & sheet flooring install – fall from height was critical
PARKVILLE “THE GREEN” DELIVERY.

The “Solution”

- Timber cassette floor
- Built off site
- Modular design and installation
- Significantly reduces the risk of fall from height
- Meets all fire, acoustic, structural and installation criteria
PARKVILLE “THE GREEN” DELIVERY.

The “Solution”

The first factory cassette prototype  The first unit prototype
PARKVILLE “THE GREEN” DELIVERY.

The “Initiative” becomes a reality

First lift occurred on the 26th June

2013
PARKVILLE “THE GREEN” DELIVERY.

The “Initiative” becomes a reality
PARKVILLE “THE GREEN” DELIVERY.

The “Time Advantage”
THE GREEN
LCA RESULTS
PARKVILLE “THE GREEN” LCA RESULTS.

A simple building life cycle

Some standards:
ISO 14044
EN 15978
**PARKVILLE “THE GREEN” LCA RESULTS.**

<table>
<thead>
<tr>
<th></th>
<th>The Green</th>
<th>Reference building</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td>Parkville, Victoria</td>
<td>Parkville, Victoria</td>
</tr>
<tr>
<td><strong>Storeys / GDA</strong></td>
<td>5 storeys / 3,895m²</td>
<td>8 storeys / 5,912m²</td>
</tr>
<tr>
<td><strong>Apartments</strong></td>
<td>57</td>
<td>91</td>
</tr>
<tr>
<td><strong>NatHERS (avg)</strong></td>
<td>7 stars</td>
<td>7 stars</td>
</tr>
<tr>
<td><strong>Main structure</strong></td>
<td>Timber on concrete foundation</td>
<td>Precast concrete, concrete foundation</td>
</tr>
<tr>
<td><strong>Building mass</strong></td>
<td>618 kg/m² GDA</td>
<td>1,653 kg/m² GDA</td>
</tr>
</tbody>
</table>
PARKVILLE “THE GREEN” LCA RESULTS.

Multi level timber construction
12th November 2015
PARKVILLE “THE GREEN” LCA RESULTS.

The bar chart compares the construction, fitout, and other components of the Reference and The Green projects. The chart shows the following categories:
- Construction
- Fitout
- Roof
- Windows
- Internal walls
- External walls
- Floors
- Core and cols
- Substructure

The Green project includes a higher proportion of sustainable materials and design features compared to the Reference project, as indicated by the longer bar on the right side of the chart.
PARKVILLE “THE GREEN” LCA RESULTS.

- Ozone Depletion
- Acidification
- Eutrophication
- Smog
- Resource Depletion

Climate Change

- Materials*
- Construction
- Use 60yrs
- End of Life

Multi level timber construction
12th November 2015
PARKVILLE “THE GREEN”
LCA RESULTS.

Full Life Cycle

<table>
<thead>
<tr>
<th>Category</th>
<th>The Green</th>
<th>Reference</th>
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</thead>
<tbody>
<tr>
<td>Climate change</td>
<td>98%</td>
<td>100%</td>
</tr>
<tr>
<td>Ozone depletion</td>
<td>100%</td>
<td>83%</td>
</tr>
<tr>
<td>Acidification</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Eutrophication</td>
<td>99%</td>
<td>100%</td>
</tr>
<tr>
<td>Photochem. ox.</td>
<td>100%</td>
<td>91%</td>
</tr>
<tr>
<td>Abiotic depletion</td>
<td>97%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Part Life Cycle (Excluding Use Phase)

<table>
<thead>
<tr>
<th>Category</th>
<th>The Green</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change</td>
<td>70%</td>
<td>100%</td>
</tr>
<tr>
<td>Ozone depletion</td>
<td>70%</td>
<td>100%</td>
</tr>
<tr>
<td>Acidification</td>
<td>100%</td>
<td>93%</td>
</tr>
<tr>
<td>Eutrophication</td>
<td>91%</td>
<td>100%</td>
</tr>
<tr>
<td>Photochem. ox.</td>
<td>100%</td>
<td>82%</td>
</tr>
<tr>
<td>Abiotic depletion</td>
<td>68%</td>
<td>100%</td>
</tr>
</tbody>
</table>

2 Green Star points

Equivalent to 6 Green Star points

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PARKVILLE “THE GREEN” LCA RESULTS.

S1: Replace timber framing elements (walls and roof) with C-section steel elements.

S2: Replace 36mm cement floor panel elements with 20mm.

S5: Replace floor joists (metal web, timber flanges) with all timber engineered joist.

S6: Replace rendered foam exterior wall system with coated cement panel.
THANK YOU.

FULL LCA REPORT AVAILABLE AT: HTTP://WWW.FWPA.COM.AU/IMAGES/MARKETACCESS/PRA344-1415-AUSTRALAND.PDF