McEvoy & Dupont Apartments, San Jose, CA:
Steel BRB Lateral System

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McEvoy and Dupont Design Case Study
McEvoy & Dupont Overview

- San Jose, California, United States
- 365 Affordable Housing units
- 2 towers over a podium
- 12 stories of Type IVB over a 1 story Type IA
- Total Area ~300,000sf
- Parking: 92 car, 16 motorcycle, 457 bicycle
- ~17,500sf of amenity (incl. office, laundry and common areas, Urban Farm)
- LEED Platinum
Structural Approach
Timber vs. Steel Columns

### Column Cost Premium

<table>
<thead>
<tr>
<th></th>
<th>Steel (wrapped)</th>
<th>Timber (wrapped)</th>
<th>Timber (intumescent)</th>
<th>Timber (exposed)</th>
</tr>
</thead>
</table>

### Architectural Opportunities
- **Steel**: Smaller columns, more usable floor space and hence better unit flexibility.
- **Timber**: Opportunity for timber exposure, aesthetics.

### Construction
- **Steel**: Slightly lighter in weight, need crane and separate trade installation.
- **Timber**: Wouldn’t require two trades to complete vertical structure erection.

### Detailing Complexities
- **Steel**: Non flush column head detail for fire rating steel connection.
- **Timber**: Need added space for acoustic attenuation at demising walls.

### Other
- **Timber**: Improved carbon footprint.
Passive Fire Protection

Option 1: Recess the steel seating plate into the Plus of the CLT with a gap (means flipping the CLT panel for the CNC machine which is best). Then run the two layers of GYP over technically the steel plate is still not protected for 2hr FRR. So need to see how hot it gets and then run a fire load case with a reduced $f_y$ to assess.

1. DETAIL: TYPICAL STEEL COLUMN TO CLT SLAB - ENCAPSULATION OPTION 1

Option 2: Don't recess the steel seating plate, which is easier for fabrication. Run standard two layers of GYP from ceiling up to edge of plate. Then do discrete "column capital encapsulation" with three layers of GYP with a bit of shimming to protect the plate from heating up, or some other idea. $f_y$ to assess.

2. DETAIL: TYPICAL STEEL COLUMN TO CLT SLAB - ENCAPSULATION OPTION 2
Steel vs. Concrete Lateral Core

Lateral Core Cost Comparison

- Supply/Install
- Other Structure
- Fire Rating
- Stairs
- Schedule/GC's
- Equipment
Passive Fire Protection

Hidden BRB (in walls)

Source: Lendlease Podium
Optimization and Distribution

**Optimising Material Usage Example**

- BRB Replacing Concrete Shear Walls/Cores Insitu
  - Steel Tonnage: 338 tons
  - Braces per floor: 14
  - Intercity Walls Facade Line

**Optimised BRB Efficiency Location**

- Steel Tonnage: 254 tons
- Braces per floor: 18

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**Element Sizing vs BRB Count Example**

All three options have the same seismic performance.

- **Option A:** 8 Locations
- **Option B:** 14 Locations
- **Option C:** 19 Locations

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Source: Lendlease Podium

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Sequencing
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Procurement & Planning

- Subcontractor Interest
- Union Trade Coordination
- Crane Utilization
- Safety during erection
Tolerances and Interfaces

Source: Lendlease Podium

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Welding & Griding

- Eliminating Hot Works
- Iron Staining
Can we make the whole more than the sum of its parts?