About B&K Structures

- Over **40** years experience
- Anticipated turnover of **£26m** for 2018/19
- Forecast turnover of **£30m** for 2019/20
- Part of the Bowmer & Kirkland Group
  - Financially robust
- Employing over 50 dedicated staff:
  - Structural Engineers
  - CAD technicians (BIM level 2 Accredited).
  - Project Managers.
  - Site Management & Engineering.
  - H&S Manager & Supervisors
  - QA & Environmental Management

* A complete design and build service
Organogram......

Andrew Goodwin
Managing Director

Mark Gration
Commercial Director
Core Products
CLT (Cross Laminated Timber)

Dalston Lane, Hackney
CLT (Cross Laminated Timber)
Dalston Lane, Hackney
Structural Steelwork
St. Mary Magdalene School, London
Structural Steelwork
St. Mary Magdalene School, London
Unitised Wall and Roof Cassettes
Pinewood Film Studios
Unitised Wall and Roof Cassettes

Pinewood Film Studios
‘Hybrid’ Solutions......
this scheme showcases Steel and CLT
CLT in Residential Builds – Dalston Lane
- The site was the original planned route for Crossrail and because of its proximity, deep piled foundations were ruled out, which meant the weight of the build would be a crucial. CLT is 1/5 the weight of concrete, thus significantly reduced the foundation design.
- The site was bounded by existing buildings on one side of the site, thus a prefabricated and pre-finished wall solution was developed and installed by BKS.
- Challenging site with limited access, required just in time delivery, CLT also enabled an 80% reduction in site deliveries.
Original design intent was an RC frame throughout, and included 700 tonnes of rebar reinforcement.
Mass Timber Choice.....

2,300 TONNES OF CLT / RC HYBRID

- RC Frame from basement to first floor
- CLT utilised for all upper floors
- Significant benefit to foundation design
LOAD-BEARING INNER SKIN OF AN EXTERNAL WALL

UPPER FLOORS FOR MULTI-STOREY

PARTY WALLS

STRUCTURAL ROOF ELEMENTS

LIFT SHAFTS

RISER SHAFTS

LOAD BEARING AND NON-LOAD BEARING INTERNAL WALLS

STAIR CORES AND STAIRCASES
How CLT has been utilised.....

141 FLATS = MAX SUPPLIES

106 FLATS = MAX SUPPLIES

35% more units achievable compared to original RC frame design
Fire

Things to consider...... Fire
• Compliance with the building regulations under fire is the same as for any product and is fulfilled by the guidance contained within AD-B.

• CLT is designed for fire in accordance with Eurocode 5, it is predictable in fire and has clearly defined charring rates determined through testing.

• CLT has a range of fire resistance and load testing that complies with EN 1363, 1364 & 1365.

• BKS undertake a project specific fire risk assessment, through a dedicated fire Engineer.
Things to consider...... Durability

Moisture

Checks and Maintenance
As a business we are now offering:

a) Moisture surveys and inspections up to project PC.

b) Assist the main contractors in the development of their project specific Moisture control procedure, beyond sectional handover by BKS.

c) The option (subject to a fee) to undertake surveys/inspections as part of the final operation and maintenance of the building.
Standing at over 33 m and 10 storeys Dalston Lane is one of the UK’s tallest timber structures.

CLT is 1/5 the weight of a reinforced concrete frame.

Due to its lightweight construction the build contained an additional 16 nr units than the equivalent concrete scheme and the option for a further 20.

Construction deliveries were reduced by 80%.

Approximately 4,650m³ of CLT, 3,460m² of commercial space and 0,850m² of residential accommodation.

A 6 month reduction in build programme.
Co2 saving could mean that every resident in this development could run a car for 14 years without producing any emissions!

<table>
<thead>
<tr>
<th>Volume Timber used</th>
<th>4649m³</th>
<th>n/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of trees</td>
<td>2325</td>
<td>n/a</td>
</tr>
<tr>
<td>Equivalent area of forest</td>
<td>9200m³</td>
<td>n/a</td>
</tr>
<tr>
<td>Time required to grow the equivalent number of trees used in German and Austrian forests</td>
<td>3 hours</td>
<td>n/a</td>
</tr>
<tr>
<td>Sequestered carbon*</td>
<td>3576 tonnes CO²</td>
<td>n/a</td>
</tr>
<tr>
<td>Embodied carbon*</td>
<td>976 tonnes CO²</td>
<td>2000 tonnes CO²</td>
</tr>
<tr>
<td>Net carbon footprint*</td>
<td>-2600 tonnes CO²</td>
<td>+2000 tonnes CO²</td>
</tr>
<tr>
<td>Weight of superstructure*</td>
<td>2300 tonnes</td>
<td>10700 tonnes (incl. approx. 700 tonnes of rebar)</td>
</tr>
<tr>
<td>Number of deliveries required*</td>
<td>111 lorries</td>
<td>700 lorries</td>
</tr>
<tr>
<td>Volume of concrete</td>
<td>6000m³ (foundations, basement to first floor podium only)</td>
<td>6000m³ (foundations, basement to first floor podium) + 4000³ (superstructure above first floor)</td>
</tr>
</tbody>
</table>

*Figures relate to the CLT superstructure only
What do the changes to Building Reg’s mean when building with CLT?....

• New regulations came in to force on the 21st December 2018.

• Combustible materials banned in the external wall / cladding above 18m on new Residential Buildings or buildings that have a sleeping risk i.e. Care Homes, Student Accommodation, Sheltered housing, Hospitals.

• CLT cannot be used within the external wall line / build up.

• CLT can still be used for the structural frame regardless of the height of the building.

• BKS have façade solutions now available for compliance.
THINK outside of the box
Building with CLT under the new regulations.....

- BKS have considered the impact on removing the external / outside CLT wall from the structure

- Considered the impact on the design for the structural frame

- Consider alternative options:
  - SFS through wall system.
  - Composite cladding façade solution

- SFS system now developed and offered to clients

- Further external façade solutions going forward with more off-site elements factory installed (windows, cladding, etc.)
Building with CLT under the new regulations.....
Building with CLT under the new regulations.....

Dashed line indicates external wall line. All CLT elements including slabs and walls are to be within this line. This is to provide a clear definition of what the external wall is.
Building with CLT under the new regulations....

**SLAB EDGE DETAIL**

- **SFS system (by BKS)** with insulation and sheathing board (by BKS)
- Plasterboard internal walling (by others)
- Internal floor finishes, typically resilient layer + insulation + screed + carpet (by Others)
- Hot rolled steel beam to edge of slab to support SFS and facade. Beam to include 1mm steel plate welded to top (by BKS)
- Mineral wool (by BKS)
- CLT slab (by BKS)
- Potential for additional strip of plasterboard for fire stopping detail if necessary (by others)
- Insulation (by others)
- Plasterboard suspended ceiling (by others)

**CROSS WALL DETAIL**

- **Internal wall linings, typically plasterboard on isolated battens and mineral wool insulation (by Others)**
- Plasterboard internal walling (by others)
- Internal wall linings, typically plasterboard on isolated battens and mineral wool insulation (by Others)
- **CLT wall (by BKS)**
- **Mineral wool (by BKS)**
- **Brickwork (by Others)**
- **SFS system (by BKS)** with insulation and sheathing board
- **Masonry support angle (by others)**

**Note:**
1. Layer of sheathing board to phases 2-4.
2. 2 layers of sheathing board to phase 1.
Building with CLT under the new regulations.....
Building with CLT under the new regulations.....
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Building with CLT under the new regulations.....
Collaboration…..it’s the process of two or more people or organisations working together to complete a task or achieve a goal.
Thank You for listening