



# PEFC & SOLID WOOD CONSTRUCTION

One of the most exciting developments across the construction landscape is the growth and increased use of engineered timber products and solid wood building solutions such as **cross laminated timber (CLT)** and **glulam**. These are recognized as a popular and fashionable way to build strong, sustainable and stable structures plus bring a striking architectural dimension to modern building design.

Due to the low carbon benefits of timber as a sustainable material, many involved in the specification and use of timber including architects, designers, engineers and contractors are looking to use timber across a range of applications – saving time and reducing CO<sub>2</sub>. Glulam and CLT are commonly made from Spruce or Larch (usually from PEFC-certified sources) and acts as a natural and renewable alternative to steel and concrete.

Created by gluing together thin laminates of timber to produce large strong solid beams and panels, glulam and CLT can be used as vertical or horizontal

beams, or can be produced in attractive curves and contribute to some of the finest contemporary parts of the built environment.

## WHY IS IT SO POPULAR?

### Exceptional Structural Performance

CLT is a very stable and structurally strong timber system with little movement post construction and with multi-story capabilities. Large vertical or horizontal beams deliver huge interior spans without supporting columns, with the scope to showcase breathtaking use of space and introduce huge swathes of natural light.

### Reduced Risk & Speedy Construction

CLT and glulam are pre-fabricated within a precision factory controlled environment, using accurate data from BIM modeling and CNC processes. Openings can also be pre-cut or routed in the factory for windows, doors or services for quick and easy installation. This means that it is easier to timetable the construction critical path and eliminate site delays. The components are also simple to erect and connect onsite without the need for complicated fixings, drilling or routing. This offsite manufacture delivers improved resource efficiency, less waste and better health and safety.



Photo © Center Parcs

### Lightweight Material

As a lightweight building material, timber can provide time and cost savings due to reduced foundation work as the structural loads required with CLT are small compared to concrete and steel. A lightweight structure can give an estimated 25% reduction in foundations compared to an equivalent precast concrete structure. Delivery loads are

also more efficient as the panels and beams can be packed to a 'maximum transportable volume'.

### Fire Resistance

Glulam and CLT chars in a constant and controlled manner. CLT can be designed to accommodate substantial fire resistance and unlike steel remains structurally stable when subjected to

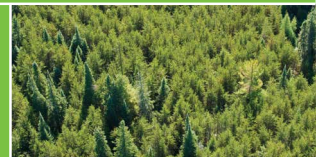
high temperatures. CLT panels can be produced with fire resistances of 30, 60 and 90 minutes.



Photo © B&K Structures

## CHAIN OF CUSTODY CERTIFICATION

1 Certified Forest



2 Certified Logs



3 Certified Sawmill



4 Certified CLT Manufacture



5 Contractor





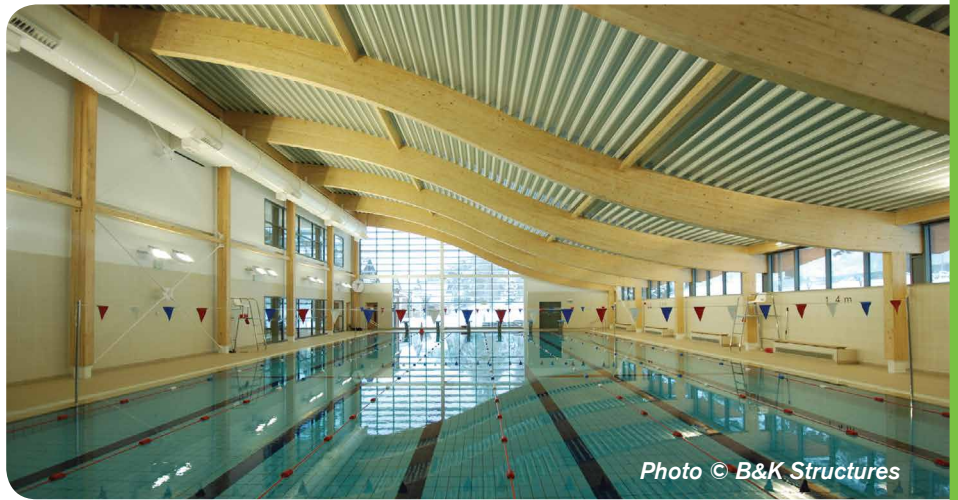
### Thermal Insulation & Airtightness

The properties of solid wood means that it can make huge contributions to a building's thermal insulation through the elimination of cold bridging and improved acoustic performance – usually better than Building Regulations with Passivhaus standards of airtightness easily achieved.

### Design Appeal

Glulam beams have enormous aesthetic appeal to architects. They are available in a wide range of standard sizes but can be made to measure to almost any requirement. Glulam arches and beams deliver exceptional clear spans and vaulted ceilings without any need for ridge beams, supporting pillars and fewer connections, allowing more design flexibility than with traditional timber construction or many alternate building materials. Glulam is also ideally suited to corrosive environments such as swimming pools.

Across the world, the international design community is embracing CLT and glulam



to deliver high profile, award winning projects from houses, schools and hotels to restaurants, theatres, supermarkets and swimming pools. It is available as **PEFC-certified** from a range of suppliers carrying Chain of Custody.

It is critical to prove that the timber used on your project is sustainably sourced

and certified. **Chain of Custody documentation** proves that each step of the supply chain has been monitored closely with independent auditing and is the key mechanism for tracing certified material from the forest to the construction site. This unbroken link is transparent proof that the timber used is sourced from a legally managed and certified forest.

## KINGSGATE HOUSE – THE FIRST UK PEFC PROJECT CERTIFIED SCHEME

Due to be completed in January 2014, a seven-story residential project in West London is destined to be the first major construction scheme in the UK to achieve **PEFC Project Certification** for its timber sourcing and supply. Kingsgate House is located on the King's Road, West London and will provide 43 affordable residential units.

Designed by Horden Cherry Lee Architects and built by main contractor Willmott Dixon, the structure will contain **PEFC-certified CLT** supplied by KLH UK. The site area is approximately 1345m<sup>2</sup> (0.13 hectares) and the high quality and striking design for affordable housing is set to be an exemplar sustainable building with an energy strategy benefiting from its open southerly aspect and achieving Code for Sustainable Homes Level 4.

### Project Chain of Custody

**Certification** is a specific form of Chain of Custody certification for one-off short term projects involving different, smaller, uncertified contractors. BM TRADA will be auditing the project against PEFC's



### strict Project Certification Standard.

Horden Cherry Lee Architects, in conjunction with the client and design team established key principle design and environmental objectives for the project.

- Provide residential apartments that meet or exceed the London Housing Design Guide recommendations, satisfy all the criteria for Lifetime Homes, comply with RBKC LDF Access Design Guide and include the provision of private amenity space for every apartment.
- To approach environmental issues holistically including retention



and reuse of existing building substructure, minimize site waste and noise using modern composite ply panel construction, and overtly integrating the renewable energy systems into the architecture of the façades.

- Provide maximum light and views to all apartments whilst protecting the privacy of its occupants and minimizing impact on adjacent neighbors through careful location of terraces, windows and screening structures.
- Propose durable materials with careful robust detailing to minimize maintenance and ensure long-term durability of the building.

**PEFC-certified timber is at the heart of two of the UK's groundbreaking multi-story buildings – Stadthaus, Murray Grove and Bridport House.**

## **CASE STUDY BRIDPORT HOUSE, LONDON**

Bridport House is an eight-story residential tower built for the London Borough of Hackney. Designed by Karakusevic Carson Architects as the first part of the regeneration of the Colville Estate, Bridport House replaces an original 1950s block with 41 new homes in two joined blocks, one eight stories high and the other five stories. Construction of the structure took 12 weeks, considerably faster than a conventional concrete frame which it is estimated would take around 21 weeks.

The 1,576m<sup>3</sup> building was entirely constructed from PEFC-certified Spruce CLT, making it one of the tallest residential wooden structures in the world and UK's first multi-story to be entirely built of the material – including the ground floor. The PEFC-certified spruce was sourced and supplied by Stora Enso Wood Products at their purpose-built factory and fully integrated sawmill at Bad St Leonard in Austria.

It was the first time that CLT had been specified in the UK for an entire multi-story structure including the ground floor. Though the material has been used in multi-story applications before now, previously the ground floor has been constructed from concrete. The team chose CLT because of its lighter weight: a survey revealed a large Victorian storm sewer under the site and building around a reinforced concrete (RC) or structural steel frame would have required significant



extra reinforcement of the foundations to create a building of the same height.

Had the building been of conventional reinforced concrete frame, the materials required would have incurred an additional 892 tonnes of carbon. This is equivalent to 12 years of operational energy required to heat and light all the dwellings at Bridport House. When the sequestered carbon locked up in the timber structure is added to the carbon avoided, the total figure is 2113 tonnes of carbon. This is equivalent to 29 years of operational energy, or with 20% renewable energy, it would take 144 years to save the same amount of carbon.

The structure has been designed so that the load bearing CLT panels, which have line loads as opposed to point loads, are placed in a variety of positions on each floor, thus spreading the load. Because

of this, it has also been possible to double the size of the replacement structure with only a 10% increase in overall weight.

## **PROJECT DETAILS**

**Client:**

London Borough Hackney

**Architects:**

Karakusevic Carson Architects

**Main Contractor:**

Willmott Dixon

**Structural Engineer:**

Peter Brett Associates

**Engineer & Timber Contractor:**

Eurban

**CLT supplied by:**

Stora Enso Wood Products

**For more information on PEFC, sustainable timber sourcing and to download a wide range of industry brochures and guidance visit: [www.pefc.org](http://www.pefc.org)**

### **PEFC International**

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