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# Carbon Neutral Construction

SAFE • EFFICIENT • AFFORDABLE • SUSTAINABLE



Photo: Alex de Rijke, dRMM Architects

## KLH UK Ltd.

Formed in 2005 as a specialist supplier of cross-laminated structural timber panels, the company also acts as a subcontractor for the erection of timber structures, where required.

KLH has worked with numerous architects and engineers to develop sustainable and cost effective structural solutions - seeking to optimise the design and buildability from the outset. It is a limited company wholly-owned by KLH Massivholz, Austria, with a London-based team of 18 working directly on UK projects and strongly focused on the social responsibility of a UK company.

## Timber and Sustainable Construction

KLH, by the nature of its product, is a specialist in sustainable construction. It promotes the use of timber in lieu of concrete and steel - all timber used is certified, as is the zero waste production process. Audits are also carried out to calculate the CO<sub>2</sub> emissions generated by the delivery vehicles and are offset against the huge amounts of stored CO<sub>2</sub>, to give a true picture of the overall carbon count.

Timber is the only truly renewable mainstream construction material, and has been appreciated as a building material for centuries - today it is experiencing a tremendous renaissance. This is due to the increasing health consciousness and environmental awareness of mankind and also to the development of high-tech engineered timber products that can also contribute to a healthy indoor environment.



Photo: KLH UK Ltd

Cross-laminated timber (German abbr. KLH) is produced from kiln dried spruce/fir boards which are stacked at right angles and glued together over their entire surface. Depending on the purpose and static requirement, the plates are available in 3, 5, 7 or more board layers.

Gluing is carried out with PUR adhesive which is completely solvent and formaldehyde free and tested in accordance with DIN 68141 and other strict criteria by MPA Stuttgart and approved for the production of load-bearing timber construction elements and special construction methods in accordance with DIN 1052 and EN 301. Crosswise gluing at high pressure reduces the wood's expansion and shrinkage to an insignificant level.

## KLH Solid Timber Panels

KLH solid timber panels are used as large wall, floor and roof elements. They are produced in a maximum length of 16.50m, a maximum width of 2.95m and a maximum panel thickness of 0.50m, though to minimise any wastage and off cuts, we recommend that the calculation widths of 2.40/2.50/2.72 and 2.95m are taken into account as early as possible in the planning phase of a project.

KLH solid timber panels are industrially manufactured structural building elements. They are available as standard in non visual quality, industrial visual quality and domestic quality for classroom/residential spaces.

The panels are cut and processed in the KLH Massivholz GmbH factories, in Austria & Sweden, using state-of-the-art CNC technologies, resulting in excellent dimensional stability, both in overall panel size and for structural openings.



Photo: Gareth Gardner

As well as the obvious environmental benefits, introducing KLH panels into a scheme can result in cost savings:

- Less weight in the overall structure results in a more economic design of the substructure/foundations (less concrete)
- The load distribution of the panelised structure can reduce the thickness of the transfer slab (less concrete)
- Prelims can be reduced due to the shortened construction programme
- Programming can be enhanced by, for example, pre-ordering windows - the high degree of accuracy afforded by the CNC cutting process ensures that exact structural openings will be delivered to site.

The clean, dry erection process ensures that no drying time is required - following trades can be working immediately on the preceding floor if required. Based on our experience it is clear that there are time saving opportunities for the following trades:

- Services - approximately 30-50 percent quicker
- Dry liners - approx. 20-30 percent quicker
- Window & door installers - approx. 20-30 percent quicker
- Insulation installers - approx. 20-30 percent quicker
- Cladding installers - approx. 20-30 percent quicker.





Photo: Alex de Rijke, dRMM Architects

Project:

## Kingsdale School Music & Sports Building

Architect: dRMM Timber Engineers: Techniker

The Music & Sports Buildings complete the extensive masterplan for the redevelopment of Kingsdale School. The challenge for the Sports Hall was to transform a generic low-budget box into daylight and expressive architecture. A large simple interior volume offers maximum flexibility for different user-groups. For acoustic reverberation, the Music School has angular form, with special windows for soundproofing qualities. At the same time the building exterior creates a sympathetic addition to the streetscape.



Photo: Urban Salon arch



Photo: Gareth Gardner

Project:

## Falmouth School

Architect: Urban Salon Timber Engineers: Techniker

The project is the extension and refurbishment of Falmouth Schools' existing design and technology block. The project was completed in August 2008 and was part of the Sorrell Foundation's 'joinedupdesignforschool' programme, where pupils are given control and responsibility as clients. The building has given the school a new landmark and improved teaching space for design and technology. The students' brief asked for environmental excellence and the initiatives in this low carbon project include modern methods of construction, energy-saving initiatives and sustainable materials.



Photos: James Brittain



Project:

## Thomas's School, Clapham

Architect: Clarridge Architects Timber Engineers: Techniker

The project is the new stand alone classroom block of 3165sq ft, including new specialist year one classrooms, four outdoor semi-enclosed teaching spaces and to the rear, reception and support block. Conceived as individual rooms, reducing massing and kept low to correspond to the existing school boundary walls, the main classrooms are seen as a rolling form with inside and outside space merging into one to create ever changing teaching zones.



Project:

## St John Fisher School, Peterborough

Architect: Gotch Saunders Surridge Engineers: Ramboll Whitby Bird, Cambridge

The £12m redevelopment of the St John Fisher School in 2008 included the construction of two new-build elements - a new two-storey teaching block and sports hall: both built with KLH panels. The superstructures of the two blocks, which totalled 6,550m<sup>2</sup>, were erected in around 8 weeks - offering a saving of approx. 14 weeks on the overall construction period. At the time of construction the St John Fisher School was the largest cross-laminated timber project in the UK - utilising 900m<sup>3</sup> of solid timber. As well as the huge volumes of certified timber (storing 100s of tones of sequestered CO<sub>2</sub>, and replacing steel frame and brick & block) other sustainable features included ground source heat pumps, solar hot water collectors and a wind turbine.



Photo: Kier Eastern





KLH UK LIMITED

7-9 WOODBRIDGE STREET  
LONDON, EC1R 0LL

tel : +44 (0) 203 031 8070

email : [office@klhuk.com](mailto:office@klhuk.com)

web : [www.klhuk.com](http://www.klhuk.com)