

LOW IMPACT MATERIALS: CASE STUDIES

CROSS-LAMINATED TIMBER

Open Academy, Norwich

BREEAM Excellent

Developer: Norwich County Council
Contractor: Kier Eastern
Architect: Sheppard Robson
Completion: Winter 2009
Location: Norwich, Norfolk
Interviewee: Ian Brooks
Business Improvement Manager,
Kier Eastern

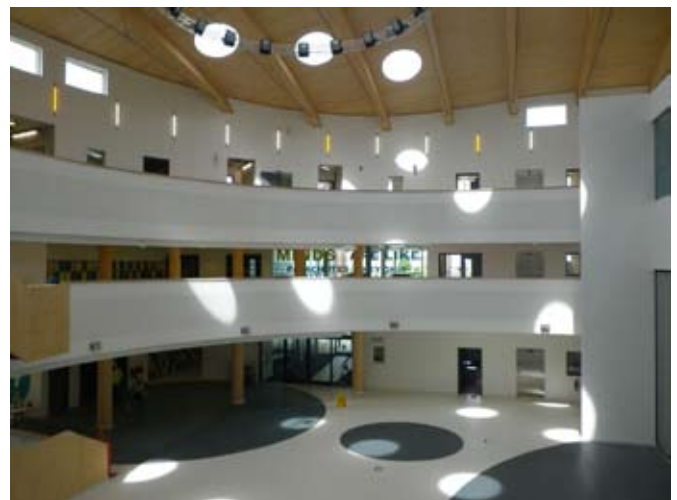


Facade at night (Kier Eastern)

Norwich's Open Academy is located just off the ring road 45 minutes walk north-east of Norwich rail station. The build is a three-storey structure centred around an atrium with a dome timber roof. Within the atrium is a two-storey central drum pod topped with a glass fronted teaching area. The construction type is structural timber with brick and timber cladding.

WHY WAS CLT CHOSEN?

- Client and corporate sponsors specified the need for a low impact material
- Open Academy wished to demonstrate strength of institution in engineering and environmental impact



Atrium (Kier Eastern)

WHAT ISSUES WERE FACED AND OVERCOME?

Potential issues with acoustics were largely designed out. Sound transmitted through floors and reflected down open corridors were particular areas of concern (rather than through walls), for which preliminary design specified high level acoustic panelling. The open atrium also reverberates sound surprisingly well, for which further acoustic panelling was specified on the balconies in order to absorb as much sound as possible.



Panels being lifted into place (Kier Eastern)

Sunlight discolouring the timber is an ongoing issue that requires on-site sanding to remedy and can cause delays. The building elements were of such a size too that the floor slabs needed to be accurate to +0mm and -15mm, a level of tolerance that contractors found difficult to achieve and that slowed proceedings.

WHAT ARE THE PROS AND CONS?

PROS: It is a low impact material and therefore in demand more and more. Kier estimate that it is about six times faster than a standard build due to panel construction and ease of subsequent fixing and remediation (e.g. four men put up the sports hall in four days). It is clean: no wet trades or brick/block dust. Handling is vastly reduced so it is much better in terms of health and safety. Scaffolding was barely used, except for the brick cladding once the structure was in place. Edge protection could be applied on the ground. Lastly, it is lighter so the base slab is much thinner.

CONS: It is very difficult to persuade contractors to gear up to take advantage of the potential speed gains, due both to unfamiliarity and to demands on higher team numbers over shorter periods. The discoloration from the sun is an unavoidable cost. Lastly, all the detailed design needs to be finished early and accurately to ensure M&E is fully and properly built in, otherwise costs rise with need for retrospective building and structural surveying work.

WOULD YOU USE IT AGAIN AND, IF SO, WHAT CHANGES WOULD YOU MAKE?

Yes, and in many different ways. City Academy in Norwich uses a steel spine and a more delicate CLT frame. Comberton Village College has a third floor only of CLT as a way of reducing the overall environmental impact.

WHAT WAS THE ELEMENTAL COST?

Costs depend on the grade and thickness of the timber, the type and number of openings, and whether covered or 'fair-faced'. Perhaps more importantly as it is sourced from the Euro-zone, the cost always changes depending on the value of the Euro. Two or three years ago timber was cheaper than steel; now steel is cheaper. This may continue to change.



Whole site during construction (Kier Eastern)



Fitting glu-lam roof beams (Kier Eastern)



Pre-cut windows and doors (Kier Eastern)

This case study was produced as part of the University of Bath's EPSRC funded Knowledge Transfer Account, a working partnership between BRE and the University of Bath. Further information on CLT is provided in a BRE Information Paper that can be purchased in hard copy from www.brebookshop.com and downloaded free from www.bre.co.uk. Four other case studies and Information Papers are also available on unfired clay block, straw bale, natural fibre insulation and hemp-lime.

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