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Feature

In this materials focus we examine the pioneering sustainable construction work of architecture practice Waugh Thistleton, reducing carbon emissions with CLT

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Waugh Thistleton: building with CLT

Words by Cate St Hill

The construction and maintenance of buildings in the UK is responsible for around half of the nation's carbon-dioxide emissions. While housing alone generates nearly a third of emissions, around 10 per cent results from the manufacture, transport of construction materials and the building process. Add to this the UK's target to reduce its carbon emissions by 80 per cent by 2050 and it is clear that a few solar panels and green roofs here and there are not going to cut it.

London-based architecture practice Waugh Thistleton believes the answer lies in cross-laminated



(CLT) panels, a carbon-neutral form of construction. Made from secondary-grade timber planks, laminated together in perpendicular layers with water-based adhesive, CLT is renewable, robust, lightweight and quick to assemble. The timber — kiln-dried to create a low-moisture content and reduce the risk of rot — is typically formed into three layers, with a thickness of between 70mm and 350mm-400mm.

Manufactured offsite in 16m x 3m precision-cut panels, the pieces slot together on site with simple brackets and screws, without the need for noisy equipment and dust-producing cement mixers. Concrete foundations are reduced and air tightness is improved with a few large panels instead of a hundred smaller components. And because it creates a dry, weatherproof environment almost immediately,

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interior fittings can be installed as soon as the panels are in place, reducing construction times and delays.

Waugh Thistleton first had success with the material in 2002 when it assembled the shell of a three-storey extension to a private-members club in Waterloo in just one afternoon. It was the first CLT building completed in the UK and the practice hasn't looked back. 'We're evangelical about the use of CLT,' says Andrew Waugh, director of Waugh Thistleton. 'We took a building material that had been designed for house extensions and made a tower block out of it [Murray Grove, 2008] and now three quarters of the work we have in the office is made from timber.' Presently it is working on research projects with Cambridge, Harvard and Yale universities, has CLT projects in France, Sweden and Norway, and has

just completed a CLT building for property developer Berkeley. 'It's now really beginning to mushroom and that's really exciting. We're working with big-volume house builders and our ambition is to change the way they build,' says Waugh.

Provided it is sustainably sourced, timber boasts a much lower level of embodied carbon than other energy-guzzling materials such as concrete and steel (approximately 2.5 times less than a concrete building). The practice's latest project, a 121-unit residential development currently on site in Dalston Lane, London, uses more than 3,000 sq m of timber and will save 2,400 tonnes of carbon compared to an equivalent block with a concrete frame. Taking into account the carbon that is locked away while the trees were alive — known as sequestered carbon — the structure

is considered by Waugh Thistleton to be 'carbon negative'.

Says Waugh: 'We need to look at the building materials we use in terms of understanding our environmental impact as architects in construction. Homes currently being constructed are not solid, they're not of any quality at all and we're going to start to see the effects. Dalston Lane is a firm building, a robust structure and a healthy place to live.' At 10 storeys and 33m high, it's set to become the UK's tallest CLT project, surpassed in the world by a 14-storey glulam and CLT hybrid structure by Artec in Bergen, Norway.

A couple of miles away on a brownfield site at Curtain Place in Shoreditch, Waugh Thistleton has also recently completed a 1,100 sq m, CLT office block topped with three storeys of residential units. In a tight,

densely packed urban area, the ease of lightweight timber panels as opposed to dozens of cement mixers clogging up the narrow streets was apparent. 'We probably saved about 30 per cent off the program building in timber compared to concrete; it took a year when it would have taken 18 months. With timber we just turn up on site, screw it together and that's our building,' notes Waugh.

Currently CLT panels are imported from Germany, Austria and Switzerland, but two CLT manufacturing plants are under construction in the UK, meaning even more carbon (and money) could be saved in reducing transportation. For Waugh, 'This is the way we're going to be building in the future.'

1 & 2 - Residential development Dalston Lane, currently in construction in east London
3, 4 & 5 - Curtain Place in Shoreditch also made use of CLT

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