

Solid solution

Cross-laminated timber provides both structure, insulation and thermal mass at an architectural archive building by Hugh Strange Architects.

Behind the remaining walls of a derelict farm building in Somerset, the shell of a new architectural archive is constructed of cross-laminated timber (CLT) panels without insulation, external wall cladding or internal lining. The structural panels range from 300mm to 420mm in thickness and simultaneously provide the building with insulation and thermal mass. This combination creates stability of temperature and relative humidity for the drawings held in the archive and is complemented by a void between the timber and the roof cladding that, during hot summer months, allows ventilation to prevent the shell from overheating.

The thickness of the CLT meant much greater panel weights than is usual: at 3.6 tonnes, the heaviest panel was on the limit of the lifting crane's capacity. One result of these

weights was some splitting around the holes through which the crane ties were strapped. Because of the building's monolithic, exposed nature, these required careful making good with timber plugs and wood filler. A second result of the weight was the difficulty in installing the panels on site. Two aluminium T-sections were fixed side-by-side to the tops of the concrete upstands on which the panels rest. Grooves on the underside of the CLT allowed the panels to slot precisely into place on top of these. The tolerances were tight and the placement on site took some time to get right.

A by-product of the panels being sized for their thermal performance rather than their structural efficiency was that the roof panels were able to span length-wise. This meant the long side walls took minimal loads and a downstand at the apex of the roof pitch could be avoided, allowing the creation of simple internal volumes.

A number of measures were taken to protect the CLT from the rain. Upstands to the concrete floor slabs lift the panels off the ground while large eaves to the fibre cement roof shield the tops of the walls. Much of the remaining wall surface is protected by the old stone walls and the roof within the covered entrance. The most susceptible part of the panels is the end grain and this was protected by fixing all the doors, windows and rooflights to the outside face of the timber, a move



with the added benefit of revealing the full depth of the CLT internally. Finally, a paint-on water-repellent UV-protection was applied to all external wall surfaces.

Works on site divided simply into three phases. The first works were

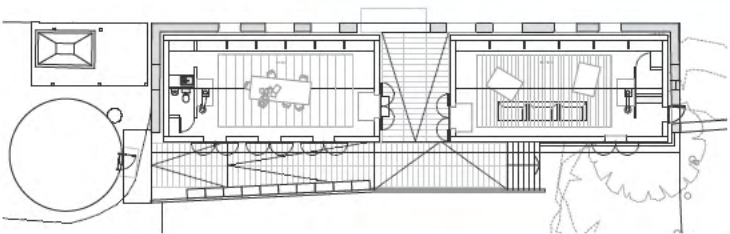
ABOVE, LEFT Exterior and interior views of the archive building. The room in interior features a hardwood 'ma' recessed in the spruce CLT floor and Gunnar Asplund's studio lamps.

RIGHT Plan and long section of the architecture archive building. The new CLT structure was inserted within the retained and modified stone walls of a former agricultural building on a Somerset farm.

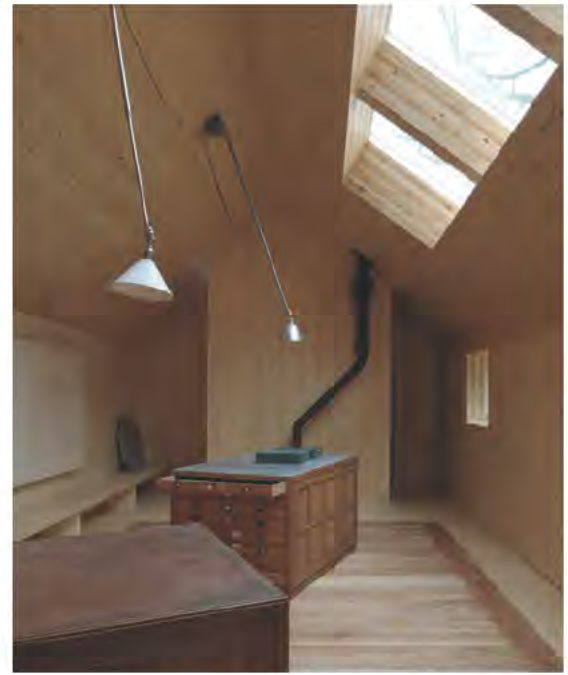


Words: Hugh Strange
Photos: David Grandorge

Project: Architecture Archive, Somerset
Architect: Hugh Strange Architects



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the slowest and messiest part of the project. Generally completed by wet trades, these included the demolition of parts of the existing building, the stone repairs and concrete works to form the foundations and retaining walls. During the two weeks of CLT erection, the installation team had the site to themselves. Subsequent works were more

precise and involved dry trades, including the doors, joinery, roof and electrics. The architecture of the scheme readily expresses this division of process and trade, with the bottom (poured concrete), middle (CLT) and top (profiled fibre cement) of the building clearly legible and each element – or trade package – distinctly articulated.

ABOVE 300mm- hick cross-lamina ed imber wall panels craned in o place on in-si u cas concrete e ups ands.
BELOW R GHT Axonomé ric showing s ruc- ural cross-lamina ed imber panels.
BELOW LEFT De ail sec ion: in-si u cas concrete e re aining wall, 2 precast concrete e bench, 3 precast concrete e pig sla s, 4 hardwood imber floor ma , 5 spruce cross-lamina ed imber floor; 6 exis ing wall, 7 roof window, 8 libre-cemen roof panels, 9 420mm spruce cross-lamina ed imber roof, 0 300mm spruce cross-lamina ed imber wall.

Credits Architect: Hugh Strange Architects; design team: Hugh Strange, Tom Bates, Rory Gaylor; structural engineer: Price & Myers; client: private; CLT supply: Stora Enso; CLT installation: Urban; joinery: 3f2 Carpentry; concrete: GA Doble Civil Engineering; masons: Keith Watson, David Jamieson; specialist lighting: Claire Spellman; heating: REM; CLT finish: Boehme Suncare 900/Woodcare; windows, doors: Rea Metal Windows; roofing: Marley Eternit Profile 3, installed by Structural Weld; roo lights: Velux; rainwater goods: Lindab; lighting: Thorn; paving slabs: Creagh Concrete.

