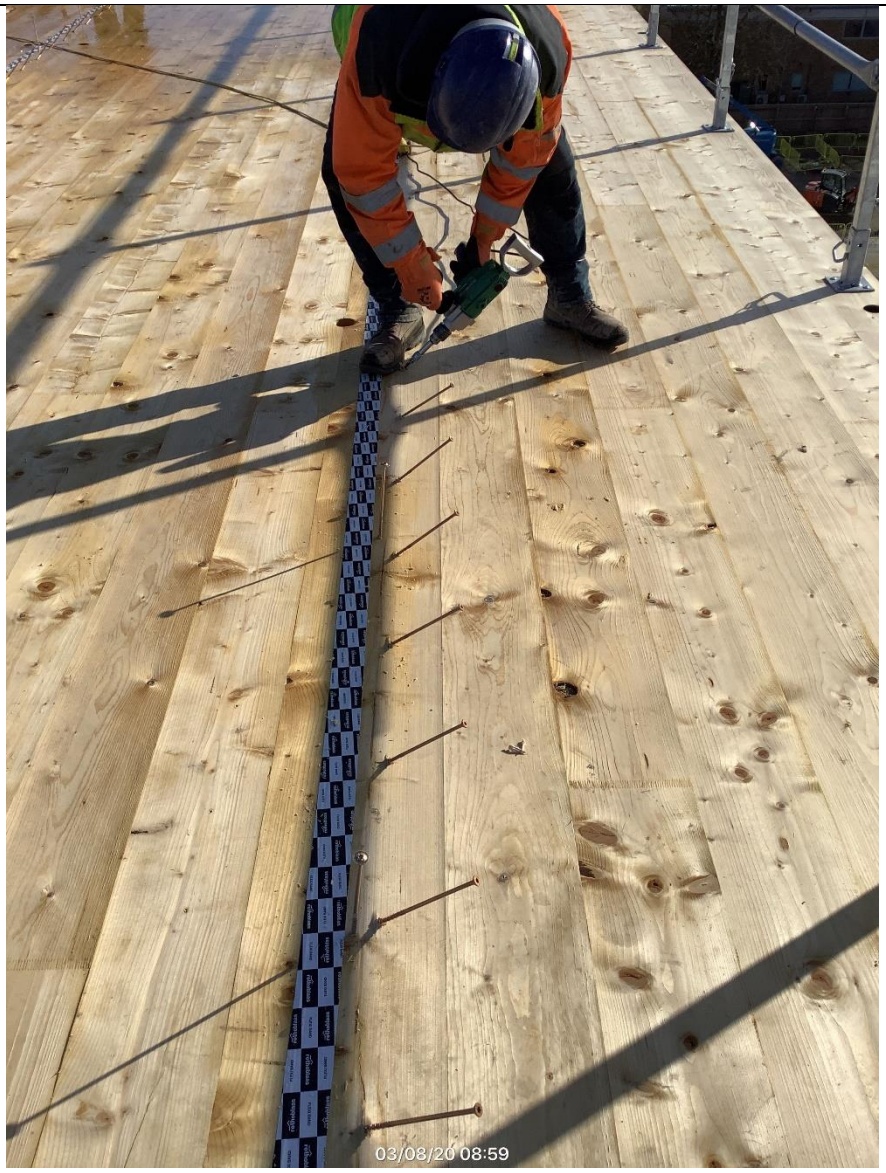
1. Title	CLT at Harwell NSTF
2. Mace project	Harwell NSTF
3. Date	15/09/2020
4. Company *Responsible for implementing this best practice*	Mace
5. What you did *Why* *How* *Who with*	• Mace installed 6000m2 of cross laminated timber (CLT) at Harwell NSTF in place of cast in situ concrete slabs • Cross-laminated timber (CLT) is a product made up of small timber sections that can be formed into large structural panels, which are light, stable and strong • Installer: B&K • Manufacturer: Binderholz • Designer: Price and Myers
6. Outcomes and benefits *(Quantify where possible)* *e.g. reduced resource use, saved time or money, new product or better process)*	**Programme:** • CLT provided a 40% programme saving over the equivalent concrete floor slab • MEP interfaces easily installed • No temporary works or cure time for concrete • Floor finishes can be applied directly • Roof finishes can be applied as soon as panel fixed into place with no cure time. Allowed earlier watertight and fit out to commence. **Cost** • CLT vs Concrete slab cost is like for like, however benefit from reduced structural weight and reduced programme period. • Reduction in outturn cost of ›£600K taking into account slimmed steel frame, alternate foundations and programme savings. • Direct omission of piled foundation • Direct omission of screed topper • Reduced project duration (secondary saving from site prelim costs) **Health & safety:** • Installed with a guard rail as edge protection at ground level prior to lifting • CLT has integral fire resistance properties • Fully dry installation eliminating wet trade • No hot works for shear stud installation • No silica dust generated when drilled for fixings or openings • Reduced weight allowed large sections of CLT to be placed reducing working at height – only limited by transportation size limits. • Panels shipped to site pre slung so reduced access to lorry required.

	Nuisance: • Reduced noise due to lack of concrete pumps / piling / shear stud • No silica dust generated when CLT worked for fixings/openings **Performance:** • Off-site manufacture and quality control • CLT weight is ~6.0kN/m3 as opposed to 25kN/m3 for concrete, so the effect on the foundations was significant (reduced foundation load) allowed change from piled foundation to ground beams • Allows riser grating to be integrated (GRP) as part of primary structure build reducing leading edge • Airtight due to lapped joint detailing • Diaphragm actions achieved by screw fixing to steel frame • Flat underside allows direct application of decorative finish • CLT self-supporting with good spanning performance meaning reduced requirement for framing around openings **Sustainability:** • 36% carbon saving compared with a concrete frame (1,200 tCO2e for concrete and 770 tCO2e with CLT) • No silica dust generated (air quality benefits) • CLT can span further than composite metal decking (the obvious alternative), meaning that the number of steel elements was reduced • CLT is a more sustainable material in terms of the embodied carbon. **Flexibility:** • Practically endless BWIC area size possible - zero cost if detailed as part of factory production • Can be reworked on site using wood working tools meaning reduced noise and dry process versus alternative concrete solutions

7. Supporting material *Internet links* *Photos* *Videos* *Reports/documents*	 Roof finishes installed directly onto CLT

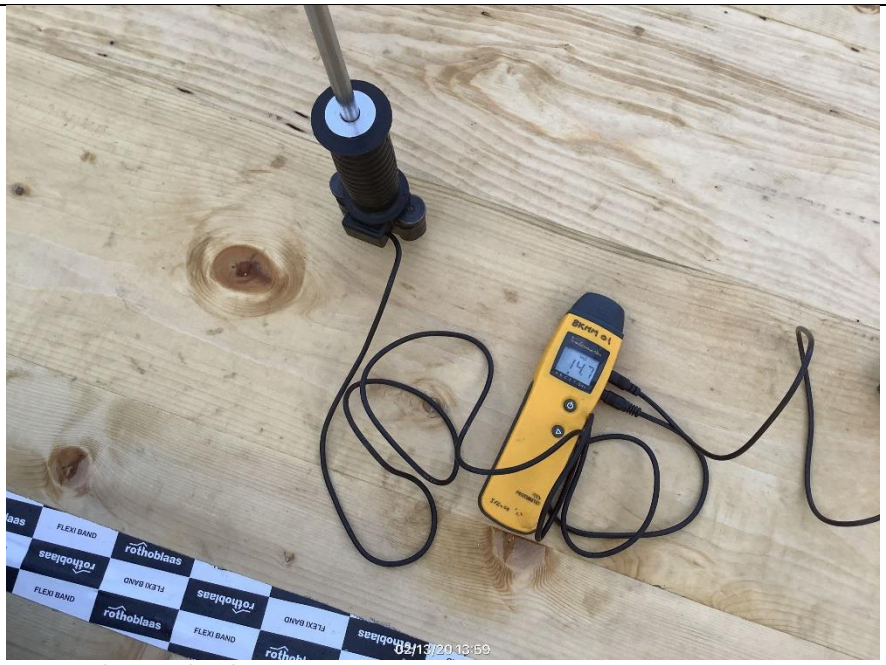
CLT GRP riser infill

CLT GRP riser interface



CLT joints screwed and tape to form monolithic slab

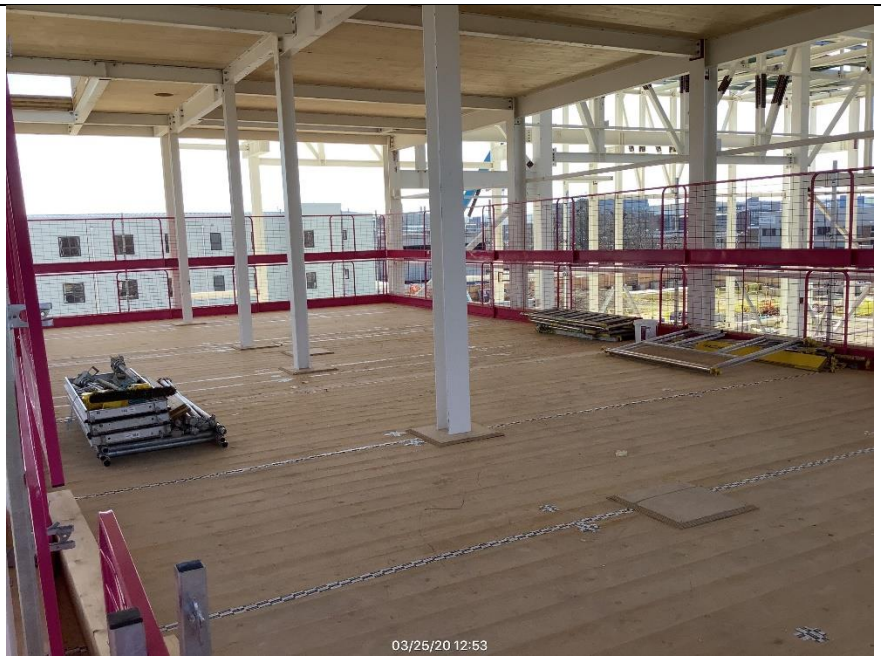
	 CLT lifted with edge protection pre-installed at ground level



CLT moisture checks

CLT shipped to site wrapped to ensure clean and dry

CLT shipped with BWIC and risers' openings preformed



CLT slab from above

CLT slab from below