

Construction in a Climate Crisis

14 December 2021
18:30-20:00

TIMBER DEVELOPMENT UK



our sponsors
and supporters



Wood for Good



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Kelly Harrison
WHITBY WOOD

TIMBER DEVELOPMENT UK



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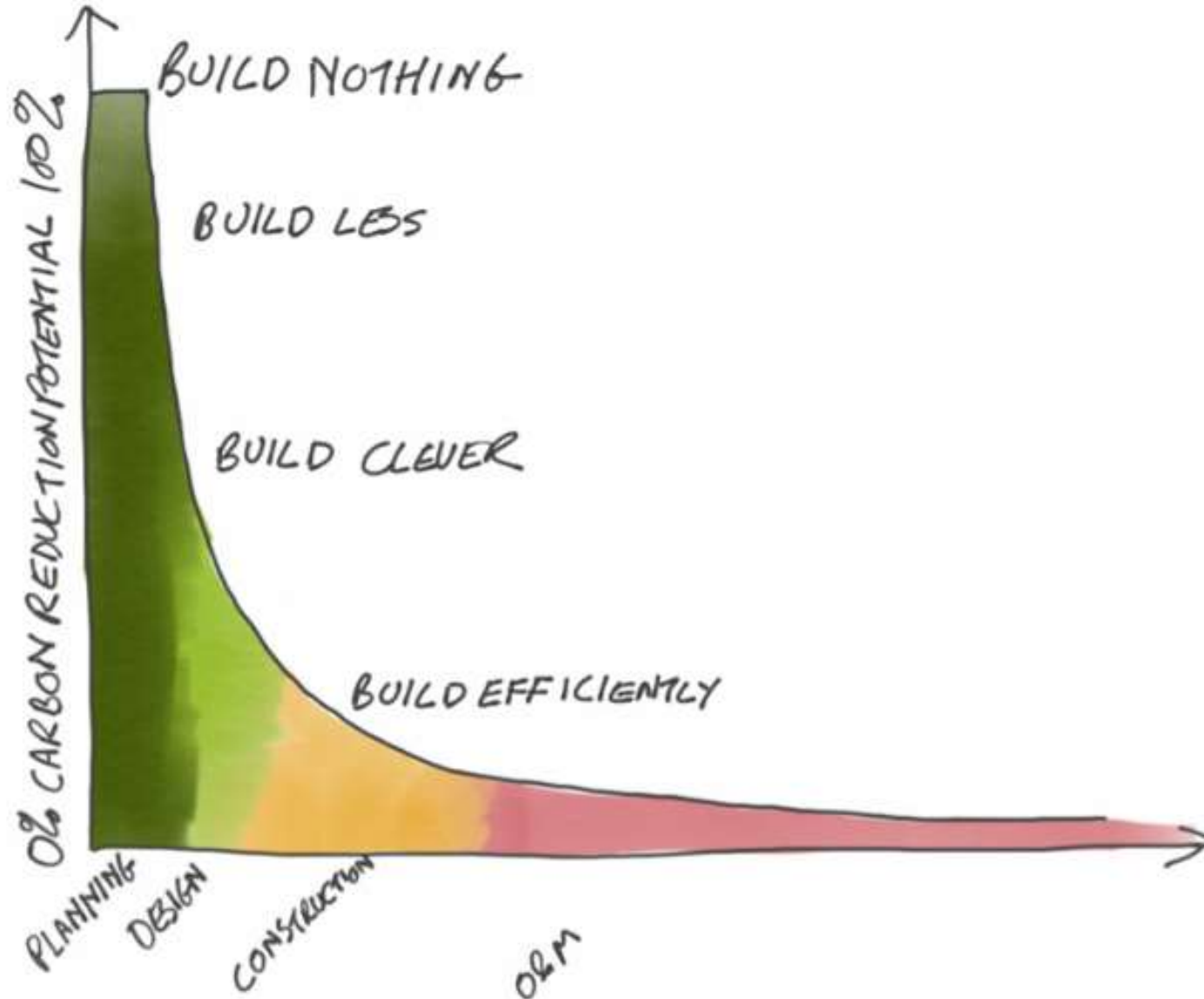




Timber Development UK Challenge 2022

whitby wood
WE ARE ENGINEERS

OPPORTUNITY FOR IMPACT



Carbon reduction potential is biggest at start of project [from James Norman](#)

- [https://www.istructe.org/journal/volumes/volume-98-\(2020\)/issue-7/how-can-we-create-an-engineering-industry/](https://www.istructe.org/journal/volumes/volume-98-(2020)/issue-7/how-can-we-create-an-engineering-industry/)



Cradle to Gate Embodied Carbon A1 - A3



Rammed Earth
48 kgCO₂e/m³
 Ranges from 40 to 170 kgCO₂e/m³



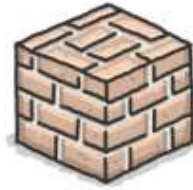
Softwood Timber
110 kgCO₂e/m³
 Ranges from 1 to 480 kgCO₂e/m³



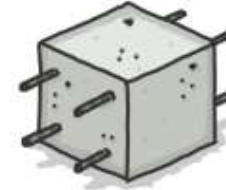
Cross Laminated Timber
219 kgCO₂e/m³
 Ranges from 160 to 320 kgCO₂e/m³



Stone Generally
237 kgCO₂e/m³
 Ranges from 60 to 2,100 kgCO₂e/m³



Clay Brick Wall*
345 kgCO₂e/m³
 Ranges from 260 to 1,100 kgCO₂e/m³



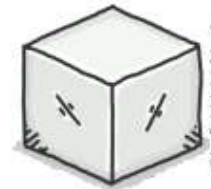
Reinforced Concrete**
635 kgCO₂e/m³
 Ranges from 120 to 1,370 kgCO₂e/m³



Glass Generally
3,600 kgCO₂e/m³
 Ranges from 2,300 to 5,100 kgCO₂e/m³



Steel Section
12,090 kgCO₂e/m³
 Ranges from 7,600 to 28,000 kgCO₂e/m³

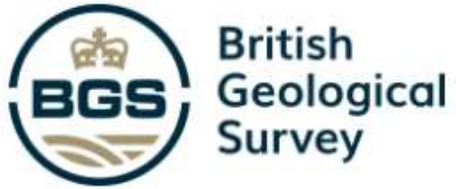


Aluminium Generally
18,009 kgCO₂e/m³
 Ranges from 2,400 to 58,000 kgCO₂e/m³

CIARAN MALIK

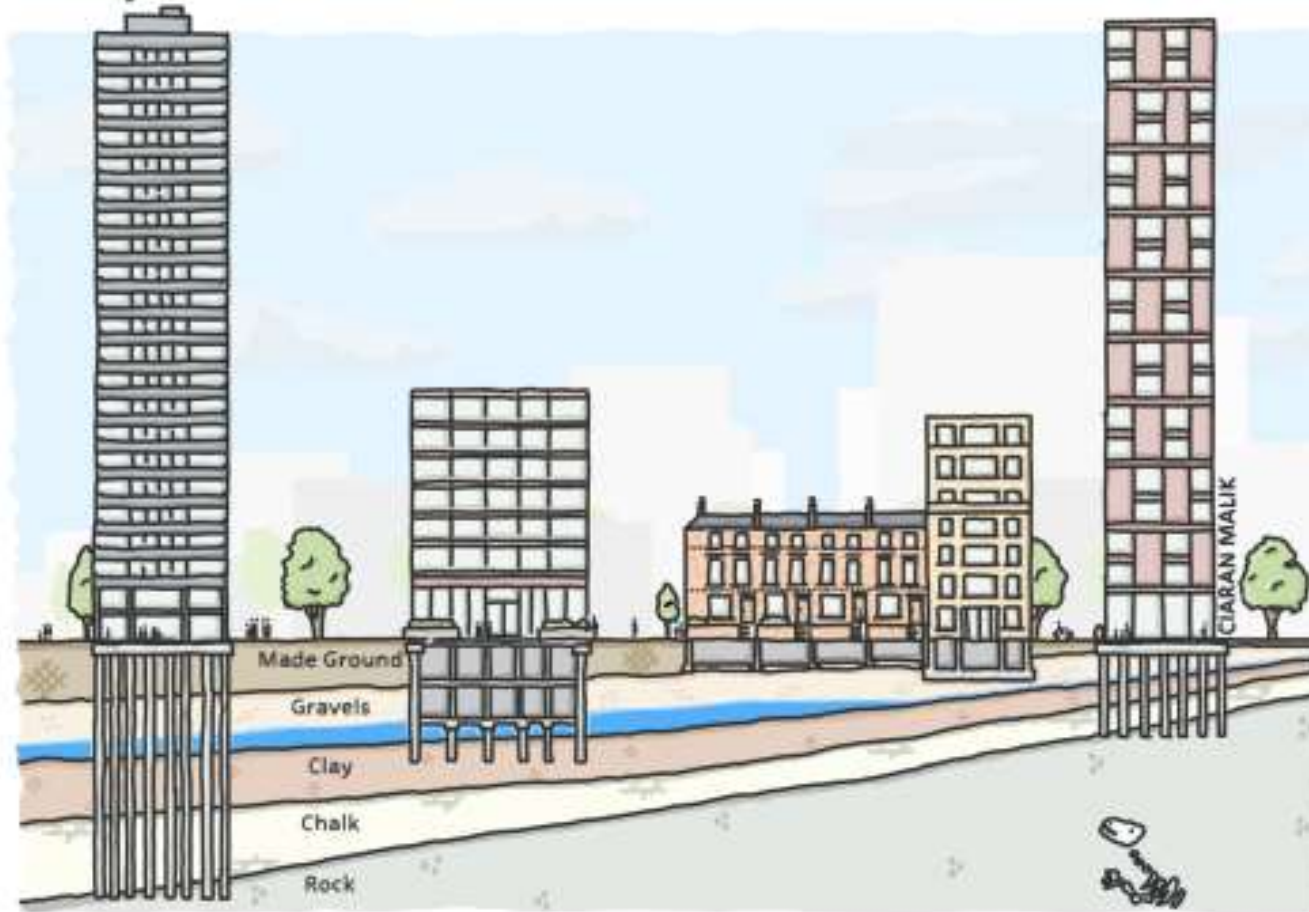
Source: <http://www.circularecology.com/embodied-energy-and-carbon-footprint-database.html>
 Using database summary values for product stage, does not include construction, use, end of life or benefits stages.
 Ranges are presented to show how values can vary, and require interpretation based on source and analysis method.
 *Based on values for brick walls, which use 1,500 bricks for 1m² of mortar
 **Based on C32/40 concrete with 2% reinforcement, maximum based on 4% reinforcement

FOUNDATIONS



<https://www.bgs.ac.uk/>

Soil, Foundations and Embodied Carbon



Foundations are 20% to 30% of the embodied carbon [A1-A5] of a building

Basements in high water levels need dewatering and waterproofing material

Build smaller, lighter buildings on weaker soil reduces embodied carbon

Build taller, heavier buildings on stronger soil which need less material

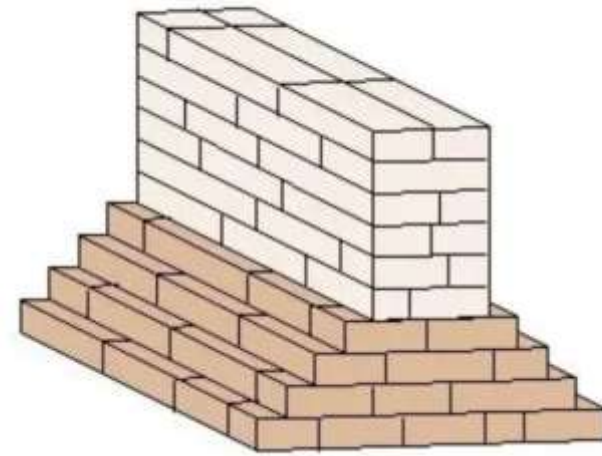
Source: Embodied Carbon Primer (LETI), Targeting Zero (Simon Sturgis)



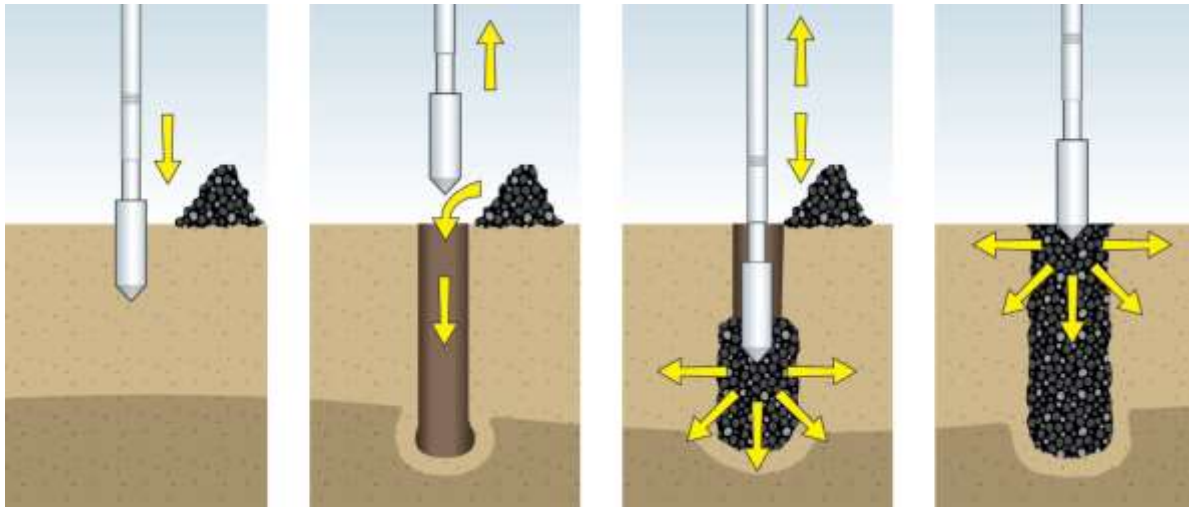
FOUNDATIONS



<https://ecochoice.co.uk/piling>



<https://theconstructor.org/building/types-masonry-foundations-construction-uses/18989/>



<https://www.roxboroughgroundimprovement.com/vibro-stone-columns>



<https://www.screwfast.com/foundation-solutions/helical-pile/>

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SUSTAINABILITY AND CIRCULARITY

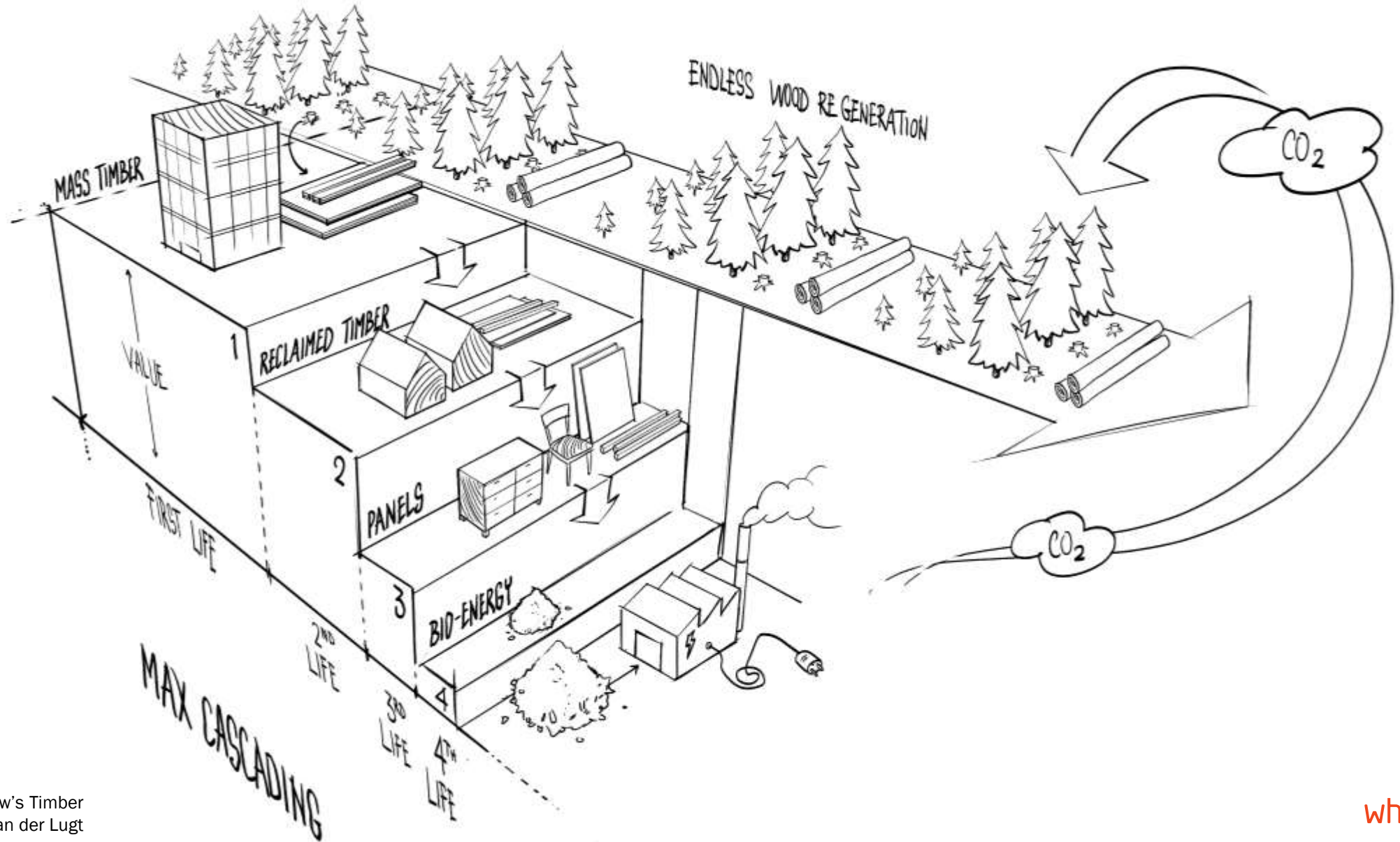
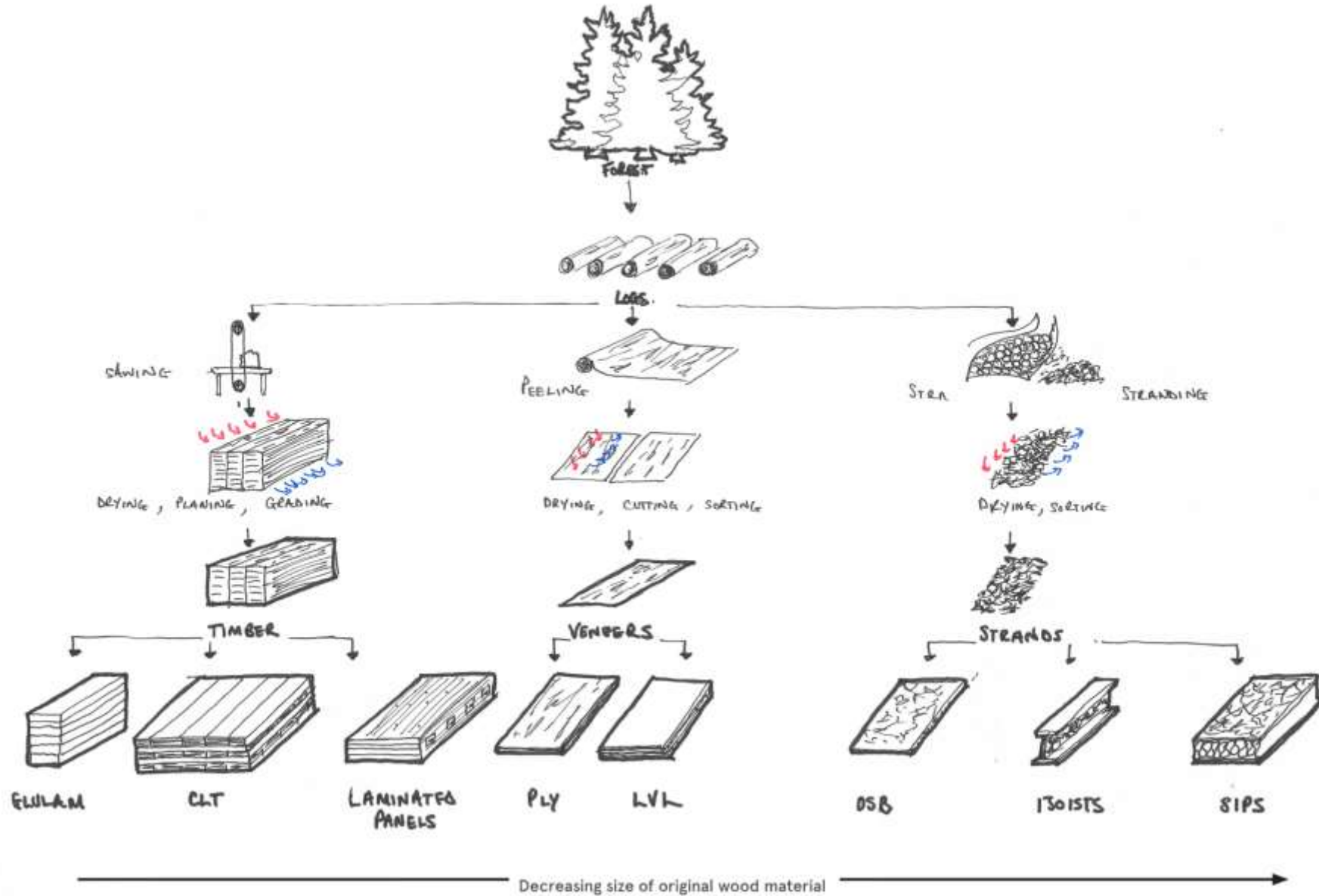


IMAGE Tomorrow's Timber
Pablo van der Lugt

WHAT IS THE RIGHT TIMBER PRODUCT?



REPLACEMENT AND DEMOUNTABILITY



<https://www.self-build.co.uk/guide-to-timber-frame-construction/>



<https://www.pbctoday.co.uk/news/mmc-news/timber-frame-housing-demand/75242/>



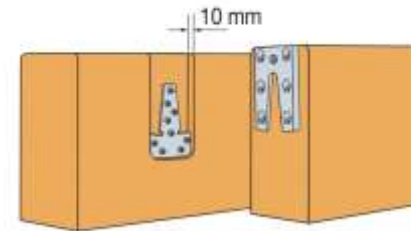
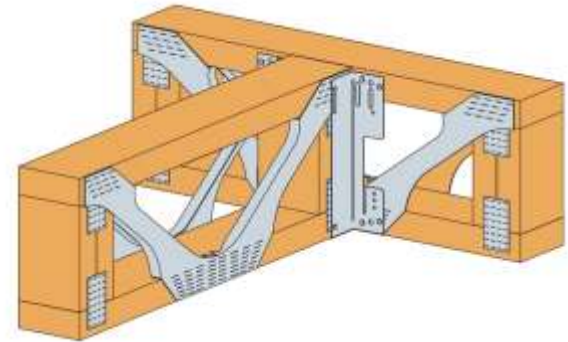
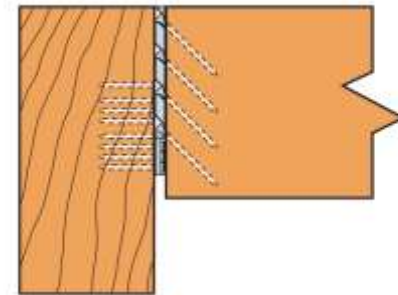
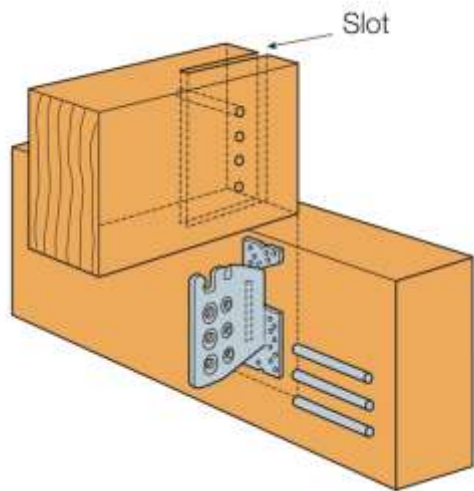
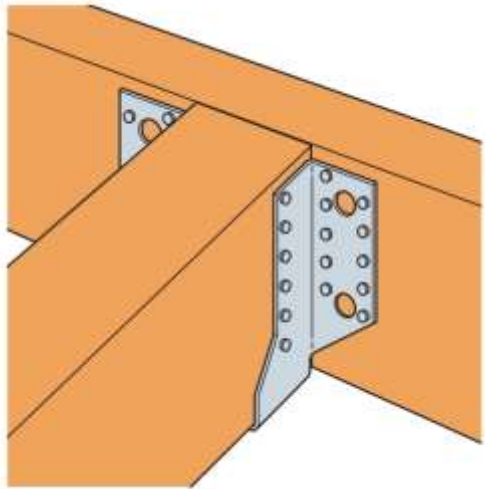
<https://www.norbord.co.uk>



<https://www.strongtie.co.uk/en-UK/solutions/cross-laminated-timber>



REPLACEMENT AND DEMOUNTABILITY



HOW YOU MIGHT PRESENT FINDINGS...

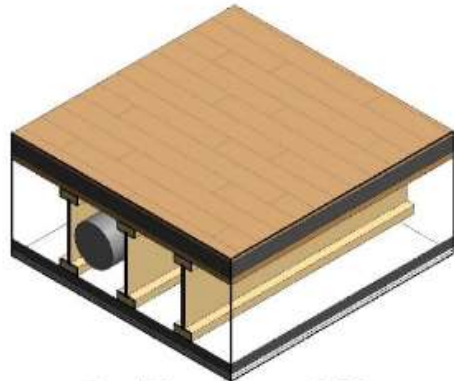
Riverside Sunderland: University Design Challenge 2021

Team M

Structural Engineer

6m SPAN & 2.5kN/m² IMPOSED LOAD & 0.8kN/m² PARTITION LOAD
90 x 360 I-joists @ 300mm centres

1.1kN/m² Dead Load
inc structural self weight



Total Headroom: 2.53m
Total Floor depth: 557mm
 Floor depth: 557mm

Services within floor depth

Total timber per 6 x 9m floor plate:
 3.391m³

Analysed using Steico Kalc &
 ETA 06/0238

280mm CLT

3.0kN/m² Dead Load
inc structural self weight



Total Floor depth: 760mm
 Floor depth: 510mm
 +
 200mm Services
 +
 50mm clearance

Total timber per 6 x 9m floor plate:
 15.120m³

Analysed using Stora Enso Calculatis

0.8kN/m² PARTITION LOAD

460mm Ribbed CLT slab.
120x360 GL24h @ 600mm centres
 2.4kN/m² Dead Load
inc structural self weight



Total Headroom: 2.37m
Total Floor depth: 690mm
 Floor depth: 330mm
 +
 120 x 360mm downstand GL24h
 beams
 +
 Services within beam depth

Total timber per 6 x 9m floor plate:
 9.288m³

Analysed using Stora Enso Calculatis



**ANY
QUESTIONS?**

THANK YOU

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TIMBER DEVELOPMENT UK

SOUTHSIDE HEREFORD

UNIVERSITY DESIGN CHALLENGE 2022



IN PARTNERSHIP
WITH...



SIGN UP NOW:

www.trada.co.uk/academic-competitions/southside-hereford-university-design-challenge-2022/

#TDChallenge22



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