

TALKING TIMBER



SUPERHEROES AT WORK

Marlene Cramer from the Centre for Wood Science and Technology highlights the InFutUReWood project, which looks at the reuse of structural timber



Three years ago, the InFutUReWood project set out with many questions around the reuse of structural timber. What happens to demolition and construction waste wood at the moment? What are the barriers to timber reuse? And how can we build today to be able to circulate tomorrow? Findings from the project are now becoming available on infuturewood.info.

Modern buildings often do not achieve the nominal design life

of 60 years; usually because they are in the wrong place at the wrong time. The buildings might be no longer wanted, but the timber inside them might still be fine. However, upon demolition it becomes waste in an instant. There is no real market for recovered sawn timber, so nobody has an interest in extracting it damage-free unless it is particularly special. The market for low-quality secondary wood for recycling, on the other hand, is booming. Most of the wood waste gets chipped, cleaned, and is either used in chipboard or incinerated for energy recovery. In the UK, more than three-quarters of wood waste is chipped, with around half of all wood waste being incinerated.

Recently, we have been seeing increases in the price for virgin timber, and difficulties with supply even when people do have the extra money to pay. The demand for reclaimed wood might increase. The building stock all over Europe contains between 0.031m³ timber/m² floor area in Irish masonry houses to 0.38m³/m² in Finnish log buildings, but if we want to reuse this timber after the buildings come to the end of their life, the linear wood value chain needs to transform into a circular one.

In a perfect world, buildings would be deconstructed instead of demolished. We need to design the buildings we build today so they can be deconstructed and their parts reused. Contemporary buildings are quite well-suited for deconstruction and reuse already, but this can be improved if we start thinking about the end of life of buildings already in the design phase. Since modern timber buildings are often offsite-manufactured, it is likely that whole assemblies (for example wall panels) can be recovered for reuse.

Eventually, the assemblies will be deconstructed into their components that in turn can be reused. The timber needs to be sorted according to its reuse potential, which is characterised mostly by damage, chemical contamination and size. Depending on its reuse potential, timber can be reused directly, remanufactured into engineered products, or recycled in conventional ways.

Before structural reuse, timber needs to be graded. The grading approaches for new timber are not suitable for recovered wood, but the properties of individual pieces can be assessed instead.

Marlene Cramer is a researcher at the Centre for Wood Science and Technology at Edinburgh Napier University and has been working in the InFutUReWood project during the past two years

Density and stiffness can be predicted well, while strength needs to be estimated conservatively. The most promising option for grading recovered timber is grading for a specific manufacturing process or construction project.

Recovered timber shows a high potential for being reused in laminated products. The strength, stiffness, bonding properties and embedment strength of glulam and CLT made with (partly) recovered wood are comparable to the ones of new products. The only problem is that the yield can be much lower when using recovered wood. This is mainly due to the limited range of available sizes of recovered timbers.

Ideally, enough recovered timber is available, so that the wood can be matched to the requirements of a project, making use of modern technology for assessment and logistics. Structural timber can be sampled to match its required function in a building. Small cross-section timber can be manufactured into laminated products. Very old timber can be used in heritage buildings. Everybody wins.

Some questions, of course, remain. Probably the hardest one: How do we get from the current state to the perfect world? This seems to be the work for superheroes, but they are already working on it: https://www.youtube.com/watch?v=6tD5_R02rvo ■

Below:

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