

Building in softwood

Donal Magner

The role of trees and forests in carbon sequestration and climate change can be divided into two main but inter-connected routes:

- First, trees remove carbon dioxide from the atmosphere and store it for long periods in soils and in wood biomass
- Second, sustainably managed and harvested wood is recognised as a) a key renewable fuel and b) a major building medium in reducing greenhouse gas emission by displacing fossil based materials.

The first benefit that trees provide is widely understood but the second – after the wood leaves the forest – has often been overlooked in Ireland but it is crucial in reducing fossil fuel emissions. Sustainable energy is carbon neutral as it directly displaces oil, coal and natural gas while the wood used is replaced in the forest to continue the carbon sequestration cycle.

The traditional benefit of softwood in displacing high-carbon construction materials such as steel and cement has been acknowledged throughout Europe.

Engineered wood

High rise buildings in engineered wood – both cross laminated timber (CLT) and glulam – exceeding 80 metres are now either built or planned in Austria, Norway, England, Germany, Sweden, Canada and Japan.

Center Parcs, Ballymahon, Co. Longford, is a major holiday complex using engineered wood as the main construction medium.



CLT IN NUIG



Research carried out by NUIG has established the viability of using grade C16 Irish Sitka spruce to produce structural CLT panels.

Species such as Norway spruce (used widely in Europe CLT), Douglas fir (used in Canada), and Scots pine are suitable for engineering, and all grow well in Ireland.

The HoHo building in Vienna is 84m high and contains 74% wood. Compared with reinforced concrete construction, the use of wood avoids some 2,800 tonnes of CO₂ equivalents. While this technology is new to Ireland, Irish architects are exploring the possibilities of engineered wood. For example Center Parcs combined glulam and CLT in their holiday resort complex outside Ballymahon, Co. Longford. John Sisk & Son (Holdings) Ltd brought together Wiehag Timber Construction and D&S Baucon to build the complex which includes 466 self-catering lodges and 30 apartments and the subtropical Swimming Paradise (STSP), which is the focal point of the development. All the species supplied are softwoods including FSC and PEFC certified Norway spruce, larch, Scots pine and and western red cedar.

Research

All CLT suitable softwoods grow well in Ireland but the suitability of home grown Sitka spruce for CLT is a major challenge in developing a domestic engineered wood construction industry. An NUI Galway study has established the viability of using grade C16 Irish Sitka spruce to produce structural CLT panels.

The NUI Galway study states: “Suitable adhesives and pressing parameters to achieve bond integrity have been determined. The load capacity of CLT floor systems has been established and characteristic values for design are now available. When compared to commercial CLT panels made from C24 timber, the C16 panels required an increase in thickness of less than 12% to achieve the same performance”.



Cygnum's 105 ultra-low-energy timber frame social housing scheme built for Norwich City Council.

Timber frame

While engineered wood offers huge potential in sustainable building, low rise timber frame construction remains a popular building method. Cygnum, based in Co. Cork, has completed major international timber frame projects including the Goldsmith Street social housing development of 105 ultra-low-energy homes for Norwich City Council

The use of mainly spruce timber frame was a critical element to achieving the Passivhaus standard. To achieve passive certification, Cygnum had to ensure that all materials, detail design and factory quality control standards were to the highest level.

At the time of writing, Center Parc, NUIG and Cygnum projects have been longlisted for Wood Awards Ireland 2020 organised by the Wood Marketing Federation and Forest Industries Ireland. The awards are supported by the Royal Institute of the Architects of Ireland and the Society of Irish Foresters. They are part funded by COFORD in the Department of Agriculture, Food and the Marine, and Enterprise Ireland.

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Wood Awards Ireland 2020



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