

Timber Construction Market Overview

Publicly available data allowed the project to conclude the following about the market for construction in the North-West Europe (NWE) area:

The building sector in NWE countries

- ✓ Despite recent difficulties, the European economy is expanding overall and this means, from the viewpoint of construction sector, that it is expected to continue to grow in the coming years.
- ✓ Europe registered an uninterrupted expansion of building activity over the last five years, but the volume of construction is still below the pre-financial crisis record level of 2007.
- ✓ Great differences can be seen in country-specific outlooks. This results from factors such as local and national political decisions (new public housing, education and health care projects, changes in regulatory policies, etc.) and external factors (price of energy).
- ✓ Ireland and Luxembourg are the two NWE countries that registered the biggest percentage increase in construction activity. Germany, France and the UK delivered the highest amounts of built volumes.

Review of Engineered Wood Product (EWP) markets in partner countries

- ✓ Stakeholders of the sector describe a constant increase of EWP markets in Europe over the past two decades in spite of the economic downturn in 2008. The prospects for the future are also positive.
- ✓ The most important factor which could lead to the further growing usage of EWP is the increase of cost competitiveness, especially for multi-story buildings.
- ✓ Maintaining future growth will require political willingness to address issues due to the relative youth of the sector. More balanced construction regulation and standardization is needed, as well as better education at all levels.
- ✓ The production of cross-laminated timber, in the production of which Europe is the world leader, is expected to increase dramatically over the next five years.

Engineered wood products (EWP) can refer to a diverse range of products. The Adhesive Free Timber Buildings (AFTB) project focuses on compressed wood technology for dowel laminated timber beams, panels and connections.

Compressed wood technology

Although compressing wood is not a new concept (a book named *Resin-treated, laminated, compressed wood* was already published by Stamm in 1941), a lot of new scientific research has been done in the last few years. It is a topic of many current academic research projects.

In the industry, confusion is often made when talking about *Compressed Wood* or *Densified Wood*. Indeed, a lot of product referenced as compressed wood on the internet are in fact particle board or firewood aimed for the energy sector. In AFTB project, compressed wood is defined as a product resulting of the compression of whole wood sections that leads to a densification of the timber. Only a few companies are manufacturing such product. Here is a non-exhaustive list of these products.

Laminated Densified Wood

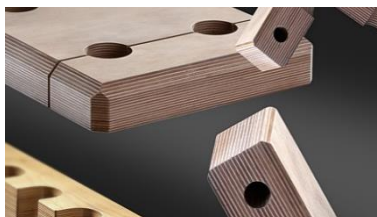
Compressed laminated wood, made of layers of wood veneer, pressed together under high pressure and temperature is used in transformers and other industrial and decorative applications. It has excellent electrical and thermal insulation and high mechanical strength. It is made by compressing thin layers of timber interspersed with petrochemical resins.

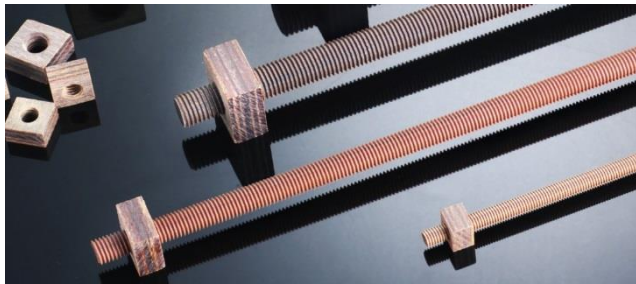
Deho Group (including Dehonit (DE) & Permal Deho(UK)), Segliwa (DE) and Röchling (DE) are three manufacturers. More information can be found on their websites.

<http://www.dehonit.de/page/en/dehonit-kunstharzpressholz.php?lang=EN>

<https://www.segliwa.de/en/materials/compressed-laminated-wood/>

<https://www.roechling.com/industrial/products/composite/laminated-densified-wood/>





Fasteners

Dehonit and Röchling are also producing fasteners (rods and nuts) and Beck is making compressed timber nails. The technology is known under the registered trademark LignoLoc®. More information can be found on their websites.

<https://www.roechling.com/industrial/products/composites/laminated-densified-wood/fasteners/>

<https://www.beck-lignoloc.com/en/lignoloc>



Other (future) applications

The following video shows research on using compressed wood for flooring. Impact resistance and wear resistance are improved. However, no evidence of marketing of this product was found.

<https://www.youtube.com/watch?v=RWTkSjj8v2c>

An article from the review Scientific American mentioned various advantages of densified wood. It is more resistant to compression, stiffer, harder, it can be molded in any shape, and with some additional treatment it can be moisture-resistant and swelling can be eliminated. Low-cost armor and lightweight material for vehicle and aviation could be future applications:

<https://www.scientificamerican.com/article/stronger-than-steel-able-to-stop-a-speeding-bullet-it-rsquo-s-super-wood/>

Dowel laminated timber

The most known construction element exclusively made of timber is the dowellam or Brettstapel (the name depends the orientation of the laminae). It is a massive timber construction system that does not use glues or nails. It is generally fabricated from softwood timber planks connected with hardwood timber dowels.



Thoma

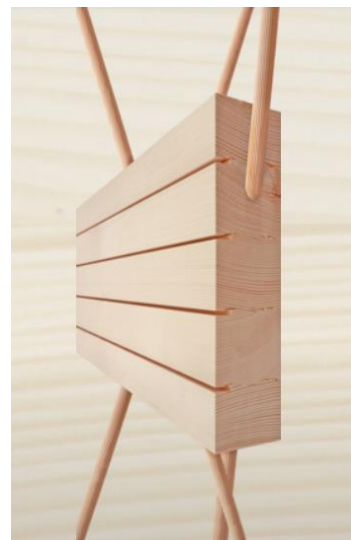


Wood100® panel from Thoma Holz GmbH

The main strategy to promote dowel laminated timber products is to insist on the fact the panel is made out of 100% natural renewable raw material. It is clearly an environmentally sustainable panel. It is also suitable for reuse at building end of life thus contributing to the circular economy.

Next to the argument of sustainability, manufacturers are also highlighting the fact that dowellam offers profile flexibility and economical attractiveness.

Additional selling points could be the possibility of using local timber, what would add significant value to the local forest resources. Other more practical benefits of adhesive-free massive timber are the good thermal behaviour of the timber panels, the exceptional fire resistance due to the thickness of the panels, the low lifecycle costs and the many advantages that offers the offsite prefabrication.



Diagonaldübelholz®
 from Sohm
 Holzbautechnik GesmbH

Currently, there are more than twenty manufacturers of Brettstapel in Europe. Most of them are located in Germany, Switzerland and Austria. They are represented by red pins on the map. It should be noted that there is a huge difference in scale between those manufacturers, ranging from *Thoma Holz GmbH*, a multinational company, to *Williams Homes LTD*, a family business.



Manufacturers of Brettstapel in Europe, represented by red pins on the map.

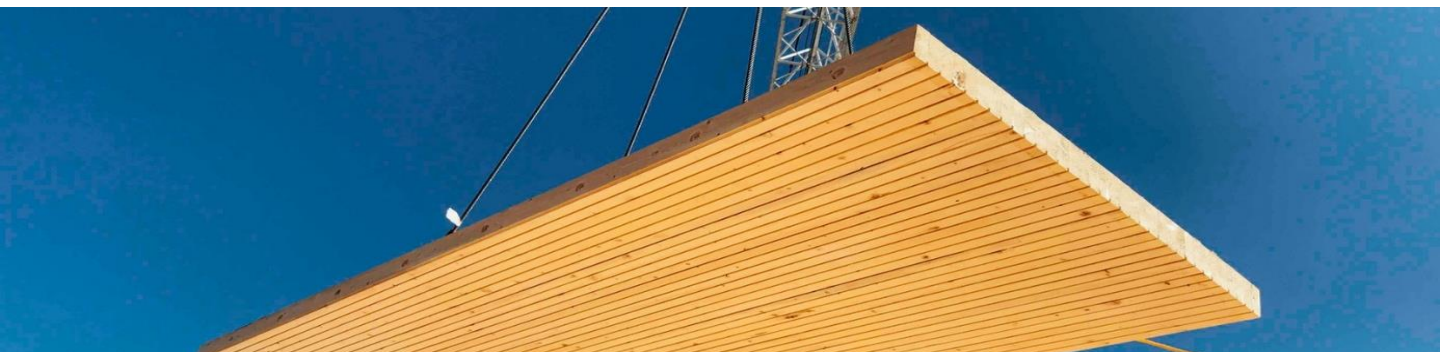
List mainly based on information available on the following website:

<http://www.brettstapel.org/Brettstapel/Home.html>

List of Brettstapel/DLT manufacturers

UK	Williams Homes Inwood MAKAR Construction	http://www.williams-homes.co.uk www.in-wood.co.uk http://makar.co.uk/news/dowel-lam
Germany	Hecker System Holzbau GmbH Römmelt Hallenbau Rombach (Nur Holz) Zwick-Holzbau Merkle Holzbau GmbH Kaufmann Massivholz GmbH Weihele Holzbau GmbH Suttner Massivholzelemente GmbH Ulrich Zeh GmbH	www.hecker-system-holzbau.de www.roemmelt-hallenbau.de http://www.rombach-holzhaus.com www.zwick-holzbau.de http://www.merkle-holzbau.de http://www.kaufmann-holzbau.de www.weihele-holz.de http://www.holz-suttner.de http://www.ulrichzeh.de
Austria	Holzbau Willibals Longin GmbH Berger Fertigteil & Produktionsges. Thoma Holz Sohm Holzbautechnik GesmbH	http://www.longin.at http://www.brettstapel.at http://www.thoma.at www.sohm-holzbau.at
Switzerland	Logus Systembau AG Tschopp Holzbau AG Krattiger Holzbau AG Kueng Holzbau AG Truber Holz AG Nägeli Holzbau AG Sägerei Sidler AG	www.oberholzer-ag.ch www.tschopp-holzbau.ch https://krattigerholzbau.ch https://www.kueng-holz.ch https://www.truberholz.ch https://www.naegeli-holzbau.ch/ www.sidler-holz.ch www.optiholz.ch
Italy	Biohabitat Service srl	http://www.biohabitat.it
Lithuania	Ekobustas	https://www.ecobustas.lt/production/technology/
Canada <i>(not on the map)</i>	StructureCraft	https://structurecraft.com/materials

DLT panel from *StructureCraft*



A key aim of the project is to engage with businesses, regulators and other interested parties. Adhesive-free timber building technology could be of interest to your business. Please get in touch via the e-mail addresses below:

For more information please visit the Adhesive Free Timber Buildings (AFTB) project website <http://www.nweurope.eu/AFTB> or use the contacts.



Project manager
University of Liverpool
Dan Bradley
Tel: +44 151 795 7363
dbradley@liverpool.ac.uk

Finance manager
University of Liverpool
Caroline Chandler
Tel: +44 151 795 7424
chandler@liverpool.ac.uk

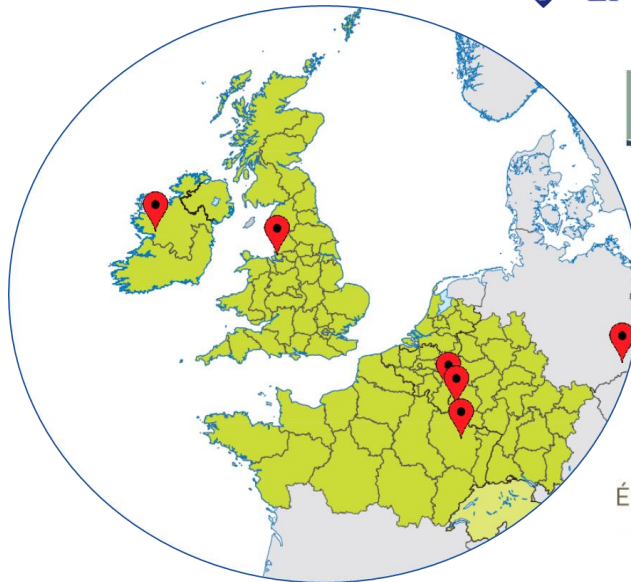
Communications manager
National University of Ireland Galway, Ireland
Conan O'Ceallaigh
School of Engineering
Tel: +353 91 49 2210
conan.oceallaigh@nuigalway.ie

Partners

Lead partner
University of Liverpool
Zhongwei Guan
765 Brownlow Hill
Liverpool
L69 7ZX
United Kingdom
Tel: +44 151 794 520
zguan@liverpool.ac.uk

National University of Ireland Galway, Ireland
Annette Harte
School of Engineering
Tel: +353 91 492732
annette.harte@nuigalway.ie

Technical University of Dresden, Germany
Peer Haller
Institut für Stahl- und Holzbau
Tel: +49 351 463 35575
peer.haller@tu-dresden.de



Luxembourg Institute of Science and Technology
Salim Belouettar
Design and Durability Research Group
Tel: +352 42 59 91 45 30
salim.belouettar@list.lu

Office Economique Wallon du Bois
François Deneufbourg
Tel: +32 84 46 03 45
f.deneufbourg@oewb.be

University of Lorraine, France
Marc Oudjene
LERMAB
Tel: +33 372 74 96 37
marc.oudjene@univ-lorraine.fr