

One of a series of short briefings on timber technology produced by the towards Adhesive-Free Timber Buildings (AFTB) research project. The project is co-funded by Interreg NWE, 2016-2020. This note explains briefly the demonstrator structures developed as part of the AFTB project.

UK Demonstrator Structure

The UK Demonstrator is shown in Fig. 1, as Ness Botanic Gardens near Liverpool showcases three of the project's key technologies:

- Beams and columns assembled using compressed wood dowels (an all-timber substitute for Glulam beam and columns)
- Dowel Laminated Timber roof, floor and wall panels (an all-timber substitute for conventional glued CLT)
- Compressed wood semi-ductile beam-column connections (an all timber substitute for metal fitche-plate connections in timber buildings)

The building was completed in January 2020 and will be used as a site office for the Brian Moss Aquatic Mesocosm Facility, one of Europe's largest, most technologically advanced, facilities for research into environmental impacts on freshwater ecosystems.



Fig. 1. The UK Demonstrator structure in Ness Gardens, Wirral, Cheshire, UK

Fig. 2 shows the internal space of the UK Demonstrator just after construction, which displays AFCLT wall and floor panels, AFLT beams and columns, as well as 100% timber adhesive free beam-column connections developed by project partner at the National University of Ireland Galway in Ireland.



Fig. 2. The internal space of the UK Demonstrator

German Demonstrator Structure

The German Demonstrator structure, located in the department of biology of Technische Universität Dresden, utilises steam-forming of sustainable hardwood to construct the elements for a geodesic artistic structure. The structure was designed using digital techniques and numerical simulation. The structure demonstrates the application of this timber technology to highly precise and complex geometrical forms, as shown in Fig. 3.

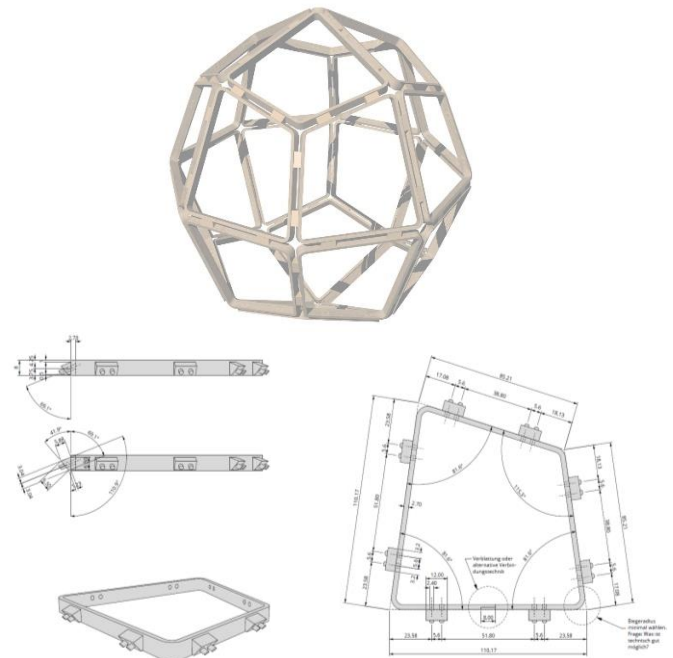


Fig. 3. Design of the German Demonstrator structure

The completed engineering-art installation (Fig. 4) is now suspended in the foyer of the Department of Biology of Technische Universität Dresden (Fig. 5).

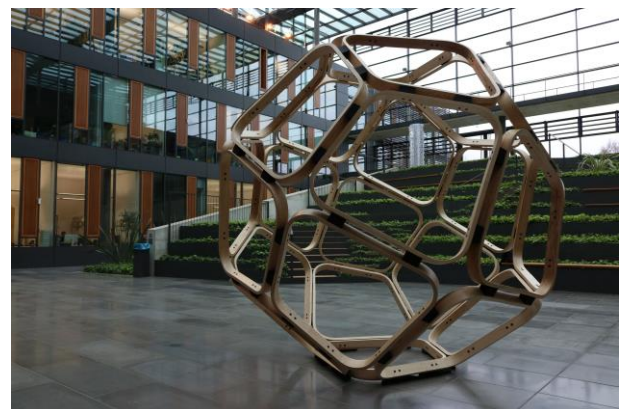


Fig. 4. The completed German Demonstrator structure

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Fig. 5. The German Demonstrator in its final resting place at Technische Universität Dresden

French Demonstrator Structure

The French Demonstrator is located at ENSTIB - National School of Wood Technologies and Industries of the Université de Lorraine in Épinal. The purpose of the structure is to house materials for a green-energy pilot plant, converting organic waste into hydrogen and methane for heating and electricity production.

The key adhesive-free element of this large (12mx8.6mx7.6m) structure, is the roof truss which is manufactured from oak elements, connected via compressed timber dowels, which is shown in Fig. 6 and Fig 7. The structure was completed in November 2019.

Fig. 8. shows the completed demonstrator structure, with roof and partial wall sections.



Fig. 8. Completed Structure of the French Demonstrator

Conclusions

Three demonstrator structures have been completed and will be available for interested stakeholders to visit. These are:

Demonstrator one, near Liverpool, UK: A 35 m² field-station incorporating office and laboratory space at Ness Botanic Gardens, part of the University of Liverpool. This structure is fully habitable and incorporates compressed wood DLT beam, columns and adhesive free connections.

Demonstrator two, Dresden, Germany: A suspended engineering-art installation demonstrating steam-bent timber utilised in the form of a space structure. It is housed in the atrium within the Technische Universität Dresden.

Demonstrator three, Epinal, France: A 12x8.6x7.6m warehouse-style structure on the timber campus of the University of Lorraine. The structure incorporates compress wood dowelled oak columns and trusses. It is currently used as a shelter to protect equipment and materials used in a renewable energy pilot plant.

For more information:

Further information on various aspects of the project, technical information and research publications, visit the project website.

<http://www.nweurope.eu/AFTB>.

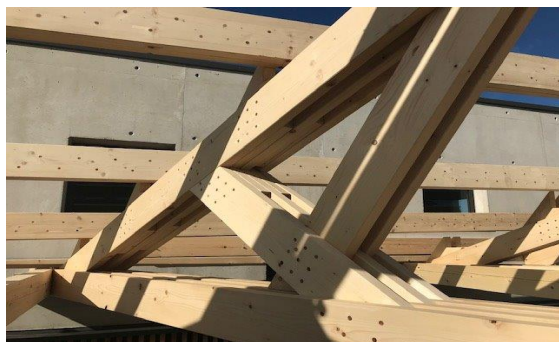


Fig. 6. AF connection detail of the French Demonstrator structure



Fig. 7. AF roof truss of the French Demonstrator structure

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

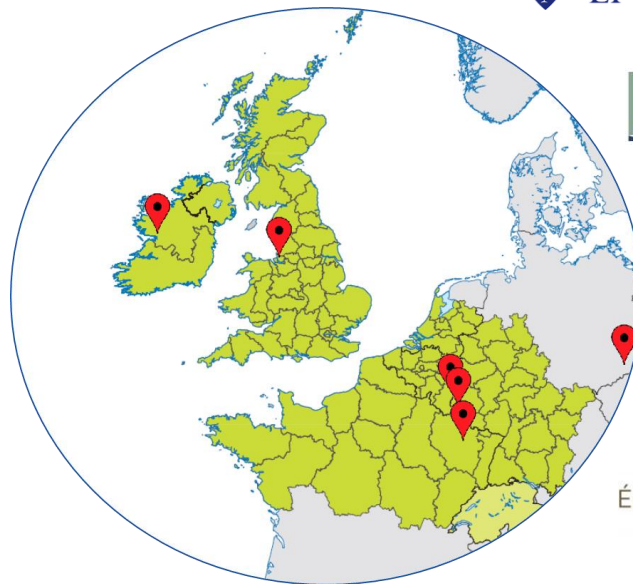
Communications manager
National University of Ireland Galway, Ireland
Conan O'Ceallaigh
School of Engineering
Tel: +353 91 49 2210
conan.oceallaigh@nuigalway.ie

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

