TIMBER IN ARCHITECTURE

08.19
Modification, innovation and sustainability

Dr Andy Pitman of Lignia Wood Company discusses how the UK timber industry is embracing change and innovating – for the benefit of the environment and the customer.

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All over the world we are surrounded by wooden structures of all ages, shapes and sizes. They range from the ancient temples of Japan and oak framed medieval buildings of Europe constructed from intricately jointed timbers sometimes fixed with timber pegs, through to more contemporary structures constructed from laminated timbers. Its excellent mechanical and thermal properties, beauty, ease of working and widespread availability has made timber the material of choice for construction across the centuries.

However, the popularity of timber in construction has placed huge pressure on the planet’s natural resources. According to the FAO (the forestry department of the United Nations), seven million hectares of forest were lost between 2000 and 2010, much of it for timber, but most for agriculture.

Satellite monitoring has enabled deforestation to be monitored real-time just as we have become aware of the important ‘eco-services’ forests provide, including carbon capture and storage.

To help combat this problem, timber used to manufacture construction products is increasingly sourced from sustainably managed forests. Timber qualifying for Chain of Custody certification is harvested from legal and well-managed forests and timber is traceable from ‘forest through to product’; the Forest Stewardship Council (FSC) runs one such well-known scheme. The industry has embraced certification and has worked to improve use of available resource.

Changing face of timber

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longer sustainable. This led to a search for methods to improve the properties of more readily available species.

Timber modification provides a solution to this issue. Studied since the early 20th century, wood modification technologies started to be commercialised in the 1950s, competing at that time with high-value timbers, which had not been overexploited. Commercialisation re-emerged in recent years, driven by need for alternatives to unsustainable tropical hardwoods.

Modification differs from preservation in that biocides are absent in the process. This is addressed in Callum A.S Hill’s comprehensive review text ‘Wood Modification,’ in which he states that the process “should not release toxic substances during or at end-of-life”.

Primarily, species to be modified are sourced from rapidly-growing softwood trees from certified plantations resulting in an environmentally friendly, more-than-worthy alternative to its established predecessor. The modification process improves one or more properties. The objective is that these softwoods have properties that are valued, primarily for their beauty, durability, strength and stability.

Currently a number of modification technologies have been commercialised. One such well-established method is acetylation, a form of chemical modification which alters bonding of water to wood, thus improving its resistance to decay and stability. Another, thermal modification, as the name suggests involves heating the wood to change its chemical structure and properties.

An overarching benefit of these modified woods is that they are, in a sense, ‘designed’ to have less variation in terms of their properties. There is stringent control over the quality of materials used and in the process of manufacture. This is apparent in modified woods’ resistance to decay. The variation of heartwood – the central wood of a tree – in a single species may vary in the extreme dependent on the source of the material. The modification process significantly reduces this level of variation.

The future

The versatility of modified wood means it’s applicable to almost all areas of traditional woodworking, in both internal and external projects. Its durability makes it ideal for cladding and exterior decking, its stability and hardness for flooring and its aesthetic appeal and thermal properties have seen it used for building interiors and furniture. These factors are essential, and modification technology means resources are now plentiful and readily accessible. Rather than simply aiming to operate within the confines of sustainability regulations, industry leaders can now look to create an environmental blueprint for the timber trade for years to come.

Manufacturers’ green credentials are under the microscope now more than ever and the market is set to grow exponentially in the coming years, as the demand for sustainable material ramps up. An increase in the variety of timber species available for modification is expected – including those that grow in the UK.

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