MASTER OF ARCHITECTURE FOR THE SUSTAINABLE PROJECT

Abstract

Looking at innovation: lightweight wood constructions.

Experimental designs, patents and technology transfers in America and Europe in XIX - XX century.

Tutor
Prof. Arch. Guido Callegari
Ing. Matteo Guiglia

by
Domenin Valentina
Dorigo Elisa

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Wood for its specific characteristics (workability, elasticity, high flexural strength, good resistance to compression) is widely used in building constructions; for this reason, timber has long been used as material for architecture in all regions in which it turns out to be an available resource.

Before XIX century, timber construction and building technology were based on tradition and experience. Designs and methods of construction depended on different conditions, first of all on the availability of building materials and tools. Building shapes and techniques were also determined by habits, climate, and cultural characteristics. Industrialisation in the XIX century had induced development in vernacular wooden architecture, leading to development in wooden construction. Even though industrialisation supplanted conventional building techniques, traditional construction influences are still evident in modern timber buildings.

This thesis deals with light-weight wood constructions; in particular it investigated in the innovation process of wooden components and joining systems, that took place in Europe and United States between XIX and XX century.

Researches started from the analysis of the developments in wooden joints and fastener systems, pointed out which were the main factors that allowed innovations in wood construction technologies. Different needs and economic conditions during the years, the discovery of a new wood product (Glulam) at the beginning of the last century, innovation in production process during all the XX century, brought to an evolution in wood joining methods and new metal fasteners, having different shapes and characteristics.

The thesis had been possible thanks to an unconventional research method. In fact, because of the lack of information in architectural history books, the main sources were patents and historic documents. The patents of different metal connectors for joining wood, found out on EPO website (European Patent Office) and Google Patent, had been selected, catalogued and placed on a timeline to have an overall view of innovation.
ESEMPIO DI SCHEDATURA DI UN BREVETTO

Tipologia specifica del connettore

Principali dati del brevetto

Documento in versione originale

Codice identificativo del brevetto

Colore in base alla macro categoria

Breve descrizione del connettore

Caratteristiche del brevetto

LINEA DEL TEMPO DEI BREVETTI SCHEDATI ED ANALIZZATI

Linea del tempo dei brevetti analizzati, inseriti in base alla data di registrazione.
The first part of the thesis highlights the main innovations of wooden structures and their connection systems between the last two centuries, describing which aspects had contributed to the whole technological innovation process.

The second part analyzes the different types of metal connectors, identified thanks to patents, which have enabled the development of new wooden structures from the early decades of XIX century.
Both sections show European development in wood joining methods. There are sometimes focuses on American wooden construction systems, in case they have been produced later indirect innovations in Europe.

For further information please contact:
Valentina Domenin, vale.domenin@libero.it
Elisa Dorigo, eli.dorigo@libero.it