

Structural wood system without metallic elements

DESCRIPTION OF THE TECHNOLOGY

Researchers from the Department of Civil Engineering at the University of Alicante have developed a new, fast, resistant and efficient way of joining pieces of wood without using metallic elements (steel), adhesives or concrete.

The joint for wood fixes two pieces together, with the first piece being a box and the second piece an inlet. In addition, the box has a first part of greater width and a second part of decreasing width.

The shape of the recess is conjugated to the second part of the box, while the walls of the second part and the recess have complementary teeth which can be sinusoidal or trapezoidal. The first teeth can be made with a milling cutter. It comprises a central shank and a series of radial protrusions that create the valleys between the first teeth.

The weight of the parts themselves can hold the joint in the correct position, but it is preferable to have a dowel or stop in the first part of the housing to prevent the return movement of the boss.

If the contact surface is large enough, the strength can be increased by making each part have a box and a boss in opposite orientation. In this way, it is possible to insert both bosses into the respective housings in a single movement. The housing and the boss of each part can be aligned or not (coincident axis of symmetry).

In the mounting position, the two recesses are aligned to ensure that the forces are transmitted without moments. This is achieved by defining steps on the contact surface of the two pieces so that the box and the inlet of each piece are aligned.

In this way, any structure made of wood or similar material is perfectly joined and strong as, for example, a wooden structure for a building.

Finally, it is worth mentioning that tests have been carried out on this type of joint, using pieces in the form of an architectural portico, with a joint at each end of the horizontal bar. This system can replace the current timber and steel structural systems with a structural timber dry jointed system.

MARKET APPLICATION SECTORS

This invention is of particular interest for the construction of wooden structures or other structures that make use of wood.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The main advantages resulting from the application of this wood joint are the following:

- ✓ The joint is produced without the use of metal reinforcing elements (nails, screws, etc.), thus achieving high strength without affecting the useful life of the wood.
- ✓ A fast joint is achieved, which also reduces manufacturing time and eliminates the use of steel in wooden constructions, achieving a dry assembly of parts.
- ✓ Fast production due to the fact that the parts are based on an automated system that is capable of reducing manufacturing time and costs.
- ✓ Standardisation of parts. Parts can be standardised and manufactured in just a few minutes using a special machining cutter, which means shorter production time and greater control of the process from the start.
- ✓ Ease of transport, due to standardised parts, which means that large quantities of material can be transported in a way that saves fuel and postage. The packaging is flat.
- ✓ Easy joining of parts due to the mechanised system. Complex assembly tools are avoided and the labour and resources required to assemble the system are optimised. Assembly without the need for metal fittings.
- ✓ Sustainable. Wood is a material adapted to the 21st century. It reduces the carbon footprint of construction and is also a highly energy-efficient material.
- ✓ The system is modular, which means that the work on site is reduced thanks to the study and manufacture of the houses/buildings in the workshop. Therefore, labour time is reduced and on-site resources are optimised.

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CURRENT STATE OF DEVELOPMENT

The technology has been developed at laboratory scale, with several prototypes available for demonstration and compression values have been tested.

INTELLECTUAL PROPERTY RIGHTS

This technology is protected under **patent application**:

- *Patent title: "Wood joint".*
- *Application number: P202131185*
- *Application date: December 21, 2021.*

COLLABORATION SOUGHT

Companies interested in acquiring this technology for its exploitation are sought. Possible type of agreements:

- Patent licensing agreements.
- R&D projects for customised developments.
- Proof of concept projects.
- R&D projects to adapt the technology to the needs of the company.

Type of company sought:

- Manufacturers of wooden building materials.
- Manufacturers of ecological building materials.
- Wooden house builders.
- Companies with wood machining capabilities.

RELATED IMAGE



CONTACT DETAILS

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