

Space truss built with wastes from the sawmill industry

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Abstract

It is well known that wood is difficult to assemble and complex steel system is often used for the joints. The solution proposed in this paper is to limit the use of steel connections by using a specific shape of element to take the shear force and link the top and bottom layers of the space truss that are made of circular logs of small diameter. This proposition is a simpler version of the solution proposed in [1].

The material used for the shear components is the part of wood which is taken off when the log is squared, it's mostly composed of bark and sapwood. This part of log is considered as a waste and often used as firewood. This experimentation aims to promote that wood as a structural element in the space truss.

The structure was designed by the laboratoire Navier/GSA and ENSAG. It was crafted, erected and tested by the IUT (institute for higher technician). The structure is 6 m by 6 m span and has a height of 0,6 m. The elements that link and brace the top and bottom layer create an hyperboloids that can be simply screwed as the element are tangent to the top circular chord and tangent to the lower circular chord. The structure was tested under symmetric and asymmetric load. The deflections and a detailed observation of the connections during loading was performed using photogrammetry. The behavior of the structure was then compared to the numerical model. Finally, the authors conclude on the economic and environmental aspects of such structures..

References

- [1] Olivier BAVEREL, Pierre CHALAS, Vincent RICHEFEU, Gerald HIVIN: Proposal for a lowtech wooden space truss, July 2018 Conference: Proceedings of the IASS 2018 *Symposium Creativity in Structural Design*, Boston, Massachusetts, USA.



Figure 1: View of the structure