

The excellence of construction timber details throughout a Tectonic methodology

L. Catalá Bustos, P. H. Kirkegaard

Department of Engineering, Aarhus University, Denmark
Inge Lehmanns Gade 10, 8000 Aarhus C, Denmark
lcbm92@gmail.com

Abstract

This investigation focuses on enhancing the excellence of the smallest unit of construction: the architectural and structural details, which have the potential to inform the character of the whole, from the first phases of design. This is made by means of a Tectonic methodology, tested through an experimental investigation, where the main material is wood, due to its Tectonic properties.

Although details have always been a fundamental part of building design, as industrialization developed, they ceased to be considered as an articulation that defined materiality and gave value to the structure and space, to be a mere production drawing. Therefore, the objective is to highlight, in the nowadays context, that joints and details can solve not only technical concerns, but can also have an artistic, social or individual meaning.

Thus, a methodology that follows the main guidelines of the Tectonics philosophy is proposed. This philosophy understands the art of building as an unbreakable bond between engineering and architecture, therefore, the methodology motivates the incorporation of the details from the early design phase, in order to transform them into the generators of a more complex structure.

The experimental investigation carried out to verify the suitability of the proposed methodology consisted of developing a proposal in which both the spatial and structural quality was influenced and directly related to the nature of the joints that defined it. Several constructive systems were studied, where the active-bending technique turned out to be the most meaningful. Thus, one of the main objectives when studying this technique was to traduce material organisation and principles from a scale and field not related to construction, as textile is. Therefore, a new tectonics relationship is created when re-ordering the principles into the construction scale. Although the textile technique has been previously introduced into the building industry, it is not until now, thanks to the digital and production tools, that is possible to adapt it to more complex structures and designs on a real scale.

The proposal was a wooden pavilion, defined by different curvatures and bends, i.e. an active bending structure, in which the joints demonstrate a fundamental role. With this experiment it was demonstrated that the designed joints were the ones that defined both the architectural character and the structural performance of the design. Therefore, if these had been different, the result would have changed too.

The main benefit of this research is translated into the positive outcome due to the interaction of the technical and artistic aspects from the conceptual design phase, having as a connecting element the constructive details and joints.

References

- [1] L. Catalá Bustos, “A Tectonic methodology for timber joints. The excellence of detail in the era of technology throughout an experimental investigation”, Master Thesis, Dept. Engineering, Aarhus University, Aarhus, Denmark, 2018.
- [2] M. Frascari, “The Tell-the-Tale Detail,” *Semiotics 1981*, pp. 325–336, 1983.
- [3] Y. Weinand, *Advanced timber structures: architectural designs and digital dimensioning*. Basel: Birkhäuser, 2017.