



POLITECNICO
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Honors thesis

COURSE OF ARCHITECTURE FOR SUSTAINABLE DESIGN

Abstract

NEW SHAPES OF SUSTAINABILITY ***bamboo like prefabricated furniture panel***

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According to the definition of sustainable an architecture sustainability to be regarded as such should be a "system can maintain constant their performance over time with reduced energy consumption and materials", while the building biology approach proposes the discovery and exploitation of more natural materials. Based on this background, the thesis aims to test new bamboo panels for ventilated facade in place in existing commercial systems. Considering the continued exploitation of the land and the progress of deforestation that every year takes away 13 million hectares of forests (FAO report "State of the World's Forest"), the choice fell on the bamboo, a material still to discover and implement in many aspects of architecture and in the construction industry.

The engineering of the bamboo has permitted to create, as for ceramics, bricks, stones and the metal laminates, a series of building panels suitable for use. But to date, no experiments are indicated on bamboo panels for external cladding, but only for internal use panels for coating or for the creation of furniture or design artifacts. Are exclusively mentioned as products for the coating of ventilated facades, bamboo strips of different lengths to be attached to wooden substructures. This finding has given the initial input for the conduct of an experimentation that further concern of the bamboo application fields. The base upon which the design and testing of the panel can therefore indicate through some key points of support for the project:

- Bamboo is a material widely known and used for some time in countries where it is necessary to use local materials for the construction of infrastructure and building low economic and energy cost.
- Among the insights and studies on the bamboo plant it is understood as its resistance when exposed externally, is minimal if not treated with appropriate additional processes. In particular, as seen in the previous paragraphs, the engineered material is subjected to treatments aimed at improving the durability, fire resistance and hardness of the finished product. In 2014 the MOSO company has patented an innovative system to enhance the durability of the bamboo class up to class 1, to improve the resistance against the formation of fungus on the surface, the carbon footprint and the hardness of the product.

- According to recent studies on panels with bamboo strips or panels with tablets of bamboo fibers their eco-cost is lower compared with the main panels of wood and can be considered a viable alternative when compared with the production of metal or synthetic panels.

The project, the construction system of the panel and the realization

The project is developed based on the ideas of departure and in succession to the search for a method of anchoring the panel to a substructure commercially available and used with other coating materials. It was decided to design and test a strip panel with three layers of strips following the technology division of the culm and the assembly of the panel. The outer layers are arranged in a horizontal direction while the inner layers in the vertical direction to a thickness of 25 mm.

