



POLITECNICO
DI TORINO

Honors thesis

COURSE OF
Architecture for the sustainable project

Abstract

**Architectural proposal for the El Pozon neighborhood in
Cartagena de Indias: a Latin American Solar Decathlon
house made in guadua.**

Tutor

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By

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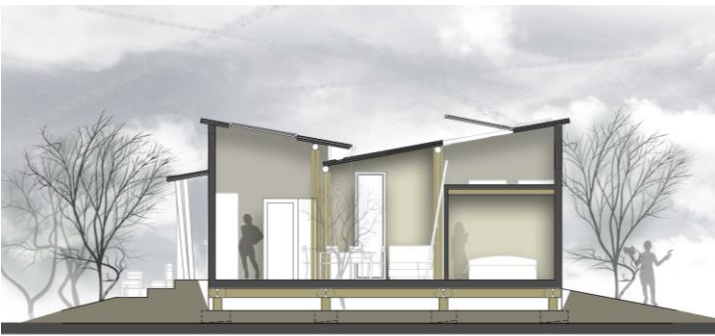
Each project starts from the actual state analysis, from the awareness of the natural and human environment, from the ability to imagine a possible scenario connected with the past, satisfying the present and anticipating the future in harmony with tradition. The stimulating design challenge proposed by the "El Pozon" district of Cartagena De Indias in Colombia - contained in the Solar Decathlon Latin America and Caribbean 2019 competition - has been the subject of various analysis that allows the learning of a new scenario, capable of conveying the previous years of preparation into a sustainable architectural result.

Months of analysis and studies in this area, together with previous years of preparation, allowed to design and integrate an architecture into the context. The thesis is divided in three parts, written in collaboration with Carlos Hernandez Correa, Luz Mery Rodelo Torres and Roberto Giordano, faces different matters in line with the contest requirements compared to the architectural tradition.

The focus goes from the urban scale to the constructive detail passing from the architectonic. Thanks to a period spent in Cartagena De Indias, the work tells first of all about the "El Pozon" neighborhood social problems, related to the territory and the climate change effects, which cause flood for months in a year in different areas of the city. The project starts from this elements. The district is characterized by poor sanitary conditions and poor connections with the rest of the city. The city continues to grow demographically and densifies on the protected area of free territory. The contest project especially focus on the dwelling architecture and detailing the technological aspects of construction and self-construction.

The second part of the thesis is focused on the study of the "Guadua", a type of Colombian bamboo; in this section are studied the morphological characteristics of the buildings in the history, the material's physical properties and the necessary treatments for its maintenance. Thanks to direct experience, typical construction methodologies are described together with the working process of the material's production phases. Moreover there have been studied a lot of examples in connection with the Colombian tradition concerning the use of the material in the pre-Hispanic period together with their constructive methods. The work, as required by the contest, is focused on the aspects related to sustainability in the technological field. In relation to these, we choose the applications and solutions presented in the project, from structure, to the materials, plants and assembly phases.

The third and final part of the thesis was based on the life cycle analysis (LCA) according to some of the contest's directives. It includes the study of the materials that quantifies the ecological footprint (Carbon Footprint) and the energy content (Embodied Energy) compared to the proposed architecture. This analysis makes possible to evaluate the real impact with respect to the functional unit of 1 sqm of component. Moreover it defines, through the selection of materials and their contribution, the environmental impact of the architectural object within the context and the site of the project. The project proposes a solution to current problems, touching the social sphere in the field of architecture and trying to integrate the inhabitants of the district in the expansion within the urban context



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