



POLITECNICO
DI TORINO

Honors thesis

COURSE OF
ARCHITECTURE FOR SUSTAINABILITY

Abstract

Kay Zewo:
a load-bearing straw bale housing prototype for Haiti

Tutor
Francesca De Filippi

by
Cecilia Miotto

Co-tutor
Fiammetta Venuti

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How this thesis born

In 2010, Haiti was hit by a devastating earthquake (105,000 homes destroyed, 208,000 damaged, 2.3 million displaced). Despite international action, after 5 years, the situation is still very precarious and 150,000 people is living in temporary shelters.

In September 2013 I met the NGO Architettura senza Frontiere Piemonte, which was carrying out the project "Re-starting from straw", born in 2012 with the thesis of G.N. Ricci and M. Restagno: the development of the rice sector and the introduction of straw as a building material for the post-earthquake reconstruction. At that time the group was working on the project of a warehouse in Bocozele, in the rice cultivation valley near Saint-Marc, built by a wooden frame and buffered with straw bales.

The subject interested me and I started doing research. In August, I attended a load-bearing straw-bale workshop organized by BAG (Beyond Architecture Group: there I could understand the dynamics of a self-building construction site and know some potential problems.

Meanwhile, the warehouse was finished. After initial skepticism, the inhabitants / manufacturers involved have shown a growing interest in the use of systems in straw "also for their home", though it raises some concerns, including economic (the high price is due to wood and to concrete, imported and of poor quality).

Aims

Continuing this research, the ultimate goal is the project of a "maison témoin", called Kay Zewo (Zero House in creole): a load-bearing straw-bale prototype house that should be economically accessible, suitable to the tropical climate and resistant to hurricanes and earthquakes .

The house could be realized in collaboration with the associations of rice growers on site and, if successful, it could spread the straw as a building material and make it an additional source of income.

Presentation

The thesis is divided in three parts.

- The first part briefly summarizes the geographical and social situation in Haiti and the analysis of the straw as a building material, as described in detail in the thesis mentioned above. From this initial base there is also a chapter on the traditional architecture and the way of conceiving the "home" and another one focused on the supply chain of bamboo in Haiti. Here I analyze native species and places of spreading / cultivation, and in general the presence of bamboo in the country.
- The second part analyzes some case studies relevant to my project to take inspiration and analyze any weaknesses.
- The third is dedicated to Kay Zewo and its ability to adapt to the context.

In addition to the technological drawings, focused on earthquake and anticyclonic resistant details, I show economic and structural estimates, demonstrating the feasibility of the project and its still weak points.

Finally, conclusions and bibliography are followed by annexes dealing legislation and the tests. This database will be especially useful for any thesis or research subsequent to mine.

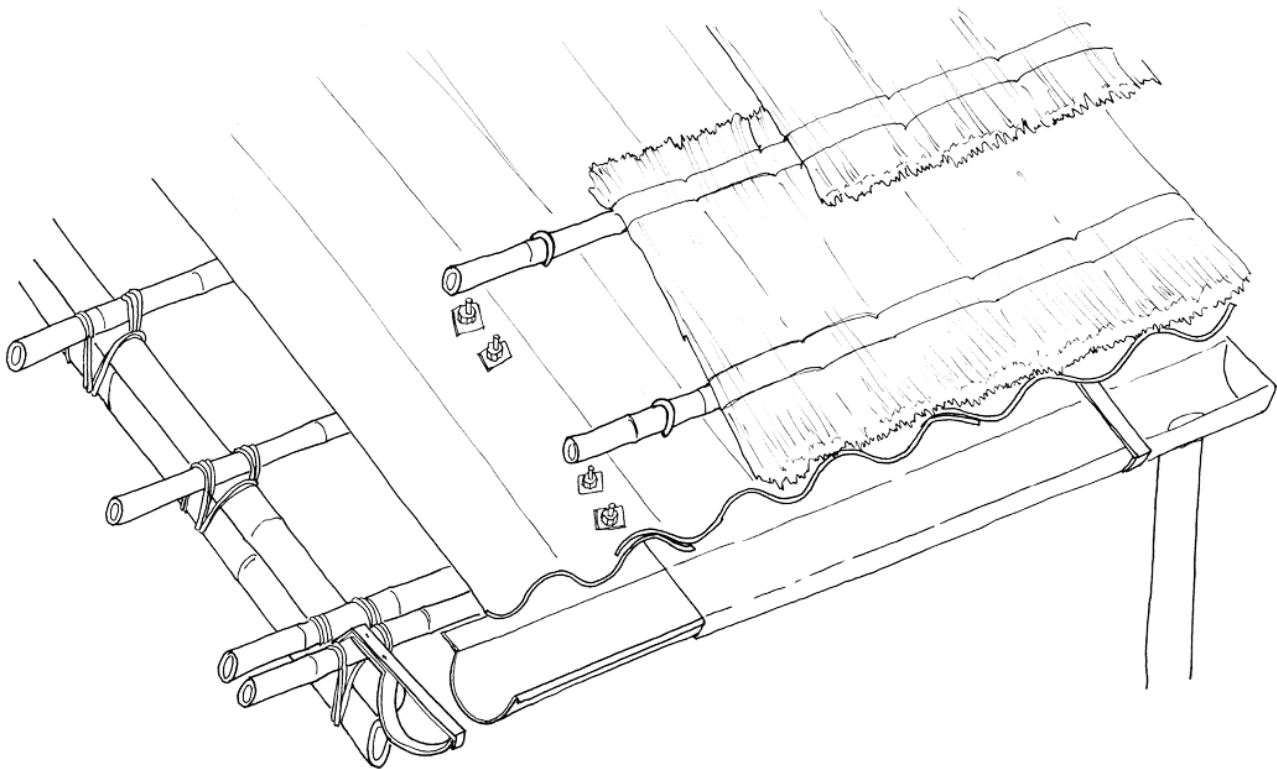
Conclusions

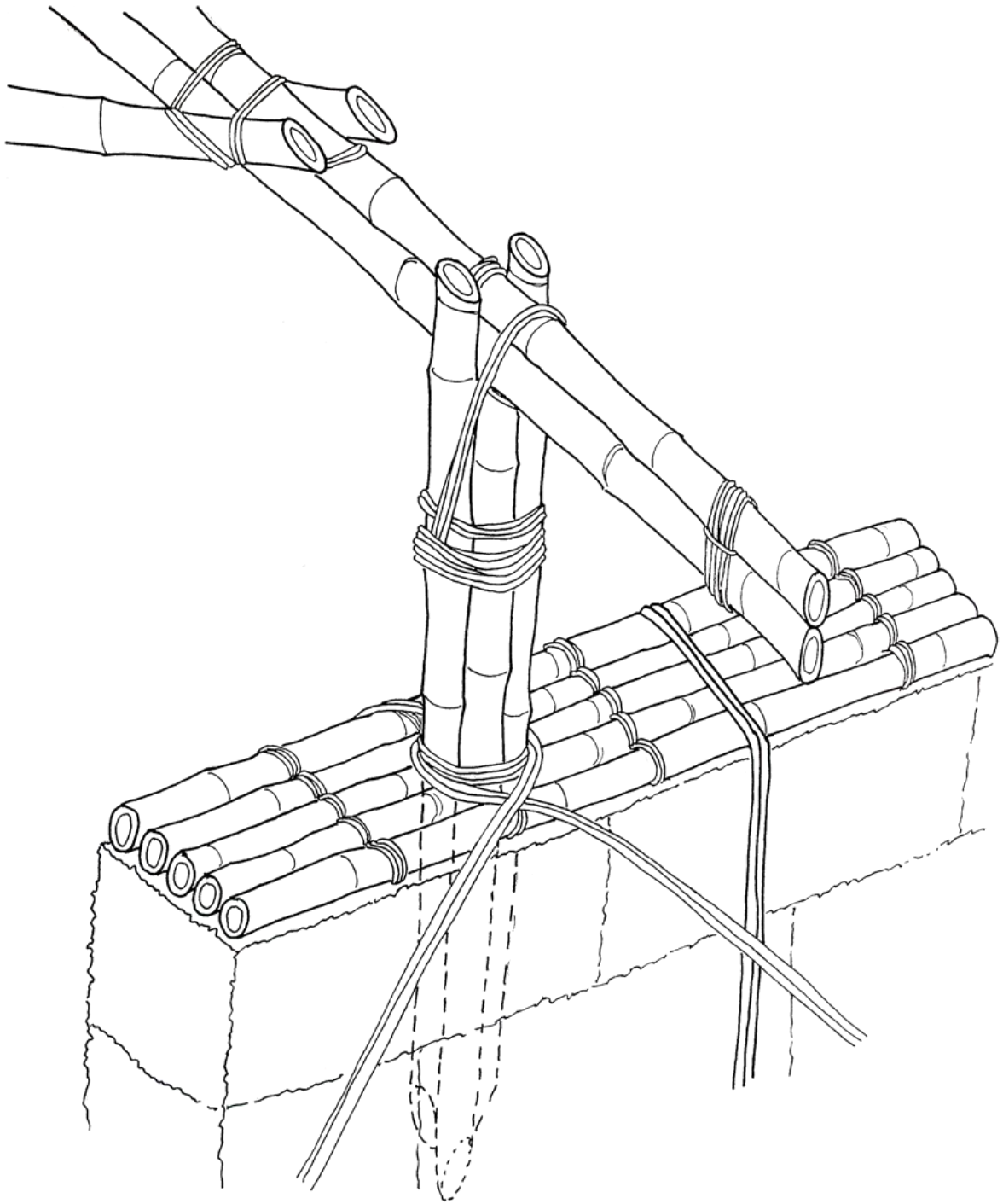
Areas for improvement:

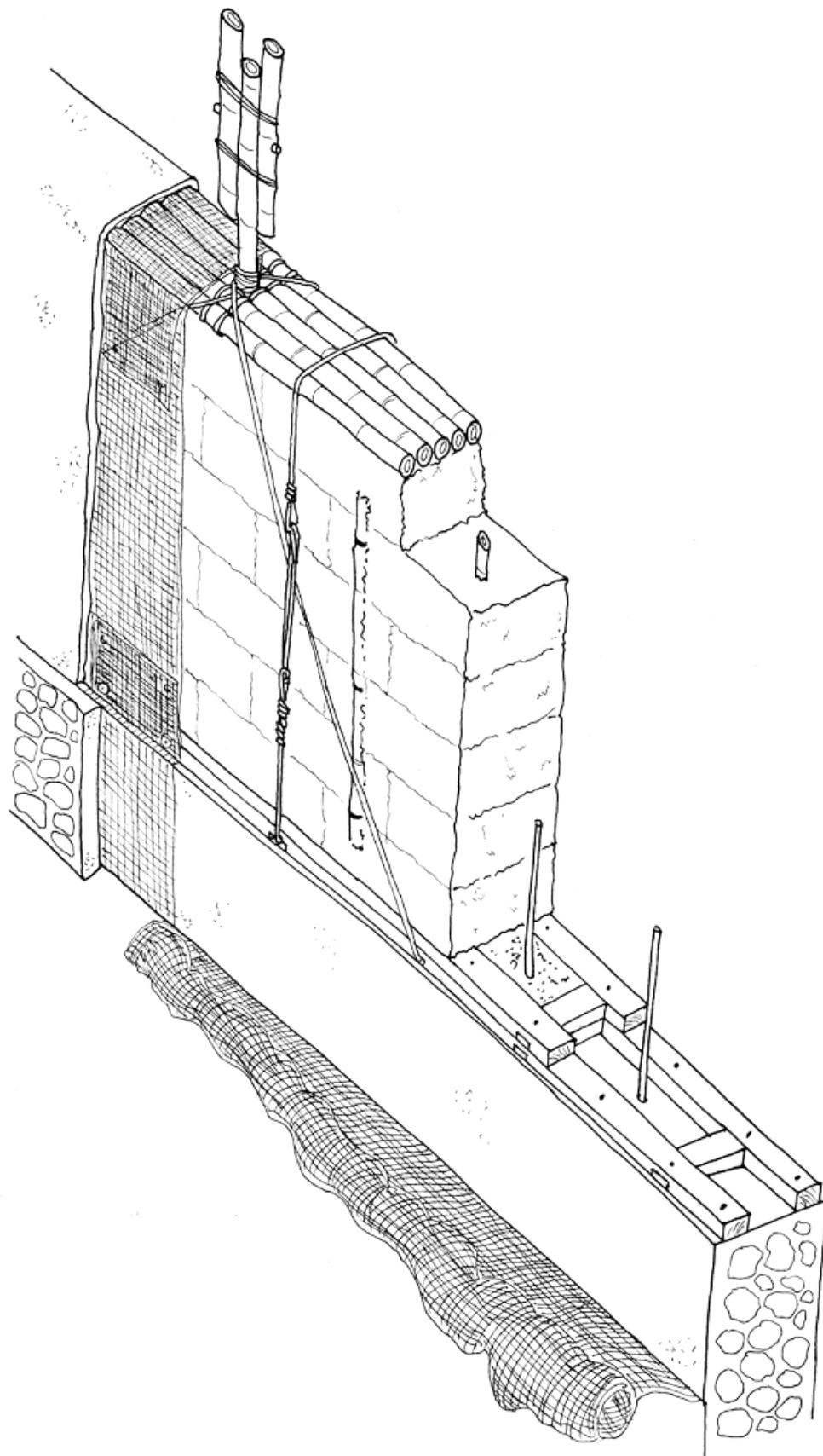
- The most pressing issue is the cost: Kay Zewo costs at least \$ 5200 (excluding contingencies), but the ultimate goal would be to go down to \$ 2,500, or assume a system of financing that allows the purchase of the house even though higher prices.
- The possibility to realize a widening.

Developable topics:

- Analyzing and mapping Haitian traditional construction methods, how effective or not;
- creating a network of bamboo farms in Haiti
- finishing the general framework of regulations and tests
- deepening the construction materials produced in Haiti (lime, ..).







For further information please contact:
Cecilia Miotto - cecilia.miotto@libero.it