



POLITECNICO
DI TORINO

HONORS THESIS

IN ARCHITECTURE CONSTRUCTION CITIES

A b s t r a c t

Constructive technologies in straw bale building

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This thesis wants to open a window to the possibility of use and potentials of recyclable materials in the construction world and in the specific straw. The start was a general analysis of the characteristic of the constructive material and after developing on a more detailed scale the constructive technologies starting by the first experiments till now. It is a research on how sustainable materials can contribute in a better evolution of the surrounding not only connected to the construction world but even the more general aspects of the society. In the last years the world was put in front of the problematics of global heating and to the research of sustainable solutions so as to prevent the problems that



it causes.

The construction industry in the world it produces the 40% of the primary energy consumption and it contribute to the 30% of gas emissions that favor the greenhouse effect (Lemmet, 2009). This is the reason why sometimes there is the need to choose other options of constructive materials and constructive technologies by profiting of other fields of development, for example the agriculture one.

The materials and the technologies that are developed have to satisfy a series of fundamental characteristics which are:

- Derive from renewable resources
- Biodegradability
- Carbon storage
- Availability
- No need to be earth extracted
- Abundant resource
- Not toxic

The increasing amount of use of straw as a construction material it comes from a series of data that have been collected the last years. Various amount of research on the thermal capacity of straw bales make it a recommended insulation material, thanks to the thermal mass that it offers.

This thermal capacity with the various structural tests that have been conducted on the bales, after a series of controls on dimension, density and humidity, show that they can be used not only as insulation but even as an element of tamponage or even structural.

This are some of the reasons that have affected the interests to study the technologies that compose this kind of constructions.

The second part of this thesis begins from an analysis of the material itself when there are shown the pro and cons. To be continue there are analyzed the different construction technologies (Nebraska, Post and Beam, Light structure, hybrid etc.) and in the end the functions of each element that compose it technologies (foundations, slab, curb, wall, roof, window frames etc.).

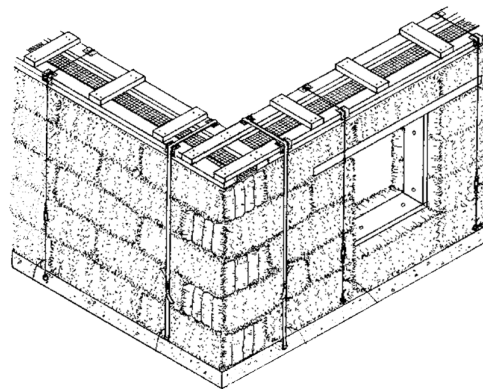
During the development of this thesis there was the possibility to put into use this knowledge in the assistance of the project of a straw bale house with a post and beam structure in wood in the commune of Vicoforte.

In this phase I have had the possibility to take notice of the reasons and logic of the decisions that have to be taken when deciding the construction method. At the same time there was the possibility to explore new technologies, for example the wall structure, as to satisfy the terrain conditions, metrological, legislative, economic and the likes of the customer.

At the end there was designed a functional project on the structural and thermal level.

This was it was possible to obtain the purpose of the thesis, construct sustainable buildings so to have a minor impact on the environment and a major physical comfort inside the houses that we live.

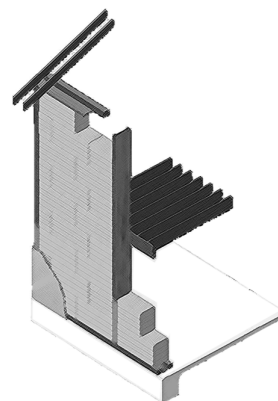




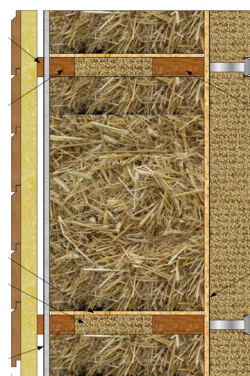
NEBRASKA



STRUTTURA LEGGERA



POST AND BEAM



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