POLYTECHNIC OF TORINO
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Honors theses

Influence of material choice on bioarchitectonical projects
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Before entering into details of material choice and its influence on bioarchitectonical projects, it's necessary to explain what's the meaning of this term.

Somebody thinks that bioarchitecture is a projectual style, but planning is rather a moment of it: a phase of synthesis and re-elaboration of studies due to various discipline, such as architecture, biology, phisics, geology, medicine, sociology and other more.

In this context, the building is considered as a living organism, naturally inserted in surrounding: its final goal is reaching maximum psyco-physical benefit for its users.

All this leads bioarchitecture to be seen as a real life-style at all.

This way of thinking has arrived in Italy for the first time in early 80ies, but only now it is spreading thanks to some associations: to one of them, the Bioecologycal Architecture National Association (ANAB) is due the Manifesto of Bioecologycal Architecture, where are defined its main principles. Among these, one is related to material choice: they have to be possibly natural not polluting, of local origin, able to preserve their ecologycal features and recyclable.

To guarantee the respect of these requirements is not simple, but the necessity of a method of valuation is recognized not only by experts, but also by lot of governments and European Union.

For managing among all these difficulties, it has been rediscovered a method known as Life Cycle Analysis (LCA), based on the whole material cycle of life, from extraction of raw materials to demolition and eventual recycling, passing through all production and using phases.

All principal european regulations refer to this procedure: for example, CEE Code n°880/92 and the main ecology label award systems in UE, including the italian project ECOCERTO.

UE Ecologycal Logo

Even the research leaded here is based on LCA: its subjects are some of most used building materials, ancient or modern, which have peculiarities, treatments and method of imploy still consolidated. Its goal is to point out all aspects of them able to cause enviromental damages and compromise the wealth of workers and final users.

The results are synthetized in tables where you can find the most important principles of valuation: natural origin, experience, enviromental pollution, production energy, radio-activity, acoustic and thermic insulation, harmful emissions, recycling possibility.

Then, according to their capacity of satisfying these principles, credits, variable from 0 to 3, have been assigned to materials: 0 means a total negative judgement, while 3 is total absence of risk in every moment of life.

So we can obtain a global ecologycal valuation; but, to examine the singol product out of its ambit of imploy is not enough: it is necessary to compare it with specific problems of every part of building and with microclimate features, for an unitary project.

This is the reason why the principal performances required to foundations, walls, floor, roof, windows, doors and furnitur have been pointed out here together with the most suitable materials for satisfying them in a bioecologycal way.

At the end, this study proposes three significative exemples of bioarchitectonical works: a living house in Pagnacco (Ud), Italy; the residential quarter Schafbruhl in Tubingen, Germany; the Hoko-Haus, a building for industry and offices in Frankfort.

View of Hoko-Haus building, Frankfort,Germany

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