

POLITECNICO DI TORINO
SECOND SCHOOL OF ARCHITECTURE
Master of Science in Architecture (Environment and Land)
Honors theses

Recycling and building: the waste becomes architecture

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Recycling and building.

Are the two key words around which we tried to set this work.

Recycle: to put or pass through a cycle again, as for further treatment;
to start a different cycle in;
to use again

Building: the act, process, art, or occupation of constructing.

The main objective is to demonstrate that even in the architecture you can think of objects of significant size for residential uses that come to life only by embracing the use of recycled materials.

Recycling is a very topical theme: the increase in the greenhouse effect due to gaseous emissions from the production processes of raw materials increased sensitivity to environmental concerns extending it also in the world building. In these two major areas, the environmental protection requirements have enabled designers to unleash their creativity using materials that would have been unthinkable before then to be used.

In recent years, due to the development of sensitivity to environmental issues, it is too often associated with the term "eco" to the sale of materials or architectural structures often to add value to the products. In fact, the marketing logic led to a misuse of the term, to pass of an eco-compatible materials when instead was been created with high impacts energetic - environmental.

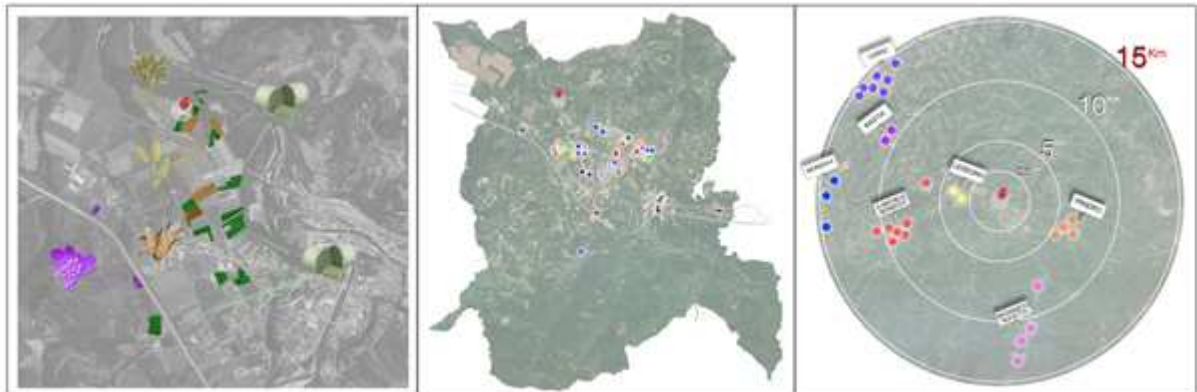
The development in the building area introduced, also on the market materials and technologies gradually more and more advanced that offer an improvement from the technical point of view but not always a solution to the problem of emissions and often presenting the consumer with a price too high compared to the precarious economic situation worldwide. The direction you should take is to take into account not only the underlying logic of eco-design, through analysis and evaluation of environmental aspects such as sun, wind, water and air, but consider approach to architecture "Slow Tech", Km 0 and "Superuse". This principle is enhancing the area by identifying within the existing urban structure the environments in which to live and work so as not to further undermine and contaminate the landscape. But not only: this development should go through the involvement of all those social actors able to contribute to local development interests.

Then, through research and the use of materials produced in the vicinity of the works to redevelop it can reduce costs and dispersion of pollutants due to supply, transport and processing of raw materials while promoting economic development and trade local.

It 'was, therefore, undertook a research to uncover projects by vanguard architects who have interpreted the concept of recycling through projects and experiments that in most cases represent real provocation for a thought which seeks to overcome the traditional linear approach and classical architecture to give space to a method and cyclic case.

This has been supported by a survey on current legislation regarding the issue of recycling both nationally, both as regards the laws of the Piedmont region: also referring to the "Piano Casa" we have analyzed the possibilities of expanding the existing building, on which to perform the rehabilitation. With this thesis, therefore, we wanted to re-design a residential building located in the countryside of Ceva (CN, Italy) starting from the analysis of environmental aspects such as daylight and ventilation should be the basis for the architect to design integrated.

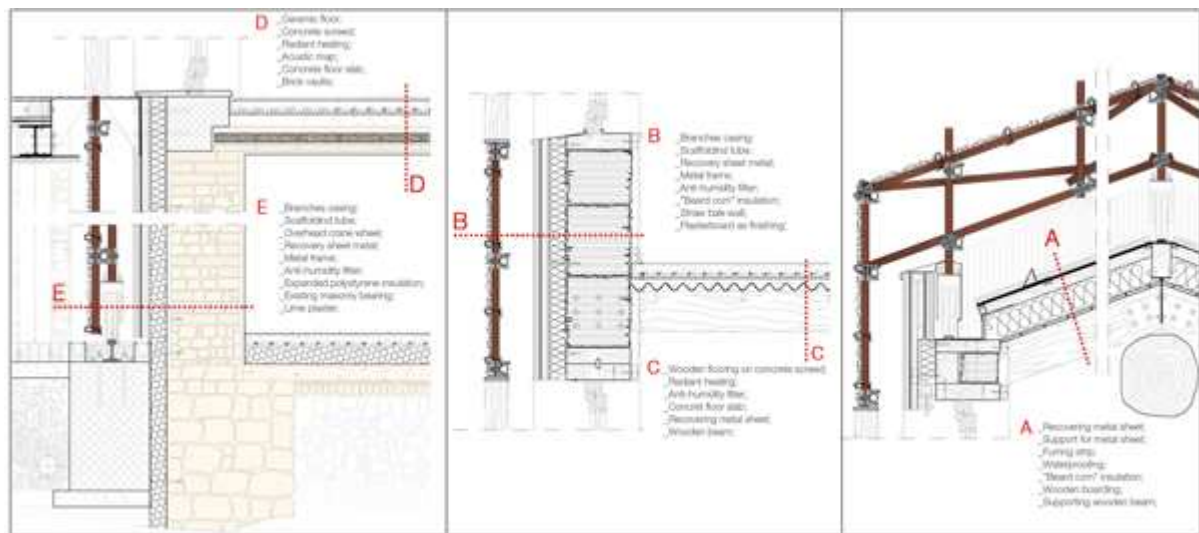
Since we have used recycled materials, it was appropriate to undertake an analysis that can lead the designer to understand the origin of the waste that you wanted to give a new dignity functional: the most materials that could be used were found directly in situ, others are residues resulting from agricultural fields adjacent to the building and others were found in companies belonging to the building industry and beyond, located in a small radius of miles.



Harvest maps: farm, city of Ceva (CN), 15 km

Since this was a project to renovate a building intended for residential purposes, it was appropriate to correlate the compositional and technological choices to the needs of the client, identifying the needs and describing the requirements of each spatial unit that make up the building.

Once aggregated spatial units between them, defining the meta-project, we proceeded to convert the functional properties of waste materials going to find their own alternative employment within the project.



Technological section: foundation, wall-floor node, wall-roof node

The first and the second part of this work, therefore, saw the drafting of a project based on a search for these waste materials with technical and aesthetic characteristics to be used for a building renovation.

In the third and final part, the focus was on building an insulating which is also characterized by the use of waste materials; has therefore initiated a search of the waste pile and the physical-technical approaching more to their use as insulation. Starting from an initial phase of experimentation that has seen the realization of some samples using different waste materials, polyurethane foam, straw and fibers of jute, we've arrived to the choice of material with which it was built the prototype and on which was performed the evaluation of the physical-technical requirements: the "beard of corn". The panel was made of alternating layers of the barbs in support of cotton gauze with the addition of a glue based on methylcellulose and a sachet of salicylic acid as a preservative. It was subsequently tested in the laboratory in the Department of the Politecnico di Torino DENERG using the hot plate (FOX flowmeter 600) from which they extrapolated the results of thermal conductivity, which confirmed its good thermodynamic behavior.



Insulator “beards of corn”

We can then summarize this work going to take the two key words that inspired him: recycle and build.

recycle: the reuse of recycled products is able to offer to the designer the strategies that represent a real added value in terms of aesthetic quality because the materials re-used have a memory and a past that adds more importance and more power of expression to the project;

building: through an innovative approach to design and analysis that would encompass all details, from macro to micro scale, we've identified the expansion of the building into an ideal area through a microclimate analysis, we've searched the used materials realizing an "harvest map" within a short range of kilometers and we've experimented the use of materials derived from agricultural production in the construction of an insulating.

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