

POLYTECHNIC OF TORINO
FACULTY OF ARCHITECTURE 2
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Honors theses

Clime and low cost roofing: the case of Junin de Los Andes

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One of the biggest problems of the housing industry within poor populations is seen by the roofs of the houses. In the majority of cases these populations use poor materials such as palm leaves, straw, general vegetation, cardboard boxes, nylon cloths and any other recycled materials which can be seen to be useful. These items have serious problems because they have a short life, they are easily inflammable and they are not very hygienic. For this reason I have decided to examine the subject of the low cost roofs in reference to the different climatic zones which are apparent in developing countries. In fact, other than the necessity to create a close relationship between the design and the construction stage of each element within the house itself, it is not possible to omit an approach to the design which covers all the variable climatic, cultural, and anthropological features that characterise, making them unique, a specific human reality, environmental and architectural.

The first part of the thesis is about, both variable environmental conditions and their relationship to man and his home, and to the consequent design principles that should be used in the different climates with the end objective to improve comfort. In the second part the element of the entire roof is analysed from the normative point of view and from functional product, material and applied technology models.

The following parts of the thesis are based on and influenced by a trip with the Architecture student Alezio Rivotti in January and February of 2001, in Junin de los Andes (Patagonia Argentina) organised by Prof. R. Mattone of the Architecture Faculty of the Politecnico Di Torino, in order to experience the self-building of a house.

After having analysed the history, geography, population, climate, the living problems of the patagonic region, and the existing housing, and after having ascertained a wide use of corrugated iron shelter, I thought of creating a solution in reference to the climatic conditions of the area that could improve the overall comfort inside the houses. I have taken the materials which make up the typical local roof structure trying to, where necessary, replace or integrate them with other types, with the aim of self-building and respecting traditions whilst keeping costs low, utilising local resources, simple construction and design, paying particular attention to the quality and to the performance of proposed components.

After the Argentina experience, a period of experimentation started within the "Laboratorio Prove materiali e componenti" (Test Laboratory for materials and components) of the Architecture Faculty of Turin directed by Prof. R. Mattone.

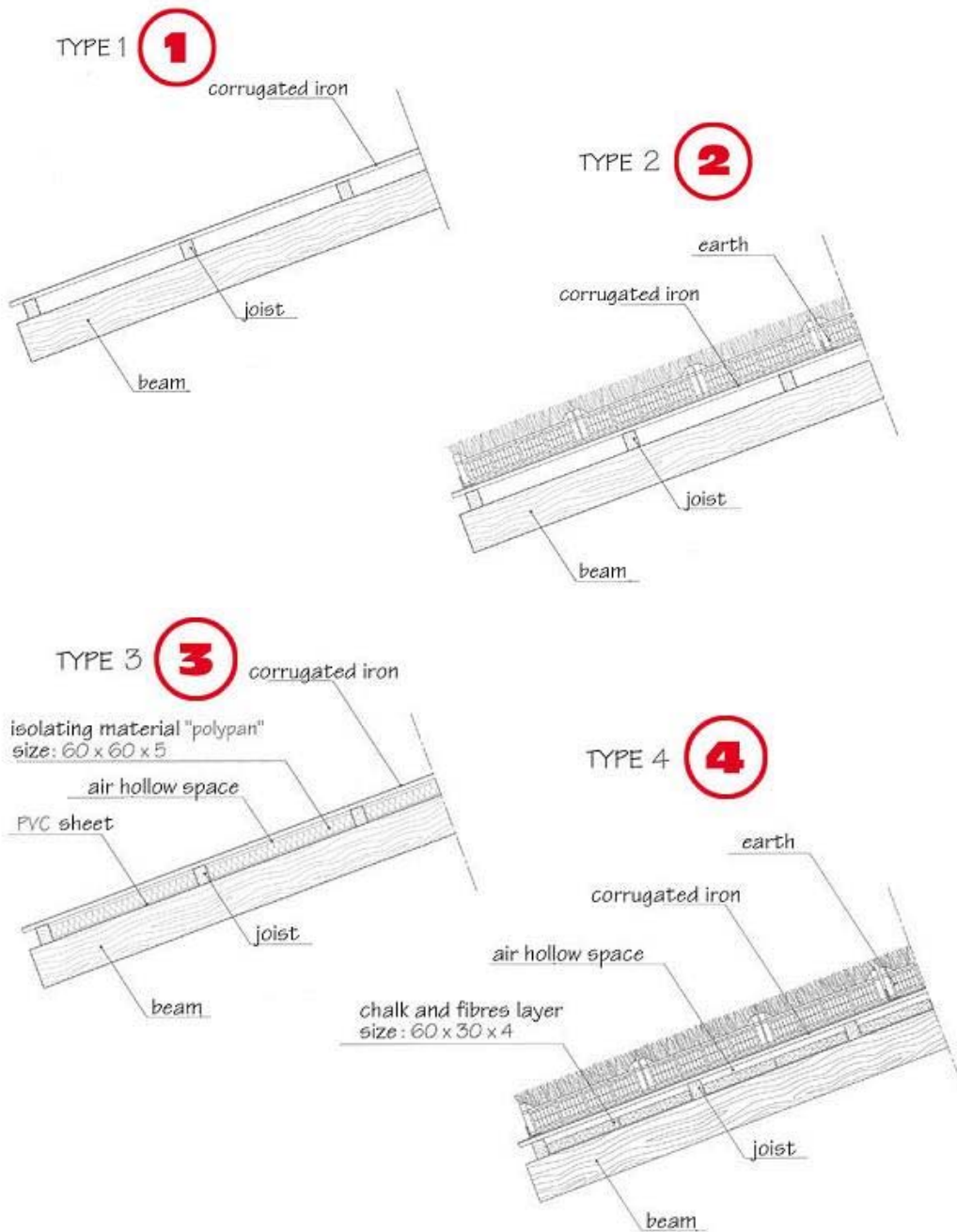


Figure 1-2. Sections of types 1, 2, 3 and 4.

With the aim of experimenting an improved solution of the roof components I have decided to compare, both by constructing and monitoring, the following possibilities (fig 1-2-3):

a) A valid local solution built in a layer of corrugated iron and one of isolating material (Type 3)

b) A chalk layer a second layer of corrugated iron followed by earth (Type 4)

c) A simple layer of corrugated iron. (Type 1)

d) A layer of corrugated iron followed by a layer of earth. (Type 2)

These are in order to evaluate the different influences of the single proposed elements.



Picture 3. Constructed types.

The "greenroofs" technology, with the proper design shrewdness that makes it economically and technologically sustainable, has been considered a possible optimal solution to the low thermal and acoustic insulation problems of the corrugated iron. The expression of will to build "ecologically" also in a low cost solution, should not and must not be disregarded.

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