REFURBISHMENT AS INNOVATION

This project innovates the local inhabitants attitude towards building activity in Palestine, introducing the practice of sustainable refurbishment of existing buildings, which is an activity of basic importance in a country with land scarcity as Palestine.

The approach is transformed with an innovative use of low-cost and local materials. The traditional Mediterranean building technique of pisé is innovated and adapted to the existing situation, using the external metal sheet as a weatherproofing and adding on the interior side of the wall bamboo panels and lime plastering.

This simple solution is highly transferable in many situations to improve existing buildings in poor countries. The monitoring of the actual school building situation – after more than a year of life – shows the good resistance of materials, thus giving proof of the high transferability of the building technique with good results in other situations.

Particularly in the C area of Palestine, the "permanent" character of this refurbishment creates a new and innovative building practice that can overcome Israeli impositions and become a typical practice to refurbish all existing buildings in Palestine.

DESIGN METHODOLOGY AS INNOVATION

The project brings innovation in designing activity methodology for auto-constructive projects. The final project comes after the verification of the building technique critical points by means of a 1:1 scale realization workshop, handmade by designers. Moreover, the creation of an illustrated instructions booklet makes dissemination of this technique easy and fast. Local workers employed for this building can now spread their acquired knowledge and autonomously apply it to other situations.

The existing metal sheet provides an effective transmission of 0.5 W/m²K classrooms were arable occupied spaces before the refurbishment. This intervention had to keep the needed keeping enough spaces inside the classrooms together with the correct thickness of the wall layers in order to the facade, in consequence of the imposition of keeping the external metal sheet as the final envelope of the school building. Thus, the solution was to apply an external insulating layer which could protect the internal solar radiation during the very long hot season, and to create a internal wall with a high know how able to give a good thermal insulation without reducing low the floor surface of the classrooms.

The room environment conditions in the geothermal context of Al-Sainah school, thermal analysis of the external envelope was made using both the empiric analysis border temperature conditions of 0.5 °C and the external border temperature conditions of 42°C. The result of heat transmission across the wall is around 0.5k W/m²K. This value is under the maximum hand transmission limits (1.0 W/m²K) and is compatible with the actual allowed values (0.8 W/m²K) and the actual allowed values (0.25 W/m²K).

The wall internal surface is around 17°C when the external temperature in 28°C, thus the gradient is of 11°C. These values show that now wall guarantees a high thermal comfort, as there is no perception of convective motions due to temperature gradient.

The instructions booklet is a fundamental instrument for practicing and spreading the diffusion of auto-constructive activities. Anyone can use it to understand materials of construction as it is connected with universal language, made of photos, drawings and a very few words in a single language – put as a free assembly instruction manual.

It correlates translation problems and it is the essential tool to master building techniques for the non-readers and for people who are going to build something for the first time in their life. In this way, building techniques become part of the permanent local building culture and can be used in different situations directly by users-builders. This is a key aspect for emergency situation in developing countries, where local economy is poor and there is need for low cost and low-tech auto-construction techniques.

The instructions booklet can be used even without designers and low-tech building techniques can be more easily adapted to different situations, thanks to their low content of complex details and high content of common materials and elements. This is deeply linked to sustainability culture, as one of its main features is sharing of open-source knowledge.