

promoter



project team



local partner

Jerusalem Bedouin Committee
Anata



Typology: primary school

Project: low environmental impact building for an international cooperation project

Recipients: 200 children 6-11 years old + 4 teachers + 1 headmistress + Jahalin Bedouins community

Covered surface: 350 m² - 2 classrooms, headmistress's office, teachers' room, hygienic facilities

Realization cost: 100.000 euros

Realization period: 12 months - from 1st February 2009 to 31st January 2010

Place: Occupied Palestinian Territory

Jahalin Bedouin village of Al Khan Al Ahmar - East Jerusalem

Social and territorial context

Jahalin Bedouins are organized in 4 camps and 300 families, sited in the desert area North of National Route no.1, which links Jerusalem and Jericho. Al Khan Al Ahmar community is composed by 60 families, corresponding to around 600 inhabitants.

Families just own a few animals and several camels; they have big problems of water scarcity and pollution, due to a chemical plant close to the area, this plant being accused of low control of its atmospheric ejections.

Children situation is extremely serious, particularly for their right to education and their critical health conditions. The Palestinian National Authority required the presence of a complete school building to send teachers in the area, but building activity was suspended in 2007 for fund absence and at present there isn't yet any public transport to reach other schools.

The area is of great strategic interest for Israeli Government, as it divides West Bank in separated areas and cuts passages between Hebron and Jerusalem; it's classified as a C area.

The need for international cooperation projects operating in very critical areas is deeply linked with the need for new technical solutions with low budget and simple realization features. If architects often face design problems with low budget and short times conditions, in the cooperation project this situation is just a daily one: budget is the lowest one and realization time is the shortest one.

Architectural Project

Vento di Terra NGO has a long experience in developing international cooperation projects in Palestine. In 2009 it faced for the first time the construction of a school in collaboration with Jerusalem Bedouins Cooperative Committee of Anata. The general frame imposed very serious limits of action: desert climate; absolute prohibition of concrete and foundation for building activity, due to the Israeli law which doesn't allow permanent buildings in the C area; fast and simple realization techniques, thus permitting the use of non specialized workers; use of local materials, such as soil, lime and sand; minimum budget.

ARCò design team developed an innovative project which fully satisfied the difficult conditions: a school of tyres.

The building technique uses recycled tyres filled with soil, which have the double advantage of rapid and simple realization, high standard thermal insulation and static resistance. Bibliography on this subject and the number of realized examples are still limited, but results are astonishing.

Tyre is a zero-cost material, with high elasticity and resistance, thanks to the iron and gum elements which it's made of. The internal woven iron threads make tyres an ideal building material. Moreover, the re-introduction in the lifecycle is a sustainable option for a material usually destined to garbage disposal. The filling of tyres made of highly pressed soil guarantees stability and resistance to compression and high thermal inertia, too. Tyres filled with soil are disposed in layers as big heavy bricks, and compose structural and external walls. The external lime and clay plastering protects tyres from solar radiation and avoids their decomposition and any possible toxic release.

Earthships are among the first examples realized with this building technique, built in New Mexico under the guide of architect Michael Reynolds. Earthships are very comfortable buildings, designed with a system of continuous water recycling, working with sustainable energy sources and bioclimatic design.

The adaptation of this building technique to the Palestinian context led to a unique experiment, putting together cooperation and self build experiences.

The project was designed in February 2009 and then followed by a workshop, during which ARCò verified in detail this building technique. Afterwards ARCò prepared an "instruction booklet" to teach in a simple way the school building process to Jahalin Bedouins. The work of 10 young Bedouins, during 15 days, with around 2200 tyres, came in June 2009 to the realization of a school composed of 4 classrooms of 50-60 m² and a secretary office of 22 m², all surrounding the common central courtyard.

The sandwich panel roof is laid on a wooden beams structure, protecting the building from high external temperatures. A cross-air circulation system creates natural ventilation during summer season. Thermal inertia realizes fresh internal temperatures in summer season and warm internal temperatures in winter season, with a difference of around 10°C. During the summer season of 2009 doors and windows were placed and the external plastering was finished with clay and lime. The children playground was finished in August 2009.

The school was accepted in the primary school program of the Education Minister of Palestine, which sent 4 teachers and 1 headmistress: the 10th September 2009 lessons started.

Thanks to the Italian Consulate of Jerusalem in the winter season 2009, a photovoltaic plant was installed to realize the complete energy autonomy of the school.

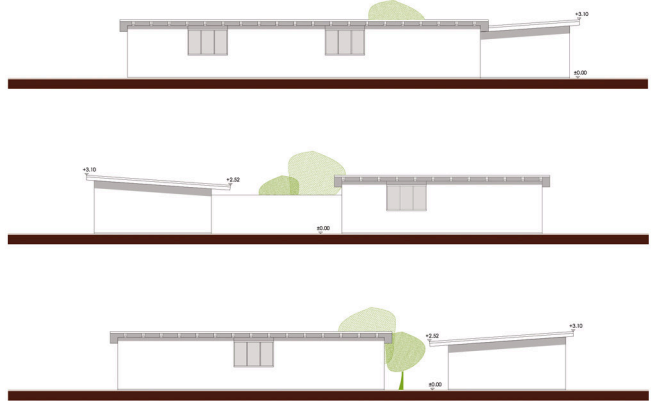
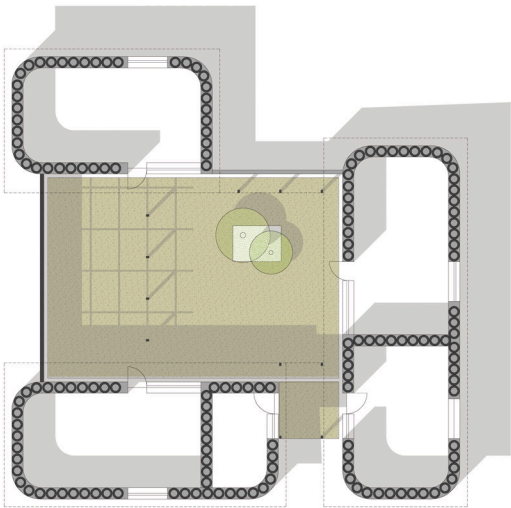
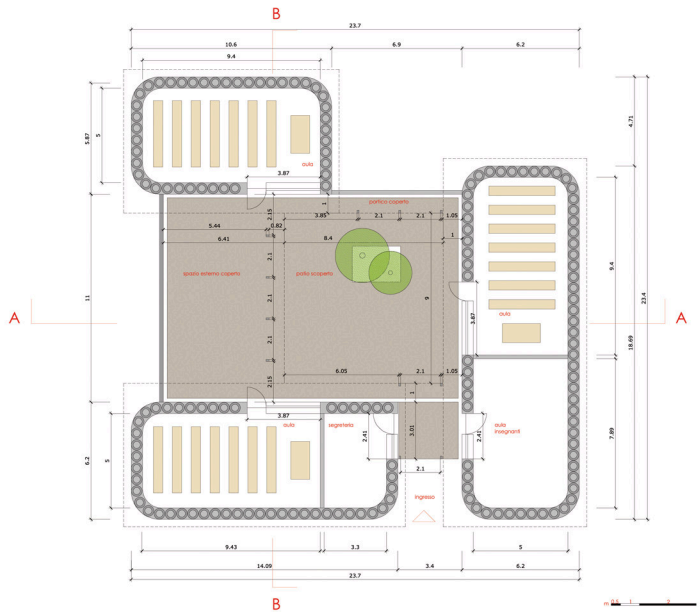
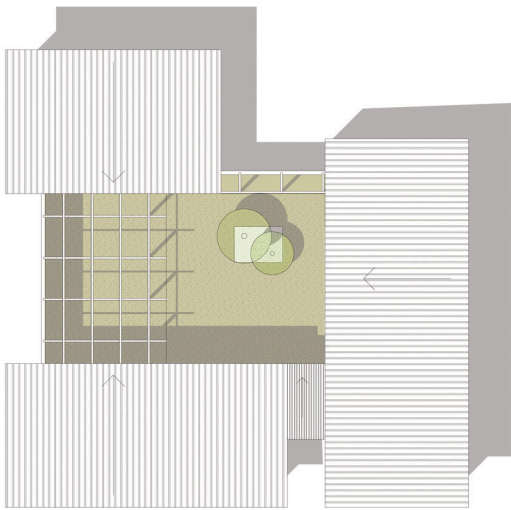
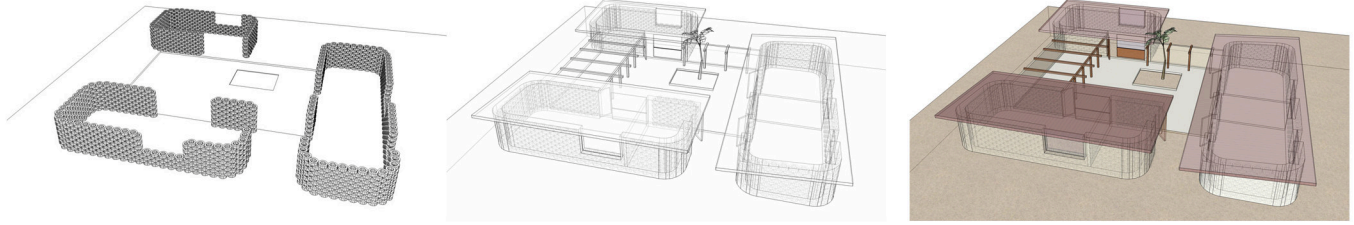
The simplicity of the three buildings is at the same time their own extraordinariness and originality. Before being a children's school, this building the Bedouins people's school, having they learnt a new sustainable, low cost building technique, and how with little things their life can greatly improve.



al khan al ahmar school - press release

We used:

- Tyres 2200
- Lime and Clay Plastering 300 m²
- Soil 220 m³
- Sandwich roof panels 344 m²
- Wooden pavement 260 m²
- Photovoltaic panels 15 m²





credits

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