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Student projects for modern earth building in traditional earth villages in Central Anatolia

The Turkish Institute for Building Biology and Ecology (YBE) has worked together with Selcuk University in Konya since 2014 on student projects concerned with earth building in the region from its traditions in the past, to its use in the fragmented present and for a peaceful future.

Run by the guest lecturer And Akman from the YBE, the projects are located in the rural regions of the high plains of Central Anatolia, in the vicinity of Çatalhöyük whose time of prosperity dates back to 7000 years BC. Due to its size, age and architecture, it is regarded as a milestone in prehistoric archaeology. The settlement comprised a series of densely-packed rectangular houses made of adobe bricks or rammed earth with flat roofs.

Since the Central Anatolian Neolithic period, this fertile region has been settled by ever more tribes, peoples and cultures, all of whom built their settlements with earth, improving and adapting their construction methods over the ages. These waves of migration resulted in a socially and culturally diverse mix of peoples that, however, with the onset of industrialisation has become increasingly divided and fragmented.

The lack of a sufficiently strong sense of local identity made it easy for globalisation, and with it cement and brick building, to take root resulting in architecture devoid of character. This transformation is most apparent in large cities such as Konya, spilling over into rural areas. But is the small villages that retain most of their original character.

The fact that Konya is surrounded by villages with traditionally-made earth buildings was seen as an opportunity by the YBE and Selcuk University to educate students in this area. In important part of this was to anchor the concepts of environmental conscious-

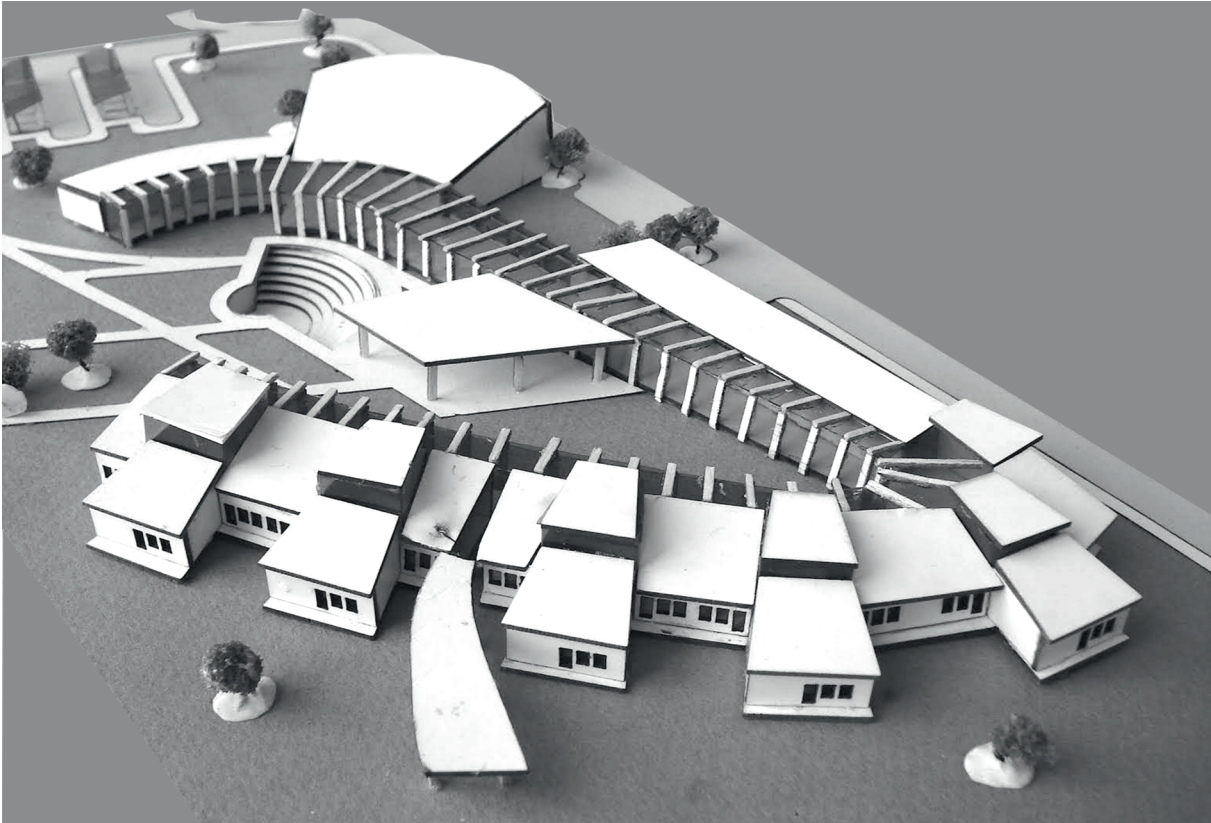
ness, sustainability and healthy living in studies by asking students to examine their roots. A secondary aim was to collaborate with industry to prepare the ground for ecological building materials with good building-biological properties.

As part of their semester project, students were asked to design a modern earth building according to ecological and building-biological principles. These semester projects were the first time that these architecture students in Turkey had the opportunity to work with earth.

The projects are not only about introducing students to modern earth building techniques and asking them to develop projects with them, but are also an opportunity to promote regional redevelopment, which is an important social problem in Turkey. As such the traditional earth-built villages were more than merely a setting for the modern earth building projects but objects of study, for example into social aspects such as the views that young people in the villages have of their homeland and what is necessary to counteract rural depopulation.

As a consequence, the following topics were selected for the semester projects:

- A social community centre for young people in Konar (Summer semester 2014).
- A social rehabilitation clinic in Resadiye (Winter semester 2015)
- Small industrial facilities for the local manufacture of ecological and building-biological building materials in Bashüyük (Summer semester 2015)



Model

1 – Social community centre for young people in Konar

The rural village of Konar lies approximately 40 km north of the provincial capital of Konya and has a population of just 145, most of them farmers. What makes the village special is an ecological chicken farm, which is the first in the country and the main employer in the area. The farm's owner has had a connection to earth building since childhood and supported the project by making land available.

Four different student designs for a social community centre for your people were designed in summer semester 2014 by a team of 19 architecture students. The 900 m²-large centre occupies an 8000 m² plot and includes ateliers for art, music and crafts, as well as rooms for dining, sleeping and hosting events.

The village lies 1176 metres above sea level and temperatures fall to -20°C in winter and can exceed 40°C in summer. The high altitude also means that diurnal temperature fluctuations are very large. In winter a strong wind blows from the northeast while in summer it is practically windless.

The designs aim to counteract the effects of the climate and reduce energy consumption. As such, the

designs are open in an east-west direction and present a closed face to the north and south.

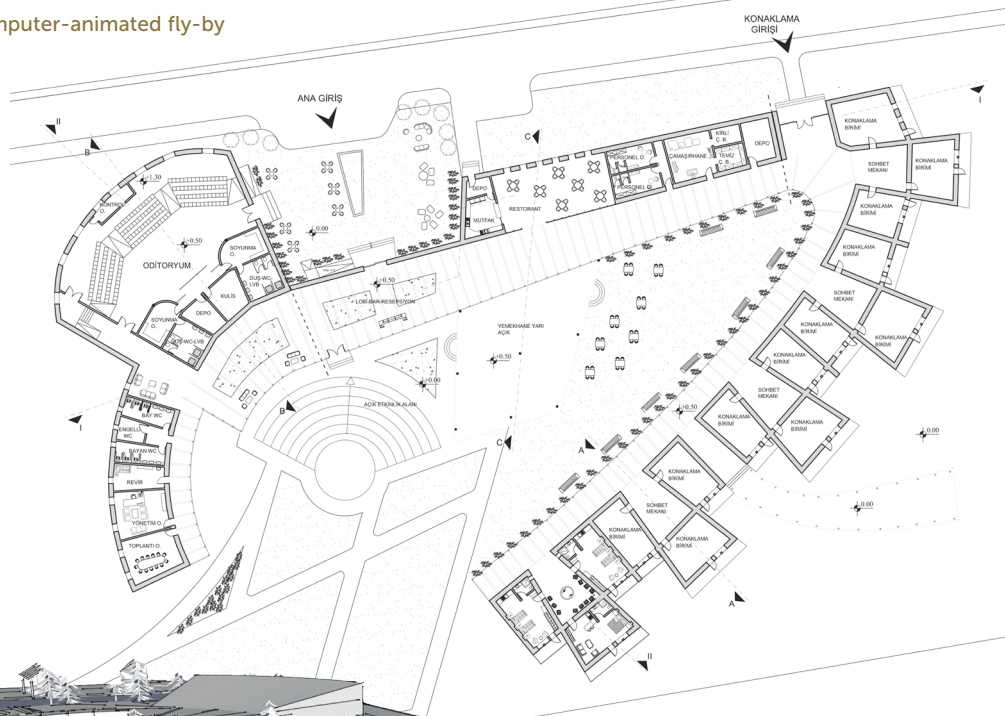
The structural framework is a timber panel construction with glue-laminated beams and solid-timber-joint floors. Rammed earth walls and floors, adobe bricks, clay panels and clay plasters are used to help retain and buffer heat and to naturally regulate humidity levels along the primary facades. The buildings are roofed with extensively greened roofs to reduce overheating in summer and to act as a natural insulator in winter.

Overgrown lane in Konar

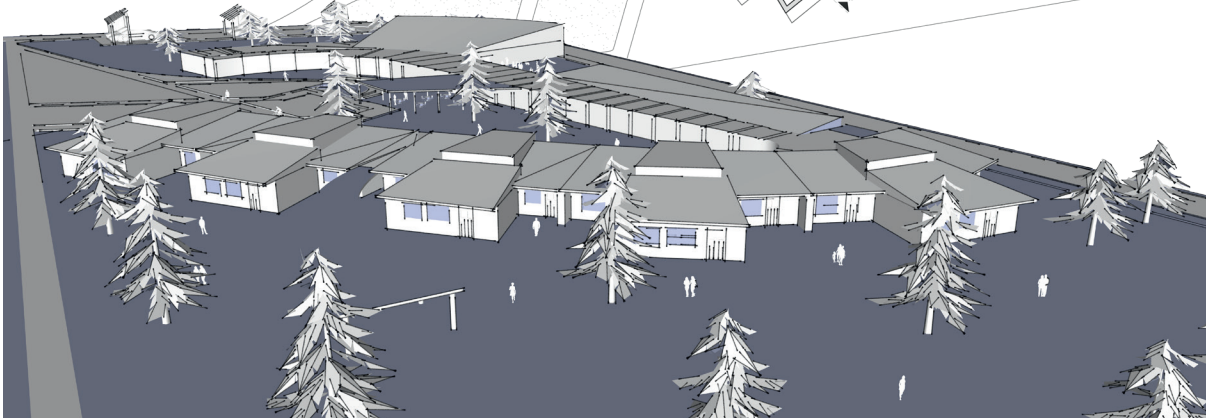




Still image from computer-animated fly-by



Ground floor plan



Sketch



Model

2 – Social rehabilitation clinic in Resadiye

The village of Resadiye lies 90 kilometres northwest of Konya and numbers 120 inhabitants of unparalleled hospitality: they invited the students into their homes, provided them with food and helped them in finding out information about the region. The idea of establishing a clinic was recognized as a chance for the young people and children of the village, offering them a new perspective and the opportunity to remain in their village instead of heading for a city to find work. Resadiye lies 1082 metres above sea level and temperatures fall on average to -14°C in winter and rise to approx. 37°C in summer. The high altitude means that temperature fluctuations between day and night are extreme. The climate of the locality is influenced by an easterly wind and Lake Ildir nearby.

The village lies on an important railway route but the railway station was decommissioned in the 1960s. The village was chosen as a location for the project in part as a way of reactivating rail transport instead of being reliant on roads.

In winter semester 2015, seven student projects for the social integration and rehabilitation different target groups were designed for Resadiye, including:

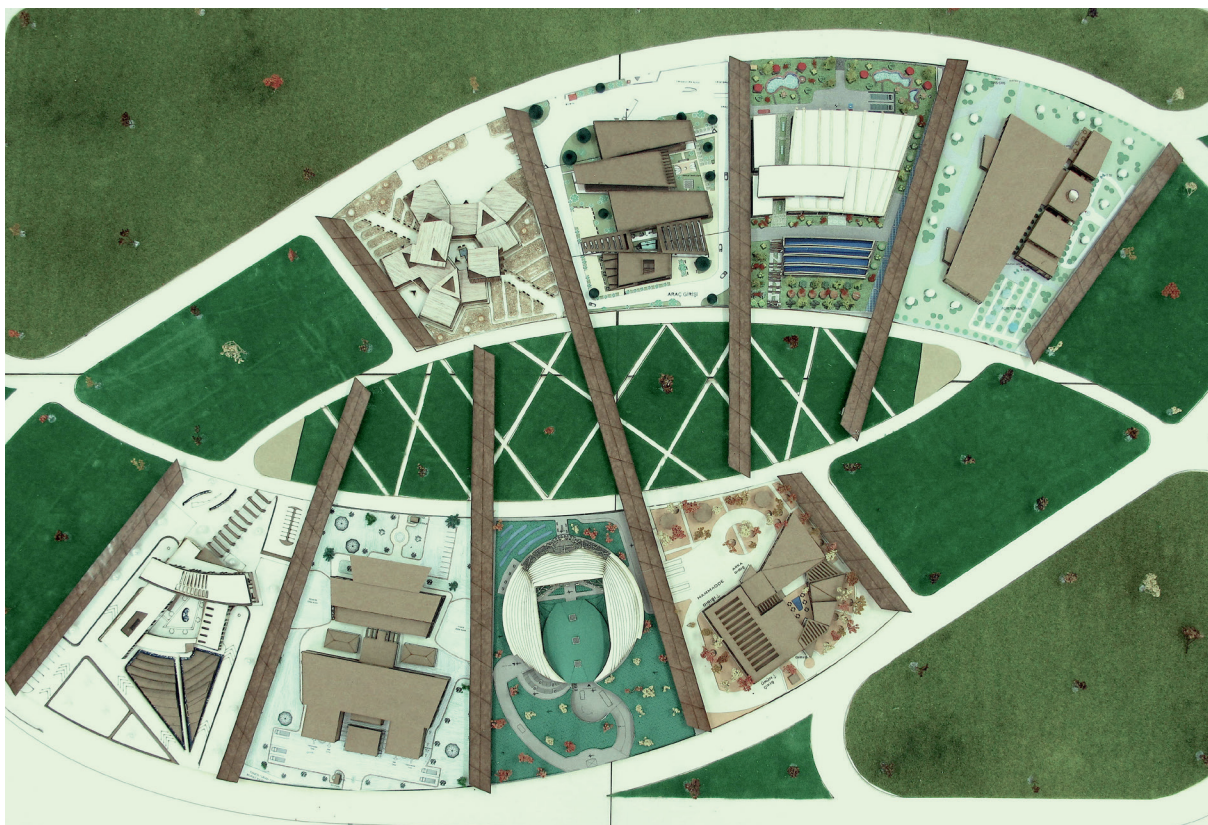
- rehabilitation of young people forced into crime

- children suffering from leukemia
- young people recovering from drug addiction
- people traumatised by natural catastrophes

A total of 32 students were involved in the project designs. Three sites around the village with different terrains and geographies were designated for the design of the 2100 m²-large centres, and the students had to determine which site was appropriate for their project, and how large it should be.

The centres included ateliers for art, music and crafts, as well as dining spaces, sleeping areas and event spaces. The form of the design responds to the climatic conditions to improve the energy balance. Different designs resulted depending on the respective location.

Here too, a timber panel construction was chosen with glulam beams and solid-timber-joist floors. Rammed earth walls and floors, adobe bricks, clay panels and clay plasters are used to help retain and buffer heat and to naturally regulate humidity levels along the primary facades. The buildings are roofed with extensively greened roofs to reduce overheating in summer and to act as a natural insulator in winter.



Group model of the students' different projects

3 – Small manufacturing facilities for the production of ecological building materials in Bashüyük

Bashüyük has 170 residents and lies 40 km north of Konya, in the vicinity of Sarayönü. The idea of building a small industrial estate for the production of ecological building materials put forward by the Turkish Institute for Building Biology and Ecology was met with enthusiasm by the local municipalities. Architecture students at Selcuk University were asked to come up with possible designs for such facilities and the local municipality has since declared land available for this purpose. The idea is a response to the gradually growing demand for environmentally-friendly and healthy building materials in Turkey, and an industry is beginning to emerge. The project is a sign of a new direction and elaborates possible ways in which this industry could grow, exposing architecture students to a subject area not normally dealt with in studies.

In winter semester 2015, a masterplan was developed for a series of production facilities for eight different building materials, including:

- Rammed earth products
- Clay building boards and plasters
- Reed mat insulation panels
- Sheepswool insulation products
- Cellulose insulation products
- Glue-laminated timber beams

- Laminated wood products
- Natural paints and preservatives

A total of 41 students took part in the project, working together in eight groups. The production facilities range from 1100–1900 m² in size, depending on what is being produced and the required indoor and outdoor space. The overall masterplan covers a total area of 13000 m².

The site lies 1123 metres above seal level and temperatures in winter fall to –17°C and rise in summer to over 41°C. The high altitude results in extreme diurnal temperature fluctuations. A northeasterly wind blows in winter but not in summer. The building forms respond to the climatic conditions to reduce energy consumption as best possible. Industrial facilities are rarely designed according to such criteria and this proved to be a considerable challenge.

Again, the structures are timber panel constructions with glulam beams and solid-timber-joist floors. Rammed earth walls and floors, adobe bricks, clay panels and clay plasters are used to help retain and buffer heat and to naturally regulate humidity levels along the respective facades where planned.



View of the Central Anatolian plateau with Bashüyük in Winter



View of Resadiye



Traditional house in Resadiye



Lane in Bashüyük



Detail of the edge of a flat roof in Bashüyük

About the Turkish Institute for Building Biology and Ecology (YBE)

The Turkish Institute for Building Biology and Ecology (YBE) is the product of a 25-year association between And Akman and the German Institute for Building-Biology and Sustainability, the IBN. The YBE acts as an independent consumer advisory body and offers training in holistic and building-biological and ecological building practice. Its activities and services including education and publicity, building-biological measurements and assessments, and the

development of new building materials, techniques and standards. It aims to contribute to making the construction sector more humane, healthy and environmentally-sound. The Institute also acts as a local representative for the IBN distance-learning course for training to become an IBN-certified building biologist. It organises seminars and work groups, including since 2014 the work group for earth building on Marmara Island.