**TECHNOLOGY FOR SUSTAINING THE LIVING TRADITION**

**PORTABLE, COMPACT, CHANGEABLE, SUSTAINABLE CELL UNITS**

**In Kocaeli/TURKEY**

## Country, Region, City

Kocaeli, a coastal city located at the North of Turkey, on the Anatolian side of Marmara region, next to Istanbul, is an advanced industrial city. It has a rich historical texture as it is an

old residential area. It is located on an earthquake-prone zone and therefore durability and strength constitute a significant importance for the constructions of the region.

## Location and risks

The area which we chose to study on is located in an historical urban site next to the city-trade center. The areais inclined and has a sea view.

At the current state, pedestrian and vehicle circulations that facilitate everyday life of local people, improve trade performance and strengthen the realization of tourism potential of the area are undefined and weak.

The proximity of city to the trade area threatens the housing texture of the area. Insufficient financial capacity of the households for renovation of the historical buildings in particular led the buildings to turn into slums due to lack of maintenance. Already located on the earthquake zone, demolishing the neglected houses of the region due to various interests and security creates a threat for the local people. Newly built high-rise apartment blocks that do not consider the living habits of the current dwellers have been observed in the

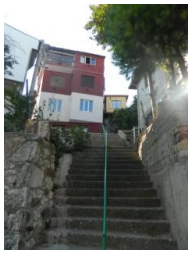
area. Since the profiles of the dwellers of multi-storey apartments that close the view of low-rise traditional houses behind them are

different from current dwellers, neighborhood relations are weakened. As a result of the questionnaires and meetings, it has been found out that these apartment blocks are not welcomed by local people at all.

**Potential, Problems and Limits of the Studied Area**

It is deduced from the questionnaires conducted in the region that the local people are very satisfied with the housing areas that have a sea view and a garden.

In the area, densely populated by old people, it is also observed that stairs and roads which are not convenient for vehicles create difficulties in accessing to various places.



The current historical buildings of the region have been improved and renewed with the addition of new functions. By this means, their historical texture has been more visible and they can be utilized by more people.

Neighborhood relations constitute an important part in the culture of social relations which has been handed down from past to present day by the local people.

Therefore, in consideration of the city located on a seismic belt, we have been studying on a project proposal to meet the demands of low-income people who like to live in a building with a view and garden and to pursue social relations in a region of neglected historical houses.

## DefiningMain Principles According to Living Traditions

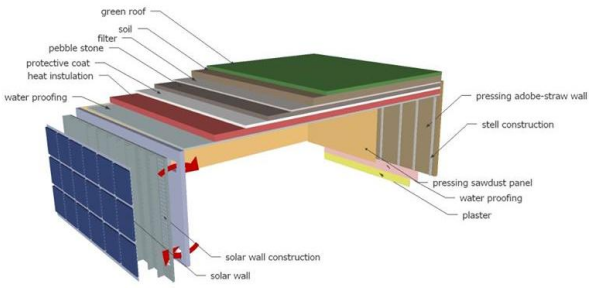
We have been aiming at integrating the area with listed houses into the city and also ensuring the happiness of local people by enabling them to continue to practice their habits. In house

planning, our aim has been to ensure the flexibility of the designed area so that it can serve for various user types and the area can change according to people's demands. Within this context, considering the minimum area and minimum cost criteria, we have designed housesthat are attached to each other in a neighborhood setup that focus on users' demandsand designed gardens in above and below grade levels that are attached to these houses,thus, creating houses that are both independent and together in a sense.

## Construction System and Advantages

It has been agreed upon that the construction of the houses must be carried out with easily found, cost- effective and durable materials for low-income people. In the proposed housing project, we paid attention that the houses and the units to be built will be designed with a principle that the replication will be possible and it will be applicable for other settlements at risk all around the world. Within this context, prefabricated construction system and cell system that is turned into three-dimensional modular system have been preferred.

The system has been formed by placing cells into a steel-constructed frame. The cells are 6.00x9.00 and 9.00x12.00 m. in sizeand 3.00 m.in height. In addition, producing light and eco-friendly panels by pressing hay and adobe has been considered as a part of the system. Adobe is a non-polluting material which balances the moisture, requires low energy in its production and cleans the air by absorbing harmful components. A bale of hay, on the other hand, is a good thermal and acoustic insulator.Besides, specified panels on the steel construction are supported with outer water insulation material. The finishing material is completely manufactured with factory precision as ready-to-use includingits heating, sanitary and electrical installations, woodwork, windows, flooring, wall coverings and painting. After they are manufactured as described, the cells are packed and sent to the construction sites for assembling. They can be used safely even in the first degree earthquake zones. They are very quick to work with and their manufacturing and assembling capacity is 4 houses per day. They are cheap. As a result of their manufacturing, they provide savings due to materials and labor cost. Thanks to short construction period, the climate's effect of prolonging the construction time is reduced. They do not have any limiting effects for architectural solutions. Preferences of dwellers on which unit to live in, how to organize the area will be learned in the meetings with local people and the interior divisions will be designed with lightweight panels based on the needs and demands of people.




In addition, the use of Solarwall system on the south frontage of the houses is considered appropriate. This system has an air-heating system functioning with sun.Solar energy is used to heat and air-condition the internal volumes of the house. The main components of the Solarwall are the sun absorbing panels. There are holes on the panels. The outer air infiltrating through the holes as a result of the

negative pressure created behind the panels gets heated by the solar power absorbed by the panels. The heated air can be distributed into the building via present air-conditioning system or a separate ventilator channel system. By this way, present air-conditioning system works less, saving on fuel and money. It serves for the environment by significantly reducing the $CO^2$ emission of the conventional heating systems.It does not require energy storage like other collectors and can be designed in any color, size and shape and be assembled.

As it is advantageous for both hot and cold climates, implementation of green roof has been considered for the parts designed as terrace in the houses with this system, the burden of heating and cooling is reduced. Instead of pebble covered terrace, livable outer spaces that are combined with green areas are created. The terraces are the only parts of structures that can function like gardens in city centers where there are no or very limited natural spaces. In that sense, growing plants on the green roofs are considered suitable. Environmental pollution will be prevented and the pollution in the air will be filtered with the planting thanks to the green roof. Thus, people will be able to continue to engage in ecologic agriculture just like they do today in the gardens of their houses.

Thecostof 1m2greenroof is 10Euro, oneunit has 27m2 greenroof. total: 27x10=270 Euro

Thecostof 1 m2 solar wall is 60 Euro, oneunit has 6 m2 solar wall total: 6x 60= 360 Euro

Thecostof 1 m2 cellunits is 130 Euro. One of theunit is 54 m2. Total cellunit: 54x130=7020 Euro

Sum: 7650 Euro