

# Materials Used in the Construction of Village House in Van



Hakan Irven, Bilge Işık  
Institute of Science Master of Architecture  
Istanbul Aydın University, Florya Istanbul /Turkey  
E-mail: hakanirven@gmail.com

**Abstract:** *The decision of the building materials is very important the survival and for the healthy living. Information, material and energy were described in the 1970s as the three pillars of the modern civilization of the people. Nowadays, the materials seem to be more important day by day. Different materials are used in the buildings according to the region. One of these regions is Van where the structures in rural areas were built with materials obtained from the completely natural environment. In the recent period, as a result of the access of the industrial building materials to the region and the economic opportunities reaching the level of purchase, a change can be seen in the buildings. Within the scope of the study, the changes in the use of the building materials were examined in the village house of Van during the process. As a result of the study it can be seen that the condition related to the human health has not been provided and the organization providing plus for the living comfort has not been structured during the selection of the materials in the newly built houses.*

**Keywords:** *Housing, natural materials, materials, region, Van*

## ***Van Köy Evi Yapılarında Kullanılan Malzemeler***

**Özet:** *Yapı Malzemesi kararı, insanların hayatta kalma ve sağlıklı yaşamaları için önemlidir. Bilgi, malzeme ve enerji 1970'lerde insanların çağdaş uygarlığının üçayağı olarak nitelendirilmiştir. Günümüzde malzemenin her geçen gün daha önemli olduğu görülmektedir. Yöre özelliklerine göre yapılarda farklı malzemeler kullanılır. Bu bölgelerden biri olan Van yöresi, kırsal kesimlerinde yapılar tamamen doğal çevreden elde edilen malzemeler ile inşa edilmiştir. Endüstriyel yapı malzemelerinin bölgeye ulaşması, ekonomik imkânların satın alma düzeyine gelmesi sonucu yapılarda son dönemde bir değişim görülmektedir. Çalışma kapsamında Van köy evlerinde süreç içerisindeki yapı malzeme kullanımındaki değişim incelenmiştir. Yapılan çalışma sonucunda yeni yapılan konutlarda malzeme seçimi yapılırken insan sağlığı ile ilgili şartların sağlanamadığı, yaşam konforuna artı sağlayacak örgütlenmenin yapılamadığı görülmektedir.*

**Anahtar Kelimeler:** *Konut, doğal malzeme, malzeme, bölge, Van*

## **1. INTRODUCTION**

The city of Van located in the eastern part of Turkey is a favourable residential center where the Lake Van can be found which is Anatolia's largest river basin with productive rivers on its shore, besides its cultural wealth which has been cradled by many civilizations for centuries. Therefore, it has been a place since the ancient times of the history which was dominated by many civilizations. According to the archaeological researches the periods of Van extend before the written history B.C. 5000-3000, until the beginning of Chalcolithic period. The Hurrions are the first in 2000 B.C. who established the first state in this region. Then the state of Urartu with its capitol Tusba was established in 900 B.C. by the indigenous tribes who had followed the Hurriles in the region [1]. The Urartus had ruled the region

of Van and their land was extended up in the south until Mesopotamia. The construction materials ongoing from these civilizations are observed to be continued in various regions of the city Van. The main building materials of the period can be listed as brick, wood beams and cane.

Adobe houses could be found frequently in the province of Van up to 1980 and the ratio of apartment type concrete houses was very little. With the founding of building societies after the mid- 1980s a rapid construction begun in the city and this construction continued to develop until today. The rapid development of the city center caused the reduction of the green areas in the environment and their completely or partially disappearance. In this process, how the green areas and old houses with large gardens which were located in the oldest residential areas of the city and which had an important place in the identity of the city were not protected, the existing green spaces were getting smaller or were completely destroyed. Neither the amount of green spaces nor the distribution of the urban pattern is sufficient enough to meet the demand. The result of the fact that the adobe materials were located in the education and that the building materials produced in the industry dominated the market in the city in the 1980s accelerated the transformation to concrete structure. As a result of the incidental observations it can be defined that the transformation reflected in the villages 10-15 years later or after 1990. It can be mentioned that in the years after 1990 the structure planning, plan scheme and the variety of materials changed significantly in village houses. In this context, as the subject of the study it was aimed to make an analysis study as a result of the obtained data by making examination of the changes occurred in the process in the materials used for the village houses in Van, in the field studies and in the literature reviews.

## **2. THE MAIN MATERIALS USED IN THE STRUCTURAL DESIGN OF THE VILLAGE HOUSES**

The substances produced naturally or artificially with the aim of making available bodies are called materials. Materials are essential components forming almost everything that we use in our daily life. The materials which occurred naturally or were obtained artificially can be used in any thinkable type of industry like automotive, aerospace, chemical, electronics, food production, and biomedical sectors. The materials can be divided into four basic groups. These are mainly expressed as natural inorganic materials, organic and natural materials, ceramics, glass, plastics, semiconductors and metals [2]. At the beginning of the civilization up to this time the materials together with energy raised the living standard of the mankind. A number of materials which have been used without changing from the ancient times until the present days always maintained their importance. The main of these materials can be listed as stone, adobe and wood. Nowadays in addition to these materials, briquette, concrete, glass wool and paint are used in the village houses.

### **2.1. Stone**

The natural stone which was formed for thousands of years in the nature has a high strength. So, the features of the material can remain the same [3]. The buildings made in the previous periods were constructed on the basis of the material's strength under the pressure. In the structure building process masonry structures were made by placing the stone on each other with a particular system. Both the existing conditions and the easy providing were effective in the choice. Nowadays the new technological conditions, the desire of high structured buildings together with the decrease of stone craftsmen reduced the commitment to this material. Today, stones are preferred mostly for decorative purposes.



*Figure 1. Village of Bayramli / Van/ stone school building [Irven, H.] photographed by Hakan Irven*  
*Figure 2. Village of Hamurkesen/ Van / Adobe building*

## 2.2. Adobe

Adobe; is a building material made by pouring the mixture of soil, straw and hay into moulds in the size and form of a brick (Figure 2). Adobe is a material used in every regions of our country. It is used less in the rural areas of Eastern Anatolia. Nowadays, with the increase of industrial building materials it can be said that the usage ratio of the adobe is reduced. Adobe which is a traditional material uses less energy at the stage of production and consumption. It came up again recently because it is an environmental friendly building material. Adobe which is a type of mud with a suitable consistency which was prepared by being mixed with straw in a pool and then it got the desired size by filling it into wood molds. In the structure, from the ground up to the window level, adobe which is sensitive to water gives its place to stone material. The adobe material is also known for creating an air conditioning effect in the building.

## 2.3. Wood

Wood used often as a material in every period, continues today to be a material by increasing its importance. In the past, in the structure of the village houses wooden beams were preferred due to passing the opening in the upper floor, making light roof (Figure 3) and easy manufacturing. Today, wood is used generally for decorative purposes.



*Figure 3. Village of Karahan / Van / Application of wooden roof [4]*  
*Figure 4. Village of Bayramli /Van / stone foundation photographed by Hakan Irven*

### **3. THE SPATIAL TRANSFORMATION OF THE CITY OF VAN**

The city of Van which was founded on the banks of the Lake Van in the year of 855 BC; besides its historical, military and strategic importance, it has been the crossing point of significant civilizations from time to time.

Even in Assyrian sources, Van was determined as a place decorated with gardens and trees. At the end of the XIX th. century Van had the feature of sparse textured settlement between the vineyards and gardens and the walled section defined as the “Lower City” created the business and commercial center of the city of Van. Here trading establishment, government offices, mosques were located. The second part of the city, the “Upper City” which was located above the walled section was famous for its gardens, beautiful fruits and rich wine production. These gardens were watered with tea and by the canals remained from the Urartu era. This part of the town was mostly devoted to residence. From entering the gardens and reaching the main street the settlement groups were selected. The private residence of the governor of Van and of other administrators and the houses of the rich Armenian merchants were located in this area. The American mission, the French Dominican mission, the consulates of Russia, Iran and England and the schools of some countries with the important churches of the Gregorian denomination, were located in the garden section. The presence of the schools and consulates of different countries such as American schools in the city, contributed significantly to the progress of urbanizations as well as in socio-cultural aspects. The Armenian revolts between the years of 1895 and 1917 due to the Russian invasion in 1917 a significant part of the segment which held the city’s vibrancy and culture in the hand either emigrated or died in the war. This situation revealed quite grave consequences on the city’s cultural heritage and lifestyle [1]. The loss of cultural accumulation which is necessary for the development, the ceaseless wars, the prohibits for the trade life brought by the new political boundaries, the weak economy of the city dwellers which was based on agriculture and hand craft led the city to remain self-enclosed for a long time, to get weakened and to become a province that gave many migrates to the big cities.

During the Republic period, in certain regions of Anatolia it was seen that together with the industrialization, the urbanization begun also. This effect of modernism was not seen everywhere in Anatolia at the same time. In the province of Van the urbanization in modern sense has entered into a rapid period for the last 20 years due to various socio-economic reasons. Due to the disasters in the last 20 years the migration towards the city has accelerated and the development in the city turned to unplanned constructions and squatters. While on one side of the town observing modern city-specific structures and forms of life, on the other side even in the most developed villages of the region miseries can be seen. During this process the structural elements of the individuals ‘buildings who were living in the village and which were still bearing the trace of the past were maintained to build in a totally unconscious way without putting them into certain discipline. This planning and these materials were continued to be used until the 1990s. After the years of the 1990s, a new process started in the construction by getting diversity in the materials, planning and structure. In this process, as material they used brick instead of adobe in the walls, concrete plaster instead of mud, steel coating in the roof and materials similar to glass wool for heat isolation. In the planning of structure carcass or mixed system was used instead of masonry structure. In accordance with this data the structure of the village houses can be taken into two periods.

### **4. THE CONSTRUCTION MATERIALS USED IN VILLAGE HOUSES BEFORE 1990**

These are the buildings which were easily made by taking the available natural materials as reference in the course of time during the years of reign of the adverse conditions of the economy’s weakness and the absence of shelter indexed aesthetic worry. These buildings were made without foreseeing a specific planning system. The m<sup>2</sup> size of the building varied depending on the number of family.

#### **4.1. The materials used in the construction of the basis**

The richness of the region in stones and rocks was the main reason for the use of natural stones. Stones are placed until a certain socle elevation. Soil is put on the top of the stones as heating isolation. The surfaces are often plastered with mud (Figure 4).

#### 4.2. Exterior walls

Adobe prepared in a specific pattern was put to the surface in an obfuscatory way and was obtained by coating the surfaces with mud plaster. Stone walls were also made by putting the stones to the outside surface of the adobe. The stone surfaces in a certain thickness can provide cool in the summer and warm in the winter by making air-conditioning effect for the house. At the same time it kept the house standing in a solid structure for many years until today. For many centuries stones were used in the structure as an important building material. Nowadays, it is preferred as building elements more for decorative purposes [5].

#### 4.3. Upper Floor

The poplar trees which are preferred in the region due to their cultivation and rapid growth were used as roof beams on many of the upper floors, then nylon canvas was laid down on the top of the roof beams (Figure 5). Then soil was put on the top of the nylon and so the flat roof was constructed. Sometimes cane found in the region was used as a cover at the top (Figure 6).



*Figure 5. The construction of adobe wall*

*Figure 6. Village of Bayramli /Van/ upper wooden columns photographed by Hakan Irven*

**Basic:** The foundation structures with the use of stone is very important for the strength between the ground and the building (Figure 7, 8)

**External surface:** was made by using stone and adobe. The surfaces were plastered with mud material (Figure 7, 8)

**Upper floor:** wooden beams (poplar tree) and cane are frequently used (Figure 7, 8)

In Figure 7, we can see examples from the village of Bayramli for buildings made from adobe before 1990. It was used until the earthquake occurred in 2011, after the earthquake it was abandoned. The building in Figure 8 is an example for adobe structure in the rural area of Van before 1990.

The use of the materials mentioned above in the village houses seen to be the reason for some factors. After the conducted field observation the reasons that lead for the use of materials can be listed as the following.

#### 5. THE CAUSES REFERRING THE MATERIALS USED IN THE VILLAGE HOUSES BEFORE 1990

The main reasons that lead for the use of materials can be listed as follows economic reasons, transportation, available materials within the near environment, the absent of the technical infrastructure and the cause of education [6].



*Figure 7. Village of Bayramli / Van/ structure from before 1990 photographed by Hakan Irven*

*Figure 8. Village of Ocakli / Van / structure from before 1990*

### **5.1. The industry of traditional building technology**

The individuals who have experience in the traditional building technologies do not have enough knowledge to use different materials in the structures. The situation restricts their entry to seek for something different.

### **5.2. The available materials which can be found in the near environment**

Materials like poplar tree, cane, soil and stone are preferred due to the easy transportation.

## **6. THE MATERIALS USED IN THE BUILDING OF THE VILLAGE HOUSES IN VAN AFTER 1990**

Together with the rapid transformation of the city the broken connection of the villages with the city began to close. The individuals living in the villages observing the development of the city have entered into various seeks. At the same time together with the multiplication of the individuals who were educated of the transportation, infrastructure and workforce development, a noticeable transformation-change was observed in the houses of the village. During this period, in addition to the structure made before 1990 as a result of the fact that the materials arrived to the region and the economic opportunity reached the level of purchase, they started to use briquette and concrete plaster for the external walls, glass wool for the heat isolation of the upper floor, and sheet metal cover for the upper cover. In the course of time, together with the transformation of the material change, different solutions started in the spatial planning. Worry can be seen about the different colours of the external walls on the building's surfaces. In this context, in some of the buildings identity changes can be observed that occurred in the buildings of the village. Without the uniform planning of the building surfaces, besides the effort to create a number of moving surfaces, worries about the different colour of the exterior paint are seen on the surfaces (Figure 9, 10)

After 1990 in the building of Figure 11, 12 as it is seen, briquettes were used instead of adobe, the surfaces were plastered with concrete and were painted with whitewash. The window is divided into several panes instead of using one eye window. This also shows that various aesthetic seeks entered in the buildings. It is often observed that they used sheet metal cover for the upper floor coverings. In the area where heavy snowfall occurs together with the easier commute of the materials to the village, this transformation has become an active cause in the choice.



*Figure 9. Village of Bayramli / Van photographed by Hakan Irven*

*Figure 10. Village of Bayramli / Van / Briquettes of the external wall photographed by Hakan Irven*



*Figure 11. Village of Bayramli / Van/ Application of briquette structure photographed by Hakan Irven*

*Figure 12. Village of Bayramli / Van / Application of masonry structure photographed by Hakan Irven*



*Figure 13. Village of Bayramli / Van/ building in the last period photographed by Hakan Irven*

The activities of change-transformation occurred in the village houses after the 1990s have gained speed. In the following years, the heat isolation and planning principles in the buildings have been adopted by the individuals. In this context, change and transformation can be observed within the framework of the emerging opportunities during this course of time in the rural area of the city of Van. This transformation in the countryside was not made by a plan and program; this should be done completely according to the basis of the individuals' own formats and planning (Figure 13).

## 7. RESULT

As the result of the studies made recently, the rural area of the city of Van emerges as two different periods. The first of these periods is before 1990 when the rural areas were observed to proceed by adopting the principles of planning for shelter in completely natural conditions. The individuals made the local places like house, barn with main materials such as stone, adobe, woods which could be found in natural conditions. At the development part of the location, some reasons which were mentioned before stood against them as forcing power to use these materials. The emerging opportunities and advantages after the 1990s helped the individuals to use new materials in the buildings. But unfortunately, this development did not go further than bringing the buildings one step forward only visually. During the selection of material for the houses, a number of contrasts were continued and it is seen that the organizations that provide a plus in the living comfort have not been achieved. To give an example, while providing the heat isolation by the glass wool which is used recently under the roof cover as isolation briquettes are used on the surface of the walls which is very weak in terms of isolation. This case shows that the structures obtained are too weak in technical way. As a result, support should be given by the relevant institutions by delegating a team of experts in the context of rural development planning.

## REFERENCES

- [1] **Taha Orhan, 2012.** Planning Construction Engineer, Anonym company Analysis Reports of the Cities.
- [2] **Seden, A., Gürdal, E., 2003.** Yenilenebilir Bir Malzeme: Kerpiç ve Alçılı Kerpiç, Istanbul.
- [3] **Siegesmund, S., Snethlage, R., 2014.** Stone in Architecture: Properties, Durability. Springer; 5 edition.
- [4] **Schachner, A., 2010.** Boğazköy-Hattuş Kazı ve Restorasyon çalışmaları, 33.3 KST (Ankara 2012)
- [5] **Öztürk, S., 2013.** Mud brick Bat and Natural Mud brick in the Production Techniques in Van, kerpici'13 – New Generation Earthen Architecture: Learning from Heritage International Conference Istanbul Aydın University, Turkey, 11-15 September 2013, 221-223.
- [6] **Sirel, A., 2013.** An Urban Fabric mainly Based on Adobe: The old city of Van Kerpici, kerpici'13 – New Generation Earthen Architecture: Learning from Heritage International Conference Istanbul Aydın University, Turkey, 11-15 September 2013, 315-319.
- [7] **Işık B., Helvacı G., 1999.** "Role of Culture and Tradition in the Development of Housing in the GAP Area of Turkey" IAHS World Congress on Housing "Housing Issues and Challenges for the New Millennium" San Francisco, USA, June 1-7

**HAKAN IRVEN,** Arch.

Graduated from Erciyes University at 2011; M.Arch at Istanbul Aydın University Institute of Natural and Applied Sciences (2014- ). Owner of architectural design office in Van; made public and private project designs, have done work in architectural design and architectural consultancy services in the Province of Van.