

Design of Building Elements in Traditional Houses

(A Case Study in Kırklareli/Turkey)

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ABSTRACT

The city of Kırklareli includes original examples of traditional building types. The buildings, located in the city center of Kırklareli within the texture of traditional dwelling, have their own features when comparing with their contemporaries. This study examines the traditional Kırklareli dwellings in terms of building components, and discusses the benefits provided by the various design characteristics. Finally, it is shown that the building elements of Kırklareli dwellings, particularly their walls have authentic features in comparison to other traditional dwellings in Anatolia.

Key words: Kırklareli province, Traditional housing, Building element design, Traditional building material, Environmental impact

1. INTRODUCTION

The building construction sector has significant negative effects on global ecological balance. Contemporary architecture seems to have lost the capacity to control the architectural environment itself. However it has been known that traditional buildings in Turkey and elsewhere are environmentally compatible along with having cultural, social and historical values etc. Traditional buildings from various cultures reflect the regional climate and other design considerations. Traditional buildings are the architectural response to the requirements of societies prior to the industrial period; to the insurmountable limits created by the region and climate; and as a result of the unique interaction between human mind and experience gained from observing natural phenomena. These

characteristics may be revealed by investigation of the aesthetic, historical, cultural, and environmental properties of traditional buildings; and provide important helpful hints for today's designers. Turkey has a rich and varied traditional building stock, in parallel with its varied geographic and climatic characteristics. In the following sections: Anatolian residential architecture is divided into seven regions according to climatic, material and technical factors however there are also some construction systems which differ from these seven types of construction systems.

The city of Kırklareli is located in northwest Turkey, and has land and sea borders with Bulgaria. Due to its location, it has been controlled by different nations for hundreds of years, and has been influenced by the

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cultures of these nations. The last remaining examples of these cultures are their architectural works. Although there are monumental buildings within the boundaries of Kırklareli city center, there are also houses, which are the most important cultural elements of the late Ottoman era. Most of these houses were abandoned to their fate until recently, when some were incorporated within the conservation area and, to some extent, preserved for a period of time.

Throughout Kırklareli and Turkey, modern buildings predominantly use a reinforced concrete construction system. However, reinforced concrete these lack any local characteristics such as features developed in response to local climate. In terms of usage comfort, reinforced concrete material alone cannot provide appropriate comfort conditions. However, in Anatolia there are ecological construction patterns built with traditional building systems that were applied for hundreds of years and designed according to local knowledge of the climate. In order to maintain this type of building tradition, it is necessary to identify the elements that constitute the building system. In Kırklareli neighborhoods, which make up the traditional texture of the city, different building styles have emerged from its multi-cultural history and the availability of different building materials in the region.

The existing values and building pattern of Kırklareli are rapidly being lost. The present study therefore analyzes the building systems of traditional Kırklareli houses in order to categorize and document the cultural assets of Kırklareli, and to protect and model elements of historical design within new settlements.

2. STUDY AREA

Kırklareli is a boundary town located in a zone of transition between the European and Asian continents. Kırklareli took different names in different periods. The names it took before Roman, Byzantium, Crusader and Greek occupations are different (Virisium, Verisse, Nerisse, Ayasaranda, Sarandakilise, Kırkkilise, Kırklareli). Kırkazizler city, the counterpart of Ayasaranda, was renamed Kırklareli (meaning not of Kırkkilise but of Kırkkimse) on 20th December 1924 [1]. Kırklareli town is located in the Istranca (Yıldız) Mountains of Marmara and parts of Ergene Plain. It borders Bulgaria in the north, the Black Sea to the northeast, İstanbul to the southeast, Tekirdağ to the south and Edirne to the west. It is situated between 41° 14' and 42° 00' north and 26° 53' and 23° 13' east. It covers an area of 6550 square kilometers. The city has a 180 kilometer land border with Bulgaria and 60 kilometers of Black Sea coastline. It is 203 meters above sea level; its northern and eastern areas are mountainous and forested, whereas other parts are generally plains. A continental climate predominates within the region. Winters are harsh and wet, and summers are hot and dry. Plant coverage comprises forest and steppe vegetation [2].

The social structure of Kırklareli is similar to that of Thrace region with respect to customs, tradition and family structure. The residents of Thrace region comprise immigrants from Bulgaria, Greece, Romania and Yugoslavia. City dwellers and villagers in the city

resemble each other in terms of social structures but there are some differences in the division of labor at the family, clothing styles and articulation [2]. Within Ottoman society, Jewish, Greek, Bulgarian and even Roma communities lived together in the Thrace region for long periods when they were connected to the Ottoman citizens. The settlement plan of Kırklareli show that Turks and Jews settled in the city center, Greeks in the outer districts, and Bulgarians and Roma in the outermost suburbs [3].

3. SCOPE AND METHOD

In this study, previous studies having analyzed construction and structural elements of buildings taking place in the geographical areas where traditional Turkish houses extend are reviewed [4-12]. A review of the literature determined that the building elements of Kırklareli traditional houses have distinctive characteristics from Turkish houses; the literature includes no previous studies of this subject.

Following literature survey, the present study examines the place of Kırklareli traditional houses within the traditional building techniques specific to Anatolia. The common material types used in the existing traditional Kırklareli houses and the general characteristics of these materials were determined. These traditional houses continue to be demolished on a daily basis, and so the study also researched the possibility of obtaining appropriate local materials for use in their restoration.

Observations were conducted within the traditional districts of Kırklareli. In addition, personal observations within seven traditional districts of the city center revealed that traditional houses employed differing building systems. After these houses were classified according to their building systems, houses representative of each building system were studied in detail, in terms of building elements, construction technique and material features. These points are nevertheless beyond the scope of this paper.

4. THE TRADITIONAL CONSTRUCTION TECHNIQUES AND MATERIALS SPECIFIC TO ANATOLIA

Turkish geography encompasses various climates and spans two continents at the center of Eurasian civilizations. Within this geography, different cultures have lived, each leaving their own traces throughout history. The most important of these remnants are the traditional dwellings. Traditional Turkish dwellings have emerged as a result of the mixing of various cultures over many centuries. Besides the effect of differing cultures on the construction of these dwellings, the experience of construction technology and environmental factors have played important roles, thereby shaping various characteristics of the dwellings.

It is clear that climatic considerations influence these constructions. Turkey is divided into seven different regions that have different climates. As a result, various construction designs have emerged in accordance with the climatic aspects of each region. For example, traditional Black Sea dwellings are adapted to moist and rainy weather, traditional East Anatolian dwellings to cold and dry weather, traditional South East Anatolian

dwellings to hot and dry weather and traditional Middle Anatolian dwellings are adapted to a terrestrial climate, in terms of employing different designs and construction materials [13].

The traditional construction systems in Anatolia have been shaped according to the potentiality of techniques, of time, and convenient materials. In this respect, three types of construction system can be identified according to their materials.

Timber frame systems: Timber frame systems display characteristics peculiar to the climatic and geographical aspects of the region. These differences emerge in the selection of load-bearing system and the definition of filling elements. A load-bearing system comprises two approaches: two pile systems and skeleton system.

Stone construction systems: Stone construction systems show little variability. It is possible to come across stone constructions in every region of Anatolia. Wood, adobe and brick are used according to availability of materials by overlaying the stone walls. Stone material is also used in the construction of predominantly wood and adobe dwellings.

Soil construction systems: Soil material is used as adobe without changing its natural and chemical form or it's used brick with changing its natural and chemical form. Adobe is the oldest known construction material. More recently, brick was commonly used in Anatolia. Adobe structures are particularly common in Central Anatolia, where wood and stone are scarce.

The selection wood, stone or adobe material in various parts of Anatolia depends on the availability of material in that region. If all of these facilities exist, workable wood is the easiest material to use. The area is seismically active. Therefore, adobe offers the benefits of being light, permitting a wide range of details, having the aspect of preventing the horizontal loads. However, in non-forested regions, soil and stone fillings are used in the surface construction of timber dwellings [13].

Anatolian residential architecture is divided into seven regions according to climatic, material and technical factors [14].

- a) Stone house architecture in Southeastern Anatolia with the same cultural traditions as Northern Syria (Figure 1)
- b) Stone and wood-beam architecture of North East Anatolia, which is close to the South Caucasus and Dagestan (Figure 2)
- c) The characteristic timber frame residential architecture seen in the East Black Sea region (Figure 3)



Figure 1. Traditional Midyat House [15]



Figure 2. Traditional Kars House [16]



Figure 3. Traditional East Black Region House [17]



Figure 4. Traditional Bodrum House [18]

- d) Flat covered cubic stone architecture of the Aegean and Mediterranean region (Figure 4)
- e) The stone architecture of Central Anatolia, especially Niğde and Kayseri, in common with North Syria (Figure 5)



Figure 5. Traditional Kayseri House [19]



Figure 6. Traditional Harran House [20,21]



- f) The adobe architecture of Central Anatolia, which dates back to the beginning of the New Stone Age (Figure 6)
- g) The residential architecture originally seen along the Anatolian coast and reaches west to the Aegean, through Sivas, then from the inner Aegean to the north hillsides of Taurus Mountains, is rare in other regions and the Balkans. This architecture features adobe filling and stone, of which ceiling structure is amplitude stone (Figure 7).



Figure 7. Traditional Kırklareli House [22].

Construction techniques which differ from the mentioned construction systems are also used in Anatolia. However those differences arise from either together using of these construction systems (with masonry and wood construction systems, etc.) or the use of different techniques in walls (with stone and adobe materials in masonry construction walls etc.) as in wood frame systems, or changing the filling material of frame system (stone, brick, adobe, wood-filled, lath and plaster and wattle and daub walls etc.).

These categorizations shows that traditional dwellings have developed according to the availability of materials and those formal aspects reflect the climatic and geographical conditions of the regions and are affected by past cultures. In terms of the categorization given above, the traditional dwellings in Kırklareli use a form of Hımsı construction technique seen in the Balkans. Most of the remaining traditional dwellings specific to Kırklareli have been constructed in accordance with the Hımsı technique. In addition, stone building techniques became important following the widespread introduction of brick production.

5. TRADITIONAL KIRKLARELI HOUSES

It is not known when - and in which conditions - Kırklareli was established in its present form. However, present-day Kırklareli developed in the town of Yayla and the Kırklar Hill areas of the city during the Byzantine era [23]. Traditional Kırklareli houses display some of the characteristics of typical Turkish houses. Buildings were positioned such that they did not block each other's view and sunlight. Almost all of the houses have gardens. They are either single or double storeys with an additional basement. Each plot typically includes a well, vegetable garden and outbuildings [24].

Plan types mostly have an inner court, and there are also middle-court type layouts. The entrances of the houses are not connected with the garden but connected directly with the street. The entrance is raised with stairs and by recessing the doorway by 1 meter. The entrance was provided by center line and designed symmetrically according to the frontispieces (Figure 9). The inner courtyard is illuminated by means of long narrow windows found on two sides of the entrance door. Opposite the entrance door is a doorway to the garden. Two rooms are placed symmetrically on both sides of the entrance, and are used for daily life [25].

All of the rooms open onto the courtyard. In two-storey houses, the staircase is either opposite the entrance, at the end of the courtyard or between the rooms. Some houses retain authentic kitchens with a furnace, niche and cabinet in the plan scheme of the ground floor, whereas in others the kitchen was combined with outhouses [26].

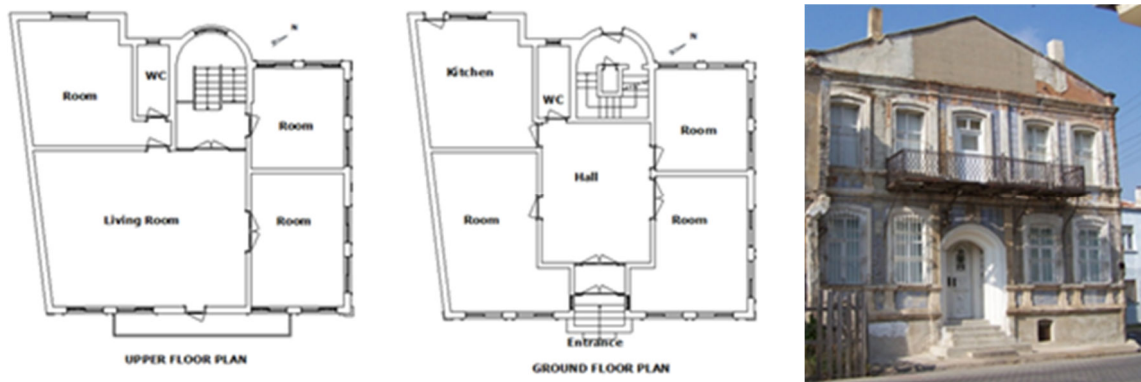


Figure 8. Example of Kırklareli traditional house [22]

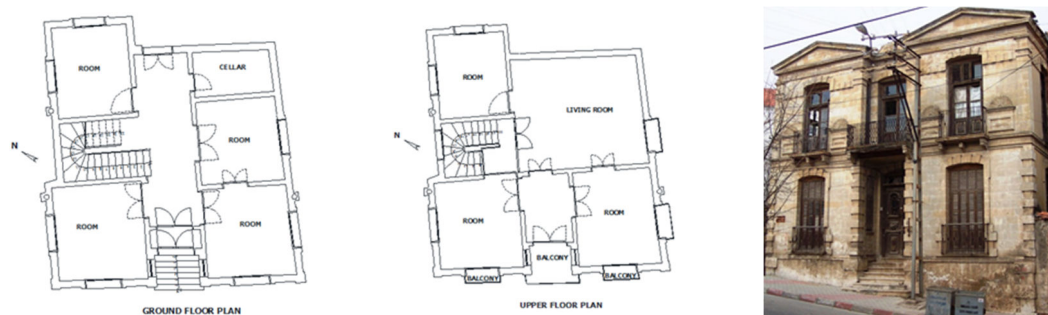


Figure 9. Example of Kırklareli traditional house [22]

Most traditional Kırklareli houses were built as stone basement and first floor and timber framed upper floors. The filling material of timber frames is adobe or brick in some structures, and both adobe and brick, differentiating from wall to wall, in other structures. Traditional Kırklareli houses are a part of half-timber structure method observed in the Balkans [24].

These dwellings reflect socio-cultural values and lifestyles, as well as the construction techniques of their time. They diversity derives from the local conditions, socio-economic status and tastes of their owners, who were directly involved in the building process. The traditional dwellings are unpretentious, modest and functional, yet long-lasting and elaborate buildings that were built by utilization of local sources. However, they could not adapt to changing living conditions, and were later abandoned by their original owners because of cultural transformations, maintenance problems, poor comfort and hygiene conditions, and inadequacy of technical services (Sanitary, heating and lightning) and the emergence of apartment houses meeting these requirements. The traditional dwellings were either ignorantly destroyed and replaced by new buildings, or occupied by low-income groups who made alterations according to their changing lifestyles. The original owners of the dwellings preferred modern apartment in newly established and more prestigious districts. However, these apartment buildings are of the same character as their contemporaries found in any other region of Turkey; they do not fit the cultural values of their users, nor do they respond to the local conditions [27].

5.1. Construction Technologies of Traditional Kırklareli Houses

It is thought that the materials commonly used in the region as well as the climatic conditions of the region have become influential in the composition of traditional Kırklareli residential architecture. The building system of the houses show changes depending on the material used. Wood, stone and brick materials were preferred in these houses as load-bearing system materials.

For example, an inventory study conducted in 2006 identified 44 pieces of timber frame construction, 27 pieces of masonry and 39 pieces of mixed-system building [22]. The data on traditional Kırklareli houses show that frame constructions and houses of mixed system construction are more common. Considering that the basic storeys in mixed system houses use a timber frame, it is concluded that wood material is dominant in the region. The following sections analyze the construction components that make up the traditional houses.

5.1.1. Basements

Foundation walls were bonded until basement level around the construction. If there is no basement floor in the construction, under the inner walls is a wall of approximately 100 - 150 cm height until the sub-basement level (Figure 12).

On the condition that there is no basement floor in the structure, the height of the wall can be raised up to 2,5 – 3 meters, starting from a strong floor. In this case, wood beams were placed at certain heights in order to

reinforce the stone wall. When the construction includes a ground floor, although the outer walls are bonded with stone up to basement level, there is no wall bond in the inner walls (Figure 10). In both masonry and frame structures, the inner walls were constructed using wooden posts put over the stone blocks placed on the ground. Locally, this is termed “direklik”. Since the traditional districts of Kırklareli developed around the hills, the construction floors are reefy.

However, in the main practices seen in the constructions built on the rocky floors, as the floor is rocky, , stone wall was not bonded for the base, but instead the basement floor was composed by carving the rocky floor(Figure 11).

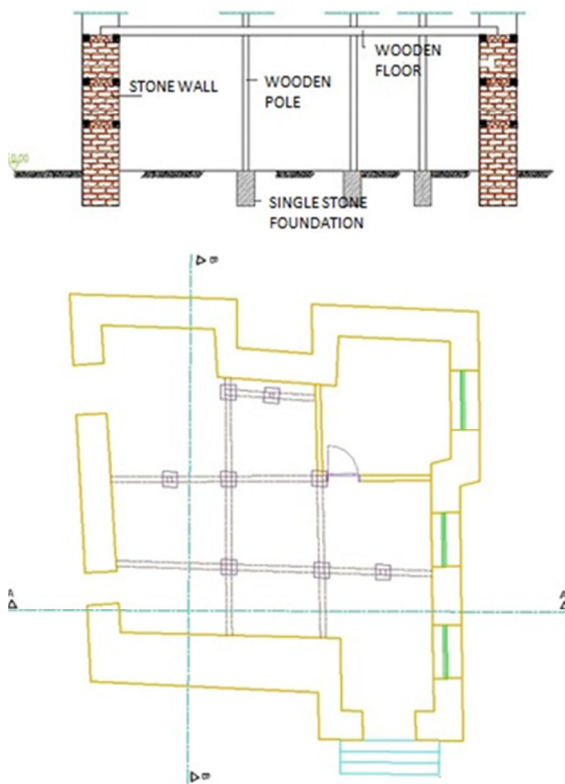


Figure 10. Basement plan and cross section [22]

The partition walls were, however, built either with the same features as external walls or of plasterboard. In some constructions, depending upon the material used, three different implementations were encountered; for instance, the middle of the timber frame system was



Figure 11. Basement formed by carving reefs [22]

When necessary, the sub-basement level was not left at the same elevation as the ground, but was somewhat raised. In such practices, if the land was sloping, the basement floor was composed by curving the rocky land and the stone wall was again bonded up to basement level from the ground, which was at lower elevation.

5.1.2. Walls

The masonry of traditional Kırklareli houses is made of brick. Exterior walls were built by using blend brick (dimensions: 5-5.5 × 11 - 12×22-24 cm) with lime mortar onto stone wall. In the timber frame buildings, the exterior walls consist of horizontal beams, columns and buttresses which are placed on stone wall (Figure 13). In the timber frame structures, however, the wall thickness is generally the same as that of wooden components. However, the wall thicknesses of timber frame structures vary according to orientation. While the front frontispieces of the structures are left at half-brick thickness, particularly in the northern direction, the side and back frontispieces which are coated. Are increased to 1 – 1.5 brick thickness by the help of bricks (Figure 12) [24]. In this way, a form of thermal sheathing insulation was constructed from brick.

Internal partition walls in both masonry and timber frame structures are placed on center-lines by combining the wooden erections with the girders at the highest level. The bottom chords of walls are laid over the flooring girders. The bottom chords are nailed onto the verticals. Besides, the erections are reinforced from one or two sides with buttresses. Upper chords restrict the walls at storey height. The center of the timber frame system is composed of elements of approximately 9×11, 12×12, 10×11 cm section, which was filled with blend brick or adobe brick in the external walls.

built of brick with adobe used as filling or as plasterboards. Even though this preference is related to the provision of materials, it also indicates that the issue of insulation was taken into account. For example, plasterboard was not used in any external walls. The walls surrounding heated rooms always include fillings insulation.

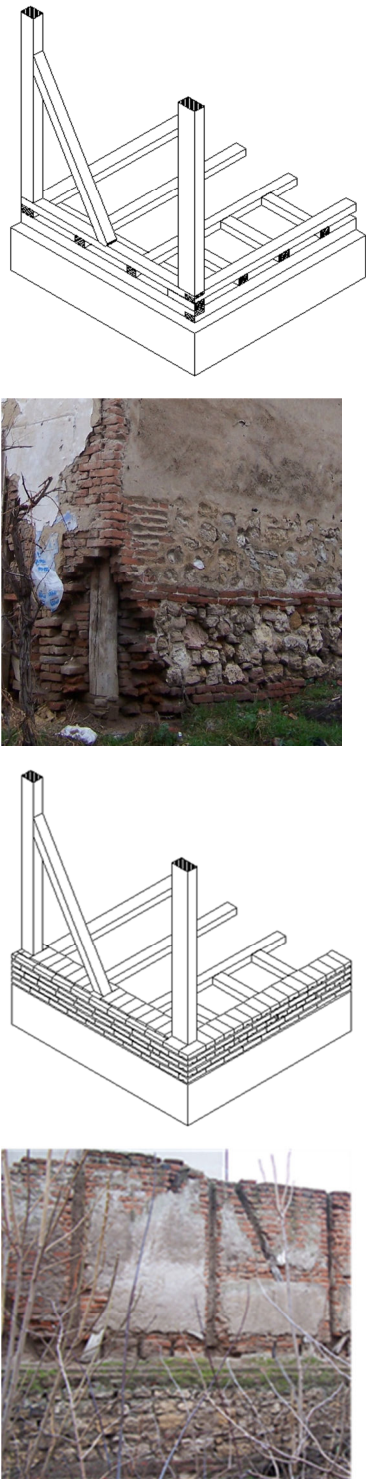


Figure 12. Increasing thickness of the outer wall [24]

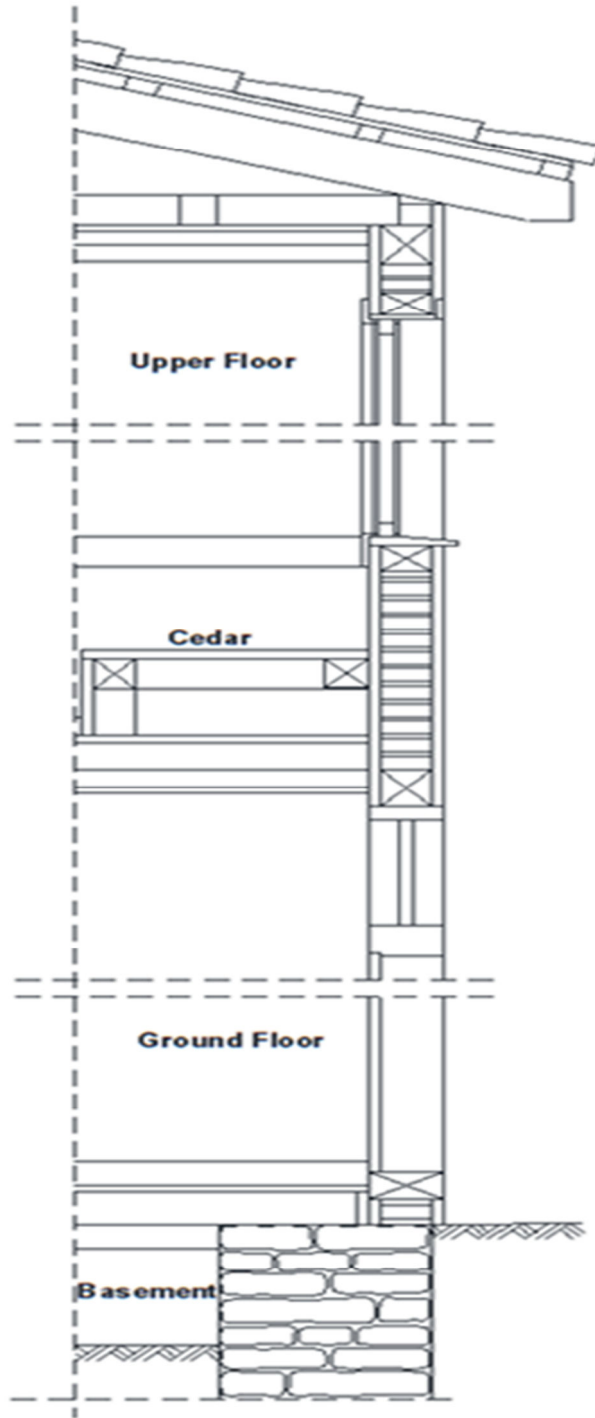


Figure 13. Details of a timber frame construction system [22]

5.1.3. Floorings

In traditional Kırklareli houses, even in the structures without a basement, flooring was not placed directly on the ground. In the ground floors, a space of 50 - 100 cm was left between ground floor and base by both increasing the levels of the basement and excavating the base to some extent (Figure 13) [24].

Floors were constructed using 12×12 cm wooden beams, which were spaced at 40–60 cm. These wooden beams were clamped to horizontal beams in the outer walls, and to 20×20 cm main girders in the interior walls. The main girders, which are at the same level as the inner partition walls, were seated on wooden erections. Outer joist surfaces were of 2.5 - 3 cm

thickness and 20 - 25 cm width, and were covered by flooring woods of different lengths [24].

In traditional houses of Kırklareli, even in buildings without basement, there are no tiles footing on the ground. Both increasing the sub-basement levels and scratching the floor a bit, the bank left between floor tiles and the ground is between 50-100 cm. Figure 5).

Tiles are formed on wooden beams at the size of 12 x 12 cm in average which are placed, with 20-60 cm banks, on main beams at the size of 20 x 20 cm in average and supported on wooden verticals in inner walls, and wooden beams that are placed on exterior walls at the level of sub-basement. Beams are coated with floor boards with different lengths, at 2.5 - 3 thickness and 20 - 25 cm width.

5.1.4. Ceilings

Mezzanine ceilings of two-storey houses were covered by wood of approximately 1 cm thickness that was nailed to the wooden joists. The wooden coverings of

some houses included various wooden embroideries around the ceiling rose (Figure 14).

The upstairs ceilings are covered by wood, as seen in the mezzanine floors or plastered with haired lime mortar over plasterboards. The plasterboard ceilings included hand-drawn images on the lime plaster (Figure 15).

5.1.5. Roofs

All the timber frame or masonry houses have wooden hipped roofs (Figure 16). Yet, unlike present-day implementations, rafters were nailed parallel to the ridge board. However, the pantile, which is the roof cover, is laid over the covering woods nailed onto the rafters. In addition, in many structures, outer walls were continued across the roof height, and the roofs were made in the form of concealed roof (Figure 17). This implementation has aesthetic contributions, but also prevents roof surfaces from being directly affected by cold winds [24].

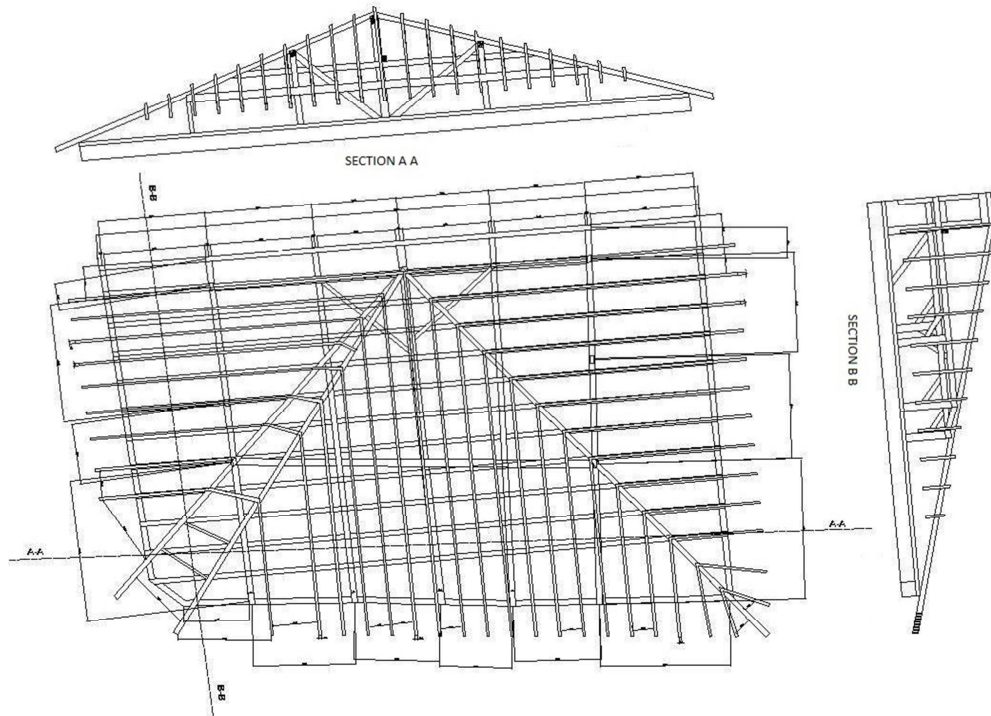


Figure 16. Plan and sections of timber frame roof [22]



Figure 14. Handwork embroideries on the wooden ceiling [22]



Figure 15. Hand-drawn images over haired lime plaster in plasterboard ceiling [22]



Figure 17. Application of concealed roof [22]

5.1.6. Chimneys

The chimneys of traditional Kırklareli houses are typical of Turkish houses. Irrespective of the construction system of the house, chimneys were placed on the outside in the form of a corbel. Corbels were installed on the wall with a massive stone or were

bound to a timber frame system with iron retainers (Figure 18). On the base of each corbel is placed a pitch-faced stone, and the chimney is bonded with blend brick and plastered with lime mortar from outside. This method keeps the chimneys away from the wooden walls and leads them to the exterior, reducing the risk of fire that may result from the chimney.



Figure 18. Arrangement of chimney [22]



Figure 19. Facade coverings in traditional Kırklareli houses [22]

5.1.7. Wall Coatings

The facade coatings of the houses vary depending on the wall material. Masonry structures are comprised entirely of lime plaster. Timber frame structures are, however, both covered by wood and plastered with lime or adobe mortars. If the center of the frame used brick infilling, it was covered by lime mortar or wooden; however, if the center of the timber frame system was

adobe infilling, the covering was either lime plaster or adobe used in rough cast, and haired mortar was used in finishing plaster; otherwise, again it was covered by wooden material. However, in some other houses, no covering was used, and the wall façade made use of wall material itself (Figure 19).



Figure 20. Stone facing on the timber frame wall [22]

In the two mixed-system structures where frame and masonry were used together, stone covering was used. Only the timber frame parts of these houses were covered with stone. It is obvious that this was an intentional choice to enable the application of stone covering to the facade. Covering stones were tied to the load-bearing elements of the timber frame by means of iron clamps and nails at certain spacing (Figure 20, 21). In addition, timber frame walls were filled with brick with lime mortar, and the covering stones were tied to the brick infilling via the lime mortar.

Interior wall coverings again used adobe or lime, as in the case of exterior coverings, depending on the wall material. Masonry structures and brick in filled timber structures were covered by lime plaster. The wooden walls filled with adobe used plasterboard walls and some brick in filled walls; rough adobe plaster with high hay content; over this was a finishing plaster with haired lime mortar. Adobe plaster was preferred because of its high insulation value. However, because adobe material soon loses its adherence and causes dust, finishing plaster was used over adobe plaster with haired lime mortar. Lime mortar is preferable because it has high adherence, does not harbor insects, and absorbs dye.

6. RESULTS AND DISCUSSION

As Kırklareli is located in the north of Turkey, which has coastline and is rich in wood, stone, soil and lime resources, the traditional houses of the region used all of these material for various purposes. In traditional Kırklareli houses, depending on the material, there are structural elements that differ from the traditional house patterns in Anatolia. Wall construction methods and stone coverings show particular differences from their contemporaries. The increasing thickness of timber frame walls differs from conventional methods employed elsewhere, and confirms the use of brick material as thermal sheathing and insulation.

Natural stone covering was first used for aesthetic reasons, and then to increase the resistance of the facade to climatic conditions. For this implementation, the front facade where stone covering was made in brick setting houses was made through timber frame

construction and the stones were bound to the timber frame via metal clamps.

Except for wall implementations, the chimneys of traditional Kırklareli houses are also original. Chimneys were taken outside the house with various consoles as a precaution against the risk of fire. This design provided the buildings with a distinctive appearance. The traditional houses used a type of hidden roof for aesthetic reasons, and to reduce heat losses, and differ from designs typically used in Anatolia. Hand-drawn decorations were made on lime plaster on interior walls and ceilings, and craftsmanship can be seen over wooden ceilings.

The analysis of structural elements of Kırklareli traditional houses determined that structure elements such as groundwork flooring, ceilings and roofs use the same construction techniques as Traditional Turkish House samples but that building elements such as external wall, chimney and wall covering have distinctive characteristics.

Even though traditional Kırklareli houses are the successors of traditional Turkish houses, they have distinctive characteristics in terms of the design of their building elements. These characteristics of buildings, shaped according to the preferences of users, climatic conditions of the region and regional structural materials, enable these houses to be more aesthetic, more durable, with lower ecological impact and better adjusted to the local climate. In addition, these buildings have global significance among traditional structures, due to their architectural, aesthetic, ecological and user-friendly characteristics.

Archaeological excavation has shown evidence of human settlement at Kırklareli for the past 7000 years [28]. The remaining traditional houses are among the area's immovable cultural assets, and are important traces of this history.

The number of traditional houses continues to decline. Many have been abandoned by their owners due to population growth and changes in socio-cultural structure. The present study aimed to contribute to documenting the original features of these buildings, and to act as a guide to their protection and restoration

REFERENCES

- [1] Kırklareli Governor's Office, Kırklareli City Yearbook, Cömertiş Printing, İstanbul, (1967).
- [2] Kırklareli, General Information, Governor of Kırklareli, <http://www.kirklareli.gov.tr/genel.aspx> (2006)
- [3] Encyclopedia of the Country, Volume: 7 Kırklareli, Anatolia Printing, İstanbul, (1983).
- [4] Altun, S. B., "Traditional Turkish houses, used construction materials, construction elements and construction techniques", unpublished MSc. Thesis, Karadeniz Technical University, Institute of Natural Science, Trabzon, (2008).
- [5] Çobancaoğlu, T., "Investigation of the structural wooden house in Turkey by regions and restoration practice recommendations", Unpublished Phd Thesis, Mimar Sinan University, Institute of Natural Science, İstanbul (1998).
- [6] Günay, R, Traditional wooden buildings: problems and solutions, Birsen Publishing, İstanbul, (2007).
- [7] Lourenço, P. B., Roca P., "Himis construction system in traditional Turkish wooden houses" Historical Constructions 2001 Possibilities of numerical and experimental techniques Proceedings of the 3rd International Seminar Guimarães, 799-810, (2001).
- [8] Matsushita, S., "Comparative Study of The Structure of Traditional Timber Housing in Turkey and Japan", Unpublished Msc. Thesis, Middle East Technical University, Graduate School of Natural and Applied Sciences, İstanbul, (2004).
- [9] Mihlayanlar, E., Umaroğulları, F., Arabulan, S., "Wooden Carcase Systems in traditional Housing Architecture: Edirne Sample", Trakia Journal of Sciences, 7(2):266-270, (2009).
- [10] Oikonomou, A., Bougiatiot F., "Architectural structure and environmental performance of the traditional buildings in Florina, NW Greece", Building and Environment, 46:669-689, (2011).
- [11] Öztank, N., "Traditional Timber Turkish Houses and Structural Details", 10th World Conference on Timber Engineering, Miyazaki, Japan, (2008).
- [12] Pajko, S., "Traditional Dwellings of Kosovo in Ottoman Civil Architecture and Prizren Shehzade Musa House Approach of Conservation", Unpublished Msc. Thesis, Mimar Sinan University, Institute of Natural Science, İstanbul, (2011)
- [13] Sözen, M., Eruzun, C., House and Human in Anatolia, Real Estate Bank Publishing, İstanbul, (1996).
- [14] Kuban, D., Observations on the Turkish House Tradition, Essays on the Turkish and Islamic Art, İstanbul, (1995).
- [15] <http://www.mavielmas.gen.tr/gezi/guneydoguanadolu/mardin>
- [16] <http://www.virtualani.freemove.co.uk/kars-traditionalhouses/index.htm>
- [17] <http://www.nationalgeographic.com.tr/> Photo by Ali Konyalı.
- <http://www.bodrubaglari.com/bodrumevleri.html>
- [18] www.fotoğrafya.gen.tr/ Photo by S. Burhanettin Akbaş
- [19] www.fotoğrafya.gen.tr/ Photo by S. Burhanettin Akbaş
- [20] <http://www.firmartuklu.net/ganadolubolgesi/192730-geleneksel-harran-evleri-hakkindabilg-harran-evleri-resimleri.html>
- [21] <http://elsissmila.blogcu.com/>
- [22] Yüksek, İ., Personal Archive, (2006).
- [23] Karaçam, N., Myth to reality Kırklareli, Kırklareli Municipality Publication, Kırklareli, (1995).
- [24] Yüksek, İ., Esin, T., "Assessment of Energy efficiency of Kırklareli Traditional Houses", Plumbing Engineering Journal, 117:32-40, (2010).
- [25] Tandoğan, E., "A Review of the Housing at Kırklareli", Unpublished Msc. Thesis, Mimar Sinan University, Institute of Natural Science, İstanbul, (2000).
- [26] Hacıhafizoğlu, E., (2003) "The Investigation of the Existing Traditional Settlement in Kırklareli in Cultural Context", Unpublished Msc Thesis, Trakya University, Institute of Natural Science, Edirne, (2000).
- [27] Ören, S.I., "Traditional Urfa dwellings: An investigation of part of the old town center. Ankara, Turkey", Unpublished Msc. Thesis in Architecture, Faculty of Architecture, Middle East Technical University, Ankara, (1996).
- [28] Eres, Z., "An Experimental model towards the solution of problems concerning the protection restoration and presentation of prehistoric sites: The case of Kırklareli-Aşağı Pınar", Unpublished Msc. Thesis, İstanbul Technical University, Institute of Natural Science, İstanbul (1999).