The Evolution of Culture-Based Architectural Norms: A Structural System Analysis of Traditional Kahramanmaraş Houses

Melike Kırmacı Çakır, Kerimcan Apak

Adana Alparslan Türkeş Science and Technology University, Türkiye
Email: melikekirmaci@hotmail.com

Abstract

This research aims to reveal the architectural and structural system features by examining the structure of traditional Kahramanmaraş houses and the effect of climate. Within the scope of the research, registered cultural assets in the old neighborhoods of Onikişubat district, which is located in the center of Kahramanmaraş city, will be examined. The research materials constitute old photographs of the city, engravings, and information about the buildings obtained from KUDEB and Kahramanmaraş Metropolitan Municipality units. In light of the information obtained from the materials, visual studies of the buildings were prepared, and the traditional building character of the region was defined. As a result of the findings, it was revealed that the regional climate caused different architectural formations in Kahramanmaraş Traditional Turkish houses and the differences in structural system details.

Keywords: Traditional Kahramanmaraş houses, climate, architecture, structural system.

The development of residential housing in Anatolia has been related to the conditional needs of the people for a long period. The outstanding Turkish architectural historian Doğan Kuban defined the history of residential housing in Anatolia as a reflection of the determination and consistency of the history of the location of the settlements (Kuban, 2013).

Traditional housing is developed with rooted experience and knowledge. Building data and routines from the past are precious in architectural design. The rich Anatolian culture with its specific future is the base of traditional Turkish houses, one of the most essential examples in the world. Sedat Hakkı Eldem and Cengiz Bektaş are the leading architects and researchers who identify traditional Turkish houses as harmonious structures with the environment, nature, and flow of life (Acciai, 2017; Bektaş, 2007).

Architect and researcher Önder Küçükerman, who is the author of the book "Turkish Houses in Anatolian Heritage", mentions that in various locations of Anatolia, the traditional houses get their identity and features from nature and climate. In each part of Anatolia, Turkish houses have a vital harmony with humans and nature in the frame of directions of the interior spaces and construction techniques. Önder Kücükerman (1985) mentions that traditional Turkish houses are sensitive to climate and passive indoor air conditions with various planning techniques. Erdem Aksoy (1963) also

considered the Anatolian dwelling tradition and its harmony with climate in his research on civilized Turkish architecture and its specific construction details depending on climate and materials with their impressive effects on those Anatolian dwelling traditions (Aksoy, 1963; Küçükerman, 1985).

Within the direction of those extensive literature reviews related to Traditional Turkish houses, a few researches have been done associated with Traditional houses in Kahramanmaraş and its surroundings. To fill the research gap, the topic of this study is related to Kahramanmaraş houses and their architectural planning, their relation with climate, and unique construction techniques.

MATERIAL AND METHOD

The research area is selected in Dulkadiroğu district in Kahramanmaraş city, which is abundantly found in traditional Turkish houses. The houses belonged to the late Ottoman period, which disappeared in time and are evidence of the regional living traditions. This research selects ten traditional houses as a case study in Divanlı and Turan district in Kahramanmaraş city. The photographs, site analysis, and literature data will be the base of methodological and observational studies. The case studies traditional houses in Kahramanmaraş district were in good condition before the 6 February 2023 catastrophic earthquake. However, those houses were damaged and partially collapsed after this enormous seismic action. Therefore, the research is done according to the conditions of those houses before the earthquake. This research examines Kahramannmaraş traditional houses in terms of architectural planning, building techniques, and construction details, along with the relation of the location, climate, plant cover, topography, and geographical specifications and their effects on Kahramanmaraş house design.

RESEARCH FINDINGS

The research findings include several issues related to the methodological approach. Therefore, those findings are listed according to the following steps: Kahramanmaraş city's geographic specification, city development, architectural features and relation with the environment, interior organization of the houses, elevations and their orientation, and construction techniques and materials.

GEOGRAPHICAL SPECIFICATIONS OF KAHRAMANMARAŞ CITY AND ITS SURROUNDINGS

Kahramanmaraş city is located in the southeast part of Anatolia. It is neighboring Osmaniye and Gaziantep cities from the south, Kayseri and Sivas cities from the north, Adıyaman and Malatya cities from the east, and Adana city from the west (Figure 1).

Figure 1. The location of Kahramanmaraş city in Turkey (red marked area) (Wikipedia, 2022).

From a geographic point of view, Kahramanmaraş city is located on the south edge of Ahır mountain with a 14.545km2 surface area, which was placed 12th largest corresponding the whole

Turkish cities (Doğan vd., 2014). Dulkadiroğlu and Onikişubat districts are located in the city center of Kahramanmaraş city and are out of eleven districts of Kahramanmaraş (Wikipedia, 2022).

The configurations of the east-west direction mountains on the north side of Kahramnamaraş city are the reason for the tectonic formations of the area. The lowlands are encompassed on the south part of the city. Kahramanmaraş is placed in a mountain terrain area and is surrounded by middle and east Toros mountains with huge valleys and forests. Kahramanmaraş city is situated on the southern slope of Ağır mountain, which is 2301 m high. To the north, it is surrounded by mountains, with peaks reaching 3000 m. The city's altitude ranges from 550 m. to 700 m. on the sloping land (Figure 2) (Doğan vd., 2014).

Figure 2. Location of Kahramanmaraş city on the south edge of Ahır mountain on the hillside (Sarıgül ve Turoğlu, 2020).

The diverse topographic formations of Kahramanmaraş significantly influence the city's climate. The prevailing Mediterranean climate is altered due to the city's altitude and its distance from the Mediterranean Sea (Paköz, 2013). The city's hillside and high-altitude areas experience a continental climate, while the low-altitude areas exhibit a Mediterranean climate. For instance, Elbistan, Göksun, and Afşin districts are influenced by a continental climate similar to eastern Anatolia. In contrast, Kahramanmaraş city center, Türkoğlu, and Pazarcık lowlands are under the influence of a Mediterranean climate (Figure 3) (Eker, 2018).

Figure 3. The map of districts in Kahramanmaraş city (Wikipedia, 2022).

The average temperature in Kahramanmaraş city decays from the south to the north, depending on the altitudes of the city (Figure 4). The city's annual average temperature is generally between +1°C and 35°C. However, the city's temperature passed 39°C in summer as a pick point. Moreover, in winter, the temperature decays below 3°C. The moisture level of the city is particularly humid (Doğan vd., 2014). The north winds are generally effective in the city and can be seen every season. The winds named "Garbi" are effective in the entire city at the beginning of the summer season, which provides moisture to the environment (Atalay, 1973). The "garbi" wind has a softening feeling. Despite this, the boreal winds in winter time are hard and cold (Figure 4) (Koç, 2009). The average

wind speed in Kahramanmaraş is 3,4 m/sn. The boreal wind, which comes through the northeast, is the strongest in the city center, with 44.1 m/sn speed (Paköz, 2013). The figure shows the general outlook of temperature variations in Kahramanmaraş and its districts with adequate wind directions in the city. According to the data received from bibliographical sources, it can be said that there are two different climatic regions in Kahramanmaraş divided into two areas: North and South.

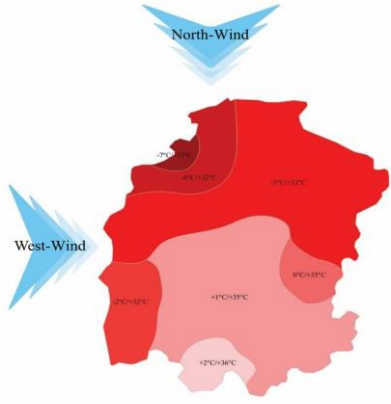


Figure 4. The average annual temperature variations and prevailing wind directions of Kahramanmaraş and its region

THE ARCHITECTURAL SPECIFICATIONS OF TRADITIONAL KAHRAMANMARAŞ HOUSES

The city layout of Kahramanmaraş and its historical development started in lowland areas. In Selcuk's period, the intersection of the Ak River, Şeker River, and Kanlı River was selected as a city location according to the criteria determined by the richness of water resources and convenience for the city's defense against the enemies. The castle, built in Selcuk's period, was in the city's center. The expansion of the castle was directed to the north, west, and south during the Ottoman period. The city's development, which started in the past and included the periods of Selcuk and Ottoman, was shown in the figure 5.

Figure 5. Kahramanmaraş city's development from historical time and continues to Selcuk's and Ottoman periods.

The settlement area of Kahramanmaraş is decided in a defensive site with stream beds inside and surrounded by the castle. In the Ottoman period, the city's development continued around the castle, and the recent form of the city center appeared. The historic houses that remained until now were located in Ekmekçi, Kurtuluş, İsadivanlı, Kayabaşı, Turan, Divanlı, Fevzi Paşa, Gazipaşa, and Yörük Selim districts.

Evliye Çelebi, who lived in the 17th century, mentioned that the length of Kahramanmaraş city is seven thousand steps (3.5 km) from North to South. He also mentioned that one thousand houses were constructed with stone and adobe masonry walls with soil flat roof dwellings (Figure 6). According to the data received from Evliya Çelebi, the Kahramanmaraş city functional specifications were developed, and a round of the city was widened in the 17th century compared to the Selcuk period (Doğan vd., 2014).

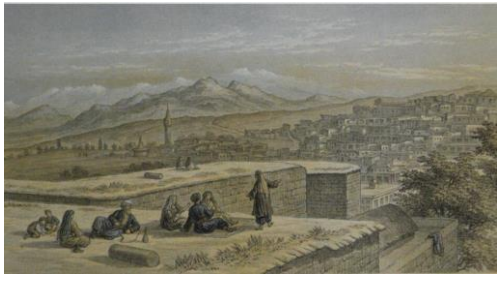


Figure 6. Kahramanmaraş gravure in 19th centry (URL -12)

According to the bibliographic references mentioned in the 18th and 19th centuries in Kahramanmaraş, the formation of the housing architecture depends on the hot climate and economic parameters that benefit from agriculture. The French architect Charles Texier, who traveled to Kahramanmaraş city, mentioned that a courtyard with a pool was placed in Kahramnamaraş houses. The functional specifications of the ground floor were designed as a hay barn, which was used for storage for agricultural harvest and cattle breeding. This reflects agricultural aspects in the design of dwelling units in that region (Erol, 1993).

Flat soil roofed with masonry walled Kahramnamaraş houses were built easily and cheaply. In the 19th century, the houses in Kahramanmaraş were constructed within a composite building system that comprised masonry and timber frames. According to the records of "Maraş Salname" in 1871, most of the houses in the city were built with adobe material. Also, in this period, most houses in İstanbul were built with similar construction techniques (Figure 7) (Toroğlu, 2008). 19th century, the Adobe buildings could not survive. This is the reason for not remaining an architectural housing heritage before the 19th century. Most of the housing heritage belonged to the late Ottoman period between the 19th and the beginning of the 20th centuries (Paköz, 2013).

Out of the past one hundred and sixty-eight authentic historic houses, which stand as silent witnesses to the city's rich culture, a significant number have been successfully preserved and conserved (KUDEB, 2012). These houses' unique architectural features are a valuable part of the late Ottoman period civilian heritage, a testament to the city's rich history and culture.

THE RELATION WITH BUILDING AND ITS ENVIRONMENT

Cultural identities, climate, and material factors were the general factors that determined the traditional Kahramanmaraş house's shapes and forms. The priorities in planning the heritage buildings in Kahramanmaraş were practicability, functionality, and adaptability to environmental

circumstances. Traditional Kahramanmaraş house planning strategies are similar to those of Anatolian traditional houses, which are designed for the daily use of residents and their needs (Doğan vd., 2014).

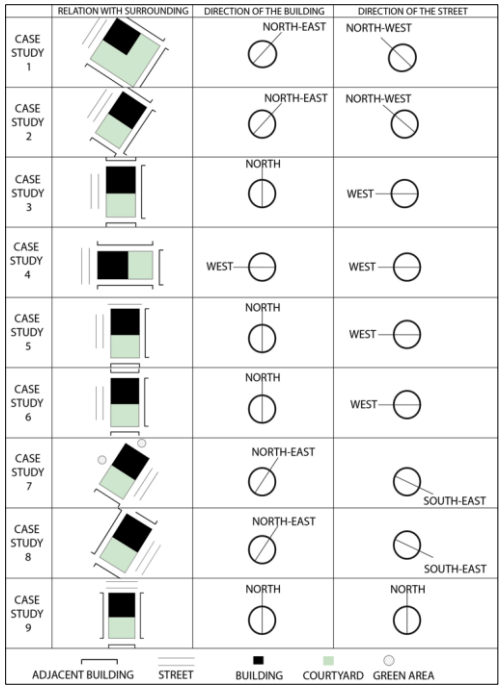
The traditional Kahramanmaraş houses were placed in the south and the west direction in convenient topographic circumstances for utilization from the sun and shielded from the cold breezes. The settlement of the historic houses on the hillside was placed in a stepped order upon each other (KUDEB, 2012). The relationship between the buildings, pavements, and roads is defined according to the privacy of the tenants of the houses. Because of this reason, the ground floors and courtyards are designed without any openings, and they are separated from the outside with high courtyard walls (Figure 7) (KUDEB 2012).

Figure 7. A vista from Kahramnamaraş Yukarı Divanlı district from Hacı Osman road was covered from its left and right with courtyards with high masonry walls and a vista from courthyard.

The analysis comprises the relationship between the buildings and their environment, shown in Table 1. The ten selected case study housing units are examined regarding their placement direction on the land and their relation to their surroundings. Generally, the housing units are placed in the North direction, and the south part is used as a garden. The main idea of using a garden in the south direction was to protect the courtyard from the cold winter winds and utilize the effect of sun radiation.

The courtyard and the road interact with a door opening. In general, the houses face the outside in the west direction, and the building opens to the courtyard in the south direction. The house's openings in the west and south directions provide a wind flow and cooling effect inside of the house in the summertime. Besides, the sun's radiation gets into the house and provides a warm effect in wintertime. These are the probable architectural approaches in Kahramanmaraş houses architectural planning.

Table 1. Examining ten case studies of traditional Kahramanmaraş houses with their surrounding.



INTERIOR SPACE ORGANIZATION

Kahramanmaraş houses are generally two floors. However, in some typologies, they were called 'Konak' and built on three floors. The people who lived in Kahramanmaraş during the period of building historical houses were involved in animal breeding and agriculture. Therefore, most of the houses' ground floors are used as barns and haylofts. In the courtyard, there is a fireplace and fountain (Paköz, 2013).

There were no openings on the courtyard walls. However, on the upper floors, there were window openings on the facades of the housing units. In some houses, one room was designed without window openings on the upper floor, but it connected with the adjacent room with openings. This type of room was designed for winter and seen in Konak-type housing units (Figure 8) (Erol, 1993).

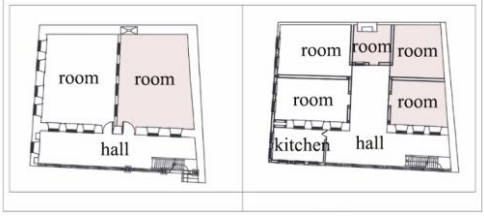
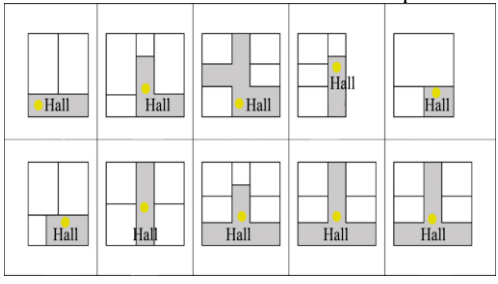


Figure 8. A sample of traditional Kahramanmaraş houses with winter rooms. Inventory number 36. (Kahramanmaraş Büyükşehir Belediyesi, 2020)

The general look of Kahramanmaraş houses and their architectural planning development were similar to traditional Anatolian Turkish house planning approaches, such as without sofa, two bedrooms with sofa, sofa in the middle of bedrooms, etc. In Kahramanmaraş houses, sofas were placed on the edge of the plans (Paköz, 2015).

In Table 2, ten case study housing units and their sofa placement and shapes were analyzed. In summer, most of the activities were on sofas, which was evidence of sofas and their importance in planning housing units.

Table 2. The shapes of sofas in Kahramanmaraş houses



There was privacy in Kahramanmaraş houses, and their relation with exterior spaces was limited. The ground floor was enclosed to the street view. The houses were built towards the garden and courtyards, which were used effectively daily. Kahramanmaraş houses had oriels and cantilevered spaces which were supported with buttresses, called 'Eli böğründe' (Figure 9) (Paköz, 2019).

Figure 9. The cantilevered samples of traditional Kahramanmaraş houses. From left to right, the inventory numbers of the case study houses are 68, 144, and 205 (KUDEB, 2012).

ELEVATIONS AND ORIENTATION

In traditional Kahramanmaraş housing units, the masonry structures of the ground floor were not plastered and painted. However, on the upper floors, the 'bağdadi' construction technique and painting were used to cover the surface of the walls. Yellowish-colored paint and limewash were used for painting the upper walls. In some of the housing examples, the ground-floor masonry walls were continued through the upper floors (Figure 10). This technique was used to provide heat insulation inside the houses against severe winter winds.

Figure 10. A monolithic masonry wall elevation located on the north face of the housing unit. From left to right, the inventory numbers of the case study houses are 35 and 111 (KUDEB, 2012).

In some of the Kahramanmaraş traditional houses, oriels and cantilevers were covered with sheet metal, which protected the structure against humidity and cold (Figure 11) (Doğan vd., 2014). Metal sheets were also applied to the elevations of the upper floors and to the whole building façade.

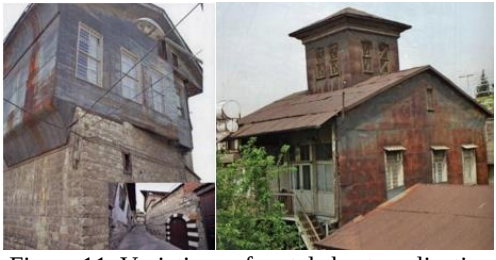
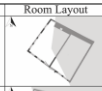
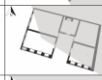


Figure 11. Variations of metal sheet applications on the facades of the buildings. From left to right, the inventory numbers of the case study houses are 101 and 132 (KUDEB, 2012).

Analysis of the results of case study housing units and their elevation orientations are listed in Table 2. Most of the elevations with openings were in the west and south directions. In all case studies on the west elevation, some openings could be used as wind access through the house for cooling. Therefore, the rooms in the west direction were used as summer rooms. Besides, the openings in the south direction are used to get sun radiation inside the house and create a visual link between rooms and the courtyard.

The north and east elevations of the housing units are generally designed without openings to preserve the houses against winter winds. The rooms placed in these directions without openings were used as winter rooms.

Table 2. Ten selected case study housing units and their elevation orientation analysis

	Room Layout	Open Facade	Closed Facade	Facade Orientation
Case Study 1		South West	North East	
Case Study 2		South West	North East	
Case Study 3		South West	North East	
Case Study 4		West	North East South	
Case Study 5		North South West	East	
Case Study 6		West	North East South	
Case Study 7		South West	North East	
Case Study 8		South West East	North	
Case Study 9		North South West	East	
Case Study 10		North South West	East	

THE CONSTRUCTION SPECIFICATIONS OF TRADITIOANL KAHRAMANMARAŞ HOUSES

In this chapter, the construction techniques and material specifications of traditional Kahramanmaraş houses were analyzed with drawings and explanations.

CONSTRUCTION MATERIALS

The traditional Kahramanmaraş houses were built with construction materials provided by the surrounding area. Stone, timber, and adobe were frequently used materials in those houses. Forests in Ahır mountain provided timber. Stone mines are located in the north part of Kahramanmaraş city, and terracotta tiles were manufactured in the city (Kanadıkırık, 1972; Paköz, 2013).

Stone material was used to construct the ground floor walls, courtyard, and foundations. The stone material was generally used without any process. However, in rare circumstances, a stone got into a process, and cut stones were used in buildings (Doğan vd., 2014).

Adobe material is light, easily manufactured, and constructed; therefore, this material was frequently used in traditional houses. Adobe material was generally used in masonry walls on the ground floor and filling materials in upper timber frame walls (Figure 12). Humidity and water affected the configuration of the adobe material, and it would break down in time. Therefore, it was preferred as a filling material on upper floors of timber frame wall construction (Doğan vd., 2014). The rate of heat insulation in adobe material was high. Therefore, in summer, adobe material prevents external heat transfer through the inside of the house, and in winter, adobe prevents internal heat transfer through the outside of the building (Atalay, 1973; TS 825, 2008).

Timber is frequently used in traditional houses in Kahramanmaraş. The timber construction material brought from forests which were planted around the Ahır mountain such as pine, cedar and hornbeam trees. Timber materials were used as tie beams inside the stone masonry walls and they were used for constructing timber frame walls on upper floors and roof construction. Bricks were rarely used as a material in Kahramanmaraş houses, and they were rarely used as filling elements inside the timber frame walls on the upper floors.

STRUCTURAL SPECIFICATIONS

Kahramanmaraş houses were built on two or three floors. On the ground floor, stone masonry bearing walls and the upper floor's timber frame filled with adobe walls were generally decided to use. Rubble stone or semi-hammer-dressed stone materials were used in masonry walls. The lime mortar is used as a binding element for the stone material. The thickness of the stone masonry bearing walls was 60 cm. to 100 cm. width, which tied together with timber beams. The upper floors and walls were constructed with timber frame elements and filled with adobe materials (Şekil 12).

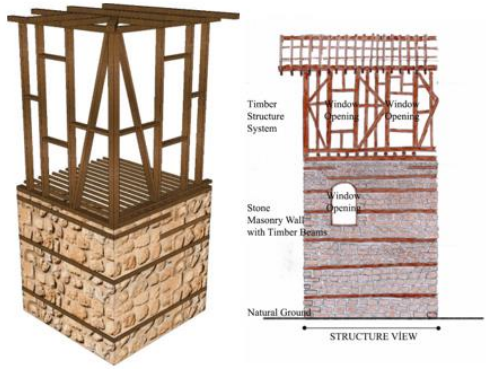


Figure 12. The building has stone masonry walls on the ground floor and timber frame walls on the upper floors. The inventory number is 99

On the ground floor, the corners of the masonry walls were designed with hammer-dressed stone materials, as seen in the figure 13. The configuration of the shape and size of the stones and their knitting techniques were designed to provide extra strength for horizontal loads such as seismic loads. Besides, the knitting pattern on the stone masonry walls was designed with big stones on the first raw and small stones on the second raw. The further raws of the masonry wall will be repeated like this (Figure 13).

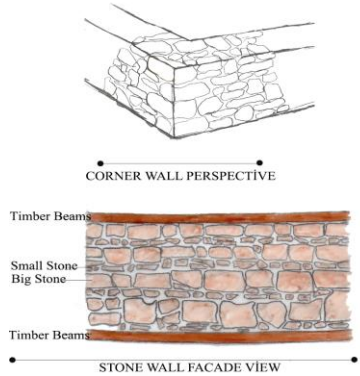


Figure 13. Perspective and elevation view of stone masonry wall, inventory number 155.

Timber frame walls on the upper floors rested on the stone masonry-bearing walls on the ground floor. The thickness of the timber frame walls was 20 cm. to 30 cm. width, which was filled with adobe material. The timber frames were supported with buttresses inside the wall against horizontal actions. Besides, timber continuation horizontal elements, which were called 'boyunduruk,' provide extra horizontal strength for the wall. These are historical construction clues for providing extra strength for the houses against the seismic actions in Kahramanmaraş (Figure 14).

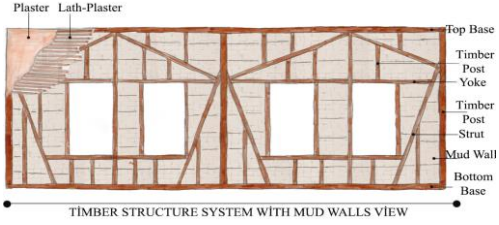


Figure 14. The timber frame wall system filled with adobe material. The inventory number of the traditional house is 154.

The timber frame walls were rarely filled with brick and adobe mixed stone materials or left void without any filling materials. The timber frame walls were finished with the 'bağdadi plastering technique'(Figure). In this technique, the timber laths are nailed on the surface of the timber frame with narrow gaps. The plaster got inside those gaps, which work as a bearing point of the plastering surface (Figure 15).

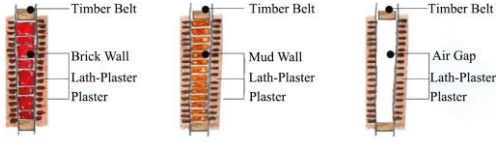


Figure 15. The drawing of the cross sections with various filling materials of the timber frame walls in Kahramanmaraş houses. From the left to right, the filling materials are brick and adobe, without filling.

In traditional Kahramanmaraş houses, timber frame construction techniques were differentiated in some houses. As seen in the figure 16 and figure 17, the filling technique was different from the other houses. Timber chocks were used between the adobe fillings inside the timber frame. This technique could be used to minimize the dead loads of the timber frame walls. Besides, the plastic behavior of timber elements provides flexibility for a wall structure for in-plane actions. These were the possible answers for using timber chocks inside walls.

Figure 16. Two-floor Kahramanmaraş house with adobe and timber chock filling on the upper floors. The inventory number of the traditional house is 144.

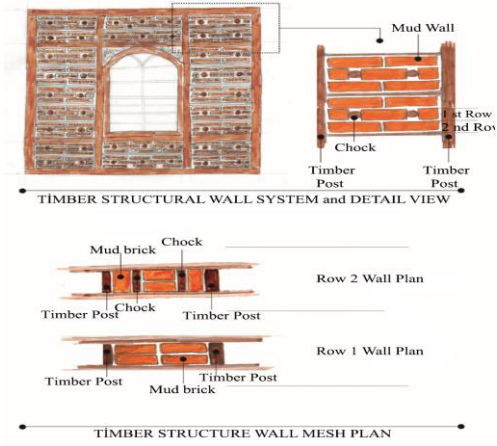


Figure 17. Oriel or cantilever wall construction with timber frame and its drawing details. The inventory number of the traditional house is 144.

The traditional Kahramanmaraş houses stand out with their unique architectural features. Stone and timber materials, with their unique construction features, contributed to their distinctiveness. Timber is used in floor beams, tie beams, roof structures, and finishing materials. Round-shaped timber floor beams rest on a single timber base of the wall; on some other occasions, timber beams rest between two wall bases (Figures 18). The timber finishing material, "rabıta," rested on timber beams.

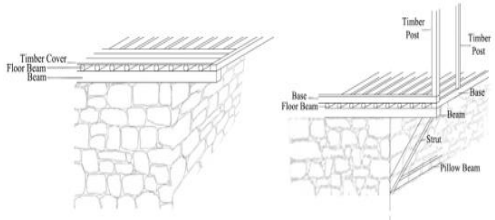


Figure 18. Round section floor beams rest on a single timber base ‘picture in left’ and timber beams rest between two wall bases ‘picture in right’

The stone masonry walls' width differed between 60 cm, 70 cm, and 85 cm. in Kahramanmaraş houses. The thick masonry walls were commonly seen on the north face of the building. The stone or adobe masonry walls sometimes continued through the second floor. The timber frame walls on the second floor were applied with 20 cm, 25 cm, and 30 cm thickness. Besides, timber tie beams were frequently used inside the masonry walls against horizontal forces (Figure 19).

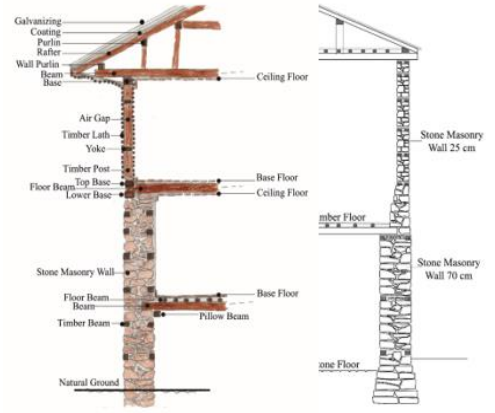


Figure 19. Cross section of Kahramanmaraş houses; ‘picture in left’; timber frame walls rested on stone masonry, ‘picture in right’; two floor height of stone masonry and its thicknesses with unique knitting technique.

DISCUSSION

Anatolian continent is rich in its unique culture and traditional architectural heritage. Significant historians and researchers identified the unique specifications of traditional Turkish houses as being in substantial harmony with nature and life. The traditional Kahramanmaraş houses are registered as

a Turkish house theme, with a significant research gap related to its architecture and construction. However, those houses still serve as dwelling units for the city's residences. Therefore, the significance of those houses is not limited to the construction techniques and unique architectural typology; more than hundreds of years of evidence of the history and culture of Kahramanmaraş city are also essential parts of it.

Therefore, planning typology and its relation to surrounding and environmental conditions are crucial for designing those historical houses. The research data received from the analysis of those houses suggest that architectural typology depends on environmental effects such as sun and wind. However, wisely used construction techniques and materials could also be another design aspect for those houses related to seismicity and the empirical static condition of the structure.

This research has shed light on the unexplored areas of Kahramanmaraş houses. However, the city and its historic structures, which are residential units and common-use architectural typologies, require further research from historical, architectural, and construction perspectives. The urgency and responsibility for this task is not overstated.

CONCLUSION

This research paper examined the architectural and construction specifications of traditional Kahramanmaraş houses, shedding light on their unique design and construction. By understanding and documenting the particular construction details of these historical houses, we can identify significant design parameters and fill the gap in the literature for conservation purposes. Architectural features of the Kahramanmaraş houses were developed according to the issues related to cultural identity, living style, climate, and building materials, which were received from its surroundings. The orientation of the Kahramanmaraş houses depended on various parameters. Sun radiation and prevailing wind direction were the essential parameters in architectural design. The houses were generally placed in the South and West directions to get more sun radiation. In contrast, cold winds were constantly blowing from the North direction. For this reason, wall openings in the north direction were not common in the design of housing in Kahramanmaraş. Besides, interior planning depended on climatic effects in the summer and winter seasons and the lifestyles and occupations of the tenants. Agriculture and stock farming were the economic resources of the people in Kahramanmaraş, and some of the interior spaces were organized according to these issues, such as space for a barn on the ground floor.

The ground floor has specific qualifications, such as the ceiling height being lower than the upper floors and the walls being constructed with stone masonry with no openings. In addition, they were thicker than the other walls. In contrast, the ceiling heights of the upper floors were higher than the ground floor. Also, there were plenty of window openings to get light inside the spaces. The walls of the upper floor were constructed with timber frames that were thinner than the ground floor walls. Those specifications cause heat loss on the upper floors. Because of this reason, the spaces on the upper floors were used in the summertime. Against this, ground floors were sufficient to preserve heat loss; therefore, ground floor spaces were used in winter.

The construction techniques and materials of the traditional Kahramanmaraş houses depended on the building techniques of the masters and the construction materials that were obtained from its close environment. The housing units had unique construction details to provide extra strength for the horizontal forces. It could be understood that those techniques were developed in time. Composite structures provide the actual behavior of the structures under seismic forces. The heavy unit, made of stone masonry, could not be more than one floor high and placed on the ground floor. However, using

light materials on the upper floors, such as timber frame systems, had sufficient structural behavior in high seismic areas.

According to all of that analysis, it could be understood that traditional Kahramanmaraş Turkish houses were unique in architectural design and construction. Besides, those houses had a strong link between their environment and culture. In this research, the received data and the detailed construction drawings of the Kahramanmaraş houses could fill the gap in the literature and be used to conserve those houses.

ACKNOWLEDGEMENTS

This article is a part of a master thesis "Energy Conservation in Traditional Turkish Houses in Kahramanmaraş: An Analysis on Thermal Comfort" in Adana Alparslan Türkeş Science and Technology University, Institute of Graduate School. Also, this master's thesis received financial support from BAP at Adana Alparslan Türkeş Science and Technology University.

WORKS CITED

Acciai, S. (2017). The Ottoman-Turkish House According to Architect Sedad Hakkı Eldem. ABE Journal (Online). https://doi.org/10.4000/abe.11023

Aksoy, E. (1963). Orta Mekân: Türk Sivil Mimarisinde Temel Kuruluş Prensibi. Mimarlık ve Sanat, İstanbul, 7-8: 39-92.

Atalay, B. (1973). Maraş Tarihi ve Coğrafyası, İstanbul: Dizer Konca Matbaası.

Bektaş, C. (2007). Türk Evi. Bileşim Yayınları, İstanbul.

Doğan, O., Avcı, R., Yakar, S., vd. (2014). Akdeniz'in Altın Kenti KAHRAMANMARAŞ, Kahramanmaraş İl Kültür ve Turizm Müdürlüğü.

Eker, F. (2018). Kahramanmaraş'ın Tarihi Coğrafyasına Bir Bakış, Kahramanmaraş Sütçü İmam Üniversitesi Sosyal Bilimler Dergisi, 10(2). 25-38.

Erol, İ. L. (1993). Kahramanmaraş ve Gaziantep'teki Geleneksel Evler, Anadolu Sanat.

Kanadıkırık, E. (1972). Maraş'ta Konut Tipleri, AÜDTCF Coğrafya Araştırmaları Dergisi.

Koç, K. (2009). Tarih Boyunca Maraş Şehri'nin Gelişmesini Etkileyen Faktörler, Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi.

Kuban, D. (2013). Türk Ahşap Konut Mimarisi 17.-19. Yüzyıllar, Türkiye İş Bankası Kültür Yayınları, İstanbul.

KUDEB. (2012). Kahramanmaraş Beylik ve Osmanlı Dönemi Sivil Mimarlık Eserleri, Kahramanmaraş Belediyesi.

Küçükerman, Ö. (1985). Kendi Mekânın Arayışı İçinde Türk Evi, Türkiye Turing ve Otomobil Kurumu.

Paköz, A. E. (2013). Maraş Sivil Mimari Yapılarının İncelenmesi ve Gözlüklü Ali Evi Restorasyon Önerisi, Yüksek Lisans Tezi, Yıldız Teknik Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul.

Paköz, A. E. (2015). Geleneksel Maraş Evlerine Bir Örnek: Gözlüklü Ali Evi, Megaron Dergisi, 10(1), 25-42. https://doi.org/10.5505/megaron.2015.03164

Paköz, A. E. (2019). Kahramanmaraş'ta Bir Erken Cumhuriyet Dönemi Evi: Çiftarslan Evi, Mimarlık ve Yaşam Dergisi, 5(1), 57-69. https://doi.org/10.26835/my.650076

Sarıgül, O. ve Turoğlu, H. (2020). Kahramanmaraş Şehri Sel ve Taşkınlarının Coğrafi Analizi ve Öngörüler, Coğrafya Dergisi 40.

Toroğlu, E. (2008). Salnamelere Göre (1869-1908) Maraş Kazasında Nüfus, Yerleşme ve Ekonomik Faaliyetler, KSÜ Yayınları, Kahramanmaraş.

Wikipedia. (2022). Kahramanmaraş. https://tr.wikipedia.org/wiki/Kahramanmara%C5%9F. Erişim:17.04.2022.

URL-1 Houshamadyan. https://www.houshamadyan.org