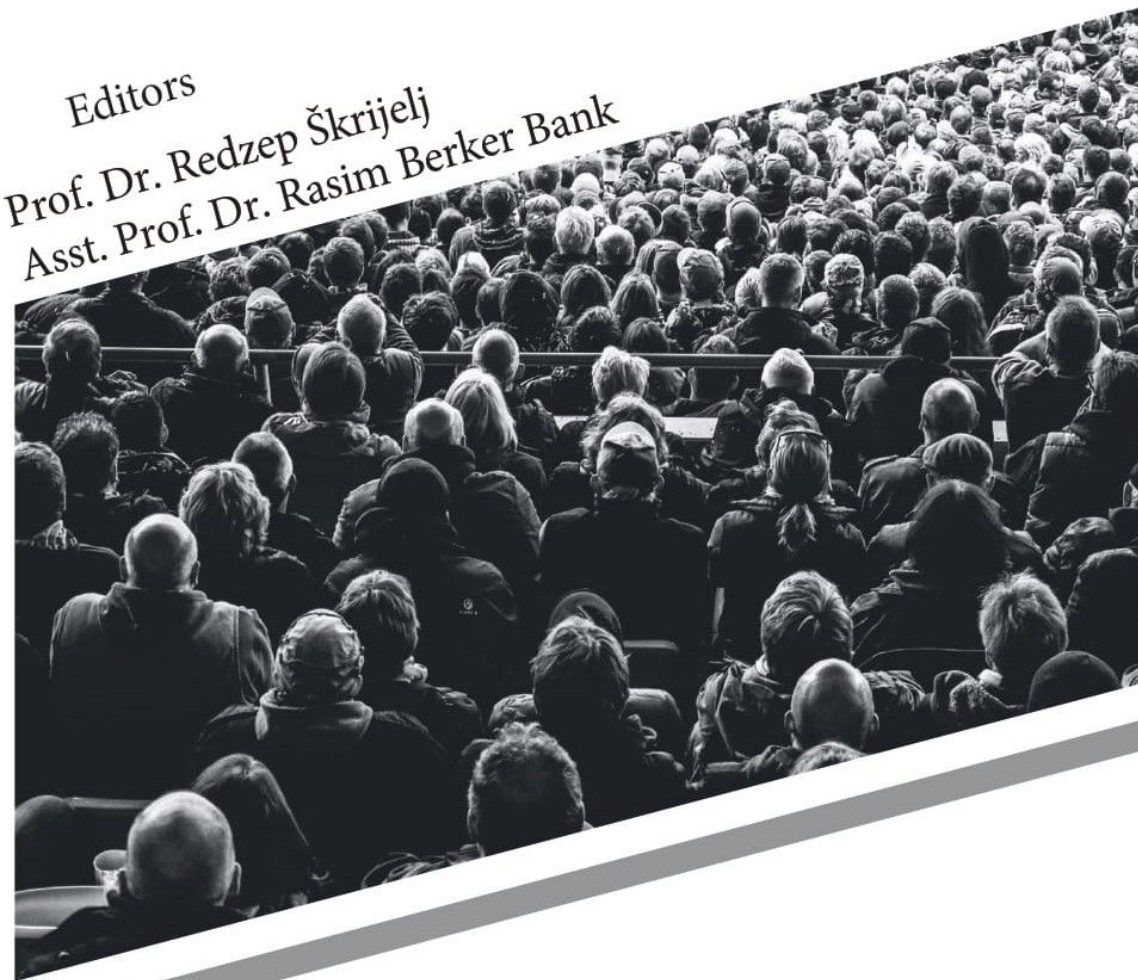


CURRENT HUMAN AND SOCIAL SCIENCES RESEARCH

Editors
Prof. Dr. Redzep Škrijelj
Asst. Prof. Dr. Rasim Berker Bank



Sociai Sciences



LIVRE DE LYON

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Current Human and Social Sciences Research


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Lyon 2021

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PREFACE

Social Sciences and Humanities is a field that studies the human and social aspects of the world and life and includes many branches of science. Social and human sciences, which have developed by humanbeings from past to present in an effort to understand both themselves and physical and human environment in which they live, are the products of modern enlightenment thought. These sciences which emerged with the need to explain scientifically and control the changes in political, economic, cultural, etc. social structures which occurred after the Industrial Revolution, have strengthened their place in the historical process by using new methodologies.

In this context, various disciplines emerging in the field of social sciences and humanities have been institutionalized to explain different aspects of reality based on experimental findings, analytical, critical or speculative methods and to produce objective knowledge. The usefulness of social sciences and humanities, which are becoming more and more important every day in the world, is only possible with the cooperation of different disciplines they embody. This book aims to contribute to both the society and the relevant literature with the cooperation at stake. This book titled "Academic Studies in Social and Human Sciences" prepared by Livre de Lyon publishing house includes descriptive and critical studies in the fields of sociology, art and communication science. We would like to thank the authors who contributed to the creation of the book with their valuable studies and who evaluated the works meticulously by acting as a referee, and we wish the book to be propitious.

Prof. Dr. Redzep Škrijelj & Asst. Prof. Dr. Rasim Berker Bank
Editors

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CHAPTER VI

THE ALTERNATING BRICK AND STONE MASONRY IN EARLY OTTOMAN MOSQUES (THE 14th CENTURY)

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Introduction

The 14th century was the time of formation era for the Ottoman State. The first half of the century started with the conquest of important provincial centers such as Bursa (1326) and Iznik (1331) and then the transition of the South Marmara Region from Byzantine to Ottoman domination took place. The second half of the century continued with transition to Thrace (Rumelia) in 1354 and a rapid expansion to the Balkans after the conquest of Edirne in 1361. As a result of incredible expansion in Northwestern Anatolia and the Balkans, the Ottoman Turks had achieved certain progress towards the institutionalization of the state and generated better financial means. Throughout the second half of the 14th century Ottoman architecture was also improved with the construction of monumental mosques (İnalçık and Quataert, 2000, 19).

At first, it cannot be stated that the quality of building materials used in the 14th century was sufficient from an architectural perspective. Rough-hewn stone and rubbles as well as bricks had been widely used in masonry of almost all Ottoman mosques of the century. Therefore, Early Ottoman Architecture has a speciality for the use of alternating courses of brick and stone bonding walls. However, before the Ottomans, the alternating masonry of brick and stone had not been used in Anatolian Turkish Architecture and Islamic Architecture despite that it was one of the main characteristics of Byzantine Architecture. Examination of the construction materials in Early Ottoman Mosques demonstrates that cultural and technical transfers from Byzantine to Early Ottoman architecture had occurred. Thus, the current study aims to illustrate the characteristics and principles of alternating brick and stone masonry in Early Ottoman mosques of the 14th century.

1. Alternating Wall

Alternating wall can be defined as “a wall formed by consecutively laid courses of different materials such as brick and stone from bottom to the top” (Sözen and Tanyeli, 2003, 18). However, alternate courses can be applied horizontally as well as vertically from the bottom to the top of the walls (Ersoy, 1994, 89). Besides that, there are also two main types of alternating with the use of same or different types of construction materials (Batur, 1970, 136; Kutlu, 2017, 132).

1.1 Types of Alternating Wall

The alternating use of the same type of construction material can be applied in accordance with different dimensions and colors. For instance, alternating courses of the stone blocks in different colors is very common in Islamic architecture. “*Ablaq*” as a term used to define this kind of alternating masonry (Petersen, 1996, 1-2). Whereas the dimension-based alternating can be described as wall masonry where different size of the stone blocks repeatedly sequenced in a specific order (Batur, 1970, 137). This type of alternating wall is much common in buildings of Western Anatolian Turkish Emirates of the 14th century (Aktuğ Kolay, 1999, 27; Batur, 1970, 179-180).

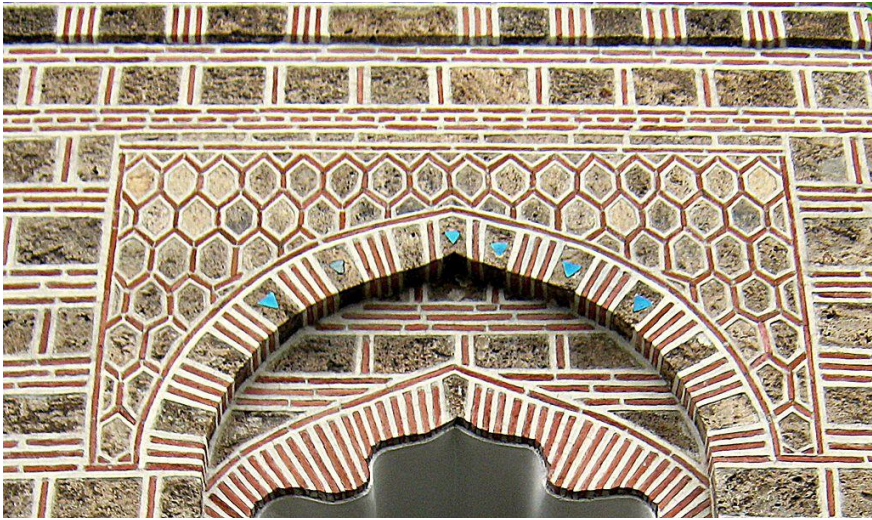


Figure 1: Alternating Brick and Stone courses for decorative purpose at Başçı İbrahim Mosque’s facade (Bursa, 15th century)

Alternating masonry with different types of construction material refers to walls formed by repeatedly sequencing at least two different kinds of construction materials. The most common use of this type can mainly be observed in the alternating courses of sequencing brick and stone walls (Batur, 1970, 136; Kutlu, 2017, 132).

There are three types of brick-and-stone alternating masonry: vertical, horizontal, and compound alternating (Kutlu, 2017, 133). Vertical Alternating occurs when the brick and stone courses consecutively bonded from the bottom to the top (Ersoy, 1994, 89). Actually, brick and stone vertical alternating is related to bonding timber technique that usually applied with a purpose of reinforcement of a wall. Bonding timber technique is a system where bonding timber placed on stone course or courses for wall reinforcement and where façade sides of timber are masoned with bricks (Ötüken, 1990, 395-398). This technique is defined as “recessed brick” (Ousterhout 1990, 163-170) or “gizli hatıl tekniği” (Ötüken, 1990, 395-396).

In the meantime, there are many common applications of the vertical alternating. Brick-and-stone courses on the same wall are generally sequenced according to a 1/1, 2/1, 3/1 and 4/1 systems. However, the 3/1 and 2/1 orders of alternating masonry were widely preferred and applied in Ottoman Mosques of th 14th - 15th centuries (Kutlu, 2017, 133).

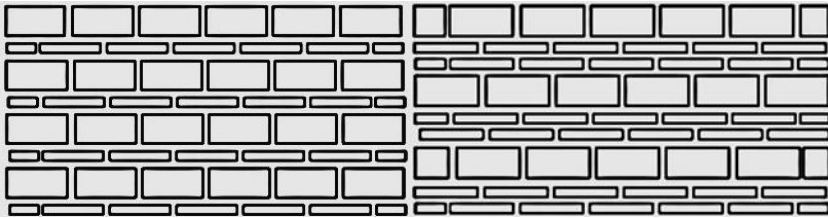


Figure 2 and 3: Vertical Alternating brick and stone wall (1/1 order: 1 brick / 1 stone) and (2/1 order: 2 brick / 1 stone)

Complex implementation of the vertical Alternating refers to the technique where bricks-and-stone courses consecutively masoned in a several orders within the same wall (Batur, 1970, 190-191). A complex implementation of 3/1 and 1/1 orders may briefly be explained with a following example (See Fig. 4, 5).

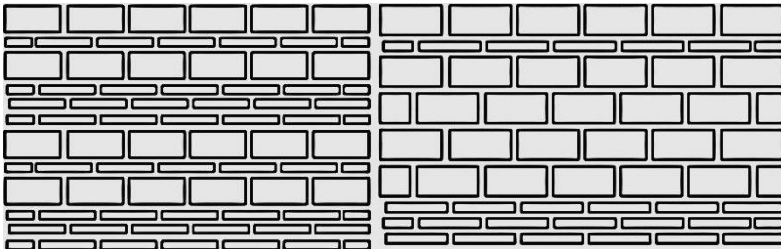


Figure 4 and 5: Vertical (Complex) alternating wall (3/1+ 1/1) and (3/4 + 1/1) order

At the same time, in horizontal alternating technique bricks and stone blocks masoned side by side within the course repeating each other along a horizontal axis. In this method, placing one or two vertical bricks

between the stones is the most common application (Ersoy, 1994, 89; Kutlu, 2017, 134).

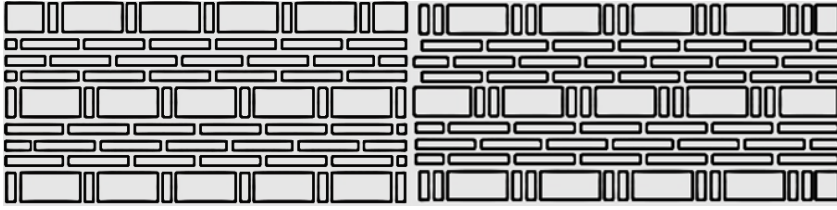


Figure 6 and 7: Horizontal alternating: 1 or 2 perpendicular brick use.

The Compound Alternating is applied to wall technique in which both bricks and stones successively bonded along both vertically and horizontally (Batur, 1970, 190-191). This technique is also called “cloisonné” (Ousterhout, 2016, 188-189) and “çerçeveli teknik” or “kasetleme tekniği” in Turkish (Ötüken, 1990, 397; Kutlu, 2017, 134).



Figure 8: İznik Nilüfer İmaretı (today's İznik Museum)

1.2. Literature Review on Early Ottoman Alternating Wall

At first, in 1970 Afife Batur published a long and detailed article with title of “Osmanlı Camilerinde Almaşık Duvar Üzerine”. It was a pioneering article thanks to her systematic approach to building materials, defined within the framework of basic units, sub-units and their relations with each other (Batur, 1970, 135-216). In the article, the author firstly gives some definitions to the alternating wall, and then makes suggestions regarding its origins. Afterward, she classified and evaluated the Ottoman Mosques which have alternating wall structures dating from the 14th – 18th centuries in a chronological order. As a result, Batur has revealed that brick-and-stone alternating is the most commonly used technique while the

alternating based on the dimension and color of material is evident in a smaller number of building examples. She analyzed and evaluated the buildings from the perspective of the brick-and-stone alternating masonry with a detailed table. Within the framework of her study different types of the alternating walls and closely related architectural elements such as arches, eaves, drums for domes, and mortar beds as well as their characteristics and decorative applications and techniques were also investigated (Batur, 1970, 173).

Another study related to the subject is the article with title of “Geç Bizans Erken Osmanlı Duvar Teknikleri” published in 1983 by M. İ. Tunay. He aimed to reveal whether there are similarities between Late Byzantine and Early Ottoman wall techniques from the aspects of using the “heart motif” on facades. As a result of the heart motif comparisons at Seyyid Mehmed Dede Zaviye at Yenişehir near Bursa with some of the Byzantine buildings he uncovered that due to the differences in the wall texture of the Zaviye that was built by Turkish craftsman and masons, despite the mutual use of the “heart motif”. He concluded that there were also some masters and architects in Byzantine origin among the craftsman and masons (Tunay, 1983, 1691-1696).

Furthermore, Ahmet Ersen’s significant work which was defended as a doctorate dissertation in 1986 and was published with the title of “Erken Osmanlı Mimarisinde Cephe Biçim Düzenleri ve Bizans Etkilerinin Niteliği”. In his book, Ersen discussed Byzantine impacts on Early Ottoman architecture. He also examined the Byzantine alternating wall techniques and its features and emphasized their relations with other structural elements. Moreover, he analyzed the early Ottoman architecture after the evaluation of Byzantine facade forms. While examining the 14th-century Ottoman walls, he made quite remarkable comparisons with the Byzantine alternating walls (Ersen, 1986).

Moreover, Y.S. Şener’s study was completed as a master thesis in 1993. In 1997, he also published it as a long journal article with the title of “14. Yüzyıl Bursa Yapılarında Erken Osmanlı Duvar Örgüsü” (Şener, 1997, 193-249). Şener initially defined the materials used in wall masonry and then examined the 14th century Bursa buildings one by one in a catalog. In his study, the buildings were reviewed in chronological order but were not classified according to building types. He assessed the properties of materials (stone block sizes, brick dimensions) of each building gone through maintenance and revised orders and pointing characteristics applied at wall masonry (Şener, 1993, 1- 216).

In addition, the book titled “Batı Anadolu 14. Yüzyıl Beylikler Mimarisinde Yapım Teknikleri” published by İlknur Aktuğ Kolaç in 1999 is one of the significant books in the field. The researcher first explored the

building construction traditions seen in Western Anatolia before the Turks, and subsequently critiqued wall techniques, materials and construction techniques. She conducted the assessment of the construction techniques, materials usage, and applications of structural elements in the architecture of Western Anatolian Turkish Emirates (Aktuğ Kolay, 1999).



Figure 9: İznik Hacı Özbek Mosque

The latest study on the subject is Mehmet Kutlu's article published in 2017 with the title of "XIV-XV. Yüzyıllarda Osmanlı Camilerinde Görülen Tuğla-Taş Almaşıklığı Üzerine Gözlemler". He firstly emphasized the importance of the previous studies on the subject and evaluated alternating brick and stone walls in Early Ottoman Mosques of the 14th - 15th centuries. He also compared the results of his study with the outcomes of the detailed and long article of Afife Batur.

1.3. Origin of Alternating Masonry in Ottoman Architecture

Alternating masonry with use of brick-and-stone courses began to be seen in the Anatolian Turkish architecture since the 14th century. It is derived from the Byzantine architecture. Actually, "*opus mixtum*" or "*opus listatum*" of Roman architecture was approved the source of Byzantine alternating brick and stone masonry (Ousterhout, 2016, 185). The fact that brick-and-stone alternating technique was not seen in Anatolian Seljuk architecture but appeared in the architecture of Early Ottoman and Western

Anatolian Turkish Emirates. This circumstance could be a result of the Ottoman State having as a heir to Byzantine lands and its civilization, technical and cultural heritage.

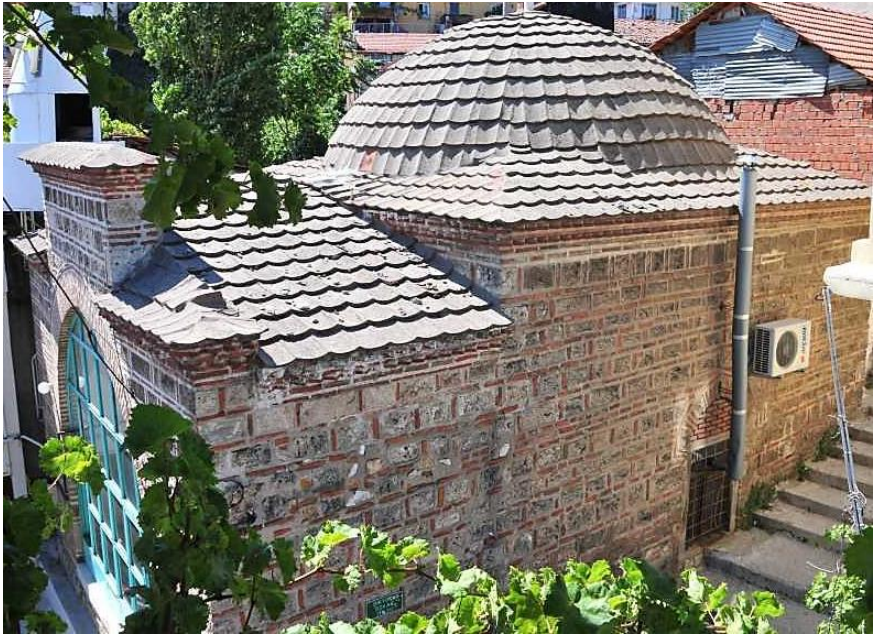


Figure 10: Bursa Hıdırlık Mosque

Particularly in 1204, the Byzantine Empire, which had to move its capital from Constantinople to Iznik (Nicaea) due to the Latin occupation, started intensive construction activities in Bursa region. Most of the buildings were constructed with the techniques based on the brick-and-stone alternating masonry. The fact that the Ottomans, who dominated Bursa region about a century later and constructed their architectural works with the techniques of brick-and-stone alternating masonry indicate on existence of a relationship (Batur, 1970, 187). Despite that Ötüken detected some influences of Seljuk architecture on the decoration of paintings at the walls of Byzantine buildings (Ötüken, 1990, 402). This process of interaction has not been in the form of simple adaptation or imitation of all the elements of Byzantine architecture. It is possible to observe the stage of “transfer and interpretation of transfer” in the first half of the 14th century. However, in the second half of the century, it has been preceded to the stage of formation of distinctive Ottoman alternating brick and stone masonry (Ersen, 1986, 44-45).

In Early Ottoman alternating masonry as a building material rough-hewn stone and rubbles were generally used. Its obvious that the bricks used in Early Ottoman architecture are slightly different from the Byzantine ones in terms of both dimension and shape. Early Ottoman

bricks are generally having sizes of 14x28 cm and 30x30 cm, whereas their thickness is detected to be around 4cm and rarely 4.5cm (Ayverdi, 1966, 536; Şener, 1997, 199-207).



Figure 11: Koca Naip Mosque (Bursa, 14th century)

In this period, the iteration ratio of brick-stone courses on wall varies inconsiderably, and the order merely reflects consistency by maintaining the same ratio. For instance, walls are constructed by the repetition of the basic (3/1) application of vertical alternating masonry where, a course of stone is over three courses of bricks. 14th century Ottoman walls differ radically from the Byzantine ones from this feature point of view. In the first half of the 14th century Ottoman vertical alternating masonry was based over the only a single course of stone (Batur, 1970, 191). Byzantine alternating masonry allegedly based on a single course of stones is almost unapparent in the capital, Constantinople, however it is possible to witness orders constituted by two, three or even four courses of stone blocks (Ousterhout, 2016, 185). Nonetheless, the vertical alternating method based on a single course of stones is essential in the examples of Arta, Mistra and Thessaloniki which located far from the Byzantine capital Constantinople (Ersen, 1986, 45; Ousterhout, 2016, 187-189).

The implemented applications of the complex vertical alternating masonry frequently encountered in the samples of Early Ottoman period indicates that the evidence of Byzantine influence. In some examples of

this practice, 3/1, 3/4 and 3/5 brick-and-stone course order are applied by repeating 1/1 order. In this context, it is not a coincidence that the complex vertical alternating examples are generally encountered in the early period (Kutlu, 2017, 137-138).

Horizontal alternating technique which occurs when bricks are vertically placed between stones is also of Byzantine origin (Batur, 1970, 191). This technique can be observed in the Early Ottoman architecture in the form of one or two bricks vertically masoned between stones.



Figure 12: Bursa Murad I Hudavendigâr Mosque

2. Alternating Brick and Stone Masonry in Early Ottoman Mosques

The data for the alternating brick and stone masonry of sixteen mosques of the 14th century has been collected and illustrated in the Table 1. This study only considers and carefully examines the well-preserved examples of the era

As a consequence, it is possible to observe rough-hewn stone and brick use in thirteen of the sixteen compared buildings (88%) and rubble stone-and-brick materials in eleven (70%) of mosques whereas both rough-hewn and rubble stone materials found to be used is the nine (56%) of them (See Table 1). Furthermore, it is clear from the data in Table 1 that the hewn stones are found to be rarely used in only a few structures and that the hewn

stones were jointly applied with rough-hewn stone and rubbles. On the other hand, there are rare samples of the masonry with the use of a single type of stone material in the facades of the building.

The fact that the structures built with stone-bricks and rubble stone-bricks are common throughout the century produces the perception that there is no significant improvement in material use. However, it is possible to observe improvement in material use especially from the period of Murad I (1362-1389) in contrast with the overview of the 14th century. In the 14th century Ottoman mosques, both simple and complex applications of the vertical alternating were widespread. The simple practices of vertical alternating masonry represented by alternative sequencing of brick and stone courses in 4/1, 3/1, 2/1 and 1/1 orders. The most common practice (seen in nine of sixteen buildings) among them is the 3/1 order. It is followed by the 1/1 order in seven mosques, 2/1 order in four mosques and 4/1 order in two structures.

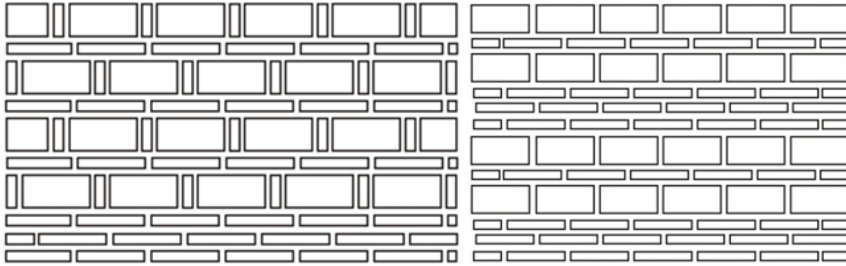


Figure 13 ve 14: Bursa Alaeddin Mosque (vertical complex 3/1 + 1/1, vertical 1 brick)

The complex alternating is seen in six buildings and the earliest of them is the Alaeddin Mosque in Bursa (1335). There are three courses of brick and four or five courses of stone followed by one course of brick and one course of stone on the walls of Bursa Alaeddin Mosque. Other structures where the complex practices of vertical alternating masonry are detected are Bursa Orhan Mosque (1339-40), Bilecik Orhan Gazi Mosque (first half of 14th century), Bursa Kavaklı Mosque (mid-14th century) and Bursa Hızırlık Mosque (second half of the 14th century).

Furthermore, use of one vertical brick in horizontal alternating masonry of the 14th century Ottoman mosques is seen in fourteen (88%) of the sixteen buildings. Use of two vertical bricks in horizontal alternating is found in only three of structures (See Table 1).

3. Evaluation and Conclusion

Alternating masonry of brick and stone courses which did not exist in Anatolian Seljuk Architecture was inherited by Ottomans, in the

geography where it was founded, from Byzantine architecture. It has emerged as the most common wall technique in the 14th century Ottoman mosques. Some researchers suggest that its widespread use can be explained by factors like the lack of enough quality and availability of stone materials in Bursa and its environs, and by the fact that the Ottoman Empire did not have sufficient financial sources in the 14th century.



Figure 15: Demirtaş Paşa Mosque (Bursa, 15th century)

The lack of enough stone resources and financial limitations may explain the presence of buildings constructed with rubble stone, brick and mudbrick in this region. However, the factors mentioned above are insufficient to explain the appearance of brick-and-stone alternating masonry applied by a certain order and technique.

The use of brick and stone (hewn, rough-hewn and rubble) courses in alternating masonry of the 14th century Ottoman mosques can be evaluated from the aspect of the building materials, the intensive use of rough-hewn stone and rubbles is evident. Nevertheless, in the second half of the century, a noticeable improvement in the quality of construction materials can be observed.

Some of the examples of Early Ottoman Mosques indicate that alternating brick and stone masonry was preferred not for technical or architectural factors but for aesthetical taste of the era. For instance, the facades of the Yerkapı Mosque, Aynalı Mosque, Demirtaş Paşa Mosque at

Bursa have well alternating brick and stone walls. In contrast, the rear fronts or facades of these mosques do not have alternating brick and stone masonry and the rear front walls are made of construction materials of modest quality (Fig. 15). As a result, the alternating masonry was probably preferred for monumentality and decorative purposes.



Figure 16: Yakup Çelebi İmaretî (İznik, 14th century)

Secondly, the most frequently implemented type of vertical alternating masonry is found to be the order of 3/1 during the 14th century. The results are similar with those of Batur (1970, 173) and Kutlu's articles (2017, 142). According to Batur, the 3/1 order exists in nine of twelve mosques (75%) while Kutlu have detected it in ten of seventeen mosques (58%). In Table 1, the order of 3/1 is found at nine (56%) of sixteen mosques of the era.

The complex applications of the vertical alternating adopted from Byzantine architecture were observed mostly in the 14th century buildings and particularly in Orhan Gazi period (1326-1259). The complex vertical alternating was encountered in four buildings at the first half of the century and in two structures at the second half of 14th century (See Table 1). The complex applications have considerably decreased during the process of the systematic implementation of simple orders of vertical alternating masonry and due to the increase in quality of the building materials used. These results are consistent with the findings of previous studies (Batur, 1970, 173; Kutlu, 2017, 144).

The horizontal alternating masonry, which is considered as Byzantine origin but not preferred in the buildings of Byzantine capital, is the technique that can be observed in the 14th century Ottoman mosques.

The development of the technique within this timeframe can be summarized as following: In the 14th century, use of one perpendicular brick was seen in fourteen (88%) of the sixteen buildings and use of two perpendicular bricks are seen in three structures (19%) (See Table 1). Currently obtained results are consistent with the previous studies. While Batur revealed one perpendicular brick alternating in six (50%) of the twelve mosques and only two structures (17%) having two perpendicular bricks in horizontal alternating (Batur, 1970, 173). Kutlu (2017, 146-147) detected technique of one perpendicular brick alternating in thirteen (76%) out of seventeen mosques and use of two perpendicular brick alternating in four (24%) of seventeen mosques.

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Table 1: Alternating Brick and Stone Masonry in Early Ottoman Mosques (14th Century)

NO	14TH CENTURY OTTOMAN MOSQUES			BUILDING MATERIAL			ALTERNATING BRICK AND STONE WALL						
							VERTICAL (SIMPLE)				VERTICAL (COMPLEX)	HORIZONTAL	
							1/1	2/1	3/1	4/1		VERTICAL ONE BRICK	VERTICAL TWO BRICK
HEVN STONE- BRICK	ROUGHHEVN STONE + BRICK	UNHEVN STONE + BRICK											
1	Hacı Özbek Mosque	İznik	1333		●	●			●	●		●	
2	Alaeddin Mosque	Bursa	1335		●	●	●			3/4 + 1/1		●	●
3	Gazi Orhan Mosque	Bursa	1339-40	●	●	●			●	3/4 - 3/5 + 1/1		●	
4	Orhan Gazi Mosque	Bilecik	first half			●	●		●	3/1 + 1/1			
5	Kavaklı Mosque	Bursa	mid. cent.		●	●				3/5 + 1/1		●	
6	Orhan Gazi Mosque	Yarhisar	first half		●		●		●			●	
7	Hüdavendigâr Mosque	Bursa	1366	●	●				●				
8	Nilüfer İmaretî	İznik	1388		●				●	●		●	●
9	Ertuğrul Mosque	Bursa	1395		●			●				●	
10	Hıdırlık Mosque	Bursa	second half		●		●			3/5 + 1/1		●	
11	Yerkapı Mosque	Bursa	second half		●	●	●					●	
12	Yakup Çelebi İmaretî	İznik	last quarter		●	●	●		●			●	
13	Hüdavendigâr Mosque	Plovdiv	last quarter		●	●		●	●	3/1 + 2/1		●	
14	Koca Naip Mosque	Bursa	last quarter		●	●			●			●	●
15	Ebu İshak Mosque	Bursa	last decade			●		●				●	
16	Yıldırım Mosque	Edirne	last decade		●	●	●	●				●	

Note: Ali Paşa Mosque is also originally built at Bursa in the 14th century. However, it was heavily destructed by an earthquake in 1854. Therefore, it was rebuilt and renovated, so its original wall structure was not preserved. Thus, Ali Paşa Mosque is not listed on Table 1.