



Use of Unglazed Brick in Monumental Architecture as an Ornamental Element

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Abstract

Anatolia had been a region for many civilizations that built many religious and cultural monumental structures, some of them survived today. One of the most important and common materials used in these structures; which cover crucial information about the properties of these old civilizations such as their socio-cultural status, religious - administrative decisions, construction technology, traditions and lifestyles; was brick. In many monumental structures; besides its use in construction, brick was also used within the context of ornamentation; and it became one of the important ornamental elements in certain periods. Within this paper; the use of brick in Anatolia in ornamental context is studied; weaving systems, dimension, color and setup are presented in detail covering the Seljukians, principalities and early Ottoman Periods.

1. INTRODUCTION

Since the beginning of history; housing need has constituted one of the essential needs for the survival of mankind. Shelters started to be built later for this need; for which cave and tree hollows had been used formerly; one of the most important construction materials for construction of the shelters was soil as it was possible to be found easily in neighboring area. Initially, soil was used solemnly by mixing it with water; within time it was made more durable by adding additives such as straw, tow and sand. This mixture called as adobe was used by pouring it into the molds and drying in the sun. As is evident from the excavations in Anatolia, Mesopotamia, and Iran; the use of adobe, the first use of which dates back to approximately BC 7000-5000 [1] still continues today in rural areas. Around BC 3500s; adobe was made more durable by firing; brick was discovered [2]. Although not yet certain; the use of brick, the surfaces of which had been plastered in the past, without plastering for both construction and decorative purposes corresponds to 10th century. As the first example seen in this context; Bakırer (1981) indicates the tomb of İsmail Samani, which was built in Bukhara on the date 295 H/907 in Samanoğulları period [2] In this structure; with the bricks, which were arranged in different forms as the interior and the exterior ornamental element, different surface patterns were created (Fig.1a). Arap Ata tomb in Tim province is another example remaining from this period. (977-978 CE) (Fig.1B).

In the period, which started after the Samanoğulları reign has been ended by Karakhanids and Ghaznevids; brick construction tradition was continued in Turkistan, Khorasan and Afghanistan. Among the important works, which were constructed in this period by using bricks; Deggaron Mosque (9-11 century) (Fig.1c), Ribat-ı Melik (M1078)(Fig.1d), Talhatan Baba Mosque (early 12th century) (Res1.e), Maghak-i Attari Mosque (early12thcentury) (Fig.1f), Nasr Bin Ali Tomb (M. 1012) (Fig.1m), Jalal al-Din Hussein's Tomb (M. 1152)(Fig.1n), South Tomb (M. 1186), Sheikh Fazıl Tomb (between 11-13th century), Tirmidhi Palace (between 11-12 century), Burana (Fig.1g) and Özkent Minarets (11th century) (Fig.1h), Car Kurgan (M.1108-1109) (Fig.1i), Vabkent Minaret (M.1127)(Fig.1j) and Firuzabad Minaret (early 13th century)(Fig.1.k), Lashkar-i Bazaar palace, Devletabad Minaret can be listed. In Great Seljukians Period; Kümbet-i Kabus (M.1007) is given as the leading example of increasingly developing brick structure tradition. Among other important works of this period, Duvazdah Imam (M. 1037), Cihil Duktaran Tomb (M.1056) (Fig.1O), Ardistan Masjid-i Cuma (1055-1058 M.) (Fig.1P), Isfahan Masjid –i Cuma (M. 1080) and Barsian Masjid-i Cuma (M.1098) can be listed [2].

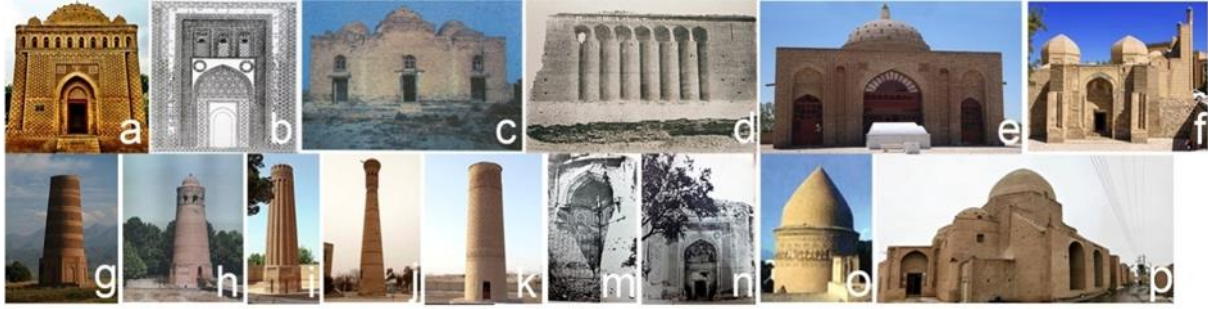


Figure 1. Examples of the monumental structures; which were built with the use of brick both as a structural and ornamental element in Samanogullari, Karahans, Ghaznavids period

The use of brick as an ornamental element besides its use as construction element continued in Iran until the mid of 12th century. In the mid of 12th century; it is seen that the brick arrangements started to routinized and the plaster applied to the grouts tended to cover the brick surfaces. In time; the use of brick was replaced with stone and the use of both of two construction materials continued in parallel.

The brick was introduced to Anatolia by Seljukians. But, the use of stone, which was the local material of the region, was more dense and brick was a secondary level construction material. The examples are low in numbers but they are rich in qualification.

2. THE USE OF BRICK FOR ORNAMENTATION IN ANATOLIAN SELJUKIANS PERIOD

Seljukians period ranks second in terms of intensity of use of brick in Anatolian architecture. However; new possibilities of the material were tested and revealed with the new pursuits and interpretations which were seen on the qualification. From the second half of 12th century until the end of 13th century; the use of brick in Anatolian architecture was nor an obligation which arised from geographical and geopolitical structures as in other cultural circles [10]; it was rather defined with a conscious choice related with the geographical locations, scales, purposes of use of the buildings and technique and taste. Tükel Yavuz, states that the most important reason for this situation is related to the prevalence and development of essential stone use in Anatolia; and shows the lack of Byzantian re-used (devşirme) brick as a construction material in the Seljukian period [9]. The geographical distribution of the use of brick; is numerically intense in Central Anatolia especially in Konya; at the first place; Akşehir and Aksaray. While the intensity continues in Sivas in the northern side; the number of the structures where brick was used, decreases around Sivas and Tokat. While the use of brick continued in one or two minarets in Seljukians cities such as Kayseri and Niğde, where stone structures are common; it was seen with its distinctive qualifications in the structures in Malatya, Kırşehir, Antalya, Alanya, Amasya and Harput where they are few but each of them are unique in their qualifications [3].

During this period, bricks were commonly used with stone. The only examples that made entirely of brick are small-scale structures such as maşjids and tombs. Yasa and Bakirer states that the İplikçi mosque is the only example made entirely with brick in large scale constructions. The mosque underwent some major repairs at Karamanoğulları ve Turgutoğulları period, only the southern wall remains as original today [3,6]. Selection of brick material for ornamental purposes and the applications in this quality were concentrated especially between the years 1220 and 1275. In this context, the application methods for the use of brick in structural or ornamental purposes are divided into 2 as brickwork 'Örgü' and brick veneering 'kaplama'.

2.1. Brickworks

Brickworks are formed with unglazed unit bricks. Their colors vary from light dun to dark red according to the soil characteristics of the region and firing conditions [3]. Aktaş Yasa has determined that plaster mortar is preferred as a binder in ornamental geometric patterns, even though lime mortar is used as a binder in plain textures in a study carried out in Anatolian Seljuk period works in Konya3 [6]. Tayla mentions the bricks used in this period as three types, full, half and minaret bricks in terms of shape [1], But Bakirer mentions that quarter bricks are also used in this period [3]. Tayla defined the dimensions of the bricks used in the works of this period as 23-25 x 23-25 x 4.5-5, 4-5 and 20-21x 21-22 x 21-22 x 20-21 x 3.5 - 4.5 cm.

[1]. The order of these brick is called as piling or stacking. The piles in Anatolian Seljukians architecture are in 3 types as, horizontal, horizontal / vertical, and inclined [2,6].

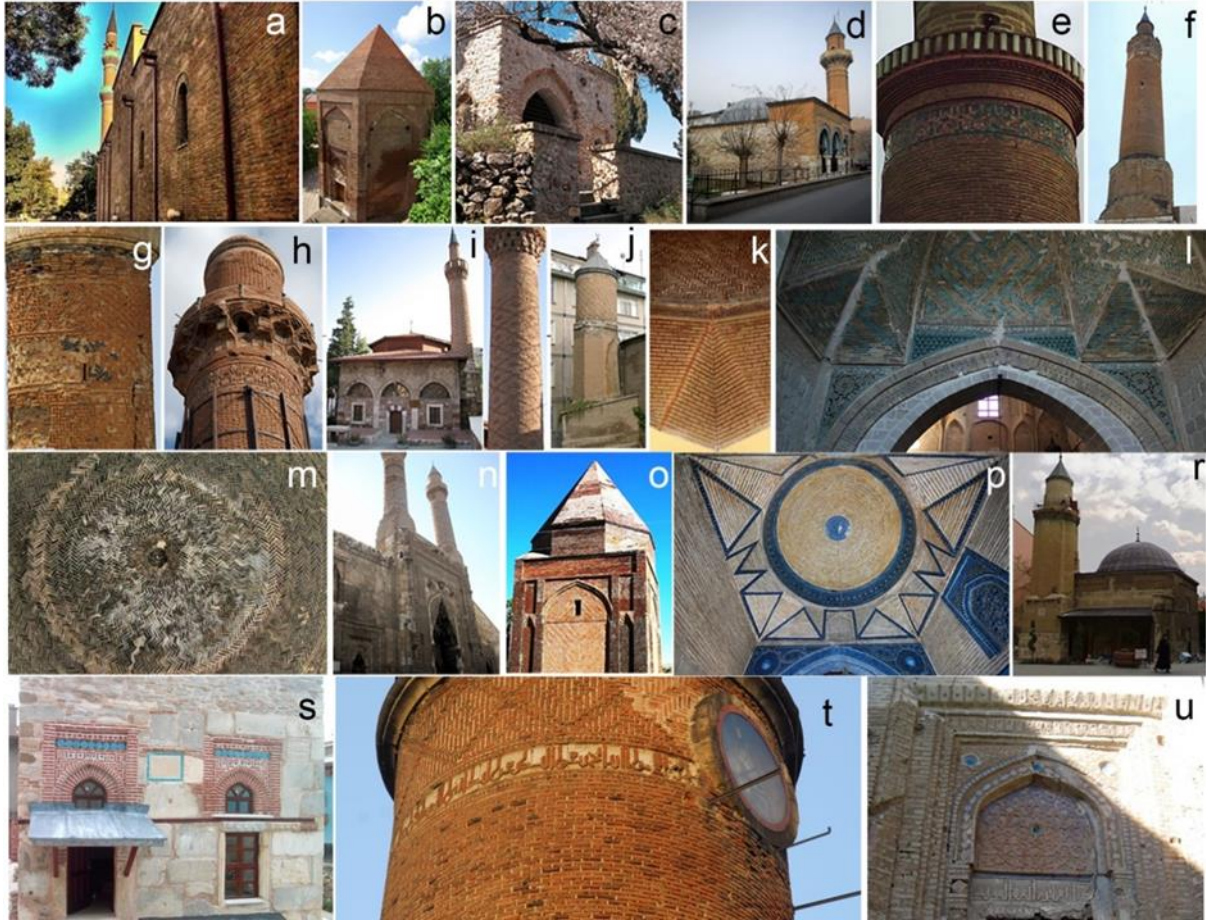


Figure 2. Examples from monumental structures constructed in Anatolia in Seljukians Period

a. Horizontal stack – Plain Weave:

Horizontal stack is shaped by stacking the brick units' side by side on horizontal directions and rise them on top of each other in horizontal rows. The weaving shapes in horizontal stacking depends on the form and dimension differences of the bricks, whether the brick is glazed or unglazed, sliding percentages of the bricks and differences between the joint spacing's. This types of stacks are seen both in outside structure (body walls and/or minaret) and inner structure (arches, vaults, domes, pulleys, etc.) Konya İplikçi Mosque (early 13th century) (Fig.2a) , Niksar Kırkkızlar Tomb (1220) (Fig.2b), Alanya Akşebe Sultan Masjid (1230) (Fig.2c), Konya Sırçalı Masjid (1258) (Fig.2d), Kayseri The Grand Mosque (early 13th century) (Fig.2e), and Ankara Aslanhane Mosque (1288-90) (Fig.2f) can be listed among the examples.

b. Horizontal / Vertical stack– Half Bullnose 'Balıksırtı' Weave:

Horizontal / vertical stack is formed by laying the bricks not only in the horizontal direction but also on vertical directions. These kinds of stacks of the bricks shape initially half bullnose weave. They are created by sliding and deflection techniques such as broken lines, diamonds and similar ones [2]. Weave variations in the types of this stack depend on form and dimension differences of the bricks, whether the brick is glazed or unglazed, shifting percentage of the bricks, deflection position and differences between joint spacing. Harput The Grand Mosque Minaret (1155-65) (Fig.2g), Aksaray Red Minaret (early 13th century) (Fig.2h), Tokat Alaca Masjid (1300) (Fig.2i), Konya Zembur Masjid (early 13th century) (Fig.2j), Konya Sırçalı Masjid dome (1242-43) (Fig.2k), Malatya The Grand Mosque (1224) (Fig.2l) can be listed among the examples.

c. Inclined Stack-Herringbone ‘başak’Weave:

Inclined stack is achieved by stacking the bricks on the first row to one direction with 45-degree angle; and stacking the bricks on the second row with same degree but on the opposite direction. The variation of this stack type depends only on material difference – glazed-unglazed brick. Konya Karatay Masjid (1248) (Fig.2m), Sivas Double Minaret Madrasah (1271) (Fig.2n), Pinarbasi Melik Gazi Tomb (end of the 12th century) (Fig.2o), Konya Sahip Ata Tomb (1283) (Fig.2p), Konya Hoca Hasan Masjid (second half of the 13th century) (Fig.2r) can be listed among the examples.

2.2. Brick Veneerings

Unlike the brick weaving; once the carrier wall of the structure is built; it is formed by adding thin brick strips and polygons, which are cut separately from the wall in different forms and dimensions, in front of the wall. It may be seen that they fall off faster and in larger pieces as their connection with the carrier wall on the back is not very solid. Akşehir Ferruh Shah Masjid (Fig. 2s), Malatya The Grand Mosque (1224) (Fig.2l), Konya Ulaş Baba Tomb, Erzurum Tray Minaret (Fig. 2t), Harput The Grand Mosque (1155-65) (Fig. 2g) and Kemah Mengücek Gazi Tomb (Fig. 2u) can be listed among the examples. Aktaş Yasa records that the brickwork was taken out of use after the 13th century [6].

2.3. Ornamentation of Grouts Between the Bricks

There is a kind of ornamentation which is made by diversifying the grouts between the bricks. Few different methods were applied in this kind of ornamentation. First of the methods is formed by denting the grouts. In this method; the bricks are left stable or while they are stacked more indented; the grouts between them are dented inwards with a wooden tool and they are differentiated. Tokat Alaca Masjid Minaret (1300) (Fig. 3a) can be given as an example. In another method; on the grouts which have the same level with the bricks, various patterns and /or writings were applied with an embossing die or sharp object. Among the works that incorporate this system Mengücek Gazi Tomb (second half of the 12th century) (Fig. 3b) and Sivas Keykavus Darüşşifa(1217-1220) (Fig. 3c) can be listed.

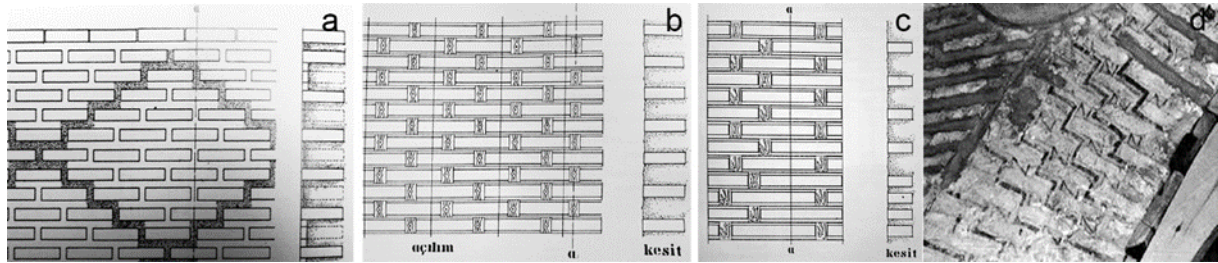


Figure 3. Example for ornamentation of brick walls by diversifying the grouts [1,6]

There are also examples of brick-walled walls that are simply grooved and the surface of the grouts are highlighted and decorated with colored lines. In these examples, plain, broken and triangular lines were applied on the grouts in shades of light ranging from light red to dark red. Among the works that incorporate this system, Alaeddin mosque (Fig.3d), İç karaarslan Masjid, Beşarebey Masjid, Tac-ül Vezir Tomb, Seyfeddin Karasungur Tomb and Kalender Baba Tomb can be listed [6].

3. USE OF BRICKS IN PRINCIPALITIES AND OTTOMAN PERIOD FOR ORNAMENTAL PURPOSES

As in principalities period; using only the brick on main outer walls is too limited with the examples of upstairs wall of entrance iwan of Bursa Koza Han, Manisa İvaz Pasha Mosque, Alaşehir Sheikh Sinan Mosque, majority of carrier walls of Bursa Green Tomb and some sections of Topkapı Palace. But except for gable roofed mosques; all coating cover and transition elements were made with bricks [1]. In both periods, the use of brick is mostly seen in alternative wall technique with face stone or rubble stone in alternative patterns. There was also a change in brick dimensions in this period. 1 / 4-5 ratio, which was used in the first Islamic Turkish states and Seljukians; changed in Principalities and Ottomans in a range

between 1/6 to 1/11 [1]4. In addition to this; the brick was also used for ornamental purposes in window mirrors, badges and separate panels; and these are explained below with examples and typologies.

3.1. Use in Panels

Geometric Patterned Decorated Panels:

Hüdavendigâr Mosque (1365-66) (Fig.4), Tire Rumi Mehmet Pasha Mosque (1471) (Fig.4ba, bb,c,d), Manisa Alasehir Sheikh Sinan Mosque (1450) (Fig.4e) Manisa İvaz Pasha Mosque (1484) (Fig.4fa,fb,ga,gb,ha,hb), Istanbul Karakoy Bath.

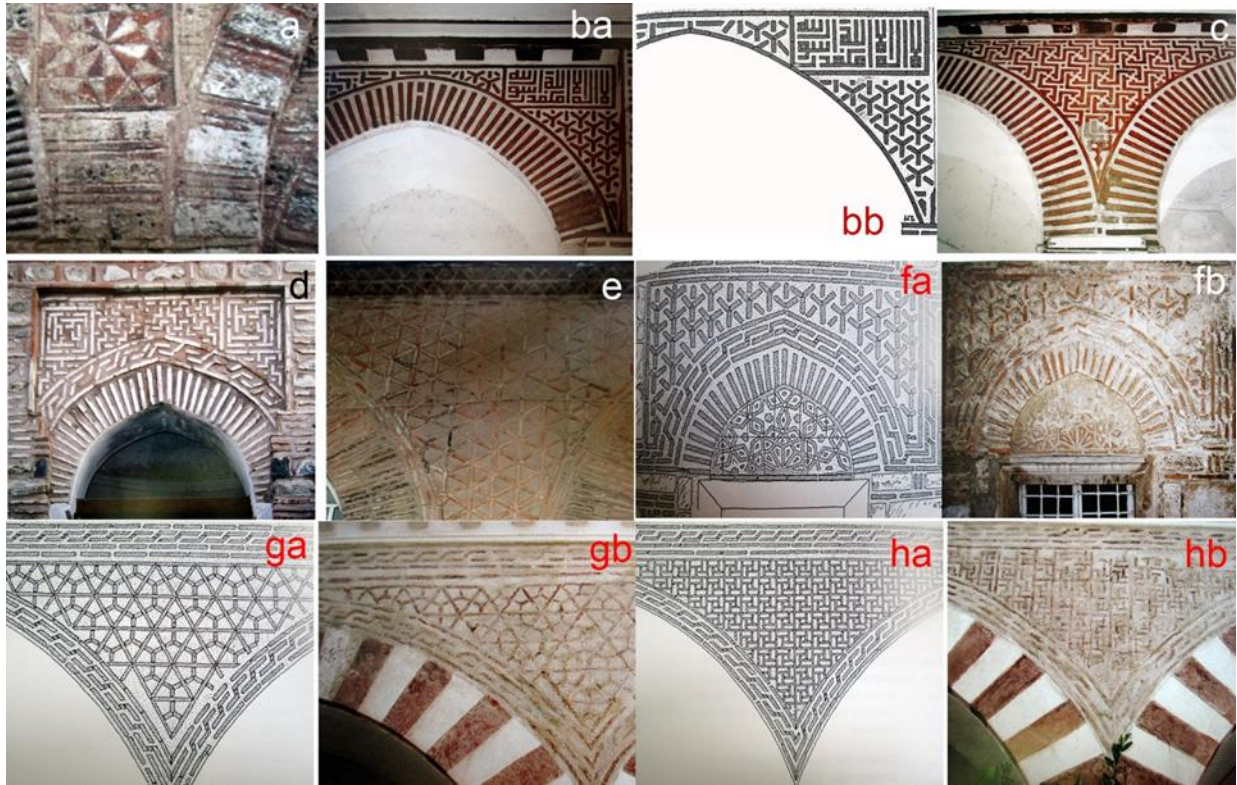


Figure 4. Examples of use of brick in geometric patterned decorated panels

Panels created with Vertical- Horizontal- Stack:

İznik Nilüfer Hatun İmaret (1388) (Fig.5a), Bursa Uluabad İssız Han (1394) (Fig.5b), Bursa Yıldırım Darüşşifa (1400) (Fig.5c), Bursa Sitti Hatun Mosque (Fig.5d), Bursa Ahmed-i Dai Mosque (point dimensioned brick is also available) (1471) (Fig.5e), İnegöl Tacünnisa Hatun Tomb (horizontal stack) (last quarter of 15th century) (Fig.5f).

Panels shaped with One or Three Brick Basket Weave Method:

Bursa Nalbandođlu Mosque

Panels shaped with Dual-Brick Basket Weave:

Edirne Yıldırım Mosque, Bursa Gülçiçek Hatun Tomb (Fig.5g), Bursa Muradiye Madrasah (Fig.5h)

Panels shaped with Triple-Brick Basket Weave:

Bursa Gülçiçek Hatun Tomb (Fig.5i), Bursa Muradiye Madrasah (Fig.5j), Manisa Alaşehir Sheikh Sinan Mosque (1450) (Fig.5k).

Panels shaped with Four-Brick Basket Weave:

Bursa Gülçiçek Hatun Tomb.

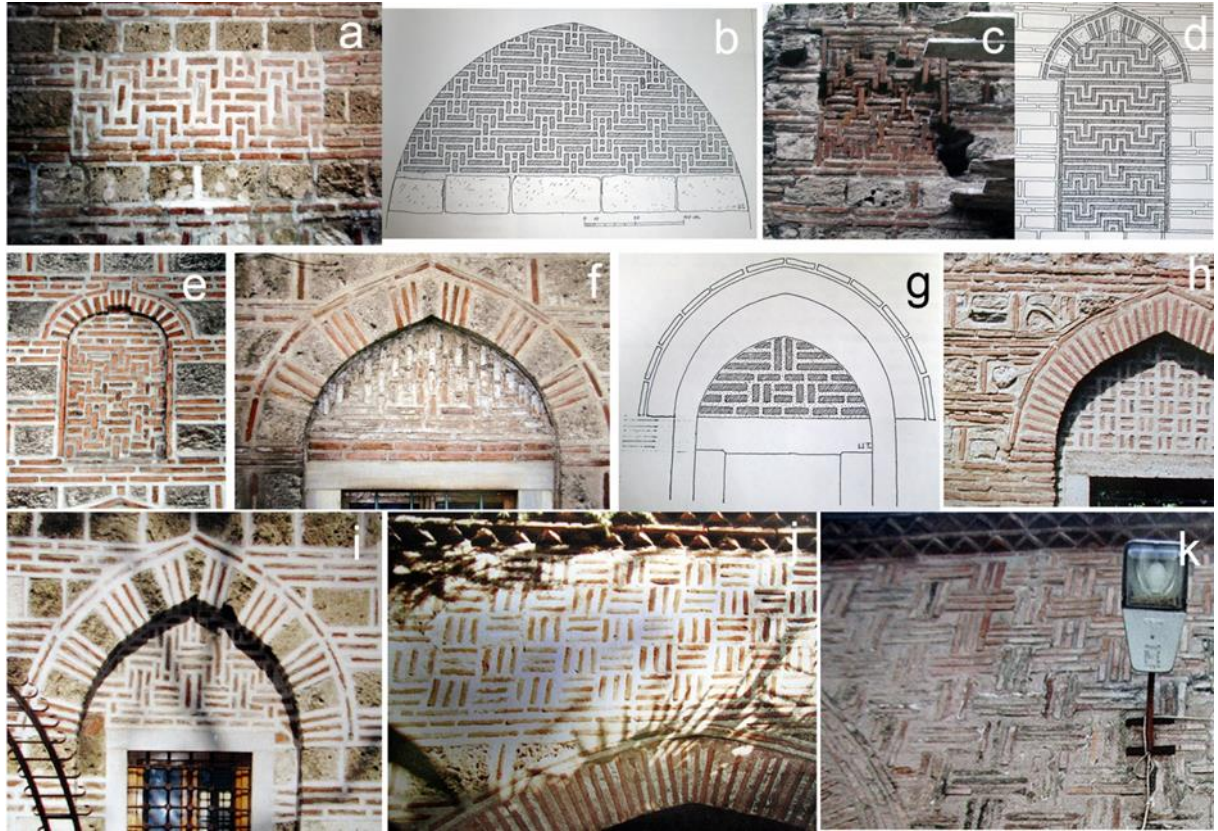


Figure 5. Examples of brick use in vertical-horizontal stack and basket weave panels

Panels formed with zigzag (Herringbone) Weaving Method:

Bursa Selçuk Hatun Mosque (horizontal) (1450) (Fig.6a), Bursa Sitti Hatun Mosque (vertical)(Fig.6b), Bursa Ahmed-i Dai Mosque (horizontal) (1471) (Fig.6c), Manisa İvaz Paşa Mosque (horizontal) (1484) (Fig.6d), İnegöl Tacünnisa Hatun Tomb (horizontal) (last quartet of 15th century) (Fig.6e), Bursa Demirtaş Mosque Minaret (1389) (Fig.6f).

Panels shaped with square cut bricks:

Bursa Selçuk Hatun Mosque (1450) (Fig.6g), İnegöl Tacünnisa Hatun Tomb (last quarter of 15th century) (Fig.6h),

Panels shaped with hexagonal and hexagram shaped Bricks:

Tire Neslihan Mesjid (1510) (Fig.6i).

Panels Shaped in Stages (Similar to Z) with Bricks:

Bursa Beşikçiler Mesjid(Fig.6j).

Written Panels:

Tire Rumi Mehmet Paşa Mosque (Kufi) (1471) (Fig.4ba, bb).

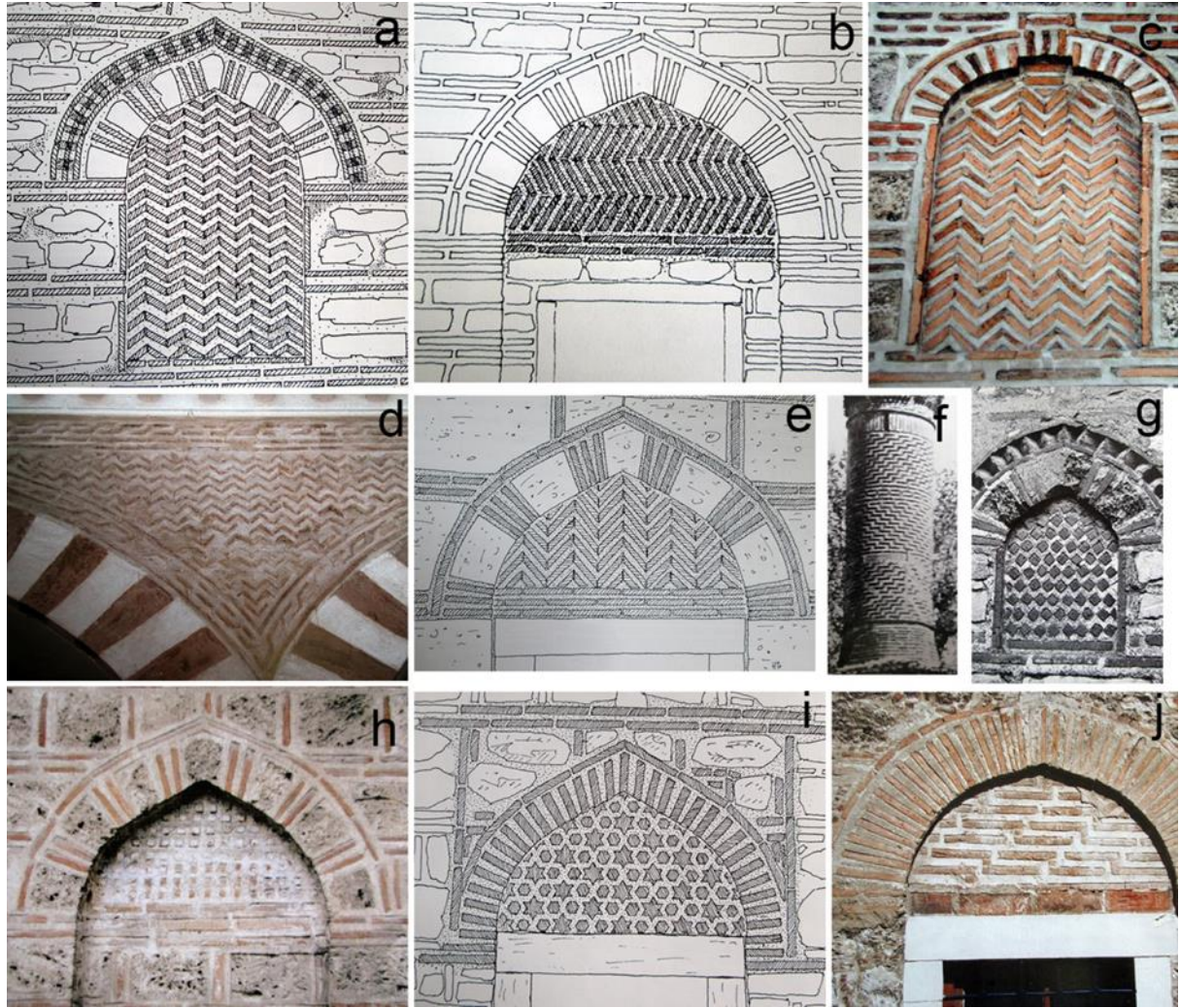


Figure 6. Examples of use of Brick in zigzag, staged and other types of panels

3.2. Use of the Badges ‘Rozet’

Badges on the entrance portico and side outer walls of Bursa Orhan Mosque (Fig.7a, b), badges on the entrance portico of Bursa Timurtaş Mosque and badges on İznik Nilüfer Hatun imaret (1388) can be given as examples. There is big badge on the southern wall of entrance iwan of the imaret, where the bricks are woven as petals and its center is filled with cobalt blue tile in stellated form (Fig.7d), and there is another small badge on the southern part of entrance portico in sun disc form (Fig.7c).

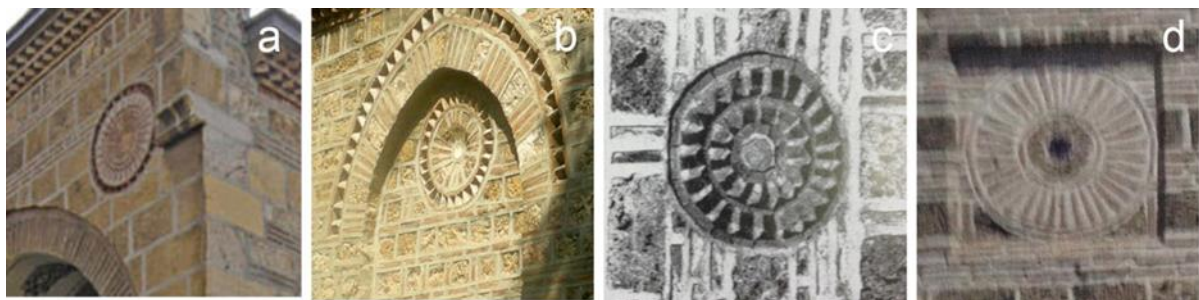


Figure 7. Brick badges ‘rozet’

3.3. Use in Spike Fringe ‘Kirpi Saçak’

Fringe corbel consisting of cross-laid brick series is called as spiky fringe- (kirpi saçak). This kind of fringe; the use of which had started during the Period of principalities; was extensively used during

Ottomans Period. The most common usage was the obfuscatory overlapping of two or three layers of brick. Few unobfuscated; directly overlapped examples also exist. Among the spiky fringe examples; Bursa Demirtas Mosque Minaret (1389), Bursa Muradiye Mosque (1424) (Fig.8b), Bursa Muradiye Madrasah (Triple Beamed Spiky Fringe) (Fig.8a), Tire Kara Hasan Mosque (Triple Beamed Spiky Fringe) (1440) (Fig.8c), Manisa Alasehir Sheikh Sinan Mosque (1450), Istanbul Karakoy Bath, İstanbul Davud Pasha Madrasah (1485), Bursa Koza Han can be listed.

It was also used in upper arch of blind Windows of Bursa Selcuk Hatun Mosque (1450) and in window arches and around the badge (Fig.4b) of Bursa Orhan Mosque in single row for ornamental purposes.

3.4. Use of Broken Brick for Ornamentation

Although the main reason of adding brick pieces in mortar is solidifying the mortar; this use has led to decorative patterns within the time. In this method which is seen especially in Mentешеoğulları and Aydınoğulları principalities; the bricks which were collected, used as big broken pieces in mortars in the grouts [4,5]. Kızılhan, Tombs in Peçin settlement, Tire Hafsa Hatun Mosque and Manisa Yedikızlar Tomb can be listed among the structures where this system was used.

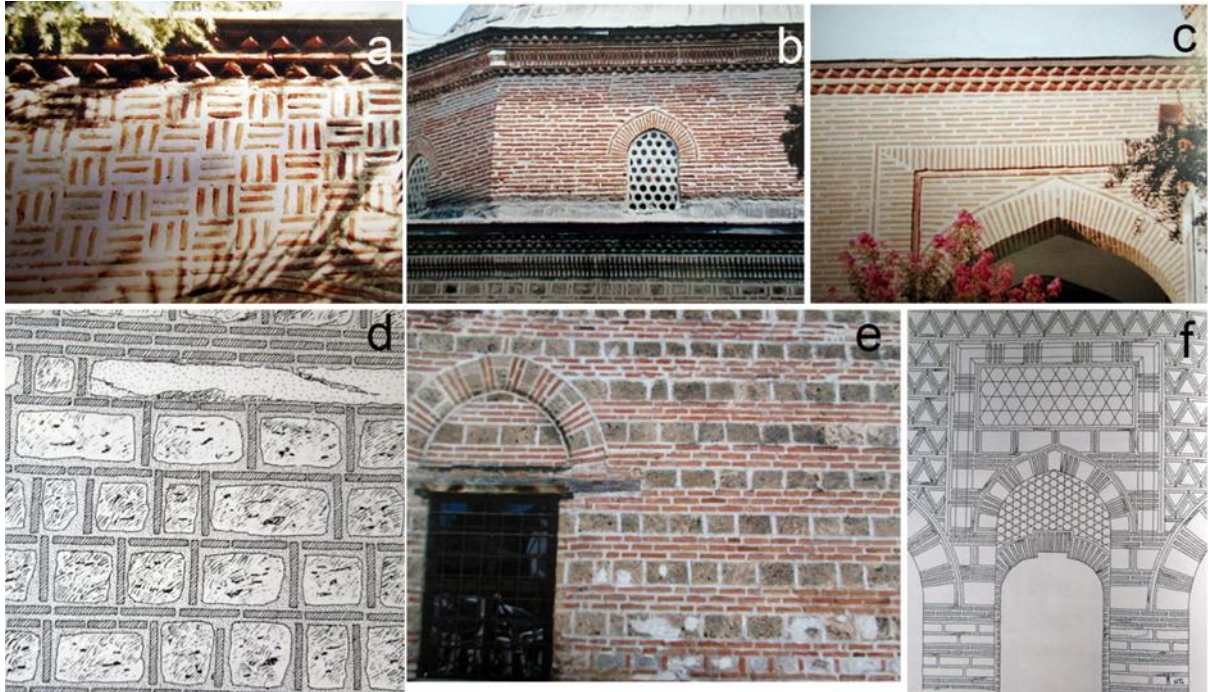


Figure 7. Examples of use of brick in spiky fringe and alternative weave

3.5. Use in Alternating 'almaşık' Weave

The wall pattern which is composed of successive rows of stone and brick is called as Alternating weave. In this kind of wall; which was common especially in early periods of Ottoman architecture; it is seen that fairly different combinations were used independently from the period and different surfaces of the structure. H.Tayla, grouped the variations related with the number of bricks-stones and their order under the headings below: [1]

- 3 Rows of Brick + Overlapping, Three 1 Row of Brick + 1 row of Cut stone between them + 3 Rows of Brick+ One Vertical Obfuscatory Brick Between the Stones: Bilecik Orhan İmareti(Fig.8d)
- 3 Rows of Brick + Overlapping, Four 1 Row of Brick + 1 row of Rubble stone between them + 3 Rows of Brick+ One Row of mixed Obfuscatory Brick Between the Stones: Bursa Alaeddin Mosque
- 4 Rows of Brick + Overlapping, Three 1 Row of Brick + 1 row of Rubble stone between them + 4 Rows of Brick+ One Vertical Obfuscatory Brick Between them: Edirne Yıldırım Mosque

- 3 Rows of Brick + 3,4 and 5 Rows of Rubble Stone+ 3 Rows of Brick: Gebze Çoban Mustafa Pasha Madrasah (1523).
- 3 Rows of Brick + 1 Row of Cut Stone + 3 Rows of Brick: Bursa Hüdavendigâr Mosque (1365), Edirne Old Mosque (1404), Bursa Şehzade Mahmut Tomb (1507), İstanbul Kılıç Ali Paşa Madrasah (1580), İznik Nilüfer Hatun Imaret (Fig8.e)
- 3 Rows of Brick + 1 Row Pitch-Faced Stone + 3 Rows of Brick: Mustafakemalpaşa Lala Şahin Pasha Tomb (1376), İstanbul Sheikh Vefa Tomb (1490), Kadıköy Osman Ağa Mosque (1612)
- 3 Rows of Brick + 1 Row of Rubble Stone + 3 Rows of Brick: Bursa Muradiye Mosque (1424), Bursa Ahmed-İ Dai Mosque (1471), İstanbul Ferruh Kethüda Mosque (1562-63)
- 3 Rows of Brick + 1 Row Cut Stone + 3 Rows of Brick + 1 Vertical Brick: Bursa Şahadet Mosque (1365), İznik Mahmud Çelebi Mosque (1442), İstanbul Spice Bazaar (1660)
- 3 Rows of Brick + 1 Row Pitch-Faced Stone + 3 Rows of Brick + 1 Vertical Brick Between the Stones: Bursa İbrahim Pasha Bath (1421), Edirne Tütünsüz Baba Tomb (1519).
- 3 Rows of Brick + 1 Row of Rubble Stone + 3 Rows of Brick + 1 Vertical Brick Between the Stones: Bursa Muradiye Mosque (1426) , Edirne Beylerbeyi Bath(1428)
- 3 Rows of Brick + 1 Row Cut Stone + 3 Rows of Brick + Double Vertical Brick: Karacabey Mosque (1447), Bursa Hacılar Mosque (1470)
- 3 Rows of Brick + 1 Row Cut Stone + 3 Rows of Brick + Triple Vertical Brick: Bursa Nalbandoğlu Mosque
- 3 Rows of Brick + 2 Rows Cut Stone + 3 Rows of Brick: İstanbul Atik Ali Pasha Mosque
- 4 Rows of Brick + 1 Row Cut Stone + 4 Rows of Brick: Edirne Bedestan, İznik Hacı Özbek Mosque
- 4 Rows of Brick + 2 Rows Pitch-Faced Stone + 4 Rows of Brick: Bursa Uluabad Village Issız Han
- 2 Rows of Brick + 1 Row Cut Stone + 2 Rows of Brick: Gebze Malkoçoğlu Mehmet Bey Tomb, Bursa Demirtaş Mosque (1404), Edirne Kılıç Ali PashaBath (1583)
- 2 Rows of Brick + 1 Row Jointed Cut Stone+ 2 2 Rows of Brick: Bursa Yıldırım Tomb (1406), İzmir Kızlarağası Han Bazaar (1744)
- 2 Rows of Brick + 1 Row Pitch-Faced Stone+ 2 Rows of Brick: İstanbul Hürrem Çavuş Masjid (1530), İstanbul Bayezid Public Library (1728), İstanbul Zeynep Sultan Mosque (1769)
- 2 Rows of Brick + 1 Row Rubble Stone+ 2 Rows of Brick: İstanbul Molla Gürani Masjid, İstanbul Şebsefa Kadın Mosque (1787), Bursa Selçuk Hatun mosque(Fig.8f)
- 2 Rows of Brick + 1 Row Cut Stone+ 2 Rows of Brick + 1 Vertical Brick: Bursa Yeşil Madrasah (1419), Bursa Hacılar Mosque (1470)
- 2 Rows of Brick + 1 Row Pitch-Faced Stone+ 2 Rows of Brick + 1 Vertical Brick: Filibe Hüdavendigâr Mosque
- 2 Rows of Brick + 1 Row Rubble Stone+ 2 Rows of Brick + 1 Vertical Brick: Bursa Hacılar Mosque (1451)
- 2 Rows of Brick + 1 Row Cut Stone+ 2 Rows of Brick + Double Vertical Brick: Skopje Davud Pasha Double Baths (1546)
- 2 Rows of Brick + 1 Row Pitch-Faced Stone+ 2 Rows of Brick+ Double Vertical Brick: Edirne Kadı Bedrettin Mosque (1530)
- 2 Rows of Brick + 1 Row Rubble Stone+ 2 Rows of Brick+ 2 Vertical Brick: Edirne Palace Kitchens
- 2 Rows of Brick + 2 Rows Rubble Stone + 2 Rows of Brick: Bursa İbrahim Pasha Mosque
- 2 Rows of Brick + 2 Rows Rubble or Pitch-Faced Stones + 2 Rows of Brick + One Obfusatory Brick: Bursa Emir Sultan Bath

- 2 Rows of Brick + 2 Rows of Rubble Stone + 2 Rows of Brick+ 2 Vertical Brick: Bursa Sitti Hatun Mosque
- 1 Row of Brick + 1 Row Rubble Stone+ 1 Row of Brick + 1 Vertical Brick: Gümüş Hacı Halil Pasha Madrasah (1415), Edirne Sarıca Pasha Masjid (1434)

4. CONCLUSION

Brick; which was obtained for housing need by firing the earth that was easily obtained from the immediate vicinity; has been one of the important and continuously used construction materials since BC 3500. Besides its durability and easy accessibility; the possibility to produce it in different dimensions enables its used for ornamental purposes. In this regard; brick, which had been used formerly to create different textures by differentiation in stack types (horizontal, horizontal/vertical and inclined stack), was later used intensively in coating context by firing the wide range of panels after they were formed. In addition to that it can be created in different colors by using different soils; with its use in glazed form in necessary areas, it contributed to the formation of outstanding pieces of our architectural heritage.

Table 1. Use of unglazed brick as an ornamental element in Anatolian Seljukians, Principalities and early Ottoman period.

PER	ORNAMENTATION TYPE		EXAMPLE	
ANA. SELJUK.	BRICK WORKS	Plain Weave	Konya İplikçi Mosque , Niksar Kırkızlar Tomb, Alanya Akşebe Sultan Masjid etc.	
		Half Bullnose 'Balıksırtı' Weave	Harput The Grand Mosque Minaret, Aksaray Red Minaret, Tokat Alaca Masjid etc.	
		Herringbone 'Başak' Weave	Konya Karatay Masjid, Sivas Double Minaret Madrasah, Pınarbası Melik Gazi Tomb etc.	
	BRICK VENEERING		Akşehir Ferruh Shah Masjid, Malatya The Grand Mosque, Konya Ulaş Baba Tomb etc.	
GROUT ORNAMENT.		Tokat Alaca Masjid Minaret, Mengücek Gazi Tomb , Sivas Keykavus Darüşşifa etc.		
PRINCIPALITIES & OTTOMAN PERIOD	PANELS	Geometric Patterned Decorated	Hüdavendigâr Mosque, Tire Rumi Mehmet Pasha Mosque, Alasehir Sheikh Sinan Mosque	
		Vertical- Horizontal- Stack	İznik Nilüfer Hatun İmaret, Bursa Uluabad İssız Han, Bursa Yıldırım Darüşşifa etc.	
		One or Three Brick Basket Weave	Bursa Nalbandoğlu Mosque	
		Dual-Brick Basket Weave	Edirne Yıldırım Mosque, Bursa Gülçiçek Hatun Tomb, Bursa Muradiye Madrasah etc.	
		Triple-Brick Basket Weave	Bursa Gülçiçek Hatun Tomb, Bursa Muradiye Madrasah, Alaşehir Sheikh Sinan Mosq. etc	
		Four-Brick Basket Weave	Bursa Gülçiçek Hatun Tomb.	
		Zigzag (Herringbone) Weave	Bursa Selçuk Hatun Mosque (horizontal), Bursa Sitti Hatun Mosque (vertical) etc.	
		With square cut bricks	Bursa Selçuk Hatun Mosque, İnegöl Tacünnisa Hatun Tomb	
		With hexagonal and hexagram shaped Bricks	Tire Neslihan Mesjid	
		Shaped in Stages (Similar to Z)	Bursa Beşikçiler Mesjid	
		Written Panels	Tire Rumi Mehmet Paşa Mosque (Kufi)	
		BADGES 'ROZET'		Bursa Orhan Mosque , Bursa Timurtaş Mosque , İznik Nilüfer Hatun İmaret
		SPIKE FRINGE 'KIRPI SAÇAK'		Bursa Demirtaş Mosque Minaret , Bursa Muradiye Mosque, Bursa Muradiye Madrasah etc.
		BROKEN BRICK		Kızılhan, Tombs in Peçin settlement, Tire Hafsa Hatun Mosque, Manisa Yedikızlar Tomb
ALMAŞIK		Bilecik Orhan İmaret, Bursa Alaeddin Mosque, Edirne Yıldırım Mosque etc.		

In this context; especially with the differentiation of stack types in Anatolia during the Seljukians Period; it had been possible to use brick intensively in the Period of principalities and Ottomans; with the use of stone as main construction material, it had been possible to see its use in mostly cover coat and cover coat transition elements and for ornamental purposes. During this period, it was especially an indispensable construction material of our architectural heritage with the examples of use in spiked fringe applications, brick badges, brick panels and alternating weave.

FOOTNOTES

1. In this paper; the use of brick for ornamental purposes in Seljukians, Principalities and Early Ottoman Period is discussed. In this regard; the study refers to the unglazed bricks and glazed bricks and tiles are excluded. But it should be noted that both in Seljukians, Principalities and Ottoman Periods; there are variety of facade, panel, writing or weave designs which were created by using unglazed bricks together with the glazed bricks and tiles.
2. The use of brick in Anatolian Architecture during pre-Seljukian and Seljukian periods has been extensively studied by Prof. Dr. Ömür Bakırer and it has been published as a book. (For more information see: Bakırer, 1981).
3. The material and technical subjects of the Anatolian Seljuk constructions were extensively studied by Asist. Prof. Dr. Azize Aktaş Yasa. (For more information about the mortar properties and plaster components see: Aktaş, 1988 and Aktaş Yasa, 2006)

4. The mentioned ratio has been defined by H.Tayla as the Thickness of Brick/ Long side of the Brick. (Tayla, 2007: 521).

CONFLICT OF INTEREST

No conflict of interest was declared by the authors

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