

CORNER DETAILS IN MİMAR SİNAN'S STRUCTURES: AN ANALYSIS OF THE DETERMINING FACTORS IN THEIR FORM



MİMAR SİNAN YAPILARINDA KÖŞE DETAYLARI: BİÇİMLERİNİ BELİRLEYEN FAKTÖRLERİN ANALİZİ

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ABSTRACT

The practice of chamfering or angling the corners of building walls or surrounding walls, particularly in narrow or congested streets, is a universal practice commonly used in both civil and monumental architecture. This detail is referred to by various names in architecture, including “corner chamfer,” “corner cutting,” “corner breaking,” “wall chamfer,” or in Turkish, “çal köşe” or “çalık köşe.” This article investigates the application of this detail in monumental architecture, with a particular focus on Mimar Sinan’s structures. Beyond its functional purpose, this detail enhances the visual composition of the building, depending on the materials and transitional elements employed, can establish the building as a key focal point within its urban context. The study investigates the factors that prompted the use of corner details and factors determining the formation of detail. The selected examples are classified according to their forms and analyzed based on the relationships between the structure-street, structure-structure, structure-parcel layout. The conclusion reveals that it was observed that the dimensions of corner details emerge in relation to the street fabric or other buildings that make up the architectural ensemble, as well as the locations of the structures and their relationships with one another. Moreover, it is observed that, alongside aesthetic considerations, the size of the chamfered detail plays a significant role in determining its form.

Keywords: *Ottoman Architecture, Mimar Sinan’s structures, corner detail, corner chamfer, muqarnas*

ÖZ

Özellikle dar sokaklarda yer alan yapıların beden duvarlarının veya çevre duvarlarının köşelerinin açılı olarak kesilmesi, sivil ve anıtsal mimaride sıklıkla kullanılmış olan evrensel bir uygulamadır. Yapılar ve sokaklar arasındaki geçişin rahatlatılması, duvar köşelerinin insan, hayvan, taşıt gibi etkenler sebebiyle zarar görmesinin engellenmesi ve

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özellikle sokakların kesişiminde yer alan köşe parselde konumlanan yapıların estetik olarak vurgulanması gibi amaçlar ile uygulanmış olan bu detay mimaride “köşe pahlı, köşe kesmesi, köşe kırmak, duvar pahlı, çal köşe veya çalık köşe” gibi farklı isimlerle adlandırılmıştır. Bu adlandırmalardan “köşe kesmesi”, benzerlerine oranla daha geniş bir kesimi tanımlamakta kullanılmış olup genellikle ihtiyaca ve/veya zorunluluğa bağlı olarak uygulanmış, boyutları da ihtiyaca ve/veya zorunluluğa göre belirlenmiştir. Köşe parselin biçimine göre tasarlanan ve yapının plan şemasında belirleyici rol oynayan ünik örneklerin yanı sıra yapıların beden veya çevre duvarlarının köşelerine uygulanan öğeler, fonksiyonel gerekliliklerine ek olarak estetik görünümleri ile kenti bütünleyen bir değer olarak, bazı yapıların kent hafızasında önemli bir yere sahip olmasına sebep olmuştur. Osmanlı mimarlığında köşe parsellerde konumlanan yapıların tasarımında da farklı uygulamalar görülmektedir. Yapının konumu ve parselin biçimi yapının plan şemasında büyük oranda belirleyicidir. Özellikle dar açılı köşe parsellerdeki yapıların tasarımında, çoğu zaman parsel biçiminin dezavantajı, plan şemasındaki özgün biçimlenişe sahip olması ile avantaja çevrilmiştir.

Tarihsel süreçte pek çok uygarlıkta örneğini gördüğümüz köşe pahları ve pahlın geçişinde kullanılan öğeler, yapının inşa edildiği döneme ve cinsine, yapı ve pahlın boyut ve biçimine bağlı olarak farklılaşmaktadır. Bu makalede, işlevsel kullanımlarına ek olarak görsel açıdan yapıyı zenginleştiren, bazı yapılarda, kullanılan malzeme ve geçiş öğelerine bağlı olarak yapıyı bulunduğu çevrede odak noktası haline getiren bu detayın, anıtsal mimaride kullanımı Mimar Sinan yapılarında ele alınmıştır. Anıtsal ve sivil mimaride pek çok yapıda karşımıza çıkan köşe detayı Mimar Sinan’ın yapılarında da sıklıkla uygulanmıştır. Büyük oranda saha çalışmasına dayanan bu çalışmada detayların bire bir incelenme olanağı sebebiyle Mimar Sinan’ın İstanbul’daki yapıları ele alınmıştır. Pek çok benzer örnek bulunması sebebiyle, çoğunlukla farklı detaylara sahip olan örnekler çalışma kapsamında incelenmiştir. Çalışmada öncelikle köşe detaylarının uygulanmasına sebep olan ve detayın biçimlenmesini belirleyen etmenler sorgulanmıştır. Bu doğrultuda detaylı rölöveler ve karşılaştırmalı tablolar hazırlanmıştır. Elde edilen verilere göre geçiş elemanı olarak üç farklı uygulamanın kullanıldığı tespit edilmiştir. Bu doğrultuda köşe pahları biçimlenmelerine bağlı olarak; klasik mukarnaslı geçiş, düz mukarnaslı geçiş ve küresel mukarnaslı geçiş olmak üzere üç başlıkta ele alınmıştır. Çalışmada ayrıca arşiv belgelerinde (plan, fotoğraf ve harita) ve güncel haritalarda köşe pahlının yapıdaki konumunun sokak dokusu ile ilişkisi; yapı-yol, yapı-yapı ve yapı-parcel ilişkisi temelinde ele alınmıştır. Çalışmanın sonuç kısmında köşe detaylarının boyutlarının sokak dokusunu veya yapı topluluğunu meydana getiren diğer yapılar, yapıların konumları ve birbiri ile ilişkisine bağlı olarak ortaya çıktığı, biçimlenmesinde ise yapıların çoğunda kullanılan mukarnaslı geçiş öğesi sebebiyle estetik kaygının, bazı yapılarda ise zorunluluklara bağlı olarak ortaya çıkan pahl boyutlarının belirleyici olduğu görülmüştür.

Anahtar Kelimeler: Osmanlı Mimarlığı, Mimar Sinan yapıları, köşe detayı, köşe pahlı, mukarnas

INTRODUCTION

Corner parcels and the buildings located on them have historically held significant importance across many civilizations, much like they do today with their visibility from multiple perspectives and their façades facing several streets and etc. In some cases, the locations of a building have played a significant role in to become the focal point, in addition to its other architectural features (structural, formal, etc.)¹. As well as unique examples, designed specifically according to the shape of the corner parcel and a determining role in the building's plan, the elements applied to the corners of a building's body walls or surrounding walls -besides fulfilling functional needs- also enhanced the aesthetic value of the structure, contributing to some structures holding significant places in the collective memory of a city².

In both monumental and civil architecture, the corners of buildings or surrounding walls³ located on corner parcels were cut at an angle for the purpose of:

- Preventing damage to walls or building corners due to external factors such as pedestrians, animals, or vehicles pulled by animals,
- Facilitating movement between buildings or streets, or preventing obstruction,
- Aesthetic concern / emphasizing the structure (with the contribution of the elements used in the design)

Although the detail, which historically we see many examples was predominantly applied at the corners of walls facing streets, it was also used in buildings and building

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- 1 The façade is an architectural element that can either facilitate a building's integration into its surroundings or enhance its visual prominence. Throughout various civilizations, buildings situated on corner parcels have capitalized on the advantages afforded by their location. A notable example of this is the Flatiron Building (1902) in New York, positioned at the intersection of two streets on a sharply angled corner parcel. Its triangular floor plan, derived from the shape of the plot, played a pivotal role in establishing the building as one of the city's most iconic landmarks, in conjunction with its other architectural features.
 - 2 Necipoğlu, 2005, 264. [For example, the green porphyry (*somaki*) corner column of the surrounding wall of the Şehzade Mehmet Mosque, located at the intersection of Dede Efendi and Şehzadebaşı Streets (*Divanyolu*), has attracted attention due to assumptions that it points to the geographic center of the city. This has made the surrounding wall a notable architectural feature.]
 - 3 The walls surrounding the structure, which determine the boundaries of structures and groups of structures with various functions on the land and are built to separate open spaces such as plots, gardens and courtyards from their surroundings, are defined as surrounding walls. In monumental architecture, surrounding walls have been used in many structures, from small-scale structures such as masjids, madrasahs and tombs to large-scale social complexes (Sözen and Tanyeli, 1994, 111; Orbeyi, 2019, 347).

groups (külliye etc.) that are located close to each other on narrow plots, to ease the transition between structures. Barışta⁴ states that corner details, in addition to their functional role, had a symbolic value in terms of folklore discipline and reflected the identity of the building owner. In this context, it can be said that the structure is personalized by its owner, especially with the use of region-specific materials, decorative elements, and the use of different corner chamfers in civil architecture examples. In monumental buildings, the shape of the corner elements is mostly dependent on the period in which the structure was built and is affected by the style of the period both in terms of decoration and form. The corner detail has been applied in two ways in the structures; corner chamfer and corner column⁵. This study explores the formation of the corner chamfered, which visually enriches the structures as well as being functional, in Mimar Sinan's structures. The corner detail, frequently encountered in both civil and monumental architecture, is also commonly applied in Sinan's structures. This research, based largely on fieldwork, focuses on Sinan's buildings in İstanbul, where the details could be examined firsthand. Due to the wealth of similar examples, the study primarily considers examples that possess distinctive details⁶. The details were compared based on their form, size, and material characteristics. The examined examples have been compared with Mimar Sinan's structures outside of İstanbul and with examples from different civilizations across various periods.

The factors that caused the application of corner details and determined the formation of the detail were first questioned. Using archival documents (like plans, photographs or historical maps) and current maps, the relationship between the street fabric and the building was analyzed in plan schemas, and the details were classified

4 Barışta, 1996, 96.

5 In architecture, in addition to chamfers, corner columns have also been applied at the corners of buildings or walls to soften the corner (Arseven, 1983: 1138). Corner columns have been widely used not only at the junctions of walls but also in structures such as portal jams, minaret bases, and mihrabs. Some examples of their application in Mimar Sinan's works include the corner at the intersection of Şehzadebaşı and Dede Efendi Streets on the surrounding wall of Şehzade Mehmet Mosque, the corner of the Primary School of the Selimiye Complex and the surrounding wall at the intersection of Mimar Sinan Street and Taşodalar Street, the corner of the Atik Valide Complex Dervish Lodge at the intersection of Ahmetoğlu Musallası Street and Tekke Önü Street, as well as the corner of the surrounding wall of the mosque at the intersection of Topbaşı Meydan Street and Çinili Cami Street, the corner of the southern surrounding wall of the Süleymaniye Mosque's cemetery, and the north and west corners of the Azapkapı Sokullu Mosque, where corner columns were used.

6 In this section, the limited number of examples has been examined under the specified headings. However, different formations may exist in various buildings. For instance, in some examples, such as the Kılıç Ali Pasha Complex, the narrow chamfer transition element observed on the mosque's surrounding wall was not used; instead, the inclined surface was directly connected to the perpendicular surface. The curved transition, differing from the quarter-sphere, at the chamfered of its bathhouse corner has also not been included in the study.

according to their form. Then the relationship between the detail and its surrounding was examined based on the relationship between “structure-street, structure-structure, and structure-parcel”.

Literature Review

In literature, there are only a limited number of studies specifically focusing on corner chamfers. Barışta⁷, in his publication, examines the corner details in houses from Antalya through four examples with emphasizing stone craftsmanship, and compares these with Classical Ottoman and Westernization Period examples from Istanbul. Another related work is Kılıç's⁸ study, which analyzes the corner chamfers and their decorations. Kılıç, classified the corner chamfers in both monumental and civil architecture examples in the Kaleiçi Region of Antalya based on ornamental elements and presented a typology. Research on this subject is mostly limited to the examples covered in the studies, specific to the region and/or building examined, and the corner chamfers are studied in a general sense. For instance, in Sönmez's⁹ study of the traditional features of Bergama houses, some examples of corner chamfers are provided. Like Barışta¹⁰, Sönmez notes that the chamfer detail has a symbolic meaning in addition to its functional feature. Another study that deals with corner chamfers within the scope of specific structures is Orbeyi's¹¹ publication, which examines surrounding walls in the works of Mimar Sinan. In this work, examples of corner chamfers are presented specifically in the context of surrounding walls.

CORNER CHAMFERS

Corner chamfers have been used as a universal application in various geographical regions. Chamfers are found in buildings located on corner lots, especially in small residential areas where historical structures with dense urban fabric are preserved. (Figure 1)¹². Corner chamfers have been applied in different forms across various civilizations. In European architecture, some chamfers found in monumental and civil architectural examples in historical cities with very narrow streets (such as the city of Toledo in Spain, etc.) have been applied in sculptural forms or with sculptures (Figure 1a, 1b and 1c). Myths and legends have emerged about the figures applied, and they have become symbols of the city¹³. Corner chamfers in Middle Eastern architecture are prominently

7 Barışta, 1996, 95.

8 Kılıç, 2022, 397-427.

9 Sönmez, 1998, 43.

10 Barışta, 1996, 96.

11 Orbeyi, 2019, 355.

12 Considering the density of the scope of the structures, a limited number of examples with accessible visuals have been presented.

13 Stories are told that the stone spheres found at the corners of many buildings in Toledo indicate the presence of a cistern that could be used as a water collection point in case of a fire (URL1).

featured in examples where muqarnas are intensively used (Figure 2). Figure 2 illustrates examples of corner chamfers in monumental buildings constructed in different periods and regions¹⁴. In Anatolian Seljuk architecture, some caravanserais and mosques feature the use of wide chamfers (Figure 3). Corner chamfers found wide application in Ottoman period architecture, being used in both civil and monumental structures¹⁵ (Figure 4).

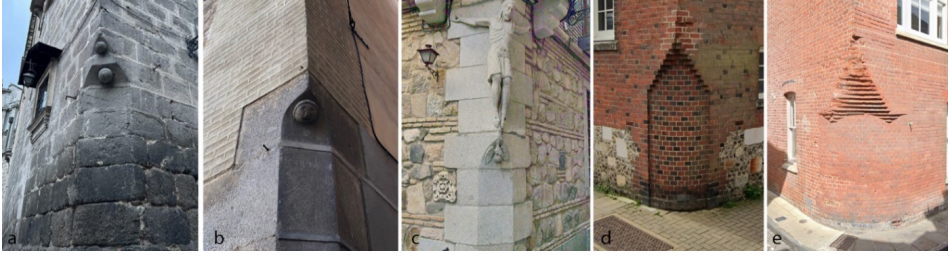


Figure 1. Examples of corner chamfers in European monumental and civil architecture; a and b) Toledo Cathedral (12th century), (URL1 and URL2), c) The Lopez Mansion (16th century), (URL3, 2025), d and e) chamfered corner detail in brick buildings, London (URL3, 2025).



Figure 2. Examples of corner chamfers in Middle Eastern monumental architecture; a) Jami' al-Aqmar (URL4), b) Madrasa al-Jaqmaqiyya (URL5); c) Madrasa al-Shu'aybiyya, (URL6); d) Chella Rabat (URL7)

¹⁴ Figure 2 illustrates the muqarnas-style corner chamfers in the following examples: the Al-Aqmar Mosque from the Fatimid period (12th century) in Cairo, Egypt; Madrasa al-Jaqmaqiyya built during the Mamluk Period (13th-16th centuries) in Damascus, Syria; Madrasa al-Shu'aybiyya constructed during the Zangid period (12th-13th centuries) in Aleppo, Syria; and Chella Rabat built during the Marinid Dynasty period (12th-15th centuries) in Morocco.

¹⁵ For examples of the application of corner chamfers in civil architecture, see: Barışta, 1996, 95-104; Sönmez, 1998, 9-83; Kılıç, 2022, 397-427.

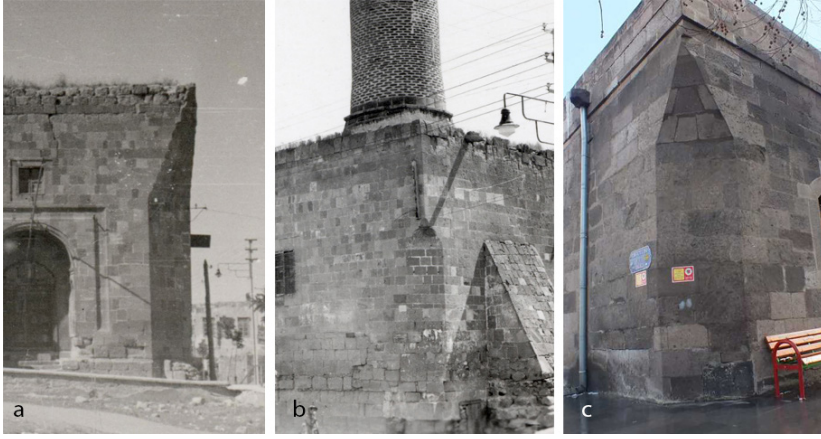


Figure 3. Examples of corner chamfers in Anatolian Seljuk monumental architecture; a) Erzurum Great Mosque, 12th century (Ülgen Archive, URL8), b) Erzurum Great Mosque, 12th century (Ülgen Archive, URL9), c) Kayseri Ulu Cami, 12th century (URL10)



Figure 4. Examples of corner chamfers in Ottoman Empire monumental architecture; a) Hacı Ilyas Yatağan Mosque, 15th century (URL11) b) Kadırga Üsküplü Yahya Efendi Primary School, 16th century (URL11), c) Great Çukur Han, 16th century (URL11), d) Saraçhane Mosque, Bolu (18th century) (URL12)

In Ottoman architecture, various design approaches are observed in buildings located on corner parcels. The position of the building and the shape of the parcel play a significant role in determining the building's floor plan. Particularly in the design of structures situated on narrow-angled corner plots, the disadvantage posed by the plot's irregular shape is often transformed into an advantage by creating a unique plan. Corner chamfers, which can be found in various types of Ottoman structures such as mosques, tombs, and fountains etc., are commonly used in civil architecture, particularly in buildings located on narrow streets and corner plots. In civil architecture, streets are generally narrow, and houses are closely located. In such cases, although the shaping of building

corners is mostly influenced by functional requirements, in some applications aesthetic concerns have overtaken this and have been effective in the emergence of different forms. However, in some instances, aesthetic considerations take precedence over functionality, resulting in the emergence of different forms¹⁶. Corner details, frequently encountered in monumental architecture too, are also commonly applied in many of Mimar Sinan's works.

In architectural terminology, the softening of the corners of intersecting walls through angled cuts is referred to as a "chamfer, wall chamfer, corner chamfer¹⁷, corner cutting, corner breaking," or in Turkish, "köşe çalığı, çal köşe or çalık köşe"¹⁸. The term refers to an angled or diagonally cut corner at the intersection of two walls, either concave or convex in form, often adorned with various decorative elements¹⁹. The term "çalık köşe" refers to a cut corner²⁰. Different forms of chamfers are referred to by various names. For instance, the term "corner cutting" (köşe kesmesi) refers to a broader cut compared to similar examples, typically applied based on necessity or functional requirements, with the size determined accordingly²¹. In the examples analyzed in this study, different forms of transitions between the chamfer and the flat part (such as the eaves line of the facade or the wall) have been observed. Based on their formation, corner chamfers are categorized into three muqarnas main types²²: classic muqarnas transition²³, flat muqarnas transition, and curved muqarnas transition.

Muqarnas Transition

Muqarnas, serving the function of transitioning and joining surfaces, is an architectural element used to create smooth transitions between different geometric forms, often in domes, vaults, and ceilings (Diez, 1979, 564; Tayla, 2005, 603; Mülayim, 2020, 126). It is a decoration specific to Islamic architecture, which was widely used in Medieval Anatolian Turkish architecture and evolved in form and richness until the Ottoman period. By the first quarter of the 16th century, different schemes had been

16 Sönmez (1998, 43), in his study on the houses of Bergama, notes that the corner chamfer examples examined were created using transitional elements such as the Turkish triangle and muqarnas. He also points out that these examples have moved away from their traditional forms and have taken on more of a symbolic meaning.

17 Chamfering at a 45 degree angle.

18 Turani, 1975, 72; Arseven, 1983, 496; Sözen and Tanyeli, 1994, 138; Barışta, 1996, 95; Sönmez, 1998, 21, 43; Hasol, 1998, 277, 344.

19 Hasol, 1998, 115.

20 Dilçin, 1983, 49.

21 Arseven, 1983, 1137.

22 All the titles are varieties of muqarnas corner chamfers. The similar ones have been classified under the specified titles.

23 Muqarnas consisting of stepped honeycomb-like niche series.

developed, introducing new elements distinct from those of the pre-Ottoman period²⁴ (for detailed information on muqarnas and its development, see Ödekan, 1977; Diez, 1979, 564-566; Aslanapa, 1979, 566-567; Tayla, 2005, 600-619; Mülâyim, 2020, 126-127; Ödekan, 1975; Ödekan, 1982; Ödekan, 1988, 475; Uluengin, 2018). It has a broad field of application in architecture, being used in many areas, such as transition elements for coverings (pendentive), portals, mihrabs, column capitals, eaves, and minaret balcony. As a structural and ornamental element, the muqarnas is frequently used in Ottoman monumental architecture in corner chamfers as in many areas, to achieve smooth transitions between surfaces while enhancing the aesthetic impact. In this section, the formation of muqarnas transitions corner chamfers examples, which are the most frequently encountered decoration examples in Mimar Sinan's buildings, is examined in 19 details located in 15 of Mimar Sinan's structures²⁵.

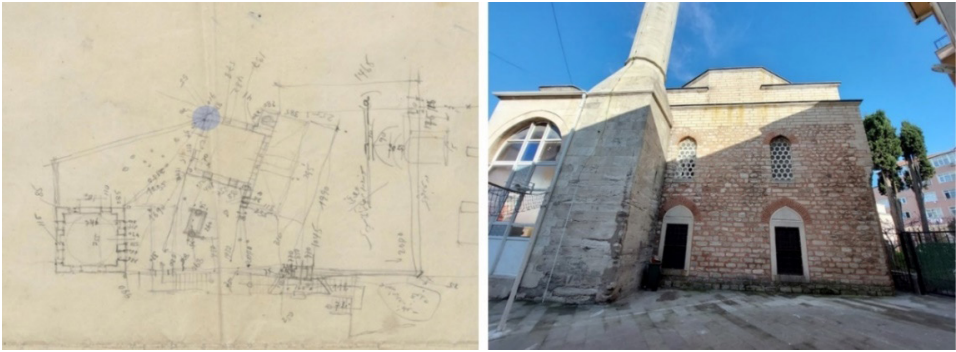


Figure 5. Dırağman Complex; a) The location of the corner chamfer in the Complex survey plan (URL13), b) Westside of the mosque (Author's archive, 2023)

Among the examples studied, the earliest is the Dırağman Mosque²⁶ (1541-42). The mosque has undergone numerous restorations over time. It is situated on an irregularly shaped, sloped plot at the intersection of two streets, bounded on two sides by neighboring buildings and facing streets on the remaining two sides. Due to the site's

24 Ödekan, 1988, 476.

25 The detail has been analyzed in fifteen structures designed by Mimar Sinan. However, some buildings feature multiple instances of this detail; for example, two in the Haseki Sultan Complex, two in the Süleymaniye Complex, and two in the Rüstem Pasha Complex, as well as four in the Zal Mahmut Pasha Complex.

This number represents the examples studied within the scope of this research, not all instances of muqarnas used in Mimar Sinan's structures. Although the Sinaneddin Yusuf Pasha Tomb, one of the structures in the Mihrimah Sultan Complex, is not a design by Mimar Sinan himself, it has been included in the study due to its location within a complex designed by Mimar Sinan.

26 The mosque is also referred to by the names Drağman, Tercüman Yunus, İsazade, and Draman Yunus Bey (Tanman, 1988, 323).

slope, the mosque has two entrances at different levels. The northern entrance, which is level with the ground, now lies within the building's plot but was depicted in archival maps as a narrow street leading to Draman Avenue. The surrounding wall enclosing the building also forms part of the façade that borders this narrow street (Table 1). The surrounding wall follows the irregular form of the plot and meets the mosque's southwest corner at an angle (Figure 5a, 5b). This corner is chamfered to align with the wall of the mosque. The chamfer measures 0.55 meters in width and its height is approximately 0.60 meters, extending upward to the level of the upper windows, where it terminates in a muqarnas decoration (Table 2). The walls of the mosque are primarily constructed of rubble masonry, with the muqarnas chamfer and the subsequent section made of finely cut limestone (küfeki). The muqarnas was formed by carving and stacking three layers of stone blocks, integrating into the wall's overall masonry pattern (Figure 5b, Table 2). When evaluating the corner chamfer in terms of its relationship with the structure-parcel and structure-street layout, it can be said that the width of the surrounding wall and the angle at which it connects to the mosque, play a decisive role in determining the dimensions of the chamfer.

Another structure is the Kepenekçi Sinan Madrasah (1545?)²⁷, located at the intersection of Kepenekçi Sabunhanesi and Kepenekçi Madrasah Streets, on a corner parcel of an irregular polygonal parcel bordered by streets (Table 1). Today, the dome-covered classroom of the madrasah that is in a state of ruin positioned at the intersection of narrow streets (Figure 6a, b). The structure was built using the alternating technique of three courses of brick and one course of stone, and its corner was chamfered at a 45-degree angle to facilitate movement between the narrow streets and prevent damage to the corner^{28 29} (Figure 6). The surrounding wall begins from the part of the chamfer within the parcel (Table 1³⁰). The 0.55-meter-wide chamfer extends up to the eaves line and features a muqarnas pattern crafted from limestone, formed by stacking three stone blocks on top of one another (Table 1 and 2). When evaluating the corner detail in the complex in the context of the relationship between the structure-street and the street-parcel, the chamfer, located at the intersection of three narrow, organically shaped streets, contributes significantly to emphasizing the corner of the structure.
















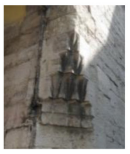









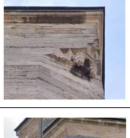



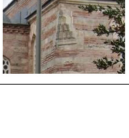
27 The madrasah is also known by the names "Sinan Emk" and "Emin Sinan Efendi". Ahunbay, 1988, 246.


















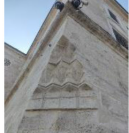




28 Today, there is an iron-barred gate located at the point where the surrounding wall connects to the mosque's main body wall.










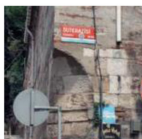

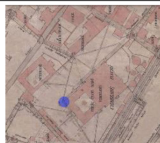

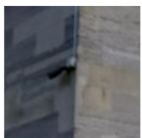
29 Ahunbay, 1988, 246; Ahunbay, 1993, 548-549.

30 Sources of structures plans: Çatalca Ferhad Pasha, Azapkapı Sokullu, and Hadım İbrahim Pasha Mosques, A.S. Ülgen archive (Ülgen, 1989); the other plans, Pervititch Maps, 1922-1945 ((Pervititch, 2000) and German Blues, 1913-1914 (Dağdelen, 2006); photographs Haseki Sultan Complex Hospital, Zeynep C. Keçici's Archive, 2017; Çatalca Ferhad Pasha Mosque, S. Giray Küçük's Archive, 2018; Rüstem Pasha Mosque, URL11. The photos other than those specified were taken between 2018 and 2024 and are owned by the author.

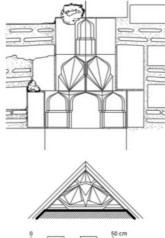
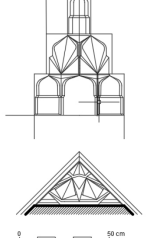
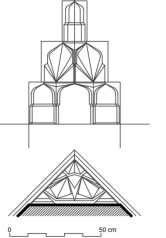
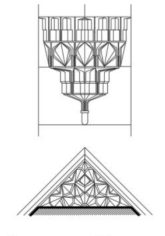
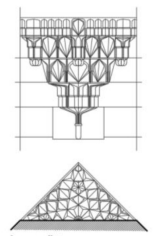
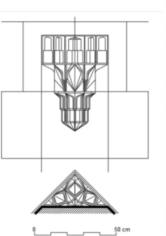
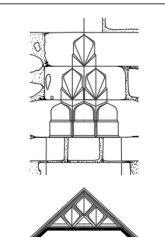
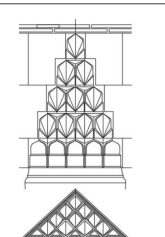
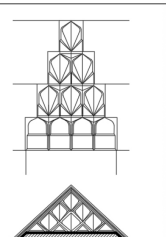
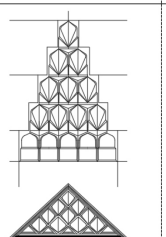
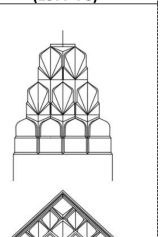
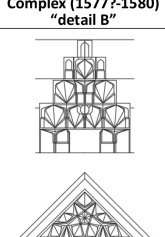
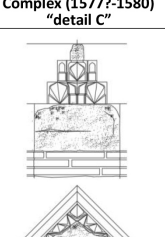
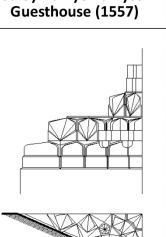
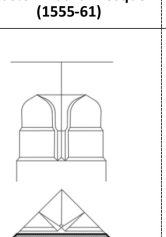
Table 1. Detail locations and photos (for the sources of structures plans see note 30)

Mosque	Aerial Photographs	Location of structure and detail on archive maps (Pervititch, German Blues, or A. S. Ülgen Arhieve)	Details location	Chamfer width (meter)	Chamfer environment relationship			Detail photos
					Parcel-structure	Struc-structure	Street-structure	
Draman Karamanlı Yusuf Bey Mosque (1541-42)				0.55	+			
Kepenekçi Sinan Madrasa (1545?)				0.55			+	
Sinaneddin Yusuf Paşa Tomb (1548)				0.56		+		
Haseki Sultan Complex Hospital (1550)				0.50	+	+		
Kara Ahmet Pasha Primary School (1555)				0.50			+	
Süleymaniye Complex Hospital and Guesthouse (1557)				1.00			+	
				0.90	+			
Hacı İbrahim Paşa Erkeği Madrasa (1557)				0.68 ve 0.70	+			

Mosque	Aerial Photographs	Location of structure and detail on archieve maps (Pervititch, German Blues, or A. S. Ülgen Arhieue)	Details location	Chamfer width (meter)	Chamfer environment relationship			Detail photos
					Parcel-structure	Parcel-structure	Struc.-struc.	
Catalca Ferhad Pasha Mosque (1575-88)				0.55			+	
Zal Mahmut Pasha Complex (1577?-1580)				0.50		+		
				0.40		+		
				0.40		+		
				0.51	+			
Azapkapı Sokullu Mosque (1577-78)						+		
Rüstem Pasha Mosque (1555-61)							+	

Mosque	Aerial Photographs	Location of structure and detail on archive maps Pervititch, German Blues, or A. S. Ülgen Arhieve)	Details location	Chamfer width (meter)	Chamfer environment relationship			Detail photos
					Parcel-structure	Parcel-structure	Struc.-struc.	
Yavuz Selim Madrasah (			1.70			+	
				1.30			+	
Kadrğa Sokullu Lodge				1.00			+	
Şehzade Mosque					+			

Tablo 2. Corner chamfer surveys (Author's archive)

TYPE 1	Kara Ahmet Pasha Primary School (1555)	Çatalca Ferhad Pasha Mosque (1575-88)	Zal Mahmut Pasha Complex (1577?-1580) "detail D"		
					
TYPE 2	Sinaneddin Yusuf Pasha Tomb (1548)	Süleymaniye Complex Hospital (1557)	Zal Mahmut Pasha Complex (1577?-1580) "detail A"		
					
TYPE 3	Draman Yunus Bey Mosque (1541-42)	Kepenekçi Sinan Madrasa (1545?)	Haseki Sultan Complex Hospital (1550)	Hadım İbrahim Pasha Madrasa (1551)	Azapkapı Sokullu Mosque (1577-78)
					
Incompatible	Zal Mahmut Pasha Complex (1577?-1580) "detail B"	Zal Mahmut Pasha Complex (1577?-1580) "detail C"	Süleymaniye Külliyesi Guesthouse (1557)	Rüstem Pasha Mosque (1555-61)	
					

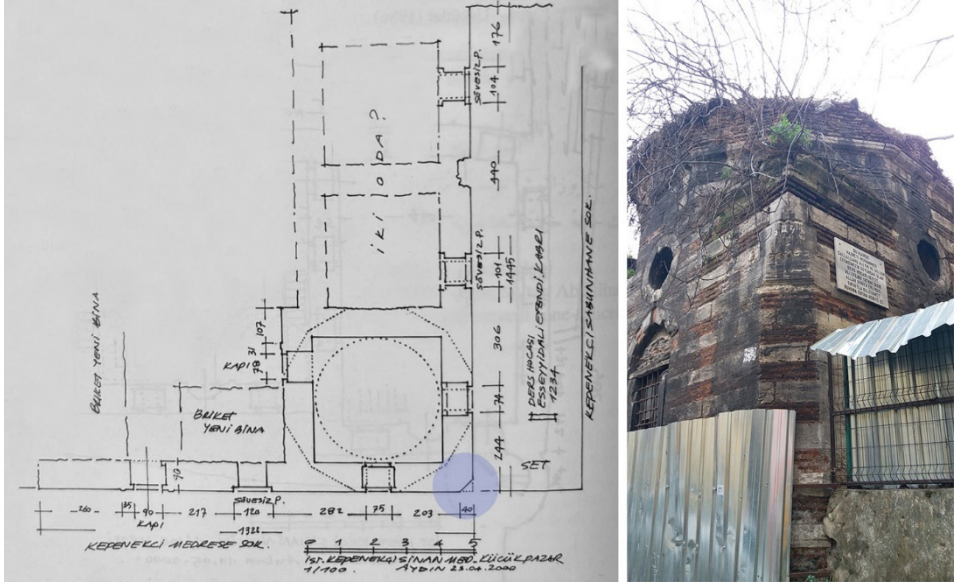


Figure 6. Kepenekçi Sinan Madrasah; a) the location of the corner chamfer in the madrasah plan³¹; b) Corner detail (Author's archive, 2020)

The Kurşunlu Madrasah and the mosque, part of the Mihrimah Sultan Complex (1548) in Üsküdar, are connected by a narrow corridor like path bordered by walls (Table 1). Two tombs, later additions to the complex, are located here. The Sinaneddin Yusuf Pasha Tomb, situated to the north, cannot be precisely dated due to the absence of an inscription. The other tomb, that is Ethem Pasha Tomb, was added to the complex in 1892, as indicated by its inscription³². The northern and southeastern corners of the tomb's body walls, which face the mosque, are chamfered up to the eaves line and measure of chamfer is 0.56 meters in width (Table 2). In the chamfer, is seen similar formation with the column capitals of the last prayer hall of the mosque, was implemented a transition created with a half muqarnas scheme according to the diagonal axis (Table 2, Figure 7). Between the eaves line and the ornamentation, there are two rows of stone. The muqarnas decoration, like the body walls, is made of limestone. It was created by carving the corners of two independent stone blocks to form the muqarnas detail within the wall masonry. In Figures 3a and 3b, it is seen that the tomb's roof and mosque's outer arcade roof has a disconnected. During the 2012-2014 restoration, the roof covering the last prayer hall was extended to connect both roofs (Figure 7c). When evaluating the corner detail in the complex in the context of the relationship between the structure-structure and structure-parcel it thinks that using chamfer of the tomb's northern and southeastern corners may

31 Ayverdi, 2004, 30.

32 Kuran, 1975, 49.

have been applied to ease the narrow transition between the tomb and the mosque's last prayer hall. Also, although it is not necessary, the application of the chamfer on both sides of the tomb suggests that the purpose is to provide symmetry on the façade (Figure 7a, c).



Figure 7. Sinaneddin Yusuf Pasha Tomb; a) Western façade (URL 14), b) Corner detail, southwest view (Author's archive, 2009), c) Corner detail, southwest view (Author's archive, 2023)

The Primary School (*sıbyan mektebi*), soup kitchen (*imaret*), madrasah, and hospital (*darüşşifa*) from Haseki Complex (1550) are located close to each other on a relatively small plot of land directly across from the Complex's mosque. Due to their proximity, a narrow, corridor-like street approximately 2.00 meters wide has formed between the imaret and the hospital buildings (Table 1, Figure 8a). The chamfer in this area measures 0.50 meters in width and approximately 2.10 meters in height. The chamfer is constructed from the same material as the walls, using limestone. The muqarnas decoration applied in this transition is integrated into the wall's masonry, with the chamfer consisting of four rows of stone blocks. The muqarnas pattern is symmetrical with the axis of the corner, and its form resembles the chamfer seen in the Kepenekçi Sinan Madrasah (Table 2, Figure 8b). When evaluating the corner detail in the complex in the context of the relationship between the structure-structure, the corner near the arched entrance of the hospital-which is connected to the street-was likely chamfered to ease movement. In contrast, the chamfer facing the outer area, when considered in relation to the structure-parcel, appears to have been implemented to soften the connection between the building and the surrounding wall.

The Primary School of the Kara Ahmet Pasha Complex (1555?) is located at the corner plot bordered on two sides by neighboring parcels where Beyazıtâğa Yağhane Street opens onto the main road. The corner of the building's wall, constructed with alternating rows of two courses of brick and one course of lime cut stone, is chamfered from ground level to approximately half the height of the wall (Figure 9a). The corner chamfer is symmetrical in relation to the diagonal axis of the building and is adorned with a muqarnas pattern, carved from three blocks of limestone. Although the detail is

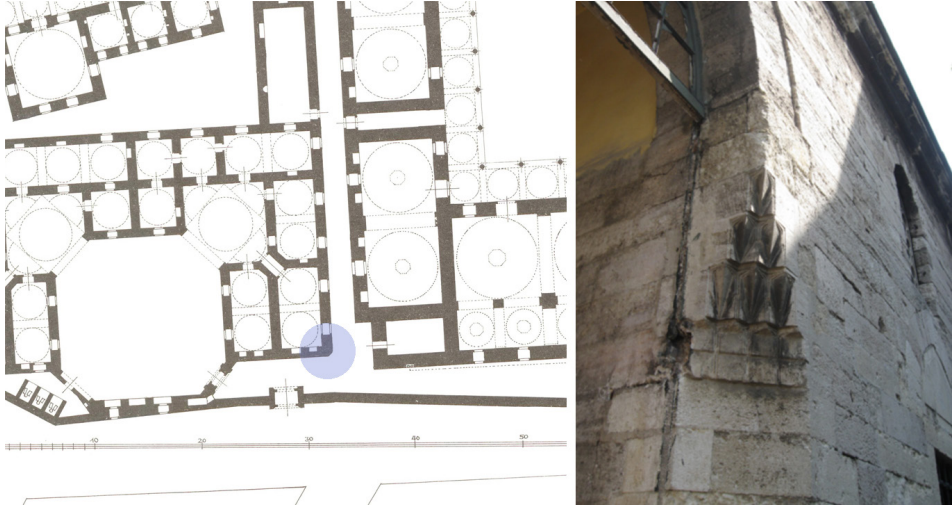


Figure 8. Haseki Sultan Complex Hospital a) the location of the corner chamfer in plan (URL 15), b) corner detail (Zeynep C. Keçici Archive, 2017)

integrated into the masonry, the stone courses of the alternating brick and limestone do not align (Figure 9b, c). When evaluating the corner detail in the complex in the context of the relationship between the structure-street, and structure-parcel layout, the chamfered corner enhances the structure's prominence the narrow, organically formed streets and the location of the detail at the corner facing the intersection of three streets.

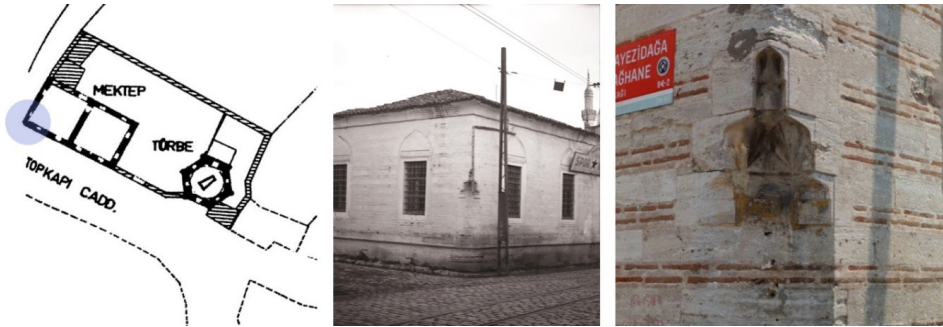


Figure 9. Kara Ahmet Pasha Primary School; a) the location of the corner chamfer in plan³³, b) Corner detail (URL 16), c) Corner detail (Author's archive, 2018).

33 Wiener, 1987, 487.

Tahtakale Rüstem Pasha Complex (1555-1561) is in a densely packed area, bordered by neighboring parcels (Table 1, Figure 10a). The detail is situated at a lower level, at the intersection of the street and the mosque's body walls. Compared to other examples of muqarnas patterns, this one is simpler, with the transition consisting of a single row of muqarnas decoration. The chamfer begins at ground level, and above the muqarnas, a single row of stone masonry leads up to the cornice. The pattern, like the body walls, is made of limestone (Table 2, Figure 10b). When evaluating the chamfered corner in terms of the relationship between the structure-street and structure-structure, the chamfer likely serves to ease movement through the narrow passages between the streets and to protect the building from damage in a highly congested area that was historically a bustling commercial district. The chamfer softens the sharp corner, preventing it from becoming a hazard.

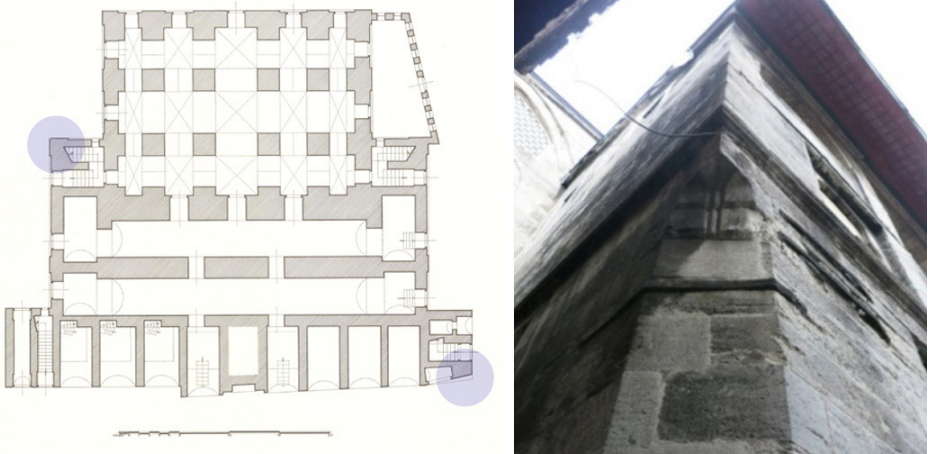


Figure 10. Tahtakale Rüstem Pasha Complex; a) the location of the corner chamfer in plan (URL 17), b) chamfer detail (Author's archive, 2020)

A similar application to the one seen in the Sinaneddin Yusuf Pasha Tomb can be observed at the corner of the hospital of the Süleymaniye Complex (1557), facing the Süleymaniye Mosque (Table 1). The hospital is located at the intersection of narrow streets on the western side of the mosque. The corner of the building, constructed from cut limestone, is chamfered from the ground up to the cornice at a width of approximately 1.00 meter. The muqarnas pattern used for the transition at this corner resembles a column capital cut at a 45-degree angle (Table 2). The large-scale muqarnas decoration, proportionate to the size of the chamfer, emphasizes the building's corner (Figure 11a, b). The muqarnas element is formed by shaping the corners of five stone blocks in the wall's masonry to fit the muqarnas decoration. As a result, the rows of the muqarnas correspond with the cut-stone masonry. Above the transition element, a row of cut-stone masonry leads up to the eaves line (Figure 11c). Because this chamfer is larger than those found

in similar examples, the muqarnas pattern is also larger in scale. Another example within the Süleymaniye Complex can be found at the eastern corner of the guesthouse (*tabhane*) building. Unlike the previous example, this corner is not chamfered at a 45-degree angle (Figure 12). Instead, the angle was determined by the geometry of the plot and how the surrounding wall connects to the corner. The chamfer begins a few steps up from the ground and extends to the eaves line. The transition to the cornice is achieved through an asymmetrical muqarnas pattern (Table 2, Figure 12b). In the first example, when evaluating the corner detail in the complex in the context of the relationship between the structure-street, it can be said that it increases the emphasis on the corner facing the intersection of three streets. In the second example, when analyzed in terms of both the structure-street and structure-parcel relationships, the shape and size of the chamfer are largely influenced by the geometry of the plot and the angle at which the surrounding wall connects to the building. Despite being harder to see due to its elevation, the chamfer remains a notable feature at the corner.



Figure 11. Süleymaniye Complex plan (URL 18); a) the location of the corner chamfer in plan, b) hospital's corner (Author's archive, 2020), c) corner detail (Author's archive, 2020)

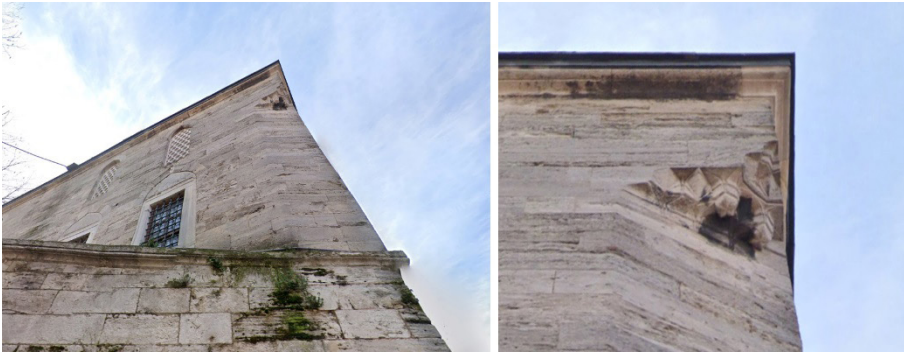


Figure 12. Corner detail of the Guesthouse in the Süleymaniye Complex (Author's archive, 2020)

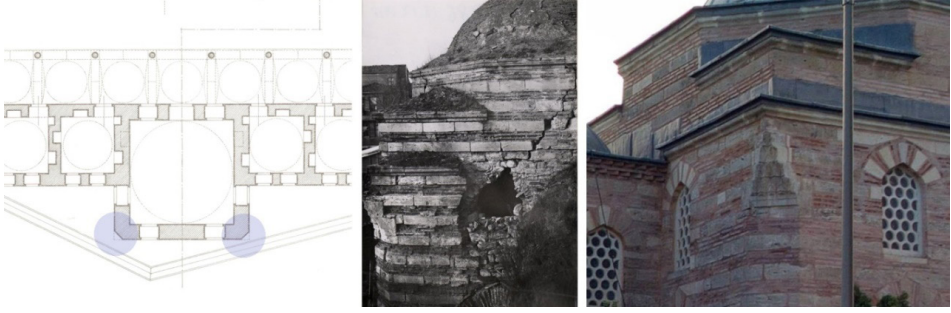
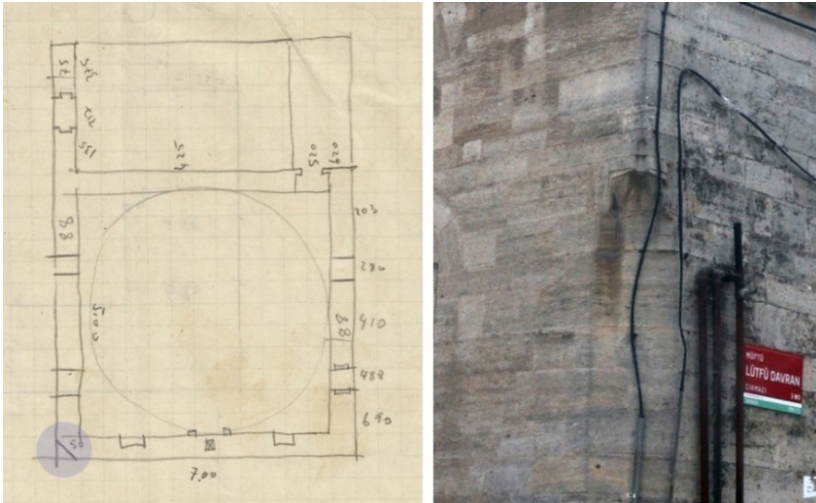


Figure 13. Hadım İbrahim Pasha Madrasah; a) the location of the corner chamfer in plan³⁴, b) corner detail (URL 19), c) corner detail (Author's archive, 2023)

The Hadım İbrahim Pasha (Esekapı) Madrasah (1551) is situated on a narrow parcel relative to the structure's size. The madrasah's prominent main room (*başoda*) on the western side is positioned very close to the surrounding wall (Table 1, Figure 13a). The corners of the space are chamfered to leave sufficient clearance between the building's body walls and the surrounding wall. The chamfer measures 0.70 meters on the western side and 0.68 meters on the southern side, continuing up to the eaves line. Today, the southeast section of the surrounding wall seen in Figure 8a no longer exists. The body walls are built using an alternating technique of three courses of brick and one course of cut limestone, while the muqarnas decoration used for the transition is also made of limestone (Table 2, Figure 13b, 13c). When evaluating the corner detail in the complex in the context of the relationship between the structure-parcel, the shape of the plot and the connection between the surrounding wall and the structure played a decisive role in determining the size and form of the chamfer.

Another example located on a restricted plot is the Çatalca Ferhat Pasha Complex (1575-88). The Primary school, one of the buildings within the complex, is positioned at the corner of the plot, which is defined by Müftü Lütü Davran Street to the north and Vezir Ferhat Pasha Street to the east (Table 1, Figure 14a). The corner of the building's street-facing walls is chamfered at a 45° angle from the ground level up to a height of approximately 3.90 meters. The chamfer begins about 0.20 meters above the ground. Its width is 0.55 meters. The muqarnas decoration applied in the transition is made of limestone. Its height is 0.60 meters. The muqarnas is symmetrically aligned with the diagonal axis of the corner and is formed within three rows of cut limestone blocks in the madrasah's wall masonry. The applied muqarnas pattern resembles the example seen in the Kara Ahmet Pasha Primary School (Table 2, Figure 14b). Despite its prominent location at the intersection of the streets, the detail has become obscured today due to the addition of electrical cables and other modern fixtures that pass over the chamfer (Figure 14b). When evaluating the corner detail in the complex in the context of

34 Ülgen, 1989.



phasizes the entrance to the main courtyard below (Figure 15a, 16a). The wall structure consists of two rows of brick and one row of cut stone. The door jamb and threshold are made of limestone. The chamfered section, approximately 0.50 meters wide, is also entirely constructed from limestone. The courses of stone in the chamfer and muqarnas detail are arranged independently from the alternating brick and stone masonry system. The chamfer sits on a raised platform that is three steps higher than the door's ground level.

Another chamfered corner (Detail C) is located at the eastern corner of the upper madrasah (Figure 15a, 16b). The chamfer is about 0.40 meters wide. The body walls of the upper madrasah in this direction are built using the alternating masonry technique of three rows of brick and one row of stone. The chamfer continues up to the eaves line. The muqarnas decoration is resolved in this section. It continues up to the eaves line, integrated within the wall's masonry. In detail B and C concerns play a role, as the chamfer visually emphasizes the entrance to the main courtyard below. When evaluated in terms of the structure-structure relationship, the detail is located in a wide area at the point opening to the courtyard. Therefore, there is no necessity for its construction. In this case, it can be said that aesthetic concerns have played a role in shaping its form.

The final chamfered corner (Detail D) is located on the east-south side of the complex, near the surrounding wall (Figure 15a, 16c). The corner of the main room of the madrasah, close to the surrounding wall, is chamfered to facilitate easier passage. Without the chamfer, the clearance would have been 0.35 meters, but with the chamfer, the passage width increases to 0.54 meters. The wall surface where this chamfer is found is plastered, and the chamfer extends up to the cornice, where the muqarnas decoration terminates just below the eaves line. When evaluating the chamfered corner in terms of the relationship between the structure-parcel, it appears that the chamfer in the Upper Madrasah may have been applied to soften the narrow space between the last prayer hall and the madrasah, as the proximity of these two structures creates a narrow passage.

The final example of a classical muqarnas-patterned corner in this section is found in the Azapkapı Sokollu Mosque (1577-1578), where a chamfered corner is applied at the intersection of the building's body wall and the surrounding wall, located at the southeast corner of the structure (Table 1, Figure 17a). In 2007, it was observed that the walls, up to the spring line of the arched windows, were partially buried underground. As a result, in older photographs, the muqarnas transition above the chamfer appears to be very close to the ground. During restoration in 2008, the ground level was adjusted, raising the basement windows and the corner detail higher above ground level (Figure 17b). The walls of the mosque and muqarnas chamfer are constructed of finely cut limestone. The muqarnas was formed by carving and stacking three layers of stone blocks, integrating into the wall's overall masonry pattern. When evaluating the chamfered corner in terms of the relationship between the structure-parcel, the corner serves to facilitate movement at the point where the pathway connects to the building's corner, while also emphasizing the corner itself. The shape, location, and size of the surrounding wall and the plan of the building played a significant role in shaping the chamfered corner.

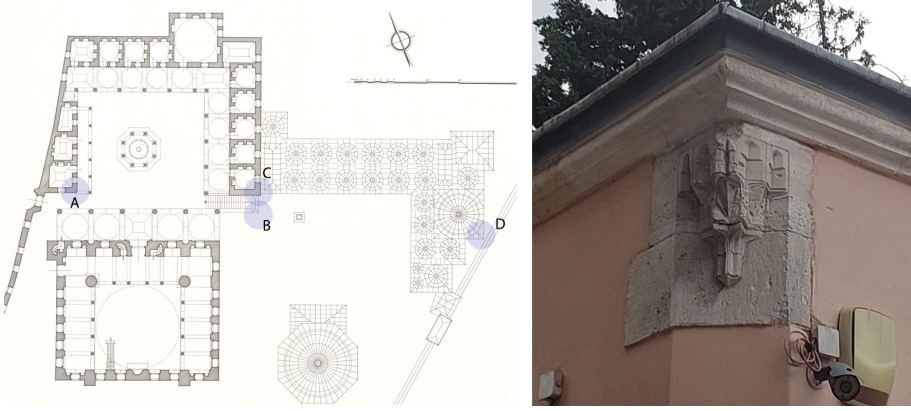


Figure 15. Corner detail of the Zal Mahmut Pasha Complex; a) the location of the corner chamfer in plan (URL 21), b) Detail A (Author's archive, 2019)



Figure 16. Corner detail of the Zal Mahmut Pasha Complex; a) Detail B, 2019 (Author's archive), b) Detail C, 2019 (Author's archive), c) Detail D, 2019 (Author's archive)



Figure 17. Corner detail of Azapkapı Sokollu Mosque; a) the location of the corner chamfer in plan (URL 22), b) chamfer detail (Author's archive, 2007), c) chamfer detail (Author's archive, 2024)

Flat Muqarnas Transition

One of the rarer applications compared to other forms of transitions is the flat muqarnas transition, which has been applied solely in the body walls of the Yavuz (Sultan) Selim Madrasah (1550) among the structures examined in this study (Table 1). The madrasah is situated on a relatively narrow plot in relation to the building's size, and at several points, there is limited space (approximately 60-70 cm) between the surrounding walls and the madrasah's body walls, with the surrounding walls intersecting the body walls in some areas (Figure 18a). The corner of the madrasah's body wall, which extends toward Halıcılar Köşkü Street, has been chamfered to avoid obstructing pedestrian passage. Due to its size, this chamfer, measuring 1.70 meters wide, can be classified as a "corner cutting". The transition to the cornice was achieved by staggered stepping of the lime cut stone masonry used in the construction of the body walls. The transition is completed with eight rows of stone (Figure 18b). A similar chamfer is located at the symmetrical wing of the madrasah, at the corner where Halıcılar Köşkü Street intersects with Adnan Menderes Boulevard. However, this chamfer was applied to provide additional clearance between the surrounding wall and the building for pedestrian passage. The distance between the surrounding wall and the chamfer is approximately 0.80 meters. This chamfer is narrower than the one at the other corner, measuring 1.30 meters. The transition element here was formed by staggered stepping of five rows of stone blocks (Figure 18c). The Sultan Selim Madrasah was restored between 1958 and 1963. Archive photographs reveal differences in ground elevation heights³⁶. Today, a large portion of the body wall is below the current street level. As a result, the transition element has become closer to the ground, falling below head clearance height at lower levels. When evaluating the chamfered corners in terms of their relationship with the street and parcel, it can be argued that the organic shape of the parcel, the building's positioning within the plot, and the interaction between the parcel and the street made the use of chamfers necessary at both corners.

A similar example can be found in the Rüstem Pasha Complex (1555-1561). Located within the marketplace, in a highly confined space at the intersection of four narrow streets, the northeastern corner of the structure features an angled floor plan (Table 1, Figure 10a). Unlike the previous example, except Süleymaniye Guesthouse, this corner is not chamfered at a 45-degree angle. The ground floor wall of the building is constructed at a different angle, while the upper floor plan corrects this slope, making it nearly perpendicular (Figure 19). The transition is achieved through the overlapping of three rows of stones in the masonry. The streets are quite narrow for such a densely populated commercial area. Even today, vehicles can barely pass through the streets. The corner chamfer is located at a narrow angle in the plan. When considering the chamfered corner in relation to the street-parcel dynamics, it can be argued that the organic shape of the parcel and streets, along with the relationship between the parcel and the street, made

36 URL 23

the use of chamfers a necessary design choice. However, even in this case, it is evident that the stones at the corner of the wall have worn down, with visible cracks in some areas (Figure 19).

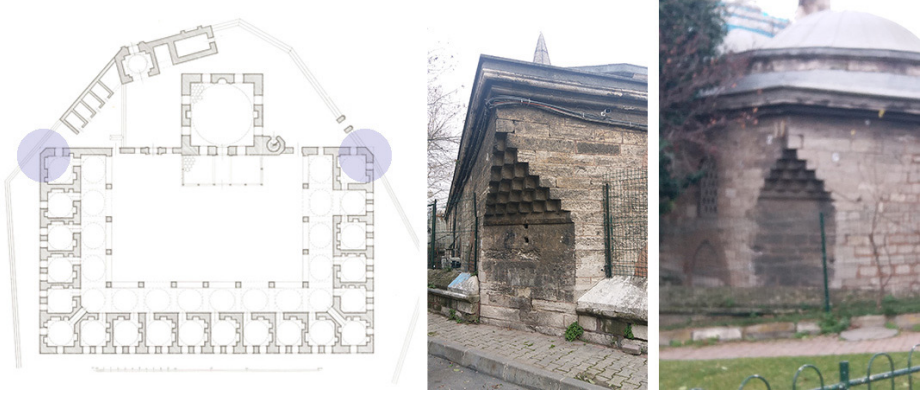


Figure 18. Yavuz (Sultan) Selim Madrasah; a) the location of the corner chamfer in plan (URL 23), b) Stepped transition detail (Author's archive, 2020), c) (Author's archive, 2020)



Figure 19. Rüstem Pasha Complex chamfer detail (URL 11)

Spherical Transition

This is a more straightforward application compared to other examples of transitions and has been implemented in various sizes across numerous structures. This form is more commonly seen in cases where the chamfer is narrow and designed up to the head height level of the wall. Comparable examples can be observed at the corner of the prayer hall of the Şehzade Mosque (1543-48) and the surrounding wall of the Hadım İbrahim Pasha Mosque in Silivrikapı (1551). In both instances, the corners are chamfered at a 45-degree angle (Table 1, Figure 20). In the case of the prayer hall, the chamfer

extends to approximately half the length of the body wall, whereas in the surrounding wall, it reaches the coping (*harpuṣta*). In both examples, the stone courses at the transition are shaped in a curved form. When analyzed in relation to the structure-parcel interaction, the chamfered corner of the surrounding wall is designed to mitigate potential damage at the intersection of the streets. In contrast, the chamfer at the prayer hall may have been intended to aesthetically soften the corner.



Figure 20. Prayer hall of the Şehzade Mosque and Hadım İbrahim Pasha Mosque surrounding wall (Author's archive, 2019)

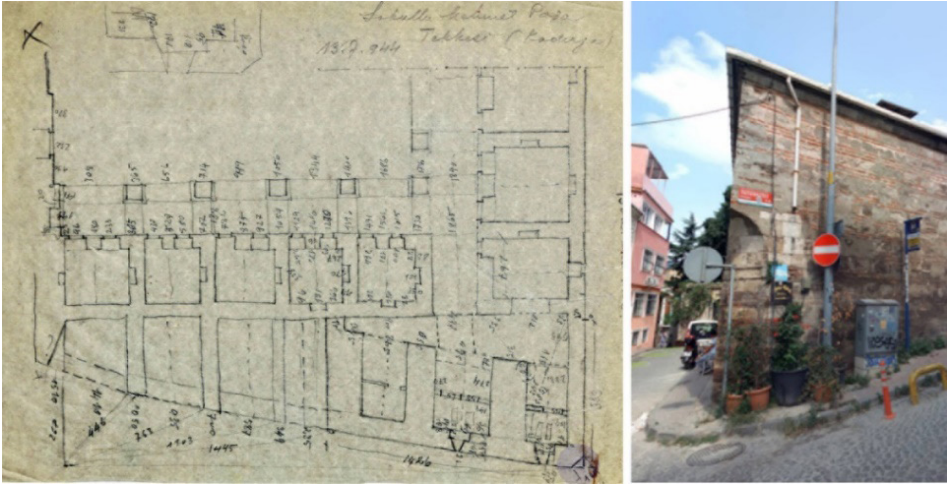


Figure 21. Corner detail of the Sokullu Mehmet Pasha Complex dervish lodge in Kadırga; a) the location of the corner chamfer in plan (URL 24), b) corner detail (Author's archive, 2020)

Another example with a wider chamfer can be found in the dervish lodge (*tekke*) of the Sokullu Mehmet Pasha Complex in Kadırga (1571-1572) (Table 1, Figure 21a).

The chamfer at the intersection of Su Terazisi Street and Şehit Mehmet Pasha Street is approximately 1.00 meter wide. The transition from the inclined surface to the flat surface is achieved through a spherical curve. The chamfer, like the body walls, is built using an alternating masonry technique, and the transition element is constructed from four rows of cut limestone (Figure 21b). The corner chamfer is located at a narrow and sharp angle in the plan. A relatively wide chamfer was applied to prevent vehicles from damaging the building's corner during turns, particularly in consideration of its relationship with the street-structure.

EVALUATION

In the muqarnas transition corner chamfer applications examined in this study, the size and form of the muqarnas decoration vary depending on the building in which the detail is found, the material, and its position within the structure. Accordingly:

- Chamfers in the buildings studied are applied at two different heights. In the first application, the chamfer starts at the ground level and ends at a height sufficient for the passage of a vehicle, person, or animal. In the second application, the chamfer also starts at ground level but extends up to the cornice. The height at which the muqarnas decoration ends differs it terminates roughly halfway up the walls in the Dırağman, Kara Ahmet Pasha, and Haseki Mosques; at the cornice level in Azapkapı and Rüstem Pasha Mosques; and at the eaves line in other structures.

- The details were evaluated based on their relationship with the streets, parcels, and other buildings within the architectural ensemble. Five details were shaped by the structure-street relationship, five by the structure-plot relationship, and six by the structure-structure relationship.

- There is no standardized width for chamfers. In all the examples examined in this study, the corners of the walls are cut at an angle of 45° or close to it. However, the width of the chamfer created by this cut varies depending on the intended purpose. In cases where there is no functional or structural need to cut the corner to a specific width, the dimensions of the chamfer are primarily determined by the size and form of the applied transition element, in other words, aesthetic considerations. For example, in the Yavuz Sultan Selim Madrasah, the width of the chamfer is determined by the distance the wall protrudes into the street, making it wider than other examples. In cases where the chamfer was applied to facilitate easier transitions at corners, while there is no fixed standard, it can be said that the dimensions of the chamfer are largely dictated by the size and form of the transition element used to connect the chamfer with the wall. In most of the examples, the chamfer's width ranges between 0.50 and 0.55 meters (Table 1). Exceptions to this range, such as the examples from the Süleymaniye Hospital and Guesthouse, as well as the Esekapi and Yavuz Sultan Madrasah, suggest that the dimensions of the chamfer were determined by necessity.

- Chamfer examples can be grouped under three types (Table 2).

- a. In Type 1, the three examples, Kara Ahmet Pasha Primary School, Çatalca Ferhat Pasha Madrasah, and Zal Mahmut Pasha Complex Detail D, are almost identical in terms of size, shape, and material.
- b. In Type 2, the three details are different from the other structures, as the column capitals are cut at a 45-degree angle to the diagonal. Their sizes and shapes differ from one another. But they are similar in formation. These examples are Sinaeddin Yusuf Pasha Tomb, Süleymaniye Hospital, Zal Mahmut Pasha Complex Details A.
- c. Type 3 is the most repeated formation. The point where the chamfer ends is followed by a muqarnas decoration, which narrows and rises. Although the size and number of repeating elements and muqarnas rows differ, the formation is the same. These examples are; the Dırağman Yunus Bey Mosque, the Kepenekçi Sinan Madrasah, and the Haseki Sultan Hospital, Hadım İbrahim Pasha Madrasah, and Azapkapı Sokullu Mosque.
- d. The other examples exhibit a different form compared to the ones mentioned above. These include the Zal Mahmut Pasha Complex Details B and C, the Süleymaniye Guesthouse, and the Rüstem Pasha Mosque. Detail C of the Zal Mahmut Pasha Complex is currently in a state of deterioration. However, based on the remaining portions, it can be inferred that it may have been like Detail B. In the Süleymaniye Guesthouse, due to the chamfer not being cut at a 45-degree slope, a rare example is presented where the muqarnas design is asymmetrical in relation to the diagonal.

When examining structures different from those addressed in the study, it can be observed that corner chamfers with similar typological forms have been applied. The Edirne Yahya Bey Mosque (1577-1578) was commissioned by Şair Yahya Bey to Mimar Sinan as a mosque. Positioned amidst a narrow street fabric, the corner of the mosque's mihrab facade, where it intersects with the surrounding wall, has been chamfered in parallel to the street. The muqarnas detail applied at the chamfer transition is identical in material and form to the muqarnas detail found in Type 1 (Figure 22, Table 2). Similar to the Kara Ahmet Pasha Primary School (Figure 9), the structure's exterior walls were built using two rows of brick and one row of cut stone masonry, with a muqarnas chamfer carved from limestone. In the Yahya Bey Mosque, in addition to this detail, there are stone-carved ornamental patterns beneath the muqarnas scheme.

In the Edirne Üç Şerefeli Mosque (1437-1447), which is not a Mimar Sinan structure, the corner of the mihrab facade intersects with the surrounding wall. At the chamfered corner, a muqarnas carved from limestone, similar to the scheme in Type 2, is applied (Table 2). Although the arrangement of the applied elements differs, it is similar in form and material. The muqarnas was formed by carving and stacking four layers of limestone blocks, integrating into the wall's overall masonry pattern (Figure 22b).

The Hatice Turhan Valide Fountain, built in Eminönü (1663-1664), has its corner facing the intersection of Şeyhülislam Hayriefendi Street and Celal Bey Street cham-

ferred, largely to ease the narrow passage. The muqarnas scheme at this corner is a similar application to Type 3 (Figure 22c). The muqarnas decoration is identical in both material and form to the application found in the Haseki Sultan Complex Hospital (1550) (Figure 8) (Table 2)³⁷. Although muqarnas schemes appear in buildings constructed in different periods, their forms and material usage are similar to the details of the Sinan's era.

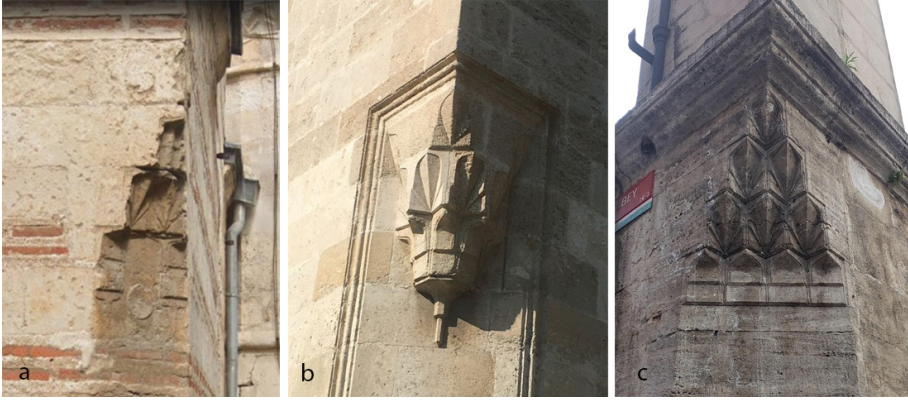


Figure 22. Examples of classical muqarnas transition elements; a) Edirne Yahya Bey Mosque, 2025 (URL3), b) Edirne Üç Şerefeli Mosque (author's archive, 2015), Hatice Turhan Valide Fountain (author's archive, 2024)

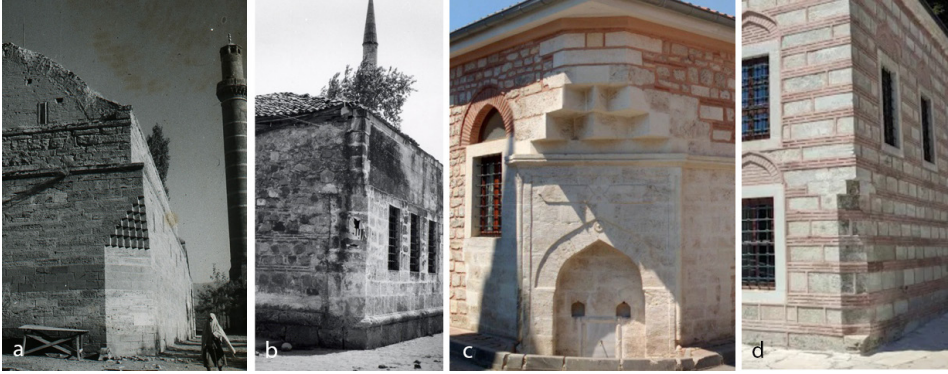


Figure 23. Examples of flat muqarnas transition elements; a) Ereğli Rüstem Pasha Caravanserai (URL 25), b) İzmit Pertev Pasha Complex Primary School (Ülgen archive, 1958, URL26), c) Hacı Hüseyin Ağa Primary School (pre-17th century, URL 11), d) Ayasofya Primary School (Author's archive, 2024)

37 Another application like Type 3 can be seen at the corners of the Darülcürre and Darülhadis Madrasah in the Edirne Selimiye Complex, which is a work of Mimar Sinan. Although similar in form, the muqarnas is smaller and consists of two rows. Another similar example can be found at the corner of the Üsküplü Yahya Efendi Primary School (1506), which faces the intersection of streets.



Figure 24. Examples of curved muqarnas transition elements; a) Elazığ Harput Alacalı Mosque (13th century), b) Selimiye Külliyesi Madrasah, (Author's archive, 2015), c) An example of traditional Antalya houses, (Cengiz Bektaş archive, URL 27)

The flat muqarnas has been applied, albeit in limited examples, in various structures. The first of these examples is the Rüstem Pasha Caravanserai in Konya Ereğli (1552), a structure designed by Mimar Sinan, which is very similar in size, shape, and material to the Yavuz (Sultan) Selim Medrese. The building's northwest corner, located at the intersection of streets, is chamfered in a manner like the applications seen in the Sultan Selim Madrasah in Istanbul. The transition element was created based on the width of the chamfer, achieved through the staggered stepping of six rows of stone blocks (Figure 23a). Another example can be found at the corner of the *İzmit* Pertev Pasha Complex Primary School (1579), which faces the street. The corner of the structure is chamfered to a width of 0.52 meters³⁸. The applied muqarnas scheme consists of two rows. One facade of the building, where the corner is formed, is built with two rows of brick and rubble stone masonry, while the other facade is constructed with cut stone masonry. The chamfer and muqarnas transition are made with limestone (Figure 23b). Another example is seen in the Hacı Hüseyin Ağa Primary School (pre-17th century). The corner of the building, constructed with rubble stone, is chamfered to a large size. A fountain is located at the chamfered section, and the transition above the fountain is completed with three rows of cut limestone, featuring a flat muqarnas detail (Figure 23c). The final example of this application is found in the Ayasofya Primary School (1740)³⁹. The building, constructed with one row of stone and two rows of alternating masonry technique, has its corner chamfered using the same masonry technique. The muqarnas detail is made of limestone and consists of two rows (Figure 23d). Some examples of the use of curved muqarnas include the Elazığ Harput Alacalı Mosque (1203-1204), Selimiye Complex Madrasah, and examples from Antalya's traditional civil architecture (Figure 24).

38 For detailed information survey drawings and photographs of the *İzmit* Pertev Paşa Works, see.; URL 28.

39 Another example, similar in both size and form, can be found at the corner of the Hacı Beşir Ağa Complex Madrasah (1744-1745), which faces the courtyard of the complex and the corner of the Şeyh Ebul Vefa Mosque, which faces the street.

CONCLUSION

Corner detailing has been applied in various forms throughout different periods of history across many civilizations. In addition to the chamfers implemented for functional purposes in European architecture, some examples feature sculptures incorporated into the decoration, transforming these elements into components with a pronounced aesthetic significance. Over the extensive period from Middle Eastern Islamic architecture to the Ottoman era, the transition of corner chamfers with the muqarnas schema is observed to have been applied extensively in both monumental and civil architecture⁴⁰. During the era of Mimar Sinan, corner chamfers utilizing the muqarnas schema were employed in a wide range of structures with diverse functional purposes.

In most of the buildings examined, the corner details were applied primarily to soften the corners in narrow streets, prevent obstruction, or ease movement between closely spaced structures. On walls facing wider openings, these chamfers were likely chosen to enhance the visual dynamism of the façade and strengthen its aesthetic impact. The classic muqarnas based transition, known for its strong visual impact, is the most frequently applied transition element in the buildings studied, having been used in many structures with striking details, with its size and form varying depending on the width of the chamfer. Curved transitions, on the other hand, are mostly used in areas that are not focal points, typically in less visible parts of the building. The transition with flat muqarnas is primarily applied in larger corner cuts. At this point, it may have been preferred because it is a transition that can be applied based on the dimensions of the chamfer rather than its position within the structure.

Buildings situated on corner parcels have historically garnered attention due to their strategic locations. One of the primary reasons for this is that corner structures occupy a prominent place in the collective urban memory, functioning as easily identifiable landmarks and focal points for the public⁴¹. When evaluated in this context, the large muqarnas chamfer at the corner of the Süleymaniye Hospital, overlooking the expansive square at the intersection of streets, as well as the corner chamfers of the Kara Ahmet Pasha and Çatala Ferhat Pasha Primary Schools, located at the intersections of streets, serve as significant focal points, areas of definition, and gathering spots in spaces populated by large crowds. Unlike other examples, these structures play a crucial role in facilitating social interaction within public spaces.

When examining corner chamfers according to the functions of the buildings they are located in, it is observed that seven of the examples⁴² considered in the study are found in madrasahs, four in mosques, two in elementary schools, hospitals, and

40 Ödekan, 1988, 475, 476.

41 Yılmaz and Saban, 2021, 505.

42 Three of the corner chamfers in the Zal Mahmut Pasha Complex are located in the madrasah buildings. One is found at the staircase door, which connects the courtyards. Due to the madrasah being located at the end of the wall, it is included in the count of madrasah buildings.

surrounding walls or courtyard walls, and one each in a tomb, a dervish lodge, and a guesthouse. The schema defined as Type 2 has been applied in areas visible to visitors, such as the courtyard or square. The two examples of Type 1, on the other hand, are found in primary schools. Type 3 has been applied in 2 madrasahs, 2 mosques, and 1 hospital. While it is not possible to directly associate the applied ornamentation with the function of the structure, a review of similar examples outside of Sinan's work reveals that two of these are in mosques, one in a fountain, and all three are located at the corners of buildings facing the street. The muqarnas chamfer in the Üç Şerefeli Mosque, with a schema similar to Type 2, is particularly noteworthy due to its position at a point of the structure that is visible from multiple angles. This strategic placement makes it a prominent feature of the building.

Details constructed in different civilizations and/or periods, regardless of their size and form, have been applied for similar purposes, even though their aesthetic emphasis may vary across periods. The definability of these details, particularly those from the pre- and post-Sinan eras, according to the typology presented in this study, serves as a significant indication of the influence between different periods.

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