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# The Protection Problems and Reparations of Ahi Çelebi Mosque in Istanbul

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**Abstract** The Ahi Çelebi Mosque, which is among Istanbul's oldest mosques, is located on the shores of the Golden Horn in the Eminönü. This mosque, which was very probably built by Ahi Çelebi towards the end of the 15th century, was restored during the 16th century by Architect Sinan. It is a stone building with a rectangular plan, single dome, with a rear congregational area*/son cemaat yeri* in front of its main space, and a cut stone minaret at its right corner. Damaged by fires and earthquakes during its long history, this building, set on reclaimed land, was restored and strengthened at various times through the years.

In the 1980s, the building was unfavourably affected by the construction of the new Galata Bridge; it began to sink and slide towards the sea, with the result that it had to be supported with steel girdles as a temporary measure and was abandoned. In 2000, the General Directorate of Foundations had concrete pillars added underground to stabilise the base, and the sea water around the foundations was pumped out. During the last restoration carried out in 2005-2006, the main dome and walls were strengthened, the minaret was rebuilt, and the interior plaster and decorations were redone.

In this study we shall make a general re-evaluation of the restoration work undertaken on the 500 year old Ahi Çelebi Mosque. We shall determine to what degree the structural interventions and, in particular, the contemporary interventions have been able to maintain the original materials, shapes, workmanship and period additions, and whether or not these are distinguishable, reversible and suitable to the aesthetics of the whole.

**Keywords:** Turkey, mosque, consolidation, structural damage, historical evidence.

## Introduction

Ahi Çelebi Mosque which is one of the oldest Ottoman buildings of İstanbul is located by Haliç Coast on Historical Peninsula. The building known also with the name Yoğurtçular Mosque does not have any building inscription, but it is supposed that it was built by Ahi Çelebi bin Kemal-üt Tabib who was head doctor of Fatih Sultan Mehmet towards the end of 15th century (1460-1499) (Ayvansarayi 1281, Ziya 1336, Topkaç 1992). The building making up the core of Ahi Çelebi Neighborhood established towards 15th century was registered as "cultural asset to be protected" in 1958, and was included in the scope of "1st group ancient work" in 1999. The mosque went through many reparations due to fires, earthquakes, and unfavorable ground conditions in Haliç coast, and came to be a special building reflecting different periods of Ottoman architecture.

## Architectural Features of the Mosque

The mosque is made up of a rectangular main space and the rear congregational area in front of this space (Fig. 1, Fig. 3). Wall thickness of the building having dimensions of 16.90x24.60 m. in the exterior varies between 1.00 and 1.50 m. The main space extended towards east and west with brick vaulted rectangular side volumes is covered with a pendentive dome having diameter of approximately 10.90 m. and height of 12.81 m. Four pointed arches carrying the main dome are located on adjacent footings on main walls in the directions of north and south, and located on independent footings in the east and west (Fig. 4, Fig. 5). The rear congregational area comprises of

six domes that arranged in two rows. Domes having diameters of 4.00 m. are located on pointed arches having thickness of 80-85 cm, and arches are carried by adjacent footings two of which are independent and others are adjacent to the wall (Fig. 6).

*Figure 1: General view of the Ahi Çelebi Mosque*

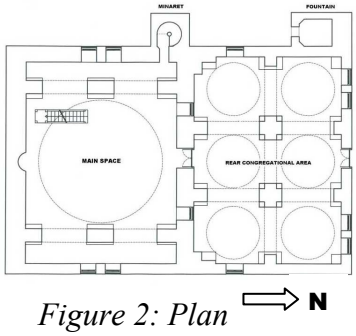


*Figure 2: Plan*

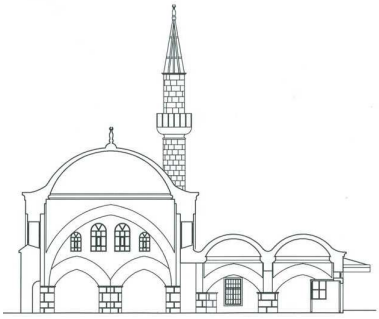

*Figure 3: Section*

*Figure 4: Main space*

*Figure 5: Side space*

*Figure 6: Rear congregational area*

Entrance of the mosque/north façade comprises of three pointed sections, and there are two windows in each side arch, and there is a marble frame entrance door in the middle (Fig. 7). There is a marbled fountain (1864) and its on a mortmain building on the northwest corner of entrance façade. A cistern adjacent to the mosque is located in eastern façade of the building, and there is a face stone minaret having single balcony/*şerefe* with inside entrance in western front of the building (Fig. 8, Fig. 9). It is seen that main dome has been supported with two buttresses on each corner of western and eastern fronts in the course of time. An inclined situation and disorders attract attention in the whole building due to the reparations and problems it has gone through.

*Figure 7: Entrance façade*

*Figure 8: Eastern façade*

*Figure 9: Southern and western façades*

It is seen that stones in very different types and dimensions were used in the building. Generally, white limestone /*küfeki* stone and white limestone were used in the main walls, and fire stone was used in frames, bottom and top caps of windows and doors. Alternating arrangement was formed by using rubble stones in the walls and row of bricks between pitch-faced stones. Lime plaster and khorasan mortars in different combinations relating to 17th, 18th and 19th century reparations and cement mortar used in 20th century reparations were encountered in the building (Topkaç 1992, Ersen and Gürdal 2004).

**Phases, problems and reparations of the building**

Approaches regarding different periods of the mosque burning, demolishing for many times and going through numberless reparations are as follows.

**15th Century** Even though planning scheme of the building -estimated to be constructed between the years 1460 and 1499- belonging to the period it was built firstly is not known , it is seen in İstanbul Miniature of Matrakçı Nasuh dated 1533-1536 that it had hipped roof and spiked eaves. Brick arched fixed windows closed in two sides of the mihrap have remained to the present time from this period of the building (Fig. 10, Fig. 11). In restitution suggestions prepared in 2004 in counseling of Kutgün Eyüpgiller, it is thought that the mosque comprised of a main space with wooden hipped roof, masonry wall and rectangular plan and an arched rear congregational area having three sections, and it had a minaret with exterior entrance adjacent to the western wall (Eyüpgiller 2004, Ersen et al. 2008).

**16th Century** It is supposed that the building suffering great damage in the earthquake in 1510 was repaired by Architect Hayrettin (Topkaç 1992). The building burning and collapsing in 1539 was repaired by Architect Sinan this time (Cezar 1963). In a gravure belonging to this period dated 1585, it is seen that the mosque comprised of a single dome main space and three dome rear congregational area. It is thought that in this reparation conducted by Architect Sinan, just main walls of the old building were used, middle space was covered with dome and sides were covered with vaults by attaching one footing for each of two sides of the space so as to cover rectangular plan main space with dome, and a three dome rear congregational area was formed in front of the main space (Eyüpgiller 2004, Ersen et al. 2008).

**17th Century** Even though it is mentioned that the mosque was demolished completely by burning in the fire breaking out in "Yemiş, Zindankapı and Hasır Port Regions" in 1652 (Naima 1969), traces belonging to 17th century in the building do not verify this view. It is thought that the building was impacted by this fire, but big changes and attachments were not made in its planning scheme (Cezar 1963).

**18th Century** It is thought that main dome was repaired, eastern and western façades were supported with buttresses, and a second rear congregational area was added to the mosque in 18th century (Eyüpgiller 2004, Ersen et al. 2008), (Fig. 12). It is supposed that iron tie systems in the building were added in this century considering the fact that metal connection elements such as wall brace and round fitting were started to be used in Ottoman buildings in 18th century (Fig. 13, Fig. 14). The building must have been impacted by the fire breaking out it its immediate surrounding in 1795 (Cezar 1963).

*Figure 10: Interior view*

*Figure 11: Window detail*

*Figure 12: The buttresses*

**19th Century** It is thought that the mosque may also have suffered damage in the fires breaking out in the immediate surrounding in the years 1818 and 1852 (Cezar 1963). The fountain dated 1864 located to the west of entrance façade may have been attached to the building in the reparations after these fires. The minaret was rebuilt, and rear congregational area gaps were filled by leaving spaces for door and window in these reparations. The building leaking water from the ground as it was located on made-up ground by Haliç Coast suffered great damage in the earthquake in 1894 (Ziya 1336). Since the building settled towards Haliç side after the earthquake, main walls of the building were braced with iron tie, windows were raised by filling them, oval

windows were opened in eastern and western façades of the main space, arches were attached to side volumes, masonry footings in main space and rear congregational area were mounted and iron bracing was made in dome basement (Topkaç 1992), (Fig. 15).

*Figure 13: Metal stretcher elements*

*Figure 14: Corner detail*

*Figure 15: Windows and iron braces*

**20th Century** The building was impacted by the construction of new Galata Bridge and excavation conducted within the scope of landscaping works in Haliç in 1980s; shakes occurring while driving in a stake during construction works caused cracks to emerge on walls of the mosque. Since the ground on which the mosque was located was made-up ground, differential settlements were formed on the footings carrying the arches on which domes were located, and bending and buckling emerged in ties binding arches to one another in the course of time (Sesigür et al. 2007). When damaged mosque started to slip towards Haliç by sinking into the ground, it was closed to worship.

Cracks emerging due to settlement and deformations were seen on dome, walls and carrying elements when plasters were removed and dome leads were disassembled in order to see the problems of the building with regard to restoration works in 1990. Ground strengthening works were started in 1991, but they were stopped due to monetary problems (Topkaç 1992). At the end of geophysical measurements and exploration drillings performed in 1993, it was realized that differential settlements occurring on bases of the mosque led to bending as well as cracks and openings in main walls in the eastern and western part and in dome and arches (Gözübol and Kipman 1993). In addition, it was seen that ground water was 7-10 cm beneath the slab level of the mosque and the mihrap wall drew capillary water from a water source located to the east of the building. Projects and technical reports of the building were prepared in 1995, and ground strengthening works were restarted. Strengthening works performed by means of micro pile method were stopped again due to monetary problems following the first phase at the end of 1997. Since structural problems increased due to Marmara earthquake in 1999, urgent reparation of the mosque came to the fore. Ground strengthening works were continued in 2000; sea water in the base level was evacuated; and it was seen via the conducted measurements that bending and settlement in the ground was stopped (KTVKK Archives 2001). Restoration project suggestion mosque to be protected in accordance with periodical features belonging to 19th century (current situation at the present time) was approved in 2004 and put into practice, and the restoration was completed in 2006 (KTVKK Archives 2004).

In the restoration, in the first place, made-up ground of the mosque was strengthened via micro piles, and sea level was evacuated through the pipes put in the base level. Operations of curetting, cleaning, partly reconstruction and integration were conducted in all of the façades (Fig. 16-Fig. 21). Structural cracks widespread in walls, main dome and rear congregational area domes were strengthened, and sutures losing their features were renewed (Fig. 22, Fig. 23). Capillary cracks on walls and domes were filled with mortar having physical features similar to the quality of original mortar through pressure injection. Wide cracks were filled via injection method after being planted, or they were disassembled regionally and bonded again (Sesigür and Çılı 2004). Non-utilizable fire/*od* stones in all of the walls were renewed, and stones and bricks not losing their features were used in their original places. Western façade of the narthex was disassembled, and its reconstruction was conducted with available materials and Pınarhisar stone (Ersen et al. 2008). The mosque and its

main dome were modeled via linear elastic three dimensional shell elements by means of SAP2000 software; 2 galvanized steel bearing arches were arranged in dome basement in the exterior in order to ensure general stability of dome in the main space; and it was determined at the end of elastic calculation that normal stresses in the dome decreased at the rates reaching 60% (Sesigür et al. 2007).

*Figure 16: Northern façade, before the last restoration*

*Figure 17: Northern façade, during the last restoration*

*Figure 18: Northern façade, after the last restoration*

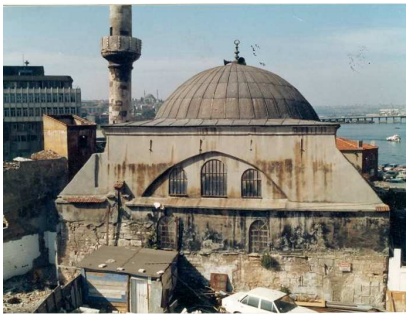

*Figure 19: Southern façade, before the last restoration*

*Figure 20: Southern façade, during the last restoration*

*Figure 21: Southern façade, after the last restoration*

Vault cover to the west of the main space was disassembled and rebuilt. Damaged lead and clay and straw plaster on main dome and rear congregational area domes were removed, and lead was covered via traditional method (Fig. 24). Arches and footings carrying the domes were strengthened, and buttresses supporting the walls were repaired. Corrosion cleaning was conducted in all of the iron components detected with corrosion in the building and in the façades as well as in wall braces, and iron component remaining inadequate since its sections lessened was changed. In the indoor, peeled plasters were renewed by dehumidifying the walls and dome, and hand-carved decorations were repaired in accordance with the motives emerging out of rubber. Since the stem of the minaret (from stand until the balcony space) slipped from its axis 22 cm towards sea and there were deformations in the stones, the minaret was disassembled until the level +5.40m and repaired via original material in accordance with its original (Fig. 25). The fountain was repaired and the mortmain on the fountain was covered with tiles.

*Figure 22: Western façade, before the restoration*

*Figure 23: Same façade, after the restoration*

*Figure 24: Covering the dome with lead*

*Figure 25: Minaret, after the restoration*

## Conclusion

Ahi Çelebi Mosque at the age of 500 has a great importance in the sense that it is one of the first mosques Ottomans built in İstanbul. In addition to its historical value, the building has a distinctive importance also because of the fact that Evliya Çelebi -famous Turkish traveler living in 17th century- he saw himself in this mosque and started his travels. 500 years original function of the mosque going through various interferences in the historical process and carrying the appurtenances of different periods on it continues at the present time, as well.

Since construction technology was not developed in Republic period reparations conducted with the aim of protecting the building, ground and humidity problems of the building could not be solved, and the use of cement increased destruction. In the last restoration implementation of the building conducted under the control of expert people and institutions in the years 2004-2006, it was firstly aimed at strengthening the building via modern techniques and materials and eliminating the problems of ground and humidity. In this reparation, protection of all traces and features of the building relating to different periods reaching the present time was adopted as a principle and implemented. In other words, criterion of protection of inclusions carrying the value of historical document rather than aesthetical integrity was given particular importance. Despite all these positive aspects, there are certain points going wrong in the last restoration implementation. The fact that plasters in indoors peel off indicates that humidity problem deriving from ground water of the building continues at the present time. "Principle of readability of periodical traces" implemented in façades of the building was not implemented within the building. Plastering indoors entirely impacts the readability of the building, and makes it difficult to understand different periods. Stone material chosen for completion in the façades does not comply with original material of the building, and leads to complication particularly in the eastern façade.

Finally, Ahi Çelebi Mosque succeeding in surviving for a long time and one of the oldest mosques of İstanbul was repaired by protecting its original appurtenances and brought in İstanbul, in spite of a couple of negative points.

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