

Istanbul – Fatih, Millet Library / Feyzullah Efendi Madrasah restoration

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ABSTRACT: The Feyzullah Efendi Madrasah, built in Fatih, Istanbul in 1700, is a small complex with a library, school, fountain for ablutions and two other fountains. In the 1999 earthquake, the madrasah was severely damaged and cracks appeared in its foundation, main walls and domes. The restoration of the building was carried out between 2000 and 2007, the ground under the building was firmed up, foundations, domes and walls were consolidated, the cracks in the walls and domes were stiffened using an injection method. This complex was used first as a madrasah / faculty and then as a library. In this paper, the damage caused by the earthquake and the problems of the new function given to the building is investigated. As for the restoration, the repair methods to be applied were examined while estimating to what extent the historical value of the building was preserved.

1 INTRODUCTION

The Feyzullah Efendi Madrasah in the Sofular quarter of Istanbul’s Fatih District is at the intersection of Macar Kardeşler Street and Feyzi Pasha Street (Figure 1). In 1700 it was built as a Daru’l Hadis / Hadith Sciences Faculty by Şeyhülislam Seyyid Feyzullah Efendi, the teacher of Sultan Mustafa II. This small complex was made up of the madrasah, library, school, fountain for ablutions and two other fountains and the architect of the it is unknown. The school was pulled down during town planning works in 1912 (Ahunbay, 1994).

The Feyzullah Efendi Medrese was converted into a library with the donation in 1916 of the historian and

librarian Ali Emiri’s book collection that was mostly composed of handwritten manuscripts and began to provide services as the “Public Library.” In 1993, it gained the identity of a research library. The library was enriched over time and now there are nearly 70,000 Ottoman language books, both handwritten and printed. The only handwritten copy of the book “Divan-ı Lügat’üt Türk,” the oldest known Turkish dictionary, by Kaşgarlı Mahmut is held in this library.

The complex was registered as “a cultural property that has to be protected” in 1995 and in 2001 was taken under the category “No. 1 Group Old Work”. Today it continues its function of being a library under the administration of the Culture Ministry, Libraries General Directorate.



Figure 1. Millet Library, Macar Kardeşler facade of the main building, 2007.

2 ARCHITECTURAL CHARACTERISTICS

The Feyzullah Efendi Complex consists of two separate buildings on the sides of a rectangular courtyard (Figure 2). The main building borders the northeast side of the courtyard and the madrasah building borders the southeast and southwest sides of the courtyard. The main building is separated into education and worship functions and the madrasah rooms are assigned as student accommodation.

The main building that sits on a low basement consists of a classroom/small mosque and library that are located on both sides of the entrance like an iwan (it is a half open space that the courtyard side is open) in the middle (Figures 3 and 4). On the open side of the rectangular iwan that provides the connection with



Figure 2. A general view of the Millet Library (Archive of the Protection Council of the Natural and Cultural Properties).



Figure 3. Entrance facade of the main building, 2007.

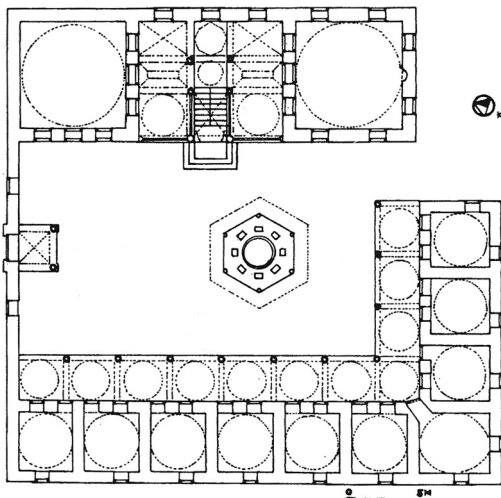


Figure 4. Millet Library, plan (Ahunbay, 1994).



Figure 5. A view towards the "mihrap" of the mosque, main building, 2007.

the courtyard is a staircase with 11 steps. Together with the classroom / mosque and the library, in the same dimensions there were square planned spaces (Figure 5). These spaces are covered with domes each with pendentives 7.5 meters in width and 1.40 meters in height. As for the entrance / iwan, there is a complicated covering made up of domes and different vaults that sits on six columns and the walls. Above of the staircase is covered with a cross vault, in front of the classroom / mosque and library with the mirror vaults and the parts that overlook the courtyard are covered with domes with pendentives (Figure 6). The covering of the north part of the iwan that is open to the street has three windows and is organized as a dome in the center and two cross vaults on the sides. In the center of the iwan is a conical dome with a stalactite (Ahunbay, 1994), (Figure 7).

The madrasah building with its "L" shaped plan is made up of 10 square medrese rooms and in front of the rooms is a half-open portico/revak section (Figure 8). In the façade of the madrasah complex that faces Feyzullah Pasha Street, there are the entrance door into the courtyard of the complex and two fountains. There is an inscription above the entrance door to the courtyard with a segmental arch and dome. Today, because the level of Feyzullah Pasha Street has been raised, the fountains and the courtyard's entrance door have



Figure 6. A view from the “eyvan”, main building, 2007.



Figure 7. In the center of the “eyvan”, a dome with stalactite, 2007.

remained in a hole. In the courtyard, there is hexagonal fountain for ablutions / şadırvan with a marble reservoir with a wooden dome supported by six marble columns and a well made from limestone/küfeki. The facades of the buildings that make up the complex are dominated by almaşık wall mesh that is made of rough stone and brick in turns but in some places the cut stone wall mesh can be seen. The almaşık



Figure 8. A view of the courtyard, “şadırvan” and madrasah, 2007.

walls of the main building were built with painstaking workmanship according to the almaşık walls of the madrasah building. The brick domes are covered with lead sheets.

3 REPAIRS THAT THE COMPLEX HAVE UNDERGONE

The complex was affected by the earthquakes, fires and town planning works that Istanbul has experienced since the 18th century (especially the 1894 earthquake) and therefore, it has been repaired at various times. Certain information about these repairs could not be obtained. However, in 1911, it is said that the water system was repaired and, in 1913, the lead sheets were replaced. The school building found inside the complex was pulled down in 1912. Demolishing the madrasah building that was in ruins in 1914 was considered (Kütükoğlu, 2000). However, through the efforts of the wife of the French ambassador, who was a member of the Commission for the Protection of Ancient Works, this proposal was abandoned. Following the librarian Ali Emiri donating his collection, the madrasah complex was repaired in 1916 and turned into a library (Ahunbay, 1994, Kütükoğlu, 2000). After this date there are no records of any further restoration work. However, in 1983 some basic repairs were made and the courtyard entrance that had been closed for years was again made functional (Ahunbay, 1994).

On 17 August 1999 during the Marmara earthquake the complex suffered significant damage and became unusable. This complex that was providing services under the name of the Millet Library and was attached to the Culture Ministry was closed and repair work was begun in 2000.



Figure 9. The dome crack of the main building, before restoration (Archive of the Istanbul Survey and Monuments Directorate).

4 DAMAGE/PROBLEMS CREATED IN THE MADRASAH AFTER THE 1999 EARTHQUAKE

The Marmara earthquake resulted in significant damage to the building. In both structures consisting of masonry walls, a series of cracks and deformations in the surface materials were seen. Removing the plaster from the surface of the buildings, revealed deep cracks in the arches, domes and in the bearer walls, particularly in the madrasah building, this damage was determined to negatively affect the support system, and the bearer walls had moved from their plane (Akcan, 2001), (Figure 9). Also it was determined that these cracks in the walls and domes might possibly extend as the foundations (Akcan, 2001).

In addition to the earthquake damage, there were areas of discoloration on the marble surfaces resulting from the effects of air pollution and the salts that may or may not be soluble. The paintings within the domes were damaged by exposure to moisture. repair work was begun in 2000.

5 RESTORATION METHODS

Under the supervision of the Culture Ministry's Istanbul Survey and Monuments Directorate, the Fatih Millet Library repair was carried out by the Ak-Alay Construction Company, beginning with the madrasah building in December 2000. The restoration work begun in 2000 was completed in 2007. It was aimed to re-open the complex for service with all kinds equipment such as heat, moisture, security, fire, etc. in 2008 as the "Research and Specialization Library."

5.1 Problems that appeared during restoration

In the consolidation project it was envisioned that first the ground would be firmed and the repair started from



Figure 10. The consolidation method of bar-mat on the dome, main building, restoration stage.

the madrasah building. The foundations, walls, domes and portico arches of the badly damaged building were strengthened with metal construction reinforcement and the foundations were converted into a raft foundation system (Figure 10). However, the dimensions and places of the material that the metal construction would create and the relations with the main walls were not clarified and the behavior of this system in future earthquakes was not investigated (Ahunbay, 2001). The plaster at the repair stage while being rasps, the cracks which occurred in the dome and walls were investigated; however, it was not investigated whether or not the historical value of the plaster would carry them. In addition the wooden posts that carried the temporary roof constructed to protect the building were seated without taking into account any measures for cracks (Ahunbay, 2001) and this was one reason why the damage to the building increased.

In 2002 the repair of the madrasah building was mostly finished; however, the fine construction works and the floor coverings were yet to be completed. As for the main building only the firming of the soil had been carried out. The Protection Commission requested a statement outlining whether it was possible to strengthen and reinforce the building using traditional methods and materials, apart from the metal reinforcement method suggested in the project. Therefore, a group of restoration experts from Mimar Sinan University examined the building and prepared a report which stated that *"the main building has characteristics that differ from those of the madrasah building such as architectural elements, height, the place sunk into the floor, the delicacy coefficient (the building height that is on the short side of the plan of the building). Also, because of the large number of decorations in the main building, it must be repaired with a different method from that used in the madrasah. Determining what is necessary in what dimensions for the metal reinforcement, there must be a scientific investigation into whether or not the characteristics of the binding mortar would be lost."* Following the report, a three-dimensional finite-element model was created by the



Figure 11. The application of the raft foundation for madrasah.

University team. Static and dynamic analysis of the F-E model showed that undesirable tensile stresses were happened in the building and that the tensile limit values were exceeded. Since the applications could not be carried out to strengthen and stiffen the building with special construction and materials it was noted that the use of steel material as reinforcement was appropriate (Eriç, 2002). However despite this recommendation, the Protection Commission reached the conclusion that the main building should be repaired using traditional methods.

5.2 Work done on the levels of restoration

The restoration work as noted above began first on the madrasah part. During the restoration work the soil was firmed up with the injection method cement and the foundations were consolidated and the cracks present in the supporting walls and domes were repaired in the main building and the madrasah. The façade was cleaned, the lead roof covering was replaced and the damage to the inner space decorations, including the paintings and the golden leaf, was repaired.

Foundation strengthening: The foundations of the madrasah building and the main building were strengthened using stainless steel. The floors of the madrasah rooms were dug down nearly 3.50 meters before cement was poured on the holes in order while the hardcore layer, rubble concrete and iron reinforcing bars was put in place (Figure 11). So it was provided that the madrasah rooms would sit on a raft foundation extending nearly 2.00 meters below and 1.50 meters above the surface level.

Strengthening the walls, arches and domes: Splicing was applied to the cracks on the walls and domes of the madrasah rooms and on the portico arches and domes. At the same time strengthening work was undertaken with the injection method (Figure 12). In this method, the cracks are filled by injecting into the cracks a grout made of brick powder, limestone/küfeki powder, marble powder, sand and hydraulic lime. To further stabilize the structure, injection holes 24 mm



Figure 12. Injection method for the consolidation of the cracks, restoration stage (Archive of the İstanbul Survey and Monuments Directorate).

in diameter were opened at a depth of 20–50 cm in the masonry wall surface at intervals on average every 50 cm. and in the brick domes on an average of 20 cm; the domes and walls were stabilized as the injected grout was pumped through these holes.

In the damaged walls of the madrasah building, in the portico arches and domes, a metal construction was used, consisting of hoops and sashes (Figure 13). In this application in order for there to be the perpendicular elements within and without, they were placed in the masonry walls, tying each one to the other at specific intervals. The channels opened in the walls of the madrasah rooms while NPU 120 profiles were being mounted were surrounded with thin plates and while the steel matting was being laid the walls were strengthened. In the repair of the damaged domes, metal elements were aligned horizontally and perpendicularly on interior and exterior surfaces of the domes. The madrasah and portico domes and the arches that carried the domes were strengthened with steel matting that was laid inside and outside.

Strengthening the stones and joints : After it was demonstrated that the main walls of the main building had been damaged, they were strengthened in part by filling the cracks with an injected grout. Prior to this work being carried out, a portion of the stones that were damaged were removed and the missing parts

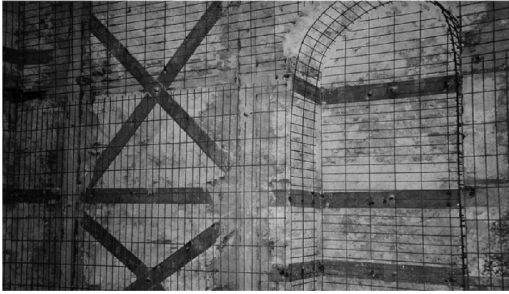


Figure 13. The application of NPU 120 profiles of the madrasah walls, restoration stage.



Figure 14. The application of bar-mat on the madrasah walls, restoration stage.

were reconstructed using new stones. Khorasan mortar was used in the joint intervals (Figure 14).

Strengthening the spike eaves/brick eaves : The spike eaves that had broken loose or rotted were removed. That is the bricks that were necessary for the spike eaves were obtained by putting Khorasan mortar in rectangular molds $5 \times 15 \times 30$ cm and drying them under the sun. The new bricks were mounted with the help of the Khorasan mortar.

Lead covering: In order to replace the lead plate, the previous lead covering had to be removed. Following



Figure 15. Laying of the lead boards on the dome, restoration stage (Archive of The Protection Council of the Natural and Cultural Properties).

the work of strengthening the domes and renewing the spike eaves, a mud mortar made of soil, hay and water was spread over the brick dome was spread over the dome 5 cm thick, providing heat insulation and protecting the lead plates. After the mud plaster had dried, the new lead plates were installed, covering the brick dome, beginning at the edge of the dome and extending up to the finials on the top (Figure 15).

Marble cleaning: First the dirt on the surface of the marble was softened using a water gun and paper dough, prepared with ammonia bicarbonate, was applied over a softened plate. In order to minimize the air contact with the chemical it was sealed with a gelatin covering before the cleaning work was completed with brush and water. The ammonia bicarbonate was re-applied locally on any badly soiled sections.

Painting Repair: All the painted decorations on the walls of the main building, on the domes and vaults were repaired in accordance with the data obtained from the research. After the existing decorations were documented with photographs, rasp work was carried out in order to reveal the main motifs (Figure 16). Following the rasp work the main motifs were found beneath 6–8 layers of dye and these motifs were transferred to translucent paper. The original designs on the surfaces that had earlier been strengthened and plastered with a lime based mortar were transferred back by means of opening holes with a needle and closing them up with coal powder. These designs were then colored with metal oxide paints.

6 CONCLUSIONS

Feyzullah Efendi Madrasah is a small complex of international significance that has survived until the present day. In the repair of this complex the application of a “consolidation” method that is a minimal intervention, has yielded positive results. For consolidation



Figure 16. Detail of a main motif, before painting repair (Archive of the İstanbul Survey and Monuments Directorate).

in the main building, traditional methods and materials were used and, in the madrasah building, steel and concrete were used. The new materials used were concealed within the bearer walls and the plaster. It could not be escaped that the structural fabric of the building that had been damaged in earthquakes, and still could be, had to be strengthened using materials and methods. In addition, concealing the intervention provided integrity to the restoration. However, in restorations of this type, priority has to be given to methods that will result in the least damage to the building. In strengthening the madrasah building, the dimensions and places of the materials that were to make up the metal construction did not clarify the relations between the main walls. Also, the approach paid insufficient attention to protecting its inherent value, such as authenticity and historical evidence. The repair of the main building was carried out with greater care through the pressure of the Protection Commission and the decorations on the inner spaces in particular were protected as a valuable historical document for the structure and the paintings were repaired with painstaking care.

Protecting historical buildings and giving them a new function is a complex challenge. The new function must not destroy the mass and spatial integrity of the old structure. The arrangements to be made and the new materials to be used must meet modern standards. The new function must protect and enrich the old building's spatial quality. There is no role in the modern educational system for the Feyzullah Efendi Medrese's educational function from the Ottoman period. Therefore a change in function was

made and it was seen as appropriate that the building should continue its library function that it has fulfilled since 1916. The main library building was separated from the collection of historical handwritten books and resident research experts; the madrasah rooms have been designated for administration and as a book depot; and the portico section for reference readers and visiting researchers. The facades that overlook the courtyard of the portico section of madrasah and the iwan in the main building were enclosed in order to gain enclosed space and because of the difficulty of walking in the half-enclosed areas they were enclosed with glass panes in aluminum frames. In addition the portico section was sectioned off with glass framed with aluminum again to create the reading room. Due to these changes the main form of the madrasah with the closed space/ the room-half open space/ the portico and courtyard/open space relationship was spoiled. Using the madrasah rooms for a book depot is also not the correct approach to maintaining the spatial quality of the original layout.

In conclusion the new function given to the building is a burden on it and detracts from the spatial integrity of the historic building. In this building the museum function is a usage that is more appropriate and does not spoil the basic form. However, despite these issues, what is pleasing is that the window borders are partially concealed in the back of the arch and the tie rods, using glass panes in the undivided and allowing these additions to be distinguished and removed.

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