1989 Technical Review Summary
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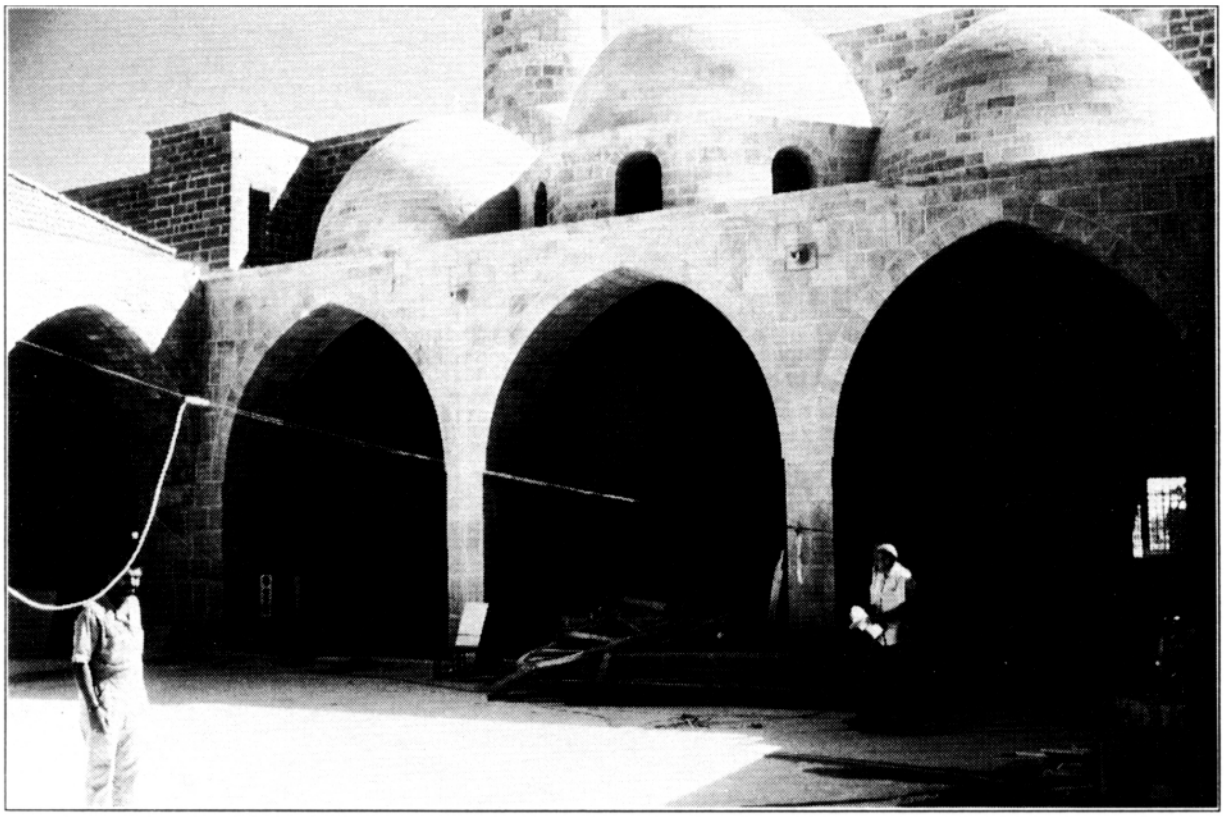
Restoration of the Great Omari Mosque

Sidon, Lebanon



Architect
Saleh Lamei Mostafa
Cairo, Egypt

Client
His Eminence the Mufti of Sidon & Southern Lebanon
Sidon, Lebanon

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Preliminary Remarks

Due to the prevailing war situation in Lebanon, it was not possible to go to Sidon to make an on-site survey of the Great Omari Mosque. However, an interview with the architect in charge of the restoration, Prof. Dr. Saleh Lamei Mostafa, was conducted in Cairo, benefiting from the fact that the latter lives there. The following report is based on his explanations on drawings and photographs, on a monograph about the restoration prepared by him in 1985 and on the architect's and client's records submitted to the Award. Consequently, this report does not exactly conform to the format and it should be evaluated within the limitations of the above-mentioned circumstances.

I. Introduction

The Great Mosque or al-Omari Mosque, lying on a height overlooking the Mediterranean sea to the west of the old city of Sidon, was founded by the Bahri Mameluks in the last decade of the 13th century, on the remains of a fortress erected during the preceding Crusaders' rule. The building features architectural elements of both Romanesque and Gothic styles as well as some dating to late Ottoman interventions. This is the oldest standing mosque in Sidon and it was severely damaged by bombing and gunfire during the Israeli invasion of Lebanon in 1982. Its restoration, which was solicited by the local community, proceeded under Israeli occupation and embodies the political resistance of the people.

II. Context

a. *Historical Background*

Sidon

Located some 45 km south of Beirut along the Mediterranean Sea, Sidon was a significant Phoenician port. The city was exposed to destructive attacks several times throughout, its history at the hands of the Assyrians and Persians. It later came under Greek and Roman rule and suffered two earthquakes in 551 and 573. Islam was introduced to Sidon in 636-37. The crusaders took the city in 1100 and it changed hands between Muslims and Crusaders numerous times until 1260 when a Mongol raid eradicated Sidon. The city was then again ruled by the Knights of the Hospitallers Order. During the reign of Sultan Nasir Mohammad ibn Qala'un, the Bahri Mameluks invaded the city in 1921. Muslim domination continued under Ottoman rule which lasted until World War I.

The Great Omari Mosque

The structure preceding that of the Great Mosque, on top of which the latter was built, dates back to the last period of Crusader rule in Sidon, following the Mongol raid (1260-1291). Built as a fortress, the structure encompassed residences a chapel, a refectory, stables and service areas. Immediately after the Mameluk reign commenced in 1291, the part of the construction which was probably the refectory was converted into a mosque and called "al-Omari" in tribute to Omar ibn al-Khattab. Not much remains of the previous structure except some walls and building elements in the prayer hall and northern *riwaq*, such as the buttresses on the south façade, a few pointed arches and the rib vault of the northern *riwaq*.

In a book written during the early 18th century, one of the earliest to cite the Mosque, al-Nabulsi mentions a fountain with a dome in the courtyard. The building suffered damages caused by sea-storms in 1820, by an earthquake in 1837 and by the bombing of the British-Austrian fleet in 1840. Repairs were carried out in 1870 (undertaken by Khediv Ismail Pasha's mother) and again in 1895. The former intervention accounts for changes observed on courses of stone, the two small buttresses added to the south façade to make way for two *mihrabs*, the modifications of window openings and the reconstruction of the vaults of the prayer room. The three domes of the southern *riwaq* and the doorway to the courtyard on the east are attributed to the repairs of 1895. The ablution fountain mentioned by al-Nabulsi probably disappeared during these works. The minaret is believed to be earlier and, on stylistic grounds it could be attributed to the building period of 1848-49. The last restoration of the Mosque was undertaken in 1979 when reinforced concrete roofs were built over the prayer room and the western *riwaq*.

In 1982, Israeli shelling and gunfire caused parts of the Mosque to collapse while other parts were severely damaged.

b. Climatic Conditions

The climate is mild, temperatures ranging between a maximum of 34°C in July and 10°C in January. Rain falls mostly in winter, from November to April while humidity rises during summer months, from July to September.

c. Immediate Surroundings

A street runs along the seaside on the west side of the Great Mosque and, on the south, there is a hill. The Mosque is surrounded by a densely populated area on its other two sides, mainly constituted of houses, a school and a bath. The main access is from the north, through a lane which leads from the bath to the small square in front of the entrance. A second and more recent entrance is from a passage that connects Zahr al-Amir street to the doorway on the eastern *riwaq*. The Mosque, sitting on an elevated terrain, is a dominant feature of the city.

d. Topography

The Great Mosque is built on top of the highest plateau of the old city, which slopes down steeply towards the sea-front on the west. Soil investigations revealed that the part of the "hill" overlooking the sea and on which the western *riwaq* of the Mosque sits is not natural but artificial.

III. Description

a. Background of Project

The Great Omari Mosque became the main target of Israeli gunfire from the sea as well as shelling and consequently suffered great damage because it was the main centre of resistance against the occupation of Sidon. Most demonstrations started there and also guns were kept in the building.

Following the destruction of the Mosque, Mr. Rafic al-Hariri, a native of Sidon living and working in Saudi Arabia, offered to build a new mosque for the city. However, the community expressed the desire to have the Great Mosque rebuilt and restored rather than to acquire a new place of worship and gathering. Thus, the preparation of a restoration project was entrusted to

Prof. Dr. Lamei Mostafa and work commenced immediately after its approval by the Lebanese Antiquities Organisation and the Islamic Awqaf Department in Sidon. The construction company Oger Liban owned by Mr. Hariri, provided the co-ordination.

Photographs and measured drawings made 5 years earlier by the architect and his students at the University proved to be of invaluable help during the restoration process.

b. *Objectives*

- The provision of urgent measures to prevent the total collapse of remaining parts of the Mosque.

- The reconstruction of the parts that suffered total destruction according to documents and studies of existing material as well as the consolidation of damaged areas in order to bring the Mosque to its former state.

- The revitalisation of traditional building crafts.

c. *Functional Requirements*

The restoration aims at restoring the Great Mosque to its function as the major "Friday mosque" of Sidon that also provides the local community with its principal place of social and political gathering and religious learning.

d. *Building Data*

The rectangular prayer hall is preceded by a central courtyard which, in turn, is surrounded by *riwaqs* on four sides. The building rises on retaining walls on the west and south. The prayer hall is covered by four cross-vaults that spring from the walls and are supported by exterior buttresses.

The western *riwaq*, which is deeper than the others, is covered by a pitched roof. The *riwaqs* on the remaining sides have cross-vaults over pointed arches which are supported by piers - only the central part of the southern *riwaq* is covered by three domes. The minaret is situated in the middle of the northern wall of the prayer hall.

The total ground floor area is 1'500 sq m. The total site area is 1'975 sq m.

e. *Structure, Materials, Technology*

Damage and Deterioration

Factors causing damage to the building in the short and long terms can be divided into three categories.

- *Destruction due to Israeli firing*

  Part of the vaulting of the prayer hall, its northern wall, the southern *riwaq* in front of it with its three domes and the pitched roof of the western *riwaq* totally collapsed. The minaret, which was a later addition, was separated from the wall, longitudinal cracks were formed and its stones fell. The southern and western façades presented numerous deep cracks and holes were opened in the walls. The hill itself was split due to the impact of the shelling.

Deterioration due to environmental factors

The Mosque, being located on the sea shore, was continuously exposed to winds carrying salt and sand which damaged the exterior surface of stones especially on the western façade.

The area being densely populated, especially in the north, leakage from the sewer system caused water infiltration. The lack of maintenance of the roof also resulted in permanent dampness. Masonry, mortar and plaster were affected; fungi developed and the wrought iron rings in the body of the minaret started to corrode.

Changes in temperature, especially diurnal extremes, resulted in the formation of fissures.

- *Damage due to the use of cement and concrete in previous interventions*

The incompatibility of cement mortar with traditional materials in terms of expansion coefficient, porosity and hardness in addition to the harmful salts it contains weakened the original fabric where the two materials met. Reinforced concrete roofs installed during the previous restoration on top of stone vaulting were not suitable in the prevailing climatic conditions while they also caused an increase of load on the original structure.

Intervention

- Consolidation to prevent total collapse; erection of scaffolding; documentation through measured drawings and photographs of the original building fabric (to distinguish reconstructed parts); investigation of the structural condition of the building to determine necessary interventions; analyses of soil, stone and mortar preceded the actual restoration work.

- The walls, piers, arches, vaults, domes and roof that had been destroyed were rebuilt, relying on former documentation and remaining materials. The stones belonging to the upper cylindrical part of the minaret were numbered, dismantled, placed in rows on the roof of the eastern *riwaq* and then reconstructed. The cleavage of the hill on which the Mosque stands was filled.

- The structure was reinforced where small cracks weakened it. Vaulting was covered with a damp-proofing mortar after concrete was removed.

- Salt accretions, fungi and dust were cleaned.

- Cement mosaic tiles of a late repair phase were replaced by a marble pavement recreating simple geometrical design in the prayer hall.

- Wooden doors and shutters, gypsum lattice windows with coloured glass and metal lattices for lower windows were made. Chandeliers and lanterns were manufactured according to prepared designs.

Materials

The Mosque is almost entirely constructed with sandstone and a mortar consisting of lime and sand. Some Ottoman works reveal the use of "black pan mortar", made of lime, mud and ash, especially utilised against humidity. Limestone is used as infill material.

All the building materials are local: sandstone comes from Qasimiya near the southern border, limestone from Marwatiya, 15 km south of Sidon, lime, clay and ashes (from burning lime) from villages nearby. The stone walls of the Crusader period are identifiable by the finely cut blocks with narrow joints.

During the restoration, stones found on the site were re-used. When they had to be replaced, stone was collected from old buildings in the area. Only a few large pieces such as lintels and drainspouts were made out of new stone, worked with a hammer and chisel. Mortar analyses were made (at the University laboratories in Beirut) and mortar samples were prepared and left to weather. A mixture of lime, clay and ash was finally employed. Kaolin was added for flexibility in instances of expansion and contraction due to temperature changes. Over the vaulting, an infill of lime, gypsum, ash and coarse sand was placed with a layer of gravel on top.

Epoxy resin mixed with sand was used to fill cracks, and steel bars were placed for reinforcement. An iron anchorage covered with lead to avoid corrosion, was introduced in the minaret.

The cleavage in the hill was filled with a mixture of lime, gypsum, ash and sand. The foundations adjacent to the southern façade were consolidated and a reinforced concrete retaining wall was built to support the soil.

Techniques

Entirely traditional techniques were employed for the reconstruction of collapsed or dismantled walls, arches, vaults and domes. The building crafts had to be revived and learned - such as the production of wooden shuttering for domes and vaults; these sometimes had to be remade 4-5 times until they "almost attained furniture quality".

Damaged walls were consolidated with epoxy resin injections and grouting. The former was also utilised to provide a damp-proof course.

The stone was cleaned with brushes and potable water. No chemicals or mechanical devices were used. However, detailed recommendations were specified for the maintenance of the building; these include materials such as a specific soap for cleaning, formaline against fungi and Paraloid for the infill of cracks.

Wooden shutters for windows were made of *katrani* pine, collected from old buildings and made according to the designs found on existing doors. Mouldings and examples of gypsum window lattices were manufactured in Egypt, then identical ones were produced on the site.

f. Origin of Technology, Materials, Expertise

Traditional construction methods were used along with contemporary restoration techniques, the former mainly for rebuilding and the latter for the consolidation of the existing parts whose duration demanded elaborated technology. However, both had to be taught - old building crafts were almost forgotten and modern technology was new.

An average of 75 workers constituted the labour force. Druze, Sunni Muslims and Christians, some brought from the mountain villages, worked together. The Christians later had to leave Sidon.

The architects, civil engineers, contractor and consultant were all local professionals. The architects were all former students of Prof. Dr. Saleh Lamei Mostafa and the Great Mosque restoration was their first experience. (They laughed and said everything would fall apart by the next winter when he started talking about lime and clay.)

Prof. Lamei Mostafa was trained in architectural restoration at Aachen University in West Germany.

IV. Construction Schedule and Costs

a. *History of Project*

The preliminary studies and documentation, the urgent measures taken to prevent further collapse of the building and the preparation of the restoration project commenced simultaneously in February 1983. The design phase was completed in November but actual restoration work had already started in July. The restoration project was completed by January 1986 and the Great Mosque was inaugurated on February 21, 1986.

b. *Total Costs and Finance*

The total cost of the restoration was 7'000'000 Lebanese Liras (approximately US$ 274'000). The entire budget was a donation by Mr. Rafic al-Hariri.

The cost of the restoration proved to be much higher than anticipated because of the high inflation rate and difficult economic conditions under occupation. Even ash, otherwise, not utilised, was bought at exorbitant prices. The chandeliers of the prayer hall would have cost US$ 20'000 each in Lebanon. They were consequently manufactured in Egypt for US$ 2'500 each.

Another reason for higher expenses was that the structural condition of the building was found to be more serious at closer inspection, after the scaffolding was put up than at first sight.

V. Technical Assessment

a. *Functional Assessment*

No functional modification was foreseen by the restoration project. So, the Great Omari Mosque went back to its former use as the oldest and largest mosque of Sidon. As before, it is the Friday mosque (special religious occasions are celebrated there) and it also houses political gatherings, social meetings, religious lectures as well as students of the adjacent school who come to study there to benefit from free electricity, etc. According to the architect, "the true function of the mosque in Islam is revived" there.

VI. Users

The entire Muslim community of Sidon uses the Mosque for religious functions or for purposes cited above.

VII. Persons Involved

a. *Client*

The Department of Islamic Awqaf in Sidon.

His Eminence the Mufti of Sidon and Southern Lebanon represents the body in charge and owner of the Mosque.

b. Financier

Mr. Rafic al-Hariri, a private entrepreneur who donated the sum necessary for the restoration. His agent was the director of his company Oger Liban, Mr. K. Darghouth.

c. Architect

Prof. Dr. Saleh Lamei Mostafa.

Responsible for the entire project and its execution, he was at the time teaching at the university. Currently, he works in Egypt, heading his own private company, the Centre of Islamic Architectural Heritage in Cairo, preparing restoration projects mainly for the Egyptian Antiquities Organisation and working as a consultant for them.

d. Consultant

Fouad Arnaot, geo-technical engineer who made the soil analyses.

e. Contractor

Abdel Wahed Shehab, also an architect.

Farid al-Hakim, in charge of all workers on the site.

Besides the contractor himself, 2 other architects and 2 civil engineers worked on the restoration. There were also 2 architects from Oger Liban, who later worked on the restoration of a 16th century palace and a *khan*; however, the restoration principles and techniques adopted were not similar to those of the Great Mosque.

Nur Altinyildiz
Istanbul, 15 May 1989